worker shall be examined at regular intervals to determine his fitness to continue work in compressed air. The interval between regular examinations shall not exceed 2 months when work pressures are 13 pounds or less. For pressures exceeding 13 pounds, the regular periodic examination shall be made at intervals not exceeding one month. [Rules (Part XX C), filed 12/28/62; § 23, filed 3/23/60.]

WAC 296-36-265 Routine examination of employees——Resumption of work. (1) Every compressed air worker who has been absent from the job 10 days or more shall be examined by the physician before resuming work. The physician's findings shall be submitted in writing to the person in charge and shall be kept on the job.

(2) Any workman who is suffering from a cold in the head, a sore throat, ear ache, or any other ailment which is likely to render him unfit for employment in compressed air shall report the matter to his employer or to the person placed in charge of the operation or to the appointed physician, and he shall not be employed in compressed air until he has since, so reporting, been examined by the appointed physician and certified by him to be fit for such employment.

(3) The appointed physician may, on examining or reexamining a person who has been or who is proposed to be employed in compressed air, vary, qualify, or revoke, by written entry in the workman's certificate, any statement relative to his fitness for employment in compressed air. By the same process, the physician may limit the pressure to which the workman is to be subjected or restrict the hours of employment or exposure in compressed air. [Rules (Part XX D), filed 12/28/62; § 23, filed 3/23/60.]

WAC 296-36-270 Routine examination of employees——Physical fitness requirements. (1) Only persons who are able to readily equalize the pressure in their ears shall be accepted for work in compressed air.

(2) Persons having chronic alcoholism shall not be permitted to work in compressed air.

(3) Persons having chronic systemic disease or any impairing physical deformity or abnormality including excessive obesity shall not be engaged for work in compressed air.

(4) Persons having any disease of the ear or any systemic disease including skeletal, cardio-vascular, respiratory, genital urinary, or gastrointestinal, which may be aggravated by work in compressed air or which may prevent safe performance of such work, shall not be permitted to work in compressed air.

(5) A person engaged for work in compressed air shall demonstrate his ability to read, speak and comprehend the English language. [Rules (Part XX E), filed 12/28/62.]

WAC 296-36-990 Severability. If any provision of this safety standard or the application thereof to any person or circumstance is held invalid, such invalidity shall not affect other provisions or applications of this safety standard which can be given effect without the invalid provisions or applications and to this end the provision of this safety standard are declared to be severable. [Rules (Part XXI), filed 12/28/62.]

Chapter 296-37 WAC
STANDARDS FOR COMMERCIAL DIVING OPERATIONS

WAC

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Reviser's note: The National Electric Code 1968, A U.S.A. Standard, NFPA No. 70-1968 USAC C1-1968 referred to in this chapter was filed in the office of the code reviser on February 28, 1969, to become effective April 1, 1969.

DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

296-37-010 Scope and application. [Section I, effective 2/1/64.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.

296-37-020 Purpose. [Section II, effective 2/1/64.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.

296-37-030 Definitions. [Section III, effective 2/1/64.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.

296-37-040 Appointment and duties of committees. [Section IV, effective 2/1/64.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17-.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.

296-37-050 Classification of apparatus permitted and air purity. [Section V, effective 2/1/64.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17.050, 49.17.240, and chapters 42-.30 and 43.22 RCW.

296-37-060 Approval of equipment. [Section VI, effective 2/1/64.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17-.050, 49.17.240, and chapters 42.30 and 43.22 RCW.

296-37-070 Diver registration—Diver training or experience physical exam and medical history record. [Section VII, effective 2/1/64.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17-.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.

296-37-071 Form # 1. [Form # 1, effective 2/1/64.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.

296-37-072 Form # 2. [Form # 2, effective 2/1/64.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-080 General requirements, procedures and techniques. [Section VIII, effective 2/1/64.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17.050, 49.17.240, and chapters 42-.30 and 43.22 RCW.
296-37-081 Form # 3. [Form # 3, effective 2/1/64.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-082 Illustrations of flags and shapes. [Illustrations, effective 2/1/64.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17-.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-090 Recompression chamber—Tables—Attendant. [Section IX, effective 2/1/64.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-100 Identification. [Section X, effective 2/1/64.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-110 Waiver or variance. [Section XI, effective 2/1/64.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-300 Use of compressors in diving operations. [Rule 101, filed 3/23/60.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-310 Equipment requirements—Divers air line, check valves, etc. [Rules 102 and 103, filed 3/23/60.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-320 Equipment requirements—Barge operations. [Rule 104, filed 3/23/60.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17-.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-330 Equipment requirements—Air tools used in underwater operations. [Rule 105, filed 3/23/60.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-340 Equipment requirements—Inspection. [Rule 106, filed 3/23/60.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17-.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-350 Safety rules—Generally. [Rule 107, filed 3/23/60.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-360 Safety rules—Suggestions made by diver considered rule to govern. [Rule 108, filed 3/23/60.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-370 Conditions on barge deck. [Rule 109, filed 3/23/60.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-380 Use of two-way telephones. [Rule 110, filed 3/23/60.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17-.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-390 Decompression chamber—When used. [Rule 111, filed 3/23/60.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-395 Special stipulation regarding inexperienced divers and workmen. [Rule 112, filed 3/23/60.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-400 Special stipulation regarding inexperienced divers and workmen—Diver may choose tender. [Rule 113, filed 3/23/60.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17-.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-410 Judgment of diver to take precedent. [Rule 114, filed 3/23/60.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17-.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-420 Requirement on all ship surveys. [Rule 115, filed 3/23/60.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17-.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-430 Use of flood lights. [Rule 116, filed 3/23/60.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-440 Rules for compressed air operations applicable to diving operations. [Rule 117, filed 3/23/60.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-450 Availability of life preservers. [Rule 118, filed 3/23/60.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17.040, 49.17-.050, 49.17.240, and chapters 42.30 and 43.22 RCW.
296-37-460 Care and replacement of equipment. [Rules 119 and 120, filed 3/23/60.] Repealed by 78-10-094 (Order 78-18), filed 10/2/78. Statutory Authority: 49.17-.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW.

WAC 296-37-510 Scope and application. (1) The requirements included in this vertical chapter shall apply throughout the state wherever commercial diving takes place within the jurisdiction of the Department of Labor and Industries. These requirements shall also be applicable to those diving related and supportive work activities not at the diving site but which have a direct effect on the safety of the diving operations. Examples may include but are not limited to: The supply of breathing air or gas; the supply of materials, equipment or supplies required by this chapter; the maintenance of diving equipment.

(2) This standard applies to diving and related support operations conducted in connection with all types of work and employments, including general industry, construction, ship repairing, shipbuilding, shipbreaking and longshoring. However, this standard does not apply to any diving operation:

(a) Performed solely for instructional purposes, using open-circuit, compressed-air SCUBA and conducted within the no-decompression limits; or

(b) Performed solely for search, rescue, or related public safety purposes by or under the control of a governmental agency; or

(c) Performed by noncommercial divers whose exposures may be of an entirely different type and whose operations are approved by the Department of Labor and Industries.

(3) This chapter shall augment the requirements of the General Safety and Health Standard, chapter 296-

24 WAC and the General Occupational Health Standard, chapter 296-62 WAC. In instances where this chapter is in direct conflict with the requirements of any general horizontal standard, the requirements of this chapter shall apply.

(4) Hoisting gear used in diving operations shall be inspected and certified as required by chapter 296-56 WAC, Safety Standards for Longshore, Stevedore and Related Waterfront Operations.

(5) Application in Emergencies. (a) An employer may deviate from the requirements of this standard to the extent necessary to prevent or minimize a situation which is likely to cause death, serious physical harm, or major environmental damage, provided that the employer:

(i) Notifies the Assistant Director of the Department of Labor and Industries in Olympia or the Chief Safety Inspector for the Region within 48 hours of the onset of the emergency situation indicating the nature of the emergency and extent of the deviation from the prescribed regulations; and

(ii) Upon request from the authority notified, submits such information in writing.

(6) Employer Obligation. (a) The employer shall be responsible for compliance with:

(i) All provisions of this standard of general applicability; and

(ii) All requirements pertaining to specific diving modes to the extent diving operations in such modes are conducted. [Statutory Authority: RCW 49.17.040, 49-.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW. 78-10-094 (Order 78-18), § 296-37-510, filed 10/2/78.]

WAC 296-37-512 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 authorized representative may, pursuant to this section, RCW 49.17.080 and/or 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 permit for variance shall be conspicuously posted on the premises and shall remain posted during the time it is in effect. All requests for variances from safety and health standards included in this or any other chapter of Title 296 WAC, shall be made in writing to the Director of the Department of Labor and Industries at Olympia, Washington, or his duly authorized representative, the Assistant Director, Division of Industrial Safety and Health, Department of Labor and Industries, Olympia, Washington. Variance application forms may be obtained from the Department upon request. [Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW. 78-10-094 (Order 78-18), § 296-37-512, filed 10/2/78.]

WAC 296-37-515 Definitions. As used in this standard, the listed terms are defined as follows:

(1) "Acfm": Actual cubic feet per minute.

(2) "ASME Code or equivalent": ASME (American Society of Mechanical Engineers) Boiler and Pressure Vessel Code, Section VIII, or an equivalent code which the employer can demonstrate to be equally effective.

(3) "ATA": Atmosphere absolute.

(4) "Bell": An enclosed compartment, pressurized (closed bell) or unpressurized (open bell), which allows the diver to be transported to and from the underwater work area and which may be used as a temporary refuge during diving operations.

(5) "Bottom time": The total elapsed time measured in minutes from the time when the diver leaves the surface in descent to the time that the diver begins ascent.

(6) "Bursting pressure": The pressure at which a pressure containment device would fail structurally.

(7) "Cylinder": A pressure vessel for the storage of gases.

(8) "Decompression chamber": A pressure vessel for human occupancy such as a surface decompression chamber, closed bell, or deep diving system used to decompress divers and to treat decompression sickness.

(9) "Decompression sickness": A condition with a variety of symptoms which may result from gas or bubbles in the tissues of divers after pressure reduction.

(10) "Decompression table": A profile or set of profiles of depth-time relationships for ascent rates and breathing mixtures to be followed after a specific depth-time exposure or exposures.

(11) "Dive location": A surface or vessel from which a diving operation is conducted.

(12) "Dive-location reserve breathing gas": A supply system of air or mixed-gas (as appropriate) at the dive location which is independent of the primary supply system and sufficient to support divers during the planned decompression.

(13) "Dive team": Divers and support employees involved in a diving operation, including the designated person-in-charge.

(14) "Diver": An employee working in water using underwater apparatus which supplies compressed breathing gas at the ambient pressure.

(15) "Diver-carried reserve breathing gas": A diver-carried supply of air or mixed gas (as appropriate) sufficient under standard operating conditions to allow the diver to reach the surface, or another source of breathing gas, or to be reached by a standby diver.

(16) "Diving mode": A type of diving requiring specific equipment, procedures and techniques (SCUBA, surface-supplied air, or mixed gas).

(17) "Fsw": Feet of seawater (or equivalent static pressure head).

(18) "Heavy gear": Diver-worn deep-sea dress including helmet, breastplate, dry suit, and weighted shoes.

(19) "Hyperbaric conditions": Pressure conditions in excess of surface pressure.

(20) "Inwater stage": A suspended underwater platform which supports a diver in the water.

(21) "Liveboating": The practice of supporting a surfaced–supplied air or mixed gas diver from a vessel which is underway.

(22) "Mixed–gas diving": A diving mode in which the diver is supplied in the water with a breathing gas other than air.

(23) "No–decompression limits": The depth–time limits of the "no–decompression limits and repetitive dive group designation table for no–decompression air dives", U.S. Navy Diving Manual or equivalent limits which the employer can demonstrate to be equally effective.

(24) "Psi(g)": Pounds per square inch (gauge).

(25) "SCUBA diving": A diving mode independent of surface supply in which the diver uses open circuit self–contained underwater breathing apparatus.

(26) "Standby diver": A diver at the dive location available to assist a diver in the water.

(27) "Surface–supplied air diving": A diving mode in which the diver in the water is supplied from the dive location with compressed air for breathing.

(28) "Treatment table": A depth–time and breathing gas profile designed to treat decompression sickness.

(29) "Umbilical": The composite hose bundle between a dive location and a diver or bell, or between a diver and a bell, which supplies the diver or bell with breathing gas, communications, power, or heat as appropriate to the diving mode or conditions, and includes a safety line between the diver and the dive location.

(30) "Volume tank": A pressure vessel connected to the outlet of a compressor and used as an air reservoir.

(31) "Working pressure": The maximum pressure to which a pressure containment device may be exposed under standard operating conditions. [Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW. 78–10–094 (Order 78–18), § 296–37–515, filed 10/2/78.]

WAC 296–37–520 Qualifications of dive team. (1) General.

(a) Each dive team member shall have the experience or training necessary to perform assigned tasks in a safe and healthful manner.

(b) Each dive team member shall have experience or training in the following:

(i) The use of tools, equipment and systems relevant to assigned tasks;

(ii) Techniques of the assigned diving mode; and

(iii) Diving operations and emergency procedures.

(c) All dive team members shall be trained in cardiopulmonary resuscitation and first aid (American Red Cross standard course or equivalent).

(d) Dive team members who are exposed to or control the exposure of others to hyperbaric conditions shall be trained in diving–related physics and physiology.

(2) Assignments. (a) Each dive team member shall be assigned tasks in accordance with the employee's experience or training, except that limited additional tasks may be assigned to an employee undergoing training provided that these tasks are performed under the direct supervision of an experienced dive team member.

(b) The employer shall not require a dive team member to be exposed to hyperbaric conditions against the employee's will, except when necessary to complete decompression or treatment procedures.

(c) The employer shall not permit a dive team member to dive or be otherwise exposed to hyperbaric conditions for the duration of any temporary physical impairment or condition which is known to the employer and is likely to affect adversely the safety or health of a dive team member.

(3) Designated Person–In–Charge. (a) The employer or an employee designated by the employer shall be at the dive location in charge of all aspects of the diving operation affecting the safety and health of dive team members.

(b) The designated person–in–charge shall have experience and training in the conduct of the assigned diving operation. [Statutory Authority: RCW 49.17.040, 49-.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW. 78–10–094 (Order 78–18), § 296–37–520, filed 10/2/78.]

WAC 296–37–525 Medical requirements. (1) General. (a) The employer shall determine that dive team members who are, or are likely to be, exposed to hyperbaric conditions are medically fit to perform assigned tasks in a safe and healthful manner.

(b) The employer shall provide each dive team member who is, or is likely to be, exposed to hyperbaric conditions with all medical examinations required by this standard.

(c) All medical examinations required by this standard shall be performed by, or under the direction of, a physician at no cost to the employee.

(2) Frequency of Medical Examinations. Medical examinations shall be provided:

(a) Prior to initial hyperbaric exposure with the employer, unless an equivalent medical examination has been given within the preceding 12 months and the employer has obtained the results of the examination and an opinion from the examining physician of the employee's medical fitness to dive or to be otherwise exposed to hyperbaric conditions;

(b) At one year intervals from the date of initial examination or last equivalent examination; and

(c) After an injury or illness requiring hospitalization of more than twenty–four hours.

(3) Information Provided to Examining Physician. The employer shall provide the following information to the examining physician:

(a) A copy of the medical requirements of this standard; and

(b) A summary of the nature and extent of hyperbaric conditions to which the dive team member will be exposed, including diving modes and types of work to be assigned.

(4) Content of Medical Examinations. (a) Medical examinations conducted initially and annually shall consist of the following:

(i) Medical history;

(ii) Diving-related work history;

(iii) Basic physical examination;

(iv) The tests required by Table I; and

(v) Any additional tests the physician considers necessary.

(b) Medical examinations conducted after an injury or illness requiring hospitalization of more than 24 hours shall be appropriate to the nature and extent of the injury or illness as determined by the examining physician.

TABLE I

TESTS FOR DIVING MEDICAL EXAMINATION

Test	Initial Examination	Annual Reexamination
Chest X-ray	x	
Visual acuity	x	x
Color blindness	x	
EKG: standard 12L[1]		
Hearing test	x	x
Hematocrit or hemoglobin.	x	x
Sickle cell index	x	
White blood count	x	x
Urinalysis	x	x

[1]To be given to the employee once, at age 35 or over.

(5) Physician's Written Report. (a) After any medical examination required by this standard, the employer shall obtain a written report prepared by the examining physician containing:

(i) The results of the medical examination; and

(ii) The examining physician's opinion of the employee's fitness to be exposed to hyperbaric conditions, including any recommended restrictions or limitations to such exposure (see WAC 296-37-585).

(b) The employer shall provide the employee with a copy of the physician's written report.

(6) Determination of Employee Fitness. (a) The employer shall determine the extent and nature of the dive team member's fitness to engage in diving or be otherwise exposed to hyperbaric conditions consistent with the recommendations in the examining physician's report.

(b) If the examining physician has recommended a restriction or limitation on the dive team member's exposure to hyperbaric conditions, and the affected employee does not concur, a second physician selected by the employee shall render a medical opinion on the nature and extent of the restriction or limitation, if any.

(c) If the recommendation of the second opinion differs from that of the examining (first) physician, and if the employer and employee are unable to agree on the nature and extent of the restriction or limitation, an opinion from a third physician selected by the first two physicians shall be obtained. The employer's determination of the dive team member's fitness shall be consistent with the medical opinion of the third physician, unless the employer and employee reach an agreement which is otherwise consistent with the recommendation or opinion of at least two of the physicians involved.

(d) Nothing in this procedure shall be construed to prohibit either a dive team member from accepting, or an employer from offering, an assignment which is otherwise consistent with at least one medical opinion while a final determination on the employee's fitness is pending. [Statutory Authority: RCW 49.17.040, 49.17-.050, 49.17.240, and chapters 42.30 and 43.22 RCW. 78-10-094 (Order 78-18), § 296-37-525, filed 10/2/78.]

WAC 296-37-530 Safe practices manual. (1) General. The employer shall develop and maintain a safe practices manual which shall be made available at the dive location to each dive team member.

(2) Contents. (a) The safe practices manual shall contain a copy of this standard and the employer's policies for implementing the requirements of this standard.

(b) For each diving mode engaged in, the safe practices manual shall include:

(i) Safety procedures and checklists for diving operations;

(ii) Assignments and responsibilities of the dive team members;

(iii) Equipment procedures and checklists; and

(iv) Emergency procedures for fire, equipment failure, adverse environmental conditions, and medical illness and injury. [Statutory Authority: RCW 49.17.040, 49-.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW. 78-10-094 (Order 78-18), § 296-37-530, filed 10/2/78.]

WAC 296-37-535 Pre-dive procedures. (1) General. The employer shall comply with the following requirements prior to each diving operation, unless otherwise specified.

(2) Emergency Aid. A list shall be kept at the dive location of the telephone or call numbers of the following:

(a) An operational decompression chamber (if not at the dive location);

(b) Accessible hospitals;

(c) Available physicians;

(d) Available means of transportation; and

(e) The nearest U.S. Coast Guard Rescue Coordination Center.

(3) First Aid Supplies. (a) A first aid kit appropriate for the diving operation and approved by a physician shall be available at the dive location.

(b) When used in a decompression chamber or bell, the first aid kit shall be suitable for use under hyperbaric conditions.

(c) In addition to any other first aid supplies, an American Red Cross standard first aid handbook or

equivalent, and a bag–type manual resuscitator with transparent mask and tubing shall be available at the dive location.

(4) Planning and Assessment. Planning of a diving operation shall include an assessment of the safety and health aspects of the following:

(a) Diving mode;

(b) Surface and underwater conditions and hazards;

(c) Breathing gas supply (including reserves);

(d) Thermal protection;

(e) Diving equipment and systems;

(f) Dive team assignments and physical fitness of dive team members (including any impairment known to the employer);

(g) Repetitive dive designation or residual inert gas status of dive team members;

(h) Decompression and treatment procedures (including altitude corrections); and

(i) Emergency procedures.

(5) Hazardous Activities. To minimize hazards to the dive team, diving operations shall be coordinated with other activities in the vicinity which are likely to interfere with the diving operation.

(6) Employee Briefing. (a) Dive team members shall be briefed on:

(i) The tasks to be undertaken;

(ii) Safety procedures for the diving mode;

(iii) Any unusual hazards or environmental conditions likely to affect the safety of the diving operation; and

(iv) Any modifications to operating procedures necessitated by the specific diving operation.

(b) Prior to making individual dive team member assignments, the employer shall inquire into the dive team member's current state of physical fitness, and indicate to the dive team member the procedure for reporting physical problems or adverse physiological effects during and after the dive.

(7) Equipment Inspection. The breathing gas supply system including reserve breathing gas supplies, masks, helmets, thermal protection, and bell handling mechanism (when appropriate) shall be inspected prior to each dive.

(8) Warning Signal. When diving from surfaces other than vessels in areas capable of supporting marine traffic, a rigid replica of the international code flag "A" at least one meter in height shall be displayed at the dive location in a manner which allows all–round visibility, and shall be illuminated during night diving operations. [Statutory Authority: RCW 49.17.040, 49.17.050, 49-.17.240, and chapters 42.30 and 43.22 RCW. 78–10–094 (Order 78–18), § 296–37–535, filed 10/2/78.]

WAC 296–37–540 Procedures during dive. (1) General. The employer shall comply with the following requirements which are applicable to each diving operation unless otherwise specified.

(2) Water Entry and Exit. (a) A means capable of supporting the diver shall be provided for entering and exiting the water.

(b) The means provided for exiting the water shall extend below the water surface.

(c) A means shall be provided to assist an injured diver from the water or into a bell.

(3) Communications. (a) An operational two–way voice communication system shall be used between:

(i) Each surface–supplied air or mixed–gas diver and a dive team member at the dive location or bell (when provided or required); and

(ii) The bell and the dive location.

(b) An operational, two–way communication system shall be available at the dive location to obtain emergency assistance.

(4) Decompression Tables. Decompression, repetitive, and no–decompression tables (as appropriate) shall be at the dive location.

(5) Dive Profiles. A depth–time profile, including when appropriate any breathing gas changes, shall be maintained for each diver during the dive including decompression.

(6) Hand–held Power Tools and Equipment. (a) Hand–held electrical tools and equipment shall be deenergized before being placed into or retrieved from the water.

(b) Hand–held power tools shall not be supplied with power from the dive location until requested by the diver.

(7) Welding and Burning. (a) A current supply switch to interrupt the current flow to the welding or burning electrode shall be:

(i) Tended by a dive team member in voice communication with the diver performing the welding or burning; and

(ii) Kept in the open position except when the diver is welding or burning.

(b) The welding machine frame shall be grounded.

(c) Welding and burning cables, electrode holders, and connections shall be capable of carrying the maximum current required by the work, and shall be properly insulated.

(d) Insulated gloves shall be provided to divers performing welding and burning operations.

(e) Prior to welding or burning on closed compartments, structures or pipes, which contain a flammable vapor or in which a flammable vapor may be generated by the work, they shall be vented, flooded, or purged with a mixture of gases which will not support combustion.

(8) Explosives. (a) Employers shall transport, store, and use explosives in accordance with this section and applicable provisions of chapter 296–52 WAC.

(b) Electrical continuity of explosive circuits shall not be tested until the diver is out of the water.

(c) Explosives shall not be detonated while the diver is in the water.

(9) Termination of Dive. The working interval of a dive shall be terminated when:

(a) A diver requests termination;

(b) A diver fails to respond correctly to communications or signals from a dive team member;

(c) Communications are lost and can not be quickly reestablished between the diver and a dive team member at the dive location, and between the designated person–

in-charge and the person controlling the vessel in liveboating operations; or

(d) A diver begins to use diver-carried reserve breathing gas or the dive-location reserve breathing gas. [Statutory Authority: RCW 49.17.040, 49.17.050, 49-.17.240, and chapters 42.30 and 43.22 RCW. 78-10-094 (Order 78-18), § 296-37-540, filed 10/2/78.]

WAC 296-37-545 Post-dive procedures. (1) General. The employer shall comply with the following requirements which are applicable after each diving operation, unless otherwise specified.

(2) Precautions. (a) After the completion of any dive, the employer shall:

(i) Check the physical condition of the diver;

(ii) Instruct the diver to report any physical problems or adverse physiological effects including symptoms of decompression sickness;

(iii) Advise the diver of the location of a decompression chamber which is ready for use; and

(iv) Alert the diver to the potential hazards of flying after diving.

(b) For any dive outside the no-decompression limits, deeper than 100 fsw or using mixed gas as a breathing mixture, the employer shall instruct the diver to remain awake and in the vicinity of the decompression chamber which is at the dive location for at least one hour after the dive (including decompression or treatment as appropriate).

(3) Recompression Capability. (a) A decompression chamber capable of recompressing the diver at the surface to a minimum of 165 fsw (6 ATA) shall be available at the dive location for:

(i) Surface-supplied air diving to depths deeper than 100 fsw and shallower than 220 fsw;

(ii) Mixed gas diving shallower than 300 fsw; or

(iii) Diving outside the no-decompression limits shallower than 300 fsw.

(b) A decompression chamber capable of recompressing the diver at the surface to the maximum depth of the dive shall be available at the dive location for dives deeper than 300 fsw.

(c) The decompression chamber shall be:

(i) Dual-lock;

(ii) Multiplace; and

(iii) Located within five minutes of the dive location.

(d) The decompression chamber shall be equipped with:

(i) A pressure gauge for each pressurized compartment designed for human occupancy;

(ii) A built-in-breathing-system with a minimum of one mask per occupant;

(iii) A two-way voice communication system between occupants and a dive team member at the dive location;

(iv) A viewport; and

(v) Illumination capability to light the interior.

(e) Treatment tables, treatment gas appropriate to the diving mode, and sufficient gas to conduct treatment shall be available at the dive location.

(f) A dive team member shall be available at the dive location during and for at least one hour after the dive to operate the decompression chamber (when required or provided).

(4) Record of Dive. (a) The following information shall be recorded and maintained for each diving operation:

(i) Names of dive team members including designated person-in-charge;

(ii) Date, time, and location;

(iii) Diving modes used;

(iv) General nature of work performed;

(v) Approximate underwater and surface conditions (visibility, water temperature and current); and

(vi) Maximum depth and bottom time for each diver.

(b) For each dive outside the no-decompression limits, deeper than 100 fsw or using mixed gas, the following additional information shall be recorded and maintained:

(i) Depth-time and breathing gas profiles;

(ii) Decompression table designation (including modification); and

(iii) Elapsed time since last pressure exposure if less than 24 hours or repetitive dive designation for each diver.

(c) For each dive in which decompression sickness is suspected or symptoms are evident, the following additional information shall be recorded and maintained:

(i) Description of decompression sickness symptoms (including depth and time of onset); and

(ii) Description and results of treatment.

(5) Decompression Procedure Assessment. The employer shall:

(a) Investigate and evaluate each incident of decompression sickness based on the recorded information, consideration of the past performance of decompression table used, and individual susceptibility;

(b) Take appropriate corrective action to reduce the probability of recurrence of decompression sickness; and

(c) Prepare a written evaluation of the decompression procedure assessment, including any corrective action taken, within 45 days of the incident of decompression sickness. [Statutory Authority: RCW 49.17.040, 49.17-.050, 49.17.240, and chapters 42.30 and 43.22 RCW. 78-10-094 (Order 78-18), § 296-37-545, filed 10/2/78.]

WAC 296-37-550 Scuba diving. (1) General. Employers engaged in SCUBA diving shall comply with the following requirements, unless otherwise specified.

(2) Limits. SCUBA diving shall not be conducted:

(a) At depths deeper than 130 fsw;

(b) At depths deeper than 100 fsw or outside the no-decompression limits unless a decompression chamber is ready for use.

(3) Procedures. (a) A standby diver shall be available while a diver is in the water.

(b) A diver shall be line-tended from the surface, or accompanied by another diver in the water in continuous visual contact during the diving operation.

(c) A diver shall be stationed at the underwater point of entry when diving is conducted in enclosed or physically confining spaces and shall have positive means of communication with the diver or divers within the space.

(d) A diver–carried reserve breathing gas supply shall be provided for each diver consisting of:

(i) A manual reserve (J valve); or

(ii) An independent reserve cylinder with a separate regulator or connected to the underwater breathing apparatus.

(e) The valve of the reserve breathing gas supply shall be in the closed position prior to the dive. [Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW. 78–10–094 (Order 78–18), § 296–37–550, filed 10/2/78.]

WAC 296–37–555 Surface–supplied air diving. (1) General. Employers engaged in surface–supplied air diving shall comply with the following requirements, unless otherwise specified.

(2) Limits. (a) Surface–supplied air diving shall not be conducted at depths deeper than 190 fsw, except that dives with bottom times of 30 minutes or less may be conducted to depths of 220 fsw.

(b) A decompression chamber shall be ready for use at the dive location for any dive outside the no–decompression limits or deeper than 100 fsw.

(c) A bell shall be used for dives with an inwater decompression time greater than 120 minutes, except when heavy gear is worn or diving is conducted in physically confining spaces.

(3) Procedures. (a) Each diver shall be continuously tended while in the water.

(b) A diver shall be stationed at the underwater point of entry when diving is conducted in enclosed or physically confining spaces.

(c) Each diving operation shall have a primary breathing gas supply sufficient to support divers for the duration of the planned dive including decompression.

(d) For dives deeper than 100 fsw or outside the no–decompression limits:

(i) A separate dive team member shall tend each diver in the water;

(ii) A standby diver shall be available while a diver is in the water;

(iii) A diver–carried reserve breathing gas supply shall be provided for each diver except when heavy gear is worn; and

(iv) A dive–location reserve breathing gas supply shall be provided.

(e) For heavy–gear diving deeper than 100 fsw or outside the no–decompression limits:

(i) An extra breathing gas hose capable of supplying breathing gas to the diver in the water shall be available to the standby diver.

(ii) An inwater stage shall be provided to divers in the water.

(f) Except when heavy gear is worn or where physical space does not permit, a diver–carried reserve breathing gas supply shall be provided whenever the diver is prevented by the configuration of the dive area from ascending directly to the surface. [Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 42-.30 and 43.22 RCW. 78–10–094 (Order 78–18), § 296–37–555, filed 10/2/78.]

WAC 296–37–560 Mixed–gas diving. (1) General. Employers engaged in mixed–gas diving shall comply with the following requirements, unless otherwise specified.

(2) Limits. Mixed–gas diving shall be conducted only when:

(a) A decompression chamber is ready for use at the dive location; and

(i) A bell is used at depths greater than 220 fsw or when the dive involves inwater decompression time of greater than 120 minutes, except when heavy gear is worn or when diving in physically confining spaces; or

(ii) A closed bell is used at depths greater than 300 fsw, except when diving is conducted in physically confining spaces.

(3) Procedures. (a) A separate dive team member shall tend each diver in the water.

(b) A standby diver shall be available while a diver is in the water.

(c) A diver shall be stationed at the underwater point of entry when diving is conducted in enclosed or physically confining spaces.

(d) Each diving operation shall have a primary breathing gas supply sufficient to support divers for the duration of the planned dive including decompression.

(e) Each diving operation shall have a dive–location reserve breathing gas supply.

(f) When heavy gear is worn:

(i) An extra breathing gas hose capable of supplying breathing gas to the diver in the water shall be available to the standby diver; and

(ii) An inwater stage shall be provided to divers in the water.

(g) An inwater stage shall be provided for divers without access to a bell for dives deeper than 100 fsw or outside the no–decompression limits.

(h) When a closed bell is used, one dive team member in the bell shall be available and tend the diver in the water.

(i) Except when heavy gear is worn or where physical space does not permit, a diver–carried reserve breathing gas supply shall be provided for each diver:

(i) Diving deeper than 100 fsw or outside the no–decompression limits; or

(ii) Prevented by the configuration of the dive area from directly ascending to the surface. [Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW. 78–10–094 (Order 78–18), § 296–37–560, filed 10/2/78.]

WAC 296–37–565 Liveboating. (1) General. Employers engaged in diving operations involving liveboating shall comply with the following requirements.

(2) Limits. Diving operations involving liveboating shall not be conducted:

(a) With an inwater decompression time of greater than 120 minutes;

(b) Using surface–supplied air at depths deeper than 190 fsw, except that dives with bottom times of 30 minutes or less may be conducted to depths of 220 fsw;

(c) Using mixed gas at depths greater than 220 fsw;

(d) In rough seas which significantly impede diver mobility or work function; or

(e) In other than daylight hours.

(3) Procedures. (a) The propeller of the vessel shall be stopped before the diver enters or exits the water.

(b) A device shall be used which minimizes the possibility of entanglement of the diver's hose in the propeller of the vessel.

(c) Two-way voice communication between the designated person-in-charge and the person controlling the vessel shall be available while the diver is in the water.

(d) A standby diver shall be available while a diver is in the water.

(e) A diver-carried reserve breathing gas supply shall be carried by each diver engaged in liveboating operations. [Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW. 78-10-094 (Order 78-18), § 296-37-565, filed 10/2/78.]

WAC 296-37-570 Equipment. (1) General. (a) All employers shall comply with the following requirements, unless otherwise specified.

(b) Each equipment modification, repair, test, calibration or maintenance service shall be recorded by means of a tagging or logging system, and include the date and nature of work performed, and the name or initials of the person performing the work.

(2) Air compressor systems. (a) Compressors used to supply air to the diver shall be equipped with a volume tank with a check valve on the inlet side, a pressure gauge, a relief valve, and a drain valve.

(b) Air compressor intakes shall be located away from areas containing exhaust or other contaminants.

(c) Respirable air supplied to a diver shall not contain:

(i) A level of carbon monoxide (CO) greater than 20 ppm;

(ii) A level of carbon dioxide (CO_2) greater than 1,000 ppm;

(iii) A level of oil mist greater than 5 milligrams per cubic meter; or

(iv) A noxious or pronounced odor.

(d) The output of air compressor systems shall be tested for air purity every six months by means of samples taken at the connection to the distribution system, except that nonoil lubricated compressors need not be tested for oil mist.

(3) Breathing Gas Supply Hoses. (a) Breathing gas supply hoses shall:

(i) Have a working pressure at least equal to the working pressure of the total breathing gas system;

(ii) Have a rated bursting pressure at least equal to four times the working pressure;

(iii) Be tested at least annually to 1.5 times their working pressure; and

(iv) Have their open ends taped, capped or plugged when not in use.

(b) Breathing gas supply hose connectors shall:

(i) Be made of corrosion-resistant materials;

(ii) Have a working pressure at least equal to the working pressure of the hose to which they are attached; and

(iii) Be resistant to accidental disengagement.

(c) Umbilicals shall: (i) Be marked in 10-foot increments to 100 feet beginning at the diver's end, and in 50 foot increments thereafter;

(ii) Be made of kink-resistant materials; and

(iii) Have a working pressure greater than the pressure equivalent to the maximum depth of the dive (relative to the supply source) plus 100 psi.

(f) Buoyancy Control (a) Helmets or masks connected directly to the dry suit or other buoyancy-changing equipment shall be equipped with an exhaust valve.

(b) A dry suit or other buoyancy-changing equipment not directly connected to the helmet or mask shall be equipped with an exhaust valve.

(c) When used for SCUBA diving, a buoyancy compensator shall have an inflation source separate from the breathing gas supply.

(d) An inflatable flotation device capable of maintaining the diver at the surface in a face-up position, having a manually activated inflation source independent of the breathing supply, an oral inflation device, and an exhaust valve shall be used for SCUBA diving.

(5) Compressed Gas Cylinders. (a) Compressed gas cylinders shall:

(i) Be designed, constructed and maintained in accordance with the applicable provisions of WAC 296-24-920 through 296-24-94003.

(ii) Be stored in a ventilated area and protected from excessive heat;

(iii) Be secured from falling; and

(iv) Have shut-off valves recessed into the cylinder or protected by a cap, except when in use or manifolded, or when used for SCUBA diving.

(6) Decompression Chambers. (a) Each decompression chamber manufactured after the effective date of this standard, shall be built and maintained in accordance with the ASME Code or equivalent.

(b) Each decompression chamber manufactured prior to the effective date of this standard shall be maintained in conformity with the code requirements to which it was built, or equivalent.

(c) Each decompression chamber shall be equipped with:

(i) Means to maintain the atmosphere below a level of 25% oxygen by volume;

(ii) Mufflers on intake and exhaust lines, which shall be regularly inspected and maintained;

(iii) Suction guards on exhaust line openings; and

(iv) A means for extinguishing fire, and shall be maintained to minimize sources of ignition and combustible material.

(7) Gauges and Timekeeping Devices. (a) Gauges indicating diver depth which can be read at the dive location shall be used for all dives except SCUBA.

(b) Each depth gauge shall be dead-weight tested or calibrated against a master reference gauge every six months, and when there is a discrepancy greater than

two percent of full scale between any two equivalent gauges.

(c) A cylinder pressure gauge capable of being monitored by the diver during the dive shall be worn by each SCUBA diver.

(d) A timekeeping device shall be available at each dive location.

(8) Masks and Helmets. (a) Surface-supplied air and mixed-gas masks and helmets shall have:

(i) A nonreturn valve at the attachment point between helmet or mask and hose which shall close readily and positively; and

(ii) An exhaust valve.

(b) Surface-supplied air masks and helmets shall have a minimum ventilation rate capability of 4.5 acfm at any depth at which they are operated or the capability of maintaining the diver's inspired carbon dioxide partial pressure below 0.02 ATA when the diver is producing carbon dioxide at the rate of 1.6 standard liters per minute.

(9) Oxygen Safety. (a) Equipment used with oxygen or mixtures containing over forty percent by volume oxygen shall be designed for oxygen service.

(b) Components (except umbilicals) exposed to oxygen or mixtures containing over forty percent by volume oxygen shall be cleaned of flammable materials before use.

(c) Oxygen systems over 125 psig and compressed air systems over 500 psig shall have slow-opening shut-off valves.

(10) Weights and harnesses. (a) Except when heavy gear is worn, divers shall be equipped with a weight belt or assembly capable of quick release.

(b) Except when heavy gear is worn or in SCUBA diving, each diver shall wear a safety harness with:

(i) A positive buckling device;

(ii) An attachment point for the umbilical to prevent strain on the mask or helmet; and

(iii) A lifting point to distribute the pull force of the line over the diver's body. [Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW. 78-10-094 (Order 78-18), § 296-37-570, filed 10/2/78.]

WAC 296-37-575 Recordkeeping requirements. (1) Recording and Reporting. (a) The employer shall record and report occupational injuries and illnesses in accordance with requirements of chapters 296-27 and 296-350 WAC.

(b) The employer shall record the occurrence of any diving-related injury or illness which requires any dive team member to be hospitalized for 24 hours or more, specifying the circumstances of the incident and the extent of any injuries or illnesses.

(2) Availability of records. (a) Upon the request of the Director of the Department of Labor and Industries or his duly authorized designees, the employer shall make available for inspection and copying any record or document required by this standard.

NOTE: Requests for information or copies of records and reports by OSHA or NIOSH shall be made to the Director of the Department of Labor and Industries.

(b) Upon request of any employee, former employee or authorized representative, the employer shall make available for inspection and copying any record or document required by this standard which pertains to the individual employee or former employee.

(c) Records and documents required by this standard shall be retained by the employer for the following period:

(i) Dive team member medical records (physician's reports) (WAC 296-37-525) – five years;

(ii) Safe practices manual (WAC 296-37-530) – current document only;

(iii) Depth-time profile (WAC 296-37-540) – until completion of the recording of dive, or until completion of decompression procedure assessment where there has been an incident of decompression sickness;

(iv) Recording dive (WAC 296-37-545) one year, except five years where there has been an incident of decompression sickness;

(v) Decompression procedure assessment evaluations (WAC 296-37-545) – five years;

(vi) Equipment inspections and testing records (WAC 296-37-570) – current entry or tag, or until equipment is withdrawn from service;

(vii) Records of hospitalizations (WAC 296-37-575) – five years.

(d) After the expiration of the retention period of any record required to be kept for five years, the employer shall forward such records to the National Institute for Occupational Safety and Health, Department of Health, Education, and Welfare.

(e) In the event the employer ceases to do business:

(i) The successor employer shall receive and retain all dive and employee medical records required by this standard; or

(ii) If there is no successor employer, dive and employee medical records shall be forwarded to the National Institute for Occupational Safety and Health, Department of Health, Education, and Welfare. [Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW. 78-10-094 (Order 78-18), § 296-37-575, filed 10/2/78.]

WAC 296-37-580 Effective date. This standard shall be effective 30 days after being filed with the code reviser. [Statutory Authority: RCW 49.17.040, 49.17-.050, 49.17.240, and chapters 42.30 and 43.22 RCW. 78-10-094 (Order 78-18), § 296-37-580, filed 10/2/78.]

WAC 296-37-585 Examples of conditions which may restrict or limit exposure to hyperbaric conditions. (1) The following disorders may restrict or limit occupational exposure to hyperbaric conditions depending on severity, presence of residual effects, response to therapy, number of occurrences, diving mode, or degree and duration of isolation.

(a) History of seizure disorder other than early febrile convulsions.

(b) Malignancies (active) unless treated and without recurrence for five years.

(c) Chronic inability to equalize sinus and/or middle ear pressure.

(d) Cystic or cavitary disease of the lungs.

(e) Impaired organ function caused by alcohol or drug use.

(f) Conditions requiring continuous medication for control (e.g., antihistamines, steroids, barbiturates, mood altering drugs, or insulin).

(i) Meniere's disease.

(ii) Hemoglobinopathies.

(iii) Obstructive or restrictive lung disease.

(iv) Vestibular end organ destruction.

(v) Pneumothorax.

(vi) Cardiac abnormalities (e.g., pathological heart block, valvular disease, intraventricular conduction defects other than isolated right bundle branch block, angina pectoris, arrhythmia, coronary artery disease).

(vii) Juxta-articular osteonecrosis. [Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 42.30 and 43.22 RCW. 78-10-094 (Order 78-18), § 296-37-585, filed 10/2/78.]

Chapter 296-43 WAC
HEATING INSTALLATIONS——CABLE, RADIANT, SOIL, ETC.

WAC

296-43-010	Heating cables——General.
296-43-020	Heating cables——Maximum wattage and temperature.
296-43-030	Heating cables——Permissible installation methods in buildings.
296-43-040	Heating cables——Thermal insulation.
296-43-050	Heating cables——Elements installed in tanks, troughs, or pipe lines containing liquids.
296-43-060	Heating element in soil or sand.
296-43-070	Heating element imbedded in driveways.

WAC 296-43-010 Heating cables——General. Heating cables or wires designed for use in low temperature heating applications, i.e., soil, water, plaster, walls and ceilings, floors, etc., shall conform to the provisions of the N.E.C. Article 422 as applicable and to the following specifications: (1) The units shall be manufactured in such continuous lengths that the maximum temperature of the element does not exceed 100 degrees C. or the maximum safe working temperature of the insulating material covering the element. Whichever is the lower temperature shall be considered the maximum permissible working temperature of the element.

(2) The insulation on the element shall equal that specified for equivalent 600 v. combined Type TW and TH or RW and RH conductor insulation and, in addition, shall meet the following requirements:

(a) Permissible maximum water absorption shall not exceed .015 grams per sq. in. of surface in distilled water at 70 degree C. in 7 days.

(b) Maximum safe operating temperature of the insulation shall not be less than 70 degrees C.

(c) It shall be suitable for the purpose intended and approved by the Washington state electrical inspection department as such.

(d) Samples for testing: The manufacturer shall submit suitable samples to the Washington state inspection department for inspection and testing as required.

(e) Marking: Each unit shall be provided with permanent labels or markings at the factory.

(i) These labels shall be placed not more than 3 in. from the terminal on each end and shall include the makers' name and the normal rating in volts and amperes; or, volts and watts.

(ii) 120 volt labels shall be bright metal or white in color. 240 v. labels shall be colored red.

(f) Units shall be installed in their complete lengths as supplied by the factory. Units from which a label or labels are missing will be considered shortened and will not be approved until such time as the installing contractor shall provide proof, by connecting suitable test meters into the circuits with which the inspector, at his convenience, may satisfy himself that the element is suitable for the purpose intended.

(g) Heating element units shall not be covered until clearance has been received from the local inspecting authority.

(h) Lead covered heating elements shall not be permitted in direct contact with plaster, concrete or similar materials capable of causing crystallization and/or checking of the lead sheath, unless protected by a suitable covering of chemically inert material.

(i) All control equipment must be of approved type and of suitable rating for the use intended. [Rules (part), filed 4/3/61.]

WAC 296-43-020 Heating cables——Maximum wattage and temperature. (1) In contact with combustible material. Maximum wattage of the element shall not exceed 3 watts per lineal foot or maximum temperature of 60 degrees c. (140 degrees F.) when in direct contact with combustible material or applied over existing ceilings.

(2) Imbedded in cement. Maximum wattage of the element shall not exceed 4 watts per lineal foot or maximum temperature of 80 degrees C. (194 degrees F.) when imbedded in cement, plaster or similar noncombustible, heat-diffusing material. [Rule (part), filed 4/3/61.]

WAC 296-43-030 Heating cables——Permissible installation methods in buildings. Wiring to the elements shall conform to the National Electrical Code and to the following conditions:

(1) **Terminals.**

(a) Termination of radiant heating elements shall be with solderless lugs, binding posts, or similar compression terminals.

(b) Terminal boxes for radiant heating elements, where they are terminated in junction boxes and also for the circuit wires with which they are connected, shall be

protected by asbestos, glass, or similar noncombustible sleeving to a point at least 18 in. from the terminal.

(c) Not more than 3 in. of element per lead shall be permitted inside the terminal box and not more than two heating element leads shall be terminated in any 1-gang terminal box.

(d) The use of metal raceways for terminating radiant heating cables is permissible providing 6 in. clearance is maintained between points where elements enter the raceways, and, that the elements are terminated as provided in subsections (1)(b) and (1)(c) above.

(e) Where nonheating leads, at least 2 ft. in length, from the element are provided by the factory requirements of subsections (1)(b), (1)(c) and (1)(d) above may be waived, providing that the number of wires per box shall comply with section 3705 of the N.E.C.

(2) **Imbedded in plaster.** Heating elements, when imbedded in plaster, shall conform to the following provisions;

(a) Adjacent turns shall be not less than 1 in. apart and secured suitably by insulated staples, adhesive tape, patching plaster, plaster of paris, or other suitable means of attachment, as approved by the local inspecting authority, on not less than 2 ft. centers.

(b) Nonmetallic insulating tape shall be used where the element crosses metal reinforcing on rock plaster board and similar lath substitutes, when the heating element is applied directly to the lath base. (Where possible, nonmetallic reinforcing should be substituted to avoid the hum that is occasionally generated in the reinforcing while the current is on.)

(c) When heating element is used on a surface employing metal lath base, a brown coat shall be applied sufficient to completely cover the metal lath before the element is applied; and, adhesive tape, patching plaster, plaster of paris, or other suitable means of attachment be used to secure the element in place.

(d) Heating element shall only be applied to fire resistant plaster bases.

(3) **Imbedded in concrete floors.** Heating elements imbedded in concrete floors shall conform to the following provisions:

(a) Adjacent turns shall not be less than 1 in. apart and shall be held securely in place by suitable frames or spreaders while the concrete topping is applied.

(b) Heating cables shall maintain at least 1 in. clearance between the element and adjacent metallic pipe or similar conductors imbedded in the slab.

(c) Suitable rigid conduit risers shall be provided for terminating elements imbedded in concrete floors unless raceways or other adequate means are provided for protecting the elements where they leave the slab.

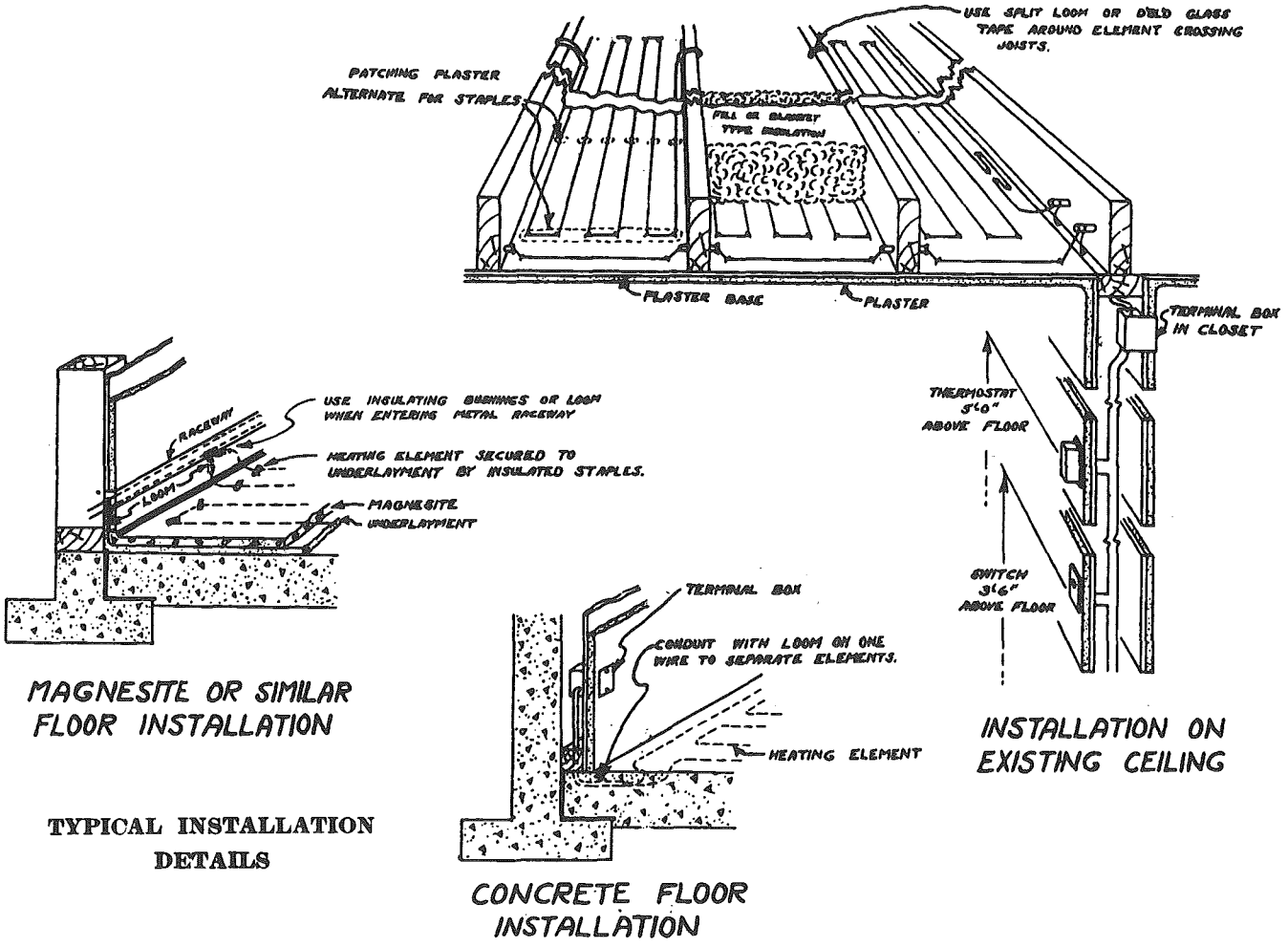
(d) Insulating sleeves shall be placed over the element from the point where it enters the slab through the conduit to the terminating box, unless nonheating leads, not less than 2 ft. long, are provided with the element by the factory.

(e) Suitable insulating bushings shall be used to separate the leads or elements where they enter the conduit in the slab.

(4) **Magnesite, terrazzo, tile and similar floors and walls.**

(a) Shall conform to the provisions of sections 1, 2, and 3 as applicable.

(b) Heating cables may be attached to the surface of the underlayment where magnesite or terrazzo floors are installed.

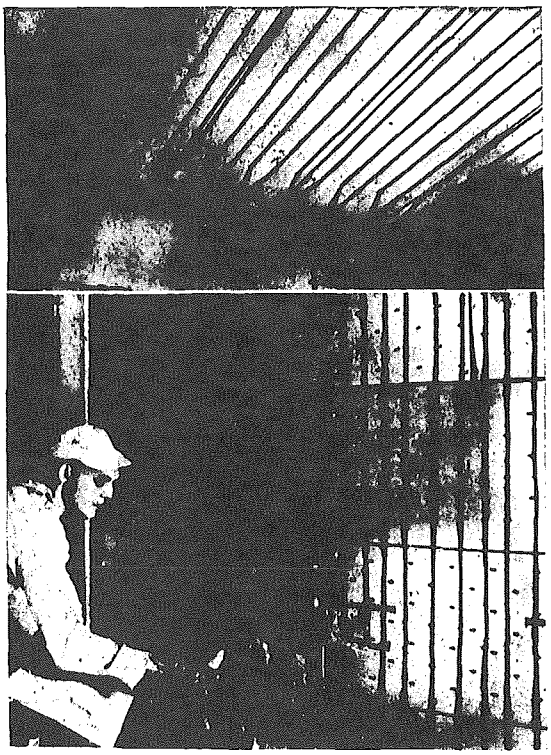


MAGNESITE OR SIMILAR FLOOR INSTALLATION

INSTALLATION ON EXISTING CEILING

CONCRETE FLOOR INSTALLATION

TYPICAL INSTALLATION DETAILS



Upper: Heating cable applied to plaster board ceiling ready for plaster. Note clearance between metal lath and heating cable.

Lower: Heating cable applied to plaster board wall. Note that elements run vertically to allow plasterer to apply the brown coat parallel to the cable.

(5) Linoleum, asphalt tile and similar floor coverings may be placed over heating elements on wood floors providing the element is first covered with 3/8 in. of magnesium oxychloride or equal fire resistant underlayment.

(6) Existing ceilings.

(a) Heating elements placed over existing ceilings shall be suitably secured thereto conforming to the provisions of WAC 296-43-020(1), and 296-43-030(1), (2), and (3) as applicable.

(b) Wood lath shall be covered with asbestos paper, gypsum board or similar fire resistant material before the element is applied to the ceiling.

(c) Heating elements shall not be applied over insulating board type of lath such as celotex, insulite, firtex, and similar materials. Where this type of material is used, the element should be secured to the under face of the ceiling and covered with plaster or fire resistant board of a noninsulating type.

(d) Elements crossing ceiling joints shall be enclosed in split loom or folded glass tape to protect the element.

(7) Gypsum board, plaster lath and similar heat conducting fire resistant materials may have the heating element applied directly thereto.

(8) Ceilings of combustible material; i.e., wood veneer, tempered hardboard and similar heat conducting materials shall first be covered by asbestos paper, gypsum board, or similar fire resistant material.

(9) Pads containing heating elements for placing heating elements in spaces over existing ceilings or in walls or floors which are otherwise inaccessible, shall conform to the provisions of WAC 296-43-010(1), (2), 296-43-020(1), 296-43-030(6), (7), (8), and 296-43-040 as applicable, and the following specifications:

(a) The pads shall be of fire resistant, nonconducting material.

(b) The pads shall rigidly secure the element in such a manner that it will be impossible for the adjacent turns of the element to touch.

(i) The leads shall be suitably secured to the pad in a manner which provides permanent adequate separation between the leads.

(ii) The leads shall be covered with an insulating sleeve from the pad to the termination of the heating part of the element.

(iii) All connections must be accessible. [Rules (part), filed 4/3/61.]

WAC 296-43-040 Heating cables——Thermal insulation. Thermal insulation placed over heating elements or in contact therewith shall be noncorrosive, noncombustible, nonconducting material as provided in section 3249 of the N.E.C. [Rules (part), filed 4/3/61.]

WAC 296-43-050 Heating cables——Elements installed in tanks, troughs, or pipe lines containing liquids. Elements installed in tanks, troughs or pipe lines containing liquids shall be provided with suitable insulating terminating bushings and terminal boxes at the points where the element enters and leaves the tank, trough, or pipe line. Elements so installed shall be secured in a manner maintaining at least 1 in. clearance between turns. [Rules (part), filed 4/3/61.]

WAC 296-43-060 Heating element in soil or sand. (1) Heating element in soil or sand shall be so spaced that the minimum distance between adjacent turns is not less than 1 in.

(2) Heating elements shall never be placed directly in peat moss or similar material of an insulating nature. Where peat moss or similar material is used, the element shall be protected by a layer of at least 1 in. over and 1 in. under the element, of a heat conducting material such as sand.

(3) Suitable drains for condensation shall be provided at the bottom of all boxes used in greenhouse or hotbed wiring.

(4) Where open wiring is used in greenhouses and hotbeds, the use of nonmetallic boxes and covers is recommended as provided in section 3716 of the N.E.C. [Rules (part), filed 4/3/61.]

WAC 296-43-070 Heating element imbedded in driveways. Heating elements imbedded in driveways shall conform to the provisions of WAC 296-43-010,

296-43-020 and 296-43-030(3), as applicable. [Rules (part), filed 4/3/61.]

Chapter 296-44 WAC
SAFETY STANDARDS——ELECTRICAL CONSTRUCTION CODE

WAC

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WAC 296-44-005 Preface. (1) The purpose of these rules and regulations is to formulate, for the state of Washington, uniform requirements for electrical construction and installations, the application of which shall insure adequate service and secure safety to persons engaged in the construction, installation, maintenance, operation, or use of electrical lines and equipment and to the public in general.

(2) These rules and regulations, however, are not to be considered as conflicting or superseding existing statutes relating to electrical construction and installations as contained in chapter 19.29 RCW.

(3) The first rules for electrical construction, of the state of Washington, were adopted as chapter 130, Laws of 1913 (chapter 19.29 RCW). During the period that these rules have had their application very few changes were made; however the industry witnessed tremendous development and manufacture of new materials and apparatus, use of new methods of installation, and advancement of the industry generally.

(4) In order to keep the rules for electrical and communications utilities abreast of the times it was apparent to all interested parties that a review of the present rules was mandatory in order to reflect in rules the progress which has been made and at the same time to make such revisions that practice has shown desirable and necessary for service and for the protection and safety of the workmen and the public in general. In order to accomplish this revision, and realizing that such a revision is concerned with many technical matters including consideration of controversial matters, a committee composed of representatives of the electrical and communication utilities and labor was appointed to review and discuss the proposed changes, keeping in mind that codes of practice of this type, of necessity include compromises between conflicting aims and that the rules must be compatible to both industry and labor.

(5) These rules provide a standard of safety both to the workmen and to the public. They contribute materially to the standard of service rendered by the utilities, and also afford a means of coordination between different types of lines, such as power and communications.

(6) Rules in this code which are to be regarded as mandatory are characterized by the use of the word "shall." Where a rule is of an advisory nature it is indicated by the use of the word "should." Other practices which are considered desirable and not intended to be mandatory are stated as recommendations. It is realized that conditions may exist which necessitate departures from such recommendations. [Preface (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-010 Definitions of special terms. (1) "Administrative authority" means the department of labor and industries through the supervisor of the division of safety.

(2) "Alive or live" means electrically connected to a source of potential difference, or electrically charged so as to have a potential different from that of the earth. The term "live" is sometimes used in place of the term "current-carrying," where the intent is clear, to avoid repetitions of the longer term.

(3) "Appliance" means current-consuming equipment, fixed or portable; for example, heating, cooking, and small motor-operated equipment.

(4) "Arm or crossarm" means a horizontal support attached to poles or structures generally at right angles to the conductor supported.

(5) "Arm, buck" means a crossarm used to change the direction of all or part of the conductors on the line arm immediately above or below. A buck arm is generally placed at right angles to the line arm.

(6) "Arm, clearance" means a crossarm supporting conductors installed on a pole of another line for the purpose of maintaining the prescribed clearances of these rules which, if the other line did not exist, could be maintained without such clearance arm.

(7) "Automatic" means self–acting, operating by its own mechanism when actuated by some impersonal influence—as, for example, a change in current strength; not manual, without personal intervention. Remote control that requires personal intervention is not automatic, but manual.

(8) "Bridge" means a structure which is used primarily for foot, vehicular or train traffic as distinguished from those which span certain areas and support signals or wires and which are classed as supporting poles, towers or structures.

(9) "Cable" means a stranded conductor (single conductor cable) or a combination of conductors insulated from one another (multiple–conductor cable).

(10) "Cable vault." (See definition of "manhole.")

(11) "Catenary construction" is that type of construction where an auxiliary wire or messenger is used to assist in supporting in desired alignment trolley contact wire, cables or large conductors that are incapable of supporting themselves in this desired alignment.

(12) "Circuit" means a conductor or system of conductors through which an electric current is intended to flow.

(13) "Circuit breaker" means a device designed to open under abnormal conditions a current–carrying circuit without injury to itself. The term as used in this code applies only to the automatic type designed to trip on a predetermined overload of current.

(14) "Circuits, railway signal" means those supply and communication circuits used primarily for supplying energy for controlling the operation of railway block signals, highway crossing signals, interlocking apparatus and their appurtenances.

(15) "Circuits, supply" means those circuits which are used for transmitting a supply of electrical energy.

(16) "Climbing space" means the space reserved along the surface of a pole or structure to permit ready access for linemen to equipment and conductors located on the pole or structure.

(17) "Common neutral system" is a system in which one conductor is used as the neutral for 2 or more different circuits; one conductor is used as the neutral for both primary and secondary circuits of a distribution system.

(18) "Common use" means simultaneous use by two or more utilities of the same kind.

(19) "Conductor" means a metallic conducting material, usually in the form of a wire or cable, suitable for carrying an electric current. Does not include bus bars.

(20) "Conductor, grounding" means a conductor which is used to connect the equipment or the wiring system with a grounding electrode or electrodes.

(21) "Conductor, lateral" means a conductor extending in a general horizontal direction and usually at an angle of approximately 90 degrees to the direction of the line conductors.

(22) "Conductor, line" means one of the wires or cables carrying electric current, supported by poles, towers, or other structures, but not including vertical or lateral connecting wires.

(23) "Conductors, open" means conductors separately and individually supported.

(24) "Conductors, unprotected" means supply conductors not covered by a "suitable protective covering," grounded metal conduit, grounded metal sheath or shield, or impregnated fiber.

(25) "Conductor, vertical" means, in pole wiring work, a wire or cable extending in an approximately vertical direction.

(26) "Conflict, antenna" means that an antenna or its guy wire is at a higher level than a supply or communication conductor and approximately parallel thereto, provided the breaking of the antenna or its support will be likely to result in contact between the antenna or guy wire and the supply or communication conductor.

(27) "Conflict, conductor" means that a conductor is so situated with respect to a conductor of another line at a lower level that the horizontal distance between them is less than the sum of the following values:

(a) Five feet.

(b) One–half the difference of level between the conductors concerned.

(c) The value required in Tables 6, 7, or 8 (WAC 296–44–325) for horizontal separation between conductors on the same support for the highest voltage carried by either conductor concerned. [See illustration at end of this section.]

(28) "Conflict, structure" (As applied to a pole line) means that the line is so situated with respect to a second line that the overturning (at the ground line) of the first line will result in contact between its poles or conductors and the conductors of the second line, assuming that no conductors are broken in either line. [See illustration at end of this section.]

Exceptions: Lines are not considered as conflicting under the following conditions:

(a) Where one line crosses another.

(b) Where two lines are on opposite sides of a highway, street, or alley and are separated by a distance not less than 60 percent of the height of the taller pole line and not less than 20 feet.

(29) "Current–carrying part" means a conducting part intended to be connected in an electric circuit to a source of voltage. Noncurrent–carrying parts are those not intended to be so connected.

(30) "Dead" means free from any electric connection to a source of potential difference and from electric charge; not having a potential different from that of the

earth. The term is used only with reference to current-carrying parts which are sometimes alive.

(31) "Dead end" means the act, point or equipment used to transfer the mechanical tension in conductors from the conductors to noncurrent-carrying parts of a structure used to support the conductors and still maintain the insulating requirements of the conductors dead-ended.

(32) "Device" means a unit of an electric wiring system which is intended to carry but not consume electric energy.

(33) "Disconnector" means a switch which is intended to open a circuit only after the load has been thrown off by some other means.

(34) "Districts, loading" means those areas in which the specified loadings of these rules apply and are known as "heavy," "medium," and "light" loading districts.

(35) "Districts, rural" means all places not urban, usually in the country, but in some cases within city limits.

(36) "District, urban" means thickly settled areas (whether in cities or suburbs) or where congested traffic often occurs. A highway, even though in the country, on which the traffic is often very heavy, is considered as urban.

(37) "Division of safety" means the division of safety of the department of labor and industries.

(38) "Duct" means (in underground work) a single tubular runway for underground cables.

(39) "Electrical supply station" means any building, room, or separate space within which electric-supply equipment is located and the interior of which is accessible, as a rule, only to properly qualified persons.

Note: This includes generating stations and substations and generator, storage-battery, and transformer rooms, but excludes manholes and isolated-transformer vaults on private premises. (See definition of "transformer vault.")

(40) "Electrode, grounding" means a suitable metallic conducting material (generally copper or copper clad) imbedded in the earth and used for maintaining ground potential on conductors connected to it and for dissipating into the earth such electric current as may be impressed upon it.

(41) "Equipment" means a general term including fittings, devices, appliances, fixtures, apparatus, and the like, used as a part of, or in connection with, an electric installation.

(42) "Equipment, electric supply" means equipment which produces, modifies, regulates controls, or safeguards a supply of electric energy. Similar equipment, however, is not included where used in connection with signaling systems under the following conditions;

(a) Where the voltage does not exceed 150 volts.

(b) Where the voltage is between 150 and 550 volts, and the power transmitted does not exceed 3.2 kilowatts.

(43) "Equipment, utilization" means equipment, devices, and connected wiring which utilize electric energy for mechanical, chemical, heating, lighting, testing, or similar purposes and are not a part of supply equipment, supply lines, or communication lines.

(44) "Explosion-proof" means capable of withstanding without injury and without transmitting flame to the outside any explosion of gas which may occur within.

(45) "Exposed:"

(a) "Applied to circuits" or lines means in such a position that in case of failure of supports or insulation contact with another circuit or line may result.

(b) "Applied to equipment["] means that an object or device can be inadvertently touched or approached nearer than a safe distance by any person. It is applied to objects not suitably guarded or isolated.

(46) "Externally operable" means capable of being operated without exposing the operator to contact with live parts.

Note: This term is applied to equipment, such as a switch, that is inclosed in a case or cabinet.

(47) "Ground connection" means the equipment used in establishing a conducting path between an electric circuit or equipment and earth. A ground connection consists of a ground conductor, a ground electrode and the earth (soil, rock, etc.) which surrounds the electrode.

(48) "Grounded" means connected to earth by a ground connection or by an unintentional conducting path.

(49) "Grounded, effectively" means permanently connected to earth through a ground connection of sufficiently low impedance and having sufficient current-carrying capacity to prevent the building up of voltages which may result in undue hazard to connected equipment or to persons.

(50) "Grounded, system" means a system of conductors in which at least one conductor or point (usually the middle wire, or neutral point of transformer or generator windings) is intentionally grounded, either solidly or through a current-limiting device.

(51) "Guarded" means covered, shielded, fenced, inclosed, or otherwise protected, by means of suitable covers or casings, barrier rails or screens, mats or platforms, to remove the liability of dangerous contact or approach by persons or objects to a point of danger.

(52) "Guy" means a tension member (a solid wire or stranded wires) used to withstand an otherwise unbalanced force on a pole, crossarm, or other overhead line structure.

(53) "Guy, anchor" means a guy which has its lower anchorage in the earth and includes a sidewalk or ground guy.

(54) "Guy, overhead (span)" means a guy extending from a pole, crossarm, or structure to a pole, crossarm, or structure.

(55) "Handhole" means an opening in an underground system into which workmen reach, but do not enter.

(56) "Identification" means, for the purpose of these rules, to identify or identification, shall mean that method of coloring, lettering, numbering, marking or maintaining in any certain position in relation to other

objects, the same wire, cable pipe, circuit, phases, or other material objects throughout the installation.

(57) "Inclosed" means surrounded by a case which will prevent accidental contact of a person with live parts. A solid inclosure means one which will neither admit accumulations of flyings or dust, nor transmit sparks or flying particles to the accumulations outside.

(58) "Insulated" means separated from other conducting surfaces by a dielectric substance or air space permanently offering a high resistance to the passage of current and to disruptive discharge through the substance or space.

Note: When any object is said to be insulated, it is understood to be insulated in suitable manner for the conditions to which it is subjected. Otherwise, it is, within the purpose of these rules, uninsulated. Insulating coverings of conductors is one means for making the conductors insulated.

(59) "Insulating" (where applied to the covering of a conductor, or to clothing, guards, rods, and other safety devices) means that a device, when interposed between a person and current–carrying parts, protects the person making use of it against electric shock from the current–carrying parts with which the device is intended to be used; the opposite of conducting.

(60) "Isolated" means that an object is not readily accessible to persons unless special means for access are used.

(61) "Isolation by elevation" means elevated sufficiently so that persons may safely walk underneath.

(62) "Joint use" means simultaneous use by two or more kinds of utilities.

(63) "Lightning arrester" means a device which has the property of reducing the voltage of a surge applied to its terminals, is capable of interrupting follow current if present, and restores itself to its original operating conditions.

(64) "Lines."

(a) Communication lines means the conductors and their supporting or containing structures which are located outside of buildings and are used for public or private signal or communication service, and which operate at not exceeding 400 volts to ground or 750 volts between any two points of the circuit, and the transmitted power of which does not exceed 150 watts. When operating at less than 150 volts no limit is placed on the capacity of the system.

Note: Telephone, telegraph, railroad–signal, messenger–call, clock, fire or police–alarm and other systems conforming with the above are included.

Lines used for signaling purposes, but not included under the above definition, are considered as supply lines of the same voltage and are to be so run.

Exception is made under certain conditions for communication circuits used in the operation of supply lines. (See WAC 296-44-424(1)).

(b) "Communication lines, minor" means communication lines carrying not more than two circuits used mainly for local telephone or telegraph service, or for police or fire–alarm service.

(c) "Electric supply" means those conductors and their necessary supporting or containing structures which are located entirely outside of buildings and are used for transmitting a supply of electric energy.

Does not include open wiring on buildings, in yards or similar locations where spans are less than 20 feet, and all the precautions required for stations or utilization equipment, as the case may be, are observed.

Railway signal lines of more than 400 volts to ground are always supply lines within the meaning of these rules, and those of less than 400 volts may be considered as supply lines, if so run and operated throughout.

(65) "Low voltage protection" means the effect of a device operative on the reduction or failure of voltage to cause and maintain the interruption of power supply to the equipment protected.

(66) "Low voltage release" means the effect of a device operative on the reduction or failure of voltage to cause the interruption of power supply to the equipment, but not preventing the reestablishment of the power supply on return of voltage.

(67) "Maintenance" means the work done on any line or any element of any line for the purpose of extending its life (excepting the replacement of the supporting poles or structures) and includes the replacement, for any reason, of crossarms, pins, insulators, wires, cables, messengers, etc., but does not contemplate the addition of elements (excepting pole stubs and guy wires) which will change the identity of the structure.

(68) "Manhole" (more accurately termed splicing chamber or cable vault) means an opening in an underground system which workmen or others may enter for the purpose of installing cables, transformers, junction boxes, and other devices, and for making connections and tests.

(69) "Manual" means capable of being operated by personal intervention.

(70) "Messenger" means stranded wire which generally is not a part of the conducting system, its primary function being to support wires or cables of the conducting system; sometimes called "suspension strand."

(71) "Minor tracks" means railway tracks included in the following list:

(a) Spurs less than 2,000 feet long and not exceeding two tracks in the same span.

(b) Branches on which no regular service is maintained or which are not operated during the winter season.

(c) Narrow–gage tracks or other tracks on which standard rolling stock cannot, for physical reasons, be operated.

(d) Tracks used only temporarily for a period not exceeding 1 year.

(e) Tracks not operated as a public utility, such as industrial railways used in logging, mining, etc.

(72) "Multi–grounded system" means a system in which the neutral conductor is grounded at many places.

(73) "Objectionable flow of current," in grounding conductors, means any measurable amount of current

flowing to earth which can be attributed to inadequately or improperly installed metallic return to sources of supply.

(74) "Open wire" means a conductor or pair of conductors separately supported above the surface of the ground.

(75) "Panelboard" means a single panel, or a group of panel units designed for assembly in the form of a single panel, including buses and with or without switches and/or automatic overcurrent-protective devices for the control of light, heat, or power circuits of small individual as well as aggregate capacity; designed to be placed in a cabinet or cut-out box placed in or against a wall or partition, and accessible only from the front. (See definition of "Switchboard.")

(76) "Pole face" means that side of the pole on which crossarms are attached, or which is so designated by the utilities owning or operating the pole.

(77) "Qualified" means familiar with the construction and operation of the apparatus and the hazards involved.

(78) "Raceway" means any channel for loosely holding wires or cables in interior work, which is designed expressly and used solely for this purpose. Raceways may be of metal, wood, or insulating material, and the term includes wood and metal moldings consisting of a backing and capping, and also metal ducts into which wires are to be pulled.

(79) "Racks, vertical (secondary racks)" for the purpose of these rules shall include individual supports in rack configuration used for the support of conductors of 0 to 750 volts.

(80) "Reconstruction" means replacement of any portion of an existing installation by new equipment or construction. Does not include ordinary maintenance replacements.

(81) "Risers" means conductors which extend below the ground line and are generally installed on the surfaces of poles.

(82) "Sag:"

(a) "Apparent sag at any point" means the departure of the wire at the particular point in the span from the straight line between the two points of support of the span, at 60° F, with no wind loading.

(b) "Apparent sag of a span" means the maximum departure of the wire in a given span from the straight line between the two points of support of the span, at 60° F, with no wind loading.

(c) "Final unloaded sag" means the sag of a conductor after it has been subjected for an appreciable period to the loading prescribed for the loading district in which it is situated, or equivalent loading, and the loading removed.

(d) "Initial unloaded sag" means the sag of a conductor prior to the application of any external load.

(e) "Maximum total sag" means the total sag at the midpoint of the straight line joining the two points of support of the conductor.

(f) "Total sag" means the distance measured vertically from any point of a conductor to the straight line joining its two points of support, under conditions of ice loading equivalent to the total resultant loading for the district in which it is located.

(g) "Unloaded sag of a conductor at any point in a span" means the distance measured vertically from the particular point in the conductor to a straight line between two points of support, without any external load.

(83) "Service" means the conductors and equipment for delivering electric energy from the secondary distribution or street main, or other distribution feeder, or from the transformer to the wiring system of the premises served.

(84) "Service drops" means the conductors strung between a pole line and a building or structure.

(85) "Span length" means the horizontal distance between two adjacent supporting points of a conductor.

(86) "Span wire" means a wire or cable used as an auxiliary support for wires, cables, or other equipment. As applied to trolley construction, it means a wire or cable used to support laterally, or which is attached to wires which support laterally, trolley contact conductors and appurtenances in electrical contact therewith, including wires commonly referred to as cross-span wires, bracket-span wires, pull-offs, trolley strain guys, dead ends, etc.

(87) "Splicing chamber." (See definition of "Manhole.")

(88) "Substantial" means so constructed and arranged as to be of adequate strength and durability for the service to be performed under the prevailing conditions.

(89) "Supervisor" means the supervisor of the division of safety.

(90) "Switch" means a device for opening and closing or for changing the connection of a circuit. In these rules, a switch will always be understood to be manually operated, unless otherwise stated.

(91) "Switchboard" means a large single panel, frame, or assembly of panels, on which are mounted (on the face, or back, or both) switches, fuses, busses, and usually instruments.

(92) "Tags" means "men at work" tags of distinctive appearance, indicating that the equipment or lines so marked are being worked on.

(93) "Tension:"

(a) "Final unloaded conductor tension" means the longitudinal tension in a conductor after the conductor has been stretched by the application for an appreciable period, and subsequent release, of the loadings of ice and wind, and temperature decrease, assumed for the loading district in which the conductor is strung (or equivalent loading).

(b) "Initial conductor tension" means the longitudinal tension in a conductor prior to the application of any external load.

(94) "Transformer vault" means an isolated inclosure either above or below ground with fire-resistant walls, ceiling, and floor, in which transformers and related equipment are installed, and which is not continuously attended during operation.

(95) "Voltage of a circuit" means the highest effective voltage between any two conductors of the circuit concerned.

Exception: Voltage of a grounded multiwire circuit, not exceeding 750 volts between any two conductors, means the highest effective voltage between any wire of the circuit and that point or conductor of the circuit which is grounded.

If one circuit is directly connected to another circuit of higher voltage (as in the case of an autotransformer), both are considered as of the higher voltage, unless the circuit of lower voltage is effectively grounded, in which case its voltage is not determined by the circuit of higher voltage. Direct connection implies electric connection as distinguished from connection merely through electromagnetic or electrostatic induction.

(96) "Voltage to ground of:"

(a) A "grounded circuit" means the highest effective voltage between any conductor of the circuit and that point or conductor of the circuit which is grounded.

(b) An "ungrounded circuit" means the highest effective voltage between any two conductors of the circuit concerned.

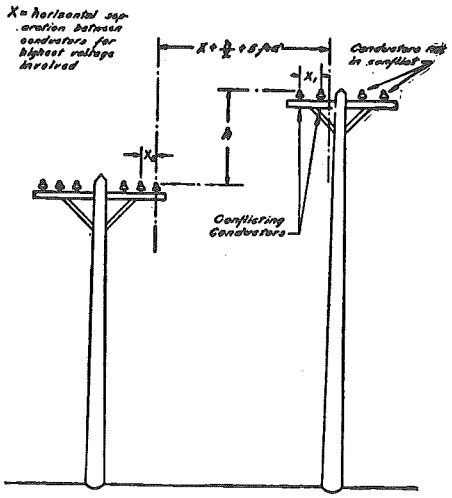
A "conductor of:"

(a) A "grounded circuit" means the highest effective voltage between such conductor and that point or conductor of the circuit which is grounded.

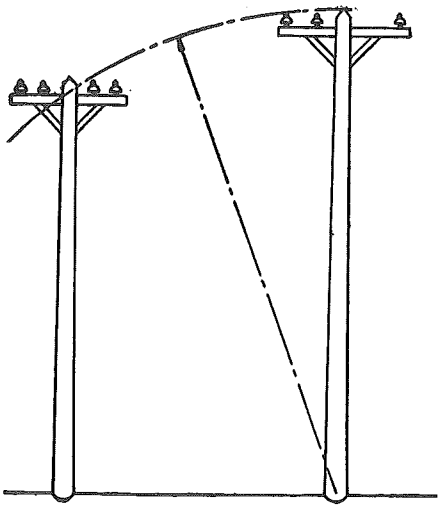
(b) An "ungrounded circuit" means the highest effective voltage between such conductor and any other conductor of the circuit concerned.

(97) "Wire gages:" The American Wire Gage (AWG), otherwise known as Brown & Sharpe (B&S), is the standard gage for copper, aluminum, and other conductors, excepting steel, for which the Steel Wire Gage (Stl. WG) is used throughout these rules.

(98) "Working space, lateral" means the space reserved for working between conductor levels outside the climbing space, and to its right and left.



Conductor Conflict



Structure Conflict

[§ 1, filed 3/23/60, effective 12/1/58.]

WAC 296-44-013 Purpose and scope of rules. (1) **Purpose.** Purpose of these rules is to formulate, for the state of Washington, uniform requirements for electrical installations, the application of which shall insure adequate service and secure safety to persons engaged in the construction, maintenance, operation, or use of electrical lines and equipment and to the public in general.

(2) **Scope.** These rules are not intended as complete construction specifications but embody only the requirements which are considered most important from the standpoint of safety and service. Construction shall be according to accepted good practice for local conditions in all particulars not specified in these rules. [§ 2 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-016 Applicability of rules——General. These rules will apply to:

(1) All overhead electrical supply and communications lines and equipment located outside of buildings.

(2) Underground lines and equipment.

(3) Stations and substations.

(4) Radio installations.

(5) All other electrical installations which come under the jurisdiction of the electrical utility inspectors of the division of safety, department of labor and industries.

(6) The installation and maintenance of electric utilization equipment. [§ 2 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-019 Applicability of rules——To construction and reconstruction of lines. These rules apply to all such lines and extensions constructed after the adoption of these rules and shall become applicable also

to such lines now existing or any portion thereof whenever they are reconstructed.

(1) Reconstruction. The reconstruction of an element of a line requires that all elements subordinate to the reconstructed element meet the requirements of these rules. For the purpose of these rules, reconstruction will be construed to mean: "Replacement of any portion of an existing installation by new equipment or construction," except:

(a) **Service drops.** Service drops may be added to existing plant without necessitating changes in the circuit or line from which they originate.

(b) **Conductors.** Conductors or circuits added to crossarms installed prior to the effective date of these rules will not be required to afford greater ground clearances than the ground clearance provided by conductors of the same or higher voltage classification which are already in place on such arms.

All other clearances except ground clearances with which such added conductors or circuits are concerned shall be in accordance with these rules.

(c) **Subordinate element.** An element (such as a crossarm, conductor, transformer or other equipment) added to a pole, tower, or structure, shall meet all the requirements of these rules but does not require any change in like elements already existing except where the added element is related in buckarm construction to an existing arm, in which case all construction on the related arms shall meet the requirements of these rules. A crossarm, pole, tower, or other structure to which any subordinate element is added shall meet the strength safety factor requirements specified in these rules.

(2) Replacement of poles, towers, or other structures. The replacement of poles, towers, or other structures is considered to be reconstruction and requires adherence to all strength and clearance requirements of these rules. The clearances of the spans adjacent to the new support need not be changed but the new support shall be such that when the adjacent support is replaced, the span between will meet all the requirements of these rules. [§ 2 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-022 Applicability of rules——Restoration of clearances. The restoration of clearances originally established prior to the effective date of these rules, where the original clearance has been reduced by additional sagging or other causes, is not considered to be reconstruction and the reestablished clearance shall conform to the requirements of the rules in effect at the time that the original clearance was established. The changing of clearance for any other purpose is reconstruction and clearances so changed shall comply with these rules where they apply to reconstruction. [§ 2 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-025 Applicability of rules——Lines constructed prior to these rules. These rules shall not apply to the use of existing electrical installations during their lifetime provided they are maintained in good condition and in accordance with the applicable safety factor requirements and the rules in effect at the time they were installed, and provided that reconstruction shall conform to the rules as herein provided. [§ 2 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-028 Applicability of rules——Reconstruction or alteration. In the interest of safety, the supervisor may order the reconstruction or alteration of existing lines or equipment. [§ 2 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-031 Applicability of other standards. If the regulations herein contained fail to provide a rule governing a particular situation, but separately accepted standards of the state of Washington do provide an applicable rule, then the rule of the safety standards here listed shall prevail.

General Safety Standards
Safety Standards for Construction Work
National Electrical Code
Rules and Regulations for Installing Electric Wires and Equipment
Electrical Workers Safety Rules
Communication Workers Safety Rules [§ 2 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-034 Design, construction and maintenance. Electrical supply and communication systems shall be of suitable design and construction for their intended use, regard being given to the conditions under which they are to be operated, and shall be maintained in a condition which will enable the furnishing of safe, proper and adequate service. The owners and employees of such systems shall at all times exercise due care to reduce to a minimum the hazard of accidental injury, to their own or fellow employees, to the public and other utilities, due to their installations.

All construction shall be done in such a manner that the operations of other utilities will be interfered with as little as possible and no conditions unusually dangerous to workmen, pedestrians or others shall be established. [§ 2 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-037 Limiting conditions specified. The requirements specified in these rules as to spacing, clearance, and strength of construction are limiting conditions expressed as minimum or maximum value as indicated. In cases where two or more requirements establish limiting conditions, the most stringent conditions shall be met, thus providing compliance with other applicable conditions. Greater strength of construction and more ample spacing and clearances than herein specified may be desirable in some cases and may be provided accordingly if other requirements are not violated in so doing. [§ 2 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-040 Waiving of rules. These rules are intended to apply to all electrical installations except as modified or waived by the supervisor of the division of safety. They are intended to be modified or waived wherever any rules are shown to be impracticable, such

as involving expense not justified by the protection secured; provided equivalent or safer construction is secured in other ways. [§ 2 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-043 Exemptions or modifications. If in a particular case or a special type of construction, exemption from or modification of any of the requirements herein is desired, the supervisor of the division of safety shall consider an application for such exemption or modification when accompanied by a full statement of conditions existing and the reasons why such exemption or modification is asked and is believed to be justifiable, and shall render a decision. It is to be understood that unless otherwise ordered, any exemption or modification so granted shall be limited to the particular case or the special type of construction covered by the application. Other methods of construction and installation than those specified in these rules may be used as experiments to obtain information if done with the permission of the supervisor.

It may sometimes be necessary to modify or waive certain rules in cases of temporary installations or installations which are soon to be discarded or reconstructed. [§ 2 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-046 Emergency. In cases of emergency or pending a decision of the supervisor of the division of safety, the person responsible for the installation may decide as to modification or waiver of any rule, subject to review by the supervisor, but shall first notify all parties directly concerned in advance of construction. Such emergency construction shall be brought into conformity with the rules, at the earliest possible date. [§ 2 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-049 Saving clause. The supervisor of the division of safety reserves the right to suspend any of the provisions of these rules in specific cases when such a change is in the interest of safety.

Compliance with these rules is not intended to relieve any utility from statutory requirements. [§ 2 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-052 Cooperation to avoid conflicts. Any party contemplating construction or reconstruction which would create a conflict with a line of another party shall notify the party or parties owning or operating the other line, in advance of such construction, giving full information as to the location and character of the proposed construction, and the parties concerned shall cooperate with a view of avoiding, or, if this is impracticable, of minimizing the hazard. [§ 2 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-055 Joint use of poles. (1) Joint use of poles shall be given consideration by all interested parties where construction or reconstruction is involved and where used it shall be subject to the appropriate grade of construction as specified in these rules. Nothing herein shall be construed as requiring joint use of the same poles, or as granting authority for the use of any poles without the owner's consent.

(2) Each party should definitely designate its space requirements on joint poles, which space shall not be occupied without consent, by equipment of any other party. [§ 2 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-058 Rules covering methods of protective grounding of circuits, equipment, and lightning arresters for stations, lines, and utilization equipment——Scope. (1) The following rules apply to the grounding of all lightning arresters except those on communication circuits, and of all circuits, equipment, or wire raceways when the grounding is intended to be a permanent and effective protective measure.

(2) They do not apply to the grounded return of electric railways, nor to the grounding of lightning protection wires which are independent of electric circuits or equipment. These rules do not require that grounding shall be done, but cover the methods for protective grounding. The rules requiring grounding, in accordance with the methods specified below, are included under the various parts of this code. [§ 9 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-061 Rules covering methods of protective grounding of circuits, equipment, and lightning arresters for stations, lines, and utilization equipment——Point of attachment of grounding conductor. (1) **Direct-current distribution systems.** Direct-current systems which are to be grounded shall have the grounding connection made at one or more supply stations but not at individual services and not elsewhere on interior wiring. In three-wire direct-current systems the ground connections shall be made on the neutral.

(2) **Alternating-current distribution systems.** In alternating-current systems the ground connection shall be made at the building service or near the transformer (or transformers) either by direct ground connection (through water-piping system or artificial ground, see WAC 296-44-067) or by the use of a system ground wire to which are connected the grounded conductors of many secondary mains and which is itself effectively grounded at intervals that will fulfill, for any secondary utilizing the system ground wire, the resistance and current-carrying requirements of these rules.

If the secondaries of transformers are supplying a common set of mains, fuses, if installed, shall be located only at such points as not to cause the loss of the ground connections after any fuses in the transformer circuits or mains have been blown.

Alternating-current secondary circuits supplied from a transformer outside the building shall not be grounded inside buildings except at the service entrance.

In single-phase, three-wire systems the ground shall be on the neutral conductor. In two-wire single-phase and in two- or three-phase systems the ground shall be made at that point of the system which brings about the lowest voltage from ground of unguarded current-carrying parts of connected devices. Where one phase of a

two- or three-phase system is used for lighting, that phase should be grounded and at the neutral conductor, if one is used.

In the absence of direct grounds at all building services, ground connections shall be made to the grounded neutral or other grounded conductor of a secondary system supplying more than one utilization equipment, at intervals that will fulfill the resistance requirements of WAC 296-44-073(1).

(3) **Current in grounding conductor.** Grounds shall be so arranged that under normal conditions of service there will be no objectionable flow of current over the grounding conductor.

The temporary currents set up under accidental conditions, while the grounding conductors are performing their intended protective functions, are not to be considered as objectionable.

If an objectionable flow of current occurs over a grounding conductor, due to the use of multiple grounds, (1) one or more of such grounds shall be abandoned, or (2) their location shall be changed, or (3) the continuity of the conductor between the grounding connections shall be suitably interrupted, or (4) other means satisfactory to the administrative authority shall be taken to limit the current.

(4) **Equipment and wire raceways.** Metal boxes, cabinets and fittings, or noncurrent-carrying metal parts of other fixed equipment, if metallically connected to grounded cable armor or metal raceway, are considered to be grounded by such connection. Where the metal enclosure of a wiring system is used as part of the protective grounding, the electrical continuity of the enclosure shall be assured.

For conduit, armored cable, or metal raceways the ground connection shall be as near as practicable to the point where the conductors in the raceway system concerned received their supply.

(5) **Service conduit.**

When the service conduit is grounded, its grounding wire shall be run directly from it to the ground connection. The interior conduit, armored cable, or metal raceways, if well bonded to the service conduit, grounded as provided in this rule, needs no additional ground connection. [§ 9 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-064 Grounding conductor. (1) **Material and continuity.** In all cases the grounding conductor shall be of copper or of other metal which will not corrode excessively under the existing conditions and, if practicable, shall be without joint or splice. If joints are unavoidable they shall be so made and maintained as to conform to the resistance requirements of WAC 296-44-073.

In no case shall a fuse or automatic circuit-breaker be inserted in the grounding conductor or connection except in a ground connection from equipment where its operation will result in the automatic disconnection from all sources of energy of the circuit leads connected to equipment so grounded; no switch shall be so inserted except in plain sight, provided with distinctive marking and effectively isolated from unqualified persons. (See also WAC 296-44-061(2) par. 2).

For lightning arresters and ground detectors the grounding conductor shall be as short and straight as practicable and free from sharp bends.

(2) **Size and capacity.** The grounding conductor shall conform to the following:

(a) For direct-current circuits. A grounding conductor for a direct-current supply system shall have a current-carrying capacity not less than that of the largest conductor supplied by the system and in no case less than that of No. 8 copper.

(b) For alternating-current circuits. A grounding conductor for an alternating-current system shall have a current-carrying capacity not less than one-fifth that of the conductor to which it is attached and in no case less than that of No. 8 copper.

(c) For instrument transformers. The grounding conductor for instrument cases and secondary circuits of instrument transformers shall not be smaller than No. 12 if of copper or, if of other metal, shall have equivalent current-carrying capacity.

(d) For lightning arresters. The grounding conductor or conductors shall have a current capacity sufficient to insure continuity and continued effectiveness of the ground connection under conditions of excess current caused by or following discharge of the arrester. No individual grounding conductor shall have less conductance than No. 6 (0.162-inch) copper wire.

(e) For raceways and equipment. The current-carrying capacity of grounding conductors for equipment, raceways, cable armor, and other metal enclosures for wires, when provided with overcurrent protection, shall be sufficient to provide adequate draining of fault current during the time required for the protective device to operate. Where connected to artificial electrodes, the grounding conductor need not be larger than No. 6 copper wire or its equivalent. If no fuse or automatic circuit-breaker is provided, the capacity of the grounding conductor shall be determined by the design and operating conditions of the circuit, but shall not be smaller than No. 8.

(f) For portable and pendent equipment. For grounding portable or pendent equipment, the conductors to which are protected by fuses or circuit-breakers rated or set at not exceeding 15 amperes, No. 18 copper wire may be used. For grounding portable or pendent equipment protected at more than 15 amperes, see preceding paragraph.

(3) **Mechanical protection and guarding against contact.** Where exposed to mechanical injury, the grounding conductor shall be protected by substantial conduit or other guard. Guards for lightning-arrester grounding conductors shall be of nonmagnetic material unless the grounding conductor is electrically connected to both ends of the guard.

If the resistance of the ground connection is in excess of three ohms, the grounding conductor, except in rural districts, shall be protected and guarded by being inclosed in insulating conduit or molding to protect persons from injury by coming in contact with it.

Note: Such a high resistance may exist where artificial grounds are necessarily permitted in lieu of the preferable grounds to buried metallic water–piping systems.

Mechanical protection and insulating guards should extend for a distance of not less than 8 feet above any ground, platform, or floor from which grounding conductors are accessible to the public.

Note: Insulating mechanical protection is advisable for single arrester grounds, even when the connection is made to a water–piping system, and has therefore a low resistance, since a single connection is liable to be accidentally broken.

Even where ground connections have a resistance not exceeding that specified in WAC 296–44–073 and no guard is therefore provided (or as an additional protection to persons even where guards are used), artificial grounds may be arranged to minimize the potential gradient along the surface of the earth by use of radial connecting wires underneath the earth surface or by other suitable means.

A grounding conductor for a circuit shall be guarded as required for current–carrying conductors of the circuit.

Exception 1: A grounding conductor for a circuit having at least two ground connections, where such conductor is entirely outside buildings and has strength and current capacity not less than No. 8 (0.1285–inch) copper wire.

Exception 2: In stations substantial bare ground busses may be used.

(4) **Underground.** Wires used for grounding conductors, if laid underground, shall, unless otherwise mechanically protected, be laid slack to prevent their being readily broken, and shall have joints carefully painted or otherwise protected against corrosion.

(5) **Common grounding conductor for circuits, metal raceways, and equipment.** The grounding conductor of an interior wiring system may be used also as the grounding conductor for equipment, conduit, and other metal raceways or enclosures for conductors, including service conduit or cable sheath and service equipment, provided such grounding conductor meets the current–carrying–capacity requirements for service raceways, as specified in subsection 2 above; and provided further, that the secondary distribution circuit supplying the interior wiring system has at least one additional ground at the transformer or elsewhere. [§ 9 (part), filed 3/23/60, effective 12/1/58.]

WAC 296–44–067 Ground connections. (1) The ground connection shall be permanent and effective, and be made as indicated below, but always to water–piping systems, if available.

(2) **Piping systems.** For circuits, equipment, and arresters at supply stations, connections shall be made to all available active metallic underground water–piping systems between which no appreciable difference of potential normally exists, if the pipe is of sufficient capacity, and to one such system if appreciable differences of potential do exist between them. At other places connections shall be made to at least one such system, if available. Gas piping should be avoided for circuit grounding wherever practicable.

Note: The protective grounding of electric circuits and equipment to waterpipe systems in accordance with these rules should always be permitted, since such grounding offers the most effective protection to life and property and is not injurious to the piping systems.

Ground connections from circuits should not be made to jointed piping within buildings except water piping.

(3) **Alternate methods.** Where underground metallic piping systems are not available, other methods which will secure the desired permanence and conductance may be permitted. In many cases metal well casings, and similar buried metal structures of considerable extent will be available and may be used in lieu of extended buried water–piping systems.

In some cases ground connection may be made to the steel frame of a building containing the grounded circuits or equipment, to which frames of machines and other noncurrent–carrying surfaces should also then be connected. In such cases the building frame should be itself well grounded by effective connection to the ground. This may require artificial grounding for steel–frame buildings supported on masonry or concrete footings.

(4) **Made electrodes.** If resort must be had to made (buried or driven) electrodes their number should be determined by the following requirements:

(a) Not more than one such ground is required for lightning arresters, except where needed for large current capacity.

(b) At least two grounds are required for low–voltage alternating–current distribution circuits at transformers or elsewhere, except as specified in paragraph (c) following.

(c) Where no part of the circuit or equipment protected can be reached by persons while they are standing on the ground or damp floors, or by persons while touching any metallic piping to which the grounding conductor is not effectively connected, a single made electrode may be used even if its resistance exceeds that specified in WAC 296–44–073. In such cases it is desirable to provide guards for the grounding conductor in accordance with WAC 296–44–064(3) wherever it is otherwise accessible.

(5) **Grounds to railway returns.** Protective ground connections should not be made to railway negative–return circuits when other effective means of grounding are available, except ground connections from electric–railway lightning arresters. When ground connections are of necessity made to the grounded track return of electric railways, they shall be made in such a manner as not to afford a metallic connection (as indirectly through a grounded neutral with multiple grounds) between the

railway return and the other grounded conducting bodies (such as buried piping and cable sheaths).

Note: This rule does not prohibit the making of drainage connections (which are not protective grounds) between piping systems and railway negative-return circuits for the prevention of electrolysis.

Multiple protective ground connections from other circuits to railway returns should be avoided; and where multiple artificial grounds are made on such other circuits near such railway returns, they should be so arranged as to prevent the flow of any considerable current in and between such connections, which flow would reduce their effectiveness, or otherwise cause damage. [Rule 93C (codified as subsection (4)), filed 10/30/64, effective 12/1/64; Subsections A through D (codified as (1), (2), (3), (4) and (5)), filed 3/23/60, effective 12/1/58; Rule 93C, § 9 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-070 Method. (1) **Piping.** The point of attachment of a grounding conductor to a water-piping system shall be on the street side of the water meter, or on a cold-water pipe of adequate current-carrying capacity, as near as practicable to the water-service entrance to the building or near the equipment to be grounded, and shall be accessible except by special permission. If the point of attachment is not on the street side of the water meter, the water-piping system shall be made electrically continuous by bonding together all parts between the attachment and the pipe entrance which are liable to become disconnected, as at meters and service unions. If water meters are located outside buildings or in concrete pits within buildings where piping connections are embedded in concrete flooring, the ground connections may be made on the building side of the meters. Gas-piping systems within buildings shall not be used for purposes of this rule where water pipes are readily available. Gas piping may serve as the grounding electrode for fixtures located at a considerable distance from water piping. Where gas piping is so used it shall be bonded to the water-piping system at the point of entrance of water piping. (See WAC 296-44-067(2).)

(2) **Ground clamps.** The ground connection to metallic-piping systems shall be made by means of an approved clamp firmly bolted to the pipe after all rust and scale have been removed, or by means of a brass plug which has been tightly screwed into a pipe fitting or, where the pipe is of sufficient thickness, screwed into a hole in the pipe itself, or by other equivalent means.

The grounding conductor shall be attached to the clamp or to the plug by means of solder or by an approved solderless connector. The point of connection shall be as readily accessible as practicable.

Note: With bell-and-spigot-joint pipe it may be necessary to connect to several lengths where circuits or equipment of large current capacity are being grounded.

(3) **Contact surfaces.** If conduit, couplings, or fittings having protective coating of nonconducting material, such as enamel, are used, such coating shall be thoroughly removed from threads of both couplings and conduit and such surfaces of fittings where the conduit or ground clamp is secured, in order to obtain the requisite good connection. Grounded pipes shall be free from rust, scale, etc., at the place of attachment of ground clamp. Conduits, other metal raceways, and the armor of cables shall be securely fastened in outlet boxes, junction boxes, and cabinets, so as to secure good electrical connection.

In ice houses, packing plants, etc., where a great deal of moisture is present and where conduits are attached to metal cabinets, cut-out, pull, or junction boxes, compensators, etc., by means of lock nuts and bushings, these conduits should be bonded together.

(4) **Made electrode grounds.** Where made electrodes are used, they shall, as far as practicable, be embedded below permanent moisture level. Made electrodes shall be of materials or combinations of materials which shall not corrode excessively under the existing conditions.

Buried-plate electrodes shall present not less than two square feet of surface to exterior soil. Electrodes of plate copper shall be at least 0.06 inch in thickness. Electrodes of iron or steel plates shall be at least one-quarter inch in thickness.

Electrodes of iron or steel pipe shall be galvanized and not less than one-half inch (nominal size). Electrodes of rods of steel or iron shall be at least five-eights inch minimum cross-sectional dimension. Approved rods of nonferrous materials or their approved equivalent used for electrodes shall be not less than one-half inch in diameter. Driven electrodes of pipes or rods, if of less than standard commercial length, shall preferably be of one piece, and, except where rock bottom is encountered, shall be driven to a depth of at least eight feet regardless of size or number of electrodes used. Such pipes or rods shall have clean metal surfaces and shall not be covered with paint, enamel, or other poorly conducting materials.

Made electrodes may be wire attached to the pole previous to the setting of the pole. The wire shall be of copper or of other metals which will not corrode excessively under the existing conditions and shall have a continuous bare or exposed length below ground level of not less than twelve feet, shall extend to the bottom of the pole, and shall be not smaller than No. 6. [Subsection D (codified as (4)), filed 10/30/64, effective 12/1/64; Subsections A through C (codified as (1), (2), (3)), § 9 (part), filed 3/23/60, effective 12/1/58; Rule 94D, § 9 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-073 Ground resistance. (1) **Limits.** The combined resistances of the grounding wire and the connection with the ground shall not exceed 3 ohms for water-pipe connections nor 25 ohms for artificial (buried or driven) grounds. Where it is impracticable to obtain, with one electrode, artificial-ground resistance as low as 25 ohms, this requirement shall be waived, and two or more electrodes, at least 6 feet apart, shall be provided.

(2) **Checking.** The resistance of station grounds should be checked when made.

Note: With artificial grounds this check may be made by measuring the voltage between the grounded point of the circuit or the grounded frame of the equipment, or the grounded point of the lightning arrester, and an auxiliary metal reference rod or pipe driven into the ground, while a measured current is flowing through the ground connection and any exposed metal piping or other artificial ground not less than 20 feet distant.

If the station ground is to water piping, the check may be made with current flowing through the water piping and some independent piping system or artificial ground not less than 20 feet distant.

The auxiliary rod or pipe should be at least 10 feet from any artificial ground or piping systems through which the measured current is made to flow.

(3) All ground connections shall be inspected periodically. Ground connections on distribution circuits should, when installed, be tested for resistance unless multiple grounding is used. [§ 9 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-076 Separate grounding conductors and grounds. (1) **Grounding conductors.** Grounding conductors from equipment and circuits of each of the following classes, if required by these rules, shall be run separately to the ground or to a sufficiently heavy grounding bus or system ground cable which is well connected to ground at more than one place, except as provided in subsection (3) of this section and in WAC 296-44-415(3).

(a) Lightning arresters.

(b) Secondaries connected to low-voltage lighting or power circuits, except that if a secondary distribution system has multiple grounds, utilization equipment and wire enclosures may use the same grounding conductor.

(c) Secondaries of current and potential instrument transformers having primary voltages of more than 750 volts, and cases of instruments on these secondaries.

(d) Frames of direct-current railway equipment and of equipment operating in excess of 750 volts.

(e) Frames of utilization equipment or wire raceways other than covered by item (d), except as provided in item (b).

(f) Lightning rods.

(2) **Electrodes.** Where conditions require more than one made electrode ground, separate grounding conductors as well as separate grounding electrodes shall be used except that a single grounding conductor may be connected to a group of electrodes which have been bonded together for the purpose of lowering the resistance to ground of the group. This does not prohibit the bonding together of these separate made electrodes or groups of electrodes near the ground level.

(3) **Interconnection of primary arrester and secondary neutral.**

(a) Solid interconnection. The grounding conductor of a lightning arrester protecting a transformer which supplies a secondary distribution system may be interconnected with the grounded conductor of such secondary distribution system, provided that in addition to the direct grounding connection at the arrester either:

(i) The secondary has elsewhere a grounding connection to a continuous metallic underground water piping system; or

(ii) The secondary neutral (which may or may not be common with the primary neutral) has at least four ground connections in each mile of line in addition to a ground connection at each individual service.

(b) Interconnection through spark gap. Where the secondary is not grounded as in item 1, interconnection, if made, shall be through a spark gap having a 60-cycle breakdown voltage of at least twice the primary circuit voltage but not necessarily more than 15 kilovolts, and there shall be at least one other ground on the grounded conductor of the secondary that is at least 20 feet distant from the lightning-arrester grounding electrode. [Subsection B (codified as (2)), filed 10/30/64, effective 12/1/64; Subsections A and B (codified as (1) and (3)), § 9 (part), filed 3/23/60, effective 12/1/58; Rule 96B, § 9 (part), filed 3/23/60, effective 12/1/58.]

INSTALLATION AND MAINTENANCE OF ELECTRIC SUPPLY STATIONS AND EQUIPMENT

WAC 296-44-079 Protective arrangements of stations and substations——Scope of the rules. The following rules apply to the electric supply equipment of indoor and outdoor stations and substations. Provided the equipment is in separate rooms or enclosures, under control of properly qualified persons and accessible only to such persons, they also apply to similar equipment, including generators, motors, storage batteries, transformers, lightning arresters, etc., if installed in factories, mercantile establishments, vehicles, or elsewhere.

Similar equipment under control of properly qualified persons, and accessible only to such persons, is exempted under the following conditions: (1) If the voltage does not exceed 150 volts to ground.

(2) If the voltage is not more than 550 volts between conductors, and the power utilized does not exceed 3,200 watts. [§ 10 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-082 Protective arrangements of stations and substations——General requirements. (1) **Enclosure of rooms and spaces.** Rooms and spaces shall be so arranged with fences, screens, partitions, or walls as to prevent entrance of unauthorized persons or interference by them with equipment inside, and entrances not under observation of an authorized attendant shall be kept locked. Signs prohibiting entrance to unauthorized persons shall be displayed at entrances.

(2) **Rooms and spaces.** All rooms or spaces in which electric supply equipment is installed shall comply with the following requirements:

(a) Fireproof construction. They shall be, as far as practicable, noncombustible.

(b) Storage and manufacturing processes. They shall be used neither for the storage of material nor for manufacturing processes causing hazard to electrical operators, except those materials or processes attendant upon

the production or distribution of a supply of electric energy.

(c) Hazardous conditions. They shall be free from combustible dust or flyings, inflammable gas, or acid fumes, in dangerous quantities. (For battery rooms, see WAC 296-44-142 through 296-44-166; for auxiliary equipment in hazardous locations, see WAC 296-44-121.)

(d) Ventilation. They should be well ventilated.

(e) Moisture and weather. They should be dry. In outdoor stations or in wet tunnels or subways, all live parts of equipment should be enclosed in weather-proof cases, unless the equipment is suitably designed to withstand the prevailing atmospheric conditions.

(3) **Rotating machinery.** Rotating machinery shall be installed upon suitable supports or foundations and if necessary secured in place. [§ 10 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-085 Protective arrangements of stations and substations——Illumination. (1) **Under normal conditions.** Rooms and spaces where electric apparatus or machinery is located shall have means for artificial illumination at intensities not less than given in Table 1. The means of illumination shall be maintained ready for use at all times.

TABLE 1.—Illumination intensities*

Location	Minimum* Footcandles
Switchboard instruments, gages, switches, etc	3
Switchboards with no exposed live parts	1
Storage-battery room	1
Generating room, boiler room, pump room	3
Stairways and passageways where there is moving machinery, exposed live parts, hot pipes, etc. (measured at floor level)	3
Any traversed space (measured at floor level)	1

*The values are to be measured at working surfaces, except as stated.

For industrial interiors see Washington state general safety standards.

Note: It is not intended that this rule should require permanent lighting in switch cells and similar small spaces occupied by electric apparatus where permanent lighting is impracticable. The code of lighting factories, mills, and other work places includes general standards of illumination required from the point of view of safety.

(2) **Emergency source.** A separate emergency source of illumination, from an independent generator, storage battery, gas main, lanterns (the latter two should never be used in battery rooms), or other suitable source, shall be provided in every station where an attendant is located.

(3) **Fixtures and pendants.** Arrangements of permanent fixtures and plug receptacles shall be such that portable cords need not be brought into dangerous proximity to live or moving apparatus. All lamps shall be arranged to be controlled, replaced, or trimmed from safely accessible places.

Pendant conductors shall not be installed where they can be readily moved so as to bring them in contact with live parts of electric supply equipment.

(4) **Attachment plugs.** Portable conductors shall be attached to fixed wiring only through separable attachment plugs which will disconnect all poles by one operation. (See WAC 296-44-625 et seq., for portables and pendants.) [§ 10 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-088 Protective arrangements of stations and substations——Floors, floor openings, passageways, stairs. (1) **Floors.** Floors shall have even surfaces and afford secure footing. Projecting nails, loose boards, uneven or greasy wood floors, and slippery floors should be avoided.

Note: Otherwise slippery floors or stairs should be provided with antislip treads.

(2) **Passageway.** Passageways (including stairways) and working spaces shall be unobstructed, and (except such as are used solely for infrequent inspection, construction, and repair) shall, where possible, provide at least 6.5 feet of headroom. (See WAC 296-44-115 for working space.)

(3) **Railings.** All floor openings over 18 inches deep and raised platforms over 4 feet high shall be provided with suitable railings.

Except for loading platforms, such rails are recommended where height exceeds 18 inches, especially where they are adjacent to live or moving parts or the working space on the platform is restricted.

(4) **Stair guards.** All stairways consisting of four or more risers shall be provided with handrails.

For very long and steep stairs occasional landings or turns are recommended.

(5) **Continuity.** The heads of permanent ladders shall be provided with guards such as gates or sliding pipe sections whenever the heading breaks the continuity of a railing adjacent to working space.

For very long ladders occasional landings, turns, or safety loops are recommended.

(6) **Floor toe boards.** All floor openings over 6 feet deep, and the edges of all raised platforms over 6 feet high, shall, where possible, be provided with suitable toe boards.

(7) **Stair toe boards.** Toe boards shall, where practicable, be arranged at back of stairway treads where over exposed live or moving parts or over working spaces, passageways, or other stairways. [§ 10 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-091 Protective arrangements of stations and substations——Exits. (1) **Clear exits.** Each room or space and each working space about equipment shall have suitable means of exit which shall be kept clear of all obstructions.

(2) **Double exits.** If the plan of the room or space and the character and arrangement of equipment are such that an accident would be liable to close or make inaccessible a single exit, as in the case of long narrow rooms, platforms, passageways, spaces behind switchboards, or wire and pipe tunnels, a second exit shall be provided. [§ 10 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-094 Protective arrangements of stations and substations——Fire-fighting apparatus. (1) **Fire extinguishers.** Adequate approved fire-extinguishing appliances shall be conveniently located and conspicuously marked. Any such appliances which have not been listed by Underwriters' Laboratories, Inc. for use on live parts should be plainly and conspicuously marked with a warning to that effect.

(2) **Temperature conditions.** Fire extinguishers shall not be installed in locations subject to conditions of high or low temperature which will reduce their effectiveness.

Note: Carbon-tetrachloride extinguishers are not adversely affected by temperatures between 60° C (140° F.) and minus 40° C (-40° F). [§ 10 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-097 Protective arrangements of stations and substations——Oil-filled apparatus. For the purposes of these rules oil-filled apparatus is divided into three classes each of which requires different treatment: (1) Oil switches and circuit-breakers, (2) transformers, induction regulators, etc., and (3) lightning arresters. The necessary safety precautions depend largely on whether they are located in buildings or outdoors.

(1) **Oil switches or circuit-breakers.** Oil switches or circuit-breakers and their transformers, regulators, reactors, or other associated equipment should be separated from other apparatus by adequate fire-resistant barriers, or otherwise adequately isolated.

Where switches or switch compartments are constructed to prevent an appreciable amount of oil being thrown outside of the compartment, exterior drainage or storage systems are not necessary.

If located outdoors, they should be adequately isolated.

If located near building walls, these should be of fire-resistive construction and should have doors or windows so located and arranged that burning oil is not liable to pass through them to inflammable material or apparatus.

Note: It should be recognized that oil-switch or circuit-breaker failures may depend upon the size and rupturing capacity of the switch or circuit-breaker and the short-circuit duty that may be required of it. The short-circuit current depends on the generating capacity supplying the system on which the switch or circuit-breaker is used as modified by the current-limiting characteristics of the system or by special apparatus installed for that purpose. By "generating capacity" is meant all of the apparatus contributing to the short-circuit current.

(2) **Transformers, induction regulators, etc., containing a liquid that will burn.** If transformers, induction regulators, etc., are in buildings, floors and floor drains should be so arranged that oil will quickly collect in a suitable drainage or storage system provided for the purpose either inside or outside of the building as may be advisable. If the apparatus contains large quantities of oil, each unit or group should preferably be placed in a separate fireproof compartment suitably ventilated.

If located outdoors, they should be adequately isolated. Provision should be made for quickly draining away to a safe distance any oil that may be spilled. This may be done by ditches and drains or the oil may be absorbed and danger of spreading removed by paving the yard around the transformers or other devices with cinders or other absorbent material to a depth of several inches.

If located in buildings, transformer tanks containing large quantities of oil shall, where practicable, be so arranged that approved firequenching material may be introduced above the oil inside the tank or in the surrounding compartment, except where tanks are completely filled with oil or where the space above the oil is filled with an inert gas.

(3) **Transformers, induction regulators, etc., containing a liquid that will not burn.** If in buildings, transformers, induction regulators, etc., filled with a liquid that will not burn should comply with WAC 296-44-178.

(4) **Lightning arresters.** If located in buildings, lightning arresters containing oil should be separated from other equipment by fire walls adequate to completely isolate them in case of fire.

If located outdoors, they should be adequately isolated. Provision for quickly draining away oil should be made as indicated for transformers in (2) above. [§ 10 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-100 Protective arrangements of equipment——General requirement. All electric supply equipment shall be of such construction and so installed and maintained as to reduce the life hazard as far as practicable. [§ 11 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-103 Protective arrangements of equipment——Inspections. (1) **Regular equipment.** Electric supply equipment shall comply with these safety rules when placed in service, and shall thereafter be periodically cleaned and inspected. Defective equipment shall be put in good order or permanently disconnected. Defective wiring, when hazardous, shall be repaired or removed.

(2) **Idle equipment.** Infrequently used equipment or wiring maintained for future service should be thoroughly inspected before use to determine its fitness for service.

(3) **Emergency equipment.** Equipment or wiring maintained for emergency service should be periodically inspected and, where necessary, tested to determine its fitness for service.

(4) **New equipment.** New equipment should be thoroughly inspected before being put in service. [§ 11 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-106 Protective arrangements of equipment——Guarding shaft ends, pulleys, and belts, and suddenly moving parts. (1) **Transmission machinery.** This code is supplemented by the General Safety Standards of Washington, which specify methods for safeguarding pulleys, belts and other equipment used in the mechanical transmission of power.

(2) **Suddenly moving parts.** Parts of equipment which move suddenly in such a way that persons in the vicinity are liable to be injured by being struck, such as handles and levers of circuit-breakers, shall be guarded or isolated. [§ 11 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-109 Protective arrangements of equipment——Protective grounding. (1) **Grounding method.** All grounding which is intended to be a permanent and effective protective measure, such as lightning arrester grounding, grounding of circuits, equipment, or wire raceways, shall be made in accordance with the methods specified in WAC 296-44-058 through 296-44-076, methods of protective grounding.

(2) **Protective grounding or isolation of noncurrent-carrying metal parts.** All electric supply equipment, if operating at more than 150 volts to ground, or if in hazardous or damp locations, regardless of voltage, shall have the exposed noncurrent-carrying parts, such as frames of generators and switchboards, cases of transformers, lightning arresters and switches, and operating levers, permanently grounded or isolated.

It is recommended that exposed noncurrent-carrying parts of electric apparatus operating at 150 volts or less to ground be permanently grounded.

It is recommended that all metallic guards (including rails, screens, etc.) about electric supply equipment should be permanently grounded. Except in hazardous or damp locations, exposed noncurrent-carrying parts of equipment operating at more than 150 volts to ground may be left ungrounded and either isolated, or guarded, or provided with insulating mats as required for live parts at the same voltage. Such isolation, guarding, or mats should be so arranged that persons cannot inadvertently touch these parts while also touching a grounded surface.

(3) **Grounding equipment during repairs.** Electric equipment or conductors normally operating at more than 750 volts between conductors on or about which work is occasionally done while separated from a source of electric energy by switches or disconnectors only, shall be provided with some means, such as switches, connectors, or readily accessible ground conductor for grounding them. (See Electrical Workers Safety Rules; chapter 296-45 WAC.) [§ 11 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-112 Protective arrangements of equipment——Guarding live parts. (1) **Where required.**

(a) Guards shall be provided for all parts exceeding 300 volts to ground unless the boundary of the guard zone around the part has a vertical clearance of more than 7 feet 6 inches for voltages up to 7,500, and 8 feet 6 inches for voltages of more than 7,500, above any permanent supporting surface for workmen, or a horizontal clearance of more than 3 feet from the nearest edge of any such surface, or both. This includes parts exposed through windows, wall openings, etc.

Exception: Guards need not be provided where it is necessary to permit routine inspection of rotating equipment as required under operating conditions.

Note: The rule applies to the electric parts energized or considered available for service in temporary or partially completed installations, as well as to permanent installations.

Definitions: The guard zone means the space of minimum clearance from guards to electric parts where guards may be installed by workmen without definite engineering design. The radius of this zone varies with the voltage as specified in column 4 of Table 2. (See Electrical Workers Safety Rules for working clearances about live parts; chapter 296-45 WAC.)

"Permanent supporting surface for workmen" includes floors, platforms, or structures used regularly and frequently by workmen for inspections and maintenance near live adjacent parts; runways, ladders, stairways, etc.

(b) Parts over or near frequently traveled passageways through which material may be carried, or in or near spaces such as corridors, storerooms, boiler rooms, etc., used for nonelectrical work, should, where practicable, be guarded or given clearances in excess of those specified such as may be necessary to secure reasonable safety. The guards should be substantial; should, where practicable, completely shield or enclose without openings the parts; and when in spaces used for nonelectrical work should be removable only by means of tools or keys.

(c) Parts of indeterminate potential, such as telephone wires exposed to induction from high-tension lines, ungrounded neutral connections, ungrounded frames, ungrounded parts of lightning arresters, ungrounded instrument cases connected directly to the high-voltage circuit, etc., shall be classified and, where practicable, guarded on the basis of the maximum voltage which may be present.

(2) **Strength of guards.** Guards shall be sufficiently strong and shall be supported rigidly and securely enough to prevent them from being displaced or dangerously deflected by a man slipping or falling against them.

TABLE 2.—Minimum clearances from live parts

1	2		3		4
Voltage between phases	Minimum vertical clearance of unguarded parts		Minimum horizontal clearance of unguarded parts		Minimum clearance from guards to parts. Radius of guard zone
	Feet	Inches	Feet	Inches	Inches
600	7	8	3	2	2
2,300	7	9	3	3	3
6,600	7	10	3	4	4
11,000	9	0	3	6	6
22,000	9	3	3	9	9
33,000	9	6	4	0	12
44,000	9	10	4	4	16
66,000	10	5	4	11	23
88,000	11	0	5	6	30
110,000	11	7	6	1	37
132,000	12	2	6	8	44
230,000	15	0	9	0	72
345,000	17	0	12	0	96

Note.—Interpolate for intermediate values.

The clearances in column 4 of this table are not a requirement for definite engineering design of either apparatus or guards, but are solely for the guidance of workmen installing guards, without such design.

For example, the minimum clearances in the table above are not intended to refer to the clearances between live parts and the walls of the cells, compartments, or similar enclosing structures. They do not apply to the clearances between bus bars and supporting structures, nor to clearances between the blade of a disconnecting switch and its base.

For the relation of the above clearance tables to the manufacture of electric apparatus, see discussion of subsection (1) of this section.

(3) **Types of guards.**

(a) Location or isolation. Parts having clearance equal to or greater than specified in (a) above are guarded by location. Parts are guarded by isolation when all entrances to enclosed spaces, runways, ladders etc., are kept locked or warning signs posted at all entrances, in which case no other permanent guards need be supplied.

(b) Grounded metal cable sheaths. These are suitable guards except where exposed to mechanical injury. Where so exposed metal conduit or other suitable guards should be provided.

(c) Railings. Railings are not substitutes for complete guards, and if used shall be located at a horizontal distance of at least 3 feet (and preferably not more than 4 feet) from the nearest point of guard zone, which is less than 7 1/2 feet above the floor.

(d) Shields or enclosures. Guards inside of the guard zone or less than 4 inches outside, shall completely enclose the parts from contact up to the heights listed in column 2 of Table 2. They shall not be closer to the live parts than listed in column 4 of Table 2, except when suitable insulating material is used with circuits of less than 7,500 volts. (See note under Table 2.) If more than 4 inches outside of the guard zone, the guards need not extend more than 7 1/2 feet above the floor. Covers or guards, which must at any time be removed while the parts they guard are alive, should be arranged so that they can not readily be brought in contact with live parts.

(e) Insulating covering on conductors or parts. The insulating covering on parts exceeding 750 volts to ground shall not be considered a protection. For parts less than 750 volts, positive barriers, enclosures, or similar arrangements are preferable, but in dry places where not exposed to mechanical injury, varnished–cloth tape, or other insulation suitable for the voltage involved may be used as a guard. The taping over connections shall be of a type and thickness suitable for the voltage involved. Friction tape is not acceptable as the sole protection.

Exception: On circuits not exceeding 7,500 volts between phases, when other guarding is impracticable, insulation suitable for the voltage involved may be used back of switchboards or in equivalent sheltered locations. Insulating mats or platforms shall be provided so that an operator can not readily touch the insulating covering without standing on the mats.

(f) Mats. Suitable insulating mat placed so that a person cannot inadvertently come in contact with the live parts without standing on the mat may be used in the following cases:

(i) Parts less than 750 volts to ground exposed at switchboards, switches, or on rotating machinery.

(ii) Disconnect switches less than 7,500 volts between phases mounted on back of switchboards or in similar sheltered locations when barriers are placed between each blade so as to extend beyond the disconnected parts in any position. Other means of guarding may be used where convenient.

(iii) Ungrounded frames of existing high–voltage series generators.

(iv) As provided for in paragraphs (3)(e), and (3)(h), of this rule, mats should be of rubber or other suitable insulating material. In dry locations they may be of wood fastened with wood pins, cork matting, or heavy (1/4–inch) linoleum laid without joints and without metal fastenings. A "nonslip" surface should be maintained, and the mats should be laid and maintained so as to reduce the tripping hazard to a minimum.

Note: Beveled edges will help in many cases.

(g) Parts below supporting surfaces for persons. The supporting surfaces above live parts shall be without openings. Toe boards at least 6 inches high shall be provided at all edges.

(h) Special rules for plug–type switchboards. A mat is a suitable guard when placed so that the operator must stand on it when operating the plugs. Suitable guards on handles of all plugs shall be provided.

(4) Parts of less than 300 volts to ground. It is recommended that live parts of more than 150 volts to ground be enclosed or guarded when in exposed locations. [§ 11 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-115 Protective arrangements of equipment——Working space about electric equipment. (1) **Where required.** Adequate and readily accessible working space with secure footing shall be maintained about all electric parts or equipment which require adjustment or examination if exposed while in service.

(2) **Width of working space.** The horizontal clearance from the farthest edge of the working space to the nearest live part of more than 300 volts to ground, exposed after removing guards, shall be not less than 3 feet plus the guard zone radius as given in column 4 of Table 2. (If the live parts are on only one side, column 3 of Table 2 gives the minimum permissible value for the total width of the free space.) See also WAC 296-44-088(2), for head room.

(3) **Elevated parts.** Clearance about normally elevated or isolated parts requiring occasional adjustment should be provided so the men need not come within the danger zone (see Electrical Workers Safety Rules; chapter 296-45 WAC), around adjacent energized parts, unless guarded in accordance with WAC 296-44-112 to 296-44-118, inclusive. [§ 11 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-118 Protective arrangements of equipment——Hazardous locations. (1) **Enclosure of arcing and heating parts.** In locations where inflammable gas or inflammable flyings normally exist in dangerous quantities, all parts where sparking, arcing, or dangerous heating is liable to occur, shall be enclosed so as to reduce the hazards as far as practicable.

This inclosure shall be by one of the following methods:

(a) By placing in separate compartments or rooms.

(b) By using nonabsorptive, noncombustible casings of the solidly enclosed type when inflammable dust or flyings are present.

(c) By using nonabsorptive, noncombustible, explosion-proof casings when inflammable gas exists in dangerous quantities.

(2) **Grounding.** The metal frames and other exposed noncurrent-carrying metal parts of equipment in these locations shall be permanently grounded as specified in WAC 296-44-058 through 296-44-076. [§ 11 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-121 Protective arrangements of equipment——Shielding of equipment from deteriorating agencies. Suitable shields or enclosures shall be provided to protect exposed current-carrying parts, insulation of leads or electric devices or equipment where susceptible to injury by being installed directly under rotating equipment or in other locations where dripping oil, excessive moisture, steam, vapors, or similar agents exist. (For battery rooms see WAC 296-44-160.) [§ 11 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-124 Protective arrangements of equipment——Identification. (1) **Equipment in general.** Electric supply equipment shall be suitably identified when necessary for safety. The identification may be by position, color, number, name plate, label, design, or other means, but the method of identification chosen shall be uniform throughout any one system. (See WAC 296-44-220(1) for switches.)

The voltage and intended use shall be shown if important.

Identification marks should not, if avoidable, be placed on removable covers or casings, such as instrument covers and disconnector compartment doors, where the interchanging of these removable parts might lead to accident.

(2) **Generators and motors.** Every generator, motor, transformer, or other piece of apparatus shall be provided with a name plate giving maker's name, the rating, normal full-load speed for rotating equipment, and the voltage. [§ 11 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-127 Rotating equipment (This includes generators, motors, motor-generators, and converters)——Speed-control and stopping devices. (1) **Speed limits for prime movers.** Prime movers driving generating equipment shall be provided with automatic speed-limiting devices, where harmful overspeed can otherwise occur, in addition to their governors, if necessary, as with some types of steam turbines.

(2) **Stops for rotating equipment.** Stopping devices, such as switches or valves which can be operated from locations convenient to machine operators, shall be provided for prime movers or motors driving generating equipment.

Devices which operate in such a way that the development of defects or their becoming inoperative will stop the units protected, should be used where practicable.

Controls to be used in emergency for machinery and electric equipment should be so located as to permit operation with a minimum of danger during such emergency. (See WAC 296-44-223 for fuses and circuit-breakers.)

(3) **Speed limit for motors.** Machines of the following types shall be provided with speed-limiting devices unless their inherent characteristics or the load and the mechanical connection thereto are such as to safely limit the speed, or unless the machine is always under the manual control of a qualified operator:

(a) Separately excited direct-current motors.

(b) Series motors.

(c) Motor-generators and converters which can be driven at excessive speed from the direct-current end, as by a reversal of current or decrease in load.

Note: The required limitation of speed may be obtained by the use of a relay, centrifugal switch, or other similar device which will cut off the supply of energy when excessive speed is attained.

(4) **Low-voltage or under-voltage protection.** All motors so employed or arranged that an unexpected starting of the motor is a hazard, except those with an emergency use, and where the opening of the circuit may cause a special hazard, such as exciter or condenser-pump motors, shall be equipped with low-voltage protection which instantaneously or after a predetermined

delay will automatically cause and maintain the interruption of the motor circuit when the voltage falls below an operating value.

(5) **Adjustable-speed motors.** Adjustable-speed motors, if controlled by means of field regulation, shall be so equipped and connected that the field cannot be weakened sufficiently to permit a dangerous speed.

(6) **Protection of control circuits.** Where speed-limiting or stopping devices are electrically operated, the control circuits by which such devices are actuated shall be in conduit or otherwise suitably protected from mechanical injury, in accordance with WAC 296-44-190. [§ 12 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-130 Rotating equipment (This includes generators, motors, motor-generators, and converters)——Guards for live parts. (1) **Guards on rotating equipment.** Guards complying with WAC 296-44-112 shall be provided.

(2) **Access to live parts.** Where necessary, steps and handrails shall be installed on or about large machines to afford ready access to live parts which must be examined or adjusted during operation.

(3) **Frame switches.** Where switches are installed on the frames of generating equipment for the purpose of reducing inductive voltage in generator and converter field coils they shall be suitably constructed or guarded to prevent passers-by from inadvertently coming in contact with the live parts, to protect persons handling them, and to prevent their being accidentally opened or closed.

(4) **Arcing shields.** Suitable shields or barriers other than rails shall be provided where practicable to prevent arcing on large commutators or any other parts of moving apparatus from injuring persons in the vicinity, as in the case of narrow working spaces located immediately above or beside such equipment.

Exception: Twenty-five-cycle apparatus of less than 150 volts to ground is exempted.

It is recommended that where suitable shields have not been installed, goggles should be available. [§ 12 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-133 Rotating equipment (This includes generators, motors, motor-generators, and converters)——Grounding machine frames. (1) **Grounding machine frames.** All frames of rotating electric equipment shall be permanently grounded except as permitted below and in WAC 296-44-109.

(2) **Coupled machines.** Where two or more machines, either of which operates at more than 150 volts to ground, are mechanically coupled together and the operator can touch the frames of more than one at a time, the frames of all such shall be permanently grounded or bonded together electrically.

(3) **Auxiliaries.** Exciters and auxiliary circuits electrically connected to generators or other machines of more than 750 volts to ground (with frames ungrounded) shall be installed, protected, and identified as machines and circuits of the same voltage as that of the machine for which they are auxiliaries. [§ 12 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-136 Rotating equipment (This includes generators, motors, motor-generators, and converters)——Deteriorating agencies. (1) **Protection required.** Suitable shields or enclosures shall be provided to protect exposed current-carrying parts, insulation of leads, balance coils, or other electric devices belonging to motors and generating equipment where installed directly under equipment or in other locations where dripping oil, excessive moisture, steam, vapors, or similar injurious agents exists.

(2) **Grounding.** The metal frames and other exposed noncurrent-carrying metal parts of equipment in these locations shall be permanently grounded. [§ 12 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-139 Rotating equipment (This includes generators, motors, motor-generators, and converters)——Motors. (1) **Control.** If the starting is caused automatically (not manually) as, for example, by a float switch, or if the starting device or control switch is not located close to the motor and all parts of the machinery operated, the starting arrangement shall be designed so that it can positively be kept open by means of locks or equivalent devices.

(2) **Motors in hazardous locations.** Motors with their auxiliary equipment, at which sparking or arcing or high temperature is liable to occur, if in rooms normally containing explosives, inflammable gas, or inflammable flyings, shall be so installed as to reduce the hazard by enclosure in an adequately ventilated separate compartment, by solidly enclosed or explosion-proof type of equipment, or when to be protected against flyings only, by partitioning off a space or by a suitable boxing.

(3) **Motors exposed to dust.** Motors should be protected from dust. Enclosed-type motors are recommended in dusty places, being preferable to boxing.

(4) **Motors on wooden floors.** Where practicable, motors permanently located on wooden floors should be provided with suitable drip pans. [§ 12 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-142 Storage batteries——General. (1) The provisions of this section are intended to apply to all stationary installations of storage batteries using acid or alkali as electrolyte, consisting of cells connected in series, with a nominal voltage in excess of 50 volts, and connected for service where so installed. (For exception, see WAC 296-44-148(2).)

(2) Nominal battery voltage shall be calculated on the basis of 2.0 volts per cell for lead-acid type and 1.2 volts per cell for alkali type. "End" or "Emergency" cells, held in reserve for connection into circuit only to maintain voltage during discharge, are not included in calculating nominal battery voltage.

(3) Two types of cell construction are recognized in this section, viz:

(a) The sealed type in which the only passage for the escape of gases from the interior of the cell is provided

by a vent of effective spray-trap design adapted to trap and return to the cell, particles of liquid entrained in the escaping gases.

(b) the nonsealed type, in which gases escaping from the cell may carry entrained particles of liquid into the surrounding atmosphere.

Caution: Smoking, or the use of open flames, or of tools which may generate sparks, should be avoided except when cells are not actively gassing and when prior ventilation has been ample. Sparks from frictional or static electricity should be avoided as they may ignite the gas if discharged close to its source, as at the vent of a sealed-type cell during overcharging. The electrolyte of storage batteries, and spray containing electrolyte, are somewhat corrosive, particularly when concentrated by evaporation, and contact with body or clothes should be avoided. [§ 13 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-145 Storage batteries——Isolation. Storage batteries should be so located at to be not accessible to other than properly qualified persons. [§ 13 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-148 Storage batteries——Ventilation. (1) **Diffusion of gases.** Provision should be made for sufficient diffusion of the gases from the battery to prevent the accumulation of an explosive mixture.

(2) **Nonsealed type.** Batteries of the nonsealed type shall be located in separate rooms or enclosures so arranged as to prevent the escape into other rooms of objectionable quantities of electrolyte spray. This applies also to batteries of the nonsealed type not exceeding 50 volts nominal voltage if the capacity at the 8-hour discharge rate exceeds 5 kw-hrs. [§ 13 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-151 Storage batteries——Insulation. Cells of the nonsealed type shall be supported by suitable insulators such as glass, glazed porcelain, or oil type, or may be grouped and supported on glass or other suitable insulating trays.

Cells of the alkali type in jars of conducting material shall be supported singly, or in groups assembled in nonconducting trays, on porcelain or other suitable insulators.

Cells of the sealed type in containers of insulating material require no additional insulation except as follows: Cells in rubber or composition containers if the total voltage exceeds 150 volts, or cells in glass jars if the total voltage exceeds 250 volts, should preferably be sectionalized into groups not exceeding these voltages, and such groups shall be mounted on trays or racks supported by suitable insulators such as glass, glazed porcelain, or oil type. [§ 13 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-154 Storage batteries——Racks and trays. (1) **Racks.** Racks, as required in this section, refer to frames designed to support cells or trays. They shall be substantial and made of:

(a) Wood, so treated as to be resistant to deteriorating action by the electrolyte; or

(b) Metal, so treated as to be resistant to deteriorating action by electrolyte and provided with insulating members directly supporting the cell; or with suitable insulating material on conducting members; or

(c) Other similar suitable construction.

Design of battery rack shall provide for earthquake shock common to the area.

(2) **Trays.** Trays refer to frames such as crates or shallow boxes usually of wood or other insulating material so constructed or treated as to be resistant to deteriorating action by the electrolyte. [§ 13 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-157 Storage batteries——Floors. It is recommended that the floors of battery rooms in which large batteries comprised of cells in lead-lined wood tanks are installed be of acid-resistive material, or be painted with acid-resistive paint, or otherwise be protected, where acid is likely to drop and accumulate. [§ 13 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-160 Storage batteries——Wiring in battery rooms. Wiring shall be in accordance with the requirements of the National Electrical Code (storage batteries). [§ 13 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-163 Storage batteries——Guarding live parts in battery rooms. (1) **Guarding.** The arrangement of cells and connections shall be such that any two current-carrying parts between which a voltage exceeding 50 volts exists shall be properly guarded if the parts are otherwise so exposed that persons are liable to make accidental contact with both at the same time.

(2) **Bare conductors.** No bare conductor of more than 150 volts to ground shall be placed in any passageway, unless guarded or isolated by elevation.

(3) **Details of guards.** Required guards shall comply with WAC 296-44-112. [§ 13 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-166 Storage batteries——Illumination for battery rooms enclosing batteries of the nonsealed type. (1) **Type of lamp.** Storage-battery rooms, in addition to daylight which is desirable when available, should be lighted only by incandescent electric lamps in keyless porcelain or composition sockets, controlled from outside the battery room if practicable.

It is recommended that portable lamps be used only in keyless sockets enclosed in holders provided with substantial guards to prevent lamp breakage and be provided with "hard-service" cord.

(2) **Heating appliances.** Heating appliances with open flames or exposed incandescent resistors shall not be installed. [§ 13 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-169 Transformers, induction regulators, rheostats, ground detectors, and similar equipment——Current-transformer secondary circuits. (1)

Short–circuiting. Secondary circuits of current transformers, including constant–current and instrument transformers, shall be provided with means (such as permanent connections for jumpers) for short–circuiting them which can be readily connected while the primary is energized and which are so arranged as to permit the removal of any instrument or other device from such circuits without opening the circuits.

(2) **Protection when of more than 7,500 volts.** Where primaries are of more than 7,500 volts, secondary circuits unless otherwise adequately protected from injury or contact of persons, shall be in permanently grounded conduit. [§ 14 (part), filed 3/23/60, effective 12/1/58.]

WAC 296–44–172 Transformers, induction regulators, rheostats, ground detectors, and similar equipment——Grounding secondary circuits of instrument transformers. The secondary circuits of all instrument transformers shall be permanently grounded unless the circuits are installed, guarded, and plainly identified as required for the secondary circuits of transformers, in accordance with WAC 296–44–187.

Note: This will sometimes require marking to distinguish such a circuit from others with which it is associated, but which are protected by ground connections. [§ 14 (part), filed 3/23/60, effective 12/1/58.]

WAC 296–44–175 Transformers, induction regulators, rheostats, ground detectors, and similar equipment——Grounding transformer cases. The metal case or exposed frame of each transformer, reactor, induction regulator, and similar equipment, which is located where dampness or inflammable gas normally exists, or which is connected to a circuit operating at more than 150 volts to ground, shall be permanently grounded.

Exception: Exception is permissible in accordance with WAC 296–44–109(2), in locations free from inflammable gas, where the entire transformer is isolated or guarded as required for the highest–voltage circuit connected with the transformer, and is plainly and conspicuously identified as of that voltage. [§ 14 (part), filed 3/23/60, effective 12/1/58.]

WAC 296–44–178 Transformers, induction regulators, rheostats, ground detectors, and similar equipment——Location and arrangement of power transformers. If located outdoors, transformers shall be installed in accordance with paragraph (1), (2), or (3) below; if located indoors, or in sidewalk vaults communicating with the interior of the building, they shall be installed in accordance with paragraph (4), (5), or (6) below.

(1) **On poles.** Transformers may be mounted on a pole or on a pole structure, in compliance with WAC 296–44–274 through 296–44–457.

(2) **On walls.** If permitted by local authority, a transformer may be mounted on the exterior wall of a building, in compliance with WAC 296–44–274 through 296–44–457.

(3) **Enclosed.** A transformer may be mounted in an outdoor enclosure such that unauthorized persons cannot readily come in contact with any part of the casing or wiring.

(4) **Indoors, combustible liquid.** A transformer immersed in a liquid that will burn, and located in a station, should be provided with sills to confine any escaping liquid, or with suitable arrangements for draining. If located in a building used for other than station purposes, and the amount of such liquid is considerable, the transformer should be placed in a suitable transformer vault which is ventilated. Such a vault shall be accessible to authorized persons only.

(5) **Indoors, incombustible liquid.** A transformer rated in excess of 25 kva and immersed in a liquid that will not burn shall be furnished with a pressure–relief vent. If installed inside a building used for other than station purposes and not well–ventilated, (1) the transformer shall be furnished with a means for absorbing any gases generated by arcing inside the case, or (2) the pressure–relief vent shall be connected to a chimney or flue which will carry such gases outside the building.

(6) **Indoors, other types.** Other types of transformers, such as air–cooled transformers, or small transformers (25 kva or less) immersed in a liquid that will not burn, may be installed in stations or, if properly enclosed or guarded, in buildings used for other than station purposes. [§ 14 (part), filed 3/23/60, effective 12/1/58.]

WAC 296–44–181 Transformers, induction regulators, rheostats, ground detectors, and similar equipment——Resistance devices. Rheostats shall be not less than 1 foot from combustible material or separated therefrom by a slab or panel of noncombustible, nonabsorptive material of suitable thickness, not less than one–half inch, somewhat larger than the rheostat, and secured in place by bolts independently of the rheostat supports.

Rheostats or resistance devices shall not be placed where spattering molten metal due to high temperature in the rheostat may fall upon inflammable material or spaces frequently occupied by persons.

Rheostats or resistance devices exposed to excessive dust or flyings should preferably be installed in suitable cabinets or equipped with dustproof side and face plates. (For installation in hazardous locations, see WAC 296–44–118.) [§ 14 (part), filed 3/23/60, effective 12/1/58.]

WAC 296–44–184 Transformers, induction regulators, rheostats, ground detectors, and similar equipment——Ground detectors. Every station supply circuits which are not permanently grounded in accordance with WAC 296–44–058 through 296–44–076 shall be provided with one or more reliable means of ground detection which can be applied to determine the existence of a ground on any such circuit extending outside the station. [§ 14 (part), filed 3/23/60, effective 12/1/58.]

WAC 296–44–187 Conductors——Electrical protection. (1) **Over–current protection required.** Conductors

shall be suitable for the location, use, and voltage. Conductors shall be protected against excessive heating by the design of the system or by suitable fuses or automatic circuit-breakers except as provided in WAC 296-44-223.

Automatic circuit-breakers may be set so as to interrupt the circuits only on excessive short-circuits, if constant attendance is provided and protection is thus also afforded by manual operation.

(2) **Fuses in grounded conductors.** Conductors normally grounded for the protection of persons shall be arranged without fuses or automatic circuit-breakers interrupting their continuity between the source of electrical supply and the point at which the ground conductor is attached, unless the circuit-breaker opens all conductors of the circuit with one operation.

(3) **Circuits exposed to higher voltages.** If exposed through transformer windings or outdoor circuits to higher voltages, circuits of less than 750 volts shall be isolated or grounded unless in suitable cable with grounded metal sheath, placed in grounded conduit or other suitable duct, or identified and guarded as required for conductors of the highest voltage to which they are exposed. [§ 15 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-190 Conductors——Precaution against mechanical and thermal damage. (1) **Protection against injury.** Where exposed to mechanical injury suitable casing, armor, or other means shall be employed to prevent injury or disturbance to conductors, their insulation, or supports.

(2) **Flame proofing.** Where conductors with insulating coverings are closely grouped and any one is liable to damage from near-by conductors (as sometimes on the rear of switchboards or in cableways), they shall have a substantial flameproof outer covering.

(3) **Protection against contact.** Large conductors liable to be torn from their supports by the forces to which they are subjected (as by the magnetic fields produced) shall be so supported they they cannot come in contact with the surfaces along which they are run if uninsulated or with other conductors and equipment.

Note: This applies in particular to generator leads and conductors liable to large short-circuit currents.

(4) **Conductors between generators and outside lines.** Conductors between generators and outside lines shall be accessible and supported on approved noncombustible, nonabsorptive insulators or placed in approved cable, metal conduit, tile, or other fireproof ducts.

(5) **High temperatures.** Insulated conductors exposed to excessive temperatures shall have insulation which remains effective and does not rapidly deteriorate under such conditions. [§ 15 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-193 Conductors——Isolation. All conductors of more than 750 volts to ground, and ungrounded bare conductors of more than 300 volts to ground, shall be isolated by elevation or guarded in accordance with WAC 296-44-112, so that no person can inadvertently come in contact with them; provided that busses and bus structures and line connections thereto may be installed in accordance with WAC 296-44-115, in suitable locations specially arranged for such purposes. [§ 15 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-196 Conductors——Guarding conductors. (1) **Metal-sheathed cable outlets of more than 750 volts between conductors.** The insulation of the several conductors of multiple-conductor cable, where leaving the metal sheath at outlets, shall be thoroughly protected from mechanical injury, moisture, and electrical strains by means of a pothead or equivalent method.

(2) **Form of guards.** Guards shall comply with WAC 296-44-112. [§ 15 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-199 Conductors——Guarding in hazardous locations. (1) **Conduit or metal sheath.** Conductors in locations where inflammable gas normally exists shall be in metal conduit or metal-sheathed cable. All fittings and outlets of such conduit and cable shall be electrically and mechanically continuous with the conduit or metal sheath, and the conduit shall be sealed to prevent entrance of gases.

Note: This rule does not apply to conductors of large cross section which obviously cannot be placed in conduit such as copper bars connecting large cells with end-cell switches.

(2) **Insulating supports.** Conductors in damp locations, if neither in conduit nor in waterproof metal sheaths in other suitable ducts, shall be effectively isolated and supported on a suitable type of insulator. [§ 15 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-202 Conductors——Taping ends and joints. Ends and joints of insulated conductors, unless otherwise adequately guarded, shall have equal insulating covering with other portions of the conductor. [§ 15 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-205 Conductors——Wiring for illumination. Wiring installed for the illumination of the station should be installed and protected as required for similar utilization equipment and conductors in WAC 296-44-460 through 296-44-664. [§ 15 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-208 Fuses, circuit-breakers, switches, and controllers——Accessible and indicating. (1) **Arrangement.** All switches, fuses, automatic circuit-breakers, starting rheostats, and other control devices shall be readily and safely accessible to authorized persons, unless remotely controlled. They shall be so arranged or marked as to identify the equipment controlled by them, and (except fuses) shall indicate whether they are open or closed.

(2) **Accidental closing.** Switches shall be so installed as to minimize the danger of accidental operation, and

where practicable so that gravity cannot close them; such switches as may tend to close by gravity shall be provided with a proper latch or stop block to prevent accidental closing. Where practicable, the blades of knife switches should be dead when the switches are open. [§ 16 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-211 Fuses, circuit-breakers, switches, and controllers——Oil switches. Oil circuit-breakers and oil switches shall, wherever practicable, be isolated from other types of switches and other electric apparatus to conform to WAC 296-44-097(1).

Remote control of switches and circuit-breakers shall be used on circuits of more than 7,500 volts, or when they may be subject to large short-circuit values.

Note: Remote control may be of a mechanical, electrical, or other type. It is not intended to prohibit the use of switches and circuit-breakers operated manually by means of levers or poles from a remote position. (See note in WAC 296-44-097(1), for conditions usually applying to electrical systems.) [§ 16 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-214 Fuses, circuit-breakers, switches, and controllers——Where switches are required. Suitable disconnectors, switches, or circuit-breakers which may be manually operated shall be inserted in all leads to all supply equipment and all outgoing supply circuits, except as listed below.

Exception 1: Where two or more pieces of electric supply equipment or supply lines are operated as a single unit, no switch is necessarily required between them.

Exception 2: Switches are not required in transformer vaults except as may be deemed necessary by the engineer in charge to meet operating requirements.

Exception 3: Switches are not required in leads to instrument transformers.

Exception 4: Switches are not required in grounded conductors.

Note: In most cases the switch called for should be capable of opening the circuit under loads. In some cases, as between generators and transformer banks used with them, disconnectors only would be required. [§ 16 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-217 Fuses, circuit-breakers, switches, and controllers——Switches or other grounding devices. It is recommended that switches or other suitable means be provided, where practicable, to facilitate short-circuiting and grounding equipment or lines for which the operating rules (see Electrical Workers Safety Rules) require grounding to protect workmen. (See WAC 296-44-109(3).) [§ 16 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-220 Fuses, circuit-breakers, switches, and controllers——Capacity of switches and disconnectors. (1) **Suitability.** Switches used otherwise than as disconnectors shall be of suitable voltage and ampere rating for the circuit on which they are installed and shall be marked with the current which they can safely interrupt. Disconnectors shall be of suitable voltage and ampere rating for the circuit on which they are installed.

It is recommended that disconnectors be marked with warning against opening when carrying load. Where a group of disconnectors is contained in one room or compartment, a single conspicuous sign may be sufficient.

(2) **Locking.** Remotely controlled switches, oil switches, and disconnectors shall be so arranged that they can be secured in the open position or plainly tagged to prevent careless closing while work is being done on equipment controlled by them.

It is important that the control circuit be tagged or provided with a positive disconnecting means near the apparatus to prevent accidental operation of the mechanism.

For switches and disconnectors the accidental opening of which may cause hazard, similar arrangements are desirable for retaining them in closed position.

Locking is recommended rather than blocking wherever parts of equipment are remote from the point of control.

(3) **Air break.** Unless a switch operating on a circuit between 750 and 7,500 volts makes an air break, it is recommended that there shall be installed between it and the source of energy supply a suitable air- or oil-break disconnector or equivalent device having an air or oil gap suitable for the operating voltage of the circuit. An air-break switch or air-break disconnector shall be inserted in each conductor between electric supply equipment or lines and sources of energy of more than 7,500 volts, if the equipment or lines may have to be worked on without protective grounding while the sources may be alive. (For lightning arresters see WAC 296-44-265.)

(4) **Alinement.** Knife switches shall maintain such alinement under service conditions that they can be closed with a single unhesitating motion. [§ 16 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-223 Fuses, circuit-breakers, switches, and controllers——Where fuses or automatic circuit-breakers are required. All circuit leads to motors, constant-potential generators, transformer primaries, and station auxiliaries, and all outgoing circuits shall be protected from excessive current by suitable fuses or automatic circuit-breakers, except as indicated below.

Fuses and automatic circuit-breakers may be omitted from the following: (1) A motor-driven generator, rotary converter, or rectifier not used for railway service and not operated in parallel with other machines or batteries if the supply leads to such apparatus are already protected by fuses or automatic circuit-breakers.

(2) Grounded conductors.

(3) Circuits for field excitation.

(4) Leads of alternating-current generators.

(5) Leads connecting two or more pieces of electric supply equipment operated as a single unit.

(6) Circuits supplying interconnected three-wire systems of direct-current distribution.

(7) Leads of series transformers.

(8) Leads of potential transformers or other circuits the opening of which may cause greater hazard to life or property through interruption of service. [§ 16 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-226 Fuses, circuit-breakers, switches, and controllers——Disconnection of fuses before handling. Fuses in circuits of more than 150 volts to ground or more than 60 amperes shall be arranged in one of the following ways: (1) So that the fuses are necessarily disconnected from all sources of electric energy before they can be touched.

(2) So that the fuses can be disconnected from all sources of electric energy by a suitable switch.

(3) So that the fuses can be conveniently handled by means of insulating handles or portable tools provided for the purpose.

Exception: Circuits of less than 150 volts to ground and less than 60 amperes capacity are exempted from the provisions of this rule.

The use of insulating gloves and mats is permissible on circuits not exceeding 750 volts. [§ 16 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-229 Fuses, circuit-breakers, switches, and controllers——Arcing or suddenly moving parts. (1) **Protection from burns.** Fuses and circuit-breakers shall, as far as possible, be so designed, located, or shielded that persons will not be burned by their operation.

(2) **Protection against moving parts.** Handles or levers of circuit-breakers and similar parts which may move suddenly, in such a way that persons in the vicinity are liable to be injured by being struck by them, shall be guarded or isolated. [§ 16 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-232 Fuses, circuit-breakers, switches, and controllers——Grounding noncurrent-carrying metal parts. Exposed noncurrent-carrying metal parts of switch and fuse cases, levers, and other similar parts to which leakage is liable to occur from live parts, and thereby create a hazard, shall be permanently grounded in accordance with WAC 296-44-109.

Exception: Minor parts, such as ferrules of knife switches, which are not liable to become alive, are excepted. [§ 16 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-235 Fuses, circuit-breakers, switches, and controllers——Guarding live parts of switches, fuses, and automatic circuit-breakers. Switches, fuses, and automatic circuit-breakers shall be isolated or guarded in accordance with WAC 296-44-112 and 296-44-115. [§ 16 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-238 Switchboards——Location and accessibility. (1) **General location.** Switchboards shall be so placed that the operator will not be endangered by any live or moving parts of machinery or equipment located near the board.

They shall be so placed as to reduce to a minimum the danger of communicating fire to adjacent combustible material.

(2) **Spaces about boards.** The space back of the board shall be kept clear of rubbish and shall not be used for storage.

(3) **Accessibility.** Switchboards shall be accessible to authorized operators from both sides when the connections are on the back (see WAC 296-44-115 for working space), but may be placed against a wall when operating at not more than 750 volts between conductors with the wiring entirely on the face.

(4) **Arrangements.** Switchboards shall have all switches so arranged that the points of control are readily accessible to the operator. Instruments, relays, and other devices requiring reading or adjustments shall be so placed that work can be readily performed from the working space. [§ 17 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-241 Switchboards——Material and illumination. (1) **Material.** Switchboards shall be made of noncombustible material and be kept free from moisture.

(2) **Illumination.** Sufficient illumination shall be provided both for the front and rear of the switchboard so that the switchboard may be readily operated and instruments conveniently read. [§ 17 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-244 Switchboards——Necessary equipment. Switchboards which control generating equipment or outgoing supply circuits shall (except in substations without regular attendance) be equipped with such instruments as are necessary to show operating conditions. (See WAC 296-44-184 for ground detectors.) [§ 17 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-247 Switchboards——Arrangement and identification. Connections, wiring, and equipment of switchboards and panelboards shall be arranged in an orderly manner, and all switches, fuses, and circuit-breakers shall be plainly marked, labeled, or arranged, so as to afford ready means for identifying circuits or equipment supplied through them, in accordance with WAC 296-44-124. [§ 17 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-250 Switchboards——Spacings and barriers against short-circuit. (1) **Bare parts.** Switchboards shall have the number of bare parts at different potentials on any panel reduced to a minimum, and these parts shall be effectively separated. Protection or separation of such parts by suitable barriers is recommended where the voltage exceeds 750 between conductors.

Such parts, including bus bars, should be so located, or provided with such insulating coverings or barriers,

that parts at different potentials will not be readily short–circuited by tools or other conducting objects.

(2) **Fuses.** Fuses shall be so located as to minimize the danger, in removing or replacing them, of short–circuiting parts at different potentials by the fuses or by the hands of the operator. [§ 17 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-253 Switchboards——Switchboard grounding. (1) **Frames.** Switchboard frames and noncurrent–carrying parts shall be permanently grounded under the conditions and with the exceptions noted in WAC 296-44-109.

Exception 1. Parts of switchboards, such as name plates, screws, and similar small parts which are not liable to become alive, except under very unusual circumstances, are not considered as coming under the rule and may be left ungrounded.

Exception 2. Switchboards electrically connected to other equipment which operate with undergrounded frames may be installed, protected, and identified as equipment of the same voltage. Mats shall be provided in accordance with WAC 296-44-112(3)(f).

(2) **Circuit worked on.** Where protective grounds are occasionally required on circuits for the protection of workmen, a permanent ground connection shall be provided, and also suitable means for effectively and readily connecting the parts being grounded to the ground connection, in accordance with WAC 296-44-109(c). [§ 17 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-256 Switchboards——Guarding live parts on switchboards. (1) **Guards.** Live parts of switchboards shall be guarded in accordance with WAC 296-44-112.

(2) **Plug–type switchboards.** Plug–type switchboards shall, except while connections are being changed, have no current–carrying part exposed on face of boards; and, if practicable, they and their plug connectors shall be so arranged where the operating voltage exceeds 150 as to have all current–carrying parts guarded so long as they are alive, even while connections are being changed.

(3) **Exposed parts of more than 7,500 volts.** No switchboard shall have current–carrying parts of more than 7,500 volts exposed (unguarded) unless these parts are effectively isolated by elevation, except at times when occasionally left exposed by removal of covers or entrance into enclosures, such as switch and instrument–transformer cells or compartments, which are ordinarily unoccupied by persons. For such parts, if exposed while alive for any purpose (including busses and disconnectors in compartments), working space shall be provided complying with the requirements under WAC 296-44-115. [§ 17 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-259 Switchboards——Instrument cases. If mounted on switchboards, metal cases of instruments (unless isolated by elevation) operating at more than 750 volts between conductors shall be grounded or enclosed in suitable covers which are either of grounded metal or of insulating material. [§ 17 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-262 Lightning arresters——Location. (1) **Where required.** Suitable precautions should be taken to protect station equipment against excessive lightning which might enter from associated overhead lines.

Exception: Precautions need not be taken in locations where thunderstorms are infrequent at all seasons of the year.

Note: Protection against lightning can be obtained in several ways, such as ground wires, graded insulation, arresters, capacitors, protector tubes, spark gaps, etc.

(2) **Indoors.** Lightning arresters with auxiliaries, if installed inside of buildings shall be located well away from all other equipment, passageways, and combustible parts of buildings. If of a type containing oil, they should be installed in accordance with WAC 296-44-097. [§ 18 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-265 Lightning arresters——Connecting wires. Grounding wires shall be run as directly as possible and be of low impedance and ample current capacity. (See WAC 296-44-058 through 296-44-076 for methods of protective grounding.)

Kinks and coils in the wires between the arresters and the outdoor lines shall be avoided as far as possible. [§ 18 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-268 Lightning arresters——Grounding frames and cases of lightning arresters. All noncurrent–carrying metal parts of arresters shall be grounded, unless effectively isolated by elevation or guarded as required for live parts of the voltage of the circuit to which the arrester is connected, and suitably identified as of that voltage, in accordance with WAC 296-44-109. [§ 18 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-271 Lightning arresters——Guarding live and arcing parts. (1) **Protection from contact or arcing.** All current–carrying parts of arresters on circuits of more than 750 volts, unless effectively isolated by elevation, shall be adequately guarded to protect persons from inadvertent contact with them, or from injury by arcing, in accordance with WAC 296-44-112.

(2) **Making adjustments.** Lightning arresters, unless provided with disconnectors which are always open before work is done on the arresters, shall be so arranged that necessary adjustments are possible (without approach to current–carrying parts) through the use of permanently grounded mechanisms or suitable insulating appliances. Where charging or adjusting must be done with arresters alive, permanently grounded mechanisms or suitable insulating appliances shall always be provided.

(3) **Insulation of attachments.** All choke coils, gap electrodes, or other attachments, inherent to the lightning protective equipment, shall have an insulation from

the ground or other conductors equal at least to the insulation demanded at other points of the circuit in the station. [§ 18 (part), filed 3/23/60, effective 12/1/58.]

INSTALLATION AND MAINTENANCE OF ELECTRIC SUPPLY AND COMMUNICATION LINES

WAC 296-44-274 Nature of rules——Minimum requirements. The rules state the minimum requirements for spacing, clearances, and strength of construction. More ample spacing and clearances or greater strength of construction may be provided if other requirements are not neglected in so doing.

Note: Some of these minimum values are exceeded in much existing construction; service requirements frequently call for stronger supports and higher factors of safety than the minimum requirements of these rules. [§ 20 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-277 General requirements applying to overhead and underground lines——Design and construction. All electric supply and communication lines and equipment shall be of suitable design and construction for the service and conditions under which they are to be operated. [§ 21 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-280 General requirements applying to overhead and underground lines——Installation and maintenance. All electric supply and communication lines and equipment shall be installed and maintained so as to reduce hazards to life as far as practicable. [§ 21 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-283 General requirements applying to overhead and underground lines——Accessibility. All parts which must be examined or adjusted during operation shall be arranged so as to be readily accessible to authorized persons by the provision of adequate climbing spaces, working spaces, working facilities, and clearances between conductors. [§ 21 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-286 General requirements applying to overhead and underground lines——Inspection and tests of lines and equipment. (1) **When in service.**

(a) Initial compliance with rules. Lines and equipment shall comply with these safety rules upon being placed in service.

(b) Inspection. Lines and equipment shall be systematically inspected from time to time by the person responsible for the installation.

(c) Tests. Lines and equipment shall be subjected, when necessary, to tests which will determine their fitness for service.

(d) Record of defects. Any defects revealed by inspection, if not promptly corrected, shall be reported.

(e) Remedying defects. Defective lines and equipment shall be put in good order or effectively disconnected.

(2) **When out of service.**

(a) Lines infrequently used. Supply lines and equipment infrequently used shall be inspected to see that they are in safe condition for service.

(b) Lines temporarily out of service. Lines temporarily out of service shall be maintained in such condition that a hazard will not be created.

(c) Lines permanently abandoned. Lines permanently abandoned shall be removed or maintained in a safe condition.

Note: Overhead service drops to consumers are often disconnected without removal when the service is discontinued. This is considered good practice when it is undesirable to remove the service drop entirely. [§ 21 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-289 General requirements applying to overhead and underground lines——Isolation and guarding. (1) **Current-carrying parts.** To promote safety to the general public and to employees not authorized to approach conductors and other current-carrying parts of electric supply lines, such parts shall be arranged so as to provide adequate clearance from the ground or other space generally accessible, or shall be provided with guards so as to isolate them effectively from accidental contact by such persons.

(2) **Noncurrent-carrying parts.** Metal fixtures and similar noncurrent-carrying parts, where liable to become charged to more than 300 volts to ground, and frames, cases and hangers of equipment shall be guarded from accidental contact by unauthorized persons or shall be 8 ft. or more above the ground. Grounding is permitted by WAC 296-44-292(2) as an alternative to isolation or guarding. [§ 21 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-292 General requirements applying to overhead and underground lines——Grounding of circuits and equipment. (1) **Methods.** The methods to be used for effective grounding for lightning arresters of supply lines, for circuits, for equipment and for wire raceways are given in WAC 296-44-058 through 296-44-076.

(2) **Parts to be grounded.** Metal lamp posts shall be effectively grounded. Cable sheaths and metal conduits shall be effectively grounded if less than 8 ft. above ground.

Metal fixtures and similar noncurrent-carrying parts, where liable to be charged to more than 300 volts to ground, and frames, cases and hangers of equipment shall be effectively grounded if they are not isolated or guarded as provided by WAC 296-44-289(2).

(3) **Use of ground as part of circuit.** Supply circuits shall not be designed to use the ground normally as the sole conductor for any part of the circuit. [§ 21 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-295 General requirements applying to overhead and underground lines——Arrangement of switches. (1) **Accessibility.** All switches shall be readily accessible to authorized persons.

(2) **Indicating open or closed position.** All switches shall indicate clearly whether they are open or closed.

(3) **Locking.** Pole–top switches accessible to unauthorized persons shall have provision for locking in both open and closed positions, and locks shall be provided.

(4) **Uniform position.** The handles or control mechanism for all switches throughout any system shall have so far as practicable the same position when open and a uniformly different position when closed, in order to minimize operating errors. Where it is advisable to depart from this practice, the switches should be marked so as to minimize the liability to mistakes in operation.

(5) **Fault current protection of operating handles.** Pole–top switches when mounted on other than grounded metal structures shall have their operating handles insulated and isolated from the base of the switch by wood or other adequate insulated sections in operating rod, or the operating handle shall be so arranged that persons operating the handle will be protected by adequately grounded areas that will prevent his body from becoming a path for fault currents traveling to ground due to break–down of switch. [§ 21 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-298 Relations between various classes of lines——Relative levels. (1) **Standardization of levels.** The levels at which different classes of conductors are to be located shall be standardized where practicable for any given community by agreement of the utilities concerned.

Note: This practice facilitates the extension of lines and promotes the safety of the public and workers by permitting the relative levels and required clearances to be readily obtained on jointly or commonly used poles as well as at crossings and conflicts.

(2) **Relative levels——Supply and communication conductors.**

(a) Preferred levels. Where supply and communication conductors cross each other or are in conflict, or are located on the same poles or towers, the supply conductors shall preferably be carried at the higher level.

Exception: This does not apply to trolley feeders which may be located for convenience approximately at the level of the trolley contact conductor.

Note: Supply lines generally use larger conductors than communication lines so there is less liability of contact between the two if the supply conductors are located in the upper position. This relative location also avoids the necessity of workmen on communication conductors passing through supply conductors and working above them and avoids the necessity of increasing the grade of construction required for communication conductors.

(b) Minor extensions. In localities where the practice of placing conductors of communication circuits for public use above supply conductors has been generally established, minor extensions may be made in either system, keeping the conductors in the same relative position. These extensions shall be made only by permission of the recognized administrative authority.

(c) Special construction for supply circuits, the voltage of which is 550 volts or less and carrying power not in excess of 3,200 watts. Where all circuits are owned or operated by one party or where cooperative consideration determines that the circumstances warrant and the necessary coordinating methods are employed, single–phase alternating–current or two–wire direct–current circuits carrying a voltage of 550 volts or less between conductors, with transmitted power not in excess of 3,200 watts, when involved in the joint use of poles with communication circuits, may be installed in accordance with footnote 8(3) of Table 1 in WAC 296–44–316(1) and footnote (1) of Table 11 in WAC 296–44–334(1)(a), under the following conditions:

(i) That such supply circuits are of wire having a good grade of commercial double–braid weatherproof covering not smaller than No. 8 AWG medium hard–drawn copper or its equivalent in strength, and the construction otherwise conform with the requirements for supply circuits of the same class.

(ii) That the supply circuits be placed on the end and adjacent pins of the lowest through signal crossarm and that a 30–inch climbing space be maintained from the ground up to a point at least 24 inches above the supply circuits. The supply circuits shall be rendered conspicuous by the use of insulators of different form or color from others on the pole line or by stenciling the voltage on each side of the crossarm between the pins carrying each supply circuit, or by indicating the voltage by means of metal characters.

(iii) That there shall be a vertical clearance of at least 2 feet between the crossarm carrying these supply circuits and the next crossarm above. The other pins on the crossarm carrying the supply circuits may be occupied by communication circuits used in the operation or control of a signal system or other supply system if owned, operated and maintained by the same company operating the supply circuits.

(iv) That such supply circuits shall be equipped with arresters and fuses installed in the supply end of the circuit and where the signal circuit is alternating current, the protection shall be installed on the secondary side of the supply transformer. The arresters shall be designed so as to break down at approximately twice the voltage between the wires of the circuit, but the break–down voltage of the arrester need not be less than 1,000 volts. The fuses shall have a rating not in excess of approximately twice the maximum operating current of the circuit, but their rating need not be less than 10 amperes. The fuses likewise shall in all cases have a rating of at least 600 volts, and where the supply transformer is a step–down transformer, shall be capable of opening the circuit successfully in the event the transformer primary voltage is impressed upon them.

(v) Such supply circuits when enclosed in effectively grounded metal–sheathed cable, or other cables carried on effectively grounded messenger, may be carried on a pole below communication attachments, with not less than 2 ft. vertical separation between the supply cable and the lowest communication crossarm. Communication circuits other than those used in connection with the

operation of the supply circuits shall not be carried in the same cable with such supply circuits.

(vi) Where such supply conductors are carried below communication conductors, transformers and other apparatus associated therewith shall be attached only to the sides of the crossarm in the space between and at no higher level than, such supply wires.

(vii) Lateral runs of such supply circuits carried in a position below the communication space shall be protected through the climbing space by wood molding or equivalent covering, or shall be carried in multiple-conductor cable having a suitable substantial insulating covering, and such lateral runs shall be placed on the under side of the crossarm.

(3) **Relative levels——Supply lines of different voltage classifications (as classified in Table 11).**

(a) At crossings or conflicts. Where supply conductors of different voltage classifications cross each other or are in conflict, the higher-voltage lines shall preferably be carried at the higher level.

(b) On poles used only by supply conductors. Where supply conductors of different voltage classifications are on the same poles, relative levels shall be as follows:

(i) Where all circuits are owned by one utility, the conductors of higher voltages shall preferably be placed above those of lower voltage.

Note: These relative levels will often avoid the necessity of increasing the grade of construction for crossarms, pins, and conductor fastenings of the lower-voltage conductors.

(ii) Where different circuits are owned by separate utilities, the circuits of each utility may be grouped together and one group of circuits may be placed above the other group provided that the circuits in each group are located so that those of higher voltage are at the higher levels and the clearances of Table 11 (WAC 296-44-334) are maintained. [§ 22 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-301 Relations between various classes of lines——Avoidance of conflict. Two parallel pole lines, either of which carries supply conductors, shall where practicable be so separated from each other that neither conflicts with the other. If this is impracticable, then the conflicting line or lines shall be built of the grade of construction required by WAC 296-44-340 through 296-44-349 for a conflicting line or the two lines shall be combined in a single pole line. [§ 22 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-304 Relations between various classes of lines——Joint use of poles by supply and communication circuits. Conditions under which joint use is desirable. In the case of local or distribution circuits along the same highway or similar right of way, where, under the provisions of WAC 296-44-340 through 296-44-349 applying to joint use, grade C construction or less would be required, joint use is generally preferable to separate pole lines (except sometimes in rural districts) unless the number of conductors is very large or the character of the circuits makes joint use undesirable.

Where circuits other than those mentioned above are involved, the choice between joint use of poles and separate pole lines shall be determined through cooperative consideration, by the utilities concerned, of all the factors involved, including the character of circuits, the total number and weight of conductors, tree conditions, number and location of branches and service drops, availability of right of way, etc. Where such joint use is mutually agreed upon, it shall be subject to the appropriate grade of construction as specified in WAC 296-44-340 through 296-44-349. Where such joint use is not employed, separate lines as specified in WAC 296-44-307 shall be used.

In any event, joint use is preferable to separate lines where it would be impracticable to avoid an overbuilt conflict with separate lines. [§ 22 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-307 Relations between various classes of lines——Separate pole lines. Where two separate pole lines are to be used, one of which carries supply conductors and the other communication conductors, they shall be separated, if practicable, so that neither conflicts with the other, but if within conflicting distance, they shall be separated as far as practicable and shall be built of the grade of construction required by WAC 296-44-340 through 296-44-349. [§ 22 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-310 Clearances——General. (1) **Application.** This section covers all clearances, including separations and climbing spaces, involving poles and wires. Clearances of lamps from pole surfaces, from spaces accessible to the general public, and height above ground are covered in WAC 296-44-418(3).

(2) **Constant-current circuits.** The clearances for constant-current circuits shall be determined on the basis of their nominal full-load voltage.

(3) **Metal-sheathed supply cables.** As far as clearances are concerned, effectively grounded continuous metal-sheathed supply cables of all voltages and any supply cables supported on effectively grounded messengers, are classified the same as open supply wires of 0 to 750 volts between conductors.

(4) **Neutral conductors.** Neutral conductors of supply circuits shall have the same clearances as the phase wires of the circuit with which they are associated, except that neutral conductors which are effectively grounded throughout their length and associated with circuits of over 750 volts between conductors may have the same clearances as circuits of 0 to 750 volts between conductors.

(5) **Maintenance of clearances.** The clearances required by this section shall be maintained at not less than the specified values. [§ 23 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-313 Clearances——Horizontal clearances of supporting structures from other objects. Poles,

towers, and other supporting structures and their guys and braces shall have the following horizontal clearances from other objects. The clearance shall be measured between the nearest parts of the objects concerned.

(1) **From fire hydrants.** Not less than 3 feet.

Recommendation: Where conditions permit, a clearance of not less than 4 feet is recommended. [See Appendix, WAC 296-44-88001 through 296-44-88011.]

(2) **From street corners.** Poles and towers should not be set so far from street corners as to make necessary the use of flying taps inaccessible from the poles.

(3) **From curbs.** Not less than 6 inches measured to the street side of the curb. [See Appendix, WAC 296-44-88001 through 296-44-88011.]

(4) **From railroad tracks.** Where railroad tracks are paralleled or crossed by overhead lines, the poles shall, if practicable, be located not less than 12 feet from the nearest track rail. [See Appendix, WAC 296-44-88001 through 296-44-88011.]

Exception 1: At sidings a clearance of not less than 7 feet may be allowed, provided sufficient space for a driveway be left where cars are loaded or unloaded.

Exception 2: Supports for overhead trolley contact conductors may be located as near their own track rail as conditions require. If very close, however, permanent screens on cars will be necessary to protect passengers.

Exception 3: Where necessary to provide safe operating conditions which require an uninterrupted view of signals, signs, etc., along tracks, the parties concerned shall cooperate in locating poles to provide the necessary clearance where practicable. [§ 23 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-316 Clearances--Vertical clearance of wires above ground or rails. The vertical clearance of all wires above ground in generally accessible places or above rails shall be not less than the following: (1) **Basic clearances.** The clearances in Table 1 apply under the following conditions:

(a) Temperatures of 60°F, no wind, with final unloaded sag in the wire, or with initial unloaded sag in cases where wires are maintained approximately at initial unloaded sags.

(b) Span lengths not greater than the following:

Loading district	Span lengths
	Feet
Heavy	175[1]
Medium	250[1]
Light	350

[1]150 feet in heavy-loading district and 225 feet in medium-loading district for 3-strand conductors, each wire of which is 0.09 inch or less in diameter.

(c) Voltages 0 to 50,000 volts between conductors.

(d) Fixed supports for the conductor or wire. (For other conditions, see subsection (2) of this section.)

TABLE 1.—Minimum vertical clearance of wires above ground or rails

(All voltages are between wires unless otherwise stated. Supply wires include trolley feeders)

Nature of ground or rails underneath wires	Guys; messengers; communication, span, and lightning protection wires; effectively grounded continuous-metal-sheath cable of all voltages	Open supply line wires, arc wires and service drops			Trolley contact conductors and associated span or messenger wires[1]	
		0 to 750 volts	750 to 15,000 volts[14]	15,000 to 50,000 volts	0 to 750 volts to ground	Exceeding 750 volts to ground
WHERE WIRES CROSS OVER						
	Feet	Feet	Feet	Feet	Feet	Feet
Track rails of railroads (except electrified railroads using overhead trolley conductors) handling freight cars on top of which men are permitted[2] [16]	27[3] [15]	27[3]	28[3]	30	22[4]	22[4]
Track rails of railroads (except electrified railroads using overhead trolley conductors) not included above[2]	18	18	20	22	18[5]	20[5]
Public streets, alleys or roads in urban or rural districts	18[6] [13]	18	20	22	18[5]	20[5]
Driveways to residence garages	10	10	20	22	18[5]	20[5]
Spaces or ways accessible to pedestrians only	13[7]	13[8]	15	17	16[9]	18[9]
WHERE WIRES RUN ALONG, AND WITHIN THE LIMITS OF PUBLIC HIGHWAYS OR OTHER PUBLIC RIGHTS-OF-WAY FOR TRAFFIC						
Streets or alleys in urban districts	18[10] [11] [13]	18[10]	20	22	18[5]	20[5]
Roads in rural districts	14[10] [11] [12]	15[10]	18	20	18[5]	20[5]

[1]Where subways, tunnels or bridges require it, less clearances above ground or rails than required by table 1 may be used locally. The trolley contact conductor should be graded very gradually from the regular construction down to the reduced elevation.

[2]For wire crossings over railways handling only cars considerably lower than ordinary freight cars, the clearance may be reduced by an amount equal to the difference in height between the highest car handled and the highest ordinary freight car, but the clearance shall not be reduced below that required for street crossings.

[3]This clearance may be reduced to 25 feet where paralleled by trolley contact conductor on the same street or highway.

[4]In communities where 21 feet has been established, this clearance may be continued if carefully maintained. The elevation of the contact conductor should be the same in the crossing and next adjacent spans

(See WAC 296-44-427(4)(b), for conditions which must be met where uniform height above rail is impracticable.)

[5]In communities where 16 feet has been established for trolley contact conductors 0 to 750 volts to ground, or 18 feet for trolley contact conductors exceeding 750 volts, or where local conditions make it impracticable to obtain the clearance given in the table, these reduced clearances may be used if carefully maintained.

[6]If a communication service drop, or a guy which is effectively insulated against the highest voltage to which it is exposed, up to 8,700 volts, crosses a street, alley or road, the clearance may be reduced to 16 feet at the side of the traveled way.

[7]This clearance may be reduced to the following values:

	Feet
(1) For communication conductors of circuits limited to 160 volts to ground, and communication cables	8
(2) For conductors of other communication circuits	10
(3) For guys	8

[8]This clearance may be reduced to the following values:

	Feet
(1) Supply wires (except trolley contact wires) limited to 300 volts to ground	12
(2) Supply wires (except trolley contact wires) limited to 150 volts to ground and located at entrances to buildings	10
(3) Where supply circuts of 550 volts or less, with transmitted power of 3,200 watts or less, are run along fenced (or otherwise guarded) private rights-of-way in accordance with the provisions specified in WAC 296-44-298(2)(c)	10

[9]Trolley contact conductors for industrial railways when not along or crossing over roadways may be placed at a less height if suitably guarded.

[10]Where a pole line along a road is located relative to fences, ditches, embankments, etc., so that the ground under the line will never be traveled except by pedestrians, this clearance may be reduced to the following values:

	Feet
(1) Communication conductors limited to 160 volts to ground, and communication cables	8
(2) Conductors of other communication circuits	10

[11]No clearance from ground is required for anchor guys not crossing streets, driveways, roads, or pathways, nor for anchor guys provided with traffic guards and paralleling sidewalk curbs.

[12]This clearance may be reduced to 13 feet for communication conductors where no part of the line overhangs any part of the highway which is ordinarily traveled, and where it is unlikely that loaded vehicles will be crossing under the line into a field.

[13]Where communication wires or cables cross over or run along alleys, this clearance my be reduced to 15 feet.

[14]A conductor which is effectively grounded throughout its length and is associated with a circuit of over 750 volts between conductors may have the clearances specified for open supply wires of 0 to 750 volts.

[15]This value may be reduced to 25 feet for guys and for cables carried on messengers.

[16]Adjacent to overhead bridges which restrict the practice of permitting men on top of cars, these clearances may be reduced, within the restricted area, by mutual agreement between the parties at interest, but in no case shall the wires or cables be at levels below the under surface of the bridge. [See Figure 1 in Appendix, page 165.]

(2) **Increased clearances.** Greater clearances than specified in Table 1, subsection (1) this section shall be provided where required by paragraphs (a), (b), and (c) below. Increases are cumulative where more than one apply.

Exception: Increased clearances are not required for trolley contact conductors, for guys, or for cable supported by messenger.

(a) Spans longer than specified in subsection (1)(b) of this section. In applying the following rules, the "point of crossing" in the case of roads, streets, alleys and driveways is considered to be the edge of the traveled way farthest from the nearer support of the crossing span. In the case of a railroad crossing, it is the track rail which is farthest from the nearer support of the crossing span. In other situations it is the location under the conductors of any topographical feature which is the determinant of the clearance.

(i) Where point of crossing occurs at point of maximum total sag of the conductor.

(A) General. For spans exceeding the limits specified in subsection (1)(b) of this section, above, the clearance specified in Table 1 shall be increased by 0.1 foot for each 10 feet of the excess of span length over such limits. See (c) below.

(B) Railroad crossings. For spans exceeding the limits specified in subsection (1)(b) of this section, above, the clearance specified in Table 1 shall be increased by the following amounts for each 10 feet by which the crossing span length exceeds such limits. See (c) below.

Loading district	Amount of increase per 10 feet	
	Large conductors	Small[1] conductors
Heavy and medium	0.15	0.30
Light	.10	.15

[1]A small conductor is a conductor having an over-all diameter of metallic material equal to or less than the following values:

Material	Outside diameter of conductor	
	Solid	Stranded
	Inches	Inches
All copper	0.160	0.250
Other than all copper	.250	.275

(C) Limits. The maximum additional clearance need not exceed the following percentages of the "maximum sag increase" for the conductor concerned:

Loading district	Percentage
Heavy	75
Medium	85
Light	75

The "maximum sag increase" to which these percentages apply is the arithmetic difference between final unloaded sag at 60° F, no wind, and the maximum total sag under the entire conductor loading of WAC 296-44-355 for the loading district concerned, or under 120° F, no wind, whichever sag is the greater, computed for the span length for which such difference is greatest.

(ii) Where point of crossing is not at point of maximum total sag of the conductor. Under these conditions the required clearance may be obtained by multiplying the clearance determined by subsections (1) and (2)(a)(i) of this section by the following factors, but in no case shall the clearance be less than required by Table 1:

Distance from nearer support of crossing span to point of crossing in percentage of crossing span length	Factors
5	0.85
10	.88
15	.91
20	.94
25	.96
30	.98
35	.99
40 to 50	1.00
Interpolate for intermediate values	

(b) Voltages exceeding 50,000 volts between conductors. For these voltages the clearances given in Table 1 of this section shall be increased at the rate of 0.5 inch for each 1,000 volts of the excess.

(c) Conductors supported by suspension-type insulators at crossings over track rails. The clearances shall be increased by such an amount that the values specified in Table 1 of this section will be maintained in case of a broken conductor in either adjoining span, if the conductor is supported as follows:

(i) At one support by suspension-type insulators in a suspended position, and at the other support by insulators which are not free to swing (including semistrain-type insulators).

(ii) At one support by strain insulators, and at the other support by semistrain-type insulators.

(d) Methods of avoiding this increase of clearance. Any of the following construction methods will avoid the necessity for the increase in clearance required by subsection (2)(c) of this section.

(i) Suspension-type insulators in a suspended position at both supports.

(ii) Semistrain-type insulators at both supports.

(iii) Arrangement of insulators so that they are restrained from displacement toward the crossing.

(3) **Supply pole wiring at underground risers.** Supply wires connecting to underground systems shall not be run open closer to the ground than is indicated by Table 2:

TABLE 2.—Clearance above ground for open supply wiring.

[See Appendix, WAC 296-44-88001 through 296-44-88011.]

Location on pole	Voltage between conductors		
	0 to 750 volts	750 to 15,000 volts	More than 15,000 volts
	Feet	Feet	Feet
Side of pole adjacent to vehicular traffic.....	14	16	18
Side of pole not adjacent to vehicular traffic	8	11	13

[§ 23 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-319 Clearances——Wire-crossing clearances. The clearance between any two wires crossing each other and carried on different supports shall not be less than the following: (1) **Basic clearances.** The clearances given in Table 3 below apply under the following conditions:

(a) Temperature of 60° F, no wind, with the upper conductor or wire at its final unloaded sag and the lower conductor or wire at its initial unloaded sag.

(b) Span lengths not greater than the following for the upper conductor or wire:

Loading district	Span lengths
	Feet
Heavy	175[1]
Medium	250[1]
Light.....	350

[1]150 feet in heavy loading district and 225 feet in medium loading district for 3-strand conductors, each wire of which is 0.09 inch or less in diameter.

(c) Voltages 0 to 50,000 volts between conductors.

(d) Fixed supports for the upper conductor or wire.

TABLE 3.—Wire-crossing clearances

[See Fig. 2 in Appendix, WAC 296-44-88002.]

(All voltages are between wires except for trolley contact conductors where voltages are to ground)

The insertion of a given clearance in italics indicates that in general the lines operating at the voltage named above this clearance should not cross over the lines at the voltage to the left of the clearance in italics.

Nature of wires crossed over	Communication wires, including cables and messengers	Open supply wires 0 to 750 volts; supply cables, all voltages, having effectively grounde continuous metal sheaths or messengers; messengers associated with such cables		Open supply wires and service drops[6]		Guys, span wires, lightning-protection wires
		Line wires	Service drops	750 to 8,700 volts	8,700 to 50,000 volts	
	Feet	Feet	Feet	Feet	Feet	Feet
Communication, including cables and messengers	2[2]	4[9 3]	2[9]	4[7]	6[10]	2[2]
Supply cables, all voltages, having effectively grounded continuous metal sheaths or messengers; messengers associated with such cables	4	2	2	2	4	2
Open supply wires:						
0 to 750 volts	4	2	2	2	4	2
750 to 8,700 volts	4	2	4	2	4	4
8,700 to 50,000 volts	6	4	6	4	4	4
Trolley contact conductors	4[4]	4[4 5]	4[4]	6	6	4[4]
Guys, span wires, lightning-protection wires, service drops 0 to 750 volts	2[2 8]	2	2	4	4	2[1 2]

[1]Completely insulated sections of guys attached to supporting structures having no conductor of more than 8,700 volts may have less than this clearance from each other.

[2]The clearance of communication conductors and their guy, span, and messenger wires from each other in locations where no other classes of conductors are involved may be reduced by mutual consent of the parties concerned, subject to the approval of the regulatory body having jurisdiction, except for the fire-alarm wires and wires used in the operation of railroads, or where one set of conductors is for public use and the other used in the operation of supply systems.

[3]Except where neutral conductors of primary supply circuits are concerned, a clearance of 2 feet may be permitted where the supply conductor is above the communication conductor, provided the crossing is not within 6 feet of any pole concerned in the crossing and the voltage to ground does not exceed 300 volts. (See note 9.)

[4]Trolley-contact conductors of more than 750 volts should have at least 6 feet clearance. This clearance should also be provided over lower-voltage trolley-contact conductors unless the crossover conductors are beyond reach of a trolley pole leaving the trolley-contact conductor or are suitably protected against damage from trolley poles leaving the trolley-contact conductor.

[5]Trolley feeders are exempt from this clearance requirement for trolley-contact conductors if they are of the same nominal voltage and of the same system.

[6]A conductor which is effectively grounded throughout its length and is associated with a circuit of over 750 volts between conductors may have the clearances specified for open supply wires of 0 to 750 volts.

[7]This clearance shall be increased to 6 feet where the supply wires cross over a communication line within 6 feet horizontally of a communication pole.

[8]This clearance shall be increased to 4 feet where communication cables cross over open supply service wires.

[9]Where a 2-foot clearance is required at 60°F, and where conditions are such that the sag in the upper conductor would increase more than 1.5 feet at the crossing point under the applicable loading of rule 251, the 2-foot clearances shall be increased by the amount of sag increase less 1.5 feet.

[10]Multigrounded wye circuits not exceeding 8,700 volts to ground may have a 4-foot clearance if the lowest supply wire at the crossing under conditions of 60°F, no wind, and final unloaded sag is not lower than a straight line joining the points of support of the highest communication conductor, provided it is not within 6 feet horizontally of a communication pole.

(2) **Increased clearances.** Greater clearances than given in Table 3, above, shall be provided under the following conditions. The increases in (a), (b) and (c) below are cumulative where more than one are applicable.

(a) Crossing spans longer than specified in subsection (1)(b) of this section. Under these conditions the clearances specified in Table 3 shall be increased as follows:

(i) Where the crossing occurs at the point of maximum total sag in the upper conductor, the clearances of Table 3 shall be increased by the following amounts for each 10 feet by which the crossing span length exceeds the limits specified in subsection (1)(b) of this section:

Loading district	Amount of increase per 10 feet	
	Large conductors	Small[1] conductors
	Feet	Feet
Heavy and medium	0.15	0.30
Light	.10	.15

[1]A small conductor is a conductor having an over-all diameter of metallic material equal to or less than the following values:

Material	Outside diameter of conductor	
	Solid	Stranded
	Inches	Inches
All copper	0.160	0.250
Other than all copper	.250	.275

The maximum additional clearance need not exceed the following percentages of the "maximum sag increase" for the conductor concerned:

Loading district	Percentage
Heavy	75
Medium	85
Light	75

The "maximum sag increase" to which these percentages apply is the arithmetic difference between final unloaded sag at 60° F, no wind, and the maximum total sag under the entire conductor loading of WAC 296-44-355 for the loading district concerned, or under 120° F, no wind, whichever sag is the greater, computed for the span length for which such difference is greatest.

(ii) If the crossing point is located elsewhere than at the point of maximum total sag in the upper span, the required clearance may be obtained by multiplying the clearance determined in subsection (1) and (2)(a)(i) of this section by the following factors, but in no case shall the clearance be less than required by Table 3.

Distance from nearer support of crossing span to point of crossing in percentage of crossing span length	Factors for basic clearance of—	
	4 feet	6 feet
5	0.35	0.47
10	.47	.58
15	.60	.68
20	.71	.78
25	.82	.85
30	.90	.92
35	.96	.98
40 to 50	1.00	1.00

Interpolate for intermediate values.

(b) Voltages exceeding 50,000 volts between conductors. For these voltages the clearances given in Table 3 (this section) shall be increased at the rate of 0.5 inch for each 1,000 volts of the excess.

(c) Conductors supported by suspension-type insulators at crossings over communication wires. For such conductors the clearance shall be increased by such an amount that the values specified in Table 3 (this section) will be maintained in case of a broken conductor in either adjacent span, provided such conductor is supported as follows:

(i) At one support by suspension-type insulators in a suspended position, and at the other support by insulators not free to swing (including semistrain-type insulators).

(ii) At one support by a strain insulator, and at the other support by a semistrain-type insulator.

(d) Methods of avoiding this increase of clearance. Any of the following construction methods will avoid the necessity for the increase in clearance required by subsection (2)(c) above:

(i) Suspension-type insulators in a suspended position at both supports.

(ii) Semistrain-type insulators at both supports.

(iii) Arrangement of insulators so that they are restrained from displacement toward the crossing. [§ 23 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-322 Clearances——Clearances of conductors of one line from other conductors and structures. (1) **Clearances from conductor of another line.** The clearance in any direction between any conductor of one line and any conductor of a second and conflicting line shall be not less than the largest value required by (a), (b), or (c) below at 60° F, no wind:

(a) Four feet.

(b) The values required by WAC 296-44-325(1)(b)(i)(A) or (B) for separation between conductors on the same support.

(c) The apparent sag of the conductor having the greater sag, plus 0.2 inch per kilovolt of the highest voltage concerned.

Exception: In situations where supply-line conductors only are involved, the clearance required by (c) above need not be greater than the value required by WAC 296-44-319(1) and (2), for a center-span crossing, assuming the conductor having the larger sag swinging through an arc of 45° from the vertical.

(2) **Clearances from supporting structures of another line.** Conductors of any line passing near a pole or similar supporting structure of a second line, without being attached thereto, shall have clearances from any part of such structure not less than the larger value required by either (a) or (b) below at 60° F, no wind:

(a) Three feet for all voltages over 750 volts.

(b) The values required by WAC 296-44-325(1)(b)(A) and (B) for separation between similar conductors on the same support, increased by 1 inch for each 2 feet of the distance from the supporting structure of the second line to the nearest supporting structure of the first line. The climbing space on the structure of the second line shall in no case be reduced by a conductor of the first line.

(3) **Clearances from buildings.**

(a) General. Conductors shall be arranged and maintained so as to hamper and endanger firemen as little as possible in the performance of their duties.

(b) Ladder space. Where buildings exceed three stories (or 50 feet) in height, overhead lines shall be arranged where practicable so that a clear space or zone at least 6 feet wide will be left, either adjacent to the building or beginning not over 8 feet from the building, to facilitate the raising of ladders where necessary for fire fighting.

Exception: This requirement does not apply where it is the unvarying rule of the local fire departments to exclude the use of ladders in alleys or other restricted places which are generally occupied by supply lines.

(c) Open supply conductors attached to buildings. Where the permanent attachment of open supply conductors of any class to buildings is necessary for an entrance, such conductors shall meet the following requirements:

(i) Conductors of more than 300 volts to ground shall not be carried along or near the surface of the building unless they are guarded or made inaccessible.

(ii) Clearance of wires from building surface shall be not less than those required in Table 9 (WAC 296-44-325(1)(c)(i)) for clearance of conductors from pole surfaces. [See Fig. 1 in Appendix, WAC 296-44-88001.]

(d) Conductors passing by or over buildings.

(i) Minimum clearances. Unguarded or accessible supply conductors carrying voltages in excess of 300 volts between conductors shall not come closer to any building or its attachments (balconies, platforms, etc.) than listed below, except that this rule should not be interpreted as restricting the installation of a trolley contract conductor over the approximate center line of the track it serves.

(A) Spans 0 to 150 feet. For spans of 0 to 150 feet, the clearances shall be as given in Table 4.

TABLE 4.—Clearances of Supply Condutors From Buildings

Voltage of supply conductors	Horizontal clearance	Vertical clearance
	Feet	Feet
300 to 8,700	3	8
8,700 to 15,000	8	8
15,000 to 50,000	10	10
Exceeding 50,000	10 plus 0.4 inch per kv in excess	10 plus 0.4 inch per kv in excess

(B) Spans exceeding 150 feet. Where span lengths exceed 150 feet, the increased clearances required by WAC 296-44-316(2)(a) shall be provided.

Exception: These increased clearances are not required where the voltage of the supply conductors is from 300 to 8,700 volts between conductors.

(ii) Guarding of supply conductors. Supply conductors of 300 volts or more between conductors shall be properly guarded by grounded conduit, barriers, or otherwise, under the following conditions:

(A) Where the clearances set forth in Table 4 (subsection (3)(d)(i)(A)) cannot be obtained.

(B) Where such supply conductors are placed near enough to windows, verandas, fire escapes, or other ordinarily accessible places, to be exposed to contact by persons.

Note: Supply conductors in grounded metal-sheathed cable are considered to be guarded within the meaning of this rule. [See Fig. 1 in Appendix, WAC 296-44-88001.]

(4) **Clearances from bridges.**

(a) Clearances of conductors from bridges. Supply conductors not installed in grounded conduit or metal-sheath cable, which pass under, over, or near a bridge shall have clearances therefrom not less than given in Table 5.

(b) Guarding trolley-contact conductors located under bridges.

(i) Where guarding is required. Guarding is required where the trolley-contact conductor is located so that a trolley pole leaving the conductor can make simultaneous contact between it and the bridge structure.

TABLE 5.—Clearances From Bridges

[See Fig. 1 in appendix.]

Voltages	Readily accessible portions (other than traveled ways[1]) of any bridge, including wing walls or bridge attachments		From ordinarily inaccessible portions[2] of bridges (other than brick, concrete, or masonry) and from abutments	
	For conductors attached to bridge[3]	For conductors not attached to bridge	For conductors attached to bridge[3 5]	For conductors not attached to bridge[4 5]
	Feet	Feet	Feet	Feet
0 to 2500	3.0	3.0	0.5	3.0
Over 2,500 to 5,000	3.0	3.0	1.0	3.0
Over 5,000 to 8,700	3.0	3.0	3.0	3.0
Over 8,700 to 15,000	5.0	5.0	5.0	5.0
Over 15,000 to 25,000	7.5	7.5	7.5	7.5
Over 25,000 to 35,000	7.5	9.0	7.5	9.0
Over 35,000 to 50,000	7.5	12.0	7.5	12.0
Exceeding 50,000	Add 0.4 inch per kv in excess			

Footnotes to Table 5.

[1]Where over traveled ways on or near bridges, the clearances of WAC 296-44-316 apply.

[2]Bridge seats of steel bridges carried on masonry, brick, or concrete abutments which require frequent access for inspection shall be considered as readily accessible portions.

[3]Conductors should have clearance not less than given in this column, where practicable.

[4]Conductors should have the clearances given in this column increased as much as practicable.

[5]Where conductors passing under bridges are adequately guarded against contact by unauthorized persons and can be deenergized for maintenance of the bridge, clearances of the conductors from the bridge, at any point, may have the clearances specified in Table 9 for clearance from surfaces of crossarms plus one-half the final unloaded sag of the conductor at that point.

(ii) Nature of guarding. Guarding shall consist of a substantial inverted trough of nonconducting material located above the conductor, or of other suitable means of preventing contact between the trolley pole and the bridge structure. [Tables 4 and 5, filed 10/30/64, effective 12/1/64; § 23 (part), Tables 4 and 5, filed 3/23/60, effective 12/1/58.]

WAC 296-44-325 Clearances--Minimum line-conductor clearances and separations at supports. (1) Separation between conductors on pole lines.

(a) Application of rule.

(i) Multiconductor wires or cables. Cables, and duplex, triple or paired conductors supported on insulators or messengers, whether single or grouped, are for the purposes of this rule considered single conductors even though they may contain individual conductors not of the same phase or polarity.

(ii) Conductors supported by messengers or span wires. Clearances between individual wires or cables supported by the same messenger, or between any group and its supporting messenger, or between a trolly feeder, supply conductor, or communication conductor, and

their respective supporting span wires, are not subject to the provisions of this rule.

(iii) Measurement of clearances. The clearances and separations stated may be measured from the center of the supporting insulator instead of from the conductor itself.

(b) Horizontal separations between line conductors.

(i) Fixed supports. Line conductors attached to fixed supports shall have horizontal separations from each other not less than the larger value required by either (1) or (2) below for the situation concerned.

Exception 1: The pin spacing at buckarm construction may be reduced as specified in WAC 296-44-328(6), to provide climbing space.

Exception 2: The pin spacing at bridge fixtures may be reduced as specified in subsection (3) of this section.

Exception 3: These clearances do not apply where conductors have insulating covering adequate for the voltage concerned.

(A) Minimum horizontal separation between line conductors of the same or different circuits. Separations shall not be less than given in Table 6.

TABLE 6.—Minimum horizontal separation at supports between line conductors of the same or different circuits.

[See Fig. 6.A – 9.A in Appendix, WAC 296-44-88005.]
(All voltages are between conductors except for railway feeders, which are to ground)

Class of circuit	Separation	Notes
	Inches	
Communication conductors	6	Preferable minimum. Does not apply at conductor transportation points.
	3	Permitted where pin spacings less than 6 inches have been in regular use. Does not apply at conductor transportation points.
Railway feeders:		
0 to 750 volts, No. 4/0 or larger	6	
0 to 750 volts, smaller than No. 4/0	12	Where 10- to 12-inch separation has already been established by practice, it may be continued, subject to the provisions of subsection (1)(b)(i)(B) of this section for conductors having apparent sags not over 3 feet and for voltages not exceeding 8,700.
750 volts to 8,700 volts	12	
Other supply conductors:		
0 to 750 volts	10	
750 to 5,000 volts	12	
5,000 to 33,000 volts	22*	
For all conductors of more than 33,000 volts add for each 1,000 volts in excess of 33,000 volts	0.4	

*On dead ends and buck arms only this distance can be reduced to 18 inches.

(B) Separations according to sags. The separation at the supports of conductors of the same or different circuits of grades B, or C shall in no case be less than the values given by the following formulas, at 60° F, no wind. The requirements of subsection (1)(b)(i)(A) of this section apply if they give a greater separation than this rule.

For line conductors smaller than No. 2 AWG:

$$\text{Separation} = 0.3 \text{ inch per kilovolt} + 7\sqrt{(S/3)} - 8.$$

For line conductors of No. 2 AWG or larger:

$$\text{Separation} = 0.3 \text{ inch per kilovolt} + 8\sqrt{S/12}.$$

S is the apparent sag in inches of the conductor having the greater sag, and the separation is in inches.

TABLE 7.—Separation in inches required for line conductors smaller than No. 2 AWG

Voltage between conductors	Sag (in inches)						
	36	48	72	96	120	180	240
2,400	14.5	20.5	28.5	35.0	40.5	51.5	60.0
7,200	16.0	22.0	30.0	36.5	42.0	52.5	61.5
13,200	18.0	24.0	32.0	38.5	43.5	54.5	63.5
23,000	21.0	27.0	35.0	41.5	46.5	57.5	66.5
34,500	24.5	30.5	38.5	44.5	50.5	61.0	70.0
46,000	28.0	34.0	42.0	48.0	53.5	64.5	73.0
69,000	...	40.5	48.5	55.0	60.5	71.0	80.0

TABLE 8.—Separation in inches required for line conductors No. 2 AWG or larger

Voltage between conductors	Sag (in inches)						
	36	48	72	96	120	180	240
2,400	14.5	16.5	20.5	23.5	26.0	31.5	36.5
7,200	16.0	18.0	22.0	25.0	27.5	33.0	38.0
13,200	18.0	20.0	23.5	26.5	29.5	35.0	39.5
23,000	21.0	23.0	26.5	29.5	32.0	38.0	42.5
34,500	24.0	26.5	30.0	33.0	35.5	41.5	46.0

Voltage between conductors	Sag (in inches)						
	36	48	72	96	120	180	240
46,000	27.5	30.0	33.5	36.5	39.0	45.0	49.5
69,000	...	36.5	40.5	43.5	46.0	51.5	56.5

(ii) Suspension insulators not restrained from movement. Where suspension insulators are used and are not restrained from movement, the conductor separation shall be increased so that one string of line insulators may swing transversely through an angle of thirty degrees from a vertical position without reducing the values given in (i) above.

(C) Clearances in any direction from line conductors to supports, and to vertical o lateral conductors, span or guy wires, attached to the same support.

(i) Fixed supports. Clearances shall be not less than given in Table 9.

TABLE 9.—Minimum clearance in any direction from line conductors to supports, and to vertical or lateral conductors, span or guy wires attached to the same support. [See 6.A – 9.A in Appendix, WAC 296-44-88005.]

(All voltages are between conductors)

Clearance of line conductors from—	Communication lines—		Supply lines		
			0 to 8,700 volts		Exceeding 8,700 volts add for each 1,000 volts of excess
	In general	On jointly used poles	In general	On jointly used poles	
	Inches	Inches	Inches	Inches	Inches
Vertical and lateral conductors:					
Of same circuit ..	3	3	3	3	0.25
Of other circuits..	3	3	6[6]	6[6]	.4
Span and guy wires attached to same pole:					
General	3[8]	6[1 8]	6	6	.4
When parallel to line	3[8]	6[1 8]	12[1]	12[1]	.4
Lightning-protection wires parallel to line	2 5	2 5	2 5	2 5	.4
Surfaces of crossarms	3[3]	3[3]	3	3	.25
Surfaces of poles ...	3[3]	5[3]	3[7]	5[4 7]	.25

[1]For guy wires, if practicable. For clearances between span wires and communication conductors, WAC 296-44-334(5)(c).

[2]Clearance shall not be less than the separation required by Table 6 or subsection (1)(b)(i)(B) of this section between two line conductors of the voltage concerned.

[3]Communication conductors may be attached to supports on the sides or bottoms of crossarms or surfaces of poles with less clearance, if at least 40 inches from any supply line conductor of less than 8,700 volts and at least 60 inches from any supply line conductor of more than 8,700 volts carried on the same pole.

[4]This clearance applies only to supply conductors carried on crossarms below communication conductors, on joint poles. Where supply conductors are above communication conductors the clearance shall be at least 3 inches.

[5]For the purpose of applying the above table, the voltage of lightning-protection wires shall be considered as being the voltage to ground of the associated supply conductors.

[6]For supply circuits of 0 to 750 volts, this clearance may be reduced to 3 inches.

[7]A neutral conductor which is effectively grounded throughout its length and is associated with supply circuits may be attached directly to the pole surface.

[8]Guys and messengers may be attached to the same strain plates or to the same through-bolts.

(ii) Suspension insulators not restrained from movement. Where suspension insulators are used and are not restrained from movement, the conductor clearances from surfaces of supports, from span or guy wires, or from vertical or lateral conductors shall be such that the values of clearances required by (i) above will be maintained with an insulator swing of thirty degrees from the vertical position.

(d) Conductor separation—Vertical racks. [See Appendix at end of this chapter.] Conductors or cables may be carried on vertical racks or separate brackets other than wood placed vertically at one side of the pole and securely attached thereto, if all the following conditions are met:

(i) The voltage between conductors shall be not more than 750 volts, except that cables having effectively grounded continuous metal sheath may carry any voltage.

(ii) Conductors shall be of the same material or materials.

(iii) Vertical spacing between conductors of 0 to 300 volts shall be not less than 8 inches, except for busses and service takeoffs, where the spacing may be reduced to 4 inches. (See Table 9, subsection (1)(c) of this section for necessary clearances from pole surfaces.) [See Appendix at end of this chapter.]

(iv) Vertical spacing between conductors of 300 to 750 volts shall be not less than 12 inches, except for busses and service takeoffs, where spacing may be reduced to 8 inches. [See Appendix at end of this chapter.]

Exception: The above conditions shall not permit supply circuits of 0 to 750 volts to occupy the same arm with circuits of over 750 volts except on substation structures and transformer banks.

(e) Separation between supply circuits of different voltage classifications on the same crossarm. Supply circuits of any one voltage classification as given in Table 11 (WAC 296-44-334(1)(a)) may be maintained on the same crossarm with supply circuits of the next consecutive voltage classification only under the following conditions:

(i) If they occupy pin positions on opposite sides of the pole.

(ii) If in bridge-arm or side-arm construction they are separated by a distance of not less than the climbing space required for the higher voltage concerned and provided for in WAC 296-44-328.

(iii) If series lighting or similar supply circuits are ordinarily dead during periods of work on or above the crossarm concerned.

(iv) If the two circuits concerned are communication circuits used in the operation of supply lines, and supply circuits of less than 8,700 volts, and are owned by the same utility, provided they are installed as in (i) or (ii) above.

Exception: The above conditions shall not permit supply circuit of 0 to 750 volts to occupy the same arm with circuits of over 750 volts except on substation structures and transformer banks.

(2) **Separation between conductors attached to buildings.** Separation of wires from each other shall be not less than those required in Table 6 (subsection (1)(b)(i)(A)) for separation of conductors from each other as supports.

Exception: Conductors on vertical racks or separate brackets other than wood placed vertically meeting the requirements of subsection (1)(d) of this section may have the separations specified in that rule.

(3) **Separation between conductors attached to bridges.** Supply conductors attached to bridges and supported at frequent intervals may have less separation at supports than required by subsection (1)(b)(i)(A) and (B). The separation shall be not less than the clearance between supply conductors and the surfaces of poles or crossarms required by subsection (1)(c)(i), or less than the following:

Span length:	Separation inches
0 to 20 feet	6
20 to 50 feet	9

[Subsections (1)(b)(ii) and (1)(c)(ii), filed 10/30/64, effective 12/1/64; § 23 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-328 Clearances——Climbing space. (1) **Location and dimensions.** (a) A climbing space having the horizontal dimensions specified in subsection (5) of this section shall be provided past any conductors, crossarms, or other parts.

(b) The climbing space shall be provided on all poles and structures.

(c) The climbing space shall extend vertically past any conductor or other part between levels above and below the conductor as specified in subsections (5), (6), (7), and (8) of this section. The position of the climbing space shall be maintained for at least 40 inches above and below any limiting conductor level and where the limiting conductor levels are separated 6 feet or more, the climbing space may be rotated by not more than 1/4 of the distance around the pole between any such levels. Where the climbing space is on the face or back of the pole, this space may be considered as in either quadrant to the right or left for the purpose of interpreting this rule. [See Appendix at end of this chapter.]

(d) The climbing space shall include not less than one quadrant nor more than one-half of the pole cross-section.

(2) **Portions of supporting structures in climbing space.** Portions of the pole or structure when included in one side or corner of the climbing space, are not considered to obstruct the climbing space, providing that such inclusion into the climbing space does not exceed 25% of the total area of the specified climbing space. Where such a condition exists, additional space shall be added to the original spacing to compensate for the loss of clearances.

(3) **Crossarm location relative to climbing space.** All single crossarms should be located on the same face and side of the pole to avoid unnecessarily obstructing the climbing space through the different conductor levels. One arm of sets of double crossarms protruding into the climbing space shall not be considered as an obstruction in the climbing space. [See Appendix at end of this chapter.]

(4) **Location of supply and communication apparatus relative to climbing space.** Transformers, regulators, lightning arresters, fuse mountings, switches, service brackets, communication terminal cans, and service drop hooks and other attachments shall be mounted outside the climbing space. Pole steps shall be placed so that they do not interfere with the climbing space. [See Appendix at end of this chapter.]

(5) **Climbing space through conductors on crossarms.** [See Appendix at end of this chapter.]

(a) Conductors of same voltage classification on same crossarm. Climbing space between conductors shall be of the horizontal dimensions specified in Table 10 below, and shall be provided both along and across the line, and shall be projected vertically not less than 40 inches above and below the limiting conductors. Where communication conductors are above supply conductors of more than 8,700 volts, the climbing space shall be projected vertically at least 60 inches above the highest supply conductor. [See Appendix at end of this chapter.]

Exception 1: This rule does not apply if it is the unvarying practice of the employer concerned to prohibit employees from ascending beyond the conductors of the given line, unless the line is killed.

(b) Conductors of different voltage classifications on same crossarm. The climbing space shall be that required by Table 10 below for the highest voltage of any conductor bounding the climbing space. The climbing space shall extend vertically to the limits specified in paragraph (a) above, and the exception thereto.

(c) Horizontal climbing-space dimensions.

TABLE 10.—Minimum horizontal dimensions of climbing space

Character of conductors adjacent to climbing space	Voltage of conductors	Horizontal dimensions of climbing space (inches)			
		On poles used solely by—		On jointly used poles	
		To ground	Between wires	Communication conductors	Supply conductors	Supply conductors above communication conductors	Communication conductors above supply conductors[1]
Communication conductors	0 to 150	No requirement.			[2]		No requirement.
	Exceeding 150.	24 recommended.			[2]		24 recommended.
Supply conductors	Less than 300.			24		24	30.
	300 to 8,700			30		30	30
	8,700 to 15,000			36		36	30.
	Exceeding 15,000			More than 36.[3]		More than 36.[3]	More than 36.[3]

[1]This relation of levels is not, in general, desirable and should be avoided where practicable.

[2]Climbing space shall be the same as required for the supply conductors immediately above, with a maximum of 30 inches, except that a climbing space of 16 inches across the line may be employed for communication cables or conductors where the only supply conductors at a higher level are secondaries (0 to 750 volts between conductors) supplying airport or airway marker lights or crossing over the communication line and attached to the pole top or to a pole-top extension fixture. [See Appendix, WAC 296-44-88001 through 296-44-88011.]

(6) **Climbing space on buckarm construction.** The full width of climbing space shall be maintained on buckarm construction and shall extend vertically in the same position at least 40 inches (or 60 inches where required by subsection (5)(a)) above and below any limiting conductor.

Method of providing climbing space on buckarm construction. With circuits of less than 5,000 volts and span lengths not exceeding 150 feet and sags not exceeding 15 inches for wires of No. 2 and larger sizes, or 30 inches for wires smaller than No. 2, a six-pin crossarm having pin spacing of 14 1/2 inches may be used to provide a 30-inch climbing space on one corner of a junction pole by omitting the pole pins on all arms, and inserting pins midway between the remaining pins so as to give a spacing of 7 1/4 inches, provided that each conductor on the end of every arm is tied to the same side of its insulator, and that the spacing on the next pole is not less than 14 1/2 inches. [See Appendix at end of this chapter.]

(7) **Climbing space past vertical conductors.** One vertical run or riser incased in suitable conduit or other protective covering not over 2 inches outside diameter and securely attached to the surface of the pole or structure and/or a ground wire attached to the surface of the pole, are allowed in the climbing space. It is recommended that this practice be avoided whenever practical.

(8) **Climbing space near ridge-pin conductors.** The climbing space specified in subsection (5)(c) shall be provided above the top crossarm to the ridge-pin conductor but need not be carried past it. [§ 23 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-331 Clearances——Working space. (1) **Location of working spaces.** Working spaces shall be provided on the climbing face of the pole at each side of the climbing space.

(2) **Dimensions of working spaces.**

(a) Along the crossarm. The working space shall extend from the climbing space to the outmost pin position on the crossarm.

(b) Perpendicular to the crossarm. The working space shall have the same dimension as the climbing space (See WAC 296-44-328(5)). This dimension shall be measured from the face of the crossarm.

(c) Vertically. The working space shall have a height not less than that required by WAC 296-44-334 for the vertical separation of line conductors carried at different levels on the same support.

(3) **Location of vertical and lateral conductors relative to working spaces.** The working spaces shall not be obstructed by vertical or lateral conductors. Such conductors shall be located on the opposite side of the pole from the climbing side or on the climbing side of the pole at a distance from the crossarms at least as great as the width of climbing space required for the highest-voltage conductors concerned. Vertical conductors enclosed in suitable conduit may be attached on the climbing side of the pole, in compliance with WAC 296-44-328(7).

(4) **Location of buckarms relative to working spaces.** Buckarms may be used under any of the following conditions, provided the climbing space is maintained. Climbing space may be obtained as in WAC 296-44-328(6). [See Appendix at end of this chapter.]

(a) Standard height of working space. Lateral working space of the height required by Table 11 (WAC 296-44-334(1)(a)) may be provided between the buckarms and adjacent line arms to which conductors on the buckarms are not attached.

Method of meeting requirements. This may be accomplished by increasing the spacing between the line crossarm gains.

(b) Reduced height of working space. Buckarms may be inserted at reduced spacing when the conductors on the buckarms are attached to conductors on one adjacent linearm as follows: Where wires are of 0 to 750 volts spacing may be reduced to 12 inches; where wires are of 750 to 15,000 volts spacing may be reduced to 18 inches. [§ 23 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-334 Clearances——Vertical separation between line conductors, cables, and equipment located at different levels on the same pole or structure. All line conductors, cables, or equipment located at different levels on the same pole or structure shall have the vertical separations set forth below. (1) **Vertical separation between horizontal crossarms.** Crossarms supporting line conductors shall be spaced in accordance with Table 11. Vertical separations between crossarms shall be measured from center to center.

(a) Basic separations. The separations given in the following Table 11 are for crossarms carrying conductors of 0 to 50,000 volts between conductors attached to fixed supports. [See Appendix at end of this chapter.]

(b) Increased separations for voltages exceeding 50,000 volts between conductors. For voltages greater than 50,000 volts between conductors the clearances of Table 11 shall be increased at the rate of 0.4 inch per 1,000 volts of the excess. [See Appendix at end of this chapter.]

TABLE 11.—Vertical separation of crossarms carrying conductors

(All voltages are between conductors) [See Appendix, WAC 296-44-88001 though 296-44-88011.]

Conductors usually at lower levels	Supply conductors; preferably at higher levels				
	Open wires, 0 to 750 volts; cables, all voltages, having effectively grounded continous metal sheath or messenger	750 to 8,700 volts	8,700 to 15,000 volts	15,000 to 50,000 volts	
				Same utility	Different utilities
	Feet	Feet	Feet	Feet	Feet
Communication conductors:					
General	4[1] [2]	4	7	——	7
Used in operation of supply lines	2	3	4	7	7
Supply conductors:					
0 to 750 volts	2	3[3]	7[5] [6]	7[5]	7
750 volts to 5,000 volts	——	2[3]	7[6]	7	7
5,000 volts to 8,700 volts	——	2[3]	4	4	7
8,700 volts to 15,000 volts:					
If worked on alive with long-handled tools, and adjacent circuits are neither killed nor covered with shields or protectors	——	——	4	4	6
If not worked on alive except when adjacent circuits (either above or below) are killed or covered by shields or protectors, or by the use of long-handled tools not requiring linemen to go between live wires	——	——	2	4[4]	4[4]
Exceeding 15,000 volts, but not exceeding 50,000 volts	——	——	——	4[4]	4[4]

[1]Where supply circuits of 550 volts or less, with transmitted power of 3,200 watts or less, are run below communication circuits in accordance with WAC 296-44-298(2)(c), the clearance may be reduced to 2 feet.

[2]In localities where the practice has been established of placing on jointly used poles, crossarms carrying supply circuits of less than 300 volts to ground and crossarms carrying communication circuits at a vertical separation less than specified in the table, such existing construction may be continued until the said poles are replaced provided that—

The minimum separation between existing crossarms is not less than 2 feet, and that—

Extensions to the existing construction shall conform to the clearance requirements specified in Table 11.

When communication conductors are all in cable, a supply crossarm carrying only wires of not more than 300 volts to ground may be placed at not less than 2 feet above the point of attachment of the cable to the pole provided that—

The nearest supply wire on such crossarm shall be at least 30 inches horizontally from the center of the pole, and that—

The cable be placed so as not otherwise to obstruct the climbing space.

[3]Where conductors are operated by different utilities, a minimum vertical spacing of 4 feet is required.

[4]These values do not apply to adjacent crossarms carrying phases of the same circuit or circuits.

[5]This value may be reduced to 4 feet where secondary vertical-rack construction is used on one side or face of pole, or on two sides where conductors are deadened, only. Service contacts are permitted in addition.

[6]A primary buck arm not less than 8 feet long supporting not more than 2 conductors in the end pin positions or one lateral primary conductor dead-ended on the pole, may be placed in the 7 foot spacing provided that this spacing is not reduced to less than 5 feet.

(2) **Vertical separation between line conductors on horizontal crossarms.** [See Appendix at end of this chapter.] Where line conductors are supported on horizontal crossarms spaced as required in subsection (1); the vertical separation between such conductors shall be not less than the following:

(a) Where conductors on the crossarm are of the same voltage classification. Under these conditions, the vertical separation required by Table 11 may be reduced as follows:

Where crossarm separation required by table 11 is—	Separation between conductors may be reduced to—
2 feet	16 inches
3 feet	28 inches
4 feet	40 inches
6 feet	60 inches
7 feet	70 inches

(b) Where conductors of different voltage classifications are on same crossarm. Under these conditions, the vertical separation between conductors on adjacent crossarms shall be that required by Table 11 (subsection (1)(a)) above for the highest voltage classification concerned.

(c) Conductors of different sags on same support.

(i) Variation in clearance. Line conductors supported at different levels on the same structure and strung to different sags shall have vertical spacings at the supporting structures so adjusted that the minimum spacing at any point in the span, at 60° F, no wind, shall not be reduced more than 25 percent from that required at the supports by WAC 296-44-325(1)(b)(i)(A) and (B) and this section.

(ii) Readjustment of sags. Sags should be readjusted when necessary to accomplish the foregoing, but not reduced sufficiently to conflict with the requirements of WAC 296-44-364(6)(d). In cases where conductors of different sizes are strung to the same sag for the sake of appearance or to maintain unreduced clearance throughout storms, the chosen sag should be such as will keep the smallest conductor involved in compliance with the sag requirements of WAC 296-44-364(6)(d).

(3) **Separation in any direction.** The separation in any direction between conductors of the same or different voltage classification when carried on the same structure, but on crossarms which are not horizontal, shall be not less than the values given in Table 11 (this section) for vertical separation. The separation in any direction shall not in any case be less than the horizontal separation specified in WAC 296-44-325(1)(b)(i)(A) and (B).

(4) **Vertical separation for line conductors not carried on crossarms.** The vertical separation between conductors not carried on crossarms shall be the same as required in subsection (2)(a) of this section, for conductors on crossarms.

Exception: Conductors on vertical racks or separate brackets other than wood placed vertically meeting the requirements of WAC 296-44-325(1)(d) may have separations as specified in that rule.

(5) **Vertical separation between conductors and noncurrent-carrying metal parts of equipment.**

(a) Equipment. For the purpose of measuring separations under this rule, "equipment" shall be taken to mean noncurrent-carrying metal parts of equipment, including metal supports for cables or conductors, and metal supply-crossarm braces which are attached to metal crossarms or are less than 1 inch from transformer cases or hangers which are not effectively grounded.

(b) Separations in general. Vertical separations between supply conductors and communication equipment, between communication conductors and supply equipment, and between supply and communication equipment shall be as follows, except as provided in (c), below:

Supply voltage between conductors	Vertical separation
	Inches
0 to 8,700	40
Exceeding 8,700	60[1]

[1]Tranformer cases and associated hangers and supply cables, when effectively grounded, may have a separation of 40 inches.

(c) Separations for span wires and brackets. Span wires or brackets for lamps or trolley contact conductors shall have at least the vertical separations from communication equipment set forth below:

From open communication conductors on crossarms:	
Span wire or brackets above crossarm	20 inches[1]
Span wire or bracket below crossarm	2 feet
From messenger wires carrying communication cables	1 foot
From terminal box of communication cables, if practicable	1 foot[2]
From communication brackets, bridle wire rings, or drive hooks	2 inches

[1]This may be reduced to 12 inches for either span wires or metal parts of lamp brackets at points 40 inches or more from the pole surface.

[2]Where it is not practicable to obtain a clearance of 1 foot from terminal boxes of communication cables, all metal parts of terminals shall have the greatest practicable separation from fixtures or span wires, including all supporting screws and bolts of both attachments. [See Figure 6.A-9.A in Appendix, WAC 296-44-88005.]

Exception: If lamp brackets are effectively grounded, these separations do not apply.

[§ 23 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-337 Clearances——Clearances of vertical and lateral conductors from other wires and surfaces on the same support. Vertical and lateral conductors shall have the clearances and separations required by this rule from other conductors, wires, or surfaces on the same support.

Exception 1: This rule does not prohibit the placing of supply circuits of the same or next voltage classification in the same iron pipe, if each circuit or set of wires be inclosed in a metal sheath.

Exception 2: This rule does not prohibit the placing of paired communication conductors in rings attached directly to the pole or to messenger.

Exception 3: This rule does not prohibit placing grounding conductors, neutral conductors which are effectively grounded throughout their length and associated with supply circuits, metal sheathed supply cables or conductors enclosed in conduit, directly on the pole.

Exception 4: This rule does not prohibit placing supply circuits of 550 volts or less and not exceeding 3,200 watts and properly insulated, in the same cable with control circuits with which they are associated.

(1) **Location of vertical or lateral conductors relative to climbing spaces, working spaces, and pole steps.** Vertical or lateral conductors shall be located so that they do not obstruct climbing spaces, or lateral working spaces between line conductors at different levels, or interfere with the safe use of existing pole steps.

Exception: This rule does not apply to vertical runs incased in suitable conduit or other protective covering. (See WAC 296-44-328(7)).

(2) **Conductors not in conduit.** Conductors not incased in conduit shall have the same clearances from conduits as from other surfaces of structures.

(3) **Mechanical protection near ground.** Where within 8 feet of ground, all vertical conductors, cables, and grounding wires shall be protected by a covering which gives suitable mechanical protection. For grounding wires from lightning arresters, the protective covering specified above shall be of wood molding, or other insulating material giving equivalent protection.

Exception 1: This covering may be omitted from armored cables or cables installed in a grounded metal conduit.

Exception 2: This covering may be omitted from vertical runs of communication cables or conductors.

Exception 3: This covering may be omitted from grounding wires in rural districts having triplebraid weather-proof covering, or where such grounding wire is one of a number of grounding wires used to provide multiple grounds.

Exception 4: This covering may be omitted from wires which are used solely to protect poles from lightning.

(4) **Requirements for vertical and lateral supply conductors on supply line poles or within supply space on jointly used poles.**

(a) General clearances. In general, clearances shall be not less than the values specified in Table 12.

TABLE 12.—General clearances.

(All voltages are between conductors)

Clearance of vertical and lateral conductors	Clearance for highest voltage concerned in the clearance	
	0 to 8,700 volts	Exceeding 8,700 volts, add the following for each 1,000 in excess
	Inches	Inches
From surfaces of supports	3	0.25
From span, guy, or messenger wires	6	.4
From line conductors rigidly supported on fixed supports, such conductors being of—		
Same circuit	3	.25
Different circuits	6	.4
From line conductors not rigidly supported on fixed supports	[1]	[1]

[1]The clearances shall be increased beyond the values given above from line conductors on fixed supports (See WAC 296-44-325(1)(b)(ii), and (1)(c)(ii)).

(b) Special cases. The following requirements apply only to portions of a pole which workmen ascend while the conductors in question are alive:

(i) Side-arm construction. Vertical conductors in metal-sheathed cables and grounding wires may be run without insulating protection from supply line conductors on poles used only for supply lines and employing side-arm construction on the side of the pole opposite to the line conductors if climbing space is provided on the line-conductor side of the pole.

(ii) On insulators. Vertical and lateral conductors of less than 8,700 volts between conductors if on poles used only for supply lines may be run in multiple-conductor cables having suitable substantial insulating covering, if such cable is held taut on standard insulators supported on pins or brackets and is arranged so that the cable is held at a distance of approximately 5 inches from the surface of the pole and from any pole step.

(iii) Conductors to street lamps. On poles used only for supply lines, open wires may be run from the supply line arm directly to the head of a street lamp, provided the clearances of Table 12 are obtained and the open wires are substantially supported at both ends.

(iv) Conductors of less than 300 volts. Vertical or lateral secondary supply conductors of not more than 300 volts to ground may be run in multiple-conductor cable attached directly to the pole surface or to cross-arms in such a manner as to avoid abrasion at the point of attachment. Each conductor of such cable which is not effectively grounded, or the entire cable assembly, shall have an insulating covering required for a conductor of at least 1,000 volts.

(v) Other conditions. If open wire conductors are within 4 feet of the pole, vertical conductors where

within a zone of 4 feet above and below such line conductors of not more than 8,700 volts between conductors, or where within a zone of 6 feet above and below such line conductors of more than 8,700 volts between conductors, shall be run in one of the following ways:

(A) So as to clear the pole center by not less than 15 inches if the vertical conductors are of 8,700 volts less between conductors, or 20 inches if more than 8,700 volts;

(B) Enclosed in insulating conduit, or in metal conduit or cable protected by an insulating covering;

(C) Conductors with triple-braid weather-proof or equivalent covering and covered by wood molding.

Methods (B) and (C) apply also to lateral runs and to grounding conductors, except that conductors for grounding lightning-protection wires are not required to be covered within 6 feet above or below circuits of 15,000 volts or more.

(5) **Requirements for vertical and lateral communication conductors on communication line poles or within the communication space** on jointly used poles.

(a) Clearances from wires. The clearances and separations of vertical and lateral conductors from other conductors (except those in the same ring run) and from guy, span, or messenger wires shall be 3 inches.

(b) Clearances from pole and crossarm surfaces. Vertical and lateral insulated communication conductors may be attached direct to a pole or crossarm. They shall have a vertical clearance of at least 40 inches from any supply conductors (other than vertical runs or lamp leads) of 8,700 volts or less between conductors, or 70 inches if more than 8,700 volts between conductors.

Exception: These clearances do not apply where the supply circuits involved are those carried in the manner specified in WAC 296-44-298(2)(C).

(6) **Requirements for vertical supply conductors passing through communication space on jointly used poles.** Vertical supply conductors, including grounding wires, which pass through communication line space on jointly used poles shall be installed as follows:

(a) Metal-sheathed supply cables. Metal-sheathed supply cables shall be covered as follows:

(i) Extent of covering. covering shall extend from the lowest points of such cables up to 40 inches or more above the highest communication conductors.

(ii) Nature of covering. The covering shall consist of wood molding or other suitable insulating material at points higher than 8 feet above the ground.

Exception 1: Metal pipe may be used throughout, under the following conditions:

On poles where there are no trolley attachments and the metal pipe is effectively grounded, no insulating covering is required.

On poles where there are trolley attachments or where the metal pipe is not effectively grounded, the pipe shall be covered with wood molding or other suitable insulating material from a point six feet below the lowest communication wire or trolley attachment to a point 40 inches above the highest communication wire or trolley attachment.

Exception 2: No insulating covering is required over supply secondary multi-conductor cables attached directly to the pole surface in accordance with the requirements of subsection (6)(b)(iii).

Exception 3: Where there are no trolley attachments on the pole, no insulating covering is required over supply cables having effectively grounded lead sheath, or supply cables, having effectively grounded metal sheath of other types where mutually agreed to by the parties concerned.

(b) Supply conductors. Supply conductors shall be installed in one of the following ways:

(i) In conduit. Conductors of all voltages may be enclosed in the same way and to the same extent as required in 1 above for metal-sheathed cables.

(ii) On pins and insulators. Vertical and lateral conductors of street-lighting circuits and service leads of less than 750 volts to ground may be run on the street side of the pole in multiple-conductor cable having suitable substantial insulating covering if such cable is held taut on standard insulators supported on pins or brackets and arranged so that the cable shall be held at a distance of approximately 5 inches away from the surface of the pole or from any pole steps.

(iii) Installed on the pole surface. Secondary supply conductors of not more than 300 volts to ground may be run in multiple-conductor cables attached directly to the pole surface in such a manner as to avoid abrasion at the points of attachment. In the case of aerial services, the point where such cables leave the pole shall be at least 40 inches above the highest, or 40 inches below the lowest, communication attachment. Each conductor of such cable which is not effectively grounded shall be insulated for a potential of at least 1,000 volts.

(iv) Suspended from supply crossarm. Lamp leads of street lighting circuits may be run from supply crossarms directly to a street lamp bracket or luminaire under the following conditions:

(A) The vertical run shall consist of paired wires or multiple-conductor cable securely attached at both ends to suitable brackets and insulators.

(B) The vertical run shall be held taut at least 40 inches from the surface of the pole (through the communication space), at least 12 inches beyond the end of any communication crossarm by which it passes, and at least 6 inches from communication drop wires.

(C) Insulators attached to lamp brackets for supporting the vertical run shall be capable of meeting, in the position in which they are installed, the same flashover requirements as the luminaire insulators.

(D) Each conductor of the vertical run shall be No. 10 AWG or larger.

(c) Supply grounding wires. Supply grounding wires shall be covered with wood molding or other suitable insulating covering to the extent required for metal-sheathed cables in subsection (6)(a) above.

Exception: If there are no trolley attachments on the pole, insulating covering is not required for a grounding conductor which is metalically connected to a conductor which forms part of an effective grounding system.

(d) Separation from through bolts. Vertical runs of supply conductors shall be separated from the ends of through bolts associated with communication line equipment by one-eighth of the circumference of the pole where practicable, but in no case less than 2 inches.

(7) **Requirements for vertical communication conductors passing through supply space on jointly used poles.** All vertical runs of communication conductors passing through supply space shall be installed as follows:

(a) Metal-sheathed communication cables. Vertical runs of metal-sheath communication cables shall be covered with wood molding, or other suitable insulating material, where they pass trolley feeders or other supply-line conductors. This insulating covering shall extend from a point 40 inches above the highest trolley feeders, or other supply conductors, to a point 6 feet below the lowest trolley feeders or other supply conductors, but need not extend below the top of any mechanical protection which may be provided near the ground.

Exception: Communication cables may be run vertically on the pole through space occupied by railroad-signal supply circuits in the lower position, as permitted in WAC 296-44-298(2)(c), without insulating covering within the supply space.

(b) Communication conductors. Vertical runs of insulated communication conductors shall be covered with wood molding, or other suitable insulating material, to the extent required for metal-sheathed communication cables in (7)(a) above, where such conductors pass trolley feeders or other supply conductors.

Exception: Communication conductors may be run vertically on the pole through space occupied by railroad-signal supply circuits in the lower position, as permitted in WAC 296-44-298(2)(c), without insulating covering within the supply space.

(c) Communication grounding conductors. Vertical communication grounding conductors shall be covered with wood molding or other insulating material between points at least 6 feet below and 40 inches above any trolley feeders or other supply line conductors by which they pass.

Exception: Communication grounding conductors may be run vertically on the pole through space occupied by railroad-signal supply circuits in the lower position, as permitted in WAC 296-44-298(2)(c) without insulating covering within the supply space.

(d) Separation from through bolts. Vertical runs of communication conductors shall be separated from the ends of through bolts associated with supply-line equipment by one-eighth of the circumference of the pole where practicable, but in no case less than 2 inches. [§ 23 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-340 Grades of construction——General. For the purpose of "Strength requirements", sections (WAC 296-44-361 et seq.) and "Line insulators", sections (WAC 296-44-373 et seq.) of this code, conductors and their supporting structures are classified under the grades specified in this section on the basis of the relative hazard existing. [§ 24 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-343 Grades of construction——Application of grades of construction to different situations. (1) **Supply cables.** For the purposes of these rules, supply cables are divided into two classes as follows:

(a) Specially installed cables. In this class are included metal-sheathed supply cables installed in accordance with WAC 296-44-361(7)(a).

Note: Such cables are sometimes permitted to have a lower grade of construction than open-wire supply conductors of the same voltage.

(b) Other cables. In this class are included all other supply cables.

Note: Such cables are required to have the same grade of construction as open-wire supply conductors of the same voltage.

(2) **Two or more conditions.** In any case where two or more conditions affecting the grade of construction exist, the grade of construction used shall be the highest one required by any of the conditions.

(3) **Order of grades.** For supply and communication conductors and supporting structures, the relative order of grades is B, C, and N, grade B being the highest. Where grades D and N are specified for communication lines, grade D is the higher.

Note: Grade D cannot be directly compared with grades B and C, but subsection (4)(c)(iii) below provides for cases where these two conditions are present.

(4) **At crossings.**

(a) Grade of upper line. Conductors and supporting structures of a line crossing over another line shall have the grade of construction specified in subsection (4)(c) below and WAC 296-44-346 and 296-44-349.

(b) Grade of lower line. Conductors and supporting structures of a line crossing under another line need only have the grades of construction which would be required if the line at the higher level were not there.

(c) Multiple crossing.

(i) Where a line crosses in one span over two other lines. The grade of construction of the uppermost line shall be not less than the highest grade which would be required of either one of the lower lines if it crossed the other lower line.

Example: If a 2,300-volt line crosses in the same span over a communication line and a direct-current trolley contact conductor of more than 750 volts, the 2,300-volt line is required to comply with grade B construction at the crossing. This is a double crossing and introduces a greater hazard than where the upper supply line crosses the communication line only.

(ii) Where one line crosses over a span in another line, which span is in turn involved in a second crossing. The

grade of construction for the highest line shall be not less than that required for the next lower line.

Exception: This requirement does not apply when the two upper lines are of such a nature and have such circuit protection that the danger of causing a break in the lower of these two lines by mechanical or electrical contact is eliminated.

(iii) Where communication conductors cross over supply conductors and railroad tracks in the same span. The grades of construction shall be in accordance with Table 13.

Recommendation: It is recommended that the placing of communication conductors above supply conductors at crossing, conflicts, or on jointly used poles, be avoided unless the supply conductors are trolley contact conductors and their associated feeders.

TABLE 13.—Grades of construction for communication conductors crossing over railroad tracks and supply lines

When crossing over—	Communication conductor grades
Railroad tracks and supply lines of 0 to 750 volts to ground, or specially installed supply cables of all voltages	D
Railroad tracks and supply lines exceeding 750 volts to ground	B

(5) **Conflicts.**

(a) How determined. Where two lines are adjacent (except at crossing spans) the distance between them and the relative heights above ground of poles and of conductors of each line determine whether conflict exists, and, if so, whether the conflict is a structure conflict (see definition) or a conductor conflict (see definition), or both.

(b) Conductor conflict. At conductor conflicts, the grade of construction of the conflicting conductor shall be as required by subsection (4)(c) above and WAC 296-44-346.

(c) Structure conflict. At structure conflicts, the grade of construction of the conflicting structure shall be as required by WAC 296-44-349. [§ 24 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-346 Grades of construction—— Grades of construction for conductors. The grades of construction required for conductors of all classes in different situations are given in Tables 14 and 15. For the purpose of these tables certain classes of circuits are treated as follows: (1) **Status of constant-current circuits.** The grade of construction for a constant-current supply circuit involved with a communication circuit and not in specially installed cable shall be based on either its current rating or on the open-circuit voltage rating of the transformer supplying such circuit, as set forth in Tables 14 and 15. In all other cases the grade of construction for a constant-current circuit shall be based on its nominal full-load voltage.

(2) **Status of railway feeders and trolley contact conductors.** In determining grades of construction where railway feeders and trolley-contact conductors are involved, they shall be considered as other supply conductors of the same voltage.

Exception: Direct-current trolley circuits exceeding 750 volts to ground where crossing over, conflicting with, or on jointly used poles with and above communication circuits, shall have the grades of construction specified in Table 14 for direct-current railway feeders.

(3) **Status of communication circuits used exclusively in the operation of supply lines.** In determining grades of construction where communication circuits used exclusively in the operation of supply lines are concerned, they shall be considered as ordinary communication circuits when run as such (see WAC 296-44-424(1)(c)) and as supply circuits when run as such (see WAC 296-44-424(1)(d)).

Exception: Communication circuits located below supply circuit with which they are used shall not require such supply circuits to meet any rules for grade of construction other than that the sizes of such supply conductors shall be not less than required for grade C (see WAC 296-44-364(6)(b)).

TABLE 14.—Grades of construction for supply conductors alone, at crossings, at conflicts, or on same poles with other conductors

(All voltages are between wires except as indicated. Corresponding voltages to grounded neutral of grounded circuits are shown in parentheses. In applying the table to two-wire grounded circuits use the "to neutral" voltage.)

Conductors, Tracks and Right of Ways at Lower Levels / Supply Conductors at Higher Levels [a]		Constant-potential supply conductors other than direct current railway feeders: 0 to 750 Volts (0 to 750 Volts to Neutral) Urban Open or Cable	0 to 750 Volts (0 to 750 Volts to Neutral) Rural Open or Cable	750 to 5000 Volts (750 to 2900 Volts to Neutral) Urban Open	750 to 5000 Volts (750 to 2900 Volts to Neutral) Urban Cable	750 to 5000 Volts (750 to 2900 Volts to Neutral) Rural Open or Cable	5000 to 8700 Volts (2900 to 5000 Volts to Neutral) Urban Open	5000 to 8700 Volts (2900 to 5000 Volts to Neutral) Urban Cable	5000 to 8700 Volts (2900 to 5000 Volts to Neutral) Rural Open	5000 to 8700 Volts (2900 to 5000 Volts to Neutral) Rural Cable	Exceeding 8700 Volts (Exceeding 5000 Volts to Neutral) Urban Open	Exceeding 8700 Volts (Exceeding 5000 Volts to Neutral) Urban Cable	Exceeding 8700 Volts (Exceeding 5000 Volts to Neutral) Rural Open	Exceeding 8700 Volts (Exceeding 5000 Volts to Neutral) Rural Cable	Constant current supply conductors: 0 to 7.5 Amperes Open	0 to 7.5 Amperes Cable	Exceeding 7.5 Amperes Open	Exceeding 7.5 Amperes Cable	Direct current railway feeders: 0 to 750 Volts Open	0 to 750 Volts Cable	Exceeding 750 Volts Open	Exceeding 750 Volts Cable	Communication conductors used exclusively in the operation of, and run as, supply lines: Open	Cable
Fenced right of ways		N	N	[b]N	N	N	[b]N	N	N	N	[b]N	[b]N	N	N	B, C or N *See Rule 242-A				B, C or N *See Rule 242-B				C or N *See Rule 242-C	
Elsewhere than on fenced right of ways		N	N	C	N	N	C	N	N	N	[c]B	C	N	N										
Railroad tracks—Main or Minor		B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B	B
Street-railway tracks having no overhead contact conductor		N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N
Constant-potential supply conductors: 0-750 Volts (0-750 Volts to Neutral)	Open or Cable	N	N	C	N	N	C	N	N	N	[c]B	C	[d]C	N	B, C or N *See Rule 242-A				B, C or N *See Rule 242-B				B, C or N *See Rule 242-C	
750-5000 Volts (750 to 2900 Volts to Neutral)	Open	[e]C	N	C	C	N	C	C	N	N	[c]B	C	N	N										
	Cable	N	N	C	N	N	C	N	N	N	[c]B	C	N	N										
5000 to 8700 Volts (2900 to 5000 Volts to Neutral)	Open	[e]C	N	C	C	N	C	C	N	N	[c]B	C	N	N										
	Cable	N	N	C	N	N	C	N	N	N	[c]B	C	N	N										
Exceeding 8700 Volts (Exceeding 5000 Volts to Neutral)	Open	[e]B	[e]C	B	B	N	B	B	N	N	[c]B	C	N	N										
	Cable	[e]C	N	C	N	N	C	N	N	N	[c]B	C	N	N										
Constant current supply conductors—open or cable		B, C or N *See Rule 242-A													B, C or N *See Rule 242-A				B, C or N *See Rules 242-A & B				B, C or N *See Rules 242-A & C	
Direct current railway feeders—open or cable		B, C or N *See Rule 242-B													B, C or N *See Rules 242-A & B				B, C or N *See Rule 242-B				B, C or N *See Rules 242-B & C	
Trolley contact conductors—alternating or direct current		B, C or N *See Rule 242-B													B, C or N *See Rules 242-A & B				B, C or N *See Rule 242-B				B, C or N *See Rules 242-B & C	
Communication conductors, open or cable, used exclusively in the operation of supply lines		B, C or N *See Rule 242-C													B, C or N *See Rules 242-A & C				B, C or N *See Rules 242-B & C				B, C or N *See Rule 242-C	
Communication conductors—urban or rural, open or cable	Major [f]	N	N	C	C	C	[g]B	[h]C	[g]B	[h]C	[g]B	[h]C	[g]B	[h]C	C	C or N [g] see Rule 242-A	[g]B	C or N [g] see Rule 242-A	N	N	[g]B	[h]C	B, C or N *See Rule 242-C	
	Minor [f]	N	N	C	C	C	C	C	C	C	C	C	C	C	C		C		N	N	C	C		

a. The words "open" and "cable" appearing in the headings have the following meanings as applied to supply conductors: "Cable" means the specially installed cables described in WAC 296-44-343(1)(a). "Open" means open wire and also supply cables not "specially installed."

b. Where lines are located so that they can fall outside the fenced right of way into urban districts, the contruction shall comply with the grades specified for lines not on fenced right of ways for corresponding voltages.

c. If circumstances within a given area warrant it, supply conductors need only meet the requirements of grade C construction if the supply circuits are so constructed, operated, and maintained that such circuits will be promptly deenergized, both initially and following subsequent breaker operations, in the event of a contact with lower supply conductors or other grounded objects.

d. Grade N construction may be used, if crossing over or conflicting with, supply services only.

e. If the wires are service drops, they may have grade N sizes and sags as set forth in tables 28 and 29 (WAC 296-44-370(5)).

f. Grade N construction may be used where the communication conductors consist only of not more than 1 insulated twisted-pair or parallel-lay conductor, or where 2 or more such insulated conductors are involved and these consist of service drops not grouped together in a single run.

g. The supply conductors need only meet the requirements of grade C construction if both of the following conditions are fulfilled:

(1) The supply and communication circuits are so constructed, operated and maintained that the supply circuits will be promptly deenergized, both initially and following subsequent breaker operations, in the event of a contact with the communication plant.

(2) The voltage and current impressed on the communication plant in the event of a contact with the supply conductors are not in excess of the safe operating limit of the communication protective devices.

h. Grade C construction applies to any supply cable on jointly used poles if carried above communication attachments and supported on an effectively grounded messenger.

i. Grade C construction may be used if the open-circuit voltage of the transformer supplying the circuit does not exceed 2,900 volts.

*Rules 242A, 242B and 242C are now codified as subsections (1), (2), and (3) of WAC 296-44-346.

(4) **Status of fire-alarm conductors.** In determining grades of construction where fire-alarm conductors are concerned, they shall be considered as other communication circuits.

Exception: Fire-alarm conductors shall always meet grade D where the span length is from 0 to 150 feet, and grade C where the span length exceeds 150 feet.

(5) **Status of neutral conductors of supply circuits.** Supply-circuit neutral conductors, which are effectively grounded throughout their length and are not located above supply conductors of more than 750 volts to ground, shall have the same grade of construction as supply conductors of not more than 750 volts to ground, except that they need not meet any insulation requirements. Other neutral conductors shall have the same grade of construction as the phase conductors of the supply circuits with which they are associated.

TABLE 15.—Grades of construction for communication conductors alone, or in upper position at crossings, at conflicts, or on joint poles

(All voltages are to ground, which, for ungrounded circuits, means the highest voltage between any two conductors.)

Conductors, tracks, and rights-of-way at lower levels			Communication conductors at higher levels[1]	Communication conductors, rural or urban, open or cable, including communication conductors run as such, but used exclusively in the operation of supply lines	
				Major	Minor
Fenced rights-of-way				N	N
Elsewhere than on fenced rights-of-way				N	N
Railroad tracks—main or minor				D	D
Street-railway tracks having no overhead-contact wire				N	N
Constant-potential supply conductors[2]	0 to 750 volts	Open or cable		N	N
	750 to 2,900 volts	do.		C	C
	Exceeding 2,900 volts	Open		B	C
		Cable		C	C
Constant-current supply conductors[2]	0 to 7.5 amperes	Open[3]		C	C
	Exceeding 7.5 amps	do[3]		B[4]	C
Direct-current railway feeders[2]	0 to 750 volts	Open or cable		N	N
	Exceeding 750 volts	do.		B	C
Trolley-contact conductors	0 to 750 volts	ac or dc		C	C
	Exceeding 750 volts	ac		B or C[5]	B or C[5]
		dc		B	C
Communication conductors, open or cable, used exclusively in the operation of supply lines				B, C, or N[6]	
Communication conductors, open or cable, urban or rural, major or minor				N	

[1]It is recommended that the placing of communication conductors above supply conductors at crossings, conflicts, or on jointly used poles be avoided, unless the supply conductors are trolley-contact conductors and their associated feeders.

[2]The words "open" and "cable" appearing in the headings have the following meaning as applied to supply conductors: "Cable" means the specially installed cables described in WAC 296-44-343(1)(a). "Open" means open wire and also supply cables not specially installed.

[3]Where constant-current circuits are in specially installed cable, they are considered on the basis of the nominal full-load voltage.

[4]Grade C construction may be used if the open-circuit voltage of the transformer supplying the circuit does not exceed 2,900 volts.

[5]See WAC 296-44-346(2).

[6]See WAC 296-44-346(3).

[§ 24 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-349 Grades of construction—Grades of supporting structures. (1) **Pole or towers.** The grade of construction shall be that required for the highest grade of conductors supported.

Exception 1: The grade of construction of jointly used poles, or poles used only by communication lines, need not be increased merely because of the fact that communication wires carried on such poles cross over trolley contact conductors of 0 to 750 volts to ground.

Exception 2: Poles carrying grade C or D fire-alarm conductors, where alone, or where concerned only with other communication conductors, need meet only the requirements of grade N.

Exception 3: Poles carrying supply service loops of 0 to 750 volts to ground shall have at least the grade of construction required for supply line conductors of the same voltage.

Exception 4: Where communication lines cross over supply conductors and a railroad in the same span and grade B is required by WAC 296-44-343(4)(c)(iii) for the communication conductors, due to the presence of railroad tracks, the grade of the poles or towers shall be D.

Exception 5: At structure conflicts, even though no conductor conflict exists, the grade of construction which would be required by WAC 296-44-346, if the conductors were in conflict, shall be applied to the pole or tower.

Note: This requirement may result in a higher grade of construction for the pole or tower than for the conductors carried thereon.

Exception 6: In the case where a structure conflict does not exist, but any conductor is in conductor conflict, the grade of construction of the pole or tower is not required to meet the conductor grade due to the conductor conflict.

(2) **Crossarms.** The grade of construction shall be that required for the lightest grade of conductors carried by the crossarm concerned.

Exception 1: The grade of construction of crossarms carrying only communication conductors need not be increased merely because of the fact that such conductors cross over trolley-contact conductors of 0 to 750 volts to ground.

Exception 2: Crossarms carrying grade C or D fire-alarm conductors, where alone or where concerned with other communication conductors, need meet only the requirements for grade N.

Exception 3: Crossarms carrying supply service loops of 0 to 750 volts to ground shall have at least the grade of construction required for supply line conductors of the same voltage.

Exception 4: Where communication lines cross over supply conductors and a railroad in the same span and grade B is required by WAC 296-44-343(4)(c)(iii) for the communication conductors due to the presence of railroad tracks, the grade of the crossarm shall be D.

(3) **Pins, insulators, and conductor fastenings.** The grade of construction shall be that required for the conductor concerned.

Exception 1: The grade of construction of pins, insulators, and conductor fastenings carrying only communication conductors need not be increased merely because of the fact that such conductors cross over trolley-contact conductors of 0 to 750 volts to ground.

Exception 2: In the case of grade C or D fire-alarm conductors where alone, or where concerned only with other communication conductors, pins, insulators, and conductor fastenings need meet only the requirements for grade N.

Exception 3: In the case of supply service loops of 0 to 750 volts to ground, pins, insulators, and conductor fastenings shall have at least the same grade of construction as required for supply-line conductors of the same voltage.

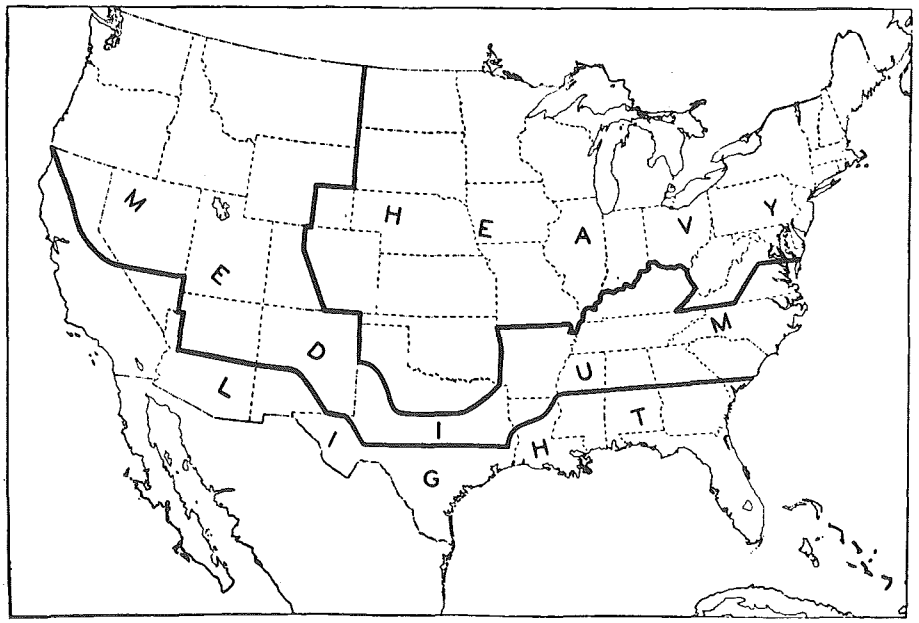
Exception 4: Where communication lines cross over supply conductors and a railroad in the same span, and grade B is required by WAC 296-44-343(4)(c)(iii) for the communication conductors due to the presence of railroad tracks, the grade of pins, insulators, and conductor fastenings shall be D.

Exception 5: In case communication conductors are required to meet grade B or C, the insulators need meet only the requirements for mechanical strength for these grades. [§ 24 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-352 Loading for grades B, C, and D——General loading map. Three general degrees of loading due to weather conditions are recognized and are designated as heavy, medium, and light loading. The map in Figure 1 shows the districts in the United States in which these loadings are normally applicable. It is recognized that loadings in certain areas in each of the loading districts are greater, and in some cases may be less, than those specified for the districts. Any variation in the general loadings specified should be based on factual weather and experience data for the local area involved.

Note: The localities in the different groups are classed according to the relative prevalence of high wind velocity and thickness of ice which accumulates on wires, light loading being, in general, for places where little, if any, ice ever accumulates on wires.

Where high wind velocities are frequent in a given place the loading for that place may be classed as heavy, even through ice does not accumulate to any greater extent than at some other place having less severe winds which has been classed as a medium loading district.



[§ 25 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-355 Loading for grades B, C, and D——Conductor loading. The loading on conductors shall be assumed to be the resultant loading per foot equivalent to the vertical load per foot of the conductor, ice-covered where specified, combined with the transverse loading per foot due to a transverse, horizontal wind pressure upon the projected area of the conductor, ice-covered where specified, to which equivalent resultant shall be added a constant. In the tabulation below are the values for ice, wind, temperature, and constants which shall be used to determine the conductor loading.

	Loading district		
	Heavy	Medium	Light
Radial thickness of ice (in.)	0.50	0.25	0
Horizontal wind pressure in pounds per square foot	4	4	9
Temperature (°F)	0	+15	+30
Constant to be added to the resultant in pounds per foot:			
For bare conductors of copper, steel, copper alloy, copper-covered steel, and combinations thereof	0.29	0.19	0.05
For bare conductors of aluminum (with or without steel reinforcement)	.31	.22	.05
For weather-proof and similar covered conductors (all materials)	.31	.22	.05

Note: Since heavy ice does not often form on conductors in a heavy wind, the transverse loading assumed is deemed sufficient for the purpose, but is not sufficient to represent the vertical (or combined) load which is imposed on conductors by the heavy deposits of ice which frequently form in comparatively still air. In order to apply a total loading to conductors representing more nearly the conditions encountered in practice, constants have been added to the conductor loading which make no substantial change in the conductor loading specified in the fourth edition of this code.

Where cables are concerned, the specified loadings shall be applied to both cable and messenger.

In applying loadings to bare stranded conductors, the coating of ice shall be considered as a hollow cylinder touching the outer strands. [§ 25 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-358 Loading for grades B, C, and D——Loads upon line supports. (1) **Assumed vertical loading.** The vertical loads upon poles, towers, foundations, crossarms, pins, insulators, and conductor fastenings shall be their own weight plus the superimposed weight which they support, including all wires and cables, ice-coated in heavy and medium loading districts, together with the effect of any difference in elevation of supports. The radial thickness of ice shall be computed only upon wires, cables, and messengers, and shall be taken as the following:

Heavy loading district (H), 0.50 inch of ice.
Medium loading district (M), 0.25 inch of ice.
Light loading district (L), no ice.

Ice is assumed to weigh 57 pounds per cubic foot.

Note: The weight of ice upon supports is ignored for the sake of simplicity.

(2) **Assumed transverse loading.** In computing the stresses in poles, towers, and side guys the loading shall be taken as one of the following according to climatic conditions of the locality concerned.

(a) Heavy loading (H). A horizontal wind pressure, at right angles to the direction of the line, of 4 pounds per square foot upon the projected area of cylindrical surfaces of all supported conductors and messengers, when covered with a layer of ice 0.5 inches in radial thickness and on surfaces of the poles and towers without ice covering, shall be called heavy loading. (See (d) and (e) following.)

For supporting structures carrying more than 10 wires, not including cables supported by messengers, where the pin spacing does not exceed 15 inches, the transverse load shall be calculated on two-thirds of the total number of such wires with a minimum of 10 wires.

(b) Medium loading (M). A horizontal wind pressure at right angles to the direction of the line, of 4 pounds per square foot upon the projected area of cylindrical surfaces of all supported conductors and messengers when covered with a layer of ice 0.25 inch in radial thickness and on the surfaces of the poles and towers without ice covering, shall be called medium loading. (See (d) and (e) following.)

For supporting structures carrying more than 10 wires, not including cables supported by messengers, where the pin spacing does not exceed 15 inches, the transverse load shall be calculated on two-thirds of the total number of such wires with a minimum of 10 wires.

(c) Light loading (L). A horizontal wind pressure at right angles to the direction of the line of 9 pounds per square foot upon the projected area of cylindrical surfaces of all supported conductors and messengers, poles and towers without ice covering, shall be called light loading. (See (d) and (e) following.)

(d) Trolley-contact conductors. When a trolley-contact conductor is supported on a pole it shall be included in the computation of the transverse load on the structure.

(e) Flat surfaces. For flat surfaces the assumed unit wind pressure shall be increased by 60 percent. Where latticed structures are concerned, the actual exposed area of one lateral face shall be increased by 50 percent to allow for the pressure on the opposite face; this total, however, need not exceed the pressure which would occur on a solid structure of the same outside dimensions. The results obtained by more exact calculations may be substituted for the values obtained by this simple rule.

(f) At angles (combined longitudinal and transverse loading). Where a change in direction of wires occurs, the loading upon the structure, including guys, shall be assumed to be a resultant load equal to the vector sum of the transverse wind load given in (a), (b), or (c) above and the resultant load imposed by the wires due to their change in direction. In obtaining these loadings, a wind direction shall be assumed which will give the maximum resultant load, proper reduction being made in loading to account for the reduced wind pressure on the wires resulting from the angularity of the application of the wind to the wires.

(3) **Assumed longitudinal loading.**

(a) Change in grade of construction. The longitudinal loading upon supporting structures, including poles, towers, and guys at ends of sections required to be of grade

B construction, when located in lines of lower than grade B construction, shall be taken as an unbalanced pull in the direction of the higher grade section equal to the pull of two–thirds of the conductors supported thereon which are smaller than No. 2 AWG, the conductor loading to be that given in WAC 296–44–355, and such two–thirds of the conductors being selected so as to produce the maximum stress in the supports.

If the application of the above results in a fractional part of a conductor, the nearest whole number shall be used. In no case shall the assumed unbalanced pull on the supporting structure be less than the maximum loaded tension in any two of the conductors carried (including overhead ground wires), such two conductors being selected so as to produce the maximum stress in the supports.

(b) Jointly used poles at crossings over railroads or communication lines. Where a joint line crosses over a railroad or a communication line and grade B is required for the crossing span, the tension in the communication conductors of the joint line may be considered as limited to one–half their breaking strength, provided they are smaller than No. 8 Stl. WG, if of steel, or No. 6 AWG, if of copper, regardless of how small the initial sags of the communication conductors at 60° F.

(c) Dead–ends. The longitudinal loading upon supporting structures shall be taken as an unbalanced pull equal to the tensions of all conductors and messengers (including overhead ground wires), under the conditions of conductor loading specified in WAC 296–44–355.

(d) Communication conductors on unguyed supports at railroad crossings. The longitudinal loading shall be assumed equal to an unbalanced pull in the direction of the crossing of all open–wire conductors supported, the pull of each conductor being taken as 50 percent of its ultimate strength in the heavy loading district, 33–1/3 percent in the medium loading district, and 22 1/4 percent in the light loading district.

(4) **Average span lengths.**

(a) General. The calculated transverse loads upon poles, towers, and crossarms, except as provided in (b) below, shall be based upon the average span length of a section of line that is reasonably uniform as to height, number of wires, grade, and span length. In no case shall the average value taken be less than 75 percent or more than 125 percent of the actual average of the two spans adjacent to the structure concerned.

(b) Crossings. In the case of crossings over railroads or communication lines (other than minor communication lines) the actual lengths of the two spans adjacent to the two structures concerned shall be used.

(5) **Simultaneous application of loads.**

(a) When calculating transverse strength, the assumed transverse and vertical loads shall be taken as acting simultaneously.

(b) In calculating longitudinal strength, the assumed longitudinal loads shall be taken without consideration of the vertical or transverse loads. [§ 25 (part), filed 3/23/60, effective 12/1/58.]

WAC 296–44–361 Strength requirements——Preliminary assumptions. It is recognized that deformation, deflection, or displacement of parts of the structure will, in some cases, change the effects of the loads assumed. In the calculation of stresses, however, no allowance shall be made for such deformation, deflection, or displacement of supporting structures (including poles, towers, guys, crossarms, pins, conductor fastenings, and suspension insulators) unless the methods used to evaluate them have been approved by the administrative authority. [§ 26 (part), filed 3/23/60, effective 12/1/58.]

WAC 296–44–364 Strength requirements——Grades B and C construction. (1) **Poles and towers.** The strength requirements for poles and towers may be met by the structures alone or with the aid of guys or braces.

(a) Average strength of three poles. A pole (single–base structure) not individually meeting the transverse strength requirements will be permitted when reinforced by a stronger pole on each side, if the average strength of the three poles meets the transverse strength requirements, and the weak pole has not less than 75 percent of the required strength.

An extra pole inserted in a normal span for the purpose of supporting a service loop may be ignored, if desired, in the calculation of the strength of the line.

Exception: In the case of crossings over railroads or communication lines (other than minor communication lines), the actual strengths of the crossing poles shall be used.

(b) Reinforced–concrete poles. Reinforced–concrete poles shall be of such material and dimensions as to withstand, for vertical and transverse strength, the loads assumed in WAC 296–44–358(1) and (2), and for longitudinal strength the loads in WAC 296–44–358(3), without exceeding the following percentages of their ultimate strength at the ground line for unguyed poles, or at the point of guy attachment for guyed poles. (Where guys are used, see subsection (3) of this section.)

	Percentage of ultimate strength for reinforced–concrete poles	
	Grade B	Grade C
For transverse strength (when installed)	25	37.5
For longitudinal strength (at all times):		
In general	100	No requirement
At dead–ends	50	75.0

(c) Steel supporting structures. In the design of steel structures, the term "overload capacity factor" referred to in Table 16 is to be interpreted in such a manner that the completed structure, if tested, shall support without permanent deflection the maximum loading to which it will be subjected as specified in WAC 296–44–352 through 296–44–358, multiplied by the factors given in Table 16. The absence of permanent set on the structure indicates that no part has been stressed beyond the yield point. Allowance should be made for bolt slip.

Steel supports, steel towers, and metal poles shall be designed and constructed so as to meet the following requirements:

(i) Vertical and transverse strength. The completed structure shall be so designed and of sufficient strength as to provide overload capacity factors specified in Table 16 under the vertical and transverse loading specified in WAC 296-44-358(1) and 296-44-358(2)(a) to (2)(e), inclusive.

(ii) Longitudinal strength. *Grade B.* The completed structure shall be so designed and of sufficient strength as to provide overload capacity factors specified in Table 16 under the longitudinal loading specified in WAC 296-44-358(3).

Grade C. No longitudinal strength requirements except at dead-ends.

(iii) Minimum strength. Steel structures shall have strength sufficient to withstand, with an overload capacity factor of 1.1, a transverse load on the structures without conductors, equal to six times the specified wind pressure.

(iv) Strength at angles in a line. At an angle in a line having supports of steel poles or towers, the strength of the support shall be sufficient to withstand a combination of the transverse and longitudinal loadings specified in WAC 296-44-358(2)(f). For grade B the transverse load shall be multiplied by 1.54, and for grade C by 2.00, before combining with the load arising from change in direction of conductors. The allowable overload capacity factor at dead-ends given in Table 16 shall be provided for the total load thus computed.

TABLE 16.—Minimum overload capacity factors of completed structures

(Based on yield point of steel)

	Overload capacity factors	
	Grade B	Grade C
Vertical strength	1.27	1.10
Transverse strength	2.54	2.20
Longitudinal strength:		
At crossings—		
In general	1.10	No requirement.
At dead-ends	1.65	1.10
Elsewhere—		
In general	1.00	No requirement.
At dead-ends	1.65	1.10

(v) Thickness of steel. The thickness of metal in members of steel poles or towers shall be not less than the following:

TABLE 17.—Thickness of steel

	Thickness of main members of crossarms and legs	Thickness of other members
	Inches	Inches
For localities where experience has shown deterioration of protective covering is rapid	1/4	3/16
For other localities	3/16	1/8

(vi) Unsupported length of compression members. The ratio of L, the unsupported length of a compression member, to R, the least radius of gyration of the member, shall not exceed the following (these figures do not apply to the complete structure):

TABLE 18.—L/R for compression members

Kind of compression member	L/R
Leg Members	150
Other members having figured stresses	200
Secondary members without figured stresses	250

(vii) General construction features. Steel poles or towers, including parts of footings above ground, shall be constructed so that all parts are accessible for inspection, cleaning, and painting, and so that pockets are not formed in which water can collect.

Recommendation: Unless sample structures, or similar ones, have been tested to assure the compliance of structures in any line with these requirements, it is recommended that structures be designed to have a computed strength at least 10 percent greater than that required by these rules.

(viii) Protective covering or treatment. All iron or steel poles, towers, or supporting structures shall be protected by galvanizing, painting, or other treatment which will effectively retard corrosion. Such protective covering shall be adequately maintained.

(d) Wood poles. Wood poles shall be of such material and dimensions as to meet the following requirements (where guys are used, see subsection (3) of this section):

(i) Transverse strength. Wood poles shall withstand the transverse and vertical loads assumed in WAC 296-44-358(1) and 296-44-358(2)(a) to (2)(d), inclusive, without exceeding at the ground line for unguyed poled, or at the point of guy attachment for guyed poled, the appropriate percentages of their ultimate stress given in Table 20.

(ii) Longitudinal and dead-end strength. The longitudinal and dead-end strength of wood poles shall be such that they will withstand the appropriate longitudinal loading specified in WAC 296-44-358(3), without exceeding, at the ground line for unguyed poles or at the point of guy attachment for guyed poles, the following percentages of the applicable ultimate fiber stress given in Table 19.

	Percentage of ultimate fiber stress for wood poles	
	Grade B	Grade C
Longitudinal:		
When installed	75[1]	No requirement.
At replacement	100	Do.
Dead-ends:		
When installed	50[1]	75[1]
At replacement	75	100

[1]Where supply lines alone are involved and built for a fixed period of temporary service not exceeding 5 years the prescribed percentage of fiber stress at installation may be increased, provided the percentage of ultimate fiber stress required at replacement is not exceeded during the life of the line.

Exception 1: At a Grade B crossing, in a straight section of line, wood poles of approximately round cross section, complying with the transverse strength requirements of subsection (1)(d)(i), without the use of transverse guys, shall be considered as having the required longitudinal strength. This exception does not modify the requirements of this rule for dead-ends.

Exception 2: At a Grade B crossing of a supply line over a highway and a communication line in the same span, where there is an angle in the supply line, wood poles of approximately round cross section shall be considered as having the required longitudinal strength if all of the following conditions obtain:

1. The angle is not over 20 degrees.

2. The corner pole is guyed in the plane of the resultant of the conductor tensions on both sides of the corner pole; the tension in this guy not to exceed 50 percent of its ultimate strength under the loading of WAC 296-44-358(2)(f).

Exception 3: The corner pole has sufficient strength to withstand, without guys, the transverse loading of WAC 296-44-358(2)(a), (b) or (c), which would exist if there were no angle at that pole, without exceeding 25 percent of its ultimate stress when installed, or 37 1/2 percent at replacement.

(iii) Ultimate fiber stress. Different kinds of wood poles are considered as having the ultimate fiber stresses given in Table 19.

TABLE 19.—Ultimate fiber stresses of wood poles

Kind of wood	Ultimate fiber stress
	lb./sq. in.
Creosoted southern pine	7,400
Douglas fir	7,400
Lodgepole pine	6,600
Chestnut	6,000
Western red cedar	5,600
Cypress	5,000
Northern white cedar	3,600
Redwood	3,600
Western Larch	8,400

When values for ultimate stresses of cypress and redwood have been approved as standard by the American Standards Association, such values shall be used in place of those given above.

(iv) Allowable percentages of ultimate stress. The allowable percentages of ultimate stress of treated and untreated poles to withstand vertical and transverse loads are given in Table 20, except as modified in the following paragraph.

At crossings where grade B construction is required, if the supply line is not maintained throughout (or between and including the nearest guyed points on each side of the crossing) so that the poles will not be stressed at any time in excess of 50 percent of their ultimate stress under the transverse loading assumed in WAC 296-44-358(2), the crossing poles, if unguyed, shall be of such strength that they will withstand the transverse loading assumptions of WAC 296-44-358(2)(a), (b) or (c), without exceeding 16 2/3 percent of their ultimate stress at installation or 25 percent at replacement. If the crossing poles are side guyed, such guys shall meet the requirements of subsection (3)(e) of this section.

TABLE 20.—Allowable percentages of ultimate stress for treated or untreated wood poles under vertical and transverse loading

	When installed	At replacement
Grade B	25.0	37.5
Grade C:		
At crossings	37.5	75.0
Elsewhere	50.0	75.0

(v) Freedom from defects. Wood pole shall be of suitable and selected timber free from observable defects that would decrease their strength or durability.

(vi) Minimum pole sizes. Wood poles shall have a nominal top circumference of not less than 15 inches.

(vii) Spliced and stub-reinforced poles. Spliced poles shall not be used at crossings, conflicts, or joint-use sections requiring grades B or C construction.

Except at crossings over major railroad tracks, the use of stub reinforcements that develop the required strength of the pole is permitted, provided the pole above the ground is in good condition and is of sufficient size to develop its required strength.

(e) Transverse-strength requirements for structures where side guying is required, but can only be installed at a distance.

Grade B. In the case of structures where, because of very heavy or numerous conductors or relatively long spans, the transverse-strength requirements of this section can not be met except by the use of side guys or special structures, and it is physically impracticable to employ side guys, the transverse-strength requirements may be met by side-guying the line at each side of, and as near as practicable to, the crossing or other transversely weak structure, and with a distance between such side-guyed structures of not over 800 feet, provided that:

(i) The side-guyed structures for each such section of 800 feet or less shall be constructed to withstand the calculated transverse load due to wind on the supports and ice-covered conductors, on the entire section between the side-guyed structures.

(ii) The line between such side-guyed structures shall be substantially in a straight line and the average length of span between the side-guyed structures shall be not in excess of 150 feet.

(iii) The entire section between the transversely strong structures shall comply with the highest grade of construction concerned in the given section, except as to the transverse strength of the intermediate poles or towers.

Grade 3. The above provision is not applicable to grade C.

(f) Longitudinal-strength requirements for sections of higher grade in lines of a lower grade of construction.

(i) Methods of providing longitudinal strength.

Grade B. The longitudinal-strength requirements for sections of line of higher grade in lines of a lower grade (for assumed longitudinal loading, see WAC 296-44-358(3)(a)) are usually met by placing supporting structures of the required longitudinal strength at either end of the higher-grade section of the line. Where this is impracticable, the supporting structures of the required longitudinal strength may be located one or more span lengths away from the section of higher grade, within 500 feet on either side and with not more than 800 feet between the longitudinally strong structures, provided such structures and the line between them meet the requirements as to transverse strength and stringing of conductors, of the highest grade occurring in the section, and provided that the line between the longitudinally strong structures is approximately straight or suitably guyed.

The requirements may also be met by distributing the head guys over two or more structures on either side of the crossing, such structures and the line between them complying with the requirements for the crossing as to transverse strength and as to conductors and their fastenings.

Where it is impracticable to provide the longitudinal strength, the longitudinal loads shall be reduced by increasing the conductor sags. This may require greater conductor separations. (See WAC 296-44-325(1)(b)(i).)

Grade C. The above provision is not applicable to grade C.

(ii) Flexible supports.

Grade B. When supports of the section of higher grade are capable of considerable deflection in the direction of the line, as with wood or concrete poles, or some types of metal poles and towers, it may be necessary to increase the normal clearances specified in WAC 296-44-310 through 296-44-337, or to provide head guys or special reinforcement to prevent such deflection.

So-called flexible steel towers or frames, if used at such locations, shall be adequately reinforced to meet the requirements of subsection (1)(c)(ii) of this section.

When the situation is one involving an isolated crossing of higher grade in a line of lower-grade construction, then the structure shall, when practicable, be head-guyed or otherwise reinforced to prevent reduction in the clearances required in WAC 296-44-310 through 296-44-337.

Grade C. The above provision is not applicable to grade C.

(g) Strength at angles in a line. At an angle in the line, the strength of a pole at the ground line, if not guyed, or at the point of guy attachment if guyed, shall be sufficient to withstand a combination of the transverse and longitudinal loadings specified in WAC 296-44-358(2)(f). For grade B the transverse load shall be multiplied by 2.0 and for grade C by 1.5, before combining with the load arising from change in direction of conductors. The allowable percentage of ultimate stress at dead-ends given in subsection (1)(d)(ii) of this section shall not be exceeded for the total load thus computed.

(2) Foundations.

(a) Use of foundations.

(i) Wood and reinforced-concrete poles. No special foundation construction is generally required.

(ii) Steel poles or towers. Steel poles or towers set in earth shall be suitably protected against injurious corrosion at and below the ground line.

(b) Strength of foundations.

(i) Steel supports. The foundations and footings shall be so designed and constructed as to withstand the stresses due to the loads assumed in WAC 296-44-358. Steel parts shall withstand these loads with the overload capacity factors specified in Table 16. Since in many localities the soil and climatic conditions are such as to alter the strength of foundations considerably from time to time, there should usually be provided a considerable margin of strength in foundations above that which (by calculation) will just withstand the loads under the assumption of average conditions of climate and soil.

(ii) Wood and concrete poles. Foundations and settings for unguyed poles shall be such as to withstand the loads assumed in WAC 296-44-358(1), (2), and (3).

(3) **Guys.**

(a) General. The general requirements for guys are covered under "Miscellaneous Requirements" (See WAC 296-44-400 through 296-44-427.)

(b) For poles in insecure earth. Where crossing poles are set in insecure earth the transverse strength requirements should, where practicable, be met by the use of side guys or braces.

(c) On steel structures. The use of guys to obtain compliance with these requirements is regarded as generally undesirable. When guys are necessarily used, the steel supports or towers, unless capable of considerable deflection, shall be regarded as taking all of the load up to their allowable working load, and the guys shall have sufficient strength to take the remainder of the assumed maximum load. (See subsection (1)(f)(ii) of this section for flexible supports.)

(d) On wood or concrete poles. When guys are used to meet the strength requirements for wood or concrete poles, they shall be considered as taking the entire load in the direction in which they act, the poles acting as

struts only. Frequently the use of shorter spans or larger poles will permit the omission of guys at crossings.

(e) Strength of guys.

(i) Guys, when required, shall be of such material and dimensions as will withstand the transverse loads assumed in WAC 296-44-385(2)(a) to 296-44-358(2)(e), inclusive, and the longitudinal load assumed in WAC 296-44-358(3), without exceeding the following percentages of their ultimate strength:

	Percentage of ultimate strength	
	Grade B	Grade C
For transverse strength (when installed)	37.50	50.00
For longitudinal strength (at all times):		
In general	100.00	No requirement.
At dead-ends	66.67[1]	87.50[1]

[1]If deflection of supporting structures is taken into account in the computation, 66 2/3 percent shall be reduced to 60 percent and 87 1/2 percent shall be reduced to 75 percent.

(ii) At an angle in the line, the strength of a transverse guy or guys shall be sufficient to withstand the combination of transverse and longitudinal loadings specified in WAC 296-44-358(2)(f). The transverse load shall be multiplied by 1.78 for both grades B and C before combining with the load arising from the change in direction of conductors. The allowable percentage of ultimate strength at dead-ends given in (i) above shall not be exceeded for the total load thus computed.

(4) Crossarms.

(a) Vertical strength. Crossarms shall, when installed, withstand the vertical loads specified in WAC 296-44-358(1) without the stress under these loads exceeding 50 percent of the assumed ultimate stress of the material. Metal crossarms, when used on wood poles to support electric-supply conductors, shall be grounded.

Exception: For built up steel crossarms on steel structures, see Table 16 for minimum overload capacity factors.

(b) Bracing. Crossarms shall be securely supported by bracing, if necessary, so as to support safely all other loads to which they may be subjected in use, including linemen working on them. Any crossarm or buckarm shall be capable of supporting a vertical load of 225 pounds at either extremity in addition to the weight of the conductors. This rule shall not apply to the top crossarm on poles used solely for communication circuits.

(c) Longitudinal strength.

(i) General. Crossarms shall withstand any unbalanced longitudinal loads to which they are exposed, with a limit of unbalanced tension where conductor pulls are normally balanced, of 700 pounds at the outer pin.

(ii) At dead-ends and at ends of higher-grade construction in line of lower grade.

Grade B. Wood crossarms shall be of sufficient strength to withstand at all times, without exceeding their ultimate stresses, an unbalanced pull equal to the tension in all supported conductors under the assumed conductor loading given in WAC 296-44-355. Steel arms shall withstand this load with the overload capacity factor for longitudinal loads given in Table 16.

Grade C. The above provisions do not apply to grade C.

(iii) At ends of transversely weak sections.

Grade B. The crossarms connected to the structure at each end of the transversely weak section, such as described in subsection (1)(e) of this section, shall be such as to withstand at all times without exceeding their ultimate stresses, under the conductor loading prescribed in WAC 296-44-355, an unbalanced load equivalent to the combined pull in the direction of the transversely weak section of all the conductors supported.

Grade C. The above provision does not apply to grade C.

(iv) Methods of meeting subsections (4)(c)(ii) and (iii) of this section.

Grade B. Where conductor tensions are limited to a maximum of 2,000 pounds per conductor, double wood crossarms fitted with spacing bolts equipped with spacing nuts and washers, pipe spacers, or similar construction, or with spacing blocks or plates, will be considered as meeting the strength requirements in (ii) and (iii) preceding.

Grade C. The above provisions do not apply to grade C.

(d) Dimensions of crossarms of selected yellow pine or fir. The cross-sectional dimensions of selected yellow pine or fir crossarms shall be not less than the values of Table 21.

TABLE 21.—Crossarm cross sections

Number of pins	Grade B	Grade C	
		Supply	Communication
	Inches	Inches	Inches
2 or 4	3 by 4	2 3/4 by 3 3/4	....
6 or 8	3 1/4 by 4 1/4	3 by 4	....
6	....	....	2 3/4 by 3 3/4
10	....	....	3 by 4

(e) Double crossarms or brackets.

Grade B. Where pin-type construction is used, two points of support shall be provided for each conductor by means of double crossarms or double brackets at each crossing structure, at ends of joint use or conflict sections, at dead-ends, and at corners where the angle of departure from a straight line exceeds 20 degrees.

Exception: Where communication cables or conductors cross below supply conductors and are attached to the same pole, the above does not apply unless another condition which requires double pins and fastenings for the supply conductors is involved.

Grade C. The above provision applies to grade C where supply conductors of more than 5,000 volts between wires (or of more than 2,900 volts to ground in the case of grounded neutral circuits) cross over minor communication lines at locations such that the supply pole is more than 6 feet from the nearest communication

conductor, unless other means of providing equivalent safety and stress are agreed to be the parties involved.

(f) Location. In general, crossarms should be maintained at right angles to the axis of the pole and to the direction of the attached conductors. At crossings, crossarms should be attached to that face of the structure away from the crossing, unless special bracing or double crossarms are used.

(5) Pins and conductor fastenings.

(a) Longitudinal strength.

(i) General. Pins and ties or other conductor fastenings shall have sufficient strength to withstand an unbalanced tension in the conductor, up to a limit of 700 pounds per pin or fastening.

(ii) At dead–ends and at ends of higher–grade construction in line of lower grade.

Grade B. Pins and ties or other conductor fastenings connected to the structure at each end of the higher–grade section shall be of sufficient strength to withstand at all times without exceeding their ultimate strength, an unbalanced pull due to the conductor loading specified in WAC 296–44–355.

Grade C. The above provisions do not apply to grade C.

(iii) At ends of transversely weak sections.

Grade B. Pins and ties or other conductor fastenings connected to the structure at each end of the transversely weak section as described in subsection (1)(e) of this section shall be such as to withstand at all times without exceeding their ultimate strength under the conductor loading prescribed in WAC 296–44–355, the unbalanced pull in the direction of the transversely weak section of the conductor supported.

Grade C. The above provisions do not apply to grade C.

(iv) Method of meeting subsections (5)(a)(ii) and (5)(a)(iii) of this section.

Grade B. Where conductor tensions are limited to 2,000 pounds and such conductors are supported on pin insulators, double pins, and ties or equivalent fastenings will be considered to meet the requirements of (ii) and (iii) preceding.

Grade C. The above provision does not apply to grade C.

(b) Sharp edges on fastenings. Tie wires, fastenings, or supports shall have no sharp edges or burrs at contacts with the conductors.

(c) Height of pin. The height of the pin and the conductor fastenings and the material and cross section of the pin should be chosen so as to afford the required strength.

Note: The method of attaching conductors by suitable ties to single pin–type insulators mounted on 1 1/2 by 9 inch wood pins of locust or equivalent wood will usually provide strength up to 1,000 pounds conductor tension with the conductor 3.5 inches above the crossarm. Steel pins may afford greater strength, both for the pins and for the crossarms.

Grade B. Where pin–type construction is used, two points of support shall be provided for each conductor by means of double pins and conductor fastenings at each crossing structure, at ends of joint use or conflict sections, at dead–ends, and at angles where the angle of departure from a straight line exceeds 20 degrees.

Exception: Where communication cables or conductors cross below supply conductors and are attached to the same pole, the above does not apply unless another condition which requires double pins and fastenings for the supply conductors is involved.

Grade C. The above provision applies to grade C where supply conductors of more than 5,000 volts between wires (or of more than 2,900 volts to ground in the case of grounded neutral circuits) cross over minor communication lines at locations such that the supply pole is more than 6 feet from the nearest communication conductor, unless other means of providing equivalent safety and strength are agreed to be the parties involved.

(6) **Open supply conductors.**

(a) Material. Conductors shall be of material or combinations of materials which will not corrode excessively under the prevailing conditions.

Recommendation: It is recommended that hard–drawn or medium–hard–drawn copper wire (conforming to the specifications of the American Society for Testing Materials) be used instead of soft in new construction where bare wire or cable is used, especially for sizes smaller than No. 2.

(b) Minimum sizes of supply conductors. Supply conductors, both bare and covered, shall have an ultimate strength and an over–all diameter of metallic conductor not less than that of medium–hard–drawn copper of the gage size AWG shown in Table 22, except that conductors made entirely of bare or galvanized iron or steel shall have an over–all diameter not less than Stl. WG of the gage sizes shown.

Exception 1: At railroad crossings, for stranded conductors, other than those in which a central core wire is entirely covered by the outside wires, any individual wire of such a stranded conductor containing steel shall be not less than 0.100 inch in diameter if copper–covered and not less than 0.115 inch in diameter if otherwise protected or if bare.

Exception 2: Supply service leads of 0 to 750 volts to ground may have the sizes set forth in WAC 296–44–370(5).

Exception 3: Where the short–span method of construction is employed in accordance with subsection 11, of this section, the conductor sizes and sags herein specified are not required.

TABLE 22.—Minimum over–all conductor sizes

Grade of construction	Gage size[1]
B	6
C	8

[1]For No. 6 and No. 8 medium-hard-drawn copper wire the nominal diameters are 0.1620 and 0.1285 inch, and the minimum values of breaking load are 1,010 and 643.9 pounds, respectively. For steel wire gage the nominal diameters are 0.192 inch for No. 6 and 0.162 inch for No. 8.

(c) Lightning protection wires. Lightning-protection wires paralleling the line conductors shall be regarded in respect to size, material, and stringing requirements as supply conductors with which they are associated.

(d) Sags and tensions. Conductor sags shall be such that, under the assumed loading of WAC 296-44-355 for the district concerned, the tension of the conductor shall be not more than 60 percent of its ultimate strength. Also the tension at 60° F, without external load, shall not exceed the following percentage of the conductor ultimate strength:

Exception: In the case of conductors having a cross section of a generally triangular shape, such as cables composed of three wires, the final unloaded tension of 60°F. shall not exceed 30 percent of the ultimate strength of the conductor.

Note: The above limitations are based on the use of recognized methods for avoiding fatigue failures by minimizing chafing and stress concentration. If such practices are not followed, lower tensions should be employed.

(e) Splices and taps.

Grade B. Splices shall as far as practicable be avoided in the crossing and adjacent spans. If it is impracticable to avoid such splices, they shall be of such a type and so made as to have a strength substantially equal to that of the conductor in which they are placed. Taps shall be avoided in the crossing span where practicable, but if required shall be of a type which will not impair the strength of the conductors to which they are attached.

Grade C. The above does not apply to Grade C.

(f) Trolley contact conductors. In order to provide for wear, no trolley contact conductor shall be installed of less size than No. 0, if of copper, or No. 4, if of silicon bronze.

(7) **Supply cables.**

(a) Specially installed supply cables. Cables having effectively grounded continuous metal sheath or armor, where located on jointly used poles, or where located on other poles and having a grade of construction less than that required for open wire supply lines of the same voltage, shall meet the requirements of (i), (ii), (iii), and (iv) below.

(i) Messengers. Messengers shall be stranded and of corrosion-resistant material, and shall not be stressed beyond 60 percent of their ultimate strength under the loadings specified in WAC 296-44-355.

(ii) Grounding of cable sheath and messenger. Each section of cable between splices shall be suitably and permanently bonded to the messenger wire at not less than two places. The messenger wire shall be grounded at the ends of the line and at intermediate points not exceeding 800 feet apart. (See WAC 296-44-058 through 296-44-076 for method.)

(iii) Cable splices. Splices in the cable shall be made so that their insulation is not materially weaker than the remainder of the cable. The sheath or armor at the splice shall be made electrically continuous.

(iv) Cable insulation. The conductors of the cable shall be insulated so as to withstand a factory potential test of at least twice the operating voltage at operating frequency applied continuously for 5 minutes between conductors and between any conductor and the sheath or armor.

(b) Other supply cables. The following requirements apply to all supply cables not included in (a) above.

(i) Messenger. The messenger shall be of corrosion-resistant material, and shall not be stressed beyond 60 percent of its ultimate strength under the loadings specified in WAC 296-44-355.

(ii) Cable. There are no strength requirements for cables supported by messengers.

(8) **Open-wire communication conductors.** Open-wire communication conductors in grade B or C construction shall have the sizes and sags given in subsections (6)(b) and (d) for supply conductors of the same grade.

Exception: Where open-wire communication conductors in spans of 150 feet or less are above supply circuits of 5,000 volts or less between conductors, grade C sizes and sags may be replaced by grade D sizes and sags, except that where the supply conductors are trolley-contact conductors of 0 to 750 volts to ground, No. 12 wire may be used for spans of 0 to 100 feet, and No. 9 steel wire may be used for spans of 125 to 150 feet.

(9) **Communication cables.**

(a) Metal-sheathed communication cables. There are no strength requirements for such cables supported by messengers.

(b) Messenger. The messenger shall be of corrosion-resistant material, and shall not be stressed beyond 60 percent of its ultimate strength under the loadings specified in WAC 296-44-355.

(10) **Paired communication conductors.**

(a) Paired conductors supported on messenger.

(i) Use of messenger. A messenger of corrosion-resistant material may be used for supporting paired conductors in any location, but is only required for paired conductors crossing over trolley-contact conductors of more than 7,500 volts to ground.

(ii) Sag of messenger. Messenger used for supporting paired conductors required to meet grade B construction because of crossing over trolley-contact conductors shall meet the sag requirements for grade D messengers.

(iii) Size and sag of conductors. There are no requirements for paired conductors when supported on messenger.

(b) Paired conductors not supported on messenger.

(i) Above supply lines.

Grade B. Sizes and sags shall be not less than those required by subsections (6)(b) and (d) for supply conductors of similar grade.

Grade C. Sizes and sags shall be not less than the following:

Spans 0 to 100 feet. No sag requirements. Each conductor shall be of corrosion-resistant material, and shall have an ultimate strength of not less than 170 pounds.

Spans 100 to 150 feet. Sizes and sags shall be not less than required for grade D communication conductors.

Spans exceeding 150 feet. Sizes and sags shall be not less than required for grade C supply conductors. (See subsection (6)(d).)

(ii) Above trolley-contact conductors.

Grade B. Sizes and sags shall be not less than the following:

Spans 0 to 100 feet. No size requirements. Sags shall be not less than for No. 8 AWG hard-drawn copper. (See subsection (6)(d).)

Spans exceeding 100 feet. Each conductor shall be of corrosion-resistant material, and shall have an ultimate strength of not less than 170 pounds. Sags shall be not less than for No. 8 AWG hard-drawn copper. (See subsection (6)(d).)

Grade C. Sizes and sags shall be as follows:

Spans 0 to 100 feet. No requirements.

Spans exceeding 100 feet. No sag requirements. Each conductor shall be of corrosion-resistant material, and shall have an ultimate strength of not less than 170 pounds.

(11) **Short-span crossing construction.** Where supply lines cross over railways or communication lines by the short-span method the requirements for grade B or C conductor sags and sizes are waived in so far as such grades are required by the crossing, provided that an effectively grounded guard arm is installed at each cross-over support in such a manner as to prevent conductors which break in either adjoining span from swinging back into the conductors crossed over, or in the case of a railroad crossing into the space between the crossing supports.

Note: The short-span method of crossing requires the cross-over span to be of such a height that a conductor breaking in that span cannot come within 15 feet of the ground or rails at a railroad crossing or make contact with any wires crossed over at a wire crossing.

This character of construction is facilitated where the cross-over supports can be placed quite near together and in the case of wire crossings where the span crossed over is at a minimum elevation above ground.

(12) **Cradles at supply-line crossing.** Cradles should not be used.

Note: It is less expensive and better to build the supply line strong enough to withstand extreme conditions than to build a cradle of sufficient strength to catch and hold the supply line if it falls.

(13) **Protective covering or treatment for metal work.** All hardware, including bolts, washers, guys, anchor rods, and similar parts of material, subject to injurious corrosion under the prevailing conditions, shall be protected by galvanizing, painting, or other treatment which will effectively retard corrosion. [§ 26 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-367 Strength requirements——Grade D construction. (1) **Poles.**

(a) Strength of unguyed poles. Unguyed poles, except as provided in subsection (1)(h), shall withstand the vertical and transverse loads specified in WAC 296-44-358(1) and (2), and the longitudinal loads specified in WAC 296-44-358(3)(d), without exceeding the following percentages of their ultimate stress:

	Percentages of ultimate stress
For transverse loads:	
When installed	25.0
At replacement	37.5
For longitudinal loads:	
When installed	75.0
At replacement	100.0

(b) Strength of guyed poles. Where poles are guyed, the poles shall be considered as acting as struts, resisting the vertical component of the tension in the guy, calculated as in subsection (3), combined with the vertical load.

(c) Strength requirements for poles where guying is required, but can only be installed at a distance. Where on account of physical conditions it is impracticable to guy or brace the crossing poles as specified in subsection (3), the requirements there given may be met by head-guying and side-guying the line as near as practicable to the crossing, but at a distance not exceeding 500 feet from the nearest crossing pole, provided that the line is approximately straight and that a stranded steel wire or other standard strand of strength equivalent to that of the head guy is run between the two guyed poles, being attached to the guyed poles at the point at which the head guys are attached, this wire being securely attached to every pole between the guyed poles.

(d) Pole locations at crossings. Where communication lines cross over railroads, the poles shall be located as follows:

(i) The poles supporting the crossing span and the adjacent spans should be located in a straight line, if practicable. Where the poles supporting the crossing span and the adjacent spans are not in line, guying shall be placed to take care of the unbalanced load.

(ii) The crossing span shall, where practicable, not exceed 100 feet in the heavy loading district, 125 feet in the medium loading district, and 150 feet in the light loading district.

(e) Freedom from defects. Wood poles shall be of suitable and selected timber free from observable defects that would decrease their strength or durability.

(f) Minimum pole size. Wood poles shall have a nominal circumference of not less than 15 inches.

(g) Spliced and stub–reinforced poles. Spliced poles shall not be used at grade D crossings. At crossings over minor railroad tracks, the use of stub–reinforcements that develop the required strength of the pole is permitted, provided the pole above the ground line is in good condition and is of sufficient size to develop its required strength.

(h) Poles located at crossings over spur tracks. Where a communication line paralleling a railroad track on the right–of–way of the railroad crosses a spur or stub track without any change in the general direction of line, the transverse strength requirements for grade D construction may be met without the use of side guys, provided the pole is not stressed beyond one–third of its ultimate stress. No requirements for longitudinal strength are made if the conductor tensions are balanced. Where conductor tensions are not balanced, due to a small angle in the line at one or both poles, or to dead–ending any of the wires, either guys or braces capable of withstanding such unbalanced tensions shall be installed.

(2) **Pole settings.** Foundations and settings for unguyed poles shall be such as to withstand the loads assumed in WAC 296–44–358(1), (2), and (3).

(3) **Guys.**

(a) General. The general requirements for guys are covered under "Miscellaneous Requirements" (WAC 296–44–400 through 296–44–427).

(b) Where used. Side guys or braces shall be used on poles supporting the crossing span to withstand the loads put upon them in accordance with the conditions specified in WAC 296–44–358(2). Head guys shall be installed in accordance with Table 23.

Exception 1: Side guys are not required where the crossing poles have the transverse strength specified in section (1)(a) without the reduction for conductor shielding specified in WAC 296–44–358(2)(a) and (2)(b).

Exception 2: Head guys are not required where the crossing poles have the longitudinal strength specified in subsection (1)(a), or where they carry a cable supported on 6,000–pound or stronger messenger.

Exception 3: Where a line crossing a railroad changes direction more than 10 degrees at either crossing support, the side guy within the angle may be omitted and the head guy, if required shall be placed in the direction of the adjacent span unless the angle of turn is greater than 60 degrees.

Exception 4: Guying may be omitted where communication lines cross over spur or stub tracks as provided in subsection (1)(h).

Exception 5: This rule does not apply to crossing poles under the special conditions set forth in subsection (1)(c).

TABLE 23.—Strength (in pounds) of head guys required for loading districts indicated.[1]

(Combinations of standard–size guys may be used)

Number of wires	Ratio of guy lead to height not less than—				
	1 1/4	1	3/4	2/3	1/2
HEAVY LOADING					
2	4,000	4,000	4,000	4,000	4,000
6	4,000	4,000	4,000	4,000	6,000
10	6,000	6,000	6,000	10,000	10,000
20	10,000	10,000	12,000	16,000	16,000
30	16,000	16,000	20,000	20,000	26,000
40	20,000	20,000	26,000	26,000	32,000
50	20,000	20,000	30,000	32,000	42,000
60	26,000	30,000	36,000	36,000	48,000
70	30,000	30,000	40,000	48,000	60,000
80	36,000	40,000	48,000	60,000	70,000
MEDIUM LOADING					
2	4,000	4,000	4,000	4,000	4,000
6	4,000	4,000	4,000	4,000	4,000
10	4,000	4,000	6,000	6,000	6,000
20	6,000	10,000	10,000	10,000	12,000
30	10,000	10,000	12,000	16,000	16,000
40	12,000	16,000	16,000	16,000	20,000
50	16,000	16,000	20,000	20,000	26,000
60	20,000	20,000	26,000	26,000	30,000
70	20,000	20,000	26,000	30,000	36,000
80	26,000	26,000	30,000	32,000	40,000
LIGHT LOADING					
2	4,000	4,000	4,000	4,000	4,000
6	4,000	4,000	4,000	4,000	4,000
10	4,000	4,000	4,000	4,000	4,000
20	4,000	6,000	6,000	6,000	10,000
30	6,000	10,000	10,000	10,000	12,000
40	10,000	10,000	10,000	12,000	16,000
50	10,000	10,000	16,000	16,000	20,000
60	12,000	16,000	16,000	16,000	20,000
70	16,000	16,000	20,000	20,000	26,000
80	16,000	20,000	20,000	26,000	30,000

[1]This table is based on ultimate or breaking strength of guys equal to seven–sixths of the nominal strengths shown in the table and a wire load of 50 percent No. 8 BWG iron and 50 percent No. 9 AWG copper with an average pull of 408.75 pounds per wire.

No guy will be required for cable, since the messenger serves as a head guy.

(c) Guys used for transverse strength. Side guys used in straight sections of line shall be considered as taking

the entire load in the direction in which they act, without exceeding 37.5 percent of their ultimate strength.

(d) Guys used for longitudinal strength.

(i) Direction of head guys. Where head guys are required, they shall be installed in the direction away from the crossing.

(ii) Size and number of head guys. Guys, if required for various open-wire loads, shall be in accordance with Table 23.

(e) Maintenance. Guys and anchors shall be maintained so that the guys carry the load.

(4) **Crossarms.**

(a) Material. Wood crossarms supporting the crossing span shall be of yellow pine, fir, or other suitable timber.

(b) Minimum size.

(i) Wood crossarms. Wood crossarms shall have a cross section not less than the following:

Maximum number of wires to be carried	Nominal length Feet	Inches	Nominal cross section (Inches)
2	1	4 1/2	2 5/16 by 3 5/16
4	3	4 1/2	2 5/16 by 3 5/16
6	6	0	2 3/4 by 3 3/4
10	8	6	2 3/4 by 3 3/4
10	10	0	3 by 4
12[1]	10	0	3 1/4 by 4 1/4
16[2]	10	0	3 1/4 by 4 1/4

[1]Where crossarms are bored for 1/2-inch steel pins, 3-inch by 4 1/4-inch crossarms may be used.

[2]Permitted in medium and light loading districts only.

(ii) Steel or iron crossarms. Galvanized or painted iron or steel crossarms of strength equal to wood crossarms may be used.

(c) Double crossarms. Crossarms and insulators shall be double on the crossing poles. The crossarms shall be held together with properly fitted spacing blocks or bolts placed immediately adjoining the outside pins. Spacing blocks or spacing bolts are not required for two-pin crossarms.

(5) **Brackets and racks.** Wood brackets may be used only if used in duplicate or otherwise designed so at to afford two points of support for each conductor. Single metal brackets, racks, drive hooks or other fixtures may be used if designed and attached in such manner as to withstand the full dead-end pull of the wires supported.

(6) **Pins.**

(a) Material. Insulator pins shall be of steel, wrought iron, malleable cast iron, or locust or equivalent wood.

(b) Strength. Insulator pins shall have sufficient strength to withstand the loads to which they may be subjected.

(c) Size.

(i) Wood pins. Wood pins shall be sound and straight-grained with a diameter of shank not less than 1 1/4 inches.

(ii) Metal pins. Steel or iron pins shall have diameter of shank not less than 1/2 inch.

(7) **Insulators.** Each insulator shall be of such pattern, design, and material that when mounted it will withstand without injury and without being pulled off the pin, the ultimate strength of the conductor attached to the insulator.

(8) **Attachment of conductor to insulator.** The conductor shall be securely tied to each supporting insulator.

(9) **Conductors.**

(a) Material. Conductors shall be of material or combinations of materials which will not corrode excessively under the prevailing conditions.

(b) Size. Conductors of the crossing span, if of hard-drawn copper or galvanized steel, shall have sizes not less than specified in (i) and (ii) below. Conductors of material other than the above shall be of such size and so strung as to have a mechanical strength not less than that of the sizes of copper conductors given in (i) and (ii) below.

(i) Spans not exceeding 150 feet. The sizes in Table 24 apply for all loading districts.

TABLE 24.—Minimum wire sizes

(AWG for copper; Stl. WG for steel)

Conductor	Spans of 125 feet or less	Spans 125 to 150 feet
Copper, hard-drawn	10	9
Steel, galvanized:		
In general	10	8
In rural districts of arid regions	12	10

(ii) Spans exceeding 150 feet. If spans in excess of 150 feet are necessary, the size of conductors specified above or the sags of the conductors shall be correspondingly increased.

(c) Paired conductors without messengers. Paired wires without a supporting messenger shall be eliminated as far as practicable and where used shall meet the following requirements:

(i) Material and strength. Each conductor shall be of material which will not corrode excessively under the prevailing conditions and shall have an ultimate strength of not less than 170 pounds.

(ii) Limiting span lengths. Paired wires shall in no case be used without a supporting messenger in spans longer than 100 feet in the heavy loading district, 125 feet in the medium loading district, and 150 feet in the light loading district.

(d) Sags. Table 25 specifies the recommended sags for wires shown in Table 24.

TABLE 25.—Stringing sags

HEAVY AND MEDIUM LOADING DISTRICTS

Length of span	100°F	80°F	60°F	40°F	20°F	0°F
Feet	in.	in.	in.	in.	in.	in.
70	5.7	4.4	3.4	2.7	2.2	1.8
75	6.4	5.1	4.0	3.1	2.5	2.1
80	7.4	5.8	4.5	3.5	2.9	2.4
85	8.4	6.6	5.1	4.0	3.2	2.7
90	9.4	7.3	5.7	4.5	3.6	3.0

TABLE 25.—Stringing sags

HEAVY AND MEDIUM LOADING DISTRICTS

Length of span	100°F	80°F	60°F	40°F	20°F	0°F
Feet	in.	in.	in.	in.	in.	in.
95	10.0	8.2	6.3	5.0	4.0	3.4
100	11.6	9.0	7.0	5.5	4.5	3.7
110	14.0	11.0	8.5	6.7	5.4	4.5
120	16.6	13.0	10.1	7.9	6.4	5.4
130	19.5	15.3	11.8	9.3	7.6	6.3
140	22.6	17.7	13.7	10.8	8.8	7.3
150	26.0	20.3	15.8	12.4	10.1	8.4

LIGHT LOADING DISTRICT

Length of span	110°F	100°F	80°F	60°F	40°F	20°F	10°F
Feet	in.	in.	in.	in.	in.	in.	in.
80	5.5	5.0	4.2	3.4	2.8	2.4	2.2
85	6.2	5.7	4.7	3.9	3.2	2.7	2.5
90	7.0	6.4	5.3	4.3	3.6	3.0	2.8
95	7.8	7.1	5.8	4.8	4.0	3.4	3.1
100	8.6	7.9	6.5	5.3	4.4	3.7	3.5
110	10.4	9.5	7.8	6.5	5.4	4.5	4.2
120	12.4	11.3	9.3	7.7	6.4	5.4	5.0
130	14.6	13.3	11.0	9.0	7.5	6.3	5.9
140	16.9	15.4	12.7	10.5	8.7	7.3	6.8
150	19.4	17.7	14.6	12.0	10.0	8.4	7.8

(e) Splices and taps. Splices shall as far as practicable be avoided in the crossing and adjacent spans. If it is impracticable to avoid such splices, they shall be of such a type and so made as to have a strength substantially equal to that of the conductor in which they are placed.

Taps shall be avoided in the crossing span where practicable, but if required shall be of a type which will not impair the strength of the conductors to which they are attached.

(10) **Messengers.**

(a) Minimum size.

(i) Spans not exceeding 150 feet. Table 26 gives the minimum sizes of galvanized steel-strand messenger to be used for supporting different sizes of cables:

TABLE 26.—Minimum sizes of messenger

Size of cable in weight per foot	Messenger (nominal breaking load)
	Pounds
Less than 2.25 pounds	6,000
2.25 to 5 pounds	10,000
Exceeding 5 and less than 8.5 pounds	16,000

(ii) Spans exceeding 150 feet. For spans exceeding 150 feet or for heavier cables a proportionately larger messenger or other proportionately stronger means of support shall be used.

(b) Sags and tensions. Multiple-conductor cables and their messengers shall be so suspended that when they are subjected to the loading prescribed in WAC 296-44-355, the tension in the messenger will not exceed 60 percent of its ultimate strength.

(11) **Inspection.** (See WAC 296-44-286.) [§ 26 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-370 Strength requirements——Grade N construction. (1) **Poles and towers.** Poles used for lines for which neither grade B, C or D is required shall be of such initial size and so guyed or braced, where necessary, as to withstand safely the loads to which they may be subjected, including linemen working on them. Such poles and stubs on state and federal highways shall be located as far as practicable from the traveled portion of such highways. The number of crossings over such highways should be kept to a minimum. Such poles and stubs located within falling distance of the traveled portion of such highways, or so located that their failure would permit wires, cables, guys, or other equipment to fall into the traveled portion of the highway, or would reduce the clearances specified in Table 1 over the traveled portion of such highways, shall be periodically inspected and maintained in safe condition.

(2) **Guys.** The general requirements for guys are covered under "Miscellaneous Requirements" (WAC 296-44-400 through 296-44-427).

(3) **Crossarm strength.** Crossarms shall be securely supported, by bracing if necessary, so as to support safety loads to which they may be subjected in use, including linemen working on them. Any crossarm, or buckarm, shall be capable of supporting a vertical load of 225 pounds at either extremity, in addition to the weight of the conductors.

Note: Double crossarms are generally used at crossings, unbalanced corners, and dead-ends, in order to permit conductor fastenings at two insulators, and so prevent slipping, although single crossarms might provide sufficient strength. To secure extra strength, double crossarms are frequently used, and crossarm guys are sometimes used.

(4) **Supply-line conductors.**

(a) Material. All supply-line conductors shall be of material or combinations of materials which will not corrode excessively under the prevailing conditions.

(b) Size. Supply-line conductors shall be not smaller than the following:

TABLE 27.—Grade N minimum sizes for supply–line conductors

(AWG for copper and aluminum; Stl. WG for steel)

	Urban	Rural
Soft copper	6	8
Medium or hard–drawn copper	8	8
Steel	9	9
	Urban and rural	
	Spans 150 feet or less	Spans exceeding 150 feet
Stranded aluminum:		
Not reinforced	1	0
Steel–reinforced	6	4

Recommendation: It is recommended that, except as modified in WAC 296–44–364(6)(b), these minimum sizes for copper and steel not to be used in spans longer than 150 feet for the heavy–loading district, and 175 feet for the medium and light–loading districts.

(5) **Supply services.**

(a) Material. All supply service conductors shall be of material or combinations of materials which will not corrode excessively under the prevailing conditions.

(b) Size of open–wire services.

(i) Not over 750 volts between conductors. Supply–service leads of not over 750 volts between conductors shall be not smaller than required by (A) or (B) below:

(A) Spans not exceeding 150 feet. Sizes shall be not smaller than specified in Table 28.

TABLE 28.—Minimum sizes of service leads carrying 750 volts or less

(All voltages are between conductors except trolley–contact conductors where voltages are to ground)

(AWG for copper; Stl. WG for steel)

Situation	Copper wire		Steel wire
	Soft–drawn	Medium or hard–drawn	
Alone	10	12	12
Concerned with communication conductors	10	12	12
Over supply conductors of—			
0 to 750 volts	10	12	12
750 to 8,700 volts[1]	8	10	12
Exceeding 8,700 volts[1]	6	8	9
Over trolley–contact conductors—			
0 to 750 volts ac or dc	8	10	12
Exceeding 750 volts ac or dc	6	8	9

[1]Installation of service leads of not more than 750 volts above supply lines of more than 750 volts should be avoided where practicable.

(B) Spans exceeding 150 feet. Sizes shall be not smaller than required for Grade C. (WAC 296–44–364(6)(b)).

(ii) Exceeding 750 volts between conductors. Sizes of supply–service leads of more than 750 volts between conductors shall be not less than required for supply–line conductors of the same voltage.

(c) Sag, open–wire services.

(i) Not over 750 volts between conductors. Supply service leads of not over 750 volts between conductors shall have sags not less than shown in Table 29.

TABLE 29.—Sags for open–wire services

Span lengths	Sag
Feet	Inches
100 or less	12.
100 to 125	18.
125 to 150	27.
Exceeding 150	Grade C sags.

(ii) Exceeding 750 volts between conductors. Supply service leads of more than 750 volts between conductors shall comply as to sags with the requirements for supply line conductors of the same voltage.

(d) Cabled services. Supply service leads may be grouped together in a cable, provided the following requirements are met:

(i) Size. The size of each conductor shall be not less than required for leads of separate conductors (subsection (5)(b).)

(ii) Sag. The sag of the cable should be not less than required for leads of separate conductors (subsection (5)(c).)

(iii) Insulation. The insulation should be sufficient to withstand twice the normal operating voltage.

(6) **Lightning–protection wires.** Lightning–protection wires paralleling the line conductors shall be regarded, in respect to size and material requirements, as supply conductors.

(7) **Trolley–contact conductors.** In order to provide for wear, no trolley–contact conductors shall be installed of less size than No. 0, if of copper, or No. 4, if of silicon bronze.

(8) **Cradles at supply–line crossing.** Cradles should not be used.

Note: It is less expensive and better to build the supply line strong enough to withstand extreme conditions than to build a cradle of sufficient strength to catch and hold the supply line if it falls.

(9) **Communication conductors.** There are no specific requirements for grade N communication line conductors or service drops. [§ 26 (part), filed 3/23/60, effective 12/1/58.]

WAC 296–44–373 Line insulators——Application of rule. These requirements apply only to supply lines in situations where grade B construction is required. (See WAC 296–44–346(5), for insulation requirements for neutral conductors.) [§ 27 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-376 Line insulators——Material and marking. Insulators for operation on supply circuits at voltages of 2,300 and above shall be of porcelain, made by the wet process or one equally suitable as regards electrical and mechanical properties, or other material which will give equally good results in respect to mechanical and electrical performance and durability. They should be marked by the maker with his name, trademark, or identification number so applied as not to reduce the electrical or mechanical strength of the insulator. [§ 27 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-379 Line insulators——Electrical strength of insulators in strain position. Where insulators are used in a strain position they shall have not less electrical strength than the insulators generally used on the line when under the normal mechanical stresses imposed by the loadings specified in WAC 296-44-352 through 296-44-358. [§ 27 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-382 Line insulators——Ratio of flash-over to puncture voltage. Insulators shall be designed so that their dry flash-over voltage is not more than 75 percent of their puncture voltage at a frequency of 60 cycles per second. [§ 27 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-385 Line insulators——Test voltages. Insulators when tested under the current specifications of the American Standard Association shall not flash over at values less than given in Table 30.

TABLE 30.—Test-voltage requirements

(For application see rules 275 and 278)

Nominal voltage between conductors	Minimum test dry flash-over voltage of insulators	Nominal voltage between conductors	Minimum test dry flash-over voltage of insulators
750	5,000	46,000	125,000
2,400	20,000	69,000	175,000
7,200	40,000	115,000	315,000
13,200	55,000	138,000	390,000
23,000	75,000	161,000	445,000
34,500	100,000	230,000	640,000

(Interpolate for intermediate values.)

[§ 27 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-388 Line insulators——Factory tests. Each insulator or insulating part thereof for use on circuits operating at voltages in excess of 15,000 volts shall be subjected to a routine dry flash-over test at the factory for a period of 3 minutes at a frequency of 60 cycles per second or to any other test sanctioned by good modern practice, such as high-frequency tests. [§ 27 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-391 Line insulators——Selection of insulators. (1) **Insulators for constant-current circuits.** Insulators for use on constant-current circuits shall be determined on the basis of the nominal full-load voltage of the circuit.

(2) **Insulators for single-phase circuits directly connected to three-phase circuits.** Insulators used on single-phase circuits directly connected to three-phase circuits (without intervening isolating transformers) shall have a flash-over voltage not less than that required for the insulators on the three-phase circuits.

(3) **Insulators for nominal voltages between conductors.** In selecting insulators of the test voltage to be used for any nominal voltage between conductors, consideration shall be given to the conditions under which the line will operate as follows:

(a) Where the system is of moderate extent, in open country, subject to intermittent rains and moderate lightning, insulators having flash-over values not less than given in Table 30 shall be used.

(b) Where operating conditions are more severe than set forth in (a) above, due to extent of system, prevalence of exceptionally severe lightning, bad atmospheric conditions (caused by chemical fumes, smoke, cement dust, salt fog, or other foreign matter), or to a long, dry season with heavy dust accumulation followed by moisture, insulators having a higher flash-over than given in Table 30 or other equally effective means of increasing insulation shall be used. The increase is to be determined by local conditions and experience. [§ 27 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-394 Line insulators——Protection against arcing. In installing the insulators and conductors, such precautions as are sanctioned by good modern practice shall be taken to prevent, as far as possible any arc from forming or to prevent any arc which might be formed from injuring or burning any parts of the supporting structures, insulators or conductors which might render the conductors liable to fall. [§ 27 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-397 Line insulators——Compliance with WAC 296-44-394 at crossings. Construction in accordance with any one of the methods ((1) to (7)) given below will be considered as a means of meeting the requirements of WAC 296-44-394 above, provided that insulators having a flash-over not less than required by WAC 296-44-391(3)(a) or (3)(b) are used, and in no case having a lower flash-over than insulators generally used in adjacent sections of the line.

Exception: If the insulator hardware on the structure is grounded at crossings and is not grounded on the adjacent parts of the line, construction in accordance with (1) or (2) below should be followed, or other equally effective means employed.

The use of grounded construction at crossings only should in general be avoided.

(1) The use of a protective device such as a gap, protector tube, lightning arrester, or the like, on or adjacent to the insulator, which is effective in suppressing the

power arc or in holding it clear of the insulator, conductor, supporting structure, and hardware.

(2) The use of protective gaps or other voltage-limiting devices on structures adjacent to crossing structures, if such devices limit the voltage to not more than 80 percent of the flash-over value of the insulators on the crossing structures.

(3) The use of circuit protection by fast-clearing fuses or circuit-breakers. Fuses, or breakers in combination with their relays, shall be considered "fast-clearing" if they interrupt fault currents within one-fifth second (12 cycles at 60 cycles per second).

(4) The use of one or more overhead ground wires installed at a higher level than the phase wires on not less than five consecutive spans, including two adjacent spans on each side of the crossing span, provided the ground wire is effectively grounded at structures adjacent to crossing structures.

Such overhead ground wires shall not be grounded at crossing structures unless such structures are inherently grounded or unless the ground wires are grounded at each of the two supporting structures on both sides of and adjacent to the crossing structures. In this latter case the down leads from the overhead ground wires shall be suitably offset from the crossing structures or otherwise arranged so as not to appreciably increase the probability of lightning flash-over from the overhead ground wire and its connections to the phase wires and other current-carrying parts.

(5) The use of insulators with ungrounded pins or supporting insulator attachments carried on wood arms.

(6) The use of insulators having a flash-over 25 percent greater than those employed on adjacent sections of the line, but not less than 25 percent greater than the values in Table 30.

(7) If the insulator supports on the crossing structure and on adjacent sections of the line are grounded, the use of insulator strings with higher flash-over voltage at crossing supports than on the adjacent sections, as follows:

(a) If the adjacent parts of the line have five or less units—one extra unit at the crossing.

(b) If the adjacent parts of the line have six or more units—two extra units at the crossing.

(c) Insulation equivalent to that provided by (a) or (b). [§ 27 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-400 Miscellaneous requirements—Supporting structures for overhead lines. (1) **Poles and towers.**

(a) Rubbish. Poles and towers shall be placed, guarded, and maintained so as to be exposed as little as practicable to brush, grass, rubbish, or building fires.

(b) Guarding poles.

(i) Protection against mechanical injury. Where poles and towers are exposed to abrasion by traffic or to other damage which would materially affect their strength, they shall be protected by guards.

(ii) Protection against climbing. On closely latticed poles or towers carrying supply conductors exceeding 300 volts to ground, either guards or warning signs shall be used, except as follows:

Exception 1: Where the right-of-way is completely fenced.

Exception 2: Where the right-of-way is not completely fenced, provided the poles or towers are not adjacent to roads, regularly traveled thoroughfares, or places where people frequently gather, such as schools or public playgrounds.

(c) Warning signs.

(i) On poles or towers. For warning signs on poles or towers, see subsection (1)(b)(ii).

(ii) On bridge fixtures. Structures attached to bridges for the purpose of supporting conductors shall be plainly marked with the name, initials, or trade-mark of the utility responsible for the attachment and, in addition, where the voltage exceeds 750 volts to ground, by the following sign or its equivalent:

"Danger—Do Not Touch."

(d) Pole steps. All poles along which shall be run vertically any wire or cable used to conduct or carry a voltage of over two hundred fifty volts may be provided with steps, and no steps shall be placed nearer the ground than seven feet.

(e) Identification of poles. Poles, towers and other supporting structures on which are maintained electric conductors shall be so constructed, located, marked, or numbered as to facilitate identification by employees authorized to work thereon. Date of installation of such structures shall be recorded where practicable by the owner.

Wood poles shall bear markings by which the depth of setting can be determined.

(f) Obstructions. All poles should be kept free from posters, bills, tacks, nails, growing vines, and other unnecessary obstructions, such as through bolts not properly trimmed. [See Figure 11 in Appendix.]

(2) **Crossarms.**

(a) Location. In general crossarms should be maintained at right angles to the axis of the pole and to the direction of the attached conductors, and at crossings should be attached to that face of the structure away from the crossing, unless special bracing or double crossarms are used.

Note: Double crossarms are generally used at crossings, unbalanced corners, and dead-ends in order to permit conductor fastenings at two insulators and so prevent slipping, although single crossarms might provide sufficient strength. To secure extra strength, double crossarms are frequently used and crossarm guys are sometimes used.

(b) Bracing. Crossarms shall be securely supported, by bracing if necessary, so as to support safely loads to which they may be subjected, including linemen working on them. Any crossarm or buckarm shall be capable of supporting a vertical load of 225 pounds at either extremity in addition to the weight of the conductors.

This rule shall not apply to the top crossarm on poles used solely for communication circuits. [§ 28 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-403 Miscellaneous requirements——Tree trimming. (1) **General.** Where trees exist near supply-line conductors, they shall be trimmed, if practicable, so the neither the movement of the trees nor the swinging or increased sagging of conductors in wind or ice storms or at high temperatures will bring about contact between the conductors and the trees.

Exception: For the lower-voltage conductors, where trimming is difficult, the conductor may be protected against abrasion and against grounding through the tree by interposing between it and the tree a sufficiently nonabsorptive and substantial insulating material or device.

(2) **At wire crossings and railroad crossings.** The crossing span and the next adjoining spans shall be kept free, as far as practicable, from overhanging or decayed trees which might fall into the line. [§ 28 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-406 Miscellaneous requirements——Guying. (1) **Where used.** When the loads to be imposed on poles, towers, or other supporting structures are greater than can be safely supported by the poles or towers alone, additional strength shall be provided by the use of guys, braces or other adequate construction.

Guys shall be used also, where necessary, wherever conductor tensions are not balanced, as at corners, angles, dead-ends, and changes of grade of construction.

Note: This is to prevent undue increase of sags in adjacent spans as well as to provide sufficient strength for those supports on which the loads are considerably unbalanced.

(2) **Strength.** The strength of the guy shall meet the requirements of WAC 296-44-361 through 296-44-367 for the grade of construction that applies.

When guys are used with wood or other poles or towers capable of considerable deflection before failure, the guys shall be able to support the entire load in the direction in which they act, the pole acting simply as a strut.

(3) **Point of attachment.** The guy should be attached to the structure as near as practicable to the center of the conductor load to be sustained, but for voltages exceeding 8,700 volts between conductors, the insulation afforded by wood crossarms and poles should not be reduced any more than is necessary.

(4) **Guy fastenings.** Guys should be stranded and where attached to anchor rods should be protected by suitable guy thimbles or their equivalent. Cedar and other softwood poles around which any guy having a strength of 10,000 pounds or more is wrapped should be protected by the use of suitable guy shims and, where there is a tendency for the guy to slip off the shim, guy hooks or other suitable means of preventing this action should be used. Shims are not necessary in the case of supplementary guys, such as storm guys.

(5) **Guy guards.** The ground end of all guys attached to ground anchors exposed to traffic shall be provided with a substantial and conspicuous wood or metal guard not less than 8 feet long.

Recommendation: It is recommended that in exposed or poorly lighted locations such guards be painted white or some other conspicuous color.

(6) **Insulating guys from metal poles.** Where anchors would otherwise be subject to electrolysis, guys attached to metal poles or structures and not containing guy insulators should be insulated from the metal pole or structure by suitable blocking.

(7) **Anchor rods.** Anchor rods shall be installed so as to be in line with the pull of the attached guy when under load, except in rock or concrete. The anchor rod shall have an ultimate strength in the eye and shank equal to that required of the guy.

The anchor rod eye shall extend above ground when installed.

(8) **Grounding.** The anchored end of guys attached to wood poles carrying circuits of more than 15,000 volts shall be effectively grounded (see section 9 for method) wherever this part of the guy has a clearance of less than 8 feet to ground.

Exception 1: This does not apply to guys in rural districts.

Exception 2: This does not apply if the guy contains an insulator which will meet the requirements of WAC 296-44-409(1)(b) for the highest voltage liable to be impressed on it. [§ 28 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-409 Miscellaneous requirements——Insulators in guys attached to poles and towers. (1) **Properties of guy insulators.**

(a) Material.

(i) **Grade B.** Guy insulators shall be made by the wet-porcelain process or a process equally suitable as regards electrical and mechanical properties.

(ii) **Grade C, D, and N.** No requirements are made for material.

(b) Electrical strength. Guy insulators shall have a dry flash-over voltage at least double the normal voltage and a wet flash-over voltage at least as high as the normal line voltage between conductors.

(c) Mechanical strength. Guy insulators shall have a mechanical strength at least equal to that required of the guys in which they are installed.

(2) **Use of guy insulators.**

(a) One insulator. An insulator shall be located in each guy which is attached to a pole or structure carrying any supply conductors of more than 300 volts to ground and not more than 15,000 volts between conductors, or in any guy which is exposed to such voltages. This guy insulator shall be located at least 8 feet above the ground.

Exception 1: A guy insulator is not required where the guy is grounded under the conditions set forth in (d) following.

Exception 2: A guy insulator is not required if the guy is attached to a pole on private right-of-way carrying no supply circuits whose voltage exceeds 550 volts or whose transmitted power exceeds 3,200 watts.

Exception 3: A guy insulator is not required if all supply conductors are in a cable having a grounded metal sheath or supported by a grounded messenger.

(b) Two insulators. Where a guy attached to any pole carrying communication or supply conductors or both, is carried over or under any overhead supply conductor of more than 300 volts to ground and where hazard would otherwise exist, two or more guy insulators shall be placed so as to include the exposed section of the guy between them as far as possible. Neither insulator shall be within 8 feet of the ground.

Exception: These insulators are not required where the guy is grounded under the conditions set forth in (d) following.

(c) Relative location of insulators in guys located one above the other. Where guys in which it is necessary to install insulators are so arranged that one crosses or is above another, insulators shall be so placed that in case any guy sags down upon another the insulators will not become ineffective.

(d) Grounding of guys. Insulators are not required in guys under the following conditions:

(i) Where the guy is electrically connected to grounded steel structures.

(ii) Where the guy is electrically connected to an effectively grounded line conductor which is a common or multi-grounded neutral for supply lines over 5000 volts, and lines of 750 to 5000 volts are not carried on the same pole or structure.

(iii) Where the guy is effectively grounded and used solely for support of communication lines.

(iv) Where the anchor guy is attached to a pole on private right-of-way carrying no supply circuits whose voltage exceeds 550 volts. [§ 28 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-412 Miscellaneous requirements—— Span-wire insulators. (1) **Mechanical strength.** Span-wire insulators shall have a mechanical strength at least equal to that required of the span wire in which they are installed.

(2) **Use of span-wire insulators.** All span wires, including bracket span wires, shall have a suitable strain insulator (in addition to an insulated hanger if used) inserted between each point of support of the span wire and the lamp or trolley-contact conductor supported, except that single insulation, as provided by an insulated hanger, may be permitted when the span wire or bracket is supported on wood poles supporting only trolley, railway feeder, or communication conductors used in the operation of the railway concerned. In case insulated hangers are not used, the strain insulator shall be located so that in the event of a broken span wire the energized part of the spanwire cannot be reached from the ground.

Exception: This rule does not apply to insulated feeder taps used as span wires. [§ 28 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-415 Miscellaneous requirements—— Overhead conductors. (1) **Identification.** All conductors of electric-supply and communication lines shall be arranged to occupy definite positions throughout, as far as practicable, and shall be constructed, located, marked, numbered, or attached to distinctive insulators or crossarms, so as to facilitate identification by employees authorized to work thereon. This does not prohibit systematic transposition of conductors.

(2) **Branch connections.**

(a) Accessibility. Connections of branches to supply circuits, service loops, and equipment in overhead construction shall be readily accessible to authorized employees. When possible, connections shall be made at poles or other structures.

(b) Clearance. Branch connections shall be supported and placed so that swinging or sagging cannot bring them in contact with other conductors or interfere with the safe use of pole steps, or reduce the climbing or lateral working space.

(3) **Common neutral.** Primary and secondary circuits may utilize a single conductor as a common neutral if such conductor has at least four ground connections in each mile of line, exclusive of individual service grounds. [§ 28 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-418 Miscellaneous requirements—— Equipment on poles. (1) **Identification.** All equipment of electric-supply and communication lines shall be arranged to occupy definite positions throughout, as far as practicable, or shall be constructed, located, marked, or numbered so as to facilitate identification by employees authorized to work thereon.

(2) **Location.** Transformers, regulators, lightning arresters, and switches, when located below conductors or other attachments, shall be mounted outside of the climbing space.

(3) **Street lighting equipment.**

(a) Clearances from pole surface. All exposed metal parts of lamps and their supports, unless effectively insulated from the current-carrying parts, shall be maintained not less than 20 inches from the surface of wood poles, except where lamps are located at pole tops.

(b) Clearances above ground. Street lamps shall be mounted not less than the following heights above ground:

over walkways	10 feet
over roadways	15 feet

(c) Horizontal clearance. Arc and incandescent lamps in series circuits should have at least 3 feet horizontal clearance from windows, porches, and other spaces accessible to the general public.

(d) Material of suspension. The lowering rope or chain for lighting units arranged to be lowered for examination or maintenance shall be of a material and strength designed to withstand climatic conditions and to sustain the lighting unit safely. The lowering rope or chain, its supports, and fastenings shall be examined periodically.

(e) Insulators in suspension ropes. When street lamps are supported by span wires, such metallic ropes or chains shall be so arranged so that they do not establish a metallic conducting path around the span wire sectionalizing insulators.

(f) Arc-lamp disconnectors. A suitable device shall be provided by which each arc-lighting unit on series circuits of more than 300 volts to ground may be safely and entirely disconnected from the circuit before the lamp is handled, unless the lamps are always worked on from suitable insulating stools, platforms, or tower wagons, or handled with suitable insulating tools, and treated as under full voltage of the circuit concerned.

(g) Grounding lamp posts. Metal lamp posts shall be effectively grounded.

(4) **Transformers.**

(a) Position on poles.

(i) Transformers installed on poles or other structures shall be placed so as to provide adequate climbing and working space.

(ii) Cases and tanks of transformers supported on arms or poles, except on multiple pole rack construction, shall be not less than 17 feet above the ground in areas accessible to vehicles and not less than 10 feet above ground in other areas.

(iii) Where practicable, transformers shall be mounted between primary and secondary supply conductors connected to the transformer and secondary wires may pass along the side of the transformer tank below the level of the primary leads.

(iv) Transformers should not be installed on supply line junction or corner poles which require primary buckarm construction.

(b) Grounding.

(i) The neutral conductor of all single phase, two phase or three phase transformer secondary windings, shall be grounded where the maximum voltage between the ground and any secondary circuit conductor will not exceed 150 volts. Where the maximum voltage between the ground and any secondary circuit conductor will, when one secondary conductor is grounded, exceed 150 volts to ground, grounding shall be permitted.

(ii) Transformer secondary ground connections shall be provided at the transformer pole or at a pole adjacent to the transformer pole or shall be connected to an effectively grounded neutral.

(c) Cutouts and disconnecting devices. Transformer cutouts, fuses, disconnects or switches shall be located so that they are readily operable from climbing and working spaces. [§ 28 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-421 Miscellaneous requirements——Protection for exposed overhead communication lines. (1) **Open wire.** Communication lines for public use and fire-alarm lines shall be treated as follows, if at any point they are exposed to supply (including trolley) lines of more than 400 volts to ground:

(a) At stations for public use they shall be protected by one of the methods specified in WAC 296-44-661 through 296-44-667.

(b) Elsewhere they shall be isolated by elevation or otherwise guarded so as to be inaccessible to the public.

(2) **Metal-sheathed cables.** Metal-sheathed cables and messengers shall be isolated or grounded in conformity with the general requirements of WAC 296-44-277 through 296-44-295. [§ 28 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-424 Miscellaneous requirements——Circuits of one class used exclusively in the operation of circuits of another class. (1) Overhead communication circuits used exclusively in the operation of supply circuits.

(a) Choice of method. Communication circuits used exclusively in the operation of supply lines may be run either as ordinary communication circuits or as supply circuits under the conditions specified in (c) and (d) of this rule, respectively. After selection of the type of communication-circuit construction and protection for any section which is isolated, or is separated by transformers, such construction and protection shall be consistently adhered to throughout the extent of such isolated section of the communication system.

(b) Guarding. Communication circuits used in the operation of supply lines shall be isolated by elevation or otherwise guarded at all points so as to be inaccessible to the public.

(c) Where ordinary communication-line construction may be used. Communication circuits used in the operation of supply lines may be run as ordinary communication conductors under the following conditions:

(i) Where such circuits are below supply conductors in the operation of which they are used (including high-voltage trolley feeders) at crossings, conflicts, or on commonly used poles, provided:

(A) Such communication circuits occupy a position below all other conductors or equipment at crossings, conflicts, or on commonly used poles.

(B) Such communication circuits and their connected equipment are adequately guarded and are accessible only to authorized persons.

(ii) Where such circuits are below supply conductors in the operation of which they are used and are above other supply or communication conductors at wire crossings, conflicts, or on the same poles, provided the communication circuits are protected by fuseless lightning arresters, drainage coils, or other suitable devices to prevent the communication circuit voltage from normally exceeding 400 volts to ground.

Note: The grades of construction for communication conductors with inverted levels apply.

(d) Where supply-line construction must be used. Communication circuits used in the operation of supply

lines shall comply with all requirements for the supply lines with which they are used, where they do not comply with the provisos of subsections (c)(i) or (c)(ii) above.

Exception 1: If the voltage of the supply conductors concerned excess 8,700 volts between conductors, the communication conductors, need only meet the requirements for supply conductors of 5,000 to 8,700 volts between conductors.

Exception 2: Where the supply conductors are required to meet grade C, the size of the communication conductors may be the same as for grade D (see WAC 296-44-367(9)(b)) for spans up to 150 feet.

(2) **Supply circuits used exclusively in the operation of communication circuits.** (See also WAC 296-44-430 through 296-44-457.) Circuits used for supplying power solely to apparatus forming part of a communication system may be run either in open wire or in aerial or underground cable as follows:

(a) Where run in open wire, such circuits shall have the grades of construction, clearances, insulation, etc., prescribed elsewhere in WAC 296-44-274 through 296-44-457 for supply or communication circuits of the voltage concerned.

(b) Where run in aerial or underground cable and the following requirements are met, the grades of construction, clearances, separations, locations, etc., prescribed elsewhere in WAC 296-44-274 through 296-44-457 for communication cables shall apply:

(i) Such cables are covered with effectively grounded continuous metal sheaths or are carried in metal cable rings on effectively grounded messengers.

(ii) All circuits in such cables are owned or operated by one party and are maintained only by qualified employees.

(iii) Supply circuits included in such cables are terminated at points accessible only to qualified employees.

(iv) Communication circuits brought out of such a cable, if they do not terminate in a repeater station or terminal office, shall be so protected or arranged that in the event of a failure within the cable, the voltage on these communication circuits will not exceed 400 volts to ground.

(v) Terminal apparatus for the power supply shall be arranged so that live parts are inaccessible when such supply circuits are energized. [See Fig. 11.A, in Appendix at end of this chapter.]

Exception: The provisions of (2)(a) and (2)(b) above, do not apply to supply circuits of 550 volts or less and which carry power not in excess of 3,200 watts, covered in WAC 296-44-298(2)(c). [§ 28 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-427 Miscellaneous requirements——Overhead electric railway construction. (1) **Trolley-contact conductor supports.** All overhead trolley-contact conductors shall be supported and arranged so that the breaking of a single contact conductor fastening will not allow the trolley conductor, live span wire, or current-carrying connection to come within 10 feet (measured vertically) from the ground, or from any platform accessible to the general public.

Span-wire insulation for trolley-contact conductors shall comply with wAC 296-44-412.

(2) **High-voltage contact conductors.** Every trolley-contact conductor of more than 750 volts in urban districts where not on fences right-of-way shall be suspended so as to minimize the liability of a break and, as far as practicable, so that if broken at a single point, it can not fall within 12 feet (measured vertically) from the ground or any platform accessible to the general public.

(3) **Third rails.** Third rails shall be protected where not on fenced rights-of-way by adequate guards composed of wood or other suitable material.

(4) **Prevention of loss of contact at railroad crossings.** Trolley-contact conductors shall be arranged as set forth in either (a) or (b) following, at grade crossings with interurban or other heavy-duty or high-speed railroad systems:

(a) The trolley-contact conductor shall be provided with live trolley guards of suitable construction, or,

(b) The trolley-contact conductor shall be as far as practicable at the same height above its own track throughout the crossing span and the next adjoining spans. Where a uniform height above rail is not adhered to, the change shall be made in a very gradual manner. Where the crossing span exceeds 100 feet, catenary construction shall be used.

Exception: This rule does not apply where the system is protected by interlocking derails or by gates.

(5) **Guards under bridges.**

(a) Where guarding is required. Guarding is required where the trolley-contact conductor is so located that a trolley pole leaving the conductor can make simultaneous contact between it and the bridge structure.

(b) Nature of guarding. Guarding shall consist of a substantial inverted trough of nonconducting material located above the contact conductor, or other suitable means of preventing contact between the trolley pole and the bridge structure. [§ 28 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-430 Rules for underground lines (See also WAC 296-44-424(2)(b))——Location. (1) **General location.** Underground systems of electric conductors should be located so as to be subject to the least practicable disturbance. Railway tracks and underground structures, including catch basins, gas pipes, etc., should be avoided where practicable.

(2) **Ducts.** The ducts between adjacent manholes or other outlets should be laid as straight and direct as practicable.

(3) **Manholes.** Manhole openings shall be located so as to provide safe and convenient access. Manhole openings shall be not less than three feet from the nearest railway or street car tracks except by permission of the recognized administrative authority. [§ 29 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-433 Rules for underground lines (See also WAC 296-44-424(2)(b))——Construction of duct and cable systems. (1) **Material, size, and finish of ducts.** Ducts shall be of such material, size, mechanical strength, and finish as to facilitate the installation and maintenance of conductors or cables. Ducts shall be freed from burrs before laying and shall have clear bores.

(2) **Grading of ducts.** Where it is necessary to drain ducts the grade of the ducts shall be such as to permit proper and adequate drainage.

(3) **Settling.** Ducts should be suitably reinforced or be laid on suitable foundations of sufficient mechanical strength where necessary to protect them from settling.

(4) **Clearances.**

(a) General. The clearance between duct or cable systems and other underground structures paralleling them, shall be as great as practicable. The distance between the top covering of the system and the pavement surface, or other surface under which the system is constructed, shall be sufficient to protect the system from injury by traffic.

(b) Below base of rail. The top of all duct and cable system structures, except as hereafter specified shall generally be located at a depth of not less than 30 inches, in the case of street railways, and not less than 42 inches, in the case of steam and electric railroads, below the base of rail. Where unusual conditions exist or where proposed construction would interfere with existing construction, a greater depth than specified above may be required.

Exception 1: Where this is impracticable, or for other reasons, this clearance may be reduced by agreement between the parties concerned. In no case, however, shall the top of the conduit protection extend higher than the bottom of the ballast section which is subject to working or cleaning.

Exception 2: Where physical and chemical conditions will permit, a conduit consisting of not more than two iron pipes, not exceeding 4 inches in diameter, or two creosoted wood ducts not exceeding 6 inches square, or one or more cables of a type designed for burying directly in the earth used for communication lines, or for service supply circuits not exceeding 750 volts, may be laid in the ground beneath railroad tracks without any form of protection at a minimum depth of 18 inches below the base of the rail unless the worked ballast section of the roadbed exceeds 18 inches, in which case the conduit shall be laid below the ballast section.

(c) Iron pipe conduit. Where iron pipe is used as a conduit for underground cables or conductors, it shall not be laid in contact with water, gas, or steam metallic-pipe systems. Where the clearance is less than two inches, the metal conduit shall be adequately separated from other metallic-pipe systems by a barrier of suitable materials, or they shall be electrically bonded together at the point of least separation.

(5) **Separations between supply and communication duct systems.**

(a) General. Duct systems, including laterals, to be occupied by communication conductors for public use should be separated, where practicable, from duct systems, including laterals, for supply conductors by not less than 3 inches of concrete, 4 inches of brick masonry, or 12 inches of well-tamped earth.

Exception 1: Extensions may, however, be made to existing interconnected or jointly owned and jointly occupied duct systems used in common by municipalities, communication companies, or supply companies with less effective separations than above specified by permission of the recognized administrative authority.

Exception 2: Cables containing circuits of 550 volts or less between conductors and having a total transmitted power of not in excess of 3,200 watts, used exclusively in connection with the operation of a railway signal or supply system, may be carried in the same duct system with communication cables, if such construction is agreed to by all parties concerned, and where the communication cables are exclusively used for the operation of the railway signal or supply system, they may be carried in the same duct.

(b) Entering manholes. Where communication and supply conductors or cables occupy ducts terminating in the same manhole, the two classes of ducts should be separated as widely as practicable and where practicable should enter the manhole from opposite sides.

Note: This requirement is made so that cables can be racked alongside walls with a minimum of crosses between the two classes of conductors.

(6) **Duct entrances into manholes.** Iron-pipe conduit terminating in manholes, handholes, or other permanent openings of underground systems, shall be provided with an effective shield, bushing or other smooth outlet.

Exception: This does not apply to communication conductors, to supply conductors of less than 300 volts between conductors, or to armored cables of any voltage.

(7) **Sealing laterals.** Lateral ducts for service connections to buildings, through which gas or water may enter buildings or other duct systems, should be effectively plugged or cemented by the use of asphaltum, pitch, or other suitable means.

(8) **Duct arrangement for dissipation of heat.** Duct systems intended to carry supply cables of large current capacity should be arranged, where practicable, so that ducts carrying such cables will not dissipate their heat solely through other ducts. [§ 29 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-436 Rules for underground lines (See also WAC 296-44-424(2)(b))——Construction of manholes. (1) **Minimum strength.** The design and construction of manholes and handholes shall provide sufficient strength to sustain, with a suitable margin of safety, the loads which may reasonably be imposed on them.

(2) **Dimensions.** Manholes shall meet the following requirements where practicable:

(a) Width. The least horizontal inside dimension shall be not less than 3 feet 6 inches.

(b) Height. The vertical dimension shall be not less than 6 feet except in manholes where the opening is within 1 foot of each side of the full size of the manhole.

Exception: The dimensions specified in 1 and 2 above are not necessary in service boxes, handholes, or in manholes used exclusively for communication-system equipment or cables.

(c) Working space. Adequate and readily accessible working space shall be maintained about all electrical parts or equipment which require adjustment, examination or work of any nature done on them if exposed while in service. The horizontal clearance shall be not less than those clearances set forth in WAC 296-44-115(2). The vertical clearance shall be not less than 6 feet unless constructed in accordance with 2 above and its exception.

(3) **Drainage.** Where drainage is into sewers, suitable traps shall be provided to prevent entrance of sewer gas into manholes.

(4) **Ventilation.** Adequate ventilation to open air shall be provided for manholes from which any openings exist into subways entered by the public. Where such manholes house transformers, sectionalizing switches, or regulators, etc., the ventilator ducts shall be cleaned at necessary intervals.

(5) **Manhole openings.** No manhole shall have an opening to the outer air less than twenty-six inches in diameter, and the cover of same shall be provided with vent hole or holes equivalent to three square inches in area.

(6) **Manhole covers.** Manholes and handholes, while not being worked in, shall be securely closed by covers of sufficient strength to sustain such loads as may reasonably be imposed upon them.

(7) **Supports for cables.** Cables should be adequately supported at each manhole.

(8) **Manhole location.** Manhole openings shall, where practicable, be located so that barriers or other suitable guards can be placed to protect the opening effectively when uncovered. [§ 29 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-439 Rules for underground lines (See also WAC 296-44-424(2)(b))——Location of cables. (1) **Accessibility.** Cables in manholes shall be accessible to workmen and clear working space shall be maintained at all times.

(2) **Cables carrying large currents.** Cables intended to carry large currents should be located, where practicable, in outside ducts so that they will not necessarily dissipate heat solely through adjacent ducts.

(3) **Separation between conductors.**

(a) Cables of different voltages. Cables shall be arranged and supported in ducts and manholes so that those operating at higher voltages will be separated as far as practicable from those operating at lower voltages.

(b) Cables of different systems. Cables belonging to different systems, particularly supply-distribution and communication systems, shall not be installed in the same duct.

Exception: This does not apply to the insulation of railway-signal supply and communication cables in the same duct, as permitted by exception 2 in WAC 296-44-433(5)(a).

(c) Cables of supply and communication systems.

(i) General. Supply cables and communication cables for public use shall be maintained in separate duct systems, and particularly in separate manholes except by permission of the recognized administrative authority.

Exception 1: Cable extensions may be made to existing interconnected or jointly owned and jointly occupied duct systems used in common by municipalities, communication companies, or supply companies.

Exception 2: This does not apply where railway-signal supply and communication cables are carried in the same duct system as permitted in exception 2, WAC 296-44-433(5)(a).

(ii) In the same manhole. Where supply cables and communication cables for public use have been permitted by administrative authority to occupy the same manhole, they shall be maintained on opposite sides of the manhole.

Where the supply and communication cables cross in these manholes, a separation of at least one foot should be maintained. [§ 29 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-442 Rules for underground lines (See also WAC 296-44-424(2)(b))——Protection and separation of conductors buried in earth. (1) **Separation.** The separation between buried communication and buried supply conductors or cables shall consist of not less than twelve inches of well tamped earth, four inches of brick, or three inches of concrete.

Exception 1: this separation and protection is not required where supply circuits having a potential of 550 volts or less between conductors and having a total transmitted power of not in excess of 3,200 watts are laid adjacent to communication cables, if all cables are used exclusively for the operation of a railway-signal or supply system, and are maintained by the same company.

Exception 2: This separation and protection is not required where supply circuits have a potential of 550 volts or less between conductors and are installed using insulated conductors with a neutral conductor.

Exception 3: This separation and protection is not required where communication and power supply conductors or cables which have a potential of over 550 volts between conductors, are buried in a common trench at the same depth with random separation under the following conditions:

(a) When a concentric neutral type power cable is used. A concentric neutral type of direct burial multiple or single conductor power cable is one designed for the

purpose using insulated conductors, the insulation being covered with a semi-conducting layer which has a concentrically applied multi-conductor bare neutral of equal current carrying capacity to the insulated conductor. This neutral to consist of not less than six wires or their equivalent with a lay of not more than eight times the cable diameter.

(b) When a spiral of continuous sheath type power cable is used with a neutral of equal conductivity to the phase wire. A spiral of continuous sheath type of direct burial multi or single conductor cable is one that has a continuous or spiral metal sheath. The conductivity may be obtained with the sheath or with a separate neutral laid not more than three inches from the cable and be not smaller than No. 4 AWG. Either the separate neutral or the sheath shall be bare and in direct contact with the earth and the two shall be interconnected.

Exception 4: No separation is required between communication and supply conductors or cables located beneath transformers, switch and terminal cabinets or their supporting pads or structures.

(2) **Protection at crossings of cables.** At all crossings where buried supply conductors or cables are above communication conductors or cables, the supply conductors or cables shall be protected from digging operations by concrete or creosoted wood plank or equivalent mechanical protective covering extending at least two feet in each direction from the point of crossing.

Exception 1: This protection is not required where supply circuits have a potential of 550 volts or less between conductors.

Exception 2: This protection is not required where supply conductors over 550 volts between conductors are installed in accordance with subsection (1), exception 3.

(3) **Protection of cables installed parallel.** Where buried communication and buried supply conductors or cables are installed in the same trench generally parallel to each other, the buried supply conductors or cables shall be covered with concrete or creosoted wood planking or equivalent mechanical protection, except that this covering may be omitted in the following cases:

(a) Where the voltage of the supply conductors does not exceed 550 volts between conductors.

(b) Where the supply conductors or cables are encased in a continuous metallic sheath effectively grounded.

(c) Where the supply conductors or cables are installed more than two feet horizontally from communication conductors.

(d) Where supply conductors over 550 volts between conductors are installed in accordance with subsection (1), exception 3.

(4) **Fault protection.** Where buried communication and power supply conductors of 550 volts or more between conductors are installed in the same trench without separation and in accordance with the requirements of subsection (1), the cable shall be protected by fuses capable of clearing phase to ground faults. The total clearing time shall not exceed twelve cycles and such protection shall not reclose.

(5) **Identification of conductors.** Each company using a random burial method of the underground system shall properly identify their cable and employees of a company shall know the identification of the cable belonging to their company.

(6) **Ground protection.** Where communication and power supply conductors are buried in the same trench without separation, the following ground protection shall be provided:

(a) At each transformer and/or pedestal installation, all grounds shall be interconnected. The common neutral conductor shall be continuous. Where straight splices are required in the common neutral, only two ends of the conductors shall be joined with one connector. All interconnections to the common neutral required by this section shall be made by taps to the common neutral, including equipment neutral connections.

(b) Telephone protectors, telephone service cable shields and secondary neutrals shall be connected to a common ground at each customer's service entrance when telephone circuits are underground without separation from power conductors.

(7) **Depth of buried cables.** Where communication and power supply cables of over 550 volts between conductors are buried without separation in the same trench or without mechanical protection, the power cable shall be buried to a minimum depth of thirty inches except under railroad tracks where they shall be buried with a minimum cover of forty-two inches. In rock, a twenty-four inch minimum depth will be acceptable or a lesser depth will be accepted where an adequate means of mechanical protection is provided. [§ 29 (part), Rule 294, filed 10/30/64, effective 12/1/64; § 29 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-445 Rules for underground lines (See also WAC 296-44-424(2)(b))——Protection of conductors in duct systems and manholes. (1) **Protection against arcing.** A suitable fire-resistant covering should be placed on the following cables to prevent injury from arcing:

(a) Closely grouped lead-sheathed supply cables containing circuits of more than 8,700 volts, or of large current capacity operating at more than 750 volts ac or 300 volts dc.

(b) Communication cables and supply cables of large current capacity, if occupying the same side of the manhole, or if they cross each other.

(2) **Bonding.** Exposed metallic cable sheaths shall be bonded at suitable intervals with a conductor of suitable size, electrolysis conditions permitting. Supply cable sheaths need not be bonded to communication cable sheaths. [§ 29 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-448 Rules for underground lines (See also WAC 296-44-424(2)(b))——Guarding of live parts in manholes. (1) **Conductor joints or terminals.** Joints or terminals of conductors or cables of supply systems shall

be arranged so that there are no bare ungrounded current-carrying metal parts exposed to accidental contact within manholes or handholes.

(2) **Apparatus.** Live parts of protective, control or other apparatus installed and maintained in manholes shall be enclosed in suitable grounded cases or in cases having no exposed metallic parts. [§ 29 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-451 Rules for underground lines (See also WAC 296-44-424(2)(b))——Construction at risers from underground. (1) **Separation between risers of communication and supply systems.** The placing of risers for communication systems and risers for supply systems on the same pole should be avoided where practicable. Where located on streets or highways, risers should, where practicable, be placed on poles so as to be in the safest available location from the point of view of traffic damage.

The number of risers on one pole shall be so limited and the risers shall be placed so as to permit replacement of the pole upon deterioration.

(2) **Mechanical protection of conductors.** All supply conductors or cables from underground systems which connect to overhead systems shall be protected by a metal pipe or conduit which gives suitable mechanical protection up to a point not less than 8 feet above the ground and 40 inches above communication circuits for public use.

Such supply conductors or cables on the pole above this protection shall be covered with wood molding or other suitable protective material.

Exception: Armored cables.

(3) **Grounding of riser pipes.** Exposed metal riser pipes containing supply conductors shall be effectively grounded.

(4) **Conductor terminal construction.** The terminals of underground cables operating at more than 750 volts to ground and connecting to overhead open-wire systems shall meet the following requirements:

(a) Protection against moisture. Protection shall be provided so that moisture will not enter the cable.

(b) Insulation of conductors. Conductors shall be properly insulated from the grounded metal sheath. In addition, the conductors of multiple-conductor cable shall be properly separated and insulated from each other.

(c) Identification. When riser terminals used for different voltage classifications are identical, the terminals shall be readily identified by position.

(5) **Clearance above ground for open supply wiring.** For supply wires connecting to underground system see WAC 296-44-316(3). [§ 29 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-454 Rules for underground lines (See also WAC 296-44-424(2)(b))——Identification of conductors. Cables shall be permanently identified by tags or otherwise at each manhole or other permanent opening of the underground system. Where the duct formation on opposite sides of the manhole is the same, the cables where practicable should be installed in corresponding ducts.

Exception: This requirement does not apply where the position of a cable, in conjunction with diagrams supplied to workmen, gives sufficient identification, or where the manhole is occupied solely by the communication cables of one utility, or of two utility companies agreeing thereto. [§ 29 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-457 Rules for underground lines (See also WAC 296-44-424(2)(b))——Identification of apparatus connected in multiple. Where transformers, regulators, or other similar apparatus not located in the same manhole operate in multiple, special tags, diagrams, or other suitable means shall be used to indicate that fact.

Exception: This requirement does not apply where disconnecting devices are provided to permit cutting such equipment completely off the system. [§ 29 (part), filed 3/23/60, effective 12/1/58.]

INSTALLATION AND MAINTENANCE OF ELECTRIC UTILIZATION EQUIPMENT

WAC 296-44-460 Installation and maintenance of electric utilization equipment——General requirements——Scope. (1) **Voltage limits and occupancies.** The following rules apply to electric utilization equipment between 25 and 750 volts, where accessible to other than qualified electrical operators, as in mills, factories, mercantile establishments, hotels, theaters, and other public buildings, cars and other vehicles, dwellings, and similar places. Communication equipment connected to communication lines (see definition) is exempted, except from rules under WAC 296-44-661 through 296-44-664.

(2) **Equipment of more than 750 volts.** Equipment and conductors of more than 750 volts between conductors where accessible to other than qualified electrical operators, shall (in addition to complying with the rules of WAC 296-44-460 through 296-44-664 for conductors of more than 300 volts) comply also with the rules for electrical supply stations, WAC 296-44-079 through 296-44-271, where such rules require more than the rules of WAC 296-44-460 through 296-44-664. Current-carrying parts shall be either incased in permanently grounded metal cases or conduits, or otherwise suitably guarded to prevent access (or too close approach) to such current-carrying parts by any but qualified persons.

(3) **Utilization equipment regarded as supply equipment.** Electric utilization equipment, however, as well as generating equipment, if inclosed in a separate room which is inaccessible to unqualified persons, and if when in service is under the control of a qualified person, may be installed in conformity with the rules applying to electrical supply stations (WAC 296-44-079 through

296-44-271) and in that case does not come under these rules. [§ 30 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-463 Installation and maintenance of electric utilization equipment——General requirements. (1) **Approved equipment.** Equipment which has been subjected to examination by some properly qualified body and found to comply with the general requirements of this code, the National Electrical Code, the state of Washington "Rules and regulations for installing electric wires and equipment," and other nonconflicting accepted standards which apply for any given purpose, should be used; otherwise, the approval of the department of labor and industries shall be obtained in advance.

Note: In order to avoid the necessity for repetition of such examinations by different examiners, frequently with inadequate facilities for such work, and to avoid the confusion which would result from conflicting reports as to the suitability of equipment examined for a given purpose, it is necessary that such examinations should be made under standard conditions, and the record made generally available through promulgation by organizations properly equipped and qualified for experimental testing, inspections of the run of goods at factories, and service-value determinations, through field inspections, and whose findings are subject to appeal to the National Bureau of Standards.

(2) **Future inspections.** Electric utilization equipment shall be installed and maintained in conformity with these safety rules. Persons in charge of equipment shall have periodic inspections of equipment and wiring made, and similar inspections shall be made by the supervising authority. [§ 30 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-466 Installation and maintenance of electric utilization equipment——Reference to other codes. Reference is to the other properly approved codes and particularly the National Electrical Code, state of Washington rules and regulations for industrial electric wires and equipment, and applicable local codes. [§ 30 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-469 Installation and maintenance of electric utilization equipment——Grounding. (1) **Grounding method.** Where grounding is required, all grounding of circuits, lightning arresters equipment, or wire raceways, which is intended to be a permanent and effective protective measure, shall be made in accordance with the methods specified in WAC 296-44-058 through 296-44-076.

(2) **Circuits required to be grounded.** All circuits included in WAC 296-44-460(1) shall be effectively grounded in accordance with the rules of WAC 296-44-058 through 296-44-076, except that the following are not are not required to be grounded:

Exception 1: Circuits on two-wire direct-current systems, provided the system is equipped with a ground detector.

Exception 2: Delta-connected three-phase circuits; except that such circuits when partly used for lighting shall be so arranged and grounded, that the lighting circuits will have the lowest practicable voltage to ground.

Exception 3: Circuits of more than 150 volts to ground.

Note: It is recommended that such circuits be grounded if the voltage to ground of any conductor of the circuit will not exceed 300 volts after grounding.

Exception 4: Electric furnace circuits. (See WAC 296-44-589.)

Exception 5: Electric crane circuits operating over combustible fibers.

Exception 6: Circuits of less than 50 volts between conductors unless run overhead between buildings, or supplied by transformers operating on circuits of more than 150 volts to ground, or by transformers operating on ungrounded circuits.

(3) **Grounding noncurrent-carrying metal parts.** Conductor armor, conductor raceways, and all equipment supplied directly by metal-incased wiring shall be grounded.

Exposed noncurrent-carrying metal parts of other fixed electric utilization equipment (such as frames of motors, cranes, cars, and switchboards, and inclosures of switches and transformers) shall be grounded under any one of the following conditions: (See WAC 296-44-058 through 296-44-076 for method of grounding, and WAC 296-44-628 for portable appliances.)

(a) If operated at more than 150 volts to ground, regardless of location.

(b) If located where exposed grounded surfaces, such as metal frames of other machines, plumbing fixtures, conducting floors or walls, exist within reach of persons while touching the metal parts under consideration. (Usually grounded surfaces within 5 feet horizontally of the parts considered and within 8 feet vertically of the floor are considered within reach.)

(c) If located where explosives, inflammable gas, or inflammable flyings normally exist in dangerous quantities, regardless of voltage.

Exception 1: Parts of machines, such as name plates, screws in wood, and similar small parts, and metal covers of fuses and switch bases which are thoroughly and effectively insulated, and which are not liable to become alive except under very unusual circumstances are not considered as coming under this rule and may be left ungrounded.

Exception 2: No ground connection need be made to expose metal frames of switchboards, motors, or lighting fixtures connected to direct-current trolley or third-rail circuits, or where accessible to qualified persons only, provided that such frames are effectively insulated from ground, and provided that the metal frames in question are so located with reference to insulating mats, floors, or platforms that persons cannot readily touch the metal

frames in question without standing on such mats, floors, or platforms.

Exception 3: No ground connection need be made to metal inclosures housing interior wiring conductors, provided such inclosures do not exceed 25 feet in length, are insulated from grounded piping or other grounded surfaces and are out of reach from grounded surfaces or guarded against contact by persons.

Exception 4: No ground connection need be made to metal pipe used for the mechanical protection of interior wiring conductors, provided each of the conductors contained are encased in a continuous nonconducting flexible tubing. [§ 30 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-472 Installation and maintenance of electric utilization equipment——Working spaces about electric equipment. (1) **Adequate space.** Suitable working space shall be provided and maintained about all electric utilization equipment.

(2) **Dimensions.** The horizontal dimension of the working space in front of live parts shall be not less than:

(a) For parts on one side of more than 150 volts to ground and no live on grounded parts on the other side of the working space, 2.5 feet.

(b) For parts on one side of more than 150 volts to ground and live or grounded parts on the other, 4 feet.

(c) For parts on one side of less than 150 volts to ground and no live or grounded parts on the other, 1.5 feet.

(d) For parts on one side of less than 150 volts to ground and live or grounded parts on the other, 2.5 feet.

(3) **Clear spaces.** Working spaces adjacent to exposed live parts shall not be used as passageways.

(4) **Elevation of equipment.** The elevation of the equipment at least 8 feet above ordinarily accessible working platforms usually affords protection at least equivalent to that provided by the horizontal clearances of B and may be used in lieu thereof. [§ 30 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-478 Installation and maintenance of electric utilization equipment——Guarding or isolating live parts. (1) **Inclosure or elevation.** Except as elsewhere required or permitted by this code, all bare, ungrounded live parts of electric utilization equipment, such as bus bars, conductors, and terminals, operating at more than 50 volts to ground, shall be protected by one of the following means:

(a) Inclosure, which gives access to live parts only through opening a door or cover.

(b) Guarding, as by railing, screen, or barriers which remove the liability of contact or approach.

(c) Isolation, by placing at least 8 feet above the floor line, or by removing beyond ready accessibility.

Note: Inclosures may consist of suitable casings or suitable insulating coverings. The continuous insulating covering of conductors should be depended upon only when the circuit is grounded in accordance with WAC 296-44-058 through 296-44-076 or is less than 300 volts to ground and entirely unexposed to leakage or induction from higher voltage circuits, and where in addition it is impracticable to install more suitable guards. It should be depended upon then only when the covering is not exposed to liability of mechanical injury, and is very substantial, thoroughly dry, and contains no noninsulating flameproofing compound or oil-soaked rubber. It is recommended that in addition to the protection afforded by such coverings the insulating mats or platforms called for in subsection (2) below be used.

Where covers, casings, or barriers must at any time be removed from the current-carrying parts which they guard, while these parts are alive, the covers, casings, or barriers, should be of insulating material, or so arranged that they cannot readily be brought in contact with the live parts.

(2) **Exception where mats and platforms are used.** Where current-carrying parts of more than 150 volts to ground must necessarily be exposed (unguarded) within 8 feet from the floor, all surrounding conducting floors and other conducting surfaces within reach shall be covered with suitable insulating platforms, mats or other insulating devices.

Note: Mats may be of wood, held together by wood pins, or of cork matting, linoleum, or rubber. The material and construction should be suitable for the voltage concerned and for the prevailing conditions. If subject to moisture or to accumulation of conducting dust, flyings, or chips, mats should present surfaces minimizing the hazards from these sources. [§ 30 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-481 Installation and maintenance of electric utilization equipment——Hazardous locations. (1) **Where explosives and inflammable exist.** In locations where explosives, inflammable gas, or inflammable flyings normally exist in dangerous quantities, all parts at which high temperature, sparking, or arcing is liable to occur shall be inclosed by one of the following methods:

(a) By installing in a separate room or compartment, free from explosive material.

(b) By surrounding with an inclosure of nonabsorptive, noncombustible material capable of withstanding without injury and without transmitting flame to the outside any explosion that may occur within.

(2) **In wet places.** External parts of lighting fixtures and all other electric equipment when within eight feet of the floor in wet locations shall be constructed of nonabsorptive insulating materials or, if of metal, shall be grounded as required in WAC 296-44-469(3). [§ 30 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-484 Installation and maintenance of electric utilization equipment——Protection by disconnection. Electric utilization equipment which will require maintenance work upon it shall have approved means of disconnecting it from all ungrounded conductors of its supply circuit.

Note: Every installation has a switch or switches controlling the power supply or subdividing it. These switches may be used as the required disconnecting means where readily accessible, but in many cases it is recommended that additional disconnecting means be provided for convenience and in order not to interfere with other apparatus.

(1) If the control apparatus opens all the main leads to the motor, and the pilot circuits are fused, a disconnector only is required for connected loads in excess of 50 horsepower.

(2) If the control apparatus does not open all of the main leads to the motor, a circuit switch or other approved disconnecting means shall be used.

Note: By main leads to the motor is meant: dc motors—all armature circuits (not including shunt–field circuits; ac motors—all primary leads (not including the secondary leads of a slip–ring motor or the field circuit of a synchronous motor).

(3) The disconnecting means shall make all circuits of the controller and motor dead.

(4) If the disconnecting means is equipped for locking in the open position it need not be in sight of the motor.

(5) If the starter is not designed for opening the motor circuit, a circuit switch should be provided in the branch circuit of each motor. [§ 30 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-487 Installation and maintenance of electric utilization equipment——Identification of equipment. (1) **Safety by identification.** All electric utilization equipment shall be suitably identified when added safety can be obtained thereby. (See also WAC 296-44-496, 296-44-550 and 296-44-634.)

Note: The identification may be by location, color, number, name plate, label, design, or other means.

(2) **Voltage and use.** The voltage and intended use shall be shown wherever it will reduce the hazard or decrease the liability of error in operation. [§ 30 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-490 Conductors——Electrical protection. (1) **Fuses and circuit–breakers.** Each conductor (except neutral conductors, grounded conductors, grounding conductors, and conductors of circuits the opening of which may cause special hazard by the interruption of service or removal of protection) shall be protected against excessive current by a suitable fuse or other automatic circuit–breaking device or by the design of the system.

(2) **Grounded and neutral conductors.** No fuse or other automatic circuit–breaking device shall be placed in any conductor which is required to be grounded, nor in the neutral conductor of a three–wire system, except as follows:

(a) Simultaneous opening. If the automatic circuit–breaking device simultaneously opens all conductors of the circuit.

(3) **Switches.** Switches shall open all conductors of the circuit by one operation except as follows:

(a) The switch need not open a grounded conductor. In the case of service switches, if the switch does not interrupt the grounded conductor, other means shall be provided in the service cabinet or on the switchboard for disconnecting the grounded conductor from the interior wiring.

(b) Single–pole switches may be used in two–wire branch circuits; on grounded circuits they shall be placed in the ungrounded conductor.

(c) On three–wire systems with a grounded neutral conductor the service switch may open either outside wire independently of the other, provided the neutral cannot be opened without opening both outside wires.

(d) Electric meters and control circuits of time switches may be connected on the supply side of the service switch and fuses or circuit–breaker on alternating–current supply not exceeding 750 volts between conductors, provided no wiring or live parts are exposed and the connections are inaccessible to unauthorized persons. [§ 31 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-493 Conductors——Protective covering. (1) **Mechanical protection.** Where exposed to mechanical injury, suitable casing, armor or other means shall be employed to prevent injury or disturbance to conductors, their insulation, or supports.

(2) **Bare conductors.** Bare conductors shall be used only for circuits of less than 300 volts to ground where accessible to qualified persons only, or in locations where insulated conductors are not feasible, such as contact conductors, bus bars, and battery connections. Such bare conductors shall be fixed at adequate separations by the use of suitable supports. Except at the point where a permanent ground connection is made, such conductors within buildings shall be kept insulated from the ground. Bare conductors shall not be used where inflammable gases or explosives are liable to be present. (See WAC 296-44-484 and 296-44-502.) [§ 31 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-496 Conductors——Identification of conductors and terminals. (1) **Conductors.** The grounded neutral conductor of multiwire alternating–current circuits, the grounded neutral conductor of three–wire circuits and the grounded conductor of two–wire circuits shall be so arranged as to be readily identified. This may be done by maintaining a specified relative position on open wiring or the conductors may be tagged or otherwise suitably identified if run in conduits. For rubber–covered wires (not including flexible cord or fixture wire) of size No. 6 (0.162 inch) and smaller the only allowable identification shall consist of a white or natural–gray covering. This conductor shall be run and maintained without change in polarity throughout the entire installation and connected at all fittings to marked terminals or to terminals which can be identified by their location relative to others, in order to preserve the continuity of the marking.

If the system to which the circuit is connected is a grounded system, the identified conductor shall be connected to the grounded conductor of this system. The identified conductor shall be connected to the screw shell of all lampholders.

Exception: Identification need not be maintained between switch and equipment controlled.

(2) **Terminals.** All devices provided with terminals for the attachment of conductors and intended for connection to more than one side of the circuit shall, unless specifically excepted, have a pair of connecting terminals properly marked for identification, unless the electrical connection between the pair of terminals intended to be connected to the grounded conductor is clearly evident.

(a) The terminals of lighting panelboards and of devices having a normal rating exceeding 30 amperes need not be marked for identification, except as required in paragraphs (e) and (f) below for polarized receptacles for attachment plugs and polarized attachment–plug caps.

(b) The terminals of utilization appliances need not be marked to indicate the proper connection to the grounded conductor. If a terminal of an utilization appliance which includes single–pole switches is marked for identification, the switches shall not be connected in the identified conductor of the circuit.

(c) The terminals of portable appliances need not be marked for identification.

(d) Devices, to the terminals of which only one side of the line is connected, need not have terminals marked for identification.

(e) Two–wire attachment–plug receptacles without screw shells, and two–wire attachment–plug caps, unless of the polarity type, need not have their terminals marked for identification. Two–wire polarized receptacles for attachment plugs and polarized attachment–plug caps shall have the terminal intended for connection to the grounded conductor marked for identification.

(f) Three–wire attachment–plug receptacles and three–wire attachment–plug caps, in which one terminal may be used for the connection of a grounding conductor, shall have such terminal identified in a manner differing from that specified in subsection (3) below. The other terminals need not be marked for identification.

(g) In the case of devices with screw shells, the identified terminal shall be the one connected to the screw shell. This does not apply to screw shells which serve as plug fuseholders.

(h) In the case of screw–shell devices with attached leads, the conductor attached to the screw shell shall have white or natural–gray finish. The outer finish of the other conductor shall be of a solid color that will not be confused with the white or natural–gray finish which is to indicate the grounded conductor.

(3) **Means of identification of terminals.** The marking of terminals shall be done by means of a metallic plated coating substantially white in color, as nickel or zinc, or the terminals may be of material substantially white in color. The other terminals shall be of a readily distinguishable different color. [§ 31 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-499 Conductors——Guarding and isolating conductors. Insulated conductors of more than 300 volts to ground, or open, bare, ungrounded conductors of all voltages, if less than 8 feet above the floor or working platform and accessible to unqualified persons, shall be guarded by approved screens, barriers, or inclosures. [§ 31 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-502 Conductors——Guarding in damp or hazardous locations. (1) **Support of conductors in damp locations.** Conductors in damp locations or where exposed to corrosion, if not in waterproof conduit, or in waterproof metal sheaths in other suitable ducts, shall be effectively isolated and supported on insulators of a suitable type.

(2) **Conductors in hazardous locations.** Conductors in locations where inflammable gas normally exists shall be in grounded rigid metal conduit. All fittings and outlets for conduit shall be electrically and mechanically continuous with the conduit, and the conduit shall be sealed by the use of suitable potheads or equivalent devices to prevent entrance of gases.

Conductors in locations where inflammable flyings normally exist shall be in grounded rigid metal conduit or cable approved for the purpose. [§ 31 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-505 Conductors——Precautions against excessive inductance and eddy currents. Supply conductors of alternating–current or direct–current circuits should not be run in separate iron conduits or on opposite sides of I beams or other iron structures or to be otherwise run so as to increase abnormally the self–inductance of the circuit.

Note: Such construction, by introducing large self–inductance in direct–current circuits, causes fuses to blow explosively; in alternating–current circuits it causes heating due to eddy currents in the metal. [§ 31 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-508 Conductors——Splicing and taping. Conductors shall be so spliced or joined as to be mechanically and electrically secure without solder and, unless made with a suitable splicing device, shall then be soldered with a fusible metal or alloy. Ends and joints of insulated conductors, unless otherwise adequately guarded, shall have equal insulating covering with other portions of the conductor, and this covering shall be securely held in place. [§ 31 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-511 Conductors——Uninsulated conductors. Uninsulated conductors may be used in the following cases under the conditions specified below: (1) As a grounded neutral service conductor, provided the secondaries of the supplying system operate at not more than 208 volts to ground and the conditions specified in

WAC 296-44-067 for a common grounding conductor are met. Except in the service drop, such an uninsulated service conductor shall be part of an approved type of service cable or shall be installed in a rigid metal raceway.

(2) As a grounding conductor for equipment, as a common grounding conductor, or as an independent circuit-grounding conductor if used where a common grounding conductor is permissible. (See WAC 296-44-058 through 296-44-076 for installation method.) [§ 31 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-514 Fuses, circuit-breakers, switches and controllers——General requirements for switches. (1) **Accessibility, marking, and installation.**

(a) All switches, fuses, automatic circuit-breakers, motor starters, and other control devices shall be readily and safely accessible and shall be installed in such a manner as to minimize the danger of accidental operation.

(b) The place of operation of starters and controllers for motors, heating, and furnaces shall be within sight of the motor or equipment controlled, except where it is inaccessible to other than qualified and authorized persons, or where the controller or disconnecting means is capable of being locked in the "off" position.

Note: This is to minimize the hazard of starting when persons are in dangerous positions, but exception is made to permit the remote control of fans, pumps, etc., when properly isolated.

(c) Where practicable, switches shall be so installed that gravity cannot close them; and such switches as may close by gravity shall be provided with a stop block or latch to prevent accidental closing.

(d) Oil switches and oil circuit-breakers shall be marked with the following data:

(i) Manufacturer's name and address.

(ii) Manufacturer's type and designation number.

(iii) Rated amperes.

(iv) Rated volts.

(v) Frequency if other than 60 cycles.

Such marking shall be placed on the switch or circuit-breaker and not on removable parts that may be interchanged.

(2) **Switches for special circuits.** Switches controlling emergency lighting circuits, elevator circuits, circuits in theaters, hospital operating rooms, and other circuits, the interruption of which might cause special hazard, shall be arranged so as to be accessible only to authorized persons.

(3) **Control of exit and emergency lights.** In buildings where emergency and exit lamps are installed, the control switch shall be located where it will be under competent supervision.

(4) **Control of exit lights in assembly halls.** Exit lamps and all lamps normally kept lighted in halls, corridors, and any other parts of theaters and other public assembly halls used by the audience except the general auditorium lighting, shall be supplied independently of the stage lighting and shall be controlled from the lobby or other place convenient to the main entrance to the building. In addition to the control required by the foregoing, there may be—

(a) A switch at the main service or on the control panel of special current source.

(b) A switch located adjacent to the emergency switch, or an automatic light-actuated device approved for the purpose, to control separately those lights on the exterior of the building which are not required for illumination when there is sufficient daylight. [§ 32 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-517 Fuses, circuit-breakers, switches and controllers——Hazardous locations. When necessary to install fuses, circuit-breakers, switches, or other control devices in locations where explosives, inflammable gas, or inflammable flyings exist, they shall be suitably protected. (See WAC 296-44-484.) Flush snap switches, if mounted in ungrounded metal boxes and located within reach of conducting floors or other conducting surfaces, shall be provided with covers of nonconducting material. (Usually grounded surfaces within 5 feet horizontally of the parts considered and within 8 feet vertically of the floor are considered within reach.) [§ 32 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-520 Fuses, circuit-breakers, switches and controllers——Where switches are required. (1) **Service switches.** Suitable switches and fuses, or circuit-breakers, or equivalent devices shall be installed in all ungrounded service conductors connecting utilization installations to the main service conductors from either overhead or underground lines. If fuses are used, unless access to them is under the control of the electric service company, they shall be disconnected by opening the service switch.

Service switches and fuses, or circuit-breakers, or equivalent devices shall be readily accessible and as close as practicable to the point where the service enters the building.

Unless mounted upon a switchboard or panelboard accessible to qualified persons only, service switches, fuses, and circuit-breakers shall be inclosed. Switches shall be operable without opening the inclosure unless additional switches are provided for separate control of the individual circuits, such switches being inclosed and externally operable.

If supply is from two or more different sources, the switch or switches controlling the supply shall be so constructed or arranged that it will be impossible to connect to one source unless the other is disconnected.

Exception: Floating batteries or supply units or systems normally operated in parallel.

(2) **Circuit switches.** Suitable switches, circuit-breakers, or equivalent devices shall be inserted in all circuit leads to lamps, motors, transformers, storage batteries, electric furnaces, and similar utilization equipment to make possible the disconnection of all such equipment from the source of supply.

Note: On a branch circuit not exceeding 15 amperes or 150 volts, plug fuses are recognized as an equivalent device.

Exception 1: Parts or pieces of apparatus intended to operate as a unit, as a motor and its starting device, may be controlled by one switch.

Exception 2: The switch need not open a grounded conductor. (See Wac 296-44-490(2) and (3).)

Exception 3: A group of incandescent lamps on the same branch circuit may be disconnected by one single-pole switch in the ungrounded conductor.

Exception 4: One switch may serve to disconnect several motors and their starting devices from the source of supply, if it complies with WAC 296-44-487.

Note: The use of a disconnecting means for each motor or a group of motors is a question of judgment, depending upon frequency of attention required by the motor and controller.

Single-pole switches shall not be placed in any neutral or grounded conductor. Three-way switches, or three-way and four-way switches used in combination, shall be classed as single-pole switches, and shall be so wired that only one pole of the circuit will be carried to any switch.

(3) **Fuses.** Switches shall be provided as necessary to make possible the disconnection of all fuses from the source of electrical supply before being handled, except as provided in WAC 296-44-526(2).

(4) **Switches or plugs on portables.** Switches or plug connectors shall be installed to permit the disconnection of temporary wiring, or of portable conductors from permanent or fixed wiring.

(5) **Emergency stop switches.** On equipment where the failure of any part of the operating or control circuits may create a life hazard and on equipment where there is possibility of the operator being caught or injured in the normal operation of the machine (such as rolls, mixers, beaters, etc.), an emergency stop switch shall be provided accessible to the operator in his usual working location. This switch shall be of a different color from any other switches on the operating or control panel and shall be clearly market "Emergency Stop." Such switch shall not be dependent upon the action of springs for opening but shall be positively opened by the movement of the operating member itself. Springs may, however, be used to accelerate the separation of current-carrying parts. The circuit shall be so arranged that once the emergency stop switch has been operated, the equipment cannot be started without going through the normal starting sequence. [§ 32 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-523 Fuses, circuit-breakers, switches and controllers——Character of switches and disconnectors. (1) **Capacity of switches.** Switches used otherwise than as disconnectors shall have a capacity such as to insure safe interruption, at the working voltage, of the greatest current which they will be required to carry continuously, and shall be marked with the current and voltage for which they are rated.

(2) **Capacity of disconnectors and warning signs.** Disconnectors shall be of suitable voltage and ampere rating for the circuit in which they are installed and shall be accessible only to properly qualified persons. They shall also be protected by signs warning against opening them while carrying current in excess of the safe opening limit.

Note: Interlocking arrangements are desirable to prevent opening of such disconnectors under loads beyond their safe opening capacity and locking arrangements to prevent accidental opening.

(3) **Locking or blocking.** Where dependence for maintaining an open circuit as a protection for persons against unexpected starting or energizing the circuit is put on certain switches or circuit-breakers, such switches or circuit-breakers shall be so arranged that they can be locked, blocked, or otherwise secured in the "Off" or "Open" position. (See WAC 296-44-538(1) and (2) and 296-44-541(12).)

Exception: Small-capacity snap switches, if near machines and in plain sight from all parts of the machines controlled are exempted. Switches of any size are exempted if the installation comprises only one motor, and the switch is in plain sight from all parts of the machines operated by the motor.

Note: Locking is to be preferred to blocking, wherever parts of the machinery driven are remote from the point of control.

(4) **Good contact.** Switches, controllers, and rheostats shall be so constructed as to make and maintain good contact. Knife switches shall maintain such alignment under service conditions that they may be closed with a single unhesitating motion.

(5) **Inclosure of switches.** Switches shall be of inclosed type unless inaccessible to other than qualified persons (see WAC 296-44-538).

(6) **Manual operation for power-operated apparatus.** It is recommended that power-operated circuit-breakers and similar switching apparatus be provided with means for readily closing them manually, and such equipment shall be provided with means for readily opening them manually. [§ 32 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-526 Fuses, circuit-breakers, switches and controllers——Disconnection of fuses and thermal cut-outs before handling. (1) **Automatic disconnection.** Fuses in circuits of more than 150 volts to ground shall, where accessible to others than qualified electrical attendants, be so arranged that the fuses are necessarily disconnected from all sources of electric energy before they can be touched. Where the circuit voltage is less than 150 volts to ground, this protection is recommended.

Note: This may be accomplished by a construction in which the fuse and its exposed current-carrying connections are accessible only when disconnected from the circuit, either by opening the fuse inclosure or by other means.

Where fuses are in locked cabinets (or otherwise made accessible only to qualified persons) sufficient protection is usually secured for all voltages if switches are provided to disconnect the fuses from all sources of electric energy.

If switches and fuses are inclosed in metal cabinets and live terminals are accessible, greater hazard to one replacing a fuse exists than if they were not so inclosed, as the live terminals are adjacent to grounded metal.

(2) **Switch ahead of the fuse.** Where fuses are not arranged so that they are necessarily disconnected from all sources of electric energy before they can be touched, switches shall be so placed or arranged that opening them will disconnect the fuses from all sources of electric energy, except service and meter switches, access to which is controlled by the electric service company. If in order to comply with the above, the supply wires must be connected to certain terminals, such terminals shall be marked "Line" and the other terminals shall be marked "Load," or with other appropriate designation.

Electric meters and control circuits of time switches may be connected on the supply side of the service switch and fuses or circuit breaker on alternating-current supply not exceeding 750 volts between conductors, provided no wiring or live parts are exposed and the connections are inaccessible to unauthorized persons.

(3) **Live load.** Where a fused inclosed switch, accessible to unqualified persons, is connected between a source of supply and a live load of more than 150 volts to ground, as in the charging circuit of a storage battery, switches shall be used in which the fuses are so arranged that they will be disconnected before they become accessible unless a supplementary switch is provided for disconnection of the live load from the fuses.

(4) **Thermal cut-outs.** Thermal cut-outs shall comply with the requirements for fuses in (1) and (2). [§ 32 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-529 Fuses, circuit-breakers, switches and controllers——Arcing or suddenly moving parts. (1) **Location.** Fuses and circuit-breakers shall be so located and shielded that persons will not be burned or otherwise injured by their operation.

(2) **Suddenly moving parts.** Handles or levers of circuit-breakers and similar parts which may move suddenly in such a way that persons in the vicinity are liable to be injured by being struck by them shall be guarded or isolated. [§ 32 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-532 Fuses, circuit-breakers, switches and controllers——Grounding noncurrent-carrying metal parts. Exposed noncurrent-carrying metal parts of switch and fuse cases, levers, and other similar parts to which leakage may occur from live parts shall be effectively grounded according to the provisions of WAC 296-44-472.

Exception: Small parts, such as name plates, screws, and metal covers of fuses and switch bases, which are thoroughly and effectively insulated, and which are not liable to become alive except under very unusual circumstances, are not considered as coming under the rule and may be left ungrounded. [§ 32 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-535 Fuses, circuit-breakers, switches and controllers——Guarding live parts. (1) **Guard disks and handles.** All manual switches, except switches less than 150 volts to ground and limited by fuses or automatic circuit-breakers to 60 amperes, shall have suitable casings or guards protecting the operator from danger of contact with current-carrying parts, or shall be provided with insulating handles and suitable insulating guard disks or shields so arranged between the handles and the live parts as to prevent the hand from slipping into contact with live parts or being burned by arcing at the switches.

(2) **Inclosure.** Current-carrying parts of switches, fuses, or automatic circuit-breakers of more than 300 volts to ground shall be provided with inclosing guards, effective during ordinary operation; and if accessible to other than qualified persons, current-carrying parts of more than 150 volts to ground shall be provided with such inclosing guards.

(3) **Platforms and mats.** Where switches or fuses of more than 150 volts to ground are not guarded during ordinary operation, suitable insulating floors, mats, or platforms shall be provided on which the operator must stand while handling the switches, fuses, or automatic circuit-breakers, and (unless operators invariably wear suitable insulating gloves while handling the switches) any conducting walls or machine frames within 3.5 feet shall be provided with suitable insulating guards.

Note: The suitable guarding of live parts will obviate the necessity for such insulating floors and other devices, and where use of such devices is impracticable from the nature of the location or mechanical process carried on, guards should always be used.

(4) **Blades dead.** Single-throw switches shall be so connected as to have no exposed blades alive when a switch is open, if the circuit configuration will allow. [§ 32 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-538 Fuses, circuit-breakers, switches and controllers——Inclosed air-break switches (not including snap switches). (1) **Locks for switches.** Inclosed switches, if used to comply with the requirement in WAC 296-44-484(5), 296-44-523(3), 296-44-541(8)(b), and 296-44-613(4), shall be provided with means for locking or sealing the switch in the "Off" position.

(2) **Locks for disconnectors.** Inclosed disconnectors shall have provisions for locking in both open and closed positions, where accessible to unqualified persons.

(3) **Marking.** Inclosed switches shall be plainly marked to show the manufacturer's name or trademark, the rating of the switch in amperes and volts (ac or dc), the open and closed positions of the switch handle, and when necessary for proper functioning, the terminals to be connected to "Line" and "Load." The marking of the manufacturer's name, the voltage, and the open and closed positions shall be on the outside of the case.

(4) **Operating handle.** Switches of the inclosed type shall be externally operable, and the external operating handle (if one is used) shall be of substantial construction, readily accessible, and provided with positive stops limiting its motion.

(5) **Grounding.** Inclosures and metal handles of switches shall be effectively grounded according to the provisions of WAC 296-44-472(3).

Note: Where a handle consists of a metal rod using the wall of the case as a bearing, and a test at rated voltage shows that the two make electrical contact, the handle will not need a separate ground connection.

(6) **Unused openings plugged.** All unused conduit and wiring openings in switch inclosures shall be effectively closed by metal plugs or plates. [§ 32 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-541 Fuses, circuit-breakers, switches and controllers——Control equipment. (1) **Classes of inclosures.** Inclosures are classified as follows:

Class I.—A solid inclosure without slot or other opening.

Class II.—A solid inclosure except for a slot for the operating handle or openings for ventilation, or both.

Class III.—Wire mesh, perforated screens, or grillwork.

(2) **Material for inclosures.** Cast metal for inclosures whether of iron or other metal, shall be at least 1/8 inch in thickness at every point and of greater thickness at reinforcing ribs and door edges; except that die-cast metal may be not less than 3/32 inch in thickness for an area greater than 24 square inches or having any dimension greater than 6 inches, and may be not less than 1/16 inch in thickness for an area of 24 square inches or less, or having no dimension greater than 6 inches. Cast metal shall be at least 1/4 inch in thickness at threaded holes for conduit.

The minimum thickness required for sheet-metal construction varies with the size of the device. For classes I and II, protective parts of sheet metal shall be of gage not less than that given in Table 1.

TABLE 1.—Thickness of inclosures

Maximum volume of inclosure	Maximum area of any surface	Maximum dimension	Minimum thickness of metal—U. S. Std. Gage	
			Without supporting frame	With supporting frame or equivalent reinforcing
cu. ft.	sq. in.	in.		
3/4	——	12	20	24
1	——	18	18	20
——	360	24	16	18
——	1,200	48	14	16
——	1,500	60	12	16
——	Over 1,500	——	10	16

Wire screening used for inclosures shall conform to the following:

Maximum opening in screen	Minimum wire size steel wire gage
1/2 inch	No. 16
More than 1/2 inch and not more than 2 inches	No. 12

If the opening is more than one-half inch, the inclosure shall not be less than 4 inches from any live part.

(3) **Clearances.** (a) There shall be sufficient space within the inclosure to permit uninsulated parts of wire terminals to be separated so as to prevent their coming in contact with each other. Inclosures shall be such as to permit proper wire connections to be made with adequate spacing of the terminals and ends of conductors from adjacent points of the inclosures.

(b) Exposed nonarcing current-carrying parts within the inclosures shall have an air space between them and the uninsulated part of the inclosure of at least 1/2 inch for 750 volts or less, except that in a controller or other small device rated at not more than one horsepower and 300 volts and having an inclosure adequately rigid, the spacing may be less than 1/2 inch but not less than 1/8 inch in air nor less than 1/4 inch over the surface of insulating material. Inclosures of sizes, materials, or forms not having adequate rigidity shall have greater spacing. A suitable lining of insulating material not less than 1/32 inch in thickness may be provided in lieu of the air space of 1/2 inch.

(4) **Securing covers, etc.** All inclosures and parts of inclosures, such as doors, covers, tanks, etc., shall be provided with means for firmly securing them in place. Among the available means are locks, interlocks, screws, and seals.

(5) **Rating of controller.** A controller shall have appropriate ratings of voltage, frequency, and horsepower.

(6) **Marking of controllers.**

(a) Controllers should be marked to indicate the duty for which they are designed, such as starting, intermittent, varying, continuous, etc.

(b) Controllers shall be marked with their ratings in volts and horsepower and in addition if for alternating current, the cycles and number of phases.

(c) Parts of controllers which are operated manually (controller handles, push-button stations) shall be marked, if necessary, to indicate proper operation.

(d) Every controller shall be provided with a wiring diagram and, where practicable, this diagram shall be permanently attached to the controller or its mounting. All incoming and outgoing terminals of the control equipment shall be marked to correspond with the markings on the diagram.

Note: It is very desirable that instruction books, tags, or cards accompany each controller installation, showing in detail how to properly repair and adjust various parts of the equipment.

(e) Field rheostats shall be marked to indicate the total ohms, volts, ampere capacity of first step, and ampere capacity of last step.

(f) A thermal cutout used as part of the control equipment shall be marked with the maximum rating of the fuse with which it can be used safely.

(7) **Guarding live parts.**

(a) Controllers and electric remote-control stations operating at 50 volts or more between conductors shall be guarded against accidental contact of persons with live parts by inclosure or guarding or location.

(b) Manual controllers and manually operated electric remote-control stations operating at more than 150 volts to ground shall be externally operable.

(c) Controllers shall be guarded against contact with live parts by conducting objects by inclosure or guarding or location. Consideration shall be given to possible hazards, from above, from cranes or other moving apparatus; from below by objects placed under the controller mounting; and from objects being carried by persons, such as pipe, tools, etc.

(8) **Protection for workmen.**

(a) Any controller installation operating at over 300 volts to ground which, for any reason, must be alive when maintenance work is being done shall comply with the following:

(i) Live parts shall be accessible only to qualified and authorized persons.

(ii) An insulating mat or platform shall be provided on which a person must stand while inspecting or working on the controller.

(iii) Any conducting surfaces within 3 1/2 feet of the controller shall be provided with insulating guards.

(b) Means shall be provided for disconnecting all ungrounded conductors from the controller, except that controllers described in subparagraph (a) above are not required to have such disconnecting means if the controller opens all ungrounded conductors to the motor. The disconnecting means may be in the same inclosure or on the same panel as the controller. If not within sight of the controller, it shall be provided with means for locking it in the open position.

(9) **Guarding arcing parts.** Controllers shall be so located or shielded as to protect operators and other persons in the vicinity from burns or eye-flash which might result from arc-rupturing parts and so as to prevent arcing to adjacent surfaces. For this latter purpose, controllers installed without inclosure, and controllers whose inclosure is built up during or after installation of the controller, shall have the air spaces (or barriers) given in Table 2 between arc-rupturing parts and the walls of metal inclosure or other adjacent surface.

TABLE 2.—Air spaces in controllers

Horsepower rating	Distance from contacts in direction of blow-out		Vertical distance above contacts without blow-out				Horizontal distance from contacts and distance below contacts	
	dc and ac		dc		ac		dc and ac	
	300 volts	750 volts	300 volts	750 volts	300 volts	750 volts	300 volts	750 volts
	Inches	Inches	Inches		Inches	Inches	Inches	Inches
5	1 3/4	3	4	[1]	1 3/4	3	3/4	1
1/2								
10	2	4	5	[1]	2	4	3/4	1
1/2								
50	3	5[1]	6[1]	[1]	3	5[1]	1	2
100	4[1]	[1]	[1]	[1]	4[1]	[1]	2[1]	3[1]
Above 100								

[1]Barrier.

Note: All distances to be measured from contact tips or arc horns. Voltage values given are between conductors.

(10) **Location of controller.** All points from which the motor is controlled shall be within sight of the motor unless that is impracticable, in which case there shall be means readily available to the person inspecting the motor for preventing operation of the controller.

(11) **Overcurrent protection.** Control equipment shall include an automatic device which will interrupt the electric power if the current exceeds a predetermined value. Such overload protection need not be a part of the controller but may be a separate unit. If a part of the controller, such overload protection shall conform to all applicable rules for the control equipment.

(12) **Under-voltage protection.** If the automatic restarting of a motor on restoration of voltage may result in injury to any person under-voltage protection shall be furnished. See WAC 296-44-568(4).

(13) **Open-phase or phase-reversal protection.** If the motor operates equipment which is of such a nature that the opening of one phase of a polyphase circuit or the reversal of a phase or phases would result in possible injury to any person, means shall be provided which will prevent starting of the motor under such a condition. [§ 32 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-544 Switchboards and panelboards——Accessibility and convenient attendance. (1) **Control arrangement.** Switchboards and panelboards shall have all switches so arranged that the means of control are readily accessible to the operator.

(2) **Location of instruments.** Instruments, relays, or other devices requiring reading or adjusting shall be so

placed that work can be readily performed from the working space provided. [§ 33 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-547 Switchboards and panelboards——Location and illumination. Switchboards shall be so placed that the persons necessarily near the board will not be endangered by machinery or equipment located near the board. Means for adequate illumination shall be provided.

Switchboards shall be made of noncombustible material and shall be kept free from moisture.

Switchboards shall be so installed and supported that they will withstand the stresses imposed by the operation of the apparatus mounted thereon, braces or other framework being installed if necessary, as covered in the General Safety Standards of Washington. [§ 33 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-550 Switchboards and panelboards——Arrangement and identification. Connections, wiring, and equipment of switchboards and panelboards shall be arranged in an orderly manner and all switches, fuses, and automatic circuit-breakers shall be plainly marked, labeled, or arranged so as to afford ready means for identifying circuits or equipment supplied through them.

It is recommended that a diagram of switchboard or panelboard connections and devices be kept posted in some convenient place near such equipment. [§ 33 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-553 Switchboards and panelboards——Spacing, barriers and covers. (1) **Separation of bare parts.** Bare parts of different potential on the front of switchboards, if accessible to unqualified persons, shall be so located or protected that they will not be readily short-circuited by tools or other objects.

(2) **Portable covers or shields.** Switchboards shall have current-carrying parts which are ordinarily isolated or guarded, but which may occasionally require adjustment or repair while alive, so arranged that suitable portable covers or shields can be effectively placed to protect workmen from contact with any neighboring live parts. [§ 33 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-556 Switchboards and panelboards——Grounding frames. Switchboard frames and metal cabinets shall be effectively grounded, with the exception noted in WAC 296-44-472. [§ 33 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-559 Switchboards and panelboards——Guarding current-carrying parts. (1) **Inclosure of parts at more than 150 volts to ground.** No switchboard or panelboard operating at more than 150 volts to ground shall have current-carrying parts exposed within 8 feet of the floor, unless accessible only to qualified operators. Parts of 100 to 150 volts to ground should not be accessible to unqualified persons. Locked cabinets or other inclosures may be provided where necessary to prevent such exposure. If the current-carrying parts are at any time exposed while alive, conducting floors about such boards shall be provided with a suitable insulating platform or mat so placed that no live parts can be inadvertently touched except while standing on the platform or mat. (WAC 296-44-481 and 296-44-535.)

(2) **Inclosure of low-voltage parts.** All switchboards and panelboards should be so arranged that current-carrying parts less than 150 volts to ground and less than 5 feet above the floor are inclosed in cabinets or screens.

Note: This is an effective precaution against accidental short-circuit or contact by persons in the vicinity.

(3) **Plug-type boards.** Plug-type switchboards if of more than 150 volts to ground, shall have no current-carrying parts exposed on face of boards, and plug connectors shall have all current-carrying parts guarded as long as they are alive.

(4) **Dead-front boards.** Switchboards having no current-carrying parts exposed on the face (working space) shall be used in theaters and similar places where rapid handling is necessary and the attention must be given to signals or to other processes.

(5) **Theater boards.** Theater switchboards at any voltage having current-carrying parts exposed on back to passersby shall be elevated or guarded by suitable railings to prevent contact with live parts. [§ 33 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-562 Switchboards and panelboards——Fuses on switchboards. (1) **Disconnection of fuses.** Fuses on switchboards shall be arranged in one of the following ways:

(a) So that they are necessarily disconnected from all sources of electric energy before they can be touched.

(b) So that they can be disconnected from all sources of electric energy by a switch.

(c) So that they can be conveniently handled by means of suitable insulating tools provided for the purpose.

When switchboards are accessible to unqualified persons the protection specified in (a) shall be provided if the voltage exceeds 150 volts to ground and should be provided if the voltage is less than 150 volts to ground.

(2) **Location of fuses.** Fuses shall be so located as to obviate the danger in removing or replacing them of short-circuiting other live parts. Open-link fuses shall not be installed on switchboards. [§ 33 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-565 Switchboards and panelboards——Panelboards. (1) **Arrangement of equipment.**

(a) Location of fuses. Fuses shall be so located as to limit as far as practicable the danger of short-circuiting other live parts when removing or replacing them.

(b) Connection of plug-fuse shells. The shells of plug-fuse holders in ungrounded conductors shall be connected to the load side of the circuit on all panelboards

employing plug fuses without switches in main or branch circuits.

(2) **Material.** Panelboard bases shall be made of nonabsorptive, noncombustible insulating material.

(3) **Marking.** Panelboards shall be plainly marked to show the manufacturer's name or trade-mark and the rating in volts and amperes. The ampere rating shall be the maximum capacity of the busses.

(4) **Protection against moisture.** Where panelboards are installed so as to be exposed to excessive moisture they shall be inclosed in weatherproof cabinets.

(5) **Hazardous locations.** Panelboards shall not be installed where hazardous conditions exist due to the presence of inflammable gas or inflammable dust or flyings, except as permitted by WAC 296-44-484.

(6) **Residences.** Panelboards in residences shall be so installed that the lowest live part exposed when the cabinet door is opened to permit operation of switches shall not be less than 4 feet from the floor. [§ 33 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-568 Motors and motor-driven machinery——Control devices. (1) **Speed limitation.** Machines of the following types shall be provided with speed-limiting devices, unless their inherent characteristics or the load and the mechanical connection thereto are such as to safely limit the speed or unless the machine is always under the manual control of a qualified operator:

(a) Separately excited direct-current motors.

(b) Series motors.

(c) Motor-generators and converters which can be driven at excessive speed from the direct-current end as by a reversal of current or decrease in load.

Note: The required limitation of speed may be obtained by the use of a relay, centrifugal switch, or other similar device which will cut off the supply of energy when excessive speed is attained.

(2) **Adjustable-speed motors.** Adjustable-speed motors, if controlled by means of field regulation, shall be so equipped and connected that the field cannot be weakened sufficiently to permit a dangerous speed, and so that the motor cannot be started under weakened field unless the motor is designed for such starting.

(3) **Wiring.** Where speed-limiting devices or remote-control switches are electrically operated, the control circuits by which such devices are actuated shall be adequately guarded, by conduit or otherwise, against mechanical injury.

(4) **Under- or low-voltage protection.** Where the restarting of the motor on restoration of voltage may result in injury to any person or persons, under- or low-voltage protection shall be furnished. When the motor and driven machinery are isolated and accessible to qualified persons only, the provision of a disconnecting switch eliminates the hazard. [§ 34 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-571 Motors and motor-driven machinery——Hazardous locations. Motors in which sparking or arcing can occur during operation shall, when in locations where explosives or inflammable gas or inflammable flying exist, be suitably protected as described in WAC 296-44-472(3) and 296-44-484. [§ 34 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-574 Motors and motor-driven machinery——Deteriorating agencies. (1) **Inclosures.** Suitable guards or inclosures shall be provided to protect exposed current-carrying parts of motors and the insulation of motor leads where installed directly under equipment or in other locations where dripping oil, excessive moisture, steam, vapors, chemicals, or similar injurious agencies exist.

(2) **Grounding frames.** The metal frames and other exposed noncurrent-carrying metal parts of equipment in these locations shall be effectively grounded. (See WAC 296-44-472(3).) [§ 34 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-577 Motors and motor-driven machinery——Guards for live parts. (1) **Inclosure of live parts.** Motors of more than 150 volts to ground, unless isolated by elevation at least 8 feet above the floor line, should be provided with permanent inclosures or other suitable guards so arranged as to prevent persons or conducting objects from inadvertently coming or being brought into contact with live parts or interfering with the operation of the motors.

(2) **Mats and platforms.** Suitable insulating mats or platforms of substantial construction and providing good footing shall be so placed on floors and, if necessary, on frames of machines having exposed live parts of more than 150 volts to ground that the operator or other persons in the vicinity cannot readily touch such parts unless standing on the mats, platforms, or insulating floors.

Note: The suitable guarding of live parts by inclosures or barriers effective during attendance or necessary adjustments of live parts will obviate the necessity for insulating mats, and where such mats are impracticable from the nature of the location or processes carried on, guards shall always be used.

Where connectors are used in motor leads, these should be provided with insulating covering equal to that on the conductors.

(3) **Steps and handrails.** Where necessary, steps and handrails should be installed on or about large machines to afford safe access to live parts which must be examined or adjusted during operation. [§ 34 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-580 Motors and motor-driven machinery——Grounding machine frames. Where two or more machines, either of which operates at more than 150 volts to ground, are mechanically coupled together, and the operator can touch the frames of more than one at a time, the frames of all such machines shall be effectively grounded as required by WAC 296-44-472(3),

unless they are bonded together electrically and surrounded by insulating mats or platforms on which persons must stand in order to touch the machine frames. If operating at more than 300 volts to ground, their frames shall always be grounded as required by WAC 296-44-472(3), and frames shall also be grounded wherever, from the nature of the location or of processes carried on, the use or maintenance of insulating mats or platforms is impracticable. [§ 34 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-583 Motors and motor-driven machinery——Protecting moving parts. Suitable guards or inclosures shall be arranged at each motor or motor-driven machine when necessary to prevent persons or objects from inadvertently coming in harmful contact with moving parts, including chains, belts, gears, and pulleys. [§ 34 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-586 Electric furnaces, storage batteries, transformers, and lightning arresters——Protection from burns. (1) **Inclosure of glowing parts.** Electric furnaces and apparatus used for arc welding, where intensely glowing incandescent or arcing parts are exposed, shall be inclosed so that those parts will not be accessible or visible to unqualified persons.

(2) **Screens, hoods, goggles.** Suitable protecting screens, hoods, goggles, gloves, and other devices shall be provided for the qualified persons who must work or come near such exposed parts. (See American Standard Safety Code for the protection of the heads, eyes, and respiratory organs, ASA A2, for mechanical and optical protection.) [§ 35 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-589 Electric furnaces, storage batteries, transformers, and lightning arresters——Grounding of furnace frames. The outside noncurrent-carrying metallic frames of furnaces shall be effectively grounded if they contain current-carrying parts connected to circuits of more than 150 volts to ground, or if the circuit within is not grounded and is exposed through transformer windings to a circuit of more than 150 volts to ground. [§ 35 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-592 Electric furnaces, storage batteries, transformers, and lightning arresters——Guarding live parts. Except at points where necessarily left exposed (as at spot-welder contacts), current carrying parts of furnaces, welders, and control equipment of more than 150 volts to ground, shall be suitably guarded with inclosures or barrier guards. [§ 35 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-595 Electric furnaces, storage batteries, transformers, and lightning arresters——Storage batteries. The installation of nonportable storage batteries shall be in accordance with WAC 296-44-142 through 296-44-166 of the rules for stations. [§ 35 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-598 Electric furnaces, storage batteries, transformers, and lightning arresters——Transformers. The installation of transformers having either winding of more than 300 volts to ground shall comply with WAC 296-44-169 through 296-44-184 of the rules for stations, and if the operating voltage of any winding exceeds 750, the transformers shall be made inaccessible to unqualified persons. [§ 35 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-601 Electric furnaces, storage batteries, transformers, and lightning arresters——Lightning arresters. The installation of lightning arresters shall comply with the rules of WAC 296-44-262 through 296-44-271 of the rules for stations, and if the operating voltage of the circuit exceeds 750 volts between conductors, the arresters shall be inaccessible to unqualified persons.

Lightning arresters when installed for the protection of utilization equipment may be installed on supply lines or service leads either within or without the buildings or inclosures containing the equipment to be protected. They shall be installed in accordance with the rules of WAC 296-44-079 through 296-44-667 depending upon their location, whether in stations, on outdoor lines, or with utilization equipment. [§ 35 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-604 Lighting fixtures and signs——Fixtures. (1) **Grounding.** The exposed noncurrent-carrying metal parts of all lighting fixtures, receptacle plates, and switch plates and other similar fixed electric devices shall be effectively grounded when used under the following circumstances (for exception, see WAC 296-44-472(3)):

(a) If in locations where explosives, inflammable gas, or inflammable flyings exist in dangerous quantities.

(b) If within reach of bathtubs, shower baths, plumbing fixtures, steam piping, or other grounded metal surfaces of the building. Metal pull chains used at these locations shall be provided with insulating links. (Usually grounded surfaces within 5 feet horizontally of the parts considered and within 8 feet vertically of the floor are considered within reach.)

(c) If connected to circuits operating in excess of 150 volts to ground, regardless of location.

Exception: Grounding is not required if the fixture, shell of socket lamp guards, etc., are made of or covered with suitable insulating material.

(2) **Polarizing lampholders.** On grounded systems the center contacts of lampholders shall be connected to the ungrounded side of the system, and the inner screw shells of the devices to the grounded side or neutral.

Note: This is in order to reduce the liability of breakdown of the dielectric between the inner screw shell and the grounded outer brass shell, and also to reduce the liability of injury to persons in replacing lamps. This is especially important in wiring electric signs.

[§ 36 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-607 Lighting fixtures and signs——Receptacle for convenience outlet. Receptacles installed for the attachment of portable cords shall be of a type not suitable for use with screw-shell-base devices. [§ 36 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-610 Lighting fixtures and signs——Exposed live parts. Electric fixtures, including lamp sockets and lamp bases, if within reach of grounded surfaces, shall be so designed and installed that no current-carrying parts will normally be exposed externally. [§ 36 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-613 Lighting fixtures and signs——Signs. (1) **Accessibility.** Electric signs at an elevation greater than 30 feet above roadways or footways, or at an elevation above a roof greater than the distance from the edge of the roof, shall, if they require attendance while in position, be provided with substantial, safely accessible, runways, ladders, or platforms from which all replacements and other necessary adjustments can be made. Provision for supporting workmen by safety belts should be made in the construction and installation of signs so located.

These provisions do not apply where the sign is so designed and installed that all maintenance is accomplished with external lift type equipment not dependent upon the sign structure for support.

(2) **Inclosure of live parts.** Electric signs outside buildings shall have no ungrounded current-carrying parts normally exposed to contact.

(3) **Grounding of noncurrent-carrying parts.** The exposed noncurrent-carrying metal parts of signs shall be effectively grounded, unless they are insulated from ground and from other conducting surfaces and are inaccessible to unauthorized persons. This does not apply to signs of the portable incandescent lamp type.

(4) **Control.** Electric signs, other than the portable type, shall be provided with switches arranged to entirely disconnect all ungrounded supply wires of the sign, and either located within sight of the sign or arranged so that they can be locked in the open position. [§ 36 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-616 Lighting fixtures and signs——Connectors for signs. Electric signs with changeable connections shall be so arranged that the connections can be changed manually only by approved connectors. Approved connectors shall interrupt all ungrounded conductors of the circuit. [§ 36 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-619 Lighting fixtures and signs——Lamps in series circuits. (1) **In or on buildings.** Series lamps mounted in building or on external walls of building shall be installed only by permission of the division of safety, department of labor and industries and the local code enforcing authority.

(2) **Elevation.** Arc and incandescent lamps and other devices in series circuits, except in grounded circuits of which no part exceeds 150 volts to ground, shall be effectively isolated or suitably guarded.

Note: Isolation will ordinarily be deemed sufficient when a vertical clearance of 8 feet is provided from floors or other ordinarily accessible places within buildings, of 10 feet from footways outside buildings, and of 15 feet from roadways. Horizontal clearance from windows, porches, and other spaces accessible to the general public should be not less than 3 feet.

(3) **Suspension of lamps.** Lamps shall be securely supported, and the hanger, rope, chain, or other means of support shall be regularly and systematically inspected. All metal cable or chain supports for lamps shall be effectively insulated from the lamp or shall be permanently grounded. Metal chains or metal cables and other conducting parts used for lowering lamps in series circuits shall be grounded or interrupted by a suitable strain insulator, the minimum height of which from the floor or ground shall be 8 feet, whether the lamp is in position or lowered. [§ 36 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-622 Lighting fixtures and signs——Safe access to arc lamps. A suitable device shall be provided by which each arc lamp or other device on series circuits may be safely and entirely disconnected from the circuit before it is handled, unless the lamps are accessible only to properly qualified persons, worked on only from suitable insulating stools, platforms, or tower wagons, and treated always as under the full voltage of the circuit concerned. [§ 36 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-625 Portable appliances, cables and connectors, and insect eliminators (not including those for communication systems)——Insulation. Portable appliances and devices shall be provided with an adequate dielectric (complying with the standardization rules of the American Institute of Electrical Engineers) interposed between ungrounded current-carrying parts and those external surfaces which persons can touch.

Exception: Toasters, grills, or other heating appliances in which the current-carrying parts at high temperature are necessarily exposed are exempted. (WAC 296-44-592.)

In locations where the dielectric is exposed to mechanical injury it shall be suitably protected. [§ 37 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-628 Portable appliances, cables and connectors, and insect eliminators (not including those for communication systems)——Grounding of frames. Grounding noncurrent-carrying metal parts. Portable appliances and devices operating on circuits of more than 150 volts to ground, shall have their exposed metal frames grounded except (1) motors, if guarded. The exposed metal frames of portable appliances and devices used in hazardous locations as listed in WAC 296-44-481(1), shall be effectively grounded, regardless of the

voltage of the circuit. The effective grounding of exposed metal frames of portable appliances and devices (especially when used in locations such as bathrooms, laundries, etc., under conditions where persons may easily touch grounded surfaces at the same time as the appliance or device) is recommended.

Note: Such grounding may be obtained by the use of a three-wire portable cord with the portable appliance or device, one wire being used for the grounding conductor and the connectors being properly designed so that wrong connections cannot be made by the user of the device. Safety may be accomplished and the need for grounding eliminated in many cases by insulating the metal frame from contact by persons, or by isolation of the device.

It is recommended that in industrial establishments portable lamps which are to be used in conductive locations, be operated at 32 volts or less between conductors through the use of step-down transformers, thus obviating the need for grounding such portable equipment. [§ 37 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-631 Portable appliances, cables and connectors, and insect eliminators (not including those for communication systems)——Cable connectors. (1) **Break all conductors.** Where used with portable conductors, it is recommended that connectors be used which necessarily disconnect both or all poles from the live source of energy when the circuit is opened.

(2) **Design of connectors.** Connectors shall be so constructed (with guards when necessary) that the person using them cannot inadvertently come in contact with live parts, or be burned by arcing when interrupting the largest current for which they are rated or marked.

Separable connectors should be so designed that the plugs will not fit receptacles rated for larger currents than the plugs.

(3) **Live parts of connectors.** The end of a separable connector which is left alive, or the two ends of a separable connector where both are connected to live circuits (as in battery charging), shall have live parts suitably guarded.

(4) **Strain relief.** Where connectors are attached to portable cables, suitable means shall be provided for relieving the terminal connections of cable from strains. [§ 37 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-634 Portable appliances, cables and connectors, and insect eliminators (not including those for communication systems)——Identified conductors, cords, and connectors. (1) **Portable appliances and devices.** Where portable appliances and devices have cases designed to be grounded and the connecting cable is provided with a separate grounding conductor for this purpose (see WAC 296-44-628), such grounding conductor and the corresponding parts of connectors shall have suitable identification, so that the grounding conductor in fixed wiring and portable cable will always be connected to the proper terminals of the connectors. Identification of an equipment grounding conductor of a portable cable may be the absence of insulating covering, but if an individual covering is provided for this conductor it shall be finished to show a green color.

Note: If portable cable containing a conductor identified as provided above is not available, the identifying color may be applied to one of the insulated conductors of the cable where the conductor is exposed at terminals.

(2) **Separable connectors.** Separable connectors shall be so constructed that wrong connection between the two parts is impossible. [§ 37 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-637 Portable appliances, cables and connectors, and insect eliminators (not including those for communication systems)——Use of portables and pendents. (1) **Voltage limit of portables.** Portable and pendent conductors shall not be installed or used on circuits operating at more than 300 volts to ground, unless they are accessible only to qualified persons. In such cases they shall be of a type suited to the voltage and conditions.

In car houses and similar locations where service at low voltage is not available and where necessary to use low-voltage pendent or portable lamps or other equipment in series with lamps on trolley circuits, the equipment should be used only with great caution and be placed preferably on the grounded side of the circuit concerned.

(2) **Use of fixed receptacles for portables.** Where portable conductors are required, fixed receptacles shall be provided at safely accessible points. (See WAC 296-44-607.)

(3) **Hazardous locations.** Where exposed to dampness or corrosive influences, portable conductors shall be of a type specially suited, and where exposed to inflammable gas or flyings, they shall be so protected or isolated by elevation that they cannot be readily damaged. In the latter case connectors shall be so arranged as not to be exposed to accidental opening by persons handling the portable conductors or devices. Portable lamps in locations where explosives or inflammable gases are normally present shall be incased in vapor-proof globes with suitable mechanical guards.

Portable lamps in damp places shall be equipped with socket and approved handle of nonabsorptive insulating material, gasket guard, and approved cord.

(4) **Strain relief.** Portable and pendent conductors shall be so installed that no strain is placed on the terminal connections and shall have no joints except at suitable fittings.

(5) **Worn and defective portables.** The use of worn or defective portable and pendent conductors should be avoided because of the danger to users by wire strands piercing the insulation or becoming exposed through abrasion of the covering. [§ 37 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-640 Portable appliances, cables and connectors, and insect eliminators (not including those for communication systems)——Portable outdoor equipment

of more than 750 volts between conductors. (1) **Scope.** This rule is intended to apply to equipment supplied through portable cable and used for such outdoor surface work as well-drilling, strip mining, quarrying, dredging, shoveling, and log sawing.

(2) **Cables.**

(a) Insulation. Cables, wiring, and electric equipment shall in insulated for not less than line-to-line voltage.

(b) Trailing cables.

(i) Trailing cables used for connecting an electric supply to mining machines, dredges, shovels, and similar equipment shall be of sturdy construction and suitable for the intended service.

(ii) It is recommended that trailing cables be in continuous lengths. If splices are made they should be equivalent mechanically and electrically to the cable in which they are made.

(iii) The individual conductors of trailing cables shall be so connected to equipment and to the source of supply as to give solid and firm connections without injury to the cable and so that the cables cannot be inadvertently disconnected. Such connections shall be weatherproof and there shall be no exposed current-carrying parts.

(3) **Relays.** Each complete metallic circuit (not separated by insulation as in transformers) shall be equipped with a relay which shall operate on occurrence of ground fault on the circuit to deenergize the faulty circuit or equipment.

(4) **Grounding.** Machinery frames shall be effectively grounded in the manner required by WAC 296-44-058 through 296-44-076.

(5) **Impedors.** If it is desired to provide protection during the interval of time the fault current exists, the use of an impedor connected between the transformer secondary neutral and the grounding point is recommended. The value of this impedor should be such that the voltage which may occur between the machinery frame and ground will not exceed 100 volts. [§ 37 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-643 Portable appliances, cables and connectors, and insect eliminators (not including those for communication systems)——Insect eliminators. Electric insect eliminators shall be of such low current output as not be a hazard to persons or property, or they shall be installed and guarded or isolated in accordance with WAC 296-44-469(3) and 296-44-478(1). [§ 37 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-646 Electrically operated industrial locomotives, cars, cranes, hoists, and elevators——Guarding live and moving parts. (1) **Guarding and isolation.** All current-carrying parts accessible to unqualified persons which are connected to circuits of more than 150 volts to ground shall be so isolated or guarded that no person can inadvertently come in contact with them.

(2) **Conductors.** All conductors of more than 150 volts to ground in locations accessible to the public shall be run in conduit, suitable cable, metal molding, or flameproof and waterproof nonmetallic ducts the exposed metallic parts of which shall be effectively grounded.

(3) **Elevators hoistways.** Electric conductors installed in or under an elevator or counterweight hoistway shall, except for flexible cables connecting the car with the fixed wiring, be incased in metal conduits or suitable cable and shall be securely fastened to the hoistway. No electrical conduit or cable, except such as is used to furnish or control power, light, heat, or signals for the elevator or hoistway, shall have any opening, terminal, outlet, or junction within the hoistway, but shall be continuous between outlets or terminals situated entirely outside the hoistway.

Note: It is not intended to prohibit the interruption of long runs for the purpose of supporting or pulling in conductors, and pull boxes may be installed for this purpose.

All live parts of electric apparatus in elevator hoistways shall be protected against accidental contact by suitable inclosing casings or coverings, and all such casings or coverings which are made of metal shall be effectively grounded.

No part of any electric circuit having a rated system or circuit voltage in excess of 750 volts dc or 550 volts ac shall be used for any control or operating circuit. No signaling push buttons shall be used in circuits of more than 300 volts to ground. Circuits of higher rated system or circuit voltage may, however, be used in machine rooms or penthouses for the operation of motors, provided that all operating and signal wiring is thoroughly insulated from such power circuits and all machine frames and handropes are effectively grounded.

The maximum system or circuit voltage permitted in the operating devices of automatic-operation elevators having operating devices in the car and at landings shall be 300 volts to ground.

(4) **Material for guards.** Guards required by WAC 296-44-478 and subsection (1) of this section for the current-carrying parts of unisolated electric equipment, such as controllers, motors, transformers, fuses, circuit-breakers, switches, and other devices, shall consist of cabinets, casings, or shields of effectively grounded metal or of substantial insulating material, or of a combination of the two. All metallic parts, such as conduits, apparatus cases, etc., which are liable to become charged shall be effectively grounded when so located that unqualified persons may come in contact with them.

(5) **Apparatus insulated and grounded.** On passenger cars, apparatus, such as air-compressor motors, having insulated nongrounded mountings, shall be located where passengers are not liable to come in contact with them, as on the exterior of the car body. The air lines from nongrounded air compressors shall be provided with insulating joints in the line, insulating joints to be located in a substantially vertical pipe run in such a manner as to insulate from the motor all pipe or exposed apparatus with which passengers or crew may come in contact. Such pipe and apparatus shall be grounded.

(6) **Collector wires and third rail.** Except on fenced right-of-way or other locations to which only qualified persons are admitted, trolley or crane collector wires and third rails, whether indoors or out, shall be so isolated by elevation (see WAC 296-44-112 and 296-44-310 through 296-44-337) or be provided with suitable guards so arranged that persons cannot inadvertently touch the current-carrying parts while in contact with the ground or with conducting material connected to the ground.

At locations where unqualified persons are especially exposed to possible contact, warning signs shall be provided.

Trolley-contact conductors, indoors, shall be so supported that, in case of a single break, the lower end of the broken wire will not come within 8 feet of the floor.

Note: Damp wood, concrete floors, and metal parts of crane cabs are considered as connected to ground.

(7) **Arcing or suddenly moving parts.** All such parts of electric equipment, including fuses and the handles and arc chutes of circuit-breakers, shall be so isolated or guarded that the liability of persons being struck or burned by sparking, flashing, or movement during operation, is avoided.

(8) **Removable headlights.** Headlight frames shall not be used as conductors and portable headlights shall be wired for double plug connections. All coupler connections shall be so designed and wired that when the coupler is pulled apart there will be no exposed live parts. [§ 38 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-649 Electrically operated industrial locomotives, cars, cranes, hoists, and elevators——Grounding noncurrent-carrying parts. (1) **Frames.** All noncurrent-carrying metal parts of electric equipment shall be effectively grounded or protected by effectively grounded guards or covers. In electric cars all steam or hot-water heating devices accessible to the public shall also be grounded.

Note: The ground connection through well-bonded track rails will be considered satisfactory for equipment on cars and cranes.

(2) **Portable equipment.** The metallic parts of portable cranes, derricks, hoists, and similar equipment on which wires, cables, chains, or other conducting objects are maintained shall be provided with an effective protective ground (see WAC 296-44-058 through 296-44-076), where operated in the vicinity of supply lines of more than 150 volts to ground, whether the cranes or similar equipment are themselves electrically operated or not.

On the booms of cranes and derricks mounted on the tracks of railways with overhead trolley-contact conductors, an insulated barrier should be provided which will prevent contact of conducting parts with the overhead wire if the boom is raised against it.

(3) **Guarding parts on car roofs.** Metal parts of car which extend above the car roof (such as whistles or smoke pipes, heater expansion tanks, and metal ventilators) shall either be grounded or insulated or guarded by substantial guards or screens insulated from ground.

If insulated, the insulating joint shall be located immediately below the car roof. Insulating joints in air pipes shall be installed in a substantially vertical run of pipe. [§ 38 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-652 Electrically operated industrial locomotives, cars, cranes, hoists, and elevators——Control of energy supply to cars, cranes, and industrial locomotives. (1) **Disconnecting means.** Readily accessible means shall be provided whereby all conductors and equipment, except lightning arresters, located in or on industrial locomotives, cars, or cranes, can be disconnected entirely from the source of energy at a point as near as possible to the trolley or other current collectors; except on such equipments where the current collectors can be readily removed from the trolley or third rail.

(2) **Main switch or circuit-breaker.** A circuit-breaker or switch, capable of interrupting the circuit under heavy loads, and readily controlled by the operator, shall be provided, unless the current collectors can be safely removed, under heavy loads, from the trolley or third rail.

(3) **Disconnector for third-rail collector.** Where current supply is from two sources (such as overhead trolley and third rail) disconnecting switches shall be provided as follows:

(a) On a public right-of-way, a double-throw switch shall be provided in current-collector cable so arranged that when current supply is from either source, the current-collector cable from the other source is disconnected.

(b) On a private right-of-way, a single-throw switch shall be provided in cable to third-rail collectors so that these may be deenergized when the current supply is from the overhead trolley. [§ 38 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-655 Control of movement of industrial locomotives, cars, cranes, and elevators. (1) **Locking or removable handles.** Means shall be provided whereby the operator (whether motorman or elevator attendant) can prevent the starting of the equipment by unauthorized persons while he is absent from his post.

Note: Removable reverse levers or controller handles and locked doors to the operator's cab or elevator hoistway are among the most effective means.

(2) **Location of controllers.** The car control lever of passenger elevators should be located so that the operator can readily face the principal car opening. For cars and traveling cranes, the car control should be so located that the operator can readily see in the direction of travel.

It is recommended that the control levers of traveling cranes be located in the same relative position each to the other in all the cages of cranes.

(3) **Limit switch.** A limit switch shall be provided for the upper limit of travel of crane hoists and for both upper and lower limits of travel for elevators. Limit switches shall be at least 4 feet above lowest floor level in garages and other buildings where inflammable gases may be present.

(4) **Reverse-phase relays.** Polyphase alternating-current motors operating freight or passenger elevators or cranes that are dependent upon phase relation for their direction of rotation shall be provided with a device such as a relay, which will prevent starting any motor if the phase rotation is in the wrong direction. In the case of cranes this device may be inserted ahead of the runway feeders.

Exception is made in the case of a control having an operating device for the reversing switches which automatically changes its direction of operation when a change in phase rotation is made in the power circuit. [§ 38 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-658 Control of movement of industrial locomotives, cars, cranes, and elevators——Subway and car lighting. Subways and similar locations used for passenger transportation where artificial illumination is indispensable shall be lighted throughout their entire length by a system independent of the current for electric traction where such is used. It is recommended that passenger cars operated in such locations and lighted normally from the railway circuit shall be equipped with an auxiliary system of emergency lighting. [§ 38 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-661 Telephone and other communication apparatus on circuits exposed to supply lines or lightning——Protective requirements. (1) **General requirements.** Where telephone or other communication apparatus (not included under (2) below) which must be handled by persons is permanently connected (not including portable telephones) to overhead communication circuits exposed to either lightning, supply lines of more than 400 volts to ground, or induction of more than 150 volts between terminals of the communication equipment and ground from supply circuits under normal conditions, provisions against shock to persons handling apparatus, shall be made by one of the following methods:

(a) The use of suitable protective devices such as fuses and arresters operating at 750 volts to ground and, for conditions of unusual exposure, additional devices such as auxiliary arresters, neutralizing transformers, drainage coils or insulating transformers.

(b) The grounding of all exposed noncurrent-carrying metal parts and the suitable guarding of all ungrounded current-carrying parts. (See WAC 296-44-664.)

(c) The arrangement of apparatus in such a way that persons using it will be obliged to stand on a suitably insulated platform in a suitably insulated booth, or on other insulating surfaces. (This method may be used only where apparatus is accessible to none but authorized persons.)

(2) **Fire and police alarm boxes.** Such signaling devices as fire and police alarm and associated test boxes, if connected to overhead communication circuits exposed to lightning or to supply lines of more than 400 volts to ground, should have the accessible noncurrent-carrying metal parts effectively grounded wherever the character of service gives valid objection to the use of arresters or transformers on the signal circuit.

Fire alarm boxes connected to overhead circuits, if not protected by arresters, should be provided with suitable insulating material between the circuit within and the exposed frame and operating hook, this insulation to be capable of withstanding the highest voltage of the supply circuits to which the fire alarm circuit is exposed up to 7,500 volts.

Police alarm boxes, where connected to overhead police alarm circuits, should be protected by arresters, operating at not more than 750 volts, placed in the connecting leads outside the box. [§ 39 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-664 Telephone and other communication apparatus on circuits exposed to supply lines or lightning——Guarding current-carrying parts. (1) **Current-carrying parts.** Telephone or other communication apparatus which is permanently located outdoors or where exposed to corrosive fumes or dampness (such as may occur in subways, cellars, basements, laundries, stables, etc.) shall be so arranged that all ungrounded current-carrying parts are so guarded as to be suitably protected against the prevailing atmospheric conditions.

The inclosing cases of communication apparatus provide suitable guards if substantially built of metal or insulating material.

(2) **Receiver cords.** Receiver cords where required to be guarded shall be guarded by shields of effectively grounded metal (such as metal armor) or of nonabsorptive insulating material (such as flexible insulating tubing) or suitable insulating coverings for the individual conductors. (See WAC 296-44-661(1)(b).)

(3) **Shields for portable cords.** Where no protective device is installed the shields of portable cords shall always be of grounded metal or of special insulating material suitable to withstand the voltage of the highest-voltage supply circuit to which the communication circuit is exposed up to 7,500 volts. [§ 39 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-667 Telephone and other communication apparatus on circuits exposed to supply lines or lightning——Grounding. The ground connections for outside installations of cable protectors employed solely to prevent electrical damage to the cable need not conform with the requirements of this rule.

(1) **Methods.** Arresters and, where required, exposed noncurrent-carrying metal parts shall be grounded in the following manner:

(a) The grounding conductor shall preferably be of copper (or other material which will not corrode excessively under the prevailing conditions of use) and shall be not less than No. 18 (0.040 inch) in size, and where within buildings shall be covered with a suitable insulation.

If necessary to guard the grounding conductor from mechanical damage (on poles or where a grounding conductor on the outside of building walls is near a roadway, sidewalk, or pathways, thus exposing it to tampering by unauthorized persons), it shall be protected for a distance of 8 feet from the ground by a wooden molding or by conduit of nonmagnetic material.

(b) The grounding conductor shall preferably be connected to a cold-water pipe. In the absence of a water pipe, connection may be made to a continuous underground metallic gas-piping system, to metallic structures when effectively grounded, or to a ground rod or pipe driven into permanently damp earth. If a gas-pipe electrode is used, connection shall be made between the gas meter and the street main. Steam or hot-water pipes should not be used for ground connections. Driven rods or driven pipes used as ground connections for protectors shall not be also used as ground connections for electric-supply circuits or electric apparatus. The requirement of separate driven rods or pipes for protectors and for electric supply circuit grounding, or the use of other separate grounds, does not prohibit bonding together such grounds where such bonding seems desirable. Where water or gas pipes are used for a ground connection, attachment to such pipes shall not be made at the same point as attachments to electric-supply circuits or equipment.

(2) **Connecting grounding conductor or pipes.** Grounding conductors shall be attached to pipes by means of suitable ground clamps; the entire surface of the pipe to be covered by the clamp shall be thoroughly cleaned.

(3) **Connecting grounding conductors to driven rod or pipe or other metallic structure.** Grounding conductors shall be so attached to the rod, pipe or metallic structure as to give reliable connection, both mechanically and electrically, and in such a manner as to prevent excessive corrosion when the joint is buried in the earth. [§ 39 (part), filed 3/23/60, effective 12/1/58.]

RADIO AND T.V. INSTALLATIONS

WAC 296-44-670 Rules for radio and T.V. installations——Scope. The rules of WAC 296-44-670 through 296-44-766 apply to radio-transmitting and receiving installations, including antennas, counterpoise wires, lead-in conductors, grounding conductors, grounding connections, protective devices, and batteries. The rules do not apply to mobile or portable installations of any type, nor to equipment and coupling wires used for coupling carrier-current equipment to supply-line conductors. In case the installation is covered by more than one rule, the superior requirement shall apply.

Community television antenna and distribution systems shall conform to construction and clearance requirements for communications cables and/or wires as provided for in other parts of the code.

The term "Radio stations" shall include television station transmitter, receiver, their antennas and distribution systems. [§ 50, filed 3/23/60, effective 12/1/58.]

WAC 296-44-673 Classification of radio stations. For the purpose of these rules, radio stations are classified as follows: (1) **Receiving stations.**

(2) **Transmitting stations.** The power rating of transmitter shall be the rating authorized by the federal communications commission or other authorized federal regulatory body in granting construction permits and licenses. For the purpose of this code, transmitting stations are divided into three groups as follows:

(a) Low power. Transmitting stations having a licensed operating power less than 100 watts output and a maximum plate supply voltage (dc or rms ac) less than 750 volts.

(b) Medium power. Transmitting stations not classified as low power or high power.

(c) High power. Transmitting stations having a licensed operating power output greater than 1,000 watts or a maximum plate supply voltage (dc or rms ac) greater than 5,000 volts.

Note: In the case of amateur stations, the classification under these rules shall be determined by the voltage used on the plate of the last tube of the transmitter.

[§ 51, filed 3/23/60, effective 12/1/58.]

WAC 296-44-676 Antenna and counterpoise installation——Application of rules. These rules apply as follows: (1) **Outdoor antennas of all classes of stations (as defined in WAC 296-44-673(1) and (2)).** There are no requirements for indoor antennas, except that they shall meet the requirements for clearance from the conductors of other systems specified in WAC 296-44-706(3). In general, transmitting antennas should not be located indoors.

(2) **Counterpoise wires.**

(3) **Ground-system wires.** There are no requirements for the ground-system wires of an antenna. [§ 52 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-679 Antenna and counterpoise installation——General requirements. (1) **Antennas.**

(a) Antennas of receiving stations. Such antennas shall comply with the requirements for the construction of communication lines for public use in similar situations, as given in WAC 296-44-274 through 296-44-457.

(b) Antennas of transmitting stations. Such antennas shall comply with the requirements for the construction of supply lines for public use in comparable situations and for the voltage concerned, as given in WAC 296-44-274 through 296-44-457.

(2) **Counterpoise wires.** Counterpoise construction shall conform to the requirements for that of the associated antenna as regards location and clearances with respect to conductors of other systems. [§ 52 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-682 Antenna and counterpoise installation——Locations to be avoided. (1) **Medium and high-power transmitting stations.** The following situations shall be avoided in erecting the antenna,

counterpoise, and guy-wire systems of medium and high-power transmitting stations:

(a) Attachment of any wires of the systems to poles which carry the conductors of any electric supply or communication circuits.

(b) Crossings (above or below) or conflicts of any of the wires of the systems with the conductors of any electric supply or communication circuits.

(c) Crossing over streets, highways, or the tracks of any railroad.

(2) **Receiving and low-power transmitting stations.**

(a) In relation to circuits of more than 250 volts—The following situations shall be avoided in erecting the antenna, counterpoise, and guy-wire systems of receiving and low-power transmitting stations, except for the equipment of public utilities attached to their own poles:

(i) Attachment of any wires of the systems to poles which carry electric supply or communication circuits of more than 250 volts to ground.

(ii) Crossings (above or below) or conflicts of any of the wires of the systems with the conductors of any electric supply or communication circuits of more than 250 volts to ground.

(b) In relation to circuits of less than 250 volts—The following situations should be avoided whenever possible in erecting the antenna, counterpoise, and guy-wire systems of receiving and low-power transmitting stations, except for the equipment of public utilities attached to their own poles:

(i) Attachment of any wires of the systems to poles carrying the conductors of electric supply or communication circuits, none of which exceeds 250 volts to ground.

(ii) Crossings or conflicts of any wires of the systems with the conductors of any electric supply or communication circuits of less than 250 volts to ground.

(iii) Crossing over streets, highways, or the tracks of any railroad. [§ 52 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-685 Antenna and counterpoise installation——Ordinary construction of antenna systems. If all of the situations listed in WAC 296-44-682 are avoided, antenna systems should be constructed in accordance with this section. If any of the situations of WAC 296-44-682(2)(b), are not avoided, antenna systems shall be constructed in accordance with WAC 296-44-688. (1) **Antenna conductors.**

(a) Material. Antenna conductors should be of copper, copper-covered steel, bronze, or other corrosion-resistant material of adequate strength.

(b) Size. Antenna conductor sizes should be not less than given in Table 1.

TABLE 1.—Antenna conductor sizes—ordinary construction

Material	Receiving and low-power transmitting			Medium and high-power transmitting		
	Span length			Span length		
	Less than 35 feet	35 to 150 feet	Exceeding 150 feet	Less than 35 feet	35 to 150 feet	Exceeding 150 feet
	AWG No.	AWG No.	AWG No.	AWG No.	AWG No.	AWG No.
Copper:						
Soft-drawn	19	14	8	14	7	———
Medium-drawn	19	14	10	14	8	———
Hard-drawn	19	14	12	14	10	8
Bronze, copper-covered steel, or other high-strength, corrosion-resistant material	19	14	14	14	12	10

(c) Strength. The conductor sizes listed in Table 1 provide for minimum strength without loading. In localities subject to glaze, ice, sleet, or snowstorms, comprised in the heavy- and medium-loading districts, additional strength should be provided. (See WAC 296-44-352.) In determining the loading, the effect of lead-in conductors and the loading thereon should be included.

(2) **Antenna insulators.**

(a) Material. Insulators should be of noncombustible material.

(b) Dielectric strength.

(i) Receiving and low-power transmitting stations. No requirements.

(ii) Medium and high-power transmitting stations. Insulators should meet the requirements of WAC 296-44-385 for the voltage developed on the antenna at the points of insulator attachment.

(c) Mechanical strength. Insulators should have a breaking strength not less than that of the smallest conductor which would be permitted by Table 1.

(3) **Antenna supports.**

(a) Strength of supports. All supporting structures should be so constructed as to carry the vertical, longitudinal, and transverse loads. They should be so erected that they are not dependent in general on the antenna for stability. Guys or braces may be used to obtain the necessary strength to withstand the longitudinal and transverse loads. Where the stability of the support is solely dependent on the guys, these should be led out in at least three approximately equally spaced directions from the support. In determining the loads, the storm-loading map given with WAC 296-44-352 should be employed; also the effect of the lead-in conductors and the load thereon should be included.

Exception: If ice-melting arrangements are regularly utilized, ice loading may be disregarded.

(b) Guys. Guys should be of galvanized steel, copper covered steel, bronze or other corrosion-resistant material and should be of adequate size, and in any case not

less than the equivalent of No. 14 AWG solid wire. They should be firmly attached to adequate anchors or to structures which will furnish a substantial anchorage. Where guys may be exposed to mechanical damage they should be provided with guards. Guys associated with antennas of transmitting stations where accessible to unauthorized persons shall be grounded or contain insulators complying with WAC 296-44-409.

(c) Roof supports. Antenna supports erected on roofs should be of substantial construction and, where necessary, shall be arranged to distribute the load over the roof.

(d) Chimneys. The attachment of antennas or antenna supports to chimneys shall be avoided where such attachment might overload the chimney.

(e) Grounding metal supports on roofs. Metal supporting poles or masts extending more than 10 feet above the supporting building shall be permanently and effectively grounded in conformance with the requirements of WAC 296-44-730 through 296-44-739, except poles or masts which themselves are used as antennas.

(f) Trees. Where antennas or guys are attached to trees, the location and method of attachment shall be such that swaying of the tree in the wind will not cause undue stress in the antenna conductors.

(4) **Strength of attachment of antennas to supports.** The means used for attaching the antenna to the support shall be such as to withstand a load that will break the conductor itself. The use of a strain hook which will release the wire before it breaks is permissible if the circumstances of a particular installation warrant it.

(5) **Minimum clearance above ground and roofs.**

(a) Spans 150 feet or less in length. Antenna conductors in approximately horizontal spans shall have clearances above ground and roofs not less than given in Table 2. These clearances do not apply to vertical antennas or vertical leadins.

TABLE 2.—Minimum antenna clearances above ground or roof

Location	Receiving and low-power antennas Feet	Medium and high-power antennas Feet
Above roofs	8	8
Along road in rural districts	15	28
Above streets and roadways	18	28
Above roadways to residence garages	10	12
Above spaces or ways normally accessible to pedestrians only	10	12

(b) Spans exceeding 150 feet in length. For such spans the above clearances shall be increased by 0.1 foot for each 10 feet in excess of 150 feet. [§ 52 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-688 Antenna and counterpoise installation——Special construction of antenna systems. Where any of the situations of WAC 296-44-682(2)(b)(i), (ii), and (iii), are not avoided, the construction shall meet such of the following rules as may apply: (1) **Recommendation against locating antennas in situations where special construction is required.** It is strongly recommended that the installation of antennas in these special situations be avoided.

Note: If such locations are employed, it must be recognized that special hazards are introduced and that great care is necessary in the construction and maintenance of antennas to avoid contact with supply or communication conductors and to avoid the reduction of clearance over highways or railroad tracks.

(2) **Attachment to poles carrying conductors of electric supply or communication circuits of less than 250 volts to ground.** The attachment to such poles shall be made in such a manner and at such a location on the pole as not to interfere with the operation or maintenance of the electric supply or communication circuits, and to provide a clearance of at least 40 inches below the conductors and equipment of the electric supply or communication circuits. The antenna conductor, counterpoise, or guy wires preferably should be attached below the foreign circuit attachments.

Exception: These requirements do not apply in the case of outdoor installations of radio equipment and antennas where the electric supply or communication circuits terminate in the radio equipment.

(3) **Crossings over or conflicts with electric supply or communication circuits of less than 250 volts to ground.** In such locations the antenna conductors, counterpoise, or guy wires shall be constructed in accordance with the provisions of WAC 296-44-685, and, in addition, a clearance of 6 feet shall be maintained at the crossing or throughout the conflicting section.

(4) **Crossings under electric supply or communication circuits of less than 250 volts to ground.** In such locations the antenna conductors, counterpoise, or guy wires shall be constructed in accordance with the provisions of WAC 296-44-685, and, in addition, they shall be so constructed as to insure the maintenance of at least 2 feet from a communication conductor and of 4 feet from an electric supply conductor.

Note: It should be noted that for relatively long spans on the electric supply or communication circuit, the increase in sag with ice and wind loading is considerably more than for short spans, and allowances should be made accordingly when determining the clearance under fair-weather conditions.

(5) **Crossings over streets, highways, or railway tracks.** In such locations the antenna conductors, counterpoise, or guy wires shall be constructed in accordance with the provisions of WAC 296-44-685 and, in addition, shall meet the requirements of WAC 296-44-274 through 296-44-457 for the strength and sag of conductors, strength of supports, and clearance above the roadway applicable to communication lines in such locations. Where the requirements of WAC 296-44-685 differ from those of WAC 296-44-274 through 296-44-457,

the requirements of WAC 296-44-274 through 296-44-457 shall control. [§ 52 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-691 Antenna and counterpoise installation——Guarding of antennas. Antennas for transmitting stations except those of the shunt-excited, grounded-base type shall be installed so as not to be readily accessible to unauthorized persons. [§ 52 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-694 Antenna and counterpoise installation——Supply circuits as antennas or grounds. Electric supply circuits shall not be employed as receiving antennas or as operating grounds through a conductive connection. They may be so used if suitable capacitors having a dielectric strength sufficient to withstand seven times the normal supply-circuit voltage and a capacitance of not more than 0.1 microfarad are inserted between the apparatus and each wire of the supply circuit. [§ 52 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-697 Lead-in conductors——Application of rules. The requirements of this section apply to lead-in conductors (including radio-frequency transmission lines) of receiving stations and low-power transmitting stations. Lead-in conductors of medium and high power transmitting stations shall meet such of the requirements of WAC 296-44-079 through 296-44-271, supply stations, as apply for the voltages concerned. [§ 53 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-700 Lead-in conductors——Material. Lead-in conductors shall be of copper, bronze, copper-covered steel, or other corrosion-resistant material. [§ 53 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-703 Lead-in conductors——Size. The size of the lead-in conductor should not be less than that specified in Table 1, the span length being taken as the distance from the point of attachment to the antenna to the first building attachment. Where the lead-in conductors are attached to intermediate supports, the maximum span shall be considered. [§ 53 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-706 Lead-in conductors——Installation of lead-in conductor. (1) **From antenna to first building attachment.** This section of the lead-in wire shall conform to the requirements as specified in WAC 296-44-680 and 296-44-688 for antennas similarly located.

(2) **From first building attachment to building entrance.** This section of the lead-in conductor shall be installed and maintained so that it cannot swing closer to the open conductors of communication supply, or lightning-rod systems than the following distances.

Communication or supply circuits of 0 to 750 volts	2 feet
Supply circuits exceeding 750 volts	10 feet
Lightning-rod systems	6 feet

Exception: The 2-foot clearance from communication or supply circuits of less than 750 volts may be reduced to not less than 4 inches if the lead-in conductor is separated from other conductors by a continuous and firmly fixed nonconductor which will maintain permanent separation. This nonconductor shall be in addition to any insulating covering on the wires.

Lead-in conductors of low-power transmitting stations shall be firmly mounted on insulating supports so as to clear by at least 3 inches the surface of the building. If the lead-in has an effectively grounded metal sheath, it may be attached directly to the surface and treated as a grounding conductor with respect to clearance and other requirements.

(3) **From building entrance to set.**

(a) Receiving stations.

(i) Lead-in conductors shall be securely fastened in a workman-like manner.

(ii) Clearance between lead-in conductor and any supply conductor not in conduit shall not be less than 4 inches.

Exception 1: This 4-inch clearance does not apply if a firmly fixed nonconductor such as a porcelain tube affords a permanent separation. This nonconductor shall be in addition to any insulating covering on the wires.

Exception 2: This 4-inch clearance does not apply where the lead-in terminates in an outlet box which is also occupied by the conductors of another system, provided such outlet box is equipped with a barrier of sheet steel not less than No. 16 U.S. Standard Gage or a barrier of fire-resistant insulating material rigidly fastened to the box or its cover, or other device which assures positive separation between the lead-in conductors and the conductors of the other system.

(b) Low-power transmitting stations.

(i) Lead-in conductors shall be securely fastened to suitable insulators which provide a clearance of at least 2 inches to the nearest surface.

(ii) Clearance between lead-in conductor and any supply wire shall be at least 4 inches.

(iii) Lead-in conductors shall be installed and protected to prevent persons from readily coming into accidental contact with them.

Exception: If the lead-in has an effectively grounded metal sheath, it may be treated as a grounding conductor and attached directly to any surface.

[§ 53 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-709 Construction at building entrance——Application of rules. The requirements of this section apply to construction at receiving stations and low-power transmitting stations. Construction at building entrance of medium- and high-power transmitting stations shall meet such of the requirements of WAC 296-44-079 through 296-44-271, supply stations, as may apply for the voltage concerned. [§ 54 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-712 Construction at building entrance——Entrance. (1) **Receiving stations.** Lead-in conductors for receiving stations shall be either insulated or surrounded by a grounded metallic sheath where they enter the building.

(2) **Low-power transmitting stations.** Lead-in conductors for low-power transmitting stations, where not installed with a grounded metallic sheath, shall enter the building by one of the following methods:

(a) through a rigid, noncombustible, nonabsorptive insulating tube or bushing;

(b) through a drilled window pane; and

(c) through an opening provided for the purpose in which the entrance conductors are firmly secured so as to provide a clearance of at least 2 inches. If the lead-in conductor is inclosed in an effectively grounded metal sheath, no further insulation is necessary. [§ 54 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-715 Construction at building entrance——Creepage and air-gap distance. The entrance bushing or window pane mentioned in WAC 296-44-712 shall, in the case of low-power transmitting stations, afford a creepage and air-gap distance from extraneous bodies of not less than 2 inches. There is no requirement under this title for receiving stations. [§ 54 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-718 Construction at building entrance——Mechanical protection of bushings. Entrance bushings of porcelain or other fragile material at low-power transmitting stations shall be protected where exposed to mechanical injury. [§ 54 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-721 Protective devices——Application of rules. The requirements of this section apply to protective devices for receiving stations and low-power transmitting stations. Protective devices for medium and high-power stations shall meet such of the requirements of WAC 296-44-079 through 296-44-271, supply stations, as may apply for the voltages concerned. [§ 55 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-724 Protective devices——Receiving stations. (1) **Lightning arrester.** Each lead-in conductor of a receiving station using an outdoor antenna shall be provided with a lightning arrester which will operate at a voltage of 750 volts or less.

Exception: If the lead-in conductor is protected by a continuous effectively grounded metal sheath, the lightning arrester may be omitted.

(2) **Location.** The lightning arrester may be located outside or inside the building as near as practicable to the point of entrance and convenient to a ground. The arrester shall not be placed in the immediate vicinity of easily ignitible material nor in a location exposed to dust, inflammable gases, or flyings of combustible materials. [§ 55 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-727 Protective devices——Low-power transmitting stations. (1) **Protective device.** Lead-in conductors of low-power transmitting stations shall be equipped with a grounding switch, lightning arrester, horn gap, or other suitable means for lightning protection. If no conducting path between the antenna and ground is provided in the connected equipment, means shall be provided to drain static charge from the antenna system.

Exception: Where the antenna itself is directly grounded, other forms of protection against lightning and static charge may be omitted.

(2) **Location.** The protective device may be located either outside or inside the building. The device should be placed in the most direct line between the lead-in conductor and the point where the grounding connection is made. The device shall not be placed in the immediate vicinity of easily ignitible material nor in a location exposed to dust, inflammable gases, or flyings of combustible material. [§ 55 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-730 Protective and operating grounding conductors——Application of rules. The requirements of this section apply to grounding conductors of receiving stations and low-power transmitting stations. Grounding conductors of medium and high-power transmitting stations shall meet such requirements of WAC 296-44-058 through 296-44-071, grounding, and WAC 296-44-079 through 296-44-271, supply stations, as apply. [§ 56 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-733 Protective and operating grounding conductors——General. The protective grounding conductor may be used also as the operating grounding conductor. [§ 56 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-736 Protective and operating grounding conductors——Material and size. (1) **Receiving stations.** Material. No requirements.

(a) Operating grounding conductor. No requirements.

(b) Protective grounding conductor. This conductor shall be not smaller than No. 14 AWG. copper and not smaller than the lead-in conductor.

(2) **Low-power transmitting stations.** The operating and protective grounding conductors of low-power transmitting stations shall be not smaller than No. 14 AWG. copper, and not smaller than the lead-in conductor. [§ 56 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-739 Protective and operating grounding conductors——Installation of grounding conductors. (1) **Method of running.**

(a) Grounding conductors shall be run in as straight a line as practicable from the set or the protective device to a good effective ground as specified in WAC 296-44-742 through 296-44-751.

(b) Grounding conductors may be run either inside or outside of the building.

Recommendation: It is recommended that the protective grounding conductor for low-power transmitting stations be run outside of the building.

(2) **Mechanical protection.** Grounding conductors shall be guarded against mechanical injury.

(3) **Insulation.** Grounding conductors may be of insulated or bare wire and need not be run on insulating supports.

(4) **Fuse not to be used.** No fuse shall be included in the circuit between the lightning arrester and the protective ground. [§ 56 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-742 Grounds and ground connections——Application of rules. The requirements of this section apply to protective grounds and ground connections for receiving stations and to operating and protective grounds and ground connections of low-power transmitting stations. There are no requirements for operating grounds or ground connections for receiving stations. Grounds and ground connections for medium and high-power transmitting stations shall meet such requirements of WAC 296-44-058 through 296-44-076, grounding, and WAC 296-44-079 through 296-44-271, supply stations, as apply. [§ 57 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-745 Grounds and ground connections——Grounds. (1) **Cold-water pipes.** Cold-water pipes shall preferably be used for grounds where such pipes are available and are connected or bonded to an extensive underground piping system or to a metallic well casing. An outlet pipe from a water tank fed by a street water main or a driven well may be used provided such outlet pipe is adequately bonded to the inlet pipe connected to the street water main or to the well casing.

(2) **Gas pipes.** In the absence of cold-water pipes, an extensive underground gas piping system may be used provided the grounding-conductor connection is made between the gas meter and the street main.

(3) **Steam and hot-water pipes.** Steam and hot-water pipes shall not be used for grounds.

(4) **Metallic structures.** A metallic structure may be used as a ground, if effectively grounded.

(5) **Artificial grounds.** In the absence of underground piping systems, driven pipes or rods or buried plates may be used. Steel or iron pipes or rods shall be galvanized or copper-coated. [§ 57 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-748 Grounds and ground connections——Attachment to pipes. Grounding conductors shall be attached to pipes by means of suitable ground clamps which will not fail because of corrosion or cause corrosion of the pipe, or by other means which will insure a good mechanical and electrical connection. The entire surface of the pipe to be covered by the clamp shall be thoroughly cleaned. Connections to such pipes shall not be made at the same point as used for grounding electric supply or communication circuits or equipment. [§ 57 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-751 Grounds and ground connections——Attachment to driven pipes, rods, or buried plates. The grounding conductor shall be attached to the rod, buried plate, or other body so as to give a reliable connection both mechanically and electrically. This connection shall be made so that it will not fail through corrosion even when the joint is buried in the earth. Driven pipes or rods or buried plates used as grounding electrodes shall not be used also as grounding electrodes for electric supply or communication circuits or equipment. This requirement, however, does not prohibit the bonding together of the grounds of these several services where such bonding seems desirable. Where an effective station ground has been established by bonding together a group of such driven pipes or rods or buried plates, connection may be made thereto even though this ground is also used for other services. [§ 57 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-754 Connection to power supply lines——Application of rules. The requirements of this section shall apply to connecting devices for receiving stations and low-power transmitting stations. Connecting devices for medium and high-power transmitting stations shall meet such requirements of WAC 296-44-079 through 296-44-271, supply stations, as may apply. [§ 58 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-757 Connection to power supply lines——Receiving stations and low-power transmitting stations. Devices used in connection with power supply lines and methods of wiring employed at receiving stations and low-power transmitting stations shall be in accordance with the rules covering permanent or portable fixtures, devices, and appliances of WAC 296-44-625 through 296-44-643. [§ 58 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-760 Batteries——Application of rules. The requirements of this section apply to batteries for receiving stations and transmitting stations of low and medium power. Large permanently installed batteries with a nominal voltage in excess of 50 volts, and batteries for high-power transmitting stations shall conform to WAC 296-44-142 through 296-44-166, rules for stations. [§ 59 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-763 Batteries——Care in handling. Care shall be used in handling batteries in order to avoid contact with terminals having a high enough difference of potential to cause shock. [§ 59 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-766 Batteries——Portable batteries. (1) **Ventilation.** Storage batteries shall be located where there is adequate ventilation.

(2) **Precautions.** Smoking, or the use of open flames, or of tools which may generate sparks, should be avoided except when cells are not actively gassing and when prior ventilation has been ample. Sparks from frictional

or static electricity should be avoided, as they may ignite the gas if discharged close to its source, as at the vent of a sealed-type cell during overcharging. The electrolyte of storage batteries, and spray containing electrolyte, are somewhat corrosive, particularly when concentrated by evaporation, and contact with body or clothes should be avoided.

Do not handle live parts of batteries or their connections unless adequate precautions are taken to avoid shock. [§ 59 (part), filed 3/23/60, effective 12/1/58.]

WAC 296-44-850 Pole lines that overbuild or underbuild existing pole lines. No company shall construct a pole line which will overbuild or underbuild the existing pole lines of any company without first giving such company fifteen days' notice in writing or receiving the permission of the company affected: *Provided*, That this rule shall not apply to wires crossing over or under existing wires at an angle in excess of fifteen degrees: *Provided, further*, That this rule shall only apply when either the existing or the proposed line is to be operated at a potential in excess of 5,000 volts. [Rule 34, filed 8/3/61.]

WAC 296-44-855 High potential lines overbuilding telephone, telegraph, or signal wires. Wires or cables carrying electricity at a potential of 750 volts or more, overbuilding telephone, telegraph, or signal wires shall have a minimum size of wire No. 6 B & S gauge annealed copper or its equivalent in strength: *Provided, further*, That this rule shall only apply when either the existing or the proposed line is to be operated at a potential in excess of 5,000 volts. [Rule 35, filed 8/3/61.]

WAC 296-44-860 Crossings over railroads, street railroads, telephone, telegraph, signal or other power lines——General requirements. All wires or cables carrying electric current shall be run, placed, erected and maintained on crossings over railroads, street railroads, telephone, telegraph, signal or other power lines, in accordance with the following specifications: (1) Location: The poles, or towers, shall be located as far as practicable from inflammable material or structures.

(2) The poles, or towers, supporting the crossing span, and the adjoining span on each side preferable shall be in a straight line.

(3) Power wires or cables shall cross above the telegraph, telephone, and similar wires wherever practicable.

(4) Cradles or overhead bridges shall not be used.

(5) Crossing spans shall have a maximum length of 150 feet, except by permission of the commission,* and the difference in length of the crossing and adjoining spans generally shall not be more than fifty percent of the length of the crossing span.

(6) Clearance: Poles shall not be located less than twelve feet from the nearest rail of mainline track, nor less than six feet from the nearest rail of sidings, except by permission of the commission.* At loading sidings sufficient space shall be left for a driveway.

(7) The separation of conductors supported by pin insulators shall not be less than:

Line voltage	Separation
Not exceeding 750 volts	10 inches
Exceeding 750 volts but not exceeding 7,500	12 inches
Exceeding 7,500 volts but not exceeding 15,000	22 inches
Exceeding 15,000 volts but not exceeding 27,000	30 inches
Exceeding 27,000 volts but not exceeding 35,000	36 inches
Exceeding 35,000 volts but not exceeding 47,000	45 inches
Exceeding 47,000 volts but not exceeding 70,000	60 inches

Note 1.—This requirement does not apply to wires of the same phase or polarity between which there is no difference of potential.

Note 2.—The separation of conductors in series arc or incandescent circuits where the potential is not in excess of 10,000 volts need not exceed 12 inches.

(8) When supported by insulators of the disc or suspension type, the wire in the crossing span and the next adjoining spans shall be so attached to the insulators that a break in the span next adjoining the crossing span will not reduce the clearance specified more than twenty-five percent.

*Public service commission abolished. Duties devolve upon director of labor and industries, RCW 43.22.050.

(9) Conductors: The normal mechanical tension in the conductors generally shall be the same in the crossing span and in the adjoining span on each side.

(10) The conductors shall not be spliced in the crossing span, nor in the adjoining span on either side when there are more than two spans between crossings.

(11) The method of supporting the conductors at the poles, or towers, shall be such as to hold the wires, under maximum loading, to the supporting structures, in case of broken insulators, or wires broken or burned at the insulator, without allowing an amount of slip which would materially reduce the clearance specified.

(12) Crossarms: Double crossarms shall be used on the poles or towers supporting crossing spans having a potential in excess of 15,000 volts where the strength of the conductor is less than that of No. 2 B. & S. gauge annealed copper.

(13) Guys: Wooden poles supporting crossing spans having a length of one hundred and twenty-five feet or more, and the next adjoining poles shall be headguyed away from the crossing span in all cases where the potential is in excess of 15,000 volts.

(14) Strain insulators shall not be used in guying steel structures, and are not required on wooden poles if the guy is effectually grounded, except within the incorporated limits of any city or town as provided in RCW 19.29.010(11).

(15) Clearing: The space around the poles, or towers, shall be kept free from inflammable material, underbrush and grass.

(16) Temperature: In the computation of stresses and clearances, and in erection, provision shall be made for a variation in temperature from minus 20 degrees Fahrenheit to plus 120 degrees Fahrenheit. A suitable modification in the temperature requirements shall be made for regions in which the above limits would not fairly represent the extreme range of temperature. [Rule 36, subsections 1–16, filed 8/3/61.]

WAC 296-44-865 Crossings over railroads, street railroads, telephone, telegraph, signal or other power lines——Loads. (1) The conductors shall be considered as uniformly loaded throughout their length, with a load equal to the resultant of the dead load plus the weight of a layer of ice one–half inch in thickness, and a wind pressure of 8.0 pounds per square foot on the ice–covered diameter, at a temperature of 0 degrees Fahrenheit.

(2) The weight of ice shall be assumed as 57 pounds per cubic foot (0.033 pounds per cubic inch).

(3) Insulators, pins, and conductor attachments shall be designed to withstand, with the designated factor of safety, the tension in the conductors under the maximum loading.

(4) The poles, or towers, shall be designed to withstand, with the designated factor of safety, the combined stress from their own weight, the wind pressure on the pole, or tower, and the above wire loading on the crossing span and the next adjoining span on each side. The wind pressure on the poles, or towers, shall be assumed at 13 pounds per square foot on the projected area of solid or close structures, and on one and one–half times the projected area of latticed structures.

(5) The poles, or towers, shall also be designed to withstand the loads specified in subsection (4) above combined with the unbalanced tension of:

2 broken wires for poles, or towers, carrying 5 wires or less.

3 broken wires for poles, or towers, carrying 6 to 10 wires.

4 broken wires for poles, or towers, carrying 11 or more wires.

(6) Crossarms shall be designed to withstand the loading specified in subsection (4) above combined with the unbalanced tension of one wire broken at the pin farthest from the pole.

(7) The poles, or towers, may be permitted a reasonable deflection under the specified loading, provided that such deflection does not reduce the clearances specified more than 25 percent, or produce stresses in excess of those specified in WAC 296–44–875. [Rule 36, subsections 17–23, filed 8/3/61.]

WAC 296-44-870 Crossings over railroads, street railroads, telephone, telegraph, signal or other power lines--Factors of safety. (1) The ultimate unit stresses divided by the allowable unit stress shall be not less than the following:

Wires and cables	2
Pins	2
Insulators, conductor attachments and guys	3
Wooden poles and crossarms	3
Structural steel	3
Reinforced concrete poles and crossarms	4
Foundations	2

(2) Insulators: Each insulator shall be subjected to a dry flash over test for five consecutive minutes at the following test voltages:

Line voltage	Test voltage
Less than 30,000	3 times line voltage
Exceeding 30,000 but not exceeding 50,000	2 1/2 times line voltage
Exceeding 50,000	2 1/4 times line voltage

Each insulator shall further be so designed that, with excessive potential, at rated frequency, failure will first occur by flash over and not by puncture.

(3) Each separate part of a built–up insulator shall be subjected to its dry flash over test for five consecutive minutes. The minimum test voltage for each given part of a built–up insulator shall be the potential difference across such part when the assembled insulator is subjected to test as specified in subsection (2) above.

(4) Each insulator shall be subjected to a wet flash over test, under a precipitation of water of one–fifth of an inch per minute, at an inclination of forty–five degrees to the axis of the insulator at the following test voltages:

Line voltage	Test voltage
Less than 30,000	2 times line voltage
Exceeding 30,000	1 3/4 times line voltage

(5) Test voltage above 35,000 volts shall be determined by the A.I.E.E. Standard Spark–Gap Method.

(6) Test voltages below 35,000 volts shall be determined by transformer ratio.

(7) Conductors: The conductors shall be of copper, aluminum or other noncorrodible material or of steel covered with such noncorrodible material.

(8) Conductors shall be of such mechanical strength that when subjected to the most severe loading conditions specified in WAC 296–44–865(1), the tension will not exceed fifty percent of the ultimate strength of the conductor and that under the maximum deflection from such loading the clearances specified will not be reduced.

(9) Insulators for use on lines operated at a potential in excess of 5,000 volts shall be of porcelain or such other material and design that the insulator will have a mechanical strength equivalent to a porcelain insulator, conforming in dielectric strength to subsections 2–6 above.

(10) Strain insulators for guys shall have an ultimate strength of not less than twice that of the guy in which placed. Strain insulators for guys shall not flash over at the line voltage under a precipitation of one–fifth of an inch per minute, at an inclination of forty–five degrees to the axis of the insulator.

Note—This only applies in the case of guys placed in observance of WAC 296–44–860(13).

(11) Pins: For voltage of 15,000 and over, insulator pins shall be of steel, wrought iron, malleable iron, or

other approved metal or alloy, and shall be galvanized or otherwise protected from corrosion: *Provided*, That cast iron pins having a minimum diameter of 1/2 inch need not be galvanized or otherwise specially protected from corrosion.

(12) Guys: Guys shall be galvanized or copper-covered stranded steel cable, not less than 1/4 inch in diameter, or galvanized rolled rods of equivalent tensile strength.

Note—This only applies in the case of guys placed in observance of WAC 296-44-860(13).

(13) Guys to the ground shall connect to a galvanized anchor rod, extending at least one foot above the ground level.

Note—This only applies in the case of guys placed in observance of WAC 296-44-860(13).

(14) Wooden poles: Wooden poles supporting conductors operated at a potential in excess of 7,500 volts shall be of selected timber, peeled, free from defects which would decrease their strength or durability, not less than seven inches minimum diameter at the top, and meeting the requirements as specified in WAC 296-44-865(4) and (5) and subsection (1) of this section. [Rule 36, subsections 24-37, filed 8/3/61.]

WAC 296-44-875 Crossings over railroads, street railroads, telephone, telegraph, signal or other power lines--Working unit stresses. Obtained by dividing the ultimate breaking strength by the factors of safety given in WAC 296-44-870(1).

(1) Structural steel: Lbs. Per Sq. In.

Tension (net section)	18,000
Shear	14,000
Compression	18,000 $-60\frac{L}{R}$

R equals radius of gyration.

(2) Rivets, pins:

Shear	10,000
Bearing	20,000
Bending	20,000

(3) Bolts:

Shear	8,500
Bearing	17,000
Bending	17,000

(4) Wires and cables:

Copper hard drawn, sold B. & S. G. 4-0, 3-0, 2-0	25,000
Copper hard drawn, solid B. & S. G. 1-0	27,500
Copper hard drawn, solid B. & S. G. No. 1	28,500
Copper hard drawn, solid B. & S. G. Nos. 2, 4, 6,	30,000
Copper soft drawn, solid B. & S. G.	17,000
Copper hard drawn, stranded B. & S. G.	30,000
Copper soft drawn, stranded B. & S. G.	17,000
Aluminum, hard drawn, stranded, B. & S. G. under 4-0	12,000
Aluminum, hard drawn, stranded, B. & S. G. 4-0 and over	11,500

(5) Untreated timber:

	Bending Lbs. Per Sq. In.	Compression $\left(\frac{L}{60D}\right)$
Eastern white cedar	600	600
Chestnut	850	850
Washington cedar	850	850
Idaho cedar	850	850
Port Oxford cedar	1,150	1,150
Long-leaf yellow pine	1,000	1,000
Short-leaf yellow pine	800	800
Douglas fir	900	900
White oak	950	950
Red cedar	700	700
Bald cypress (heartwood)	800	800
Redwood	650	650
Catalpa	500	500
Juniper	550	550

L equals length in inches.
D equals least side, or diameter, in inches.

Note 1—In lieu of the above construction, power lines may be carried on poles of such length and spaced at such distances that a wire breaking at any point in the crossing span will swing clear of wire leads below and not come within ten feet of the ground at the highest point.

Note 2—Drop wires from a pole to the patrons' premises or wires crossing over same need not conform to the foregoing specifications except as covered by the following note.

Note 3—Telephone and telegraph lines, and telephone and power drops or service wires must be placed below power wires carrying 750 volts or more, or otherwise must maintain the same standard of strength as the wires they cross or are above.

Note 4—Only the construction last in point of time so run, placed, erected or maintained shall be held to be in violation of the provisions of this rule.

[Rule 36, subsections 38-41, filed 8/3/61.]

WAC 296-44-880 Crossings over railroads, street railroads, telephone, telegraph, signal or other power lines——Clearance.

CLEARANCE The following clearances shall be maintained in all crossing spans	Rails of Railroads	Buildings	Telephone, Telegraph and Signal wires	Power Lines 750 Volts and less, Except Trolley wires
Telephone, Telegraph and Signal Wires	25'	.....	2' above or below*	
Power Lines 750 volts and less, except Trolley Wires	25'	4'	Less 300V 2' above More 300V 3' above	2' above or below
Power Lines more than 750 volts and less than 7,500 volts	28'	6'	3' above	3' above or below

CLEARANCE The following clearances shall be maintained in all crossing spans	Rails of Rail-roads	Buildings	Telephone, Telegraph and Signal wires	Power Lines 750 Volts and less, Except Trolley wires
Power lines more than 7,500 volts and less than 15,000 volts	28'	6'	7' above	7' above
Power Lines 15,000 volts or more	34'	8'	7' above	7' above
Trolley Wires	22'	.....	4' below+	4' below
Drops and Service Wires	25'	.....	2' above or below	Less 300V 2' below More 300V 3' below

* Unless suitably supported to prevent contact.

\+ Except for properly protected cables when two feet will be permitted

CLEARANCE The following clearances shall be maintained in all crossing spans	Power Lines more than 750 an less than 7,500 volts	Power Lines more than 7,500 and less than 15,000 volts	Power Lines 15,000 volts or more	Trolley Wires
Telephone, Telegraph and Signal Wires				
Power Lines 750 volts and less, except Trolley Wires				
Power Lines more than 750 volts and less than 7,500 volts	3' above or below			
Power Lines more than 7,500 volts and less than 15,000 volts	7' above or below	7' above or below		
Power Lines 15,000 volts or more	7' above or below	7' above or below	7' above or below	
Trolley Wires	4' below	7' below	7' below	None
Drops and Service Wires above+	3' below	7' below	7' below	3'

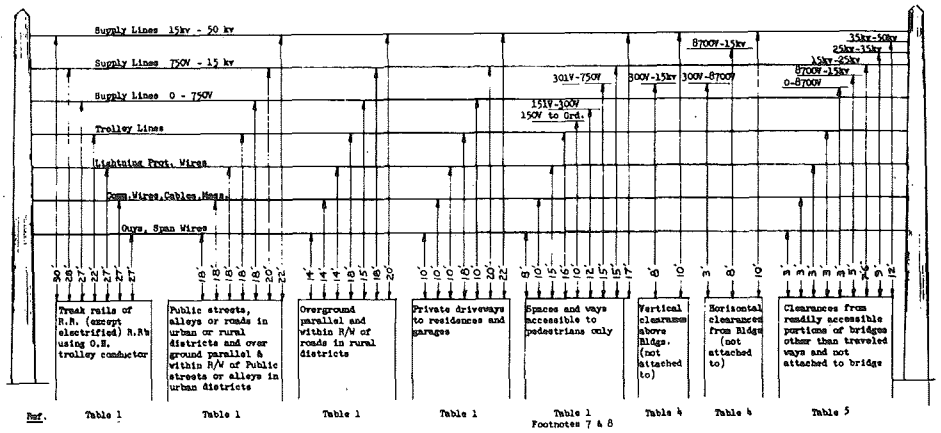
\+ Except for properly protected cables when two feet will be permitted.

[Rule (part), (codified as WAC 296-44-880), filed 8/3/61.]

WAC 296-44-88001 Figure 1--Ground wire clearance.

GROUND AND WIRE CLEARANCES

Fig. 1



NOTE: Above clearances are subject to local ordinances and laws.
State Highways are governed by franchise.
For voltages above 50 kv – Basic clearance at 50 kv plus 0.5 ins. per kv in excess of 50 kv.

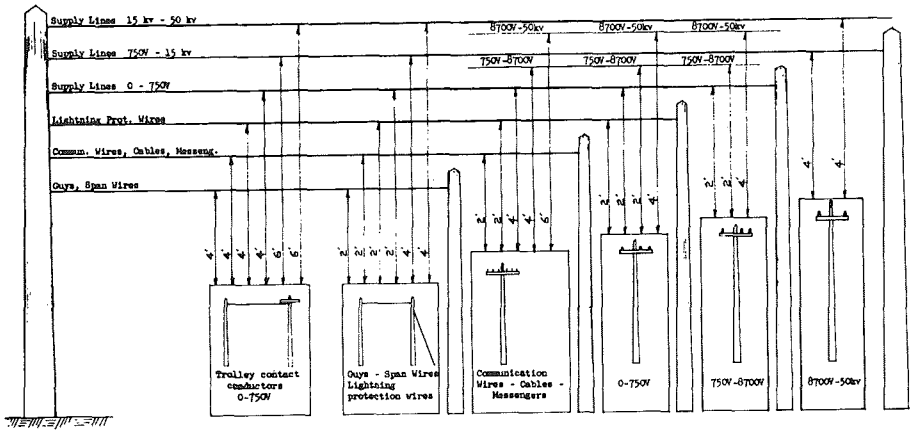
REF: WAC 296-44-316(1) Table 1, WAC 296-44-322(3) and (4) Tables 4 and 5.

[Figure 1, (codified as WAC 296-44-88001), filed 3/23/60, effective 12/1/58.]

WAC 296-44-88002 Figure 2--Basic wire crossing clearance.

BASIC WIRE CROSSING CLEARANCES

Fig. 2

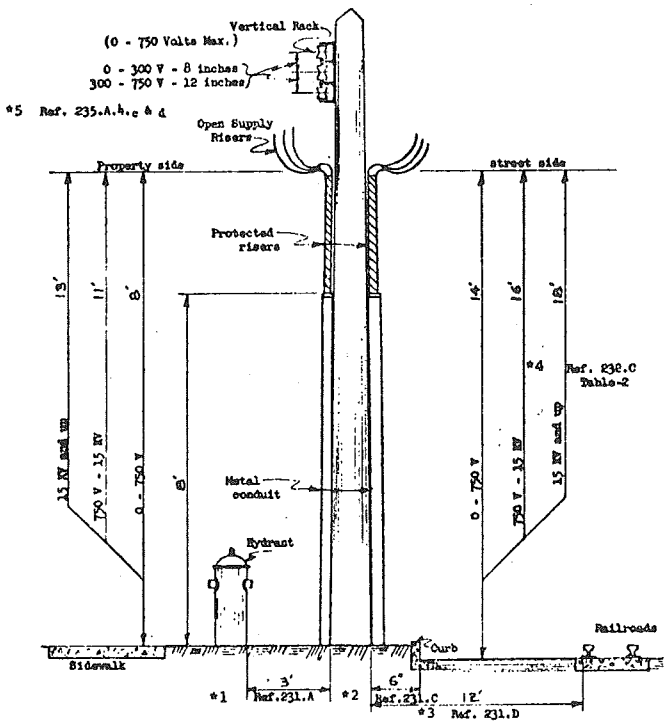


Ref: WAC 296-44-319(1) - Table 3

[Figure 2, (codified as WAC 296-44-88002), filed 3/23/60, effective 12/1/58.]

WAC 296-44-88003 Figure 5--Clearances above ground for underground risers and horizontal clearance of poles from hydrants, curbs and railroads.

FIG. 5



Clearances above ground for underground risers and horizontal clearance of poles from hydrants, curbs and railroads.

*1 WAC 296-44-313(1).
*2 WAC 296-44-313(3).
*3 WAC 296-44-313(4).
*4 WAC 296-44-316(3).
*5 WAC 296-44-325(1)(d)(iii) and (iv).

[Figure 5, (codified as WAC 296-44-88003), filed 3/23/60, effective 12/1/58.]

WAC 296-44-88004 Illustration--Working space.

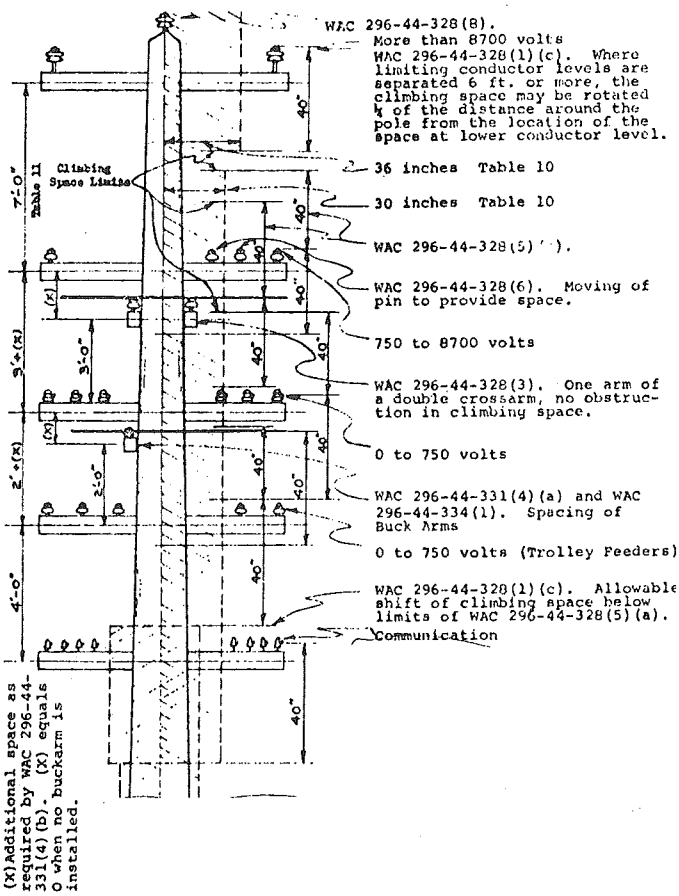


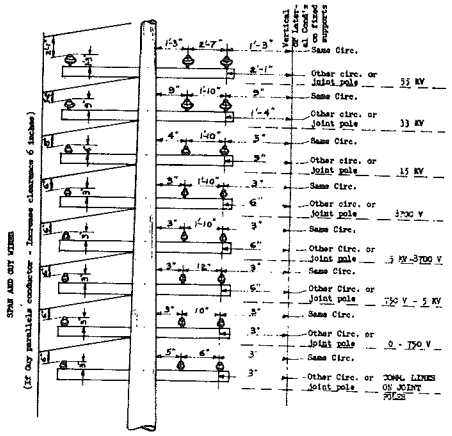
Illustration of
Minimum Crossarm Spacing
and
Minimum Climbing & Working Spaces

Note: The climbing space at communication conductors shall be the same as required for supply conductors immediately above, with a maximum of 30". (Footnote 2 – Table 10)
The climbing space of supply conductors shall be that required by Table 10 for the highest voltage conductor bounding the climbing space and where this voltage level is 40" or less above or below the next lower voltage level than the larger space shall be required. (The vertical separation of conductors on standard pin supports are the regular points for reference.)

[Illustration, (codified as WAC 296-44-88004), filed 3/23/60, effective 12/1/58.]

WAC 296-44-88005 Figures 6.A - 9.A--Clearances.

FIG 6.A – 9.A



MINIMUM CLEARANCES BETWEEN CONDUCTORS AND FROM CONDUCTORS TO GUYS, SURFACES OF POLES, CROSSARMS, VERTICAL OR LATERAL CONDUCTORS ATTACHED TO FIXED SUPPORTS.

These clearances graphically represented are Basic Minimums and are not intended to represent absolute allowable clearances under these rules.

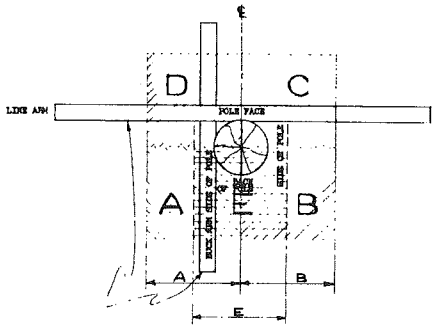
Note: If suspension insulators are not restrained from movement, these clearances are to be maintained with insulator swing of 45° on steel supports or 30° on wooden supports.

Interpolation: For vertical and lateral conductors of over 8700 Volts OF THE SAME CIRCUIT – 3 ins. plus 0.25 in. for each 1000 Volts. OF OTHER CIRCUITS – 6 ins. plus 0.4 in. for each 1000 Volts.

REF. WAC 296-44-325 – Tables 6 and 9
WAC 296-44-334(5)(c)

[Figures 6.A – 9.A, (codified as WAC 296-44-88005), filed 3/23/60, effective 12/1/58.]

WAC 296-44-88006 Figure--Climbing space.



WAC 296-44-328(3) A single cross arm at any conductor level is considered as an obstruction in the climbing space. WAC 296-44-328(4).

WAC 296-44-328(1)(c) "A"-"B"-"C"-& "D" Pole quadrants of the dimensions specified in Table #10 for the voltage of the conductor concerned.

If climbing space is located in quadrant "B", then it may be rotated to quadrant "A" or "C" in any 6 ft. conductor separation.

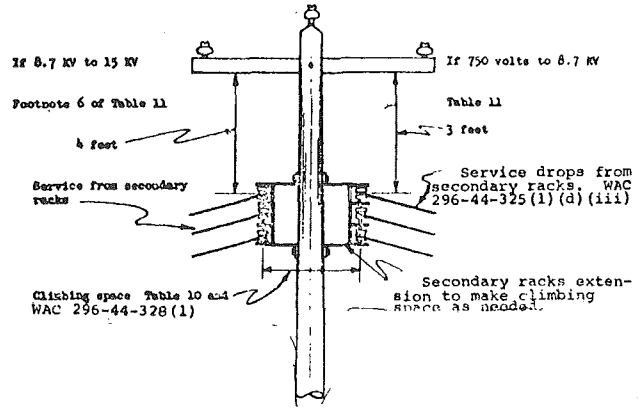
"E" Climbing space on back of pole and may be shifted to quadrants "A" or "B" at 40 inches below limiting conductor levels, or to "C" or "D" in any 6 ft. conductor spacing by the shortest path.

WAC 296-44-331(4) Location of buckarms in relation to linearms.

Note: Conductors supported in standard 29 1/2 in. pin spaces which conflict with the climbing space requirements shall be considered in compliance with the 30 in. climbing space as specified in WAC 296-44-328.

[Figure, (codified as WAC 296-44-88006), filed 3/23/60, effective 12/1/58.]

WAC 296-44-88007 Illustration--Climbing space.



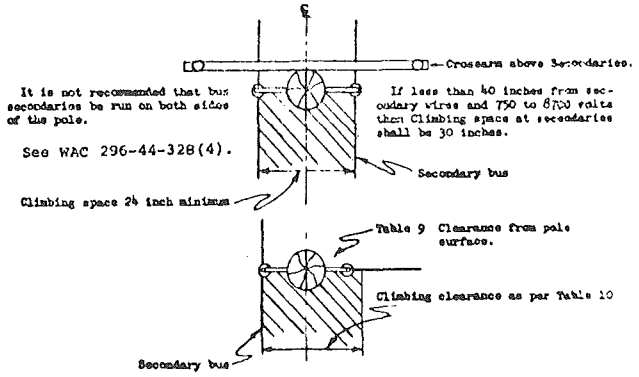
Note: The following application of these rules will be made when secondary racks installed according to WAC 296-44-325(1)(d) are involved.

(1) Secondary racks will be considered the same as crossarms for the application of Table 11 and dimensions as per WAC 296-44-334(1) will apply.

(2) The top and bottom conductors will be the limiting conductors as per WAC 296-44-328(5)(a).

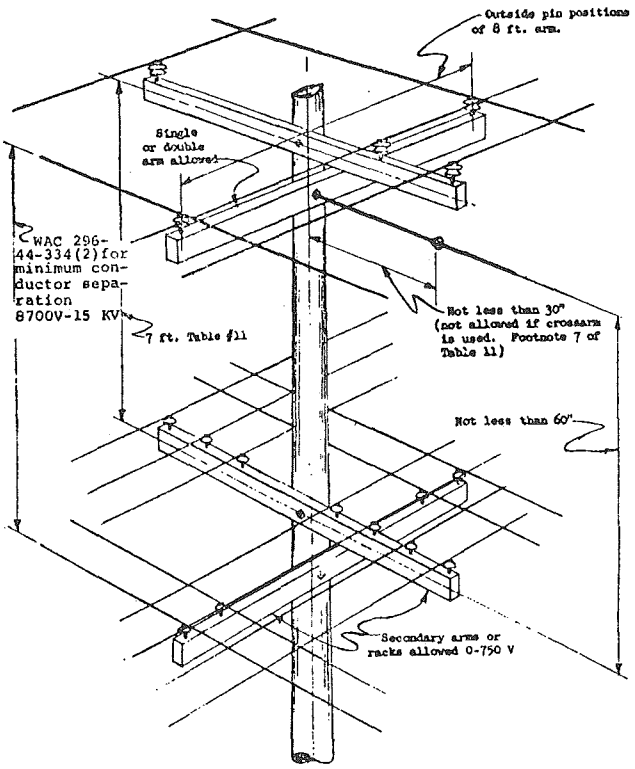
[Illustration, (codified as WAC 296-44-88007), filed 3/23/60, effective 12/1/58.]

WAC 296-44-88008 Illustration--Climbing space.



[Illustration, (codified as WAC 296-44-88008), filed 3/23/60, effective 12/1/58.]

WAC 296-44-88009 Illustration--Footnote 7 of Table 11--Climbing space.



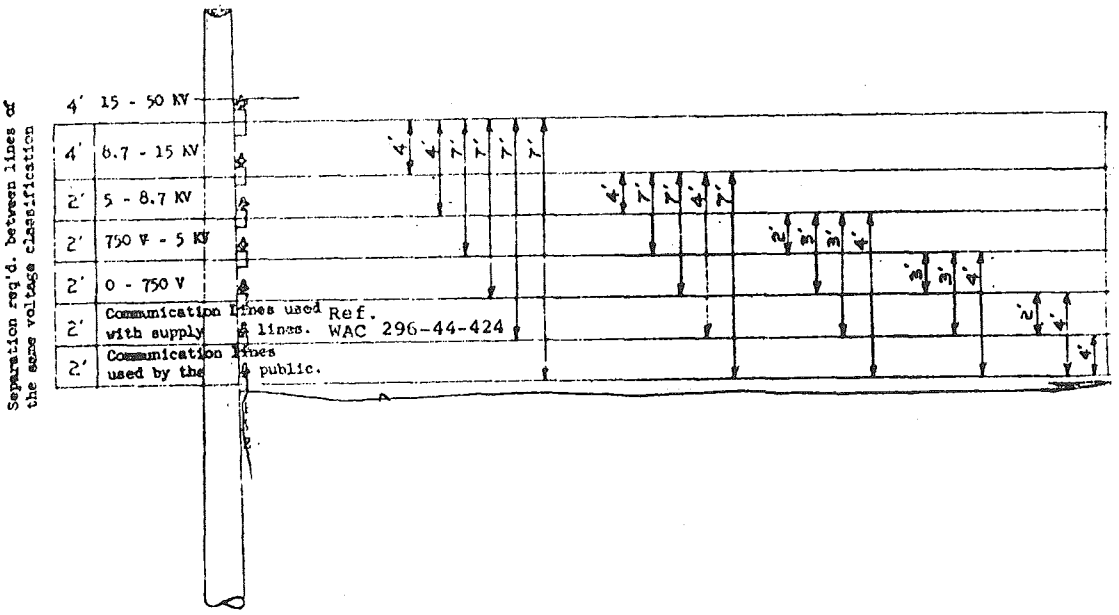
REF. - WAC 296-44-334(1)(a).
FOOTNOTE 7 OF TABLE #11.

[Illustration, (codified as WAC 296-44-88009), filed 3/23/60, effective 12/1/58.]

WAC 296-44-88010 Figure 11.A--Minimum vertical separation between horizontal crossarms.

FIG. 11.A

Minimum vertical separation between horizontal crossarms of the same utility and communication circuits.



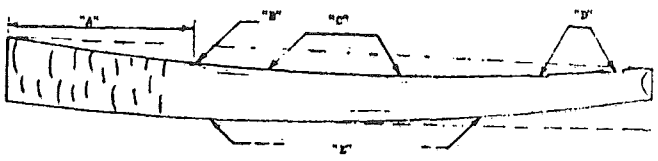
Ref. WAC 296-44-334 - Table 11
Exception: See WAC 296-44-334(1)(a), Table 11-Footnote 6.

WHERE CONDUCTORS ARE OF THE SAME VOLTAGE CLASSIFICATION

Where crossarm separation is:	Separation between conductors may be reduced to:
2 Ft.	16 ins.
3 Ft.	28 ins.
4 Ft.	40 ins.
6 Ft.	60 ins.
7 Ft.	70 ins.

[Figure 11.A, (codified as WAC 296-44-88010), filed 3/23/60, effective 12/1/58.]

WAC 296-44-88011 Illustration--Climbing space--Location and spacing of crossarms.



WAC 296-44-400(1)(f) Length or distance from butt of pole to butt gain or other marking that will indicate depth of pole setting.
WAC 296-44-400(1)(f) Butt gain or other permanent marking.
WAC 296-44-328(3) Face of pole, preferred for the location of line arms.
"D" Cut gains for the location and spacing of crossarms.
"E" Back of pole. Preferred location of climbing space.

[Illustration, (codified as WAC 296-44-88011), filed 3/23/60, effective 12/1/58.]

Chapter 296-45 WAC
SAFETY STANDARDS——ELECTRICAL WORKERS

WAC
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DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

296-45-010 General. [§ 296-45-010, filed 1/3/68; § I, Rules 1.1 through 1.9, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-020 Causes of accident. [§ I, Rule 1.10, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-030 Safety. [§ I, Rule 1.11, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38,, filed 12/30/76.

296-45-040 Definitions. [§ I, Rules 1.12 through 1.29, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-050 Employer's responsibility. [§ II, Rules 2.1 through 2.11, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-060 Foreman's responsibility. [§ II, Rules 2.12 through 2.23, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-070 Employees' responsibility. [§ II, Rules 2.24 through 2.31, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-080 First aid. [§ III, Rules 3.1 through 3.4, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-090 Industrial hygiene. [§ III, Rules 3.5 through 3.7, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-110 Tools——General. [§ IV, Rules 4.1 through 4.7, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-120 Tools——Inspection of tools. [§ IV, Rules 4.8 and 4.9, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-130 Tools——Storage of tools and materials. [§ IV, Rule 4.10, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-140 Tools——Hand tools——Using metal objects. [§ IV, Rules 4.11 and 4.12, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-150 Tools——Ladders. [§ IV, Rules 4.13 through 4.27, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-160 Tools——Scaffolds. [§ IV, Rule 4.28, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-170 Tools——Guards and barriers. [§ IV, Rule 4.29, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-180 Tools——Grounding equipment. [§ IV, Rules 4.30 and 4.31, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-190 Tools——Hot line tools. [§ IV, Rules 4.32 and 4.33, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-200 Tools——Switch stick. [§ IV, Rules 4.34 and 4.35, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-210 Tools——Climbing equipment. [§ IV, Rules 4.36 through 4.39, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-220 Protective devices——Rubber protective equipment. [§ IV, Rules 4.40 through 4.51, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-230 Equipment——Soldering equipment. [§ IV, Rules 4.52 through 4.55, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-240 Equipment——Fire extinguishers. [§ IV, Rule 4.56, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-250 Wearing apparel. [§ 296-45-250, filed 1/3/68; § IV, Rules 4.57 through 4.61, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-260 Transportation——Motor vehicle and trailer operations law. [§ IV, Rule 4.62, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-270 Transportation——Safety practices. [§ 296-45-270, filed 1/3/68; § IV, Rules 4.63 through 4.69, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-280 Employee qualifications. [§ V, Rule 5.1, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-290 Work required of foreman. [§ V, Rule 5.2, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-300 Number of men required to do work safely. [§ V, Rules 5.3 through 5.5, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-310 Replacing or pulling fuses. [§ V, Rules 5.6 through 5.8, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-320 Electric utility employee operated motor cranes, "A" frames, aerial lift equipment, hole digger, winches, etc. [§ V, Rule 5.9, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-330 Working on or near energized lines or equipment. [§ V, Rules 5.10 through 5.15, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-340 Stringing or removing wires. [§ V, Rule 5.16, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

296-45-350 Temporary guard poles and structures. [§ V, Rule 5.17, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-360 Safe working practices. [§ V, Rules 5.18 through 5.46, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-370 Overhead lines——Working above energized circuits over 5 KV. [§ V, Rules 5.47 through 5.50, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-380 Overhead lines——Using hot line tools. [§ V, Rules 5.51 through 5.54, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-390 Overhead lines——Strength of spans and their supports. [§ V, Rules 5.55 and 5.56, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-400 Overhead lines——Foreign operations. [§ V, Rule 5.57, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-410 Overhead lines——Tree trimming. [§ V, Rule 5.58, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-420 Overhead lines——Foreign attachments and placards. [§ V, Rule 5.59, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-430 Substations and generating plants——General. [§ V, Rules 5.60 through 5.64, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-440 Maintenance of clearance. [§ V, Rule 5.65, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-450 Number of men required to work safely. [§ V, Rule 5.66, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-460 Safe working practices. [§ V, Rules 5.67 through 5.78, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-470 Clearances. [§ VI, Rules 6.1 through 6.13, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-480 Grounding. [§ VI, Rules 6.14 through 6.25, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-490 Underground maintenance——General. [§ VII, Rule 7.1, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-500 Underground maintenance——Working in manholes. [§ VII, Rules 7.2 through 7.7, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-510 Underground maintenance——Guarding manholes and street openings. [§ VII, Rules 7.8 through 7.12, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-520 Underground maintenance——Use of tools and equipment. [§ VII, Rules 7.13 through 7.17, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-530 Underground maintenance——Pulling U.G. cable. [§ VII, Rule 7.18, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-540 Underground maintenance——Testing. [§ VII, Rules 7.19 through 7.21, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-550 Underground maintenance——Fishing conduit or ducts. [§ VII, Rule 7.22, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-560 Underground maintenance——Working in elevated position. [§ VII, Rule 7.23, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-570 Underground maintenance——Grounding U.G. power conductors and equipment. [§ VII, Rules 7.24 through 7.27, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-580 Trolley maintenance. [§ VII, Rules 7.28 through 7.40, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-590 Aerial manlift equipment. [§ 296-45-590, filed 1/3/68; § VIII, Rules 8.1 through 8.10, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.
296-45-600 Conclusion. [Matter following Rule 8.10, filed 3/23/60, effective 2/3/56.] Repealed by Order 76-38, filed 12/30/76.

WAC 296-45-650 Electrical workers safety rules——Foreword. The purpose of this chapter is to make the workplace of electrical employees as free from recognized hazard as is reasonably possible. The observance of these rules may in some instances require that speed and work performance be subordinated to the safety of employees. Since the purpose of these rules is the safety of employees, it is expected that those employees engaged in the work for which these rules are intended will, in good faith, adhere to the provisions of this chapter. This chapter is not intended to be a complete description of the work to be done nor is it complete in the sense that additional or unusual hazards may not exist for which there is no regulation or rule. In the event a hazard exists which is not contemplated by this chapter, it is expected that the foreman and employees will in good faith mutually discuss the particular hazard and arrive at a method of performing the work with the greatest degree of safety.

The Department of Labor and Industries is the sole and paramount administrative agency responsible for the administration and interpretation of this chapter and the Washington Industrial Safety and Health Act of 1973. If there exists a question as to the meaning of any provision of this chapter, such question must first be directed to the Department of Labor and Industries and its authorized representatives.

Experience has proven that the majority of injuries and deaths are preventable. Most injuries and deaths are not due to defective equipment but are due to failure on the part of the employees and those in authority to observe safety rules and failure to use safety devices. In the last analysis, this chapter is a compilation of experience and common sense. Electrical safety requires that the work be properly planned, executed by the use of good judgment and under the direction of intelligent supervision. [Order 76-38, § 296-45-650, filed 12/30/76.]

WAC 296-45-65003 Scope and application. (1) The work for which this chapter is enacted is a specialized type of construction work and, insofar as it is specialized, such operations, procedures and work require a particular type of rule or regulation which is generally embodied within this chapter. The purpose of this chapter shall be to avoid those hazards peculiar to the industry, the purpose for which this chapter is designed, and this chapter shall include employees and employers whose business and work include power distribution and transmission lines. The standards apply to all such construction work of an electrical nature regardless of the general nature of the business. The criterion for application of this chapter shall be the nature of the particular

work to be or which is being performed. That work which is intended to be encompassed within the provisions of the mandatory and recommended provisions of this chapter shall include that work, conditions, practices, means, operations and processes performed at or on power distribution and transmission line installations, regardless of location, whether such installation for power distribution is (are) above ground or below ground, and shall include such adjacent and supporting structures as are fairly encompassed by these regulations.

Generally, the nature of the work will be such that industrial insurance premiums could reasonably be said to be reportable; (as of the effective date of this chapter) under WAC 296-17-521 (Class 5-8); WAC 296-17-522 (Class 6-1); and WAC 296-17-539 (Class 13-1). This guideline applies insofar as said class either directly or indirectly is related to the construction, erection, maintenance, repair, alteration, or other operation involving power distribution and transmission lines.

(2) Communication lines and work directed communication lines as defined in chapter 296-32 WAC (Safety Rules for Tele-communications) are subject to the provisions of chapter 296-32 WAC and are not encompassed within the scope of this chapter.

(3) These standards shall apply to installations under the exclusive control of electric utilities used for the purpose of communications or metering, or for generation, control, transformation, transmission, and distribution of electric energy, which are located in buildings used exclusively by the electric utilities for such purposes, or located outdoors on property owned or leased by the electric utilities or on public highways, streets, roads, etc., or outdoors by established rights on private property.

(4) Operation, conditions, work methods and other work related situations or activities not specifically covered by this chapter are subject to the rules and regulations of chapter 296-24 WAC, General Safety and Health Standards; chapter 296-62 WAC, General Occupational Health Standards; chapter 296-155 WAC, Safety Standards for Construction Work; and, insofar as applicable to employee safety and health, RCW 19.29. Additionally, operations, conditions, work methods and other work related situations or activities may be subject to additional rules and regulations depending upon the nature of the work being performed.

(5) Under certain circumstances, an employer may obtain a variance from the Director of the Department of Labor and Industries or his authorized representative. Until such time as a variance is granted, the employer and employees must comply with the mandatory provisions of this chapter. The procedure and requirements for variances are found in WAC 296-350-200 through WAC 296-350-280.

(6) These rules shall not apply to the use of existing electrical installations during their lifetime, provided they are maintained in good condition and in accordance with the applicable safety factor requirements and the rules in effect at the time they were installed, and provided that reconstruction shall conform to the rules as herein provided.

(7) Any rule, regulation or standard contained within this chapter, if subject to interpretation, shall be interpreted so as to achieve employee safety, which is the ultimate purpose of this chapter.

(8) Should a rule or standard contained within this chapter conflict, in any manner, with a standard or rule contained within a general (horizontal) chapter, the standard or rule contained herein shall apply so long as the work being done is electrical work involving power distribution and transmission lines. Should a standard or rule contained within this chapter conflict, in any manner, with a standard or rule contained within a specialized (vertical) chapter (one which applies to a particular type of work), the standard or rule contained herein shall apply as long as the work being performed involves power distribution and transmission lines as hereinbefore defined. Should there be a conflict between two or more standards or rules contained within this chapter, the standard or rule which affords the worker greater safety shall apply.

(9) Neither the promulgation of these rules, nor anything contained in these rules shall be construed as affecting the relative status or civil rights or liabilities between employers and their employees and/or the employees of others and/or the public generally; nor shall the use herein of the words "duty" and "responsibility" or either, import or imply liability other than provided for in the industrial insurance and safety laws of the State of Washington, to any person for injuries due to negligence predicated upon failure to perform or discharge any such "duty" or "responsibility," but failure on the part of the employees, foreman, or employer to comply with any compulsory rule may be cause for the Department of Labor and Industries to take action in accordance with the industrial insurance and safety laws.

(10) "Shall" and "must" as used in this chapter make the provisions mandatory. "Should," "may," or "it is recommended" are used to indicate the provisions are not mandatory but are recommended.

(11) If any section, subsection, phrase, or provisions of this chapter or part thereof should be held invalid by any court for any reason, such invalidity shall not in any way affect the validity of the remainder of this chapter, unless such decision renders the remainder of the provision unintelligible, or changes the meaning of such other provision or provisions.

(12) When the language used in this chapter indicates that it is the responsibility, duty, or obligation of the foreman or other employee, it shall also be the employer's responsibility, obligation, and duty.

Whenever this chapter refers to the provisions of another safety and health standard or statute affecting safety and health, such reference refers to the statute or code in effect at the time the work is being performed. [Order 76-38, § 296-45-65003, filed 12/30/76.]

WAC 296-45-65005 Definitions. These definitions are applicable to chapter 296-45 WAC.

(1) "Aerial Manlift Equipment." All types of equipment such as extended towers, boom–mounted cages or baskets, and truck–mounted ladders. This equipment is primarily designed to place personnel and equipment aloft to work on elevated structures and equipment.

(2) "Apprentice." An employee who is being trained to be a journeyman.

(3) "Approved." Meets or exceeds the recognized standards of safety within the industry.

(4) "Approved Protectors." Gloves worn over rubber insulating gloves which are of such material or substance and so constructed as to protect the rubber gloves from abrasions, lacerations, or other physical damage which might otherwise occur to rubber gloves. Approved protectors must conform to the standards which are recognized by the industry.

(5) "Automatic Circuit Recloser." A self–controlled device for automatically interrupting and reclosing an alternating current circuit with a predetermined sequence of opening and reclosing followed by resetting, hold closed, or lockout operation.

(6) "Barrier." A physical obstruction which is intended to prevent contact with energized lines or equipment.

(7) "Barricade." A physical obstruction such as tapes, screens, or cones intended to warn and limit access to a hazardous area.

(8) "Belts." (a) "Lineman's Body Belt." A waist belt of approved material with a front buckle, two "D" rings for attaching safety straps and multiple loop strap for holding tools.

(b) "Strap." An adjustable leather, web, nylon, or other approved material in various lengths which permit free use of both hands in circling of post, pole, girder, etc. The safety strap permits the employee to assume a safe working position.

(c) "Construction Belt." A strong leather, web, or other approved material belt at least 1 3/4 inches wide that may be equipped with fixed or adjustable "D" rings for attaching safety straps or lanyards.

(d) "Lanyard." A flexible line or strap of high tensile strength with snap hooks at one or both ends. They serve as safety straps or tail lines for use with belts or harness.

(9) "Bond." An electrical connection from one conductive element to another for the purpose of minimizing potential differences or providing adequate conductivity for fault current or for mitigation of leakage current and electrolytic action.

(10) "Bushing." An insulating structure including a through conductor, or providing a passageway for such a conductor, with provision for mounting on a barrier, conducting or otherwise, for the purpose of insulating the conductor from the barrier and conducting current from one side of the barrier to the other.

(11) "Cable." A conductor with insulation, or a stranded conductor with or without insulation and other coverings (single–conductor cable) or a combination of conductors insulated from one another (multiple–conductor cable).

(12) "Cable Sheath." A protective covering applied to cables. A cable sheath may consist of multiple layers of which one or more is conductive.

(13) "Circuit." A conductor or system of conductors through which an electric current is intended to flow.

(14) "Clearance (operating power lines and equipment)." The certification by the proper authority that a specified line or piece of equipment is deenergized, that the proper precautionary measures have been taken and the line or equipment is being turned over to the employee.

(15) "Climbing Space." The vertical space reserved along the side of poles or structures to permit ready access to equipment and conductors located on poles or structures.

(16) "Communication Lines." The conductors and their supporting or containing structures which are used for public or private signal or communication service: *Provided*, That such lines operate at potentials not exceeding 400 volts to ground or 750 volts between any two points of the circuit: *Provided further*, That the transmitted power does not exceed 150 watts. When operating at less than 150 volts, no limit is placed on the capacity of the system.

Communication lines generally include telephone, telegraph, cable antenna TV, railroad signal, data, clock, fire, police alarm, community television antenna, or other similar systems conforming with the above. Lines used for signaling purposes, but not included under the above definition, are considered as supply lines of the same voltage and are to be so run.

(17) "Conductor." Any material, usually in the form of a wire, cable, or bus bar which is approved for carrying an electric current.

(18) "Conductor Shielding." An envelope which encloses the conductor of a cable and provides an equipotential surface in contact with the cable insulation.

(19) "Current–carrying Part." A conducting part intended to be connected in an electric circuit to a source of voltage. Noncurrent–carrying parts are those not intended to be so connected.

(20) "De–energized (or Dead)." Free from any electrical connection to a source of potential difference and from electrical charges. "Dead" is used only with reference to current–carrying parts which are sometimes alive or energized.

(21) "Designated or Authorized Employee." A qualified person delegated to perform specific duties under the conditions existing.

(22) "Effectively Grounded." Intentionally connected to earth through a ground connection or connections of sufficiently low impedance and having sufficient current–carrying capacity to prevent the buildup of voltages which may result in undue hazard to connected equipment or to persons.

(23) "Electric Line Truck." Any vehicle used to transport men, tools, and material, which serves as a traveling workshop for electric power line construction and maintenance work. It may be equipped with a boom

and auxiliary equipment for setting poles, digging holes, and elevating material and/or workers.

(24) "Electric Supply Lines." Those conductors used to transmit electric energy together with necessary supporting and containing structures. Signal lines of more than 400 volts to ground are always electric supply lines if they are installed and used as electric supply lines.

(25) "Emergency." An unforeseen occurrence endangering life, limb, or property.

(26) "Enclosed." Surrounded by a case, cage, fence or otherwise which will protect the contained equipment and prevent accidental contact of a person with live parts.

(27) "Energized, Alive, or Live." Electrically connected to a source of potential difference or electrically charged so as to have a potential different from that of the earth or different from that of adjacent conductors or equipment. Electrical connections of less than 100 volts are not considered energized. Communication or signal lines as defined in this chapter are not considered energized.

(28) "Equipment." A general term which includes fittings, devices, appliances, fixtures, apparatus, and comparable equipment used as part of, or in connection with, an electrical power transmission and distribution system, or utility communication systems over 400 volts.

(29) "Exposed." Not isolated or guarded.

(30) "Fault Current." As used in this chapter means the current that flows in an electrical system because of a defect in the circuit induced accidentally or otherwise.

(31) "Fixed Ladder." A ladder which is permanently secured to a structure.

(32) "Foreman or Man–in–Charge." The person directly in charge of workers doing the work, regardless of title.

(33) "Foreign Operation." Any business or work being performed which does not come within the mandatory scope and application of this chapter; an operation which would otherwise be subject to the provisions of this chapter may be subject to the provisions of another chapter in the event the employees performing the particular work were not competent as defined within the provisions of this chapter.

(34) "Guarded." Protected by personnel, covered, fenced, or enclosed by means of approved casings, barrier rails, screens, mats, platforms, or other approved devices in accordance with standard barricading techniques designed to prevent dangerous approach or contact by persons or conductive objects.

(35) "Ground" (reference)." That conductive body, usually earth or a system ground, to which an electric potential is referenced.

(36) "Ground" (as a noun). A conductive connection, whether intentional or accidental, by which an electric circuit or equipment is connected to reference ground.

(37) "Ground" (as a verb). The connecting or establishment of a connection, whether by intention or accident, of an electric circuit or equipment to reference ground.

(38) "Grounding." For the purpose of these rules, means the act of placing shorts and grounds on de–energized conductors and equipment.

(39) "Grounding Electrode (Ground Electrode)." A conductor embedded in the earth, used for maintaining ground potential on conductors connected to it, and for dissipating into the earth current conducted to it.

(40) "Grounding Electrode Resistance." The resistance of the grounding electrode to earth.

(41) "Grounding Electrode Conductor (Grounding Conductor)." A conductor used to connect equipment or the grounded circuit of a wiring system to a grounding electrode.

(42) "Grounded Conductor." A system or circuit conductor which is intentionally grounded.

(43) "Grounded System." A system of conductors in which at least one conductor or point (usually the middle wire, or neutral point of transformer or generator windings) is intentionally grounded either solidly or through a current–limiting device (not a current–interrupting device).

(44) "Groundman." A member of crew working on ground under direction of foreman.

(45) "Hotline Tools and Ropes." Those tools and ropes which are specifically designed for work on energized high voltage lines and equipment.

(46) "Insulated." Separated from other conducting surfaces by a dielectric substance including air space offering a high resistance to the passage of current. When any object is said to be insulated, it is understood to be insulated in an approved manner for the conditions to which it is subjected. Insulated covering of conductors is one means of making the conductor insulated.

(47) "Insulation (as applied to cable)." That which is relied upon to insulate the conductor from other conductors or conducting parts or from ground.

(48) "Insulation Shielding." An envelope which encloses the insulation of a cable and provides an equipotential surface in contact with cable insulation.

(49) "Isolated." An object that is not readily accessible to persons unless special means of access are used.

(50) "Manhole." A subsurface enclosure which personnel may enter and which is used for the purpose of installing, operating, and maintaining equipment and/or cable.

(51) "Neutral." A system in which one conductor is used as the neutral for one or more circuits; one conductor may be used as the neutral for both primary and secondary circuits of a distribution system.

(52) "Pole." Any device used to support a power distribution or transmission line. The pole may be made of any substance including wood, concrete, metal, is usually cylindrical in shape and comparatively slender. It is the upright standard to which is affixed part of the power distribution and transmission line system as defined in this chapter.

(53) "Portable Ladder." As used in this chapter means a ladder capable of being moved by hand or manually and one which is usually moved into position by hand.

(54) "Power Dispatcher (Load Dispatcher or System Operator)." A person who has been designated by the employer as having authority over switching and clearances of high voltage lines and station equipment.

(55) "Protective Devices." Those devices such as rubber gloves, rubber blankets, line hose, rubber boots, or other insulating devices, which are specifically designed for the protection of employees.

(56) "Public Highway." For the purpose of these rules shall include every way, land, road, street, boulevard, and every other way or place in the state open as a matter of right to public vehicular travel, both inside and outside the limits of cities and towns, regardless of ownership.

(57) "Pulling Tension." The longitudinal force exerted on a cable during installation.

(58) "Qualified Person or Qualified Employee." A person who is familiar with the construction of, or operation of such lines and/or equipment that concerns his position and who is fully aware of the hazards connected therewith, OR, one who has passed a journeyman's examination for the particular branch of the electrical trades with which he may be connected.

(59) "Secured Ladder." A ladder which is not capable of being dislodged from the top by lateral, or jerking motion(s).

(60) "Sheath." As applied to tools carried in lineman's tool belt shall mean a sheath that effectively covers the tool and prevents such tool from falling from the belt.

(61) "Switch." A device for opening and closing or changing the connection of a circuit. In these rules, a switch is understood to be manually operable, unless otherwise stated.

(62) "Tag." A system or method of identifying circuits, systems, or equipment for the purpose of alerting employees and others that the circuit, system, or equipment is being worked on.

(63) "Rubber." Any goods, equipment, or tool made out of either natural or synthetic rubber.

(64) "Unstable Material." Earth material, other than running, that because of its nature or the influence of other conditions, cannot be depended upon to remain in place without extra support, such as would be furnished by a system of shoring.

(65) "Vault." An enclosure into which personnel may enter and used for the purpose of installing, operating, or maintaining equipment and cable.

(66) "Voltage." The effective (rms) potential difference between any two conductors or between a conductor and ground. Voltages are expressed in nominal values. The nominal voltage of a system or circuit is the value assigned to a system or circuit of a given voltage class for the purpose of convenient designation. The operating voltage of the system may vary above or below this value.

(67) "Voltage of an Effectively Grounded Circuit." The voltage between any conductor and ground unless otherwise indicated.

(68) "Voltage of a Circuit Not Effectively Grounded." The voltage between any two conductors. If one circuit is directly connected to and supplied from another circuit of higher voltage (as in the case of an auto-transformer), both are considered as of the higher voltage, unless the circuit of lower voltage is effectively grounded, in which case its voltage is not determined by the circuit of higher voltage. Direct connection implies electric connection as distinguished from connection merely through electromagnetic or electrostatic induction. Low voltage includes voltages from 100 to 750 volts. High voltage shall mean those voltages of 751 volts to 230,000. Extra high voltage means any voltage over 230,000 volts. Where the words "high voltage" are used in this chapter it shall include extra high voltage, unless otherwise specified. [Order 76-38, § 296-45-65005, filed 12/30/76.]

WAC 296-45-65009 Employer's responsibility. (1) The employer shall provide and maintain the necessary protective devices specified in these rules and require the employees to use them properly.

(2) There shall be installed and maintained in every fixed establishment employing eight or more persons a safety bulletin board of a size to display and post safety bulletins, newsletters, posters, accident statistics and other safety educational material. It is recommended that safety bulletin boards be painted green and white.

(3) The employer shall require the foremen to observe and enforce all safety rules and shall furnish a copy of the Electrical Workers' Safety Rules to each employee who is covered by these rules.

(4) The employer shall appoint only competent workers to supervise other employees and those appointed shall be responsible for the safety of the employees under their supervision.

(5) The employer shall hold safety meetings at least once a month, which meetings shall be held at a reasonable time and place as selected by the employer. The employer shall require all employees subject to provisions of this chapter to attend said meetings: *Provided*, That employees whose presence is otherwise required by reason of an emergency or whose function is such that they cannot leave their station or cease their work without serious detriment to the service provided, such as dispatcher, may be excused from such meeting under those circumstances.

Minutes shall be kept of each safety meeting and retained for a period of one year.

(6) The employer or a representative(s) designated by him shall investigate all accidents or injuries of a serious nature and, where possible, take the proper remedial steps to prevent the occurrence of similar accidents.

(7) The employer shall furnish instructions stating the proper procedure in event of an emergency, which shall include the names of those individuals to be notified and methods of contacting them.

(8) The employer shall provide and make available to all employees accident report and safety suggestion forms.

(9) In the case of fatal accident, immediate notice shall be given by the employer or his authorized representative either by telephone or telegraph (collect) to the

Department of Labor and Industries, Division of Industrial Safety and Health, Olympia, Washington, or any of its branch offices. All such notices shall include time, place, and date of the accident and the employer's name.

(10) Nothing contained within this chapter shall prohibit an employer or his authorized representative from disciplining employees for failure to comply with the provisions of this or any other safety code. [Order 76-38, § 296-45-65009, filed 12/30/76.]

WAC 296-45-65011 Foreman's responsibility. (1) Every foreman shall understand these and any other applicable safety rules and comply therewith. Foremen shall require all employees under their direction or supervision to read this chapter and the provisions contained therein and require every employee subject to this chapter to be able to apply this chapter and any provision of this chapter on a day-to-day basis.

(2) Foremen shall inform employees under their supervision or direction of the type and voltage of circuits on or near which the employees are to work.

(3) Foremen shall require all employees under their supervision to properly use safety devices and equipment, including barricades, warning flags or signs, or any other device called for to protect employees. [Order 76-38, § 296-45-65011, filed 12/30/76.]

WAC 296-45-65013 Foreman-employee responsibility. (1) An employee shall protect his climbing and working space at all times if the conductors are so spaced that in climbing or working he will be, or where it is possible to come within, the minimum required distances specified in these rules.

(2) Foremen or supervisors shall in good faith consider verbal or written reports of hazardous conditions and shall, as soon as practicable, investigate and remedy same if warranted.

(3) When hazards are reported by employees, foremen and others having authority shall accept the report in a cooperative manner, and in no case shall an employee be reprimanded or penalized for reporting hazards or potential hazards.

(4) Foremen shall require all employees under their supervision to keep their belts, spurs, and straps in good working condition. When straps and belts are in poor condition or defective, they shall not be used.

(5) Before leaving a jobsite, foremen shall correct or arrange to give warning of any condition which might result in injury to employees.

(6) No employee shall be permitted or allowed to remain on the jobsite when under the influence of any intoxicating beverage or controlled substance or substances: *Provided*, That if an employee is taking prescription medication under the direction of a practicing physician and such prescription does not interfere with the safe performance of the work assigned, such employee may be permitted to work.

(7) No intoxicating beverages or controlled substances shall be consumed on the jobsite other than prescription medication as set forth above. [Order 76-38, § 296-45-65013, filed 12/30/76.]

WAC 296-45-65015 Work required of foremen. (1) A foreman cannot properly supervise the work and look out for the safety of employees under his direction if required to work as a foreman and a lineman at the same time.

(2) Foremen should be constantly alert and shall not be required to serve in such dual capacity, except in crews of not more than two linemen, in which case they may work as one of the linemen.

(3) In crews of two linemen or less, each lineman may have a groundman but, if additional linemen or groundmen are added to the crew, the foreman shall confine his activities to supervising the work, as exhibited below:

Type of Crew	Minimum Requirements
2 linemen	One lineman as man-in-charge.
2 linemen plus 1 groundman	One lineman as man-in-charge or climbing foreman.
2 linemen plus 2 groundmen	One lineman as man-in-charge or climbing foreman.
2 linemen plus any combination of 3 linemen or groundmen	One non-climbing foreman.

[Order 76-38, § 296-45-65015, filed 12/30/76.]

WAC 296-45-65017 Employee's responsibility. (1) Employees shall not engage in horseplay or scuffling while on the job or jobsite and the employer shall not permit horseplay or scuffling while on the jobsite or otherwise in the course of employment.

(2) During such time as any employee is working on or near any energized line or energized equipment in excess of 750 volts there shall be no talking or communication other than that which is absolutely necessary and essential for the safe and proper performance of the work. Should there be communication or talk from a person other than an employee, the work shall stop until such time as the distraction ceases.

(3) Employees shall report any hazardous or potentially hazardous condition, operation, means, or work in a constructive manner and shall not engage in personality conflicts.

(4) Neither the employer nor the employees shall throw or permit anything to be thrown from elevated position(s) or poles to the ground or lower level, nor shall anything be thrown from the ground or lower level to an elevated position, whether that elevated position is on a pole, aerial manlift or otherwise.

(5) Employees shall report all injuries, regardless of severity, to the employer or designated representative. Report forms furnished by the employer should be used. [Order 76-38, § 296-45-65017, filed 12/30/76.]

WAC 296-45-65019 First aid. In addition to complying with the first aid provisions as found in WAC 296-24-060 through WAC 296-24-073, all employees

whose duties require them to work on energized wires, equipment, or to climb poles or related structures, shall take an approved course in controlling bleeding and cardiopulmonary resuscitation, and

(1) All linemen shall be instructed in pole-top rescue and become and remain proficient in its application.

(2) It is recommended that all employees receive basic first aid training.

(3) Safety suggestion forms should, where possible, be used for suggesting the elimination of hazardous conditions and such reported suggestions shall be retained by the employer or his authorized representative. [Order 76-38, § 296-45-65019, filed 12/30/76.]

WAC 296-45-65021 Tools and protective equipment. (1) Protective Equipment. (a) Rubber protective equipment shall be in accordance with the provisions of the American National Standards Institute (ANSI), ANSI J6 series as revised in 1971, as follows:

Item	Standard
Rubber Insulating Gloves	J6.6-1971 Edition
Rubber Matting for Use Around Electrical Apparatus	J6.7-1971 Edition
Rubber Insulating Blankets	J6.4-1971 Edition
Rubber Insulating Hoods	J6.2-1971 Edition
Rubber Insulating Line Hose	J6.1-1971 Edition
Rubber Insulating Sleeves	J6.5-1971 Edition

(b) No protective equipment or material other than rubber shall be used: *Provided*, That such other nonconductive equipment may be used if it provides equal or better (dielectric) electrical and mechanical protection than rubber protective equipment: *Provided*, That the employer obtain before placing in service, manufacturer's data or other data to demonstrate that such nonrubber protective equipment provided equal or better electrical and mechanical protection than approved rubber equipment.

(c) Protective equipment shall not be used at voltages in excess of that for which the manufacturer has supplied data to the employer demonstrating that it is fit for such voltages.

(d) No protective equipment shall be modified, altered, or used for purposes other than those for which it is designed unless and until the manufacturer has, in writing, agreed or suggested that there be such modification, alteration, or use.

(e) High voltage rubber gloves shall have and pass a minimum dielectric test of at least 10,000 volts.

(f) Each rubber glove before it is used shall be inspected for defects and an approved air test performed. If, upon inspection, rubber gloves are either defective or appear to be defective, they shall not be used.

(g) Before being placed in service, all rubber protective equipment shall be numbered and records kept for test purposes and assignment.

(h) Rubber protective equipment shall not be used unless it has been dielectrically tested within six months and bears marking or identification of the date of the dielectric test: *Provided*, That all rubber gloves and rubber sleeves which are in service must be dielectrically tested every three months and shall not be used unless they have been tested within three months and bear marking or identification of the date of the last dielectric test.

(i) Whenever any rubber protective equipment is dielectrically tested, such testing shall be performed by a person or persons familiar with the testing procedure and in a facility which meets the recognized standards in the industry for such testing. All rubber gloves that are in service shall be tested at a voltage twice the amount for which such rubber equipment is used. Whenever a dielectric test is conducted, the rubber protective equipment shall also be visually inspected in detail for defects.

(j) Approved protectors shall be worn at all times over rubber gloves. Inner liners may be worn if desired.

(k) Rubber gloves when not in use shall be carried in an approved bag provided and designed for that purpose. It shall be provided by the employer and made available to the employees.

(l) Approved rubber gloves and carrying bag shall be assigned to each employee who works with, or is exposed to energized parts.

(m) Rubber protective equipment shall not be vulcanized or patched.

(n) A compartment or box shall be provided on each electric line truck, which box or compartment shall be used for storing rubber protective equipment. No equipment shall be stored in said compartment or box which can or could cause damage to the rubber equipment or goods placed in the compartment or box. Additionally, a separate container or compartment shall be provided for rubber blankets.

(o) Line hose shall not be doubled on themselves at any time. All blankets before storage must be wiped clean and rolled, not folded, before being placed in the container or box.

(p) Protective line equipment of material other than rubber shall be kept clean and visually inspected before each use.

(q) If protective line equipment of material other than rubber is found to be substantially defective or unsuitable for the purpose for which it is designed and intended, said protective line equipment shall not be used for personal protection of employees as may be required in Table 1 of this chapter. Said protective line equipment shall be marked defective but may be otherwise used unless the defect or damage to said protective line equipment creates additional safety hazards.

(r) Line hose or similar type of equipment shall not be used on voltages in excess of 15,000 volts as measured from phase to phase unless the manufacturer specifies otherwise.

(s) All protective hats shall be in accordance with the specifications of ANSI Z89.2-1971 Edition Industrial Protective Helmets for Electrical Workers, Class B, and

shall be worn at the jobsite by employees who are exposed to overhead or electrical hazards.

(2) Personal Climbing Equipment. All lineman body belts, safety straps, lanyards, hooks, and other similar equipment shall comply to this chapter. This rule shall not apply to personal climbing equipment in use at the effective date of this chapter during its lifetime provided such equipment is maintained in good condition and in accordance with the applicable safety rule and requirement in effect at the time such equipment was obtained.

(a) Safety lines shall not be used for shock loading and shall be used only for emergency rescue. All safety lines shall be a minimum one–half inch diameter and three– or four–strand first grade manila or its equivalent in strength (2,650 pounds) and durability.

(b) Defective ropes shall not be used and shall be replaced.

(c) Employees, when working from a hook ladder, must either belt themselves securely to the ladder, attach themselves to the structures by means of a safety line, or belt themselves to ladder safety equipment, which shall consist of a safety rope or belting threaded through the rungs or secured to the ladder at intervals of not more than three feet.

(d) Body belts with straps or lanyards shall be worn by employees working at an elevated position such as on poles, towers, or similar structures: *Provided*, That body belts and lanyards need not be used by employees while erecting transmission towers. Body belts and straps shall be inspected each day for defects before use. Defective body belts and straps shall not be used.

(e) Safety straps shall not be placed around poles above the cross–arm except where it is not possible for the strap to slide or be slipped over the top of the pole by inadvertence of the employee. Neither end of the strap shall be allowed to hang loose or dangle while the employee is ascending or descending poles or other structures.

(f) Body belts and safety straps shall not be stored with sharp–edged tools or near sharp objects. When a body belt, safety strap and climbers are kept in the same container, they shall be stored in such a manner as to avoid cutting or puncturing the material of the body belt or safety strap with the gaffs or climbers.

(g) Employees shall not attach metal hooks or other metal devices to body belts. Leather straps or rawhide thongs shall have hardwood or fibre crossbars. Leather straps and rawhide thongs shall not have metal or other conductive crossbars on them.

(h) Climbing gaffs shall be kept properly sharpened and shall be at least 1–1/8 inches in length.

(3) Ladders. (a) Portable metal or other portable conductive ladders shall not be used on or near energized line or equipment except where non–conductive 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. All conductive or metal ladders shall be prominently marked and identified as being conductive and shall be grounded when used near energized lines or equipment.

(b) All ladders including hook type ladders used in structures shall be secured to prevent the ladder from being accidentally displaced.

(c) All ladders shall be handled and stored in such a manner as to prevent damage to the ladder.

(d) When ascending or descending a ladder, the employee shall face the ladder and have free use of both hands.

(e) All defective ladders shall be taken out of service and labeled as defective.

(f) When a ladder is being used which is not fixed or otherwise secured, there shall be an attendant to hold the ladder and watch traffic when the work is being done on streets, alleys, sidewalks, or in industrial plants or other places where there exists the possibility of accidental contact with the ladder by third persons or vehicles.

(g) When working on the ladder, employees shall, where possible, tie the top of the ladder to a substantial object to prevent falling unless the ladder is equipped with approved hooks which may be used for the same purpose.

(h) Portable ladders shall not be moved with employees on the ladder.

(i) No employee shall ascend or descend a rolling ladder while it is moving.

(j) No employee shall stand on the top two steps of a step ladder.

(k) No employee shall use a step ladder as a straight ladder.

(l) All ladders shall be of sufficient strength for the use to which they are placed.

(m) Ladders shall always be placed on a secure footing with both legs resting firmly on the lower surface.

(n) Ladders made by fastening cleats or similar devices across a single rail shall not be used.

(4) Hot Line Tools. (a) Only hot line tools having manufacturer's certification of withstanding the following minimum tests shall be used:

(i) 100,000 volts per foot of length for 5 minutes when the tool is made of fiberglass; or

(ii) 75,000 volts per foot of length for 3 minutes when the tool is made of wood; or

(iii) Other tests which equal or exceed (i) and (ii) of this subsection.

(b) All hot line tools shall be visually inspected each day before use. All hot line tools shall be wiped clean before being used.

(c) Defective hot line tools shall not be used and shall be marked as defective and turned in for repair or replacement.

(d) Hot line tools and ropes shall be inspected each day before use. They shall be stored and maintained and used in such a manner as to prevent damage. Hot line tools and ropes shall not be used for purposes other than line work. Wood hot sticks shall be maintained with a surface coating of varnish or other approved treatment to prevent the absorption of moisture into the stick. The maintenance, inspection, storage, and use of such equipment shall be in conformance with the methods and standards recognized by manufacturers and the industry.

(5) Measuring Ropes and Tapes. (a) Measuring ropes or measuring tapes which are metal or certain conductive strands shall not be used when working on or near energized lines or parts.

(6) Hand Tools. (a) All power hand tool switches shall comply with the provisions of WAC 296-24-650 through WAC 296-24-67005.

(i) Be equipped with three-wire cord having the ground wire permanently connected to the tool frame and having a means for grounding the other end of the cord except when such three-wire cord increases the hazard to the employees or where the hand held tool is double insulated and permanently labeled "Double Insulated."

(ii) Be connected to the power supply by means of an isolating transformer, or other isolated power supply.

(b) All hydraulic tools which are used on or around energized lines or equipment shall use nonconductive hoses having approved strength for the normal operating pressures. The provisions of WAC 296-155-360(4)(a) and (b) are mandatory.

(c) All pneumatic tools which are used on or around energized lines or equipment shall:

(i) Have nonconducting hoses having approved strength for the normal operating pressures, and

(ii) Have an accumulator on the compressor to collect moisture.

(7) Hand axes shall not be used when working overhead.

(8) Small tools carried in body belts shall be placed so as to present the least danger of coming into accidental contact with live parts.

(9) All tools carried in workers' body belts shall be sheathed: *Provided*, That tower erectors need not comply with this rule except when working on or above electric power equipment or lines.

(10) Tools other than those which are carried in workers' body belts shall not be carried up or lowered down poles or similar structures in belts but shall be raised and lowered by means of an approved container or hand line.

(11) All tools shall be kept in good working condition and shall be properly stored. Defective tools shall be taken out of service.

(12) Tools and loose material shall not be left at the top of poles or structures.

(13) Tools shall be placed where they will not be the cause of injury due to stepping or tripping on them.

(14) The surface and surface preservation of wood tools such as ladders, pike poles, switch sticks, insulating platforms used in electrical work shall be maintained. Only transparent preservatives shall be used. Where ladders and pike poles are not used on or near energized lines and are inspected monthly by qualified inspectors, they may be painted.

(15) Scaffolds shall be constructed and used in conformance with the General Safety and Health Standards (WAC 296-24-82503) and the Safety Standards for Construction Work (WAC 296-155-485) of the State of Washington.

(16) Wearing Apparel. (a) Goggles, rubber gloves, respirators, and other such personal protective devices shall not be interchanged among employees unless they have been sanitized.

(b) Workers shall wear clothing appropriate to the season and the kind of work being performed: *Provided*, That shirts or jumpers with full length sleeves rolled down and protective hats shall be worn when working on or near live parts or while climbing poles.

(c) When working on or near energized parts, employees shall not wear loose dangling watch chains, key chains, or unnecessary metal of any type, and should not wear coats with metal zippers.

(17) When working at night, spotlights or portable lights for emergency lighting shall be provided and used as is necessary to perform work safely.

(18) Sanitary Facilities. The requirements of WAC 296-24-120 through WAC 296-24-130(13) shall be complied with.

(19) Industrial Hygiene. The requirements of chapter 296-62 WAC are mandatory unless they are inconsistent with this chapter.

(20) Fire Extinguishers. Employees should know the location and how to operate fire extinguishers in the worksite vicinity.

(21) Foreign Attachments and Placards. Nails and unauthorized attachments should be removed before climbing above such attachments. When through bolts present a hazard to climbing, they shall be trimmed to a safe length.

(22) Working Near or Over Water. When employees are engaged in work over or near water and when the danger of drowning exists, suitable flotation protection shall be provided and worn as required by WAC 296-24-086. [Order 76-38, § 296-45-65021, filed 12/30/76.]

WAC 296-45-65023 Clearances, operating power lines and equipment. Clearances, directly under the control of the power dispatcher or person acting in that capacity, shall be requested and executed by observing the following rules:

(1) Employers shall designate a qualified person or persons to act in the capacity of power dispatcher, also known as load dispatcher or system operator.

(2) No switch shall be operated and no clearance tag placed or removed without an order from the power dispatcher having jurisdiction, except where standing orders or regulations have been given covering such operations.

(3) In all cases, switching orders must be given directly to the employees in charge of operating the switches by the power dispatcher who has jurisdiction and such communications *must be repeated back word for word to the speaker.* When requesting clearance on lines under the control of the power dispatcher, a person requesting the clearance shall obtain the name of the dispatcher to whom the request was made and the dispatcher shall obtain the name of the person requesting the clearance; and assure himself that the person is qualified to receive such a clearance.

(4) Should it become necessary for a person holding a clearance to leave the job, he shall relinquish his clearance to the dispatcher and a new clearance shall be taken by another qualified person.

(a) In the event of an occurrence which renders it impossible to contact the individual who had a clearance on a given circuit or piece of equipment, that clearance may be released only by the next higher available official who is familiar with the work and has jurisdiction over the circuit or equipment.

(5) The dispatcher shall order clearance tags printed on red cardboard, or equivalent, not less than 2-1/4 inches by 4-1/2 inches, attached to all switches opened or checked open to provide clearance on any line or equipment for employees to work thereon.

(6) Clearance tags attached to substation control devices and to line switches beyond the switchyard of any substation; indicating the limits of the clearance involved; shall state the designation of the switch opened or checked open and tagged; the name of the person to whom the clearance is to be issued; the date and time the switch was opened or checked open; the name of the dispatcher ordering the switching and tagging; and the name of the person doing the switching and tagging.

(7) Clearance tags attached to airbreak switches opened within a substation shall indicate clearly that the line or equipment is cleared for employees to work thereon.

(8) In cases where more than one person will require clearance on the lines or parts of equipment, the power dispatcher must order complete sets of clearance tags for each person requesting clearance.

(9) When two or more crews are engaged in work at any one location on account of emergency or for other reasons, the proper authority may designate one of the foremen to act as foreman of the combined crews for the purpose of obtaining clearances only.

(10) To meet unforeseen conditions, it will be permissible to tag isolated switches for the dispatcher and issue clearances against this tag. In tagging out inter-utility tie lines, the open switches on the foreign end of the line shall be tagged for the foreign dispatcher requesting the outage who will issue clearances to individuals of his organization against this tag.

(11) No work shall be performed on lines or equipment until the power dispatcher in control of such lines or equipment has clearly granted the clearance. The power dispatcher shall never grant a clearance on lines or equipment before all necessary protective tags are applied, and his own records of such clearance are clear and complete. Before considering any line or equipment to be de-energized, the power dispatcher shall assure himself that all switches which could possibly energize the line or equipment in question have been opened, all phases checked open, the switches tagged and, if possible, locked in the open position.

(12) Metal-clad, draw-out switchgear of over 750 volts in which the physical separation of the disconnecting parts is not visible may be used to clear a line or equipment, provided the switchgear is equipped with:

(a) A positive positioning means to insure that the disconnecting contacts are separated;

(b) An isolating shutter which moves into place between the separated contact for circuit isolation; and

(c) A mechanically-connected indicating means to show that the shutter is in place.

(13) In all other cases, only a visible break of all phases shall be regarded as clearing a line or equipment.

(14) Where two or more 5000-volt (or higher) lines are on the same pole or bus structure, arrangements must be made for simultaneous clearances on all such lines unless the person who requested the clearance specifically states that less will be sufficient.

(15) In giving a clearance, the power dispatcher shall make certain that the man to whom the clearance is given is fully aware of the extent or the limits of his clearance.

(16) The person or persons to whom a clearance has been given shall make certain that all protective grounding or short-circuiting devices installed by him or persons under his direction are removed before clearing the line or equipment to the dispatcher for service.

(17) After receiving notification from the dispatcher that the necessary switching has been done, the person making the request shall take the following precautionary steps before any employee comes in direct contact with the circuit or equipment:

(a) The circuit or equipment shall be tested by generally accepted methods to make certain that it is de-energized.

(b) The circuit or equipment shall be grounded and shorted as prescribed in this section.

(18) No person shall make contact with a circuit or equipment that has not been taken out of service to be worked on until he has the circuit or equipment cleared and tagged by himself or is working directly under the supervision of one who has the circuit or equipment cleared and tagged for himself.

(19) No tag shall be removed and no lines or equipment energized until the clearance has been released to the dispatcher.

(20) There shall be a tag used on any switch, regardless of the voltage or type of construction, where workers are likely to be endangered by the closing of such switch and/or where the switch is not directly visible to the employee protected by the open switch. [Order 76-38, § 296-45-65023, filed 12/30/76.]

WAC 296-45-65025 Grounding. (1) When a line which is energized or which may be energized at over 750 volts is removed from service for the purpose of work thereon, the lines shall be considered and worked on as energized until such line is cleared, tagged and grounded.

(2) Grounding Equipment. (a) Grounding equipment shall be available for use when working on de-energized circuits or parts.

(b) Grounding equipment itself shall be of approved carrying capacity to actuate protective devices such as oil circuit breakers, relays, without destroying the ground equipment itself.

(c) If the work is on new construction, definitely known to be dead and not cut into any point where it is possible for anyone to energize it by mistake, the grounding rule is not compulsory but is advisable when the lines extend a considerable distance.

(3) Preliminary Grounding. Preliminary grounding or other testing shall first be done to determine that the line or equipment to be grounded is de-energized.

(4) Preliminary grounding shall be done as follows:

(a) A conductor, preferably stranded copper cable, shall be attached to a reliable ground. The use of chain is prohibited.

(b) A dry hand line shall then be thrown over the wires to be grounded, attached to the preliminary grounding conductor and, with all men standing in the clear, the grounding conductor may be pulled over the lines.

(c) Care must be taken that every line wire is in contact with the preliminary grounding conductor.

(d) The regular grounds shall then be placed.

(e) Preliminary grounding need not be used when the presence of other energized lines creates additional hazard through the use of preliminary ground, provided an approved test is made to ascertain that the lines to be grounded are de-energized.

(5) The following are methods of preliminary tests to determine whether a line is de-energized.

(a) A line may be buzzed out by extending the hot line tool equipment with a substantial piece of metal on the end to within a close distance of the line.

(b) Approved testers may be used in some locations, but these shall only be used and accepted as approved testers when such tester has been tested immediately before and after on another line known to be energized or other equivalent testing methods and has been proven to be in good working condition.

(6) Communication Conductors. Bare wire communication conductors on power poles and structures are subject to these rules as energized lines and voltages in excess of 750 volts unless protected by insulating materials.

(7) Attaching Grounds. (a) When attaching grounds, the ground end shall be attached first, and the other end shall then be attached and removed by means of insulated tools or approved devices.

(b) When removing grounds, the grounding device shall first be removed from the line or equipment by using insulated tools or other approved devices.

(c) Grounds shall be placed between work location and the sources of energy and as close as practicable to the work location, or grounds shall be placed at the work location. If work is to be performed at more than one location in a line section, the line section must be grounded and short-circuited at one location in the line section and the conductor to be worked on shall be grounded at each work location. The minimum distance shown in Table 1 shall be maintained from ungrounded conductors at the work location. Where the making of a ground is impracticable, or the condition resulting therefrom would be more hazardous than working on the lines or equipment without grounding, the grounds may be omitted, provided that all work is done according to this chapter as if the line or equipment is energized.

(8) Testing Without Grounds. (a) Grounds may be temporarily removed only when necessary for testing purposes: *Provided*, That during such period of time as the grounds are removed, care shall be exercised during that test procedure.

(9) Grounding to tower shall be made with an approved tower clamp capable of conducting the anticipated fault current.

(10) A ground lead, to be attached to either a tower ground multiple ground system or driven ground, shall be capable of conducting the anticipated fault current and shall have a minimum conductance of No. 2 AWG copper.

(11) The grounding set shall be firmly connected to a reliable ground at the ground end first.

(12) Grounds shall be placed on both sides of the section of line on which work is to be done, with the following exceptions:

(a) Where visible openings, such as airbreak switches, disconnects, disconnected jumpers, etc., are within sight of the job, disconnecting the line from its source of power, and no energized high voltage line crosses over or below the line section being worked on, and no other source of feed exists to this line section. One ground installation on the side away from a visible opening may be considered to be approved protection.

(b) One ground is adequate when installed at the point where work is being performed if the line is not to be opened or if there is no source of supply beyond the ground or no possibility of contact with other energized lines.

(13) The ground set shall make firm contact with each conductor of the circuits being worked.

(14) In cases where the conductor separation at any pole or structure is so great as to make it impractical to apply shorts on all conductors, and where only one conductor is to be worked on, only that conductor which is to be worked on need be grounded.

(15) No ground shall be removed until all employees are clear of the energized wire or equipment. When removing the grounding set, it shall be disconnected from the line conductors first and lowered to a point below all energized conductors before the ground end is disconnected. [Order 76-38, § 296-45-65025, filed 12/30/76.]

WAC 296-45-65027 General requirements. (1) The live-line bare-handed technique is prohibited on voltages of 750 volts or more.

(2) Number of Men Required To Do Work Safely. (a) Two competent electrical workers shall be required when performing work on energized high voltage lines or equipment or within the distances in Table 1. One of them shall serve principally as a standby man who shall be so located that he may physically reach the other employee in the event of an accident either with his hand or with a hot stick. The stand-by shall be so positioned as to be able to observe the other employee, his bodily movements, and verbally warn of any impending

dangers. In no case when working in pairs shall employees work simultaneously on energized wires or parts of different phases or polarity.

(b) In cases of necessity the stand-by man may temporarily assist the other employee provided that they both work on wires or parts of the same phase or polarity. Both employees shall so position themselves so that the presence of the second man does not increase the hazard.

(c) While on patrol at night and operating a motor vehicle on public highways, there shall be two employees, at least one of whom shall be a journeyman lineman or otherwise a competent or qualified employee. If repair to line or equipment is found to be of such nature as to require two linemen, work shall not proceed until additional help has been obtained provided that in cases of emergency where delay would increase the danger to life, limb, or substantial property, one employee may clear the hazard without assistance.

(3) When only one qualified employee is available and he is required to work on high voltage, these circuits shall be de-energized while the work is performed except for emergencies.

(4) The provisions of subsection (2) of this section do not apply in the following circumstances:

(a) When re-fusing circuits or equipment with a hot stick.

(b) When operating switches by means of operating handle or switch sticks.

(c) When installing or removing a hot line clamp connection with an approved hot stick on single phase line or apparatus, providing that the connection or disconnection does not interrupt or pick up a load.

(5) Initial Determination. (a) Before any work is performed, the location of energized lines and their condition, the location and condition of energized equipment, the condition of the poles, the location of circuits and equipment including power communication lines, CATV and fire alarm circuits, shall be determined as shall any other particular hazard of a particular work site.

(b) No work shall be performed on energized lines or parts until the voltage of such equipment and lines is determined.

(6) Employees shall not stand on or otherwise come in contact with transformer cases or similar equipment while working on energized lines or equipment.

(7) Employees and conducting objects shall not come within the minimum distances as set forth in Table 1 of energized lines or conductors, except:

(a) When working on voltages of 5 Kv between phases or less employees may come within the distances as set forth in Table 1 if and so long as the employees are wearing approved rubber gloves, or use approved line hoses, rubber blankets, guards or barriers or similar approved protective equipment in such a manner as to protect against accidental contact, if the rubber gloves and other protective equipment is used in an approved manner.

(b) Nothing contained herein shall prevent the use of approved hot sticks on any voltage.

(8) Rubber gloves shall be worn or hot sticks used when placing protective equipment on or around energized conductors of voltages of 750 to 5,000 volts.

(9) Rubber gloves shall be worn or hot sticks used when removing tree branches, limbs, or similar objects from contact with high voltages or when such branch, branches, limbs or other conducting object is within the prohibited distance of Table 1. Rubber gloves shall be worn whenever the employee can touch or come within the prohibited distances as provided in Table 1.

(10) Employees should not wear rubber gloves while ascending or descending a pole until such time as the employee becomes so positioned that he is likely or capable of touching voltages of 750 or more.

(11) Rubber gloves, line hoses, rubber blankets, and other recognized protective equipment are barriers when used. Such barriers can be used on voltages of 5,000 or less between phases.

(12) It shall not be permissible to consider one part of a high voltage switch or disconnect as de-energized for the purpose of doing work on it if the remainder of the switch or disconnect remains energized unless approved barriers are erected which will prevent employees who are doing the work on such equipment from coming in direct contact with the energized parts.

(13) Conductor support tools such as link sticks, strain carriers, and insulator cradles may be used: *Provided*, That the clear insulation is at least as long as the insulator string or the minimum distance specified in Table 1 for the operating voltage.

(14) TABLE 1:

Voltage Range (phase to phase) Kilovolt	Minimum Working and Clear Hot Stick Distance
.75 up to 15	2 ft. 0 in.
15 up to 35	2 ft. 4 in.
35 up to 46	2 ft. 6 in.
46 up to 72.5	3 ft. 0 in.
72.5 up to 121	3 ft. 4 in.
121 up to 145	3 ft. 6 in.
145 up to 169	3 ft. 8 in.
169 up to 242	5 ft. 0 in.
242 up to 362	7 ft. 0 in.[1]
362 up to 552	11 ft. 0 in.[1]
552 up to 765	15 ft. 0 in.[1]

[1]NOTE: For these voltages of 242 and up, the minimum working distances and the minimum clear hot stick distance at the work location may be reduced when and so long as such distances are not less than the shortest distance between the energized part and grounded surface.

(15) Foreign Operations. All foreign operations as defined within this chapter conducted on or near power lines or energized equipment shall maintain clearance according to the provisions of WAC 296-24-24019. [Order 76-38, § 296-45-65027, filed 12/30/76.]

WAC 296-45-65029 Overhead lines. (1) General. (a) When working on or with overhead lines, this section shall be complied with as well as the applicable divisions of any other section.

(2) Strength of Span and Its Support. (a) Precautions shall be taken to determine that the span and the supports thereof are of a strength so as to safely bear the weight of the employee(s) and the equipment used thereon.

(b) Before an employee climbs a pole, it shall be inspected or tested to determine that such pole is safe, both above and below the ground level. If the pole is found to be unsafe for climbing, it must be guyed or braced or otherwise supported in such a manner as to allow the employees to safely perform their work.

(c) Before moving conductors there shall be a thorough inspection for strength and good condition of the adjacent supporting poles, structures, and conductor supporting hardware. Approved safeguards shall be installed on such adjacent poles or structures as may be necessary to prevent unexpected or uncontrolled movement of these adjacent poles, structures or conductors supporting equipment or conductors.

(3) When setting, moving or removing poles using cranes, derricks, gin poles, A–frames, or similar equipment near energized lines or equipment, minimum clearances shall be maintained, as provided by Table 1 except when approved barriers or other line protecting devices have been installed.

(4) Temporary Guard Poles or Structures. Guard poles, towers, or other guard structures installed for the purpose of protecting employees, lines, conductors or equipment during the course of construction shall be installed at the same clearance requirements as for permanent construction and with strength and safety factors as required to safely support the loads that may normally be imposed on them during their use.

(5) The safest possible working position shall be assumed before starting work in the vicinity of energized wires, lines, transformers or similar energized equipment.

(6) No work should be performed in inclement weather on high voltage equipment when conditions are such as to materially increase the hazards to the employees excepting emergency work necessary to restore service.

(7) While work is being performed overhead, tools and materials shall be placed in proper receptacles when not being used. Tools and materials shall not be thrown to or from the employees on the pole or other elevated position(s) but shall be raised and lowered by means of a handline and/or tool bag. Tools and loose materials shall not be left on poles, crossarms, ladders or other elevated structures or positions.

(8) Employees shall not work in elevated positions unless secured so as to prevent accidental falling. They shall be secured by a safety belt or other approved means except when ascending, descending or moving from one location to another while in an elevated position. Before an employee throws his weight on a belt, the employee shall determine that the snap or fasteners are properly engaged.

(9) When winches, trucks, or tractors are being used to raise poles, materials, to pull in wires, to pull slack or in any other operation, there shall be an operator at the controls unless the machinery or process is stopped.

(10) Foremen shall designate an employee to give signals when required.

(11) Raising poles, towers or fixtures in the close proximity of high voltage conductors shall be done under the supervision of a qualified employee.

(12) Employees shall not wear climbers on work where they are not required. Employees shall not continue to wear their climbers while working on the ground; except for momentary or short periods of time on the ground.

(13) After a capacitor has been disconnected from its source of supply, workers shall wait five (5) minutes before short–circuiting and grounding them, unless the capacitor is equipped with an adequate grounding and/or short–circuiting device. Employees shall take care not to contact the terminals, jumpers, or line wires connected directly to capacitors until they have been properly short–circuited and/or grounded.

(14) After removal from service, short circuits shall remain on capacitors in storage until returned to service.

(15) Pulling or slacking shall be done only as directed by the lineman overhead while hoisting or lowering materials by means of a block.

(16) Steel cables shall not be used to raise transformers, poles or any other material except when the cable is rigged below all energized parts at a sufficient distance to prevent any possibility of the cable or conductive material being raised from contacting unguarded energized parts, unless adequately spread, guarded or clearance is maintained as provided in Table 1. The term "energized parts" in this section means wires or equipment carrying more than 300 volts.

(17) Employees shall not crawl over insulator strings but shall use a platform or other approved device to work from when making dead ends or doing other work beyond strings of insulators, at such distance that they cannot reach the work from the pole or fixture. While working on the platform or other device, they shall be secured with safety straps or a rope to prevent falling. The provision of this subsection does not apply to extra high voltage bundle conductors when the use of such equipment may produce additional hazard. Climbing over dead end assemblies is permissible only after they have been completed and pinned in the final position.

(18) When employees are working overhead, employees shall not dig or do any other work that exposes them to danger due to inattention of the work being performed overhead. Employees shall wear approved hard hats when it is necessary to be beneath overhead employees.

(19) Splicers platforms of the type commonly used for splicing or approved ladders securely hooked over or lashed to the strands may be used.

(20) When employees are required to climb through energized circuits of 2.1 KV or more, preventive measures shall be taken so as to minimize the possibility of contact with energized lines. This may include approved spreading and guarding of the energized conductors.

(21) Methods shall be used that will effectively prevent ropes, (excepting hot line ropes) including hand lines, equipment or materials passing through the conductor level from making contact with the energized conductor or equipment of voltages of 2.1 KV or more. This may include approved spreading or guarding.

(22) All lifting equipment shall be bonded to an effective ground or it shall be considered and worked as energized and barricaded when utilized within the prohibited distance of Table 1 or if during the use of such equipment it is possible that it could come within the prohibited distance of Table 1 it shall be considered energized and barricaded. [Order 76-38, § 296-45-65029, filed 12/30/76.]

WAC 296-45-65031 Poles and pole settings. (1) All poles, the methods of use and installation of poles, insofar as they affect the employee safety, are subject to the relevant provisions of the Electrical Construction Code, chapter 296-44 WAC.

(2) Pole holes shall not be left unattended or unguarded.

(3) Tag lines shall be of a nonconductive type when used in an area that will come within the prohibited distance of Table 1 or where it is possible that during use such line could come within the provisions of Table 1.

(4) Framing. During framing operations, employees shall not work under a pole or structure suspended by a crane, A-frame or similar equipment unless it is adequately supported. [Order 76-38, § 296-45-65031, filed 12/30/76.]

WAC 296-45-65033 Transmission line construction. (1) Metal Tower Construction. (a) When working with unstable material, the excavation for pad or pile-type footings in excess of four feet deep shall be either sloped to the angle of repose, or shored as provided in WAC 296-155-660 and WAC 296-155-665. Ladders shall be used for ingress and egress to a pad or pile-type footing excavation, if such excavation is in excess of four feet in depth. Employees shall not enter excavation to clear, clean or free the auger unless shoring is first installed.

(b) A designated employee shall be used in directing mobile equipment when such equipment either is or could come within the area of the fault line of the footing excavation.

(c) No employee shall be permitted to remain in the footing when equipment is being spotted for placement or being moved within an area that is likely to disturb the soil of or in the area of the excavation. This rule applies to excavation regardless of whether the excavation is shored or not.

(d) When necessary to assure the stability of mobile equipment, the location of use for such equipment shall be graded and leveled.

(e) Tower assembly shall be carried out with a minimum exposure to employees for falling objects. Employees shall not work under overhead work unless it is required by the very process and there is no other feasible method of performing the work.

(f) During construction or assembly, guy lines shall be used to maintain and secure parts of sections in position in towers or equivalent means shall be used.

(g) Tower members and sections being assembled shall be supported by an approved method.

(2) No employees shall be permitted under a tower when it is in the process of erection or assembly, except as may be required to guide and secure the section being set.

(a) When erecting towers using hoisting equipment adjacent to energized lines or equipment, such lines or equipment shall be de-energized if practical. If the lines are not de-energized, additional caution shall be used, such as a competent qualified employee to watch in order to maintain the minimum clearance provided in Table 1.

(b) Erection cranes or similar equipment shall be set on firm, level foundations and when the equipment has outriggers, the outriggers shall be properly used.

(c) Tag lines shall be utilized to maintain control of tower sections until the section is positively secure.

(d) The load lines shall not be detached from the tower sections until the section is positively secure.

(e) Except during emergency restoration procedure, erection shall be discontinued in the event of high wind or other adverse weather conditions when such weather conditions materially increase the hazard of the work being performed.

(f) All equipment and rigging shall be regularly inspected and maintained in safe operating condition.

(g) Traffic controls shall be maintained and used when crossing highways and railways with equipment as required by the provisions of WAC 296-155-300(7)(a) and (b).

(h) A designated employee shall be used and shall observe in order to assure that equipment being moved under or near energized lines or equipment maintains the minimum distance as required in Table 1.

(3) Stringing or Removing De-energized Conductors.

(a) When stringing or removing de-energized conductors, the provisions of this subdivision shall be complied with.

(b) Prior to stringing operations, there shall be a briefing with all affected employees, setting forth the plan of operation and specifying the type of equipment to be used, grounding devices and procedures to be followed, crossover methods to be employed, and the clearance authorization required, together with any other matters which the particular situation requires. Where conducting objects might contact, or come within the prohibited distance as set forth in Table 1, energized circuits, lines or where there might be a voltage build-up, the conductor being installed or removed shall be grounded first or the employee isolated or insulated.

(c) If the existing line is to be de-energized, proper clearance authorization shall be secured, and the line

grounded on both sides of the crossing or the line being crossed shall be treated as energized.

(d) When crossing over energized conductors in excess of 750 volts, rope, nets or guard structures shall be installed so as to prevent accidental contact with the energized conductor(s). Where reasonably practical, the automatic reclosing feature of the circuit interrupting device shall be made inoperative.

(e) When conductors are being strung in or removed, they shall be kept under positive control to prevent accidental contact with energized circuit.

(f) Guard structures members shall be of approved dimension, strength and securely supported to meet the purpose for which they are intended.

(g) Catch–off anchors, rigging and hoists shall be of ample capacity to prevent loss of the lines.

(h) Manufacturer's load rating shall not be exceeded for stringing lines, pulling lines, sock connections, and all load–bearing hardware and accessories.

(i) Pulling lines and accessories shall be inspected prior to each use and replaced or repaired when damaged or when there is a reasonable basis to doubt the dependability of such lines or accessories. The provisions of WAC 296–155–330(3)(d)(ii) concerning splices shall not apply to stringing and removing of de–energized conductors.

(j) Conductor grips shall not be used on wire ropes unless designed for that particular purpose.

(k) When the conductor or pulling line is being pulled (in motion) employees shall not be permitted directly under overhead operations, nor shall any employee be permitted on the crossarm.

(l) A transmission clipping crew shall have a minimum of two structures clipped in between the crew and the conductor being sagged. When working on bare de–energized conductors, clipping and tying crews shall work between grounds at all times. The grounds shall remain intact until the conductors are clipped in except on dead end structures.

(m) Except during emergency restoration procedures, work from structures shall be discontinued when there exists adverse weather conditions such as high wind or ice on the structures which would make the work more hazardous than usual.

(n) Removing, stringing and clipping operations shall be discontinued during the process of an electrical storm when such storm reasonably presents an additional hazard.

(o) Reel handling equipment, including pulling and braking machines, shall have ample capacity, operate smoothly and be leveled and aligned in accordance with the manufacturer's operating instructions.

(p) Communication between the reel tender and pulling rig operator shall be provided and maintained.

(q) Each pull shall be snubbed or dead ended at both ends before subsequent pulls.

(4) Stringing Near, Above, Below or Otherwise Adjacent to Energized Lines. (a) Before stringing near, above, below, parallel to an existing line, there shall be a determination as to whether or not there exists a possibility of a dangerously induced voltage buildup, particularly during switching and grounding fault conditions. Where such possibility of danger does exist, employer shall comply with provisions of subdivision (3)(a) through (3)(j) of this subsection in addition to the provisions of subsection (3) of this section unless the line is worked as energized.

(b) When stringing adjacent to or near energized lines, the tension stringing method or other methods which preclude accidental contact between the lines being pulled and any employee shall be used.

(c) All pulling and tensioning equipment shall be isolated, insulated or effectively grounded.

(d) A ground shall be installed at the tensioning reel set–up in order to ground each bare conductor, subconductor and overhead ground conductor during stringing operations.

(e) During stringing operations, each bare conductor, subconductor and overhead ground conductor shall be grounded at the first transmission structure adjacent to both the tensioning and pulling set–up and in increments so that no point is more than two miles from a ground, and

(i) The grounds shall be left in place until the conductor installation is completed.

(ii) Such grounds shall be removed as the last step of aerial cleanup.

(iii) Except for moving type grounds, the grounds shall be placed and removed with a hot stick.

(iv) Conductors, subconductors and overhead ground conductors shall be grounded at all dead–end or catch–off points.

(f) A ground shall be located at each side and within 10 feet of working areas where conductors, subconductors or overhead ground conductors are being spliced at ground level. The two ends to be spliced shall be bonded to each other.

(g) All conductors, subconductors and overhead ground conductors shall be bonded to the tower at any isolated tower where it may be necessary to complete work on the transmission line.

(h) Work on dead–end towers shall require grounding on all de–energized lines.

(i) Removal of temporary guards: Temporary guards shall not be removed until the adjacent structures have been clipped: *Provided*, The guard structures may be removed if safety slings have first been installed on adjacent tower or structure.

(j) When performing work from the structure, clipping crews and all others working on conductors, subconductors, or overhead ground conductors shall be protected by individual grounds installed at each such work location. [Order 76–38, § 296–45–65033, filed 12/30/76.]

WAC 296–45–65035 Substations. (1) Before work is performed on any electrically operated circuit breaker, it shall be cleared from the line and the control switch at the breaker opened. Where circuit breakers are operated by springs, solenoids or compressed air, or similar

means, proper precautions shall be taken to prevent unauthorized or accidental operation of the device. This provision does not preclude repairs or adjustments that present no hazard to the employee.

(2) Disconnecting switches must be operated with approved sticks provided for that purpose unless said switches are provided with an operating mechanism having an insulated or grounded handle.

(3) Handles for manual operation of oil circuit breakers shall not be left in their sockets.

(4) Approved insulated platforms or mats shall be provided and used by employees while working on any live part of the switchboard on which any wire or appliance carries a potential in excess of 300 volts.

(5) All generators and motors having a potential of more than 300 volts shall have an approved insulated platform or mat, so arranged so as to permit the attendant to stand upon such a platform or mat when working upon live parts of such generator(s) or motor(s).

(6) Work Near Energized Equipment. (a) When work is performed in an energized substation, authorization shall be obtained from the designated, authorized employee before work is started.

(b) When work is to be done in an energized substation, the following shall be determined prior to the commencement of work:

(i) What facilities are energized, and

(ii) What protective equipment and precautions are necessary for the safety of personnel.

(c) Extraordinary caution shall be exercised in the handling of busbars, tower steel, materials and equipment in the vicinity of energized facilities. The provisions of Table 1 shall be complied with.

(7) Barricades and Barriers. (a) Barricades or barriers shall be installed to prevent accidental contact with energized lines or equipment.

(b) Where appropriate, signs indicating the hazard shall be posted on or near the barricade or barrier. These signs shall comply with the provisions of WAC 296-155-300.

(8) Control Panels. (a) Work on or adjacent to energized control panels shall be performed by designated employees only.

(b) Precautions shall be taken to prevent accidental operation of relays or other devices due to jarring, vibration, or improper wiring.

(9) Mechanized Equipment. (a) Use of vehicles, gin poles, cranes and other equipment in restricted or hazardous areas shall at all times be controlled by a designated employee.

(b) All mobile cranes and derricks shall be effectively grounded when being moved or operated in close proximity to energized lines or equipment, or where there exists a reasonable possibility that said equipment could accidently move within the prohibited distance as specified in Table 1, or the equipment shall be considered energized.

(10) Storage. (a) The storage requirements of WAC 296-24-21501 through WAC 296-24-21505 are mandatory.

(11) Fences. (a) When a substation fence must be expanded or removed for construction purposes, a temporary fence affording similar protection shall be provided and installed when the site is unattended, approved interconnection with ground shall be maintained between the temporary fence and permanent fence.

(b) All gates to all unattended substations shall be locked, except when work is in progress.

(12) Footing Excavation. (a) Excavation for auger, pad and piling-type footings for structures and towers shall comply with the provisions set forth for metal tower construction. (See WAC 296-45-65033.)

(b) No employee shall enter an unsupported auger-type excavation if such excavation is in unstable material. Necessary clean-out shall be accomplished without entry. [Order 76-38, § 296-45-65035, filed 12/30/76.]

WAC 296-45-65037 Underground. (1) Protective barriers, or approved guards and warning signs must be erected before removing manhole covers or making excavations in places accessible to vehicular or pedestrian traffic.

(2) Whenever an opening is made in the street, it shall be properly guarded or covered until same is closed and whenever an obstruction is left in the roadway after dark, it shall be marked with approved lights, flares or similar devices.

(3) When work is to be performed in a manhole or unvented vault:

(i) No entry shall be permitted unless forced ventilation is provided or the atmosphere is found to be safe by testing for oxygen deficiency and the presence of explosive or potentially hazardous gases or fumes.

(ii) When unsafe conditions are detected, by testing or other means, the work area shall be ventilated and otherwise made safe before entry.

(iii) Provisions shall be made for a continuous supply of air as provided for in WAC 296-62-110.

(iv) When forced ventilation is not used a method of monitoring said manhole or vault so as to prevent the occurrence of oxygen deficiency due to work being performed in said manhole or vault, and to detect the presence of any explosive gases or fumes which may occur while the employees are working in said manhole or vault.

(4) When open flames are used or smoking is permitted in manholes, adequate mechanical forced air ventilation shall be used.

(5) Before using open flames in a manhole or excavation in an area where combustible gases or liquids may be present, such as near a gasoline service station, the atmosphere of the manhole or excavation shall be tested and found safe or cleared of the combustible gases or liquids prior to the entry.

(6) When work is to be performed in manholes containing any wires or appliances carrying electrical current, they shall be in a sanitary condition.

(7) A watchman shall be kept at the surface when there is any hazard to the employees in the manhole and he should not leave the manhole unwatched until such

time as all employees are out and the cover has been replaced.

(8) Care shall be taken to prevent the possibility of vehicles or pedestrians coming in contact with the wires and equipment.

(9) Trenching and Excavating. (a) During excavation or trenching, in order to prevent exposure of employees to the hazards created by damage to dangerous underground facilities, efforts shall be made to determine the location of such facilities and work conducted in a manner designed to avoid damage.

(10) No work shall be permitted to be done in any manhole or subway on any energized wire, cable or appliance carrying more than 300 volts of electricity by less than two competent or qualified persons who shall at all times, while performing such work, be in the same manhole or subway in which work is being done. This rule shall not apply to work on telephone, telegraph or signal wires or cables.

(11) Trenching and excavation operations shall comply with the provisions of WAC 296-155-650 and WAC 296-155-660.

(12) (a) Cables in manholes shall be accessible to employees and clear working space shall be maintained at all times.

(b) Where cables are not permanently identified by tags or otherwise, diagrams and information establishing positive identification and position of the cables shall be provided and supplied to the employees.

(c) Where multiple cables exist in an excavation, cables other than the one being worked on shall be physically protected when necessary.

(d) When multiple cables exist in an excavation, the cables to be worked on shall be identified by approved testing unless its identification is obvious by reason of the distinctive appearance.

(e) Before cutting into a high voltage cable or opening a high voltage splice, the cable shall be de-energized then clearance obtained, tested and then grounded in an approved manner. The cable to be worked on shall be identified by tags or equivalent means.

(f) When working on buried cables or cables in manholes, the metallic sheath continuity shall be maintained by bonding across the opening or by equivalent means.

(13) Insulated platforms or other protective devices shall be provided when work is to be done on energized wires or equipment in manholes.

(14) Tools and materials shall not be left on the ground around or near the manhole opening where they might be pushed or otherwise fall into the hole.

(15) Furnaces shall always be placed in a secure, level position on the downhill side of the manhole to avoid spillage of hot metals or compounds into the manhole.

(16) Materials shall not be thrown into or out of manholes but shall be placed in the proper receptable and hoisted in and out by means of a rope.

(17) Pulling Underground Cable. When pulling cable(s) all employees shall be made aware of the hazard of being caught in the sheaves, lashings or winch gears. All employees shall stand clear of the pulling line when the pull is begun or when the line is under tension. This rule applies to all work performed by means of a winch.

(18) Fishing Conduit or Ducts. When fishing conduit or ducts, it shall first be determined that the fish tape or wires will not contact any energized line or equipment.

(19) WAC 296-45-65023 on Clearances and WAC 296-45-65025 on Grounding shall be complied with. [Order 76-38, § 296-45-65037, filed 12/30/76.]

WAC 296-45-65039 Trolley maintenance, jumpering or by-passing. (1) Energized trolley wire shall be jumpered when it is to be opened or cut.

(2) Reaching Over Trolley Wire(s) or System(s). Linemen shall not reach over trolley wire(s) unless properly protected by line hose or rubber blanket.

(3) Reaching Across Sectional Insulators. Linemen shall not reach across section insulator(s), insulated spacer(s) or insulated approach.

(4) Polarity on Either Side of Sectionalizing Breakers. Since the polarity on both sides of a sectionalizing insulator may be different, it is required that prior to performance of work, tests be performed with approved testing equipment to determine whether or not the polarity is the same or different on one side of the sectional insulator as compared with the other.

(5) Working on Hangers. More than one truck crew shall not work on hangers attached to the same span at the same time, without rubber protection.

(6) Workers on Hangers of Opposite Polarity. Trolley hangers and ears of opposite polarity shall not be worked on at the same time when trolley wire is energized.

(7) Checking Electric Switches. When electric switches are checked for operation, making it necessary to short circuit the contactor to each trolley wire, tools with insulated handles shall be used.

(8) Short Circuit Due to Use of Noninsulated or Conductive Long Handled Tools. When a hazard of short circuit exists, due to use of noninsulated or conductive long handled tools, approved protective rubber equipment shall be used as provided in this chapter.

(9) Trolley Feeders. When work is to be performed on street railway trolley feeders where it is necessary for workers to work from metal or other grounded poles or fixtures or on poles or fixtures on which grounds are maintained, the feeders shall be de-energized unless the poles or fixtures are insulated before the work is started with approved protective devices in such manner that employees cannot become grounded while working on the feeders, and employees shall wear approved rubber gloves. [Order 76-38, § 296-45-65039, filed 12/30/76.]

WAC 296-45-65041 Aerial manlift equipment. This section applies to aerial manlift equipment as defined in WAC 296-45-65005.

(1) A daily visual inspection and operating tests shall be made in accordance with the manufacturer's recommendation by the assigned operator.

(2) Aerial manlift equipment shall be of the type designed and maintained to meet the following safety factors:

(a) Stability Test. All such equipment shall meet or exceed a safety factor of one and one-half to one (1 and 1/2 to 1) in all working positions, based upon the posted working load.

(b) Structural and Mechanical Tests. All such equipment shall meet or exceed a safety factor of 2 to 1 in all working positions, based upon the manufacturer's maximum rated capacity.

(i) The Division of Industrial Safety and Health will accept, in lieu of subdivision (b) of this section, the safety factor test data submitted by the manufacturer by a competent testing laboratory, or by a registered engineering firm. When and if there exists a reasonable doubt as to whether or not the equipment will meet the data required for stability in structural and mechanical testing, the Division may require that such testing be performed on such equipment before it can be used. If the Division in writing requires that the employer test its equipment or have such equipment tested, the employer will have a reasonable time within which to secure such information as is required by this rule.

(3) Employee shall not move any such equipment in the direction of an obstructed view unless the following requirements have been met. (An obstructed view exists even though the operator is able to see to the rear by reason of a system of mirrors or a mirror.)

(i) Vehicle can be backed up only when observer signals that it is safe to do so or the driver makes a walk-around inspection prior to backing up, or

(ii) The vehicle has a reverse signal alarm audible above the surrounding noise level.

(4) Hydraulic Fluids. (a) All hydraulic fluids used for the insulated section of derrick trucks, aerial lifts, and hydraulic tools which are used on or around energized lines or equipment shall be of the insulating type.

(5) Mechanical adjustment or repairs shall not be attempted or performed in the field except by a person qualified to perform such work.

(6) Malfunction or needed repairs of manlift equipment shall be reported to the employee responsible for such repairs as soon as is reasonably possible. Use of equipment which is known to be in need of repairs or is malfunctioning is prohibited when such deficiency creates an unsafe operating condition.

(7) No employee shall ride in the basket while traveling to or from jobsites.

(8) When any aerial manlift equipment is parked for operation at the jobsite, the brakes shall be set. Wheel chocks shall be used to prevent accidental movement while parked on an incline. If the aerial manlift equipment has outriggers, the outriggers shall be implanted on firm footing and all manufacturer's specifications shall be complied with.

(9) Safety check valves shall be installed in the outrigger hydraulic system which will automatically lock the outrigger in position in case of failure of the hydraulic system except when outriggers are equipped with mechanically self-locking device.

(10) The truck shall not be moved until the boom or ladder is cradled and/or fastened down, the outrigger retracted, and the power take-off disengaged, except for a short move when the truck can be moved with care and under the direction of the employee in the elevated position.

(11) Employees shall not sit or stand on the basket edge, stand on materials placed in or across the basket, or work from a ladder set inside the basket.

(12) The basket shall not be rested on a fixed object(s) so that the weight of the boom is either totally or partially supported by the basket.

(13) Neither the basket, supporting boom or ladder on aerial equipment shall come within the prohibited distance of energized high voltage conductors or equipment as set forth in Table 1 unless protective equipment is used. Special approved insulated tools, insulated fittings and insulated masts need not comply with this section.

(14) When the basket is being used in such a manner that it may contact energized high voltage lines or equipment, the vehicle shall be considered energized at line potential and the following safe practices shall be observed unless such equipment is grounded:

(a) Approved protective devices shall be used.

(b) Before physically contacting, entering or leaving the vehicle, all employees shall make sure that the boom and basket is stationary and not in contact with energized high voltage lines or equipment.

(15) While working in aerial equipment, employees shall wear an approved safety belt attached to the boom or basket, in a secure manner.

(16) No component of aerial devices shall be operated from the ground without permission from the employee in the basket except in case of emergency.

(17) Truck driver shall remain at tower controls while workers are working on towers except when the aerial manlift equipment has been properly chocked to prevent uncontrolled movement. Tower trucks shall be equipped with a reliable signaling device between the employees working on the tower and the truck driver.

(18) Working on Truck Towers. Employees shall not stand on tower gates or railings. Work shall not be done from plank(s) placed on tower railings.

(19) Tower Truck Railings. Towers shall have standard railings and toeboards around the tower and all railings shall be constructed of wood, fiberglass or other nonmetallic material. All railings shall be a vertical height of not less than 36 inches or more than 42 inches from the floor of the platform to the upper surface of the top rail. Intermediate railings shall be midway between the floor and the underside of the top rail. Tower gates shall be so constructed as to prevent accidental opening.

(20) Tower truck decks shall be kept clear of tools, wire and other materials and tools shall be kept in proper storage area when not in use.

(21) Linemen shall not wear climbers or spurs while working on a tower truck.

(22) Employees operating controls of aerial equipment shall not stand on the ground or on separate grounded surface unless wearing rubber gloves or standing on insulated board or mat, where equipment is exposed to or operated in the near vicinity of high voltage conductors.

(23) Operating levers or controls shall be kept clear of tools, materials or obstructions.

(24) Load limits as recommended by the manufacturer of aerial manlift equipment shall not be exceeded. Shock loading of the equipment is prohibited.

(25) Employees shall not climb into or out of the basket or platform while it is elevated or change from one basket to another on dual basket equipment, except in case of emergency or when the employees involved agree that this is the safest way to perform the work. This exception shall not be used to circumvent safety rules.

(26) Employees shall not belt to adjacent poles, structures, or equipment while performing work from aerial devices.

(27) Whenever it is necessary to work beyond the guarded traffic work area, extreme care shall be exercised and all precautions taken to insure the safety of the operation and the employees.

(28) Power tools not in use shall be disconnected from external power sources.

(29) Electrical, hydraulic or air tools shall have safety switches or devices to prevent accidental operation and, in addition, a quick means of disconnecting on electrically operated equipment shall be within easy reach of the operator.

(30) Existing safety rules governing the use of hot line tools, rubber and other protective equipment and safe work practices while performing work from poles or structures shall also apply to work done from aerial manlift equipment.

(31) The basket shall be kept clean and all tools not in use shall be secured or removed.

(32) Approved warning light shall be operating when the boom leaves the cradle. This light shall be visible to approaching traffic when the boom is in position over any traveled area.

(33) A braking system, independent of the drive-line braking system, shall be installed on all aerial manlift equipment where, from the engineering standpoint, it is feasible.

(34) Safety check valves shall be installed in the hydraulic system of aerial manlift equipment to automatically lock the boom or ladder in position in case of failure to any part of the hydraulic pressure system.

(35) All aerial manlift equipment shall have both upper and lower controls (except ladder trucks need not have upper controls). The upper controls shall not be capable of rendering the lower controls inoperative. The lower controls should be located at or near the base of the aerial structure.

If the lower controls are used, the operator shall have a view of the elevated employee(s) or there shall be communication between the operator and the employee in the elevated aerial structure; *Provided*, That no employee shall be raised, lowered, or moved into or from the elevated position in any aerial manlift equipment unless there is another employee, not in the elevated aerial structure, available at the site to operate the lower controls, except as follows:

(a) Where there is a fixed method permanently attached to or part of the equipment which will permit an employee to descend from the elevated position without lowering the elevated structure, or

(b) Where there is a system which will provide operation from the elevated position in the event of failure or malfunction of the primary system.

This section shall not be interpreted as an exception to any other rule in this chapter.

(36) Controls in aerial manlift equipment shall be protected from accidental operation. Controls of the outriggers shall also be protected from accidental operation. Such protection may be by guarding or equivalent means.

(37) The manufacturer's recommended maximum load limit shall be posted at a conspicuous place near each set of controls and shall be kept in a legible condition.

(38) Side member guys on aerial ladders shall be insulated.

(39) The manufacturer's operator's instructional manual shall be kept on the vehicle.

(40) Operating instructions, proper sequence and maintenance procedures prescribed by the manufacturer for operation of the equipment shall be followed. [Order 76-38, § 296-45-65041, filed 12/30/76.]

WAC 296-45-65043 All motor vehicle and trailer operations. When motor vehicles and trailers are operated on public right-of-way, highways or similar areas, the equipment shall be operated and maintained in conformance with the Motor Vehicle Code of the State of Washington, chapters 46.04 through 46.61 RCW.

(1) Whenever and wherever such motor vehicle is operated, such equipment shall have a safe functioning brake and an emergency brake. In addition, all motor vehicles and trailers shall have such equipment as is necessary for the safe operation of the vehicle(s).

(a) When traveling, employees must ride inside the vehicle and shall not ride on the sides or on the top, nor shall employees ascend or descend a motor vehicle when such vehicle is in motion.

(b) Employees shall not ride on trailers except in cases where the trailer requires an employee to steer or brake the trailer.

(c) A truck shall not be moved from place to place with the ladder erect other than when positioning the truck at a given location. This rule does not apply to approved tower or fixed ladder trucks.

(d) Warning signs, flares and other protective devices shall be used which shall conform with the requirements for road construction or maintenance as set forth in chapter 46.37 RCW. [Order 76-38, § 296-45-65043, filed 12/30/76.]

WAC 296-45-65045 Material handling. (1) Prior to unloading steel, poles, crossarms and similar materials, the load shall be thoroughly examined to determine if the load has shifted, binders or stakes have broken or the load is otherwise hazardous to employees.

(a) The hoist rope shall not be wrapped around the load. This provision shall not apply to electric construction crews when setting or removing poles.

(2) Pole Handling. (a) During pole hauling operations, all loads shall be secured to prevent displacement, and a red flag shall be displayed at the trailing end of the longest pole.

(b) While loading and unloading materials, roadways shall not be blocked unless approved traffic control is used.

(c) When hauling poles during darkness, illuminated warning devices shall be attached to the trailing end of the longest pole in accordance with the State of Washington Motor Vehicle Code.

(3) Tag Lines. When necessary to control loads, tag lines or other approved devices shall be used.

(4) Oil Filled Equipment. During construction or repair of oil filled equipment, the oil may be stored in temporary containers other than those required by WAC 296–155–270, such as pillow tanks.

(5) Storage of Tools and Materials. All tools and materials shall be stored in a safe and orderly manner in yards for equipment and other areas. [Order 76–38, § 296–45–65045, filed 12/30/76.]

WAC 296–45–65047 Specification for linemen's belts and similar equipment. (1) All hardware for linemen's body belts, safety straps and lanyards shall be drop forged or pressed steel and have a corrosive resistive finish tested to the American Society for Testing and Materials B117 as published in 1964 (50 hour test). Surfaces shall be smooth and free from sharp edges.

(a) All buckles shall be those guaranteed by the manufacturer as having at least a 2,000–pound tensile strength with a maximum permanent deformation no greater than one sixty–fourth (1/64) inch.

(b) All "D" rings shall be those guaranteed by the manufacturer as having at least a 5,000–pound tensile strength without cracking or breaking.

(c) All snap hooks shall be those guaranteed by the manufacturer as having at least a 5,000–pound tensile strength without distortion sufficient to release the keeper.

(d) All fabric used for safety straps shall be guaranteed by the manufacturer as being capable of withstanding either AC or DC dielectric test of not less than 25,000 volts per foot "dry" for 3 minutes without visible deterioration.

(e) All fabric and leather used shall be that which has been represented by the manufacturer as having been tested for leakage current of 1 milliampere with a potential 3,000 volts when applied to the electrodes positioned 12 inches apart.

(f) The cushion part of the body belt may be either leather or other material provided that it;

(i) Has no exposed rivets on the inside;

(ii) Is at least 3 inches in width;

(iii) Is at least five thirty–seconds (5/32) inch thick, if made of leather; or have equivalent strength if made of other material.

(iv) Has pocket tabs that extend at least 1–1/2 inches down and three inches back of the inside of circle of each "D" ring for riveting on plier or tool pockets. On shifting "D" belts, this measurement for pocket tabs shall be taken when the "D" ring section is centered.

(v) A maximum of four (4) tool loops shall be so situated on the body belt that four (4) inches of the body belt in the center of the back, measuring from "D" ring to "D" ring, shall be free of tool loops and any other attachments.

(vi) All stitching shall be of minimum 42–pound weight nylon or equivalent thread and shall be lock stitched. Stitching parallel to an edge shall not be less than three–sixteenths (3/16) inch from edge of narrowest member caught by the thread. The use of cross–stitching on leather is prohibited. Approved copper, steel or equivalent liners shall be used around the bar of "D" rings to reduce the wear.

(vii) The keeper of snap hooks shall have a spring tension that will not allow the keeper to begin to open with a weight of 2–1/2 pounds or less, but the keeper of snap hooks shall begin to open with a weight of four (4) pounds, when the weight is supported on the keeper against the end of the nose.

(2) Testing linemen's safety straps, body belts and lanyards shall be in accordance with the following procedure:

(a) Attach one end of the safety strap or lanyard to a rigid support, the other end shall be attached to a 250–pound canvas bag of sand;

(b) Allow the 250–pound canvas bag of sand to free fall 4 feet for (safety strap test) and 6 feet for (lanyard test), in each case stopping the fall of the 250–pound bag;

(c) Failure of the strap or lanyard shall be indicated by any breakage, or slippage sufficient to permit the bag to fall free of the strap or lanyard. The entire "body belt assembly" shall be tested using one "D" ring. A safety strap or lanyard shall be used that is capable of passing the "impact loading test" and attached as required in item (a) of this subdivision. The body belt shall be secured to the 250–pound bag of sand at a point to simulate the waist of a man and allowed to drop as stated in item (b) of this subdivision. Failure of the body belt shall be indicated by any breakage, or slippage sufficient to permit the bag to fall free of the body belt.

(d) Life lines and Lanyards shall comply with the provisions of WAC 296–155–225(2), (3), (5) and (6). [Order 76–38, § 296–45–65047, filed 12/30/76.]

WAC 296–45–675 Rotorcraft/helicopter for power distribution and transmission line installation, construction and repair——Scope. (1) These standards which include WAC 296–45–675 shall apply to work being done on or near any rotorcraft, helicopter crane, or similar device when such device is for power distribution and transmission line construction, alteration, repair or similar work. These standards include work practices when such equipment is being or is about to be used and shall apply to the exclusion of any other standard should such other standard be in conflict with the standards contained herein.

(2) These rules shall be interpreted where necessary to achieve the protection of employees affected by the hazards particular to the helicopter operation and shall be so interpreted as not to conflict with any federal law or regulation governing the operation or maintenance of such craft. [Order 76-38, § 296-45-675, filed 12/30/76.]

WAC 296-45-67503 Definitions. (1) "Cargo hooks." A device attached or suspended from an aircraft which is used to connect an external load to the aircraft through direct couplings or by lead lines. This unit has both mechanical and electrical locking/unlocking means.

(2) "Designated employees." Those employees selected or designated by the employer to work under or near helicopters who have first been instructed in hooking, unhooking, guiding and securing the load, including the signalman, all of whom have been instructed in the hazards of helicopter work and who know the provisions of this section.

(3) "Downwash." A down and outward air column from the main rotor system.

(4) "Ground personnel or crew." Those employees who are physically and mentally capable, who are familiar with the hazards of helicopter use in power distribution and transmission line work, and who know these rules and the methods of operation.

(5) "Helicopter," helicopter crane," and "rotorcraft." Those aircraft whose support in the air is derived solely from the reaction of a stream of air driven downward by propellers revolving around a vertical axis, which are designed for and capable of carrying external loads. The use of the word helicopter in these rules shall also mean helicopter crane, rotorcraft, or similar device.

(6) "Hooking and unhooking." That process by which an external load is either attached to or released from the cargo hook.

(7) "Positive guide system." A system or method of installing a load into position so that the load is capable of being released from the helicopter without being otherwise secured so that the load will remain in position permanently or until otherwise secured by physical means.

(8) "Rotors." That system of blades which rotates or revolves to supply lift or direction to the rotorcraft.

(9) "Approved rubber gloves." Rubber insulating gloves used for protection of electrical workers from electric shock while working on energized conductors and equipment.

(10) "Signalman." That member of the ground crew that is designated by an employer to direct, signal and otherwise communicate with the operator of the helicopter.

(11) "Sling line." A strap, chain, rope or the like used to securely hold something being lifted, lowered, carried or otherwise suspended.

(12) "Sock line." A rope(s), cable(s) or similar line(s) which is used to pull a conductor line from a reel or to remove existing strung conductors from poles or towers.

(13) "Static charge." A stationary charge of electricity.

(14) "Tag line." A rope or similar device used to guide or control the direction or movement of a load. [Order 76-38, § 296-45-67503, filed 12/30/76.]

WAC 296-45-67505 Briefing. (1) Before work or a job involving helicopters begins, there shall be a discussion between all affected employees which shall include the ground crew, signalman and pilot or operator of the helicopter. The discussion shall cover the particular hazards of the job, the methods of performing the work and the signals to be used. All employees shall, before the beginning of such work or job, understand in detail the hazards, the methods and the signals to be used and these regulations.

(2) Every employee before being allowed to work on or near helicopter(s) operating with or without load shall be advised and understand the hazards involved, the methods of performing the work, the signals being used and these regulations. [Order 76-38, § 296-45-67505, filed 12/30/76.]

WAC 296-45-67507 Signals. (1) The signals between the signalman and the operator of the helicopter shall be those submitted to the Federal Aviation Agency for the particular procedure or job. In the event no signals have been submitted to the Federal Aviation Administration, a system of signaling shall be used which has been reduced to writing and which is capable of being clearly understood by all employees and others involved in the job.

(2) Should there occur a change in the hazards, method of performing the job, signals to be used, or other operating conditions during the course of any particular job, a conference shall immediately be held at which time all affected employees and others, including signalmen, groundmen, pilot(s), will be advised of such hazards or change of operation. No employee shall be permitted to work unless such employee and others fully understand the change(s) which have taken place. [Order 76-38, § 296-45-67507, filed 12/30/76.]

WAC 296-45-67509 Slings and tag lines. (1) Loads shall be properly slung so that there will be no slippage or shifting of the load and so that the load will not accidentally be dislodged from the helicopter.

(2) Tag lines shall be of such length as not to be capable of being accidentally drawn into or otherwise entering into the rotors.

(3) Pressed sleeves, wedged eyes, or equivalent means shall be used for all suspended loads. [Order 76-38, § 296-45-67509, filed 12/30/76.]

WAC 296-45-67511 Cargo hooks. (1) All electrically operated cargo hooks shall have the electrical activating device which is so designed and installed as to prevent inadvertent or accidental operation. Such cargo hooks shall be equipped with an emergency mechanical or manual control for releasing the load. The electrical control shall be a double button single hand control.

(2) No electrical cargo hook shall be used unless, prior to that day's operation, the releases are tested and

functioning properly, both electrically and mechanically (manually).

(3) No employee shall be permitted to work under a hovering helicopter(s) unless the cargo hooks used comply with Federal Aviation Administration regulations governing such hooks. [Order 76-38, § 296-45-67511, filed 12/30/76.]

WAC 296-45-67513 Personal protective equipment. Personal protective equipment when working on, under or in the near vicinity of helicopters:

(1) All employees shall wear eye protection of such design as to prevent the likelihood of dust or other substances from contacting the eye(s) of employees.

(2) All employees shall wear hard hats which shall be secured on the employee's head by a chinstrap. [Order 76-38, § 296-45-67513, filed 12/30/76.]

WAC 296-45-67515 Wearing apparel. No employee shall wear clothing or apparel which is either designed to or in fact can reasonably be expected to flap or otherwise react in a similar fashion in the downwash or air disturbance of a helicopter(s). No employee shall work on, under or in the near vicinity of a helicopter while wearing such apparel or clothing which flaps or moves to the extent that it presents a hazard in that it could be caught in the moving equipment, the hoist line, or otherwise interfere with the safe performance of the work. [Order 76-38, § 296-45-67515, filed 12/30/76.]

WAC 296-45-67517 Loose gear and objects. All loose gear, including lunch boxes, rope, cardboard, wire covers and similar items shall be removed or secured or otherwise made fast before the helicopter is started or allowed to approach such area. In the event the gear is not secured or fastened, it shall be removed and located outside the downwash at least 100 feet from the helicopter. [Order 76-38, § 296-45-67517, filed 12/30/76.]

WAC 296-45-67519 Housekeeping. All helicopter landing, loading and unloading areas shall be maintained in a neat and orderly fashion so as to reduce the likelihood of flying materials, tripping, or other hazards attendant to the work being performed. [Order 76-38,§ 296-45-67519, filed 12/30/76.]

WAC 296-45-67521 Operator's responsibility. (1) The helicopter operator shall be responsible for the size, weight and manner in which loads are connected to the helicopter.

(a) No load shall be made if the helicopter operator believes the lift cannot safely be performed. The employer shall make certain that the operator of the helicopter is able to freely exercise his prerogative and judgment as to safe operation of the helicopter itself concerning size, weight and manner by which loads are connected.

(2) No employee shall work on, under, near or in conjunction with a helicopter whose operation does not correspond with the foregoing provisions. [Order 76-38, § 296-45-67521, filed 12/30/76.]

WAC 296-45-67523 Hooking and unhooking loads. No employee shall perform work under hovering helicopters: *Provided*, That qualified and capable employees may function under such craft for that limited period of time necessary to guide, secure, hook or unhook the loads. When guiding, securing, hooking or unhooking the load at elevated positions, employees shall be assisted by and use a positive positioning guide system. When under hovering helicopters at any other location, the employee shall have a safe means of ingress and egress, including readily available escape route or routes in the event of an emergency. No other work or work-related activity other than the aforementioned shall be permitted under hovering helicopters. Bolting of or otherwise permanently securing the structures is prohibited under hovering helicopters except that in the event of an unforeseen contingency of an emergency nature which represents a substantial hazard to life or property, an employee may do such work as is necessary to preserve life or protect substantial property. [Order 76-38, § 296-45-67523, filed 12/30/76.]

WAC 296-45-67525 Static charge. All loads shall be grounded with a grounding device capable of discharging either the actual or potential static charge before ground personnel either touch or come close enough to touch the suspended load, or protective rubber gloves shall be worn by all ground personnel either touching the suspended load or who are likely to touch the load. [Order 76-38, § 296-45-67525, filed 12/30/76.]

WAC 296-45-67527 Load permitted. Weight of the external load shall not exceed the manufacturer's load limit.

(1) A helicopter shall not pull any cable, rope or similar line which is at any point attached to a fixed object other than the helicopter itself. Helicopters may pull a free-wheeling sock line so long as the end of the sock line is not tied to a reel, truck, or other fixed object. Such line cannot be tied to or otherwise secured to the roll-off reel other than by having been wrapped around such reel. [Order 76-38, § 296-45-67527, filed 12/30/76.]

WAC 296-45-67529 Visibility. Employees shall keep clear of and outside the downwash of the helicopters except as necessary to perform a permitted activity. Where reasonably practicable, reduced vision of the operator and ground crew shall be eliminated. [Order 76-38, § 296-45-67529, filed 12/30/76.]

WAC 296-45-67531 Signal systems. Communication shall be maintained between the air crew and ground personnel at all times. Such signal systems shall be understood by the air crew and the ground crew, including signalmen, prior to the hoisting of any load. There shall be constant radio and hand signals used. The signalman shall have the sole and exclusive function during periods of loading and unloading of signaling and

maintaining communications with the pilot. The signalman shall be so dressed as to make his appearance distinguishable from other members of the ground crew by the operator of the craft. This may be by way of orange-colored gloves, vest, or other wearing apparel. In addition, the foreman and one top man shall also have an operating transmitter and receiver.

(1) Designated employees may come within 50 feet of the helicopter when the rotor blades are turning, but no closer, other than to enter the craft or to hook or unhook the load or do other essential functions. Other employee(s) shall not come closer than 100 feet of the craft when it is operating. [Order 76-38, § 296-45-67531, filed 12/30/76.]

WAC 296-45-67533 Approaching the helicopter. Whenever approaching or leaving a helicopter with blades rotating, all employees shall remain in full view of pilot or operator and remain in a crouched position if within 50 feet of the helicopter. No employee shall approach the rear of the helicopter unless directly authorized and directed by the operator of such craft to be there at that time. All employees when operating or working within 50 feet of the helicopter with blades turning are subject to the direction of the helicopter operator. No employee shall enter or leave the helicopter unless and until the place at which they enter or leave such craft is large enough for the helicopter itself to land. [Order 76-38, § 296-45-67533, filed 12/30/76.]

WAC 296-45-67535 In helicopter. (1) While in the helicopter, safety belts will remain fastened at all times except when pilot or operator instructs otherwise or while entering or leaving the helicopter.

(2) No smoking in the helicopter unless otherwise permitted by the pilot.

(3) All rack cargo will be secured prior to and during takeoff and flight.

(4) All internal cargo will be secured or otherwise held.

(5) No gear shall be thrown toward or placed in front of the cockpit on or near plexiglass enclosure.

(6) No employee shall lean against or rub the plexiglass.

(7) No employee shall ride in or work under or near a helicopter with less than 15 minutes reserve fuel.

(8) No employee shall have sharp objects in his pocket while sitting in or on the helicopter.

(9) No employee shall touch any switch, knob, instrument, or other control or device in the cockpit unless specifically directed by the operator.

(10) No cargo shall be thrown into pans or cargo rack.

(11) No employee shall obscure or otherwise obstruct the pilot's ability to visually see the instruments or flight path during flight or operation.

(12) No employee shall attempt to slow or stop the rotorcraft blades by hand unless directed or instructed to do so and aided by the pilot. [Order 76-38, § 296-45-67535, filed 12/30/76.]

WAC 296-45-67537 Sling and rigging. (1) The sling used for the external load shall be inspected each day before use. An employee designated as rigger, who shall be capable of properly inspecting the rigging, shall inspect the sling.

(2) No sling shall be used unless it has a minimum tensile strength of four times the load which will be carried or is being carried.

(3) No sling shall be used unless upon inspection it is determined to be in good condition and capable of the work which is to be performed. [Order 76-38, § 296-45-67537, filed 12/30/76.]

WAC 296-45-67539 Personnel. All ground personnel shall be physically and mentally able to perform the work to which they are assigned, including being knowledgeable in these rules. There shall be a sufficient number of ground personnel so as to be able to safely guide, secure, hook and unhook the load. [Order 76-38, § 296-45-67539, filed 12/30/76.]

WAC 296-45-67541 Fires. Open fires shall not be permitted in any area in which said fires will be affected by the downwash of the rotors, nor shall any employee smoke in an area subject to the downdraft of the rotor. [Order 76-38, § 296-45-67541, filed 12/30/76.]

WAC 296-45-67543 General. No employee shall work under or in the near vicinity of helicopters unless the operator has a valid license for operating the craft, knows the signals to be used, has been present at the last briefing held and knows these rules. No employee shall work under or near such craft if the operator is under the influence of intoxicating beverages or prescription medications which affect his ability, nor shall any employee work under or near such craft if the operator is careless or engages in any negligent or reckless operation of the helicopter. [Order 76-38, § 296-45-67543, filed 12/30/76.]

Chapter 296-46 WAC
SAFETY STANDARDS--INSTALLING ELECTRIC WIRES AND EQUIPMENT--ADMINISTRATIVE RULES

WAC

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DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

296-46-010, 296-46-020, 296-46-030, 296-46-040, 296-46-050, 296-46-060. [Filed 9/22/60, effective 12/1/60.] Repealed by Order 69-2, filed 2/28/69, effective 4/1/69.

296-46-165 Service ampacity. [Order 72-7, § 296-46-165, filed 6/7/72.] Repealed by Order 74-43, filed 12/19/74.

296-46-250 Safe wiring label. [Order 69-2, § 296-46-250, filed 2/28/69, effective 4/1/69.] Repealed by 78-02-098 (Order 77-31), filed 1/31/78; Statutory Authority: RCW 19.28.060.

296-46-260 Direct burial cable. [Order 75-25, § 296-46-260, filed 8/4/75; Order 72-7, § 296-46-260, filed 6/7/72; Order 69-2, § 296-46-260, filed 2/28/69, effective 4/1/69.] Repealed by Order 74-43, filed 12/19/74 and later adopted, as amended, by Order 75-25, filed 8/4/75.] Repealed by 78-02-098 (Order 77-31), filed 1/31/78; Statutory Authority: RCW 19.28.060.

296-46-265 Conductors of different systems. [Order 74-43, § 296-265 (codified as WAC 296-46-265), filed 12/19/74.] Repealed by 78-02-098 (Order 77-31), filed 1/31/78; Statutory Authority: RCW 19.28.060.

296-46-310 Clothes dryers. [Order 69-2, § 296-46-310, filed 2/28/69, effective 4/1/69.] Repealed by Order 72-7, filed 6/7/72.

296-46-320 Electric heating. [Order 74-43, § 296-46-320, filed 12/19/74; Order 73-7, § 296-46-320, filed 5/17/73; Order 72-7, § 296-46-320, filed 6/7/72; Order 69-2, § 296-46-320, filed 2/28/69, effective 4/1/69.] Repealed by 78-02-098 (Order 77-31), filed 1/31/78; Statutory Authority: RCW 19.28.060.

296-46-330 Bathroom receptacles. [Order 69-2, § 296-46-330, filed 2/28/69, effective 4/1/69.] Repealed by Order 72-7, filed 6/7/72.

296-46-340 Recreation room. [Order 69-2, § 296-46-340, filed 2/28/69, effective 4/1/69.] Repealed by Order 74-43, filed 12/19/74.

296-46-400 Mobile homes. [Order 69-2, § 296-46-400, filed 2/28/69, effective 4/1/69.] Repealed by 78-02-098 (Order 77-31), filed 1/31/78; Statutory Authority: RCW 19.28.060.

296-46-401 License fee. [Order 71-17, § 296-46-401, filed 12/7/71.] Repealed by 78-02-098 (Order 77-31), filed 1/31/78; Statutory Authority: RCW 19.28.060.

296-46-402 Fees. [Order 75-25, § 296-46-402, filed 8/4/75; Order 74-43, § 296-46-402, filed 12/19/74; Order 71-17, § 296-36-402 (codified as WAC 296-46-402), filed 12/7/71.] Repealed by 78-02-098 (Order 77-31), filed 1/31/78; Statutory Authority: RCW 19.28.060.

296-46-410 Conductor termination. [Order 69-2, § 296-46-410, filed 2/28/69, effective 4/1/69.] Repealed by Order 72-7, filed 6/7/72.

296-46-425 Construction sites. [Order 74-43, § 296-46-425, filed 12/19/74.] Repealed by 78-02-098 (Order 77-31), filed 1/31/78; Statutory Authority: RCW 19.28.060.

296-46-450 Grounded neutral conductor. [Order 69-2, § 296-46-450, filed 2/28/69, effective 4/1/69.] Repealed by 78-02-098 (Order 77-31), filed 1/31/78; Statutory Authority: RCW 19.28.060.

296-46-460 Terminating immediately inside an outside building wall. [Order 75-25, § 296-46-460, filed 8/4/75; Order 72-7, § 296-46-460, filed 6/7/72; Order 69-2, § 296-46-460, filed 2/28/69, effective 4/1/69.] Repealed by 78-02-098 (Order 77-31), filed 1/31/78; Statutory Authority: RCW 19.28.060.

Appendix A Residential heat loss tables. [Order 72-7, Appendix A—Residential heat loss tables, filed 6/7/72; Order 69-2, Appendix A—Electric heat loss calculation, filed 2/28/69, effective 4/1/69.] Repealed by 78-02-098 (Order 77-31), filed 1/31/78; Statutory Authority: RCW 19.28.060. Later promulgation, see WAC 296-46-59005.

Appendix B Outdoor design temperatures—Charts. [Order 72-7, Appendix B—Outdoor design temperatures—Charts, filed 6/7/72.] Repealed by 78-02-098 (Order 77-31), filed 1/31/78; Statutory Authority: RCW 19.28-.060. Later promulgation, see WAC 296-46-59010.

Reviser's note: The 1978 Edition of National Electrical Code (NFPA No. 70-1978) was adopted by the Department of Labor and Industries on January 1, 1978. [Statutory Authority: RCW 19.28.060. 78-02-098 (Order 77-31), filed 1/31/78.]

WAC 296-46-110 Foreword. These Rules and Regulations are issued by the Electrical Inspection Section of the Department of Labor and Industries under the authority of chapter 19.28 RCW, Electrical Installations Law. The Department is empowered by law to enforce these Rules and Regulations and the National Electrical Code.

The 1978 edition, National Electrical Code, is hereby adopted by reference as part of these Rules and Regulations. The Rules and Regulations are adopted for the safety of the public and are to be used in connection with the 1978 edition of the National Electrical Code. Other codes, manuals and reference works referred to in this code will be available for inspection and review in the office of the Electrical Inspection Section of the Division of Building and Construction Safety Inspection Services, Olympia, during business hours. Where there is any conflict between the Rules and Regulations and the

National Electrical Code, the Rules and Regulations shall be observed.

Electrical inspectors will give information as to the meaning or application of the National Electrical Code and these Rules and Regulations, but will not lay out work or act as consultants for contractors, owners or users.

A copy of chapter 19.28 RCW, Electrical Installations Law, may be obtained from the Department of Labor and Industries. [Statutory Authority: RCW 19-.28.060. 78-02-098 (Order 77-31), § 296-46-110, filed 1/31/78; Order 74-43, § 296-46-110, filed 12/19/74; Order 72-7, § 296-46-110, filed 6/7/72; Order 69-2, § 296-46-110, filed 2/28/69, effective 4/1/69.]

WAC 296-46-120 Workmanship. All electrical wiring and equipment shall be installed in a neat, workmanlike manner. Where applicable non-metallic sheath cables shall follow the lines of the building and be fastened to building structures. Unnecessary, or unnecessarily complicated wiring shall be avoided. See National Electrical Code, Article 110. [Order 72-7, § 296-46-120, filed 6/7/72; Order 69-2, § 296-46-120, filed 2/28/69, effective 4/1/69.]

WAC 296-46-130 Classification of occupancies. (1) Educational Occupancy means a building or that portion thereof used primarily for educational purposes.

(2) Institutional Occupancy shall mean a building or that portion thereof where persons are harbored to receive charitable or other care or treatment or are involuntarily detained and health facilities as defined in Section 517-2 of the National Electrical Code. [Order 72-7, § 296-46-130, filed 6/7/72; Order 69-2, § 296-46-130, filed 2/28/69, effective 4/1/69.]

WAC 296-46-140 Plan review for institutional, educational and other buildings. (1) All plans for new or altered electrical installations in institutional buildings shall be reviewed and accepted by the State Health Department and the Electrical Inspection Section prior to beginning such installation. Refer plans to State Health Department, Olympia Airport, Olympia, Washington 98504.

(2) All plans for new or altered electrical installations in educational buildings shall be reviewed and accepted by the State Electrical Inspection Section prior to beginning such installation. Refer plans to Electrical Plans Examiner, Room 515, Department of Labor and Industries, 300 West Harrison, Seattle, Washington 98119.

(3) Plan review for new or altered electrical installations of other types of construction may be voluntarily requested by the owner or other interested parties.

(4) Charges for plan review of educational and other type buildings, but not including institutional buildings reviewed under subsection (1) of this section, will be based upon ten percent of the job label fee as determined by WAC 296-46-495 with a minimum fee of twenty dollars. Review fee shall be due at time of plan submittal. [Statutory Authority: RCW 19.28.060. 78-02-098 (Order 77-31), § 296-46-140, filed 1/31/78; Order 74-43, § 296-46-140, filed 12/19/74; Order 72-7, § 296-46-140, filed 6/7/72; Order 69-2, § 296-46-140, filed 2/28/69, effective 4/1/69.]

WAC 296-46-150 Wiring methods for designated building occupancies. (1) The fixed wiring methods for institutional and educational occupancies shall be metal raceway, nonmetallic raceways encased in not less than two inches of concrete, M.I. or M.C. cable.

EXCEPTION No. 1—For signal and control circuits, other than those circuits defined under emergency systems per National Electrical Code, Section 517-2, and Sections 725-3(a) and 725-4, open cable wiring approved for the purpose shall be permitted for Class 2 signal and control circuits installed in accordance with Article 725 of the National Electrical Code.

EXCEPTION No. 2—Open cable wiring approved for the purpose of (NFPA Bulletin No. 71) shall be permitted for Central Station Protective Systems installed and operator manned and supervised in accordance with the latest adopted edition of the National Fire Protection Association Bulletin No. 71.

(2) Other Buildings. The fixed wiring method in the following building occupancies shall be busways, metal raceways, nonmetallic raceways encased in not less than two inches of concrete, cable trays or types SNM, TC, MI, MC cables; subject to the National Electrical Code.

(a) Commercial Buildings: Commercial buildings open to the public and designed, intended or used for the purpose of accommodating 200 or more persons. For determination of such population capacity, the following number of square feet per person shall be applied: for standing capacity, 3 square feet per person for such building areas as transit stations, bus depots, court rooms and like buildings; for fixed seating capacity, 6 square feet per person for such building areas as church chapels, conference rooms, multi-purpose rooms and like buildings; for all other such commercial buildings, 25 square feet per person. Occupant capacity noted in Article 518 of the National Electrical Code governing those occupancies designated will not be recognized.

(b) Industrial Plants: Industrial plants, except that open conductors of No. 4/0 or larger size may be installed on insulators not less than 20 feet above floor or working surface level in accordance with Article 320 of the National Electrical Code.

EXCEPTION No. 1—Rigid nonmetallic conduit may be installed in areas outlined in National Electrical Code Section 300-6.

(c) Multi-Family Occupancy Buildings (i.e., apartment buildings, hotels, motels and dormitories) of two or more stories, not including basement, shall be wired in accordance with Chapter 3 of the National Electrical Code except feeders and subfeeders in such buildings shall be wired in a raceway(s).

EXCEPTION NO. 1—For signal and control circuits, other than those defined as Class 1 circuits per National Electrical Code, Sections 725-3(a) and 725-4, open cable wiring approved for the purpose shall be permitted for Class 2 signal and control circuits installed in accordance with Article 725 of the National Electrical Code.

EXCEPTION NO. 2—Open cable wiring approved for the purpose (NFPA Bulletin No. 71) shall be permitted for Central Station Protective Systems installed and operator manned and supervised in accordance with the latest adopted edition of the National Fire Protection Association Bulletin No. 71.

[Statutory Authority: RCW 19.28.060. 78-02-098 (Order 77-31), § 296-46-150, filed 1/31/78; Order 75-25, § 296-46-150, filed 8/4/75; Order 74-43, § 296-46-150, filed 12/19/74; Order 72-7, § 296-46-150, filed 6/7/72; Order 69-2, § 296-46-150, filed 2/28/69, effective 4/1/69.]

WAC 296-46-160 Service requirements. The serving utility shall be consulted by the owner, his agent, or the contractor making the installation regarding service entrance location before installing equipment. Provisions for meter, attachment of service drop, or for an underground service lateral shall be made at a location acceptable to the serving utility. The point of attachment for a service drop must permit the clearances required by law. [Order 69-2, § 296-46-160, filed 2/28/69, effective 4/1/69.]

WAC 296-46-170 Clearance of service drop for single family or duplex residences. Notwithstanding Section 230-24 of the National Electrical Code the following requirements shall prevail for service drop clearances for single family or duplex residences. Service drop conductors shall have a vertical clearance of not less than 8 feet from roofs over which they pass except as follows:

EXCEPTION NO. 1 - Where the voltage between conductors does not exceed 300 and the pitch of the roof is not less than one in three, the clearance shall not be less than 3 feet.

EXCEPTION NO. 2 - The clearance of service drop conductors of 300 volts or less over roofs having a pitch of less than one in three may be less than 8 feet but not less than 3 feet provided:

(a) Cable approved for such purpose is used having the ungrounded conductors insulated with rubber, thermosplastic or equivalent.

(b) The roof is not accessible by permanent convenient means.

(c) The service entrance is located so as to limit over the roof distance to the practicable minimum length with the service drop originating at a pole designated by the servicing agency. When in doubt, consult the serving agency as to the pole designation and the electrical inspector as to the minimum practicable length.

EXCEPTION NO. 3 - Service drop conductors of 300 volts or less may have a minimum clearance of 18 inches from that portion of the roof over which they pass when not more than 4 feet from the point of attachment. [Order 69-2, § 296-46-170, filed 2/28/69, effective 4/1/69.]

WAC 296-46-180 Meter location. Except as otherwise permitted by the serving utility, meter height shall not be more than 7 feet or less than 5 feet above finished grade or floor below the meter. The center of the meter shall be the point of reference. [Order 74-43, § 296-46-180, filed 12/19/74; Order 69-2, § 296-46-180, filed 2/28/69, effective 4/1/69.]

WAC 296-46-190 Current transformers. Unless otherwise specified by the serving utility, current transformer installations for utility billing shall conform to the following.

(1) Current transformers shall be factory installed if in a custom built panel board assembly.

(2) Enclosure furnished for job installation of current transformers shall be at least 9 inches deep and of such size as to permit ready installation of the current transformers on the size of wire used. The minimum nominal size of metal cabinets for this purpose shall be as follows:

No. of C.T.	Max MCM/Leg	Enclosure Size
2	250	18" x 24"
3	250	24" x 32"
2	400	24" x 32"
3	400	30" x 32"
2	750	24" x 36"
3	750	32" x 36"

Consult serving utility regarding enclosures for use with larger conductors.

(3) Secondary instrument transformer conductors for metering will not be permitted in service raceway. [Order 69-2, § 296-46-190, filed 2/28/69, effective 4/1/69.]

WAC 296-46-200 Service entrance conductors. (1) Service entrance conductors shall extend at least 18 inches from the service head to permit connection to the service drop. See National Electrical Code, Section 230-54.

(2) Service entrance conductors shall extend no more than 15 feet inside a building.

(3) Unfused code grade conductors 600 volts or less shall be installed in a metallic raceway when within the building structure. See National Electrical Code, Section 230–44. [Statutory Authority: RCW 19.28.060. 78–02–098 (Order 77–31), § 296–46–200, filed 1/31/78; Order 74–43, § 296–46–200, filed 12/19/74; Order 73–7, § 296–46–200, filed 5/17/73; Order Order 74–43, § 296–46–200, filed 12/19/74; Order 73–7, § 296–46–200, filed 5/17/73; Order 69–2, § 296–46–200, filed 2/28/69, effective 4/1/69.]

WAC 296-46-210 Service entrance cable. Service entrance cable may be used in accordance with National Electrical Code Article 338. When used for service entrances, service entrance cable shall not extend more than 18 inches inside the building. [Order 69–2, § 296–46–210, filed 2/28/69, effective 4/1/69.]

WAC 296-46-220 Service equipment. Service equipment shall be readily accessible and shall not be installed in bathrooms, clothes closets, shower rooms, cupboards, attics, nor above washers, dryers or plumbed in fixtures.

Service equipment shall be readily accessible after any subsequent building additions.

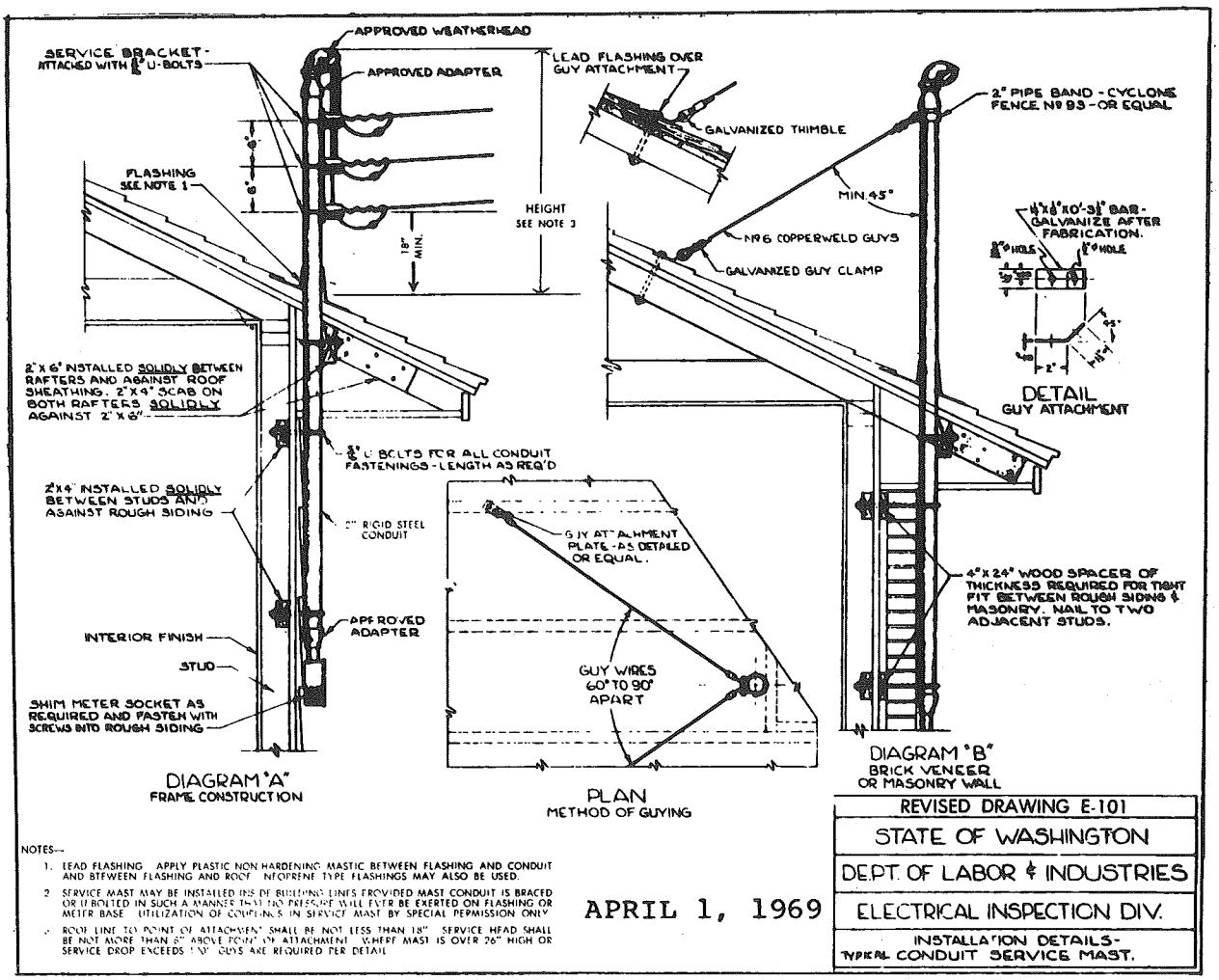
Service switches and other equipment exposed to elements of the outside weather shall be rain tight type factory built for the purpose. [Statutory Authority: RCW 19.28.060. 78–02–098 (Order 77–31), § 296–46–220, filed 1/31/78; Order 72–7, § 296–46–220, filed 6/7/72; Order 69–2, § 296–46–220, filed 2/28/69, effective 4/1/69.]

WAC 296-46-230 Service entrance. (1) The size of service entrance installed in a new and/or existing single family dwelling shall be calculated in accordance with the National Electrical Code, Section 220–10.

(2) Provisions of Sections 220–30 and 220–31 of the National Electrical Code, optional calculation for additional loads in existing one family dwelling occupancy or individual apartment of multi–family dwelling, will not be recognized.

(3) If any building is moved to a new location, the service entrance must at least meet calculated load requirements in accordance with paragraph (1). [Order 74–43, § 296–46–230, filed 12/19/74; Order 72–7, § 296–46–230, filed 6/7/72; Order 69–2, § 296–46–230, filed 2/28/69, effective 4/1/69.]

WAC 296-46-240 Service mast. A service entrance conduit extended through the roof to provide a means of attaching the service drop shall be no smaller than 2–inch rigid steel galvanized conduit. It shall provide a structurally sound attachment for the service drop and be equipped with a properly installed flashing at the roof line. Installation shall be in accordance with State Drawings E–101 and E–102, or provide equivalent strength by other approved means.



NOTES—

1. LEAD FLASHING - APPLY PLASTIC NON HARDENING MASTIC BETWEEN FLASHING AND CONDUIT AND BTEWEEN FLASHING AND ROOF. NEOPRENE TYPE FLASHINGS MAY ALSO BE USED.
2. SERVICE MAST MAY BE INSTALLED INSIDE BUILDING LINES PROVIDED MAST CONDUIT IS BRACED OR U-BOLTED IN SUCH A MANNER THAT NO PRESSURE WILL EVER BE EXERTED ON FLASHING OR METER BASE. UTILIZATION OF COUPLINGS IN SERVICE MAST BY SPECIAL PERMISSION ONLY.
3. ROOF LINE TO POINT OF ATTACHMENT SHALL BE NOT LESS THAN 18". SERVICE HEAD SHALL BE NOT MORE THAN 8" ABOVE POINT OF ATTACHMENT. WHERE MAST IS OVER 26" HIGH OR SERVICE DROP EXCEEDS 150' GUYS ARE REQUIRED PER DETAIL.

APRIL 1, 1969

REVISED DRAWING E-101

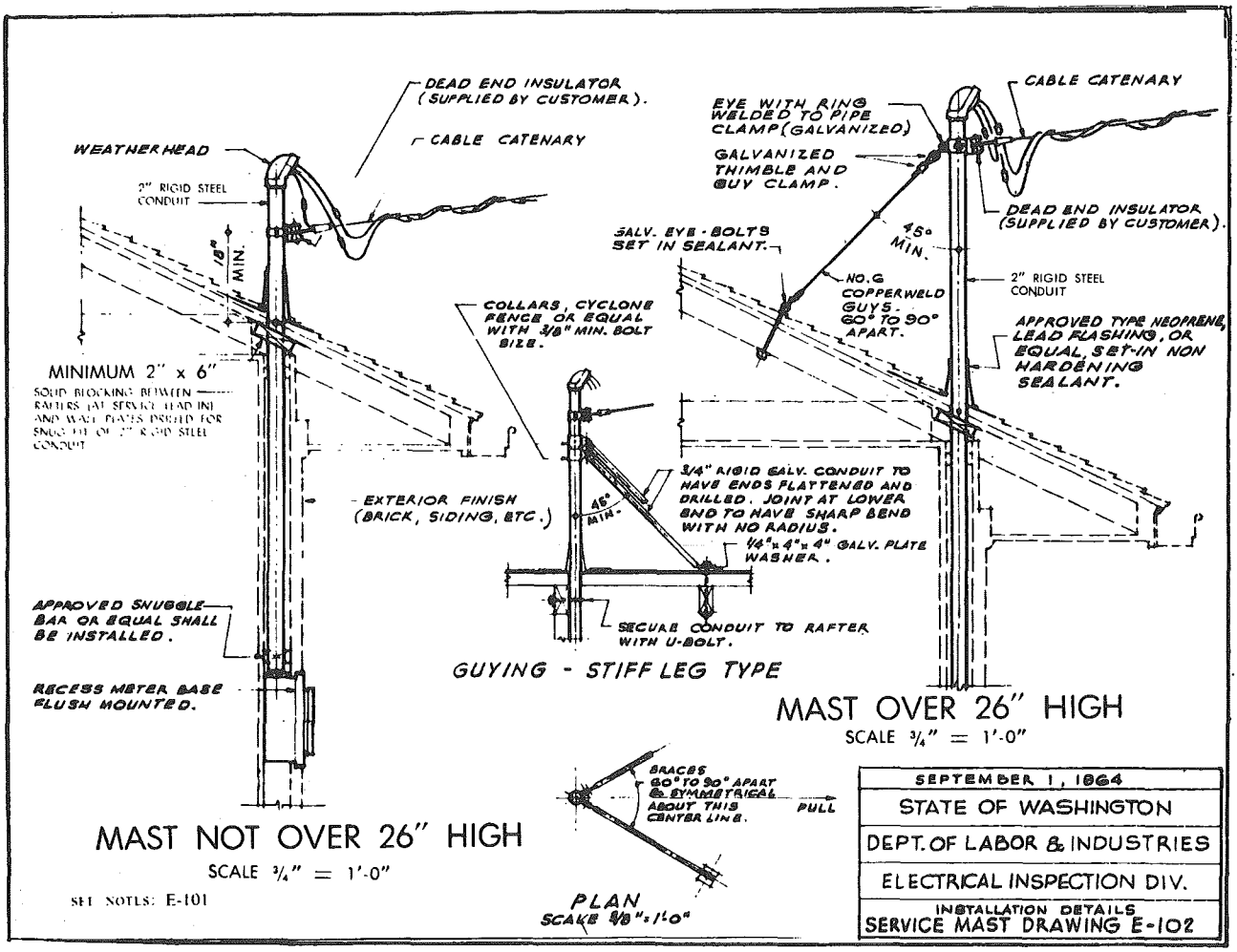
STATE OF WASHINGTON

DEPT. OF LABOR & INDUSTRIES

ELECTRICAL INSPECTION DIV.

INSTALLATION DETAILS- TYPICAL CONDUIT SERVICE MAST.

S. F. No. 9562—OS-1 6c



[Order 69-2, § 296-46-240, filed 2/28/69, effective 4/1/69.]

WAC 296-46-242 Transformer neutral grounding. Where services over 600 volts are supplied from multi-ground, neutral systems with transformer protection provided by fuses in the primary feeders as provided in the National Electrical Code, Section 450-3(a), the grounded neutral conductor shall be connected to a grounding electrode at each transformer location. Where the secondary of the transformer or transformers is grounded, the secondary ground shall be connected to the common neutral ground.

EXCEPTION No. 1—Will not apply to industrial distribution systems.

EXCEPTION No. 2—The bond between the transformer secondary neutral ground and primary common neutral may be removed if the connection causes undesirable currents or voltages.

[Statutory Authority: RCW 19.28.060. 78-02-098 (Order 77-31), § 296-46-242, filed 1/31/78.]

WAC 296-46-244 Utility conductor limitations. (1) "Termination immediately inside an outside building wall" will be interpreted to mean terminating in a junction box or a meter enclosure located in the outside wall of the structure with not more than eight feet of rigid steel or intermediate metal conduit within the framed wall. See WAC 296-45-900 (Appendix C, Drawing E-103), and WAC 296-45-905 (Appendix D, Drawing E-104).

(2) "Termination immediately inside the building lines" shall be interpreted to be a maximum of 18 inches rigid steel or intermediate metal conduit to the bottom of a J-box, C.T. or meter enclosure. See WAC 296-45-900 (Appendix C, Drawing E-103(A)), and WAC 296-45-905 (Appendix D, Drawing E-104).

(3) The identified neutral conductor of a service lateral in accordance with the preceding paragraphs may be identified with a yellow jacket.

(4) National Electrical Code, Section 230-44, will be recognized except as stated in paragraph (1) above. [Statutory Authority: RCW 19.28.060. 78-02-098 (Order 77-31), § 296-46-244, filed 1/31/78.]

WAC 296-46-270 Metallic plumbing lines. All metallic water lines including waste systems, shall be bonded together by approved means. See Section 250-80 of the National Electrical Code. [Statutory Authority: RCW 19.28.060. 78-02-098 (Order 77-31), § 296-46-270, filed 1/31/78; Order 69-2, § 296-46-270, filed 2/28/69, effective 4/1/69.]

WAC 296-46-280 Garbage disposal, waste disposal or waste compactor appliances and dishwasher circuits. Except as otherwise provided in this section, a separate circuit of 20 ampere capacity or larger shall be provided to serve each dishwasher. One garbage disposal unit and/or one waste compactor may be supplied from a three wire circuit of 20 amperes or larger also supplying the dishwasher. If not thus supplied, each disposal or compactor appliance shall be supplied by a separate circuit of 15 amperes or larger. A separate circuit of 20 amperes or larger may supply one garbage disposal unit and one compactor unit provided no other appliances are connected to the circuit. [Order 72-7, § 296-46-280, filed 6/7/72; Order 69-2, § 296-46-280, filed 2/28/69, effective 4/1/69.]

WAC 296-46-290 Range circuit. The branch circuit for a standard free standing electric range 50 amperes or less (other than wall mounted ovens or counter mounted cooking units) shall terminate in an approved flush or surface type plug-in device elevated at least 2 inches above the floor. Minimum circuit capacity for above circuits shall be 50 amperes. [Order 69-2, § 296-46-290, filed 2/28/69, effective 4/1/69.]

WAC 296-46-300 Water heaters. Electric water heaters shall be provided with a circuit suitable for the load, but for those in excess of 9 amperes, the conductor shall not be smaller than 10 A.W.G. copper or equivalent with ground wire for grounding the tank as per Section 250-95, National Electrical Code.

Cover plates to thermostats and controls for water heaters must be accessible for maintenance and repair after the water heater has been installed. [Order 75-25, § 296-46-300, filed 8/4/75; Order 74-43, § 296-46-300, filed 12/19/74; Order 69-2, § 296-46-300, filed 2/28/69, effective 4/1/69.]

WAC 296-46-335 Unfinished areas. Space suitable for future living areas shall have circuits terminated or accessible for future electrical rough-in in accordance with the National Electrical Code, Chapter 3. [Order 74-43, § 296-46-335, filed 12/19/74; Order 72-7, § 296-46-335, filed 6/7/72.]

WAC 296-46-350 Emergency systems. See Article 700, National Electrical Code. Emergency systems shall comply with the latest adopted edition of the National Fire Protection Association Bulletin 101, Life Safety Code. In accordance with Section 700-6(d), National Electrical Code, separate emergency service conductors shall be provided and may be tapped on the load side of the electric utility metering equipment provided they are sufficiently separated and effectively fireproofed from the main service disconnecting means.

Emergency Systems: Exit and emergency lights in places of assembly and including corridors must be installed where the seating capacity is 200 or more. The seating capacity will be determined by allowing a basis of 6 square feet per person. [Statutory Authority: RCW 19.28.060. 78-02-098 (Order 77-31), § 296-46-350, filed 1/31/78; Order 72-7, § 296-46-350, filed 6/7/72; Order 69-2, § 296-46-350, filed 2/28/69, effective 4/1/69.]

WAC 296-46-360 Carnivals, circuses and traveling shows. Wiring methods shall comply with Chapter 3 of the National Electrical Code.

(1) Secondary feeders shall be a type approved for the purpose. Type "S" Cable or equal.

(2) Each concession shall be considered in a single occupancy, and a separate enclosed externally operable fused switch or circuit breaker shall be provided. [Order 69-2, § 296-46-360, filed 2/28/69, effective 4/1/69.]

WAC 296-46-370 Boat moorages and similar installations. In addition to complying with Article 555, National Electrical Code, there shall be a disconnect for all services of 600 volts or less for docks, wharves, boat moorages, etc. located at the shoreline, street side of the first point of building construction in compliance with WAC 296-46-200, subsection 2. [Order 75-25, § 296-46-370, filed 8/4/75; Order 72-7, § 296-46-370, filed 6/7/72; Order 69-2, § 296-46-370, filed 2/28/69, effective 4/1/69.]

WAC 296-46-380 Rockcrushers. Except when wired in an approved metallic system, rockcrushers shall be wired with approved "rough usage" flexible cable having a grounding conductor as an integral part of the cable assembly and with approved connector bodies and caps. The grounding conductor must be brought to the main panel grounding bus or electrode. [Order 69-2, § 296-46-380, filed 2/28/69, effective 4/1/69.]

WAC 296-46-390 Woodworking plants. The production areas of saw mills and commercial and industrial woodworking plants shall be wired in rigid metal conduit, intermediate metal conduit M.I. cable, MC cable, or, if not subject to mechanical injury or vibration, E.M.T. with compression ring fittings. [Statutory Authority: RCW 19.28.060. 78-02-098 (Order 77-31), § 296-46-390, filed 1/31/78; Order 69-2, § 296-46-390, filed 2/28/69, effective 4/1/69.]

WAC 296-46-40101 Administrator fees.

(1) Qualifying Certificate Examination	$50
(2) Reexamination Fee (within 30 days)	$15
(3) Certificate Renewal (annual)	$20

[Order 74-43, § 296-46-401, (codified as WAC 296-46-40101), filed 12/19/74.]

WAC 296-46-420 All electrical equipment grounding. All electrical equipment grounding (boxes, service and equipment and provisions for grounding receptacles, etc.) for non-metallic cable systems, shall be completely made up at the time of rough-in. [Order 69-2, § 296-46-420, filed 2/28/69, effective 4/1/69.]

WAC 296-46-424 Residential occupancies, ground fault circuit interrupters. In addition to complying with Article 210-8, National Electrical Code, there shall be a separate circuit and/or circuits limited to the bathroom(s), garage and those outdoor receptacles GFCI protected. Receptacles on the load side of the GFCI device shall be considered as being on a separate circuit.

EXCEPTION: Receptacles for a single appliance such as door openers and refrigeration equipment need not be GFCI protected.

[Statutory Authority: RCW 19.28.060. 78-02-098 (Order 77-31), § 296-46-424, filed 1/31/78; Order 75-25, § 296-46-424, filed 8/4/75.]

WAC 296-46-426 Bonding agricultural structures and equipment. In accordance with the National Electrical Code, Article 250, buildings housing livestock must have all metallic and conductive portions of such structures and/or equipment used in such structures bonded to a common grounding electrode. Concrete slabs shall be considered as a conductive portion of the structure. For Agricultural Buildings, see National Electrical Code, Article 547. [Statutory Authority: RCW 19.28-.060. 78-02-098 (Order 77-31), § 296-46-426, filed 1/31/78; Order 74-43, § 296-46-426, filed 1/3/75.]

WAC 296-46-480 Location of pad-mounted transformers. (1) Definition - A pad-mounted transformer installation is an installation of an oil-filled transformer outdoors wherein all bushings, handholes, and live and operating parts are guarded by a solid metal enclosure so secured as to be available to authorized qualified personnel only. This will not prohibit the use of approved glass monitoring devices or properly baffled ventilators.

(2) Where a pad-mounted transformer is to be installed adjacent to a structure of combustible material, it shall not be closer than eight feet minimum. This eight foot separation should be measured from the nearest metal portion of the pad-mounted transformer installation to the nearest building features required to be safeguarded. In the case of overhanging eaves or roof lines of combustible material on standard single story structure, the eight foot measurement should be made in such a way as to provide eight feet of clear space between said eaves and the nearest metal portion of the pad-mounted transformer installed outside a vertical line extended from the ends of the eaves to the ground if this distance is at least eight feet horizontally from a combustible wall. In addition, the grade of the ground at the location of the pad-mounted transformer shall be such that any oil leaking from the transformer will flow away from the building and will not form pools

EXCEPTION: In urban residential areas where improved alleyways are utilized, and where a pad-mounted transformer is to be installed adjacent to a structure of combustible material; it shall not be closer than two feet minimum, provided the structure is noninhabited, such as an automobile garage.

(3) Pad-mounted transformer installations shall not be made nearer than two feet, measured horizontally to a noncombustible building surface having no doors, windows or other openings closer than indicated in paragraph (2).

(4) Pad-mounted transformer installations should not be located where exposed to damage by automobiles, trucks or other mobile type of machinery. Where transformers are installed in areas subject to other than pedestrian traffic, they shall be provided with additional guarding.

(5) Pad-mounted transformer installations shall meet the requirements for being effectively grounded as provided in Section 250-51, National Electrical Code. [Statutory Authority: RCW 19.28.060. 78-02-098 (Order 77-31), § 296-46-480, filed 1/31/78; Order 69-2, § 296-46-480, filed 2/28/69, effective 4/1/69.]

WAC 296-46-490 Location of total underground transformers. Enclosures for total underground transformers shall not be located within eight feet of a doorway or fire escape. Adequate space shall be maintained above the total underground transformer enclosure so that a boom may be used to lift the transformer. [Order 69-2, § 296-46-490, filed 2/28/69, effective 4/1/69.]

WAC 296-46-492 Electrical license and administrator certificate designation. See RCW 19.28.120. (1) General Electrical License and/or Administrator's Certificate encompasses all phases of electrical installations for heat, light and power.

(2) Specialty (limited) electrical licenses and/or administrator's certificates are as follows:

(a) Residential: Limited to the wiring of one and two family dwellings, or multi-family dwellings not exceeding three floors above grade. All wiring to be in nonmetallic sheathed cable, except service and/or feeders.

(b) Domestic Appliances: Limited to the electrical connection of household appliances and the wiring thereto; such as hot water heaters, ranges, dishwashers, clothes dryers, oil and gas furnaces and similar appliances. This specialty license includes circuits to the appliances; however, it does not include the installation of service and/or feeders.

(c) Pump and Irrigation: Limited to the electrical connection of domestic and irrigation water pumps, circular irrigating systems and related pumps and pump houses. This specialty license includes circuits, feeders, controls and services to supply said pumps.

(d) Limited Energy System: Limited to the installation of signaling and power limited circuits and related equipment. Such license includes the installation of fire protection signaling systems, intrusion alarms, nonutility owned communication systems and such similar low energy circuits and equipment.

(e) Signs: Limited to the placement and connection of signs and outline lighting, the electrical supply, related controls and associated circuit extensions thereto. [Statutory Authority: RCW 19.28.060. 78-02-098 (Order 77-31), § 296-46-492, filed 1/31/78.]

WAC 296-46-493 Electrical contracting and administrator certificate fees.

(1) General Electrical License (Annual) –	$200
(2) Specialty Electrical License (Annual) –	$150
(3) Administrator Certificate Examination –	$50
(4) Administrator Certificate Renewal (Annual) –	$20

[Statutory Authority: RCW 19.28.060. 78-02-098 (Order 77-31), § 296-46-493, filed 1/31/78.]

WAC 296-46-495 Safe wiring labels and fees. Inspections shall not be made nor services connected unless a safe wiring label is completely and legibly filled out and readily available.

For fee purposes:

(1) Mobile homes shall be considered as single family residences.

(2) Four or more locations for mobile homes, travel trailers or coaches shall be considered a mobile home park.

(3) Fees shall be paid in accordance with the inspection fee schedule WAC 296-46-910 (Appendix F). [Statutory Authority: RCW 19.28.060. 78-02-098 (Order 77-31), § 296-46-495, filed 1/31/78.]

WAC 296-46-500 Administrative rules, scope and purpose. The State Electricians and Electrical Installations Law, chapter 19.28 RCW, establishes the governor appointed Electrical Advisory Board and a Board of Electrical Examiners and fixes their administrative responsibilities as follows: (1) The Advisory Board's principal function is to assist the director of the Department of Labor and Industries in adopting and promulgating reasonable rules and regulations in furtherance of safety to life and property with respect to electrical installations and appliances. While the Advisory Board will, upon request of the director of the Department of Labor and Industries or the Electrical Inspection Section thereof, aid in the administrative interpretation of the National Electrical Code and the rules and regulations covering standards for electrical installations in the state of Washington, it will not function as a board of appeal nor will it render decisions concerning the application or interpretation of any adopted rules and regulations to any person, firm or corporation engaged in the business of installing wires or equipment to convey electric current, or engaged in installing apparatus or appliances to be operated by such current.

(2) The Board of Electrical Examiners principal purpose and function is to establish and administer a written examination for an electrical contractors qualifying certificate and to certify to the director of the Department of Labor and Industries all persons who are entitled to electrical contractors qualifying certificates.

(3) The primary purpose of the following rules is to provide a uniform procedure whereby persons, firms or corporations interested in communicating with the Department of Labor and Industries on any subject matter relative to rules or regulations which should be adopted, amended or repealed for electrical installations in the state of Washington or relative to the operation of the Electrical Inspection Section of such department may be heard. [Statutory Authority: RCW 19.28.060. 78-02-098 (Order 77-31), § 296-46-500, filed 1/31/78; Order 74-43, § 296-46-500, filed 12/19/74.]

WAC 296-46-510 Definitions. Whenever used in these rules, the words:

Advisory Board: Shall mean the Washington State Electrical Advisory Board appointed by the governor pursuant to RCW 19.28.065.

Examining Board: Shall mean the Board of Electrical Examiners.

Department: Shall mean the Department of Labor and Industries of the state of Washington.

Director: Shall mean the Director of the Department of Labor and Industries.

Regular Meeting: Shall mean the quarterly meetings held by the Advisory Board on the last Friday of January, April, July and October.

Board Meeting: Shall mean the quarterly meetings held by the Examining Board on the first Monday of February, May, August and November of each year.

Special Meeting: Shall mean any meeting of the Advisory Board or Examining Board called by the chairman thereof or the Director and held at times other than the regular meetings. [Statutory Authority: RCW 19-.28.060. 78-02-098 (Order 77-31), § 296-46-510, filed 1/31/78; Order 74-43, § 296-46-510, filed 12/19/74.]

WAC 296-46-515 Officers. In addition to the chairman and secretary of the Advisory Board, as provided for by RCW 19.28.065, the Advisory Board shall elect from its members a vice chairman who shall perform all functions of the chairman in his absence.

The Examining Board shall select its own chairman and elect from its members a vice chairman who shall perform all functions of the chairman in his absence. [Statutory Authority: RCW 19.28.060. 78-02-098 (Order 77-31), § 296-46-515, filed 1/31/78; Order 74-43, § 296-46-515, filed 12/19/74.]

WAC 296-46-520 Internal management. The Advisory Board shall adopt written rules of procedure for its internal management which shall include "Roberts' Rules of Order, Revised", copies of which rules of procedure shall be made available to interested persons upon written request. [Order 74-43, § 296-46-520, filed 12/19/74.]

WAC 296-46-525 Board duties. (1)(a) The Advisory Board shall study proposed rules and regulations submitted to it by the Director or by the Electrical Inspection Section of the Department and shall make recommendations to the Director concerning their adoption and promulgation.

(b) The Advisory Board shall further develop and submit for consideration to the Director administrative procedures, organizational plans and rules relating to improving the functions of the Electrical Inspection Section.

(c) The Advisory Board shall at each regular or special meeting consider any written proposals made by any persons, firms or corporations for new electrical rules or regulations or for amendments to or repeal of existing electrical rules or regulations or for changes in administrative procedures of the Electrical Inspection Section provided such proposals are submitted in writing to the secretary of the Advisory Board at least fifteen (15) days prior to any such meeting so that the same may be properly included on the agenda for such meeting.

(2) The Examining Board shall design an examination which will reasonably insure that electrical contractor's qualifying certificate holders are competent to engage in and supervise the work covered by the Statute, chapter 19.28 RCW.

This board shall certify to the Director all persons who are entitled to electrical contractors qualifying certificates. [Statutory Authority: RCW 19.28.060. 78-02-098 (Order 77-31), § 296-46-525, filed 1/31/78; Order 74-43, § 296-46-525, filed 12/19/74.]

WAC 296-46-530 Hearings. Any person, firm or corporation desiring to be heard on any subject matter relative to rules or regulations which should be adopted, amended or repealed for electrical installations in the state of Washington, or relative to the operation of the Electrical Inspection Section of such Department at any regular meeting of the Advisory Board shall present a written request to that effect to the secretary of the Advisory Board at least fifteen (15) days prior to the next regular meeting, setting forth a summary of any and all proposals on which the hearing is requested. [Order 74-43, § 296-46-530, filed 12/19/74.]

WAC 296-46-535 Appearance and practice before advisory board. No person may appear in a representative capacity before the Advisory Board other than the following:

(1) Attorney at law duly qualified and entitled to practice before the Supreme Court of the state of Washington.

(2) Attorneys at law duly qualified and entitled to practice before the highest court of record of any other state, if the attorneys at law of the state of Washington are permitted to appear in a representative capacity before administrative agencies of such other state, and if not otherwise prohibited by Washington State Law.

(3) A bona fide owner, officer, partner, or full time employee of an individual, firm, association, organization, partnership, or corporation who appears for such individual, firm, association, organization, partnership or corporation or a person (other than an attorney at law as provided in subparagraph (1) and (2) above, appointed in writing to represent an individual, firm, association, organization, partnership or corporation. [Order 74-43, § 296-46-535, filed 12/19/74.]

WAC 296-46-540 Solicitation of business unethical. It shall be unethical for persons acting in a representative capacity before the Advisory Board to solicit business by circulars, advertisements or by personal communication or interviews not warranted by personal relations, provided that such representatives may publish or circulate business cards. It is equally unethical to procure business by solicitors of any kind. [Order 74-43, § 296-46-540, filed 12/19/74.]

WAC 296-46-545 Standards of ethical conduct. All persons appearing in proceedings before the Advisory Board in a representative capacity shall conform to the standards of ethical conduct required of attorneys before the courts of Washington. If any such person does not conform to such standards, the Advisory Board may decline to permit such person to appear in a representative capacity in any proceeding before the Advisory Board. [Order 74-43, § 296-46-545, filed 12/19/74.]

WAC 296-46-550 Appearance by former employee. No former employee of the Advisory Board or member of the attorney general's staff may at any time after severing his employment with the Advisory Board or the attorney general appear, except with the written permission of the Advisory Board, in a representative capacity on behalf of other parties in any proceeding wherein he previously took an active part as a representative of the Advisory Board. [Order 74-43, § 296-46-550, filed 12/19/74.]

WAC 296-46-555 Former employee as expert witness. No former employee of the Advisory Board shall at any time after severing his employment with the Advisory Board appear, except with the written permission of the Advisory Board, as an expert witness on behalf of other parties in any proceeding wherein he previously took an active part in the investigation as a representative of the Advisory Board. [Order 74-43, § 296-46-555, filed 12/19/74.]

WAC 296-46-560 Computation of time. In computing any period of time prescribed or allowed by the Advisory Board rules, by order of the Advisory Board, or by any applicable statue, the day of the act, event, or default after which the designated period of time begins to run is not to be included. The last day of the period so computed is to be included. [Order 74-43, § 296-46-560, filed 12/19/74.]

WAC 296-46-565 Administrative Procedures Act. All proceedings regarding supplemental rules and regulations shall comply, where applicable, with the provisions of the Administrative Procedures Act, chapter

34.04 RCW, and any amendments thereto. [Order 74-43, § 296-46-565, filed 12/19/74.]

WAC 296-46-590 Electric heating. (1) In accordance with the National Electrical Code, Section 215-5, where electric heating is to be installed, heat loss calculations and plans will be required whenever it appears necessary in order to assure the safe operation of the electric heating equipment or when diversity is requested.

These calculations shall be made in accordance with one of the following:

(a) WAC 296-46-59005 (Appendix A).

(b) The local serving utility heat loss calculations when based on the 1977 edition of ASHRAE GUIDE, Handbook of Fundamentals.

(c) The 1977 edition of the American Society of Heating, Refrigeration and Air Conditioning Engineers' Handbook of Fundamentals (ASHRAE 1977 Handbook of Fundamentals). Manuals and guides from National Environmental Systems Contractors Association (NESCA-Manual J. 1975).

(d) Any published heat loss tables based on ASHRAE GUIDE and approved by the Department of Labor and Industries.

(2) The submitter of heat loss calculations shall provide satisfactory evidence in writing from the general contractor, financing institution and/or owner stipulating in the "R" value of the insulation (insulation material only) that will be installed and where it is to be located.

(3) Line voltage double circuit thermostats shall not be permitted. The Department of Labor and Industries has the right to review and rule on the use of new line voltage controls submitted by the the manufacturers.

(4) Line voltage electric heating control devices, if not approved for continuous load, shall be derated to 80 percent of rated capacity.

(5) Residential and Residential Multiple Occupancy Structures:

(a) Heat loss calculations shall be based on a minimum of 70°F. indoor temperature with an outdoor design temperature as indicated in WAC 296-46-59010 (Appenidx B) or the 97 1/2 percent column of ASHRAE Standards, weather data and design conditions, except that special application justifying the use of different design temperatures may be approved.

(b) Heat loss calculations for common ceilings, walls or floors separating living spaces from garages and carports shall be considered the same as outside exposure for calculation purposes.

(c) Heat loss calculations for common interior walls and floors separating adjoining living units of multiple occupancy structures shall be based on a minimum of 10° temperature difference. Common interior ceilings separating adjoining living units of multiple occupancy structures shall be based upon a minimum of 20° temperature difference, except that radiant ceilings shall be based on a minimum of 50° temperature difference.

(d) Structures designed with unheated interior spaces adaptable for future use shall have adequate service entrance and service equipment ampacity to provide electric heat for that space. In calculating the additional capacity needed to adequately heat these spaces, insulation values shall be comparable to that which is installed in the finished spaces. (If ducts from a central system are installed for the purpose of heating an interior space adaptable for future use, the system shall be sized to include the heat loss of that space.)

(e) Electric heating equipment shall be installed to meet or exceed the calculated heat loss in all new structures and existing structures which are converted to electric heat.

The minimum demand factor of 75 percent of the installed heating capacity may be used in sizing service entrance equipment when electric service is provided through a single panel.

(f) Where electric heat is used in a supplemental or auxiliary capacity, or where electric heating is installed in garages, patios, workshops, storage areas, and other incidental applications, heat loss calculations will not be required.

(g) An automatic temperature regulating device shall be installed to provide effective control of a heated space except for bathroom heater's designed for manual switch operation.

(i) Heated space shall be interpreted to mean: An entire space which is effectively separated from another by means of partition walls and/or doors, even though small permanent openings such as pass throughs and passage ways may exist.

(ii) Effective control shall be interpreted to mean: Not more than one automatic temperature regulating device to control all heating equipment in any heated space. (Applications outlined in subdivision 5-f are excluded.) An additional control may be used for regulating the temperature in adjoining stairways and entries where necessary due to design and/or exposure conditions. Special control applications justifying deviations from the above shall be subject to approval.

(h) Heat loss shall be calculated for ductwork or piping installed in vented attics, crawl spaces and unheated garages when central electric systems are to be installed.

(i) Heat loss calculations for radiant ceilings shall be based on a minimum of 100°F. ceiling temperature.

(6) Commercial and Industrial Electric space heating:

(a) When required by the department of labor and industries or when diversity is requested on sizing service entrance equipment, heat loss calculations and plans shall be submitted.

(b) A minimum demand factor of 75 percent of the installed space heating capacity used exclusively for heating may be used in sizing service entrance equipment if all the following conditions are met:

(i) Heat loss calculations shall be computed in accordance with subdivision 1-b, c or d where applicable.

The indoor temperature used for the purpose of calculating heat loss may vary according to the established use factor of the spaces involved.

(ii) Subsections 2, 3 and 4 shall be complied with.

(iii) Heating capacity installed meets or exceeds the submitted heat loss calculations.

(iv) Where electric heating equipment is controlled by three or more automatic temperature regulating devices.

(v) The service entrance conductors shall not have less ampacity than he largest feeder conductor. [Statutory Authority: RCW 19.28.060. 78-02-098 (Order 77-31), § 296-46-590, filed 1/31/78.]

WAC 296-46-59005 Appendix A--Residential heat loss tables.

APPENDIX A - RESIDENTIAL HEAT LOSS TABLES

NOTE: All "Added Insulation" values are for MATERIAL ONLY. R-Values for construction were included in the calculations deriving the watt loss factors in the following tables.

Table 1

Windows and Doors

Watt Loss Factor (Per Square Foot)

Temperature Difference	Single Glass (R=.9) (U=1.13)	Doors Double Glass Storm Windows (R=1.43) (U=.70)
50°F	16.6	10.1
55°F	18.2	11.1
60°F	19.9	12.1
70°F	23.2	14.2
80°F	26.5	16.2
90°F	29.8	18.2

Table 2

Outside Walls
(R=3.0) (U=.33)
Frame

Watt Loss Factor (Per Square Foot)

Temperature Difference	No Added Insulation	R-7 Added Insulation	R-11 Added Insulation	R-13 Added Insulation	R-18/19 Added Insulation
50°F	4.8	1.5	1.0	0.9	0.70
55°F	5.3	1.6	1.2	1.0	0.77
60°F	5.8	1.8	1.3	1.1	0.84
70°F	6.8	2.1	1.5	1.3	0.98
80°F	7.7	2.3	1.7	1.5	1.10
90°F	8.7	2.6	1.9	1.6	1.30

Table 3

Outside Walls
(R=1.35) (U=.74)
Concrete and Other Masonry Units Above Grade

Watt Loss Factor (Per Square Foot)

Temperature Difference	No Added Insulation	R-4 Added Insulation	R-6 Added Insulation	R-9 Added Insulation	R-11 Added Insulation	R-18 Added Insulation
50°F	11	2.7	2.0	1.4	1.2	0.76
55°F	12	3.0	2.2	1.6	1.3	0.83
60°F	13	3.3	2.4	1.7	1.4	0.91
70°F	15	3.8	2.8	2.0	1.7	1.10
80°F	17	4.4	3.2	2.3	1.9	1.20
90°F	20	4.9	3.6	2.5	2.1	1.40

Table 4

Ceiling
(R=1.8) (U=.56)
With Vented Attic Above

Watt Loss Factor (Per Square Foot)

Temperature Difference	No Added Insulation*	R-7 Added Insulation*	R-11 Added Insulation*	R-13 Added Insulation*	R-19 Added Insulation*	R-24 Added Insulation*	R-30 Added Insulation*	R-38 Added Insulation*
50°F	8.1(13.0)	1.7(2.7)	1.1(1.8)	1.00(1.6)	0.70(1.13)	0.57(0.91)	0.46(0.74)	0.37(0.59)
55°F	9.0(13.8)	1.8(2.8)	1.3(1.9)	1.10(1.7)	0.77(1.20)	0.63(0.97)	0.51(0.78)	0.40(0.63)
60°F	9.8(14.6)	2.0(3.0)	1.4(2.1)	1.20(1.8)	0.85(1.30)	0.68(1.02)	0.55(0.83)	0.44(0.66)
70°F	11.4(16.3)	2.3(3.3)	1.6(2.3)	1.40(2.0)	0.99(1.40)	0.79(1.10)	0.64(0.92)	0.52(0.74)
80°F	13.0(17.9)	2.7(3.7)	1.8(2.5)	1.60(2.2)	1.10(1.50)	0.91(1.20)	0.74(1.01)	0.59(0.81)
90°F	14.6(19.5)	3.0(4.0)	2.1(2.7)	1.80(2.4)	1.30(1.70)	1.00(1.40)	0.83(1.11)	0.66(0.88)

* For Ceilings with heating cable installations (radiant heat) use figures in parentheses. (Calculated on 100°F ceiling temperature).

Table 5

Ceiling
(R=3.0) (U=.33)
Open Beam Construction
With Built–Up Roof

Watt Loss Factor (Per Square Foot)

Temperature Difference	No Added Insulation	R-4 Added Insulation	R-8 Added Insulation	R-11 Added Insulation	R-13 Added Insulation	R-19 Added Insulation	R-24 Added Insulation	R-30 Added Insulation
50°F	4.9	2.1	1.3	1.0	0.9	0.67	0.54	0.44
55°F	5.4	2.3	1.5	1.2	1.0	0.73	0.60	0.49
60°F	5.9	2.5	1.6	1.3	1.1	0.80	0.65	0.53
70°F	6.8	2.9	1.9	1.5	1.3	0.93	0.76	0.62
80°F	7.8	3.3	2.1	1.7	1.5	1.07	0.87	0.71
90°F	8.8	3.8	2.4	1.9	1.6	1.20	0.98	0.80

Table 6

Floor
(R=4.3) (U=.23)
Over Crawl Space or Garage Areas

Watt Loss Factor (Per Square Foot)

Temperature Difference	No Added Floor Insulation	R-6 Added* Perimeter Wall Insulation	R-8 Added* Perimeter Wall Insulation	R-9 Added Floor Insulation	R-11 Added Floor Insulation	R-19 Added Floor Insulation
50°F	3.4	2.15	1.80	1.10	0.96	0.63
55°F	3.7	2.36	1.98	1.21	1.05	0.69
60°F	4.1	2.57	2.15	1.32	1.15	0.75
70°F	4.8	3.00	2.51	1.54	1.34	0.88
80°F	5.5	3.42	2.87	1.76	1.53	1.01
90°F	6.1	3.86	3.23	1.98	1.72	1.13

* When tightly–fitting operable louvered vents are installed in the perimeter foundation wall and insulation extends from the interior ground level to the subflooring.

Table 7

Floor
(R=4.3) (U=.23)
Over Enclosed Unheated Area
Basements, Cellars, Etc.

Watt Loss Factor (Per Square Foot)

Temperature* Difference	No Added Insulation	R-9 Added Insulation	R-11 Added Insulation	R-13 Added Insulation	R-19 Added Insulation
50°F	1.7	.55	.48	.42	.31
55°F	1.9	.61	.53	.47	.35
60°F	2.0	.66	.57	.51	.38
70°F	2.4	.77	.67	.59	.44
80°F	2.7	.88	.77	.68	.50
90°F	3.1	.99	.86	.76	.57

* Calculations are based on the assumption that 50% of outdoor temperature difference occurs between heated and unheated space.

Table 8

Floor
Concrete Slab Including
Concrete Walls Below Grade*

NOTE: Watt Loss Factor (Per Lineal Foot – Measure Entire Perimeter)

Temperature Difference	No Added Perimeter Insulation	R-4 Added Perimeter Insulation	R-6 Added Perimeter Insulation	R-8 Added Perimeter Insulation	R-9 Added Perimeter Insulation	R-11 Added Perimeter Insulation
50°F	12	7.5	5.0	3.4	2.8	1.8
55°F	13	8.3	5.5	3.8	3.1	2.1
60°F	14	9.0	6.0	4.1	3.4	2.4
70°F	17	10.5	7.0	4.8	3.9	2.9
80°F	19	12.0	8.0	5.5	4.5	3.5
90°F	22	13.5	9.0	6.1	5.0	4.0

* Heat loss of slab floor includes loss of any concrete walls below grade.

Table 9

Common Interior Ceilings, Walls or Floors
Of Multiple Occupancy Structures*
Ceilings(R=4.9) Walls(R=3.2) Floors(R=5.9)

Watt Loss Factor (Per Square Foot)

Temperature Difference		No Added Insulation	R-7 Added Insulation	R-11 Added Insulation	R-14 Added Insulation
20°F(50°F)	Ceilings*	1.2 (3.0)	.49(1.2)	.37(.92)	.31(.78)
10°F	Walls**	.92	.29	.21	.17
10°F	Floors**	.50	.23	.17	.15

* Based on 20° temperature difference (70° minus 50°) across ceiling area. For radiant ceiling installations use figures in parentheses, based on 50° temperature difference (100° minus 50°).

** Walls and floors based on 10° temperature difference (70° minus 60°).

Table 10

Infiltration

Watt Loss Factor (Per Cubic Feet of Volume)

Temperature Difference	Sunken Basement 1/2 Air Change Per Hour	2/3 Air Change* Per Hour	1 Air Change Per Hour
50°F	.13	.17	.26
55°F	.14	.19	.29
60°F	.16	.21	.32
70°F	.18	.25	.37
80°F	.21	.28	.42
90°F	.24	.32	.48

* For rooms with weatherstripped doors and insulated glass or storm windows.

Table 11

Duct Heat Loss Multipliers
(Central Systems Only)

NOTE: It is recognized that detailed duct layouts seldom accompany floor plans; therefore, this table is based on average duct design and shall be used to estimated duct heat loss, unless calculation of duct heat loss is based in accordance with formulas outlined in manuals listed in item 1-b of WAC 296-46-590.

Duct Location	Duct Insulation*	Approximate Installed R-Value	Multiplier**
Ducts located in unconditioned spaces such as attics, vented crawl spaces and unheated garages	No Insulation	R-0	0.70
	1" duct wrap	R-3.50	0.20
	1-1/2" duct wrap	R-5.00	0.16
	2" duct wrap	R-7.00	0.10
	1" rigid duct insulation	R-4.50	0.10
	3" duct wrap	R-9.00	0.08
	4-1/2" duct wrap	R-11.00	0.06

Ducts located in conditioned space – no duct heat loss applicable.

* Nominal thickness listed.

** Multiplier assumes all joints are taped to prevent excess air loss.

Example: A house has a structure heat loss of 10,000 watts. Approximately 60% of the ductwork is located in unconditioned space and is insulated with 1-1/2" of duct wrap (R-5.0)

Refer to Heat Loss Calculation Form

(1) Structure Heat Loss (SHL) = 10,000 Watts
(2) 1-1/2" wrap duct insulation (thickness or R-value)
(3) Duct heat loss multiplier (Table 11) DHLM – 0.16
(4) 60% = 0.6 fraction of duct in unconditioned space
(5) Estimated Duct Heat Loss = SHL (1) X DHLM (3) X Fraction (4) = (10,000) X (0.16) X (0.60) = 960 Watts
(6) Total Heat Loss (1 plus 5) = 10,960 Watts

For Central Hydronic Systems

Calculation of piping heat loss for central hydronic systems shall be used on formulas outlined in manuals listed in item 1-b of WAC 296-46-590.

Table 12

Mobile Home
Walls
(R=2.2) (U=.45)

Watt Loss Factor (Per Square Foot)

Temperature Difference	No Added Insulation	R-7 Added Insulation	R-8 Added Insulation	R-11 Added Insulation	R-13 Added Insulation
50°F	6.7	1.6	1.4	1.1	0.97
55°F	7.4	1.8	1.6	1.2	1.10
60°F	8.0	1.9	1.7	1.3	1.20
70°F	9.4	2.2	2.0	1.6	1.40
80°F	11.0	2.6	2.3	1.8	1.50
90°F	12.0	2.9	2.6	2.0	1.70

Table 13

Mobile Home
Ceiling (R=2.5)
*Floor (R=2.5) (U=.40)

Watt Loss Factor (Per Square Foot)

Temperature Difference	No Added Insulation	R-7 Added Insulation	R-10 Added Insulation	R-11 Added Insulation	R-16 Added Insulation	R-19 Added Insulation
50°F	5.9	1.5	1.2	1.10	0.79	0.68
55°F	6.5	1.7	1.3	1.20	0.87	0.75
60°F	7.1	1.9	1.4	1.30	0.95	0.82
70°F	8.2	2.2	1.6	1.50	1.10	0.96
80°F	9.4	2.5	1.9	1.70	1.30	1.10
90°F	10.6	2.8	2.1	2.00	1.40	1.20

* Floor heat loss based on mobile home having skirting around it.

CALCULATION OF WATT LOSS FACTORS FOR INSULATION R-VALUES NOT GIVEN IN TABLES

Use the following formula:

$$\text{Watt Loss Factor} = \frac{\text{Temperature Difference}}{3.4 \times \text{Total Resistance}}$$

Where:

Temperature Difference: is the indoor to outdoor temperature difference listed in WAC 296-46-59010 (Appendix B), except for ceiling cable or panel heat add 30° to the temperature difference listed in WAC 296-46-59010 (Appendix B).

Total Resistance: is the sum of the thermal resistance of the basic construction found at the top of each table and the thermal resistance of the insulation material.

Example:

A floor over vented crawl space is insulated with R-24 insulation and is located in an area with a design temperature difference of 50°F. Calculate the watt loss factor.

Solution:

Basic construction resistance (Table 6)	= 4.3
Resistance of Insulation	= 24.
Total Resistance	28.3

$$\text{Watt Loss Factor} = \frac{\text{Temperature Difference}}{3.4 \times \text{Total Resistance}}$$

$$= \frac{50}{3.4 \times 28.3}$$

$$= .52 \text{ Watts/Sq. Ft.}$$

To convert BTU per hour to watts, the following formula will apply:

$$\text{Watts} = \frac{\text{BTUH}}{3.413}$$

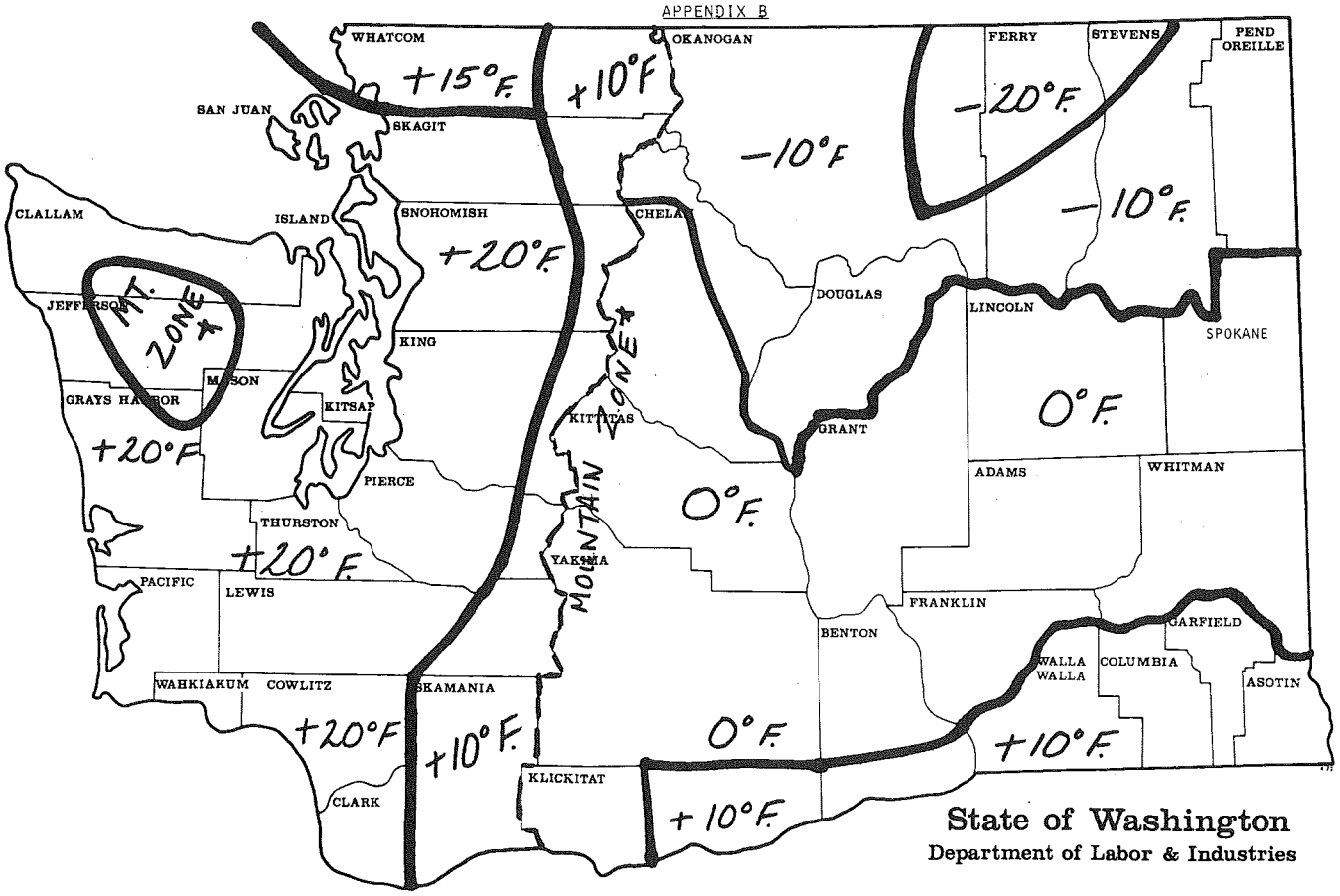
$$\text{BTUH} = \text{Watts} \times 3.413$$

[Statutory Authority: RCW 19.28.060. 78-02-098 (Order 77-31), § 296-46-59005, filed 1/31/78. Formerly Appendix A.]

WAC 296-46-59010 Appendix B--Outdoor design temperatures.

State of Washington

Department of Labor & Industries
OUTDOOR DESIGN TEMPERATURES



* Structures located in the summit areas of the Cascades shall be considered east of the Cascades for calculation purposes.

Mountain zone design temperatures will vary based upon the elevation above sea level, location, and wind conditions. Therefore, some areas may require a colder outdoor design temperature. Consult the local inspecting authority if in doubt.

Outdoor Design Temperature	Design Temperature Difference
+25°F.	45°F.
+20°F.	50°F.
+15°F.	55°F.
+10°F.	60°F.
0°F.	70°F.
-10°F.	80°F.
-20°F.	90°F.

[Statutory Authority: RCW 19.28.060. 78-02-098 (Order 77-31), § 296-46-59010, filed 1/31/78. Formerly Appendix B.]

WAC 296-46-900 Appendix C--Drawing E-103.

INTERPRETATIONS:

N.E.C. 90-2 (C) — Terminating immediately: J-Box, C.T. or meter enclosure (C). See WAC 296-46-244, paragraphs (1) and (2).

Conduit Raceways — All raceways shall be rigid steel or intermediate metal conduit when within the building lines. Conduit shall terminate underground a minimum of 24 inches deep with an approved fiber bushing attached.

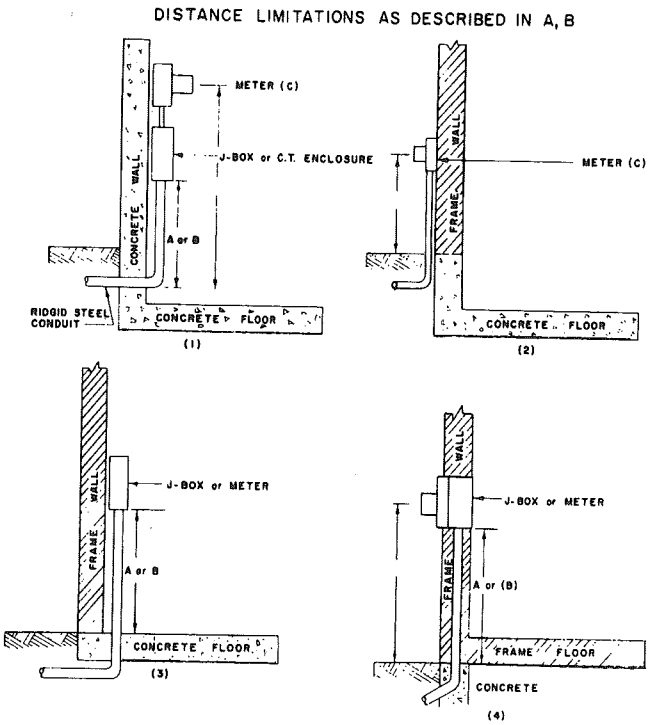
EXCEPTION:

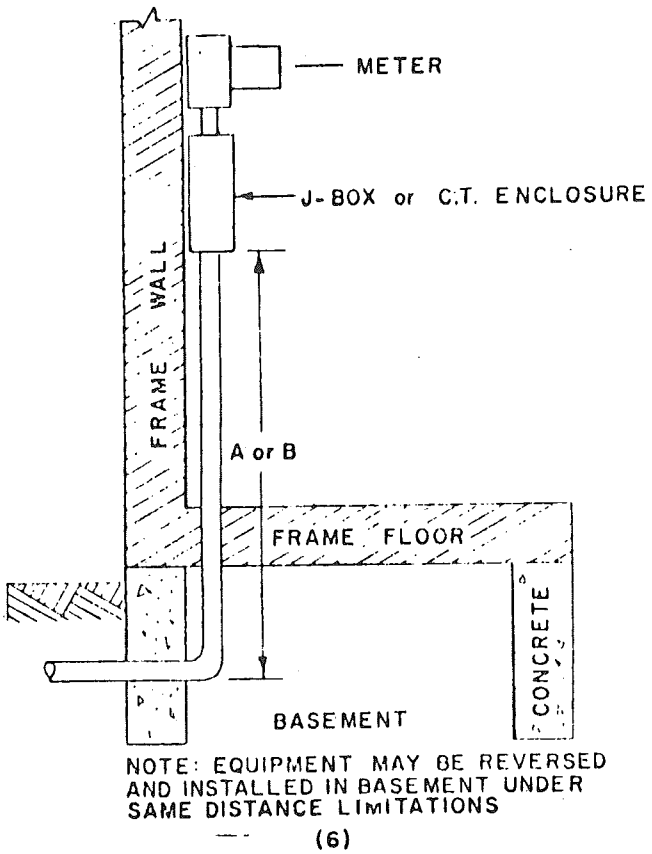
WAC 296-46-244(4)

DISTANCE LIMITATION:

A. Utility grade wire — Service Lateral Termination WAC 296-46-244 — As measured maximum, 18 inches if conduit is located inside the structure, or 8 feet if conduit is located in an outside framed wall.

B. Code grade wire — Service Entrance Conductors WAC 296-46-200 — As measured maximum 15 feet.

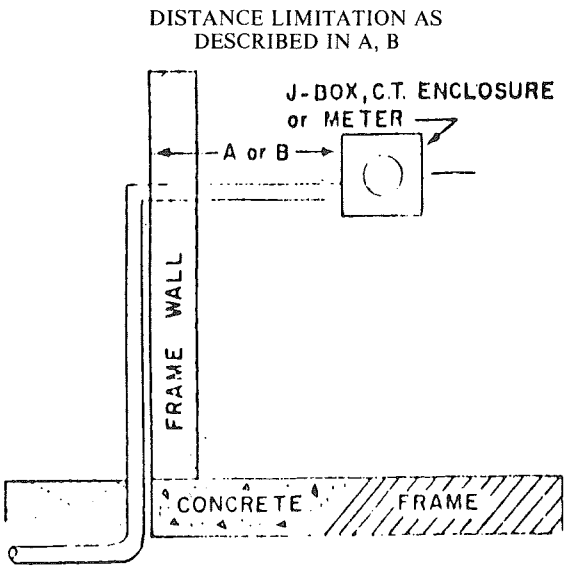


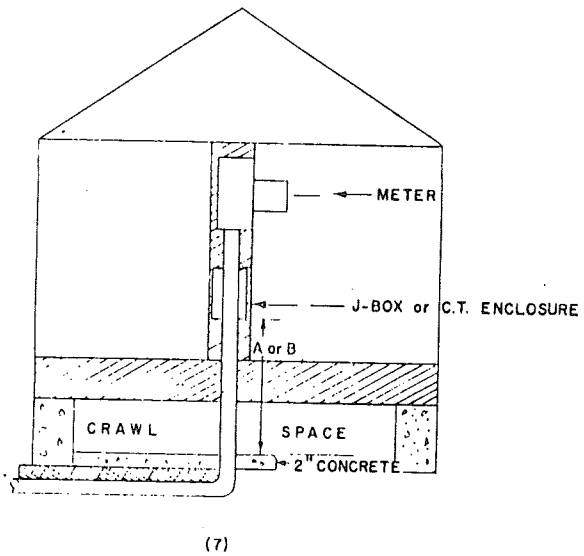


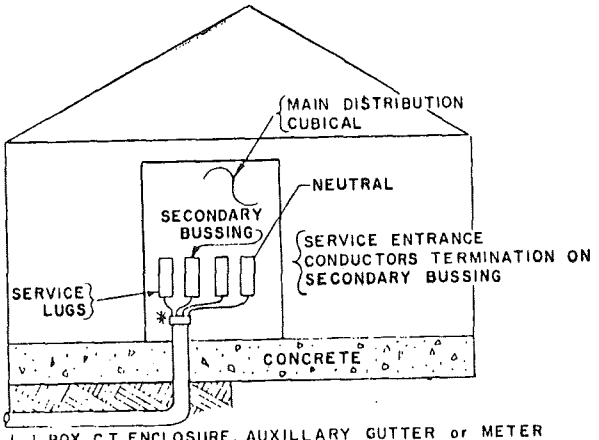
[Statutory Authority: RCW 19.28.060. 78-02-098 (Order 77-31), § 296-46-900, filed 1/31/78; Order 75-25, Appendix C—Drawing E-103 (codified as WAC 296-46-900), filed 8/4/75; Order 72-7, Appendix C, filed 6/7/72.]

WAC 296-46-905 Appendix D--Drawing E-104.

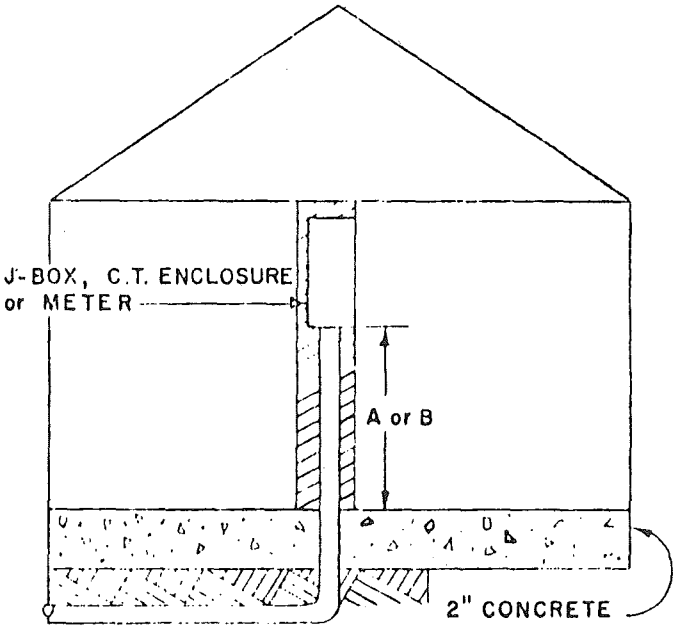
APPENDIX D—DRAWING E-104



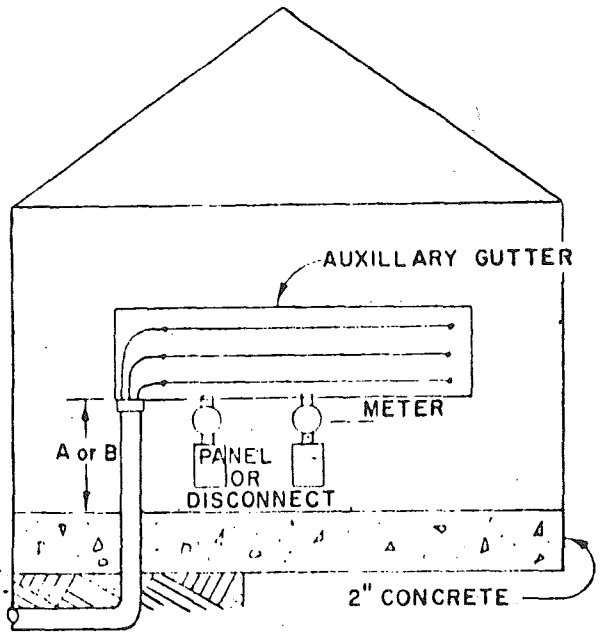




(8)



(9)



(10)

FOR INTERPRETATATIONS AND NOTES, SEE DRAWING E-103

STATE OF WASHINGTON
DEPT. OF LABOR & INDUSTRIES
ELECTRICAL INSPECTION DIV.
UNDERGROUND SERVICE TERMINATIONS
DRAWING E-104

[Order 75-25, Appendix D (codified as WAC 296-46-905), filed 8/4/75; Order 72-7, Appendix D, filed 6/7/72.]

WAC 296-46-910 Appendix F--Inspection fees schedule.

INSPECTION FEES SCHEDULE

Appendix F

BUILDING AND CONSTRUCTION SAFETY INSPECTION SERVICES DIVISION

ELECTRICAL INSPECTION SECTION DEPARTMENT OF LABOR AND INDUSTRIES

FEES. For fee calculation purposes, amperage will be based on conductor ampacity. Voltage will be based on

service conductor voltage as per National Electrical Code, Article 230-201, or load side of transformer.

INSPECTION FEES SHALL BE PAID PRIOR TO CONNECTION BY SERVING UTILITY.

(1) New Service Fees:

Mobile Home Residence	Single Multi-Family Residence (Each Family Dwelling Unit)	Other Than Residential 120/208 240 Volts		480-600 Volts	601 & Over Volts
AMPS	1 phase	1 phase	3 phase	3 phase	3 phase
1- 100	$ 16.00	$ 16.00	$ 16.00	$ 16.00	$ 32.00
101- 200	20.00	20.00	24.00	32.00	56.00
201- 300	24.00	24.00	36.00	48.00	88.00
301- 400	32.00	32.00	52.00	64.00	124.00
401- 500	40.00	40.00	68.00	84.00	160.00
501- 600	56.00	56.00	84.00	104.00	192.00
601- 800	64.00	64.00	96.00	120.00	228.00
801-1200	76.00	76.00	112.00	140.00	264.00
1201-1600		80.00	120.00	152.00	280.00
1601-2000		84.00	123.00	160.00	300.00
2001-2500		92.00	136.00	168.00	316.00
2501-3000		96.00	144.00	180.00	332.00
3001-4000		100.00	152.00	188.00	352.00
4001-5000		104.00	160.00	200.00	376.00
5001-6000		112.00	168.00	212.00	396.00

(2) A minimum fee of $7 shall be charged for each of the following subject to noted limitations.
   a. Mobile home service connection in a mobile home park.
   b. Mobile home feeder where service is existing in a mobile home park.
   c. Recreational vehicle park each lot to which power is supplied.
   d. Boat space in a boat harbor or marina each berth to which power is supplied.
   e. Calculation of or checking heat calculations, where required.

(3) A minimum fee of $10 shall be charged for each of the following subject to noted limitations.
   a. A temporary construction service for lighting and power of 20 KVA or less. The fee for a temporary construction service in excess of 20 KVA shall be 50% of the fee for a new service installation of like ampacity.
   b. Circuit extension installed for controls and motors for central heating plants such as gas, oil, and electrical furnaces.
   c. Yard pole meter loops or similar isolated metering installations.
   d. Each adjacent farm building served from yard pole other than each residence. Exceptions: Installations exceeding 200 amperes shall be in accordance with the appropriate schedule.
   e. Transient worker housing per unit.

(4) The fee for installations, increase and/or relocation (altered) of an existing service or feeder shall be 50% of the fee for a new service of like ampacity, with a minimum fee of $10.

(5) The fee for new circuits, circuit extensions, circuit alterations, where the service or feeder is not modified, shall be a total of $10 for one to four circuits inspected at the same time on the same premises under a single label and $2 for each additional circuit.

(6) The fee for sign and outline lighting circuits shall be a total of $10 for one to four circuits inspected at the same time on the same premises under a single label and $2 for each additional circuit.

(7) Where a high voltage primary feeder terminates in a separate building it shall be classed as a separate service.

(8) The fee for the first feeder installations with new services shall be 25% of the fee for service installations of like ampacity with a minimum fee of $7.

*(9) Optional fee schedule for service to individual motor(s) will be $10 per motor for motor rating 25 HP or less: each additional horse power in excess of 25 HP will be an additional fifty cents per HP, with a maximum of $100, including an allowance of 5 KVA of auxiliary motor equipment.

(10) In addition to the service and feeder installation fee, the fee for each electrically driven irrigation machine shall be $15.

Inspections requested for existing electrical facilities will be $7 for the first hour or fraction thereof and $20 each additional hour or fraction thereof.

* The optional fee for a new service installation to individual motor(s) may be calculated in accordance with Item (9) above based on HP rating or calculated per the new service amperage schedule Item (1) above whichever is the lesser of the calculation methods so stated.

[Statutory Authority: RCW 19.28.060. 78-02-098 (Order 77-31), § 296-46-910, filed 1/31/78.]

Chapter 296-47 WAC
ELECTRICAL WIRING & APPARATUS

Reviser's note: On March 29, 1961, the department of labor and industries filed with the code reviser's office the November 1959 edition of the N.B.F.U. National Electrical Code #70.

On March 31st, the code reviser received a letter from the department stating that such code was adopted [by the department] by the procedure prescribed by law.

It is the custom of this office not to print national safety codes, but rather to leave the distribution of same to the various departments.

Chapter 296-48 WAC
MOBILE HOMES, COMMERCIAL COACHES AND RECREATIONAL VEHICLES

WAC

AUTHORITY, APPLICATION AND SCOPE

296-48-005 Administrative——Authority for mobile home, commercial coach and recreational vehicle code.
296-48-010 Application and scope.
296-48-020 Alteration of mobile homes.

DEFINITIONS

296-48-051 Definitions.

ENFORCEMENT AND ADMINISTRATION

296-48-600 Enforcement.
296-48-602 State enforcement of federal rules and regulations.
296-48-604 Limited application of remaining sections.
296-48-605 Equipment and installations.
296-48-610 Department disapproval of listed or labeled equipment and installations.
296-48-615 Approval of alternates and equivalents.
296-48-620 Manufacturer's approval.
296-48-625 Required inspection.
296-48-630 Inspection approval.
296-48-635 Notice of violations.
296-48-636 Complaint investigation.
296-48-640 Action after requested inspection.
296-48-645 Field technical service.

PLAN APPROVAL

296-48-701 Application for structural system approval.
296-48-702 Application for electrical, mechanical and plumbing system approval.
296-48-703 Application for model plan approval.
296-48-704 Application for in-plant quality control manual approval.
296-48-706 Calculations and test procedure.
296-48-710 Model manufactured in more than one location.
296-48-715 Out-of-state applicant.
296-48-720 Non-conforming application and plans.
296-48-725 Evidence of department's approval.
296-48-730 Plan approval expiration.
296-48-735 In-plant quality control.
296-48-740 Changes to approved plans.
296-48-745 Change of ownership.
296-48-750 Change of name or address.
296-48-755 Discontinuance of manufacture.
296-48-760 Vehicle identification.
296-48-761 Labels for exterior locations.
296-48-765 Insignia required.
296-48-770 Insignia not required.
296-48-775 Application for insignia pursuant to plan approval.
296-48-776 Application for insignia pursuant to requested inspection.
296-48-780 Alteration or conversion.
296-48-781 Not applicable.
296-48-782 Application requirements.
296-48-785 Denial of insignia.
296-48-790 Insignia removal.
296-48-795 Lost or damaged insignia.
296-48-800 Fees.

HEARINGS

296-48-825 Public hearing.
296-48-830 Aggrievance hearing request.
296-48-890 Appendix——ANSI A119.1——Copies.

DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

296-48-011 Conditions of reciprocity. [Order 74-11, § 296-48-011, filed 4/8/74; Order 73-14, § 296-49-001, filed 7/31/73. Formerly WAC 296-49-001 and 296-49-011.] Repealed by Order 76-26, filed 8/23/76.

296-48-012 Agreements with out-of-state jurisdictions. [Order 73-14, § 296-48-012, filed 7/31/73.] Repealed by Order 76-26, filed 8/23/76.

296-48-050 General. [Order 70-2, § 296-48-050, filed 4/27/70; Order 68-4, § 296-48-050, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-055 Alteration or conversion. [Order 70-10, § 296-48-055, filed 9/17/70, effective 1/1/71; Order 68-4, § 296-48-055, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-060 Approved. [Order 68-4, § 296-48-060, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-063 Approved listing agency. [Order 70-10, § 296-48-063, filed 9/17/70, effective 1/1/71.] Repealed by Order 75-20, filed 7/16/75.

296-48-065 Approved testing agency. [Order 70-10, § 296-48-065, filed 9/17/70, effective 1/1/71; Order 68-4, § 296-48-065, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-066 Camping trailer. [Order 70-2, § 296-48-066, filed 4/27/70.] Repealed by Order 75-20, filed 7/16/75.

296-48-070 Dealer. [Order 70-2, § 296-48-070, filed 4/27/70; Order 68-4, § 296-48-070, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-075 Department. [Order 70-2, § 296-48-075, filed 4/27/70; Order 68-4, § 296-48-075, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-080 Equipment. [Order 70-10, § 296-48-080, filed 9/17/70, effective 1/1/71; Order 70-2, § 296-48-080, filed 4/27/70; Order 68-4, § 296-48-080, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-085 Field technical service. [Order 68-4, § 296-48-085, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-090 Insignia. [Order 70-2, § 296-48-090, filed 4/27/70; Order 68-4, § 296-48-090, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-095 Installations. [Order 70-10, § 296-48-095, filed 9/17/70, effective 1/1/71; Order 68-4, § 296-48-095, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-100 Labeled. [Order 68-4, § 296-48-100, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-105 Length of vehicles. [Order 68-4, § 296-48-105, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-110 Listed. [Order 68-4, § 296-48-110, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-115 Mobile home. [Order 70-2, § 296-48-115, filed 4/27/70; Order 68-4, § 296-48-115, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-120 Vehicle——Expandable. [Order 68-4, § 296-48-120, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-125 Vehicle——Multiple. [Order 68-4, § 296-48-125, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-130 Model. [Order 70-10, § 296-48-130, filed 9/17/70, effective 1/1/71; Order 68-4, § 296-48-130, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-135 Model change. [Order 68-4, § 296-48-135, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-140 Model——Group. [Order 68-4, § 296-48-140, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-145 Prohibited sales notice. [Order 68-4, § 296-48-145, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-150 Commercial coach. [Order 70-2, § 296-48-150, filed 4/27/70; Order 68-4, § 296-48-150, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-151 Travel trailer. [Order 68-4, § 296-48-151, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-155 Recreational vehicle. [Order 70-2, § 296-48-155, filed 4/27/70; Order 68-4, § 296-48-155, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-156 Travel trailer. [Order 70-2, § 296-48-156, filed 4/27/70.] Repealed by Order 75-20, filed 7/16/75.

296-48-158 Truck camper. [Order 70-2, § 296-48-158, filed 4/27/70.] Repealed by Order 75-20, filed 7/16/75.

296-48-160 Vehicle. [Order 70-2, § 296-48-160, filed 4/27/70; Order 68-4, § 296-48-160, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-165 Vehicle——Self contained. [Order 70-2, § 296-48-165, filed 4/27/70.] Repealed by Order 75-20, filed 7/16/75.

296-48-200 Air gap. [Order 68-4, § 296-48-200, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-205 Combination compartment. [Order 68-4, § 296-48-205, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-210 Common vent. [Order 68-4, § 296-48-210, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-215 Continuous vent. [Order 68-48-215, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-220 Critical level. [Order 68-4, § 296-48-220, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-225 Diameter. [Order 68-4, § 296-48-225, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-230 Drain coupler. [Order 68-4, § 296-48-230, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-235 Drain outlet. [Order 68-4, § 296-48-235, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-240 Drainage system. [Order 68-4, § 296-48-240, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-245 Flush tank. [Order 68-4, § 296-48-245, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-250 Flush valve. [Order 68-4, § 296-48-250, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-255 Flushometer valve. [Order 68-4, § 296-48-255, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-260 Horizontal pipe. [Order 68-4, § 296-48-260, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-265 Individual vent. [Order 68-4, § 296-48-265, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-270 Longitudinal center. [Order 68-4, § 296-48-270, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-275 Main drain. [Order 68-4, § 296-48-275, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-280 Main vent. [Order 68-4, § 296-48-280, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-285 Plumbing fixture. [Order 68-4, § 296-48-285, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-290 Toilet-mechanical seal. [Order 68-4, § 296-48-290, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-295 Toilet-recirculating chemical. [Order 68-4, § 296-48-295, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-300 Toilet-water flush. [Order 68-4, § 296-48-300, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-305 Trap. [Order 68-4, § 296-48-305, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-310 Trap arm. [Order 68-4, § 296-48-310, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-315 Trap seal. [Order 68-4, § 296-48-315, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-320 Vent system. [Order 68-4, § 296-48-320, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-325 Vertical pipe. [Order 68-4, § 296-48-325, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-330 Waste-holding tank. [Order 68-4, § 296-48-330, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-335 Water distribution system. [Order 68-4, § 296-48-335, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-340 Water supply connection. [Order 68-4, § 296-48-340, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-345 Water storage tank. [Order 68-4, § 296-48-345, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-350 Wet vent. [Order 68-4, § 296-48-350, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-355 Wet-vented drainage system. [Order 68-4, § 296-48-355, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

HEAT PRODUCING

296-48-400 Anti-flooding device. [Order 68-4, § 296-48-400, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-405 Appliance branch piping. [Order 68-4, § 296-48-405, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-410 Appliance compartment. [Order 68-4, § 296-48-410, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-415 Automatic pilot device. [Order 68-4, § 296-48-415, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-420 Automatic pump (oil lifter). [Order 68-4, § 296-48-420, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-425 BTUH. [Order 68-4, § 296-48-425, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-430 Duct. [Order 68-4, § 296-48-430, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-435 Gas appliance connector. [Order 68-4, § 296-48-435, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-440 Gas piping. [Order 68-4, § 296-48-440, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-445 Gas supply connection. [Order 68-4, § 296-48-445, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-450 Gas supply connector. [Order 68-4, § 296-48-450, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-455 Heat-producing appliance. [Order 68-4, § 296-48-455, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-460 Input rating. [Order 68-4, § 296-48-460, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-465 Main gas piping manifold. [Order 68-4, § 296-48-465, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-470 Oil piping system. [Order 68-4, § 296-48-470, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-475 Roof jack. [Order 68-4, § 296-48-475, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-480 Vent connector. [Order 68-4, § 296-48-480, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-485 Water heater. [Order 68-4, § 296-48-485, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

ELECTRICAL

296-48-500 A.W.G. [Order 68-4, § 296-48-500, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-501 Accessible (as applied to wiring methods). [Order 70-2, § 296-48-501, filed 4/27/70.] Repealed by Order 76-26, filed 8/23/76.

296-48-505 Battery circuit. [Order 70-2, § 296-48-505, filed 4/27/70; Order 68-4, § 296-48-505, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-510 Branch circuit panelboard. [Order 70-2, § 296-48-510, filed 4/27/70; Order 68-4, § 296-48-510, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-515 Low-voltage power circuit. [Order 70-2, § 296-48-515, filed 4/27/70; Order 68-4, § 296-48-515, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-520 National electrical code (N.E.C.). [Order 70-2, § 296-48-520, filed 4/27/70; Order 68-4, § 296-48-520, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-525 Power supply assembly. [Order 70-2, § 296-48-525, filed 4/27/70; Order 68-4, § 296-48-525, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-526 Concealed. [Order 70-2, § 296-48-526, filed 4/27/70.] Repealed by Order 76-26, filed 8/23/76.

296-48-528 Converter. [Order 70-2, § 296-48-528, filed 4/27/70.] Repealed by Order 76-26, filed 8/23/76.

296-48-530 D.C. Current. [Order 70-2, § 296-48-530, filed 4/27/70.] Repealed by Order 76-26, filed 8/23/76.

296-48-535 Dual supply source. [Order 70-2, § 296-48-535, filed 4/27/70.] Repealed by Order 76-26, filed 8/23/76.

296-48-540 Laundry area. [Order 70-2, § 296-48-540, filed 4/27/70.] Repealed by Order 76-26, filed 8/23/76.

296-48-545 Transformer. [Order 70-2, § 296-48-545, filed 4/27/70.] Repealed by Order 76-26, filed 8/23/76.

STRUCTURAL DEFINITIONS

296-48-550 Ceiling height. [Order 70-10, § 296-48-550, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

296-48-551 Definitions. [Order 73-17, § 296-48-551, filed 10/12/73.] Repealed by Order 76-26, filed 8/23/76.

296-48-555 Construction. [Order 70-10, § 296-48-555, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

296-48-560 Dead load. [Order 70-10, § 296-48-560, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

296-48-562 Dormitory. [Order 70-10, § 296-48-562, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

296-48-565 Dwelling unit. [Order 70-10, § 296-48-565, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

296-48-568 Exit. [Order 70-10, § 296-48-568, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

296-48-570 Fire safety. [Order 70-10, § 296-48-570, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

296-48-572 Superficial floor area. [Order 70-10, § 296-48-572, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

296-48-574 Guest room. [Order 70-10, § 296-48-574, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.]

296-48-576 Habitable room. [Order 70-10, § 296-48-576, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

296-48-577 Interior finish. [Order 70-10, § 296-48-577, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

296-48-578 Kitchen. [Order 70-10, § 296-48-578, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

296-48-580 Live load. [Order 70-10, § 296-48-580, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

296-48-582 Multiple dwelling unit. [Order 70-10, § 296-48-582, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

296-48-584 Occupancy. [Order 70-10, § 296-48-584, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

296-48-588 Wall——Bearing. [Order 70-10, § 296-48-588, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

296-48-590 Wall——Exterior. [Order 70-10, § 296-48-590, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

296-48-592 Wall——Nonbearing. [Order 70-10, § 296-48-592, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

296-48-594 Wall——Parapet. [Order 70-10, § 296-48-594, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

296-48-596 Wind load. [Order 70-10, § 296-48-596, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

296-48-598 Window. [Order 70-10, § 296-48-598, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

296-48-700 Application for plan approval. [Order 68-4, § 296-48-700, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-705 Plan and specification requirements. [Order 70-10, § 296-48-705, filed 9/17/70, effective 1/1/71; Order 70-2, § 296-48-705, filed 4/27/70; Order 68-4, § 296-48-705, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-905 Minimum standards. [Order 70-2, § 296-48-905, filed 4/27/70; Order 68-4, § 296-48-905, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-910 Rodent proofing. [Order 68-4, § 296-48-910, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-915 Prohibited fittings and practices. [Order 68-4, § 296-48-915, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-920 Alignment of fittings. [Order 68-4, § 296-48-920, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-930 Standards for equipment and installations. [Order 70-2, § 296-48-930, filed 4/27/70; Order 68-4, § 296-48-930, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-940 Strains and stresses. [Order 68-4, § 296-48-940, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-950 Tightness. [Order 68-4, § 296-48-950, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-955 Threaded joints. [Order 68-4, § 296-48-955, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-960 Solder joints. [Order 68-4, § 296-48-960, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-965 Plastic pipe and fittings. [Order 68-4, § 296-48-965, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

DRAINAGE SYSTEMS

296-48-1005 Pipe. [Order 68-4, § 296-48-1005, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1011 Fittings. [Order 68-4, § 296-48-1010, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1010.] Repealed by Order 76-26, filed 8/23/76.

296-48-1021 Location. [Order 70-2, § 296-48-1021, filed 4/27/70; Order 68-4, § 296-48-1020, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1020.] Repealed by Order 76-26, filed 8/23/76.

296-48-1025 Cap or plug. [Order 68-4, § 296-48-1025, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1031 Clearance from drain outlet. [Order 68-4, § 296-48-1030, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1030.] Repealed by Order 76-26, filed 8/23/76.

296-48-1035 Drain couplers and caps. [Order 68-4, § 296-48-1035, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1041 Drain outlet size. [Order 70-2, § 296-48-1041, filed 4/27/70; Order 68-4, § 296-48-1040, filed 5/31/68, effective 7/1/68. Formerly § 296-48-1040.] Repealed by Order 76-26, filed 8/23/76.

296-48-1051 Fixture load. [Order 68-4, § 296-48-1050, filed 5/31/68, effective 7/1/68. Formerly § 296-48-1050.] Repealed by Order 76-26, filed 8/23/76.

296-48-1055 Wet-vented drainage system. [Order 70-2, § 296-48-1055, filed 4/27/70; Order 68-4, § 296-48-1055, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1061 Side-vent drainage system. [Order 70-2, § 296-48-1061, filed 4/27/70; Order 68-4, § 296-48-1060, filed 5/31/68, effective 7/1/68. Formerly § 296-48-1060.] Repealed by Order 75-20, filed 7/16/75.

296-48-1071 Changes in direction. [Order 68-4, § 296-48-1070, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1070.] Repealed by Order 76-26, filed 8/23/76.

296-48-1075 Grade of horizontal drainage piping. [Order 68-4, § 296-48-1075, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1081 Waste holding tank. [Order 70-2, § 296-48-1081, filed 4/27/70; Order 68-4, § 296-48-1080, filed 5/31/68, effective 7/1/68. Formerly § 296-48-1080.] Repealed by Order 75-20, filed 7/16/75.

296-48-1082 Detachable waste holding system. [Order 71-11, § 296-48-1082, filed 10/8/71.] Repealed by Order 75-20, filed 7/16/75.

TRAPS AND CLEANOUTS

296-48-1101 Traps required. [Order 68-4, § 296-48-1100, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1100.] Repealed by Order 76-26, filed 8/23/76.

296-48-1105 Dual fixtures. [Order 70-2, § 296-48-1105, filed 4/27/70; Order 68-4, § 296-48-1105, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1111 Prohibited traps. [Order 68-4, § 296-48-1110, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1110.] Repealed by Order 76-26, filed 8/23/76.

296-48-1115 Material and design. [Order 68-4, § 296-48-1115, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1121 Trap seal. [Order 68-4, § 296-48-1120, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1120.] Repealed by Order 76-26, filed 8/23/76.

296-48-1125 Size. [Order 68-4, § 296-48-1125, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1131 Location. [Order 68-4, § 296-48-1130, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1130.] Repealed by Order 76-26, filed 8/23/76.

296-48-1135 Distance from trap to vent. [Order 68-4, § 296-48-1135, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1141 Length of tailpiece. [Order 68-4, § 296-48-1140, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1140.] Repealed by Order 76-26, filed 8/23/76.

296-48-1151 Grade of trap arm. [Order 68-4, § 296-48-1150, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1150.] Repealed by Order 76-26, filed 8/23/76.

296-48-1155 Trap arm offset. [Order 68-4, § 296-48-1155, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1161 Concealed traps. [Order 68-4, § 296-48-1160, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1160.] Repealed by Order 76-26, filed 8/23/76.

296-48-1165 Protection. [Order 68-4, § 296-48-1165, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1175 Location of cleanout fittings. [Order 68-4, § 296-48-1175, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1181 Access to cleanouts. [Order 68-4, § 296-48-1180, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1180.] Repealed by Order 76-26, filed 8/23/76.

296-48-1185 Material. [Order 68-4, § 296-48-1185, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1191 Design. [Order 68-4, § 296-48-1190, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1190.] Repealed by Order 76-26, filed 8/23/76.

VENTS AND VENTING

296-48-1201 General. [Order 68-4, § 296-48-1200, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1200.] Repealed by Order 76-26, filed 8/23/76.

296-48-1205 Pipe. [Order 68-4, § 296-48-1205, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1211 Fittings. [Order 68-4, § 296-48-1210, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1210.] Repealed by Order 76-26, filed 8/23/76.

296-48-1215 Main vent. [Order 68-4, § 296-48-1215, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1221 Combination compartment. [Order 68-4, § 296-48-1221, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1220.] Repealed by Order 75-20, filed 7/16/75.

296-48-1225 Individual vents. [Order 70-2, § 296-48-1225, filed 4/27/70; Order 68-4, § 296-48-1225, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1231 Common vent. [Order 68-4, § 296-48-1230, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1230.] Repealed by Order 76-26, filed 8/23/76.

296-48-1235 Intersecting vents. [Order 68-4, § 296-48-1235, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1241 Horizontal vents. [Order 68-4, § 296-48-1240, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1240.] Repealed by Order 76-26, filed 8/23/76.

296-48-1245 Grade. [Order 68-4, § 296-48-1245, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1251 Roof extension. [Order 68-4, § 296-48-1250, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1250.] Repealed by Order 76-26, filed 8/23/76.

296-48-1255 Flashing. [Order 68-4, § 296-48-1255, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

WATER DISTRIBUTION SYSTEM

296-48-1305 Piping material. [Order 68-4, § 296-48-1305, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1311 Fittings. [Order 68-4, § 296-48-1310, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1310.] Repealed by Order 76-26, filed 8/23/76.

296-48-1315 Prohibited materials. [Order 68-4, § 296-48-1315, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1325 Screw pipe. [Order 68-4, § 296-48-1325, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1331 Solder fittings. [Order 68-4, § 296-48-1330, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1330.] Repealed by Order 76-26, filed 8/23/76.

296-48-1335 Flared fittings. [Order 68-4, § 296-48-1335, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1341 Water supply piping. [Order 68-4, § 296-48-1340, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1340.] Repealed by Order 76-26, filed 8/23/76.

296-48-1345 Minimum sizes. [Order 70-2, § 296-48-1345, filed 4/27/70; Order 68-4, § 296-48-1345, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1351 Sizing procedure. [Order 68-4, § 296-48-1350, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1350.] Repealed by Order 76-26, filed 8/23/76.

296-48-1355 Valves. [Order 68-4, § 296-48-1355, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1361 Location. [Order 70-2, § 296-48-1361, filed 4/27/70; Order 68-4, § 296-48-1360, filed 5/31/68, effective 7/1/68. Formerly § 296-48-1360.] Repealed by Order 76-26, filed 8/23/76.

296-48-1365 Prohibited connections. [Order 68-4, § 296-48-1365, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1371 Supply outlets. [Order 68-4, § 296-48-1370, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1370.] Repealed by Order 76-26, filed 8/23/76.

296-48-1375 Appliance connections. [Order 68-4, § 296-46-1375, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1381 Flushometer valves or manually-operated flush valves. [Order 68-4, § 296-48-1380, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1380.] Repealed by Order 76-26, filed 8/23/76.

296-48-1385 Flush tanks. [Order 68-4, § 296-48-1385, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1391 Backflow preventer. [Order 68-4, § 296-48-1390, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1390.] Repealed by Order 75-20, filed 7/16/75.

296-48-1395 Mechanical seal toilet valves. [Order 68-4, § 296-48-1395, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-1405 Relief valves. [Order 70-2, § 296-48-1405, filed 4/27/70; Order 68-4, § 296-48-1405, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1411 Water tanks. [Order 68-4, § 296-48-1410, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1410.] Repealed by Order 76-26, filed 8/23/76.

PLUMBING FIXTURES——GENERAL REQUIREMENTS

296-48-1451 Quality of fixtures. [Order 68-4, § 296-48-1450, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1450.] Repealed by Order 76-26, filed 8/23/76.

296-48-1455 Strainers. [Order 68-4, § 296-48-1455, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1461 Fixture connections. [Order 70-2, § 296-48-1461, filed 4/27/70; Order 68-4, § 296-48-1460, filed 5/31/68, effective 7/1/68. Formerly § 296-48-1460.] Repealed by Order 76-26, filed 8/23/76.

296-48-1465 Drain connections. [Order 68-4, § 296-48-1465, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1471 Concealed connections. [Order 68-4, § 296-48-1470, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1470.] Repealed by Order 76-26, filed 8/23/76.

296-48-1475 Directional fitting. [Order 68-4, § 296-48-1475, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1481 Toilet. [Order 68-4, § 296-48-1480, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1480.] Repealed by Order 76-26, filed 8/23/76.

296-48-1485 Toilet connection. [Order 70-2, § 296-48-1485, filed 4/27/70; Order 68-4, § 296-48-1485, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1491 Shower stalls. [Order 68-4, § 296-48-1490, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1490.] Repealed by Order 76-26, filed 8/23/76.

296-48-1495 Shower and tub enclosures. [Order 68-4, § 296-48-1495, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1501 Dishwashing machines. [Order 68-4, § 296-48-1500, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1500.] Repealed by Order 76-26, filed 8/23/76.

296-48-1505 Clotheswashing machines. [Order 71-11, § 296-48-1505, filed 10/8/71; Order 68-4, § 296-48-1505, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1511 Access. [Order 68-4, § 296-48-1510, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1510.] Repealed by Order 76-26, filed 8/23/76.

296-48-1515 Alignment. [Order 68-4, § 296-48-1515, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1521 Brackets. [Order 68-4, § 296-48-1520, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1520.] Repealed by Order 76-26, filed 8/23/76.

TESTS AND INSPECTION

296-48-1551 Water piping system. [Order 68-4, § 296-48-1550, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1550.] Repealed by Order 76-26, filed 8/23/76.

296-48-1555 Drainage and vent system. [Order 68-4, § 296-48-1555, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1561 Fixtures. [Order 68-4, § 296-48-1560, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1560.] Repealed by Order 76-26, filed 8/23/76.

HEAT-PRODUCING EQUIPMENT AND INSTALLATIONS MATERIALS, APPLIANCES, AND EQUIPMENT

296-48-1601 Standards for appliances and equipment. [Order 68-4, § 296-48-1600, filed 5/31/68, effective 7/1/68.

Formerly WAC 296-48-1600.] Repealed by Order 76-26, filed 8/23/76.

296-48-1605 Capacity of containers. [Order 70-2, § 296-48-1605, filed 4/27/70; Order 68-4, § 296-48-1605, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1611 Construction of containers. [Order 68-4, § 296-48-1610, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1610.] Repealed by Order 76-26, filed 8/23/76.

296-48-1615 Marking of containers. [Order 68-4, § 296-48-1615, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1621 Location and enclosure of containers and systems. [Order 68-4, § 296-48-1620, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1620.] Repealed by Order 76-26, filed 8/23/76.

296-48-1625 Valves, connectors and accessories. [Order 68-4, § 296-48-1625, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1631 Safety Devices. [Order 68-4, § 296-48-1630, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1630.] Repealed by Order 76-26, filed 8/23/76.

296-48-1635 Container mounting. [Order 68-4, § 296-48-1635, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1641 System design and service line pressure. [Order 68-4, § 296-48-1640, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1640.] Repealed by Order 76-26, filed 8/23/76.

GAS PIPING SYSTEMS

296-48-1681 General. [Order 70-2, § 296-48-1681, filed 4/27/70; Order 68-4, § 296-48-1680, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1680.] Repealed by Order 76-26, filed 8/23/76.

296-48-1685 Materials. [Order 68-4, § 296-48-1685, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1691 Piping design. [Order 68-4, § 296-48-1690, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1690.] Repealed by Order 76-26, filed 8/23/76.

296-48-1695 Expandable or multiple vehicles. [Order 68-4, § 296-48-1695, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1701 Gas pipe sizing. [Order 68-4, § 296-48-1700, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1700.] Repealed by Order 76-26, filed 8/23/76.

296-48-1705 Joints for gas piping. [Order 68-4, § 296-48-1705, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1711 Joints for tubing. [Order 68-4, § 296-48-1710, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1710.] Repealed by Order 76-26, filed 8/23/76.

296-48-1715 Pipe joint compound. [Order 68-4, § 296-48-1715, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1721 Concealed tubing. [Order 68-4, § 296-48-1720, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1720.] Repealed by Order 76-26, filed 8/23/76.

296-48-1725 Concealed joints. [Order 68-4, § 296-48-1725, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1731 Location of gas supply connection. [Order 70-2, § 296-48-1731, filed 4/27/70; Order 68-4, § 296-48-1730, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1730.] Repealed by Order 76-26, filed 8/23/76.

296-48-1735 Identification of gas supply connections. [Order 68-4, § 296-48-1735, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1741 Gas supply connectors. [Order 68-4, § 296-48-1740, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1740.] Repealed by Order 76-26, filed 8/23/76.

296-48-1745 Appliance connections. [Order 68-4, § 296-48-1745, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1746 Exterior appliance connection. [Order 68-4, § 296-48-1746, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1751 Valves. [Order 68-4, § 296-48-1750, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1750.] Repealed by Order 76-26, filed 8/23/76.

296-48-1755 Gas supply connection cap. [Order 68-4, § 296-48-1755, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1761 Electrical ground. [Order 68-4, § 296-48-1760, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1760.] Repealed by Order 76-26, filed 8/23/76.

296-48-1765 Couplings. [Order 68-4, § 296-48-1765, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1771 Hangers and supports. [Order 68-4, § 296-48-1770, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1770.] Repealed by Order 76-26, filed 8/23/76.

296-48-1775 Testing. [Order 68-4, § 296-48-1775, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1781 Leaks. [Order 68-4, § 296-48-1780, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1780.] Repealed by Order 76-26, filed 8/23/76.

OIL PIPING SYSTEMS

296-48-1801 General. [Order 68-4, § 296-48-1800, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1800.] Repealed by Order 76-26, filed 8/23/76.

296-48-1805 Expandable or multiple vehicles. [Order 68-4, § 296-48-1805, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1811 Materials. [Order 68-4, § 296-48-1810, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1810.] Repealed by Order 76-26, filed 8/23/76.

296-48-1815 Size of oil piping. [Order 68-4, § 296-48-1815, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1821 Joints for oil piping. [Order 68-4, § 296-48-1820, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1820.] Repealed by Order 76-26, filed 8/23/76.

296-48-1825 Pipe joint compound. [Order 68-4, § 296-48-1825, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1831 Couplings. [Order 68-4, § 296-48-1830, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1830.] Repealed by Order 76-26, filed 8/23/76.

296-48-1835 Oil tanks-installation. [Order 68-4, § 296-48-1835, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1841 Auxiliary oil storage tanks. [Order 68-4, § 296-48-1840, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1840.] Repealed by Order 76-26, filed 8/23/76.

296-48-1845 Tank compartment. [Order 68-4, § 296-48-1845, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1851 Shutoff valve. [Order 68-4, § 296-48-1850, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1850.] Repealed by Order 76-26, filed 8/23/76.

296-48-1855 Fuel oil filter. [Order 68-4, § 296-48-1855, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

HEAT-PRODUCING APPLIANCES

296-48-1901 General. [Order 71-11, § 296-48-1901, filed 10/8/71; Order 68-4, § 296-48-1900, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1900.] Repealed by Order 76-26, filed 8/23/76.

296-48-1902 Gas clothes dryers. [Order 71-11, § 296-48-1902, filed 10/8/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-1905 Vented wall furnace installation. [Order 68-4, § 296-48-1905, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1911 Type of fuel. [Order 68-4, § 296-48-1910, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1910.] Repealed by Order 76-26, filed 8/23/76.

296-48-1921 Vents and venting. [Order 68-4, § 296-48-1920, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1920.] Repealed by Order 76-26, filed 8/23/76.

296-48-1925 Cooking area ventilation. [Order 68-4, § 296-48-1925, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1931 Safety devices-appliances-types. [Order 70-2, § 296-48-1931, filed 4/27/70; Order 68-4, § 296-48-1930, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1930.] Repealed by Order 76-26, filed 8/23/76.

296-48-1935 Installation-appliances——General. [Order 68-4, § 296-48-1935, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1941 Location. [Order 68-4, § 296-48-1940, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1940.] Repealed by Order 76-26, filed 8/23/76.

296-48-1945 Accessibility. [Order 70-2, § 296-48-1945, filed 4/27/70; Order 68-4, § 296-48-1945, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1951 Operating instructions. [Order 68-4, § 296-48-1950, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1950.] Repealed by Order 76-26, filed 8/23/76.

296-48-1955 Clearances——General. [Order 68-4, § 296-48-1955, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1961 Clearances——Ranges. [Order 68-4, § 296-48-1960, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1960.] Repealed by Order 76-26, filed 8/23/76.

AIR DUCTS

296-48-1985 Material. [Order 68-4, § 296-48-1985, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-1991 Construction and installation. [Order 68-4, § 296-48-1990, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-1990.] Repealed by Order 76-26, filed 8/23/76.

296-48-1995 Expandable or multiple vehicles. [Order 68-4, § 296-48-1995, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-2001 Sizing of ducts. [Order 68-4, § 296-48-2000, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-2000.] Repealed by Order 76-26, filed 8/23/76.

296-48-2011 Airtightness of supply duct system. [Order 68-4, § 296-48-2010, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-2010.] Repealed by Order 76-26, filed 8/23/76.

296-48-2015 Test Equipment. [Order 68-4, § 296-48-2015, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-2021 Required air. [Order 68-4, § 296-48-2020, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-2020.] Repealed by Order 76-26, filed 8/23/76.

296-48-2025 Fresh air openings. [Order 68-4, § 296-48-2025, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-2031 Location of openings. [Order 68-4, § 296-48-2030, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-2030.] Repealed by Order 76-26, filed 8/23/76.

296-48-2041 Return air openings. [Order 68-4, § 296-48-2040, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-2040.] Repealed by Order 76-26, filed 8/23/76.

296-48-2045 Return air ducts. [Order 68-4, § 296-48-2045, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-2051 Permanent openings. [Order 68-4, § 296-48-2050, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-2050.] Repealed by Order 76-26, filed 8/23/76.

ELECTRICAL EQUIPMENT AND INSTALLATION

296-48-3001 General. [Order 70-2, § 296-48-3001, filed 4/27/70; Order 68-4, § 296-48-3000, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-3000.] Repealed by Order 76-26, filed 8/23/76.

296-48-3011 Battery circuits. [Order 70-2, § 296-48-3011, filed 4/27/70; Order 68-4, § 296-48-3011, filed 5/31/68, effective 7/1/68. Formerly § 296-48-3010.] Repealed by Order 75-20, filed 7/16/75.

296-48-3015 Wiring materials for low-voltage circuits for recreational vehicles. [Order 70-2, § 296-48-3015, filed 4/27/70; Order 68-4, § 296-48-3015, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-3019 Wiring methods. [Order 70-2, § 296-48-3019, filed 4/27/70; Order 68-4, § 296-48-3020, filed 5/31/68, effective 7/1/68. Formerly § 296-48-3020.] Repealed by Order 75-20, filed 7/16/75.

296-48-3021 Generator installations. [Order 70-2, § 296-48-3021, filed 4/27/70; Order 68-4, § 296-48-3021, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-3025 Overcurrent protection. [Order 70-2, § 296-48-3025, filed 4/27/70; Order 68-4, § 296-48-3025, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-3031 Combination electrical systems. [Order 70-2, § 296-48-3031, filed 4/27/70; Order 68-4, § 296-48-3030, filed 5/31/68, effective 7/1/68. Formerly § 296-48-3030.] Repealed by Order 75-20, filed 7/16/75.

296-48-3041 Separation. [Order 68-4, § 296-48-3040, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-3040.] Repealed by Order 75-20, filed 7/16/75.

296-48-3045 Protection and insulation. [Order 68-4, § 296-48-3045, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-3051 Overcurrent protection and mounting. [Order 68-4, § 296-48-3050, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-3050.] Repealed by Order 75-20, filed 7/16/75.

296-48-3055 Identification. [Order 70-2, § 296-48-3055, filed 4/27/70; Order 68-4, § 296-48-3055, filed 5/31/68, effective 7/1/68.] Repealed by Order 75-20, filed 7/16/75.

296-48-3065 Application. [Order 70-2, § 296-48-3065, filed 4/27/70; Order 68-4, § 296-48-3065, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-3066 Materials and equipment. [Order 70-2, § 296-48-3066, filed 4/27/70.] Repealed by Order 76-26, filed 8/23/76.

296-48-3071 Receptacle outlets required. [Order 70-2, § 296-48-3071, filed 4/27/70; Order 68-4, § 296-48-3070, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-3070.] Repealed by Order 76-26, filed 8/23/76.

296-48-3072 Ground-fault circuit protection. [Order 75-4, § 296-48-3072, filed 3/5/75.] Repealed by Order 76-26, filed 8/23/76.

296-48-3075 Branch circuits required. [Order 71-11, § 296-48-3075, filed 10/8/71; Order 70-2, § 296-48-3075, filed 4/27/70; Order 68-4, § 296-48-3075, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-3081 Calculations for lighting and appliance load. [Order 70-2, § 296-48-3081, filed 4/27/70; Order 68-4, § 296-48-3080, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-3080.] Repealed by Order 76-26, filed 8/23/76.

296-48-3085 Branch circuit panelboard. [Order 70-2, § 296-48-3085, filed 4/27/70; Order 68-4, § 296-48-3085, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-3091 Identification. [Order 68-4, § 296-48-3090, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-3090.] Repealed by Order 76-26, filed 8/23/76.

296-48-3095 Circuit breakers and fuses. [Order 68-4, § 296-48-3095, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-3098 Conductors in outlet boxes. [Order 70-2, § 296-48-3098, filed 4/27/70.] Repealed by Order 76-26, filed 8/23/76.

POWER SUPPLY INSTALLATIONS

296-48-4001 General. [Order 68-4, § 296-48-4000, filed 5/3/68, effective 7/1/68. Formerly WAC 296-48-4000.] Repealed by Order 76-26, filed 8/23/76.

296-48-4005 Power supply assembly. [Order 70-2, § 296-48-4005, filed 4/27/70; Order 68-4, § 296-48-4005, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-4011 Attachment-plug cap. [Order 70-2, § 296-48-4011, filed 4/27/70; Order 68-4, § 296-48-4010, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-4010.] Repealed by Order 76-26, filed 8/23/76.

296-48-4015 Overhead and undervehicle feeder assemblies. [Order 70-2, § 296-48-4015, filed 4/27/70; Order 68-4, § 296-48-4015, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-4021 Identification of power supply connection. [Order 70-2, § 296-48-4021, filed 4/27/70; Order 68-4, § 296-48-4020, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-4020.] Repealed by Order 76-26, filed 8/23/76.

296-48-4025 Location power supply assembly. [Order 70-2, § 296-48-4025, filed 4/27/70; Order 68-4, § 296-48-4025, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-4031 Location——Permanent wiring method. [Order 68-4, § 296-48-4030, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-4030.] Repealed by Order 76-26, filed 8/23/76.

WIRING METHODS

296-48-4051 Protection and installation. [Order 70-2, § 296-48-4051, filed 4/27/70; Order 68-4, § 296-48-4050, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-4050.] Repealed by Order 76-26, filed 8/23/76.

296-48-4055 Expandable or multiple vehicles. [Order 70-2, § 296-48-4055, filed 4/27/70; Order 68-4, § 296-48-4055, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-4061 Under chassis wiring (exposed to weather). [Order 70-2, § 296-48-4061, filed 4/27/70; Order 68-4, § 296-48-4060, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-4060.] Repealed by Order 76-26, filed 8/23/76.

296-48-4062 Conductors and outlet boxes. [Order 70-2, § 296-48-4062, filed 4/27/70.] Repealed by Order 76-26, filed 8/23/76.

296-48-4063 Painting of wiring. [Order 70-2, § 296-48-4063, filed 4/27/70.] Repealed by Order 76-26, filed 8/23/76.

296-48-4064 Connection of terminals and splices. [Order 70-2, § 296-48-4064, filed 4/27/70; Order 68-4, § 296-48-4065, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-4065 relating to Splices in Grounding. Conductor now codified as WAC 296-48-4064 (part).] Repealed by Order 76-26, filed 8/23/76.

296-48-4065 Wall switches. [Order 70-2, § 296-48-4065, filed 4/27/70. Formerly WAC 296-48-4065 relating to Splices in Grounding Conductor see WAC 296-48-4064.] Repealed by Order 76-26, filed 8/23/76.

296-48-4066 Receptacles. [Order 70-2, § 296-48-4066, filed 4/27/70.] Repealed by Order 76-26, filed 8/23/76.

296-48-4075 Lighting fixtures. [Order 68-4, § 296-48-4075, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-4081 Shower fixtures. [Order 70-2, § 296-48-4081, filed 4/27/70; Order 68-4, § 296-48-4080, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-4080.] Repealed by Order 76-26, filed 8/23/76.

296-48-4085 Equipment mounting. [Order 68-4, § 296-48-4085, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-4091 Outdoor fixtures and equipment. [Order 68-4, § 296-48-4090, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-4090.] Repealed by Order 76-26, filed 8/23/76.

GROUNDING

296-48-5001 Panelboard grounding. [Order 70-2, § 296-48-5001, filed 4/27/70; Order 68-4, § 296-48-5000, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-5000.] Repealed by Order 76-26, filed 8/23/76.

296-48-5005 Grounded conductor (neutral). [Order 68-4, § 296-48-5005, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-5011 Appliance grounding. [Order 68-4, § 296-48-5010, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-5010.] Repealed by Order 76-26, filed 8/23/76.

296-48-5015 Interior grounding. [Order 68-4, § 296-48-5015, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-5021 Grounding of noncurrent-carrying metal parts. [Order 68-4, § 296-48-5020, filed 5/31/68, effective 7/1/68. Formerly WAC 296-48-5020.] Repealed by Order 76-26, filed 8/23/76.

296-48-5025 120-volt or 120/240-volt. [Order 70-2, § 296-48-5025, filed 4/27/70; Order 68-4, § 296-48-5025, filed 5/31/68, effective 7/1/68.] Repealed by Order 76-26, filed 8/23/76.

296-48-5031 Battery and low voltage circuits. [Order 70-2, § 296-48-5031, filed 4/27/70; Order 68-4, § 296-48-5030, filed 5/31/68, effective 7/1/68. Formerly 296-48-5030.] Repealed by Order 75-20, filed 7/16/75.

296-48-6001 Examination of equipment for safety. [Order 70-2, § 296-48-6001, filed 4/27/70.] Repealed by Order 76-26, filed 8/23/76.

CONSTRUCTION, OCCUPANCY AND FIRE SAFETY

296-48-6101 Minimum requirements. [Order 70-10, § 296-48-6101, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6111 Structural analysis. [Order 70-10, § 296-48-6111, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6115 Standards for equipment installations. [Order 70-10, § 296-48-6115, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6121 Structural requirements. [Order 70-10, § 296-48-6121, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6125 Design loads. [Order 70-10, § 296-48-6125, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6131 Wind loads. [Order 70-10, § 296-48-6131, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6135 Roof loads. [Order 70-10, § 296-48-6135, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6141 Walls. [Order 70-10, § 296-48-6141, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6145 Firestopping. [Order 70-10, § 296-48-6145, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6151 Interior partition. [Order 70-10, § 296-48-6151, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6155 Floors. [Order 70-10, § 296-48-6155, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6161 Design load deflections. [Order 70-10, § 296-48-6161, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6165 Ultimate load tests. [Order 70-10, § 296-48-6165, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6171 Chassis assembly. [Order 70-10, § 296-48-6171, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6175 Basic structural integrity. [Order 70-10, § 296-48-6175, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6181 Roof rafter or truss test procedure. [Order 70-10, § 296-48-6181, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6185 Weather resistance. [Order 70-10, § 296-48-6185, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6191 Interior walls, partitions and ceilings. [Order 73-17, § 296-48-6191, filed 10/12/73; Order 70-10, § 296-48-6191, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6195 Rodent resistance. [Order 70-10, § 296-48-6195, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6201 Heat loss. [Order 73-17, § 296-48-6201, filed 10/12/73; Order 70-10, § 296-48-6201, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6205 Room and hallway sizes. [Order 73-17, § 296-48-6205, filed 10/12/73; Order 70-10, § 296-48-6205, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6211 Ceiling height. [Order 73-17, § 296-48-6211, filed 10/12/73; Order 70-10, § 296-48-6211, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6215 Light and ventilation. [Order 73-17, § 296-48-6215, filed 10/12/73; Order 71-11, § 296-48-6215, filed 10/8/71; Order 70-10, § 296-48-6215, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6221 Exit facilities. [Order 73-17, § 296-48-6221, filed 10/12/73; Order 71-11, § 296-48-6221, filed 10/8/71; Order 70-10, § 296-48-6221, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6222 Interior privacy. [Order 73-17, § 296-48-6222, filed 10/12/73.] Repealed by Order 76-26, filed 8/23/76.

296-48-6223 Interior passage. [Order 73-17, § 296-48-6223, filed 10/12/73.] Repealed by Order 76-26, filed 8/23/76.

296-48-6225 Windows. [Order 73-17, § 296-48-6225, filed 10/12/73; Order 70-10, § 296-48-6225, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

296-48-6226 Mobile home fire warning equipment. [Order 73-17, § 296-48-6226, filed 10/12/73.] Repealed by Order 76-26, filed 8/23/76.

Appendix A Flexural Rigidity Chart. Figures 1, 2, 3, and 4. [Order 70-10, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

Table 1 Accepted engineering practice standards. [Order 70-10, filed 9/17/70, effective 1/1/71.] Repealed by Order 76-26, filed 8/23/76.

Appendix B Heat loss. [Order 70-10, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

Appendix C Table 1 Maximum allowable areas of glass Table 2 Adjustment factors relative resistance to wind loads Table 3 Glass dimensional tolerances Table 4 Glazing relative to specific hazardous locations. [Order 70-10, filed 9/17/70, effective 1/1/71.] Repealed by Order 73-17, filed 10/12/73.

AUTHORITY, APPLICATION AND SCOPE

WAC 296-48-005 Administrative——Authority for mobile home code. This chapter is adopted pursuant to the provisions of chapter 157, Laws of 1967, effective July 1, 1968, entitled Sale of and Manufacturing of Mobile Homes and Travel Trailers, as amended by chapter 229, Laws of 1969, effective August 11, 1969, chapter 27, Laws of 1970, effective May 14, 1970 and chapter 82, Laws of 1971, effective August 9, 1971 (see RCW 43.22.340 et seq.) order to implement, interpret, make specific and otherwise carry out the provisions relating to the manufacture, lease and sale of mobile homes in the State of Washington. [Order 76-26, § 296-48-005, filed 8/23/76; Order 75-20, § 296-48-005, filed 7/16/75; Order 70-2, § 296-48-005, filed 4/27/70; Order 68-4, § 296-48-005, filed 5/31/68, effective 7/1/68.]

WAC 296-48-010 Application and scope. (1) The provisions of this chapter are applicable to all mobile homes, manufactured after July 1, 1968. Mobile homes labeled under the Department of Housing and Urban Development (HUD) rules, effective June 15, 1976, shall be governed by those Construction and Safety Standards, Procedural and Enforcement Regulations as published in the Code of Federal Regulations (Federal Register) (24 CFR Part 280 and 24 CFR Part 3282).

(2) The provisions of this chapter are also applicable to the alteration, replacement, addition, modification or removal of any plumbing, heat-producing or electrical equipment, fire safety, occupancy and structural alterations in any mobile home leased, rented, sold or offered for sale within the State of Washington regardless of date of manufacture. This provision applies to HUD labeled mobile homes after sale by a manufacturer to a dealer or distributor but prior to sale by a dealer to a purchaser. [Order 76-26, § 296-48-010, filed 8/23/76; Order 75-40, § 296-48-010, filed 12/4/75; Order 75-20, § 296-48-010, filed 7/16/75; Order 70-10, § 296-48-010, filed 9/17/70, effective 1/1/71; Order 70-2, § 296-48-010, filed 4/27/70; Order 68-4, § 296-48-010, filed 5/31/68, effective 7/1/68.]

WAC 296-48-020 Alteration of mobile homes. (1) Alterations and repairs to mobile homes not covered by the Federal Mobile Home Standards shall comply with the provisions of this section.

(2) Subject to the exceptions of subsections (3) and (4) of this section, the 1974 edition of the Standard for Mobile Homes as adopted by the National Fire Protection Association (NFPA) and approved by the American National Standards Institute (ANSI) A119.1, 1975, is hereby incorporated by reference into these rules and regulations.

(3) The following provisions of ANSI A119.1, 1975, are not incorporated herein:

(a) Part A, General 2, Definitions common to all Parts B, C, D and E. (See WAC 296-48-051).

(b) Section 3.10 of Part E, Electrical Systems.

(c) Sections 4.5 of Part E, Electrical Systems.

(4) The following provisions of ANSI A119.1, 1975, are adopted in amended form as follows:

(a) Section 3.1 of Part E, Electrical Systems, the second paragraph is amended to read "The power supply to

the mobile home shall be a single power supply cord rated at 40 or 50 amperes or shall have a single set of permanently installed feeders."

(b) Section 3.11 of Part E, Electrical Systems, the 150 ampere requirement is amended to be a 50 ampere requirement. [Order 76-26, § 296-48-020, filed 8/23/76.]

DEFINITIONS

WAC 296-48-051 Definitions. (1) AGENCY LISTING. An agency approved by the department which is in the business of listing or labeling and which maintains a periodic inspection program on current production of listed models, and which makes available at least an annual published report of such listing in which specific information is included that the product has been tested to approved standards and found safe for use in a specified manner.

(2) AGENCY TESTING: An organization which is:

(a) In the business of testing equipment and installations;

(b) Qualified and equipped for such experimental testing;

(c) Not under the jurisdiction or control of any manufacturer or supplier for any affected industry;

(d) Maintaining at least an annual inspection program of all equipment and installations currently listed or labeled;

(e) Making available a published directory showing current listing of manufacturer's equipment and installations which have been investigated, certified and found safe for use in a specified manner and which are listed or labeled by the testing agency;

(f) Approved by the department.

(3) ALTERATION OR CONVERSION: The replacement, addition, modification or removal of any equipment or installations which may affect the construction, fire safety, occupancy, plumbing, heat-producing or electrical systems or the functioning thereof of mobile homes subject to the provisions of this chapter.

(4) APPROVED: When used in connection with any material, appliance, or construction, means meeting the requirements and approval of the department.

(5) DEALER: Any person, company or corporation authorized to engage wholly or in part in the business of leasing, selling or offering for sale mobile homes or buying or taking in trade such mobile homes, whether or not they are owned by such person.

(6) DEPARTMENT: The Department of Labor and Industries.

(7) EQUIPMENT: All materials, appliances, devices, fixtures, fittings or accessories used in the construction, fire safety, plumbing, heat-producing and electrical systems of mobile homes.

(8) FIELD TECHNICAL SERVICE: Interpretation and clarification by the department of technical data relating to the application of this chapter, but not including inspection.

(9) INSIGNIA: A tab or tag issued by the department to indicate compliance, on the date of issue, with the provisions of this chapter.

(10) INSTALLATIONS: All arrangements and methods of construction, fire safety, plumbing, heat-producing and electrical systems used in mobile homes subject to the provisions of this chapter.

(11) LABELED: Equipment bearing an inspection label of an approved testing agency.

(12) LEASE: Is an oral or written contract for the use, possession and occupation of property. It includes rent.

(13) LENGTH OF VEHICLES: The distance measured from the extreme front to the extreme rear of a mobile home (including expandable rooms, hitch, coupling, tongue and other attachments).

(14) LISTED: All equipment and installaltions that appear in a list published by an approved testing or listing agency.

(15) MOBILE HOME: A factory-assembled structure or structures equipped with the necessary service connections and made so as to be readily movable as a unit or units on its (their) own running gear and designed to be used as a dwelling unit(s) without a permanent foundation.

The phrase "without a permanent foundation" indicates that the support system is constructed with the intent that the mobile home placed thereon will be moved from time to time at the convenience of the owner.

(16) MOBILE HOME——EXPANDABLE: An enclosed room, semi-enclosed room or roofed porch which expands outward from the basic mobile home by means of rollers, hinges or other devices or arrangements but is designed as a structural portion of the mobile home and is carried on or within the mobile home while traveling on the highway.

(17) MOBILE HOME IDENTIFICATION NUMBER: Serial number.

(18) MOBILE HOME——MULTIPLE: Two or more separately licensed mobile home units, each of which is designed, constructed or reconstructed, to be attached directly to the other without intervening structures.

(19) MODEL——GROUP: Two or more manufactured-designed mobile homes which constitute one model.

(20) MODEL——MOBILE HOME: A specific design of mobile home as designated by the manufacturer which is based on width and/or type of construction.

(21) PROFESSIONAL ENGINEER: A registered professional engineer licensed to practice engineering in Washington as defined in chapter 18.43 RCW.

(22) PROHIBITED SALES NOTICE: A printed notification issued by the department that the mobile home may not be offered for sale because of violations of the provisions of this Code.

(23) RENT: Is money or other consideration given for the right of use, possession and occupation of property. [Order 76-26, § 296-48-051, filed 8/23/76; Order 75-20, § 296-48-051, filed 7/16/75.]

ENFORCEMENT AND ADMINISTRATION

WAC 296-48-600 Enforcement. The department shall administer and enforce all of the provisions of this chapter and shall act as a Production Inspection Primary Inspection Agency (IPIA) or as the State Administrative Agency (SAA) upon receiving approval from the Secretary of HUD. Any officer, agent or employee of the department is authorized to enter any premises where mobile homes are manufactured, repaired, altered, sold, offered for sale, rent or lease. He may examine any records and may inspect any mobile homes, equipment or installations to ensure compliance with the provisions of this chapter. When it becomes necessary to determine compliance, he may require that a portion or portions of such mobile homes be removed or exposed in order that an inspection or required tests be made to determine compliance. [Order 76-26, § 296-48-600, filed 8/23/76; Order 75-20, § 296-48-600, filed 7/16/75; Order 70-10, § 296-48-600, filed 9/17/70, effective 1/1/71; Order 70-2, § 296-48-600, filed 4/27/70; Order 68-4, § 296-48-600, filed 5/31/68, effective 7/1/68.]

WAC 296-48-602 State enforcement of federal rules and regulations. The Mobile Home Construction and Safety Standards (24 CFR Part 280) and the Mobile Home Procedural and Enforcement Regulations (24 CFR Part 3282) and the standards identified in WAC 296-48-020 shall be enforced by the Department of Labor and Industries, Mobile Home and Recreational Vehicle Section, as a Production Inspection Primary Inspection Agency (IPIA) or as the State Administrative Agency (SAA) upon receiving approval from the Secretary of HUD. [Order 76-26, § 296-48-602, filed 8/23/76.]

WAC 296-48-604 Limited application of remaining sections. (1) The provisions of WAC 296-48-605 and all subsequent sections of this chapter shall apply only to those mobile homes not subject to those rules and regulations of the Department of Housing and Urban Development (HUD) as incorporated into this chapter (see WAC 296-48-010) *Provided:* that the provisions of WAC 296-48-800 Fees shall apply throughout this chapter.

(2) For the purposes of WAC 296-48-605 and all subsequent sections of this chapter, the word "vehicle(s)" shall mean "mobile home(s)" unless the context of the provision in which the word "vehicle(s)" appears clearly requires otherwise. [Order 76-26, § 296-48-604, filed 8/23/76.]

WAC 296-48-605 Equipment and installations. (1) All equipment and installations in the construction, fire safety, plumbing, heat-producing and electrical systems of vehicles shall be subject to the approval of the department and the provisions of these rules and regulations. The department may accept for approval such equipment and installations which are listed or labeled by an approved testing or listing agency. Equipment and installations not listed or labeled may be accepted for approval by the department when it determines such equipment and installations are adequate for the protection of health, safety and the general welfare.

(2) Existing equipment and installations may be accepted for approval by the department provided such equipment and installations do not present a hazard to the health and safety of the occupants of a vehicle and the public.

(3) The following information and criteria will be required by the department in considering acceptance of approved listing and testing agencies:

(a) Names of agents or officers and location of offices.

(b) Specification and description of services proposed to be furnished under these rules and regulations.

(c) Description of qualifications of personnel and their responsibilities.

(d) Summary of organizational experience.

(e) General description of procedures and facilities to be used in proposed services, including evaluation of the product, factory follow-up, quality assurance, labeling of production units and specific information to be furnished with the listing.

(f) How defective units resulting from oversight are to be dealt with.

(g) Proof of independence and absence of conflict of interest.

(h) A published directory including product manufacturer and product information.

(4) The following information and criteria will be required by the department in considering acceptance of independent engineers qualifying under WAC 296-48-706:

(a) Names of agents or officers and location of offices.

(b) Specification and description of services proposed to be furnished under these rules and regulations.

(c) Description of qualifications of personnel and their responsibilities.

(d) Summary of organizational experience.

(e) How defective units resulting from oversight are to be dealt with.

(f) Proof of independence and absence of conflict of interest. [Order 75-20, § 296-48-605, filed 7/16/75; Order 70-10, § 296-48-605, filed 9/17/70, effective 1/1/71; Order 70-2, § 296-48-605, filed 4/27/70; Order 68-4, § 296-48-605, filed 5/31/68, effective 7/1/68.]

WAC 296-48-610 Department disapproval of listed or labeled equipment and installations. Equipment and installations may be disapproved by the department when it determines that such equipment and installations, even though listed or labeled by an approved testing or listing agency, are not adequate for the protection of health, safety and the general welfare. [Order 75-20, § 296-48-610, filed 7/16/75; Order 68-4, § 296-48-610, filed 5/31/68, effective 7/1/68.]

WAC 296-48-615 Approval of alternates and equivalents. Any construction, equipment or installations may be submitted to the department for approval as an alternate or equivalent pursuant to RCW 43.22.360 and these rules and regulations.

Requests for department approval of alternates and equivalents shall be submitted to the Mobile Home and Recreational Vehicle Section on forms supplied by the department together with an alternate approval fee pursuant to the fee schedule and two sets of substantiating plans and information. [Order 75-20, § 296-48-615, filed 7/16/75; Order 70-10, § 296-48-615, filed 9/17/70, effective 1/1/71; Order 70-2, § 296-48-615, filed 4/27/70; Order 68-4, § 296-48-615, filed 5/31/68, effective 7/1/68.]

WAC 296-48-620 Manufacturer's approval. Every manufacturer of vehicles subject to requirements of these rules and regulations shall obtain approval and insignia for each vehicle by requesting an inspection pursuant to WAC 296-48-625 and WAC 296-48-630 or by plan approval method pursuant to WAC 296-48-701 – WAC 296-48-740. Where insignia are obtained pursuant to the plan approval method, those vehicles for which plan approval insignia have been issued shall be manufactured in accordance with approved plans. [Order 75-20, § 296-48-620, filed 7/16/75; Order 68-4, § 296-48-620, filed 5/31/68, effective 7/1/68.]

WAC 296-48-625 Required inspection. Any person selling, leasing, offering for sale, converting or altering any mobile home, commercial coach, or recreational vehicle manufactured after July 1, 1968, shall request an inspection by the department under any of the following conditions:

(1) If the vehicle does not bear an insignia.

(2) When the vehicle bearing or required to bear such insignia is to be altered or converted.

(3) Where a correction notice has been given and a reinspection is necessary to determine compliance. [Order 75-20, § 296-48-625, filed 7/16/75; Order 70-2, § 296-48-625, filed 4/27/70; Order 68-4, § 296-48-625, filed 5/31/68, effective 7/1/68.]

WAC 296-48-630 Inspection approval. (1) Any person manufacturing, owning, selling, offering for sale, renting, leasing, altering or converting any vehicle may request the department to make an inspection of such vehicle for approval pursuant to these rules and regulations.

(2) Request for inspection shall be made on forms supplied by the department at least five working days prior to the desired date of inspection and shall indicate the date upon which the inspection is to be made, the location, make, model, serial number of the vehicle and the serial number of the department insignia of approval affixed to the vehicle, if any, and be accompanied by the minimum inspection fees pursuant to WAC 296-48-800 of these rules and regulations. All additional inspection fees are payable upon completion of each inspection. Written request shall be submitted to the appropriate department office.

Where the vehicle is not available or ready for inspection at the location indicated on the request, a one-hour inspection fee shall be charged.

(3) The department may require plans, specifications, calculations or test results pursuant to WAC 296-48-701, WAC 296-48-702, WAC 296-48-703 and WAC 296-48-706 of these rules and regulations.

(4) Where it is necessary to determine compliance with the regulations, the department may require inspections prior and subsequent to completion of construction

(5) Where a manufacturer requests an inspection of a mobile home or commercial coach under construction, he shall have an approved structural plan on file with the department for the structural system, pursuant to WAC 296-48-701.

(6) Where a person proposes to sell, offer for sale, rent or lease a mobile home or commercial coach manufactured after July 1, 1968, containing plumbing, heating and electrical, or other equipment, and after July 1, 1970, body and frame design or construction for which an insignia of approval has not been issued, it will be necessary for such person to supply the department with written certification by a licensed architect or professional engineer stating that the vehicle has been inspected and the structural system of the vehicle is constructed in accordance with the regulations. The department will make an inspection of the exits, ceiling heights, room and hallway sizes, light and ventilation, safety glass, electrical, mechanical and plumbing equipment and installations in order to determine compliance with the regulations.

The applicant shall also furnish written certification to the department that the vehicle is designed to comply with Part B, Paragraph 7.5, NFPA 501B, 1974, at the time the mobile home was manufactured. [Order 75-20, § 296-48-630, filed 7/16/75; Order 70-10, § 296-48-630, filed 9/17/70, effective 1/1/71; Order 70-2, § 296-48-630, filed 4/27/70; Order 68-4, § 296-48-630, filed 5/31/68, effective 7/1/68.]

WAC 296-48-635 Notice of violations. When an inspection reveals that a vehicle bearing, or required to bear, a department insignia, is in violation of any provision of these rules and regulations, the department shall serve upon the owner, person responsible for violation, or their agents, a Notice of Violations setting forth in what respect the provisions of these rules and regulations have been violated. The department may also post the vehicle with a Prohibited Sales Notice. Violations shall be corrected within 10 days or such other period of time as may be allowed by the department and an inspection by the department shall be requested. Should the violations not be corrected within the allotted time, the department shall institute legal and/or administrative actions as necessary to secure compliance and may reappropriate the department's insignia.

Any person served with a Notice of Violations shall, within 10 days of receipt, notify the department in writing of the action taken to correct the violations, and may file a request for a hearing pursuant to WAC 296-48-830 of these rules and regulations. No person served with a Notice of Violations shall move or cause to be moved said vehicle until the department has been furnished written notification of its destination and disposition. No person shall remove or cause to be removed a Prohibited Sales Notice until so authorized by the department. [Order 75-20, § 296-48-635, filed 7/16/75; Order 68-4, § 296-48-635, filed 5/31/68, effective 7/1/68.]

WAC 296-48-636 Complaint investigation. Any owner of a vehicle bearing, or required to bear, a department insignia may file a complaint with the department setting forth the items which the owner believes do not comply with the provisions of these rules and regulations. The department shall make an inspection of all vehicles indicated to be in violation of these rules and regulations by such complaints.

When an inspection reveals that vehicles bearing, or required to bear, a department insignia, is in violation of any provision of these rules and regulations, the department shall serve upon the seller, person responsible for violations, or their agents, a Notice of Violations setting forth in what respect the provisions of these rules and regulations have been violated. Violations shall be corrected within 10 days or such longer time as may be allowed by the department, and an inspection by the department shall be requested. The request for inspection shall be accompanied by a minimum one hour inspection fee in addition to fees required for the initial inspection pursuant to the complaint. Fees shall be paid in accordance with WAC 296-48-800.

Should the violations not be corrected and/or an inspection request submitted within the allotted time, the department shall institute legal and/or administrative actions as necessary to secure compliance.

Any person served with a Notice of Violations shall, within 10 days of receipt, notify the department in writing of the action taken to correct the violations, and may file a request for a hearing pursuant to WAC 296-48-830 of these rules and regulations. [Order 75-20, § 296-48-636, filed 7/16/75.]

WAC 296-48-640 Action after requested inspection. After a requested or required inspection pursuant to WAC 296-48-625 and WAC 296-48-630 of this Code, if the vehicle inspected meets the requirements of this Code and the applicant submits completed application forms and fees pursuant to WAC 296-48-800, an insignia shall be issued for such vehicle. [Order 68-4, § 296-48-640, filed 5/31/68, effective 7/1/68.]

WAC 296-48-645 Field technical service. Any person may request field technical service. Requests for such service shall be submitted to the department in writing and accompanied by the fee pursuant to WAC 296-48-800 of these rules and regulations. Requests from out-of-state shall be accompanied by a cashier's check or money order. [Order 75-20, § 296-48-645, filed 7/16/75; Order 68-4, § 296-48-645, filed 5/31/68, effective 7/1/68.]

PLAN APPROVAL

WAC 296-48-701 Application for structural system approval. All manufacturers of mobile homes and commercial coaches which are to be sold, offered for sale, rented or leased in Washington shall make application to the department for a typical structural design approval prior to construction, which may be referenced on subsequent plans submitted pursuant to WAC 296-48-703.

(1) General Requirements.

(a) Dimensioned drawings and specifications which clearly indicate the nature and extent of the work proposed.

(b) Two copies of all documents submitted for approval shall be on substantial paper or cloth, not less than 8 1/2 x 11 inches or multiples thereof but not exceeding 25 x 36 inches.

(c) An application on forms supplied by the department.

(d) Plan filing fees as required by WAC 296-48-800 for each system or plan.

(e) Plan checking fees as required by WAC 296-48-800. A minimum plan checking fee shall accompany all plans and specifications.

(2) Specific Requirements.

(a) All necessary cross sections.

(b) Floor, wall, ceiling and roof construction details.

(c) Typical connections.

(d) Design live and wind loads.

(e) Grade or quality of materials including fire protection.

(f) List of all applicable approvals.

(g) Substantiating calculations or test results, where required.

(h) Plans and calculations signed by a Washington licensed architect or professional engineer as required by WAC 296-48-706.

Note: The letter "S" shall be used on plans to designate typical structural systems.

(3) When it becomes necessary to resubmit plans to the department for checking, an hourly resubmission fee rate shall be charged pursuant to WAC 296-48-800. A minimum resubmission fee shall accompany all plans and specifications. [Order 75-20, § 296-48-701, filed 7/16/75; Order 70-10, § 296-48-701, filed 9/17/70, effective 1/1/71.]

WAC 296-48-702 Application for electrical, mechanical and plumbing system approval. A manufacturer of vehicles may make application to the Seattle office of the department for approval of typical equipment and installations prior to construction, which may be referenced on subsequent plans submitted pursuant to WAC 296-48-703.

(1) General Requirements.

(a) Dimensioned drawings and specifications which clearly indicate the nature and extent of the work proposed.

(b) Two copies of all documents submitted for approval shall be on substantial paper or cloth, not less than 8 1/2 x 11 inches or multiples thereof but not exceeding 25 x 36 inches.

(c) An application on forms supplied by the department.

(d) Plan filing fees as required by WAC 296-48-800 for each system or plan.

(e) Plan checking fees as required by WAC 296-48-800. A minimum plan checking fee shall accompany all plans and specifications.

Note: The following letters shall be used on plans to designate typical systems: Electrical—"E"; Mechanical—"M"; and Plumbing—"P".

(2) When it becomes necessary to resubmit plans to the department for checking, an hourly resubmission fee rate shall be charged pursuant to WAC 296-48-800. A minimum resubmission fee shall accompany all plans and specifications.

(3) Electrical. Complete electrical specifications.

(a) Type and size of feeder assembly.

(b) Voltage and amperage of branch circuit panelboard.

(c) Branch circuit identification, amperage of overcurrent protection device, wire size and type.

(d) Voltage and amperage of fixed appliances.

(e) Calculations.

(f) When designated for low voltage systems, a complete schematic of the electrical system, including wire sizes, overcurrent protection and equipment ratings shall be made.

(g) Type and rating of generators and switching equipment.

(4) Mechanical. Plan may be to scale or schematic and must show:

(a) Description of all materials, appliances, fittings, pipe tubing, vents and ducts.

(b) Btuh input rating of all fuel-burning appliances.

(c) Size of openings for combustion air except where an integral part of an approved appliance.

(d) Type(s) of fuel.

(e) Diameter and type of pipe and tubing, including method of calculating the system.

(f) Size and location of liquid fuel tanks and LPG cylinders.

(g) Size, location and construction of fuel storage compartments.

(h) Vertical clearances between range burners and combustible material and methods of protection where required.

(i) Size, length, type and location of vents and vent connectors.

(j) Type, size and material of air ducts.

(k) Minimum free area and location of circulating air supply inlet.

(l) Minimum size and location of all conditioned and return air openings.

(m) Certification that heating facilities for mobile homes comply with Part B, Paragraph 7.5, NFPA 501B, 1974.

(5) Plumbing. Plan may be to scale or schematic and must show:

(a) Description of all materials, fixtures, fittings, pipe, tubing, shower stalls and walls.

(b) Diameter and type of pipe and tubing, length of three-eighths inch O.D. tubing and all trap arms.

(c) Size and type of fittings.

(d) Grade of drainage piping.

(e) Method of securing all piping. [Order 75-20, § 296-48-702, filed 7/16/75.]

WAC 296-48-703 Application for model plan approval. Any manufacturer of vehicles may make application to the department for plan approval of a model or model group prior to construction. The application shall be made to the Seattle office of the department and shall include:

(1) An application on forms supplied by the department.

(2) Plan filing fees as required by WAC 296-48-800.

(3) Plan checking fees as required by WAC 296-48-800. A minimum plan checking fee shall accompany all plans and specifications.

(4) Quality control manual as outlined in WAC 296-48-735 unless previously filed with and approved by the department.

(5) When required, substantiating calculations or test results, indicating details of construction, plumbing, mechanical and electrical equipment and installation for each model or model group or approved system designations pursuant to WAC 296-48-701 and WAC 296-48-702.

(6) Mobile Homes and Commercial Coaches. General Requirement. Two copies of complete plans and specifications shall be on substantial paper or cloth not less than 8 1/2 x 11 inches or multiples thereof, but not exceeding 25 x 36 inches.

(7) Specific Requirements.

(a) A dimensioned floor plan(s).

(b) Proposed use of rooms and method of ventilation.

(c) Size, type and location of windows and exterior doors.

(d) Location of all appliances and fixtures.

(e) Location of plumbing drain, water, gas and electrical connections.

(f) Location of all electrical outlets (receptacle and lights).

(g) Number of outlets and appliances on each circuit and circuit rating.

(h) Occupancy classification for commercial coaches, pursuant to the Uniform Building Code, 1973 edition.

(i) Type and location of fire warning equipment.

(8) Recreational Vehicles. General Requirement. Two copies of complete plans and specifications shall be on substantial paper or cloth not less than 8 1/2 x 11 inches or multiples thereof, not exceeding 25 x 36 inches.

(9) Specific Requirements. Two copies of complete plans and specifications for recreational vehicles.

(a) A dimensioned floor plan(s).

(b) Location of all appliances and fixtures.

(c) Location of plumbing drain, water, gas and electrical connections.

(d) Location of all electrical outlets (receptacle and lights).

(e) Number of outlets and appliances on each circuit and circuit rating.

(f) Flamespread classification of interior finish materials.

(g) Type and location of exits.

(10) When it becomes necessary to resubmit plans to the department for checking, an hourly resubmission fee rate shall be charged pursuant to WAC 296-48-800. A minimum resubmission fee shall accompany all plans and specifications. [Order 75-20, § 296-48-703, filed 7/16/75.]

WAC 296-48-704 Application for in-plant quality control manual approval. A manufacturer of vehicles shall make application to the department for an in-plant quality control manual approval. The submittal shall contain at least the following:

(1) An outline of the procedure which will direct the manufacturer to construct vehicles in accordance with the approved plans, as per WAC 296-48-735.

(2) Two copies of all documents submitted for approval shall be on substantial paper or cloth, 8 1/2 x 11 inches.

(3) An application on forms supplied by the department.

(4) Fee as required by WAC 296-48-800(7). [Order 75-20, § 296-48-704, filed 7/16/75.]

WAC 296-48-706 Calculations and test procedure. (1) The load bearing capacity of elements or assemblies may be established either by specifications or calculations in accordance with generally established principles of engineering design, or by tests acceptable to the department. When the composition or configuration of elements, assemblies or details of structural members are such that calculations of their safe load-carrying capacity and basic structural integrity cannot be accurately determined in accordance with generally established principles of engineering design, structural properties of such members or assemblies may be established by the results of tests acceptable to the department.

(2) When any structural design or method of construction is substantiated by calculations and supporting data, such calculations and supporting data shall be signed by a Washington licensed architect or professional engineer and shall be submitted to the department.

(3) When any structural design or method of construction is substantiated by tests, all such tests shall be performed by an approved testing agency acceptable to the department or shall be directed, witnessed and evaluated by an independent Washington licensed architect or professional engineer. All test procedures and results shall be reviewed and evaluated by a Washington licensed architect or professional engineer. The approved testing agency, architect or professional engineer shall submit the evaluation of test results, calculations and recommendations, accompanied by test reports from the laboratory to the Seattle office of the Mobile Home and Recreational Vehicle Section. The department may require that a representative of the division witness the test. [Order 75-20, § 296-48-706, filed 7/16/75; Order 70-10, § 296-48-706, filed 9/17/70, effective 1/1/71.]

WAC 296-48-710 Model manufactured in more than one location. (1) If the manufacturer plans to produce the same model at more than one location, approval may be obtained at the time of filing, subject to submission of the following:

(a) One set of application forms for plan approval for each location of manufacture and fees pursuant to WAC 296-48-800.

(b) One additional set of identical plans and quality control manual for each location of manufacture (duplicate approved plans and quality control manuals may be used for the additional locations).

(2) If, subsequent to plan approval, the manufacturer wishes to produce the same model at additional locations of manufacture, it will be necessary to submit the following:

(a) One set of application forms for plan approval for each location of manufacture and fees pursuant to WAC 296-48-800.

(b) One additional set of identical approved plans and quality control manuals for each location of manufacture (duplicate approved plans and quality control manuals may be used for the additional locations). [Order 75-20, § 296-48-710, filed 7/16/75; Order 68-4, § 296-48-710, filed 5/31/68, effective 7/1/68.]

WAC 296-48-715 Out-of-state applicant. If the applicant is out-of-state, the application shall include the following items:

(1) A statement signed by the applicant that he agrees to an in-plant inspection and that he will apply for an insignia for each vehicle to be sold or offered for sale in Washington.

(2) Submit to the department and maintain current the names and addresses of all Washington distributors and dealers.

(3) Request inspection, as required by the department, of vehicles under construction that are to be shipped to Washington.

(4) Requested out-of-state inspection fees pursuant to WAC 296-48-800 of these rules and regulations.

(5) The department shall issue insignia only when the applicant complies with the provisions of this section. [Order 75-20, § 296-48-715, filed 7/16/75; Order 68-4, § 296-48-715, filed 5/31/68, effective 7/1/68.]

WAC 296-48-720 Non-conforming application and plans. Should the application and plans not conform with this Code, the applicant shall be notified in writing of the action taken by the department within ten working days of the date they are received by the department. Should the applicant fail to submit a corrected

application and plans within 90 days of such notice, the application will be deemed abandoned and all fees submitted will be forfeited to the department. Additional submissions shall be as for a new application. [Order 70-2, § 296-48-720, filed 4/27/70; Order 68-4, § 296-48-720, filed 5/31/68, effective 7/1/68.]

WAC 296-48-725 Evidence of department's approval. Approved plans, specifications and quality control manual shall be evidenced by the stamp of approval of the department. An approved copy of the plans, specifications and quality control manual shall be returned to the manufacturer. An approved copy shall be retained at each place of manufacture. [Order 75-20, § 296-48-725, filed 7/16/75; Order 68-4, § 296-48-725, filed 5/31/68, effective 7/1/68.]

WAC 296-48-730 Plan approval expiration. (1) Model Plan Approvals. Plan approvals shall expire 15 months from the date of department approval. Plans may be renewed prior to the expiration date by submission of an application for plan approval renewal form obtainable from the department. Application for plan approval renewal shall be submitted in duplicate together with the appropriate plan renewal fees pursuant to WAC 296-48-800 of these rules and regulations. Plan approval renewal is permitted only when the plans for the designated model are identical to those on file with the department. A change of model name or designation is permitted on a renewal of plan approval. After expiration date, application for renewal of approval of any such expired plan approvals shall be submitted and processed as for a new plan approval. Insignia not assigned to a vehicle under construction prior to the expiration of plan approval are void and shall be returned to the department.

(2) Systems Plan Approvals. System plan approvals on file with the department shall expire 15 months from the date of department approval. System plans may be renewed prior to the expiration date by written application to the department. The written application shall contain a listing of the valid system(s) plan approvals the manufacturer wishes to maintain as current and a plan renewal fee pursuant to WAC 296-48-800(5). Where system plan approvals contain supplements, the supplements shall be incorporated into a single revised plan and filed fees pursuant to WAC 296-48-800(1) and (2). When renewal involves changes from original approval, resubmission fees shall be charged pursuant to WAC 296-48-800. [Order 75-20, § 296-48-730, filed 7/16/75; Order 71-11, § 296-48-730, filed 10/8/71; Order 70-2, § 296-48-730, filed 4/27/70; Order 68-4, § 296-48-730, filed 5/31/68; effective 7/1/68.]

WAC 296-48-735 In-plant quality control. (1) The manufacturer shall submit a manual, or shall reference an applicable manual previously approved by the department, outlining a program of quality control concurrent with his request for plan approval. The program outlined must meet the standards of and be approved by the department. In addition, the manufacturer shall designate a company or corporate officer or other responsible person to be responsible for the quality control program and shall maintain records to substantiate that each unit has been inspected and complies with the plans as approved by the department.

(2) Specific Requirements for Manual for Mobile Homes, Commercial Coaches and Recreational Vehicles:

(a) Scope and purpose of manual.

(b) Receiving inspection procedure for basic materials.

(c) Material storage and stock rotation procedure.

(d) Drawings and bills of material.

(e) Types and frequency of product inspection.

(f) Sample of inspectional control form used.

(g) Record-keeping procedures for quality control forms.

(h) List of major pieces of production equipment.

(i) Responsibility for quality control program.

(j) Test procedural manual, including electrical, gas line, water systems and drain/vent/plumbing fixture tests and type of test equipment used.

(k) List of test equipment.

(3) The manufacturer shall provide a control card or other approved documents with each vehicle on the assembly line. The card or other approved documents shall identify the structural, electrical, mechanical and plumbing system in the vehicle and the Vehicle Identification Number (VIN).

(4) The department shall make periodic inspections of both vehicles under construction and of completed vehicles. The issuance of insignia shall be conditioned to compliance with the regulations as indicated by these periodic inspections. [Order 75-20, § 296-48-735, filed 7/16/75; Order 70-10, § 296-48-735, filed 9/17/70, effective 1/1/71; Order 68-4, § 296-48-735, filed 5/31/68, effective 7/1/68.]

WAC 296-48-740 Changes to approved plans. (1) Where the manufacturer proposes changes in the construction, fire safety, occupancy, plumbing, heat-producing or electrical equipment or installations, or the department's regulations are amended to necessitate such change, two sets of supplemental detailed plans and specifications of such changes shall be submitted to the department for plan checking and comparison. Plans shall be accompanied by Transmittal of Supplementary Plan Application form, obtainable from the department, and the plan filing fee pursuant to WAC 296-48-800 of these rules and regulations. If the department determines that such supplemental details do not constitute a new model or system, the supplement will be filed with and become a part of the existing plan approval. Where the supplemental details constitute a new model or system, the application for plan approval is to be processed as a new model or system.

(2) A model designation may be changed or added prior to the expiration date by filing an amended application and plan filing fee pursuant to WAC 296-48-800 of these rules and regulations.

(3) Where the manufacturer proposes changes to the quality control manual, two copies of such changes shall be submitted to the department for approval accompanied by a quality control manual filing fee pursuant to WAC 296-48-800. [Order 75-20, § 296-48-740, filed 7/16/75; Order 70-10, § 296-48-740, filed 9/17/70, effective 1/1/71; Order 70-2, § 296-48-740, filed 4/27/70; Order 68-4, § 296-48-740, filed 5/31/68, effective 7/1/68.]

WAC 296-48-745 Change of ownership. Where there is a change of ownership of a vehicle manufacturing business having department plan approval, the new owner shall notify the department of such change within ten days. The notification shall be accompanied by appropriate fee pursuant to WAC 296-48-800 of this Code. If the new owner submits a statement that he will continue to manufacture in accordance with previously approved plans, new applications and plan fees pursuant to WAC 296-48-800 of this Code shall not be required. [Order 68-4, § 296-48-745, filed 5/31/68, effective 7/1/68.]

WAC 296-48-750 Change of name or address. In the event of a change in the name or address of any vehicle manufacturer, the manufacturer shall so notify the department in writing within ten days. The notification shall be accompanied by appropriate fee pursuant to WAC 296-48-800 of this Code. [Order 68-4, § 296-48-750, filed 5/31/68, effective 7/1/68.]

WAC 296-48-755 Discontinuance of manufacture. When a vehicle manufacturer discontinues production of a model carrying department plan approval, the manufacturer shall, within ten days, advise the department of the date of such discontinuance and return all insignia allocated for such discontinued vehicles. [Order 68-4, § 296-48-755, filed 5/31/68, effective 7/1/68.]

WAC 296-48-760 Vehicle identification. (1) Each vehicle manufactured, sold, offered for sale, rented or leased in Washington shall bear a permanently affixed label which contains the following information: Name of manufacturer; month and year of manufacture; vehicle identification number (VIN); where applicable, the plan approval number; and the manufacturer's assigned identification number.

(2) The label shall be permanently attached on the forward half of the left side of the exterior wall, not less than six inches above the floor line.

NOTE: See WAC 296-48-761, Type I, for label size and type of material.

(3) Each unit of a multiple vehicle shall have the same vehicle identification number (VIN), except that the vehicle identification number (VIN) of the primary or left (road) side unit shall be prefaced by the letter "A". The vehicle identification number (VIN) of the first connecting unit shall be prefaced by the letter "B" and each additional unit similarly identified in alphabetical order. (Should the number of connected units exceed 26, the VIN of the 27th unit would be preceded by the letters "AA" and the 28th "BB", etc.)

Each connecting unit after the primary unit shall have an identification label as prescribed in (1) above permanently attached to the left corner of the front exterior wall, not less than six inches above the floor line.

(4) Where applicable, vehicle identification numbers (VINs) shall be as assigned or required by the Department of Motor Vehicles. For slide-in campers, converted vans, vehicles manufactured out-of-state, or other vehicles where the assignment of vehicle identification numbers (VINs) are not subject to the requirements of the Department of Motor Vehicles, the vehicle identification number (VIN) shall be as assigned by the vehicle manufacturer or seller. [Order 75-20, § 296-48-760, filed 7/16/75; Order 70-2, § 296-48-760, filed 4/27/70; Order 68-4, § 296-48-760, filed 5/31/68, effective 7/1/68.]

WAC 296-48-761 Labels for exterior locations. The label shall be either of 3 basic types, each capable of 20 year life expectancy when exposed to ordinary outdoor environments. Letters and numbers shall be bold Gothic or similar style varied for emphasis as large as space permits with smallest size being 5/64". Wording shall be easily read and concise.

Type I*. Rigid metal plates affixed by screws, rivets or permanent type adhesives.

Minimum Size: .020" x 1 1/2" x 3" net dimensions (inside fastener heads).

Material: Aluminum, brass or stainless steel etched, stamped, engraved or embossed to .015 minimum depth differential—color anodized or enamel filled.

Type II*. Flexible metal plates affixed by permanent adhesives—either pressure sensitive acrylics or solvent activated resins.

Minimum Size: .005" x 1 1/2" x 3".

Material: Aluminum foil etched or stamped to .001 minimum depth differential with color anodized background.

Type III*. Minimum Size: .002" x 1 1/2" x 3" metallized polyester surface bonded.

Minimum Size: .006" x 1 1/2" x 3" aluminum/vinyl, surface bonded (to be used for nameplates where variable information is required by debossing, which can be done with a conventional typewriter).

NOTE: No person shall alter, remove, or cause to be altered or removed, any insignia or label required by these rules and regulations.

*Where permanent type adhesives are used on Type I, II or III plates, adhesives shall have a minimum thickness of .004 inch, they shall be properly affixed to a relatively smooth surface.

[Order 75-20, § 296-48-761, filed 7/16/75.]

WAC 296-48-765 Insignia required. (1) Unless prior written approval is granted by the department, all vehicles manufactured for sale in Washington shall bear

a department insignia prior to leaving the manufacturing plant.

(2) Each insignia shall be assigned and affixed to a specific completed vehicle. Insignia shall only be affixed to vehicles that comply with the provisions of these regulations.

Insignia shall only be issued to out-of-state manufacturers for those vehicles constructed for sale in Washington.

(3) Assigned insignia are not transferable and are void when not affixed as assigned. All voided insignia shall be returned to, or may be confiscated by, the department. The insignia shall remain the property of the department and may be reappropriated by the department in the event of violation of the conditions of approval.

(4) The insignia shall be securely affixed to the rear of the vehicle on the lower left corner of the exterior wall not less than six inches above the floor line or on the exterior wall immediately adjacent to the main door, not less than six inches above the floor line.

(5) The manufacturer shall maintain a current list of departmental insignia designating:

(a) Insignia affixed to vehicles.

(b) Insignia not affixed to vehicles. [Order 75-20, § 296-48-765, filed 7/16/75; Order 68-4, § 296-48-765, filed 5/31/68, effective 7/1/68.]

WAC 296-48-770 Insignia not required. (1) Vehicles falling into any of the following categories need not bear an insignia:

(a) Any mobile home, commercial coach or recreational vehicle manufactured prior to July 1, 1968.

(b) A vehicle manufactured in Washington, designated by the manufacturer as an out-of-state delivery for, and delivered by the manufacturer or his agent to, a purchaser in another state.

(c) A vehicle delivered in-state when:

(i) Purchased by a common carrier, shipped by the seller via the purchaser, carried under a bill of lading whether the freight is paid in advance or the shipment is made freight charges collect to a point in another state, and the property is actually transported to the out-of-state destination for use by the carrier in the conduct of its business as a common carrier.

(ii) Purchased from a dealer located in another state for use outside of this state, delivered by the seller in Washington to the purchaser within this state, and such purchaser drives or moves such vehicle from the Washington manufacturer's place of business in this state to any out-of-state point within 30 days from and after the date of delivery.

(2) In each case the vehicle manufacturer shall supply the department with the following information within 30 days after shipment.

(a) Make and model of the vehicle.

(b) Vehicle Identification Number (VIN).

(c) Date of manufacture.

(d) Date of sale.

(e) Name of purchaser.

(f) Destination. [Order 75-20, § 296-48-770, filed 7/16/75; Order 68-4, § 296-48-770, filed 5/31/68, effective 7/1/68.]

WAC 296-48-775 Application for insignia pursuant to plan approval. (1) Following receipt of plan approval, the vehicle manufacturer shall make application for an insignia for each vehicle manufactured, except as provided in WAC 296-48-770. The application shall be submitted to the department's Seattle office in duplicate, accompanied by the insignia fees pursuant to WAC 296-48-800 of these rules and regulations. The application shall include the vehicle manufacturer, manufacturer's identification number, plan approval number and the vehicle identification number (VIN) of each vehicle for which an insignia is requested. Multiple vehicles shall be designated where applicable. Occupancy classification shall be shown for commercial coaches.

(2) Out-of-State Manufacturers. The following additional information shall be supplied to the department with each request for insignia prior to shipment of the vehicle(s) to Washington:

(a) Estimated date of manufacture of vehicle.
(b) Estimated date of sale of vehicle by manufacturer.
(c) Name and address of purchaser.
(d) Destination of vehicle (including address).
(e) Estimated date of arrival at destination.

NOTE: The department shall be notified immediately, by the manufacturer, of any changes in this information provided pursuant to this section. Insignia shall only be issued to out-of-state manufacturers for those vehicles constructed for sale in Washington.

(3) Commercial Coaches. Insignia will only be issued for commercial coaches where the occupancy classification has been designated by the manufacturer in writing to the department and the vehicle complies with all applicable provisions of the regulations.

Where the manufacturer is unable to designate an occupancy class, the department may approve structural, electrical, mechanical and plumbing systems plans and specifications and may certify compliance of such systems. The department may issue a certificate which shall be affixed to the vehicle by the manufacturer. The manufacturer shall request an inspection of the vehicle and make application for insignia of approval prior to selling, offering for sale, renting or leasing any commercial coach.

(4) Washington insignia of approval shall not be issued until the department can effectively determine that the manufacturer's assembly and quality control procedures are such as to assure that vehicles manufactured for sale in Washington comply with the Washington regulations. The department shall make inspections of vehicles under construction at the manufacturer's facilities to determine compliance.

Exception: Advance inclusions of the vehicle's serial number may be omitted from the application provided the applicant submits a report

of the insignia number and serial number of the specific vehicle to which the insignia has been assigned. Such report shall be on the insignia application form and shall be submitted not later than 30 days after the receipt of such insignia. The vehicle manufacturer shall legibly stamp the vehicle serial number on the insignia. Where the applicant fails to utilize this exception, insignia shall be issued pursuant to WAC 296-48-775.

[Order 75-20, § 296-48-775, filed 7/16/75; Order 70-2, § 296-48-775, filed 4/27/70; Order 68-4, § 296-48-775, filed 5/31/68, effective 7/1/68.]

WAC 296-48-776 Application for insignia pursuant to requested inspection. (1) Any person selling, offering for sale, rent or lease, any mobile home, commercial coach or recreational vehicle manufactured after July 1, 1968, containing plumbing, heating or electrical equipment and after July 1, 1970 body and frame design or construction on mobile homes and commercial coaches shall obtain insignia for such vehicle from the department prior to sale, offering for sale, renting or leasing said vehicle. (See WAC 296-48-625 and WAC 296-48-630 relating to inspections.)

(2) Application for insignia shall be made on forms obtainable from the department together with the fees required pursuant to WAC 296-48-800 of these regulations. [Order 75-20, § 296-48-776, filed 7/16/75.]

WAC 296-48-780 Alteration or conversion. Application. (1) Electrical, Mechanical and Plumbing. No person shall make any alteration or conversion of the electrical, mechanical or plumbing equipment or installations of a vehicle bearing or required to bear a department insignia unless an application for such alteration or conversion has been filed with and approved by the department.

(2) Construction, Fire Safety and Occupancy. No person shall make any alteration or conversion of the construction, fire safety or occupancy of any mobile home, commercial coach or recreational vehicle bearing or required to bear a department insignia, manufactured after July 1, 1968, unless an application for such alteration or conversion has been filed with and approved by the department. [Order 75-20, § 296-48-780, filed 7/16/75; Order 70-10, § 296-48-780, filed 9/17/70, effective 1/1/71; Order 68-4 § 296-48-780, filed 5/31/68, effective 7/1/68.]

WAC 296-48-781 Not applicable. The following shall not constitute an alteration or conversion:

(1) Repairs with approved component parts.

(2) Conversion of listed appliances in accordance with the terms of their listing.

(3) Adjustment and maintenance of equipment.

(4) Replacement of equipment in kind. [Order 75-20, § 296-48-781, filed 7/16/75; Order 68-4, § 296-48-781, filed 5/31/68, effective 7/1/68.]

WAC 296-48-782 Application requirements. (1) Any person proposing to make an alteration or conversion to a vehicle bearing a department insignia of approval shall file an application with and obtain approval of the department. Such application shall include:

(a) Type of vehicle (if commercial coach, occupancy classification).

(b) Make and model of the vehicle.

(c) Vehicle Identification Number (VIN).

(d) Department insignia number.

(e) Month and year of manufacture.

(f) A complete description of the work to be performed together with plans and specifications when required.

(g) Location of the vehicle where work is to be performed.

(h) Alteration or conversion fee and inspection fee pursuant to WAC 296-48-800.

(i) Name and address of the owner of the vehicle.

(j) Any proposed change in occupancy classification.

(2) The department may require inspections of the vehicle during the course of alteration or conversion to determine compliance with the regulations. The applicant shall make such request for inspection on forms furnished by the department pursuant to WAC 296-48-625 and WAC 296-48-630 together with inspection fees pursuant to WAC 296-48-800 of these regulations. Upon completion of the alteration or conversion, the applicant shall request the department to make an inspection pursuant to WAC 296-48-625 and WAC 296-48-630 of these regulations.

(3) The applicant shall purchase a replacement insignia, based on inspection of the alteration or conversion only or may purchase a new insignia based on a complete inspection. [Order 75-20, § 296-48-782, filed 7/16/75.]

WAC 296-48-785 Denial of insignia. Should inspection reveal that a manufacturer is not manufacturing vehicles according to plans approved by the department, and such manufacturer, after having been served with a notice setting forth in what respect the provisions of this Code have been violated, continues to manufacture vehicles in violation of this Code, applications for new insignia shall be denied and the insignia previously issued shall be confiscated. Upon satisfactory proof of compliance such manufacturer may resubmit an application for insignia. [Order 68-4, § 296-48-785, filed 5/31/68, effective 7/1/68.]

WAC 296-48-790 Insignia removal. In the event that any vehicle bearing department insignia is found in violation of these rules and regulations, and a Notice of Violations has been served pursuant to WAC 296-48-635 and WAC 296-48-636, the department may remove its insignia. The department shall not issue a new insignia until corrections have been made; an inspection requested pursuant to WAC 296-48-625; fees have been paid pursuant to WAC 296-48-800; and the vehicle found in compliance. [Order 75-20, § 296-48-790, filed

7/16/75; Order 68-4, § 296-48-790, filed 5/31/68, effective 7/1/68.]

WAC 296-48-795 Lost or damaged insignia. (1) When an insignia of approval becomes lost or damaged, after sale by the manufacturer, the department shall be notified immediately in writing by the owner. The owner shall specify the manufacturer, the vehicle identification number (VIN), when possible the insignia number and shall request inspection pursuant to WAC 296-48-630.

(2) Whenever possible, all damaged insignia shall be promptly returned to the department. Damaged and lost insignia shall be replaced by the department with a replacement insignia on payment of the replacement insignia fee as provided in WAC 296-48-800 of these rules and regulations.

(3) Whenever it becomes necessary to replace insignia for a manufacturer, the manufacturer shall submit a request in writing outlining all related circumstances and where possible, shall return insignia to be replaced together with replacement insignia fees pursuant to WAC 296-48-800. [Order 75-20, § 296-48-795, filed 7/16/75; Order 68-4, § 296-48-795, filed 5/31/68, effective 7/1/68.]

WAC 296-48-800 Fees. (1) Plan Filing Fee. Ten dollars ($10) for each set of plans and specifications, filed in addition to other fees required by this subsection.

(2) Plan Checking Fee.

(a) Twenty dollars ($20) provided that such plan check is not in excess of one hour duration.

(b) Ten dollars ($10) for each 30 minutes or fractional part thereof in excess of one hour.

(3) Plan Resubmission Fee. Twenty dollars ($20) minimum plus ten dollars ($10) for each 30 minutes or fractional part thereof in excess of one hour.

(4) Plan Supplement Fee. Twenty dollars ($20) minimum plus ten dollars ($10) for each 30 minutes or fractional part thereof in excess of one hour.

(5) Plan Renewal Fee. Fifteen dollars ($15) for each plan or group of plans.

(6) Alteration or Conversion Fee. Five dollars ($5), includes insignia.

(7) Quality Control Manual Filing Fee. Five dollars ($5).

(8) Inspection or Reinspection Fees.

(a) Twenty dollars ($20) provided that such inspection or reinspection of vehicle(s) is not in excess of one hour in duration.

(b) Ten dollars ($10) for each 30 minutes or fractional part thereof in excess of one hour.

(9) Field Technical Service Fees.

(a) Mobile Homes:

(i) Thirty-two dollars ($32) provided that such service is not in excess of one hour in duration.

(ii) Sixteen dollars ($16) for each 30 minutes or fractional part thereof in excess of one hour.

(b) Recreational Vehicles or Commercial Coaches:

(i) Twenty dollars ($20) provided that such service is not in excess of one hour in duration.

(ii) Ten dollars ($10) for every 30 minutes or fractional part thereof in excess of one hour.

(10) Alternate Approval Fee. Twenty-five dollars ($25) for each application.

(11) Insignia Fees.

(a) Ten dollars ($10) for each recreational vehicle.

(b) Fifteen dollars ($15) for each single width and ten dollars ($10) for each additional unit of a multiple commercial coach.

(c) Five dollars ($5) for each replacement insignia.

(12) Requested Out-of-State Inspection or Field Technical Service Fee. Total travel cost based on published air fare, or equivalent rate, between Seattle, Washington and the point of inspection, plus necessary supplemental surface transportation, reimbursement for food and lodging consistent with Central Budget Agency of the State of Washington allowances and inspection fees of twenty dollars ($20) per hour not to exceed eight hours in any one day.

(13) Change in Manufacturer's Name, Ownership or Address Fee. Ten dollars ($10).

(14) In-Plant Primary Inspection Agency (IPIA) Fees.

(a) Mobile Homes:

(i) Thirty-two dollars ($32) for each inspection, reinspection, or in-plant monitoring provided that such inspection, reinspection or in-plant monitoring is not in excess of one hour in duration.

(ii) Sixteen dollars ($16) for each 30 minutes or fractional part thereof in excess of one hour. [Order 77-5, § 296-48-800, filed 4/6/77; Order 76-26, § 296-48-800, filed 8/23/76; Order 75-20, § 296-48-800, filed 7/16/75; Order 70-10, § 296-48-800, filed 9/17/70, effective 1/1/71; Order 70-2, § 296-48-800, filed 4/27/70; Order 68-4, § 296-48-800, filed 5/31/68, effective 7/1/68.]

HEARINGS

WAC 296-48-825 Public hearing. Any code, standards, or regulations relating to chapter 43.22 RCW or modifications considered for adoption, the department shall comply with the requirements of the A.P.A. for the State of Washington. [Order 68-4, § 296-48-825, filed 5/31/68, effective 7/1/68.]

WAC 296-48-830 Aggrievance hearing request. Any person refused department approval, receiving a notice of violation, or who feels aggrieved by application of this Code may request and shall be granted a hearing on the matter before the director of the department or his duly authorized representative. Such person shall file with the department a written petition requesting such hearing which shall set forth a brief statement of the grounds therefor.

(1) **Notice of Hearing.** Upon receipt of such petition, the department shall set a time and place for such hearing and shall give the petitioner written notice thereof. Said hearing shall commence no later than 30 days after the day on which such petition was filed provided that, upon application of the petitioner, the department may

postpone the date of such hearing for a reasonable time beyond such 30 day period, if in its judgment the petitioner has submitted a good and sufficient reason for such postponement. Should petitioner fail to appear at the scheduled time and place of said hearing, the department may dismiss the petition without further action.

(2) **Result of Hearing.** Upon conclusion of such hearing, the director of the department or his duly authorized representative shall notify the petitioner in writing of his decision in the matter. [Order 68-4, § 296-48-830, filed 5/31/68, effective 7/1/68.]

WAC 296-48-890 Appendix——ANSI A119.1——Copies.

Copies of ANSI A119.1 are available from:

NATIONAL FIRE PROTECTION ASSOCIATION
470 Atlantic Avenue, Boston, MA 02210

[Order 76-26, Appendix (codified as WAC 296-48-890), filed 8/23/76.]

Chapter 296-48A WAC
STANDARDS FOR RECREATIONAL VEHICLES

WAC

296-48A-001 Standards for recreational vehicles.
296-48A-200 Individual vents.
296-48A-400 Sizing and capacity of gas piping.
296-48A-405 Description of tables.
296-48A-410 Use of capacity tables.
296-48A-600 Low-voltage wiring materials.
296-48A-605 Power-supply assembly.
296-48A-610 Ground-fault circuit protection.
296-48A-615 Labeling at the electrical entrance.
296-48A-700 Administrative——Authority for recreational vehicle code.
296-48A-750 Conditions of reciprocity.
296-48A-755 Agreements with out-of-state jurisdictions.
296-48A-770 Definitions.
296-48A-780 Enforcement.
296-48A-800 Approvals, inspections, quality control, identification.
296-48A-990 Appendix.

WAC 296-48A-001 Standards for recreational vehicles. The 1974 Edition of The Standard for Recreational Vehicles as adopted by the National Fire Protection Association (NFPA) and approved by The American National Standards Institute (ANSI) A119.2, 1975, is hereby adopted by reference as part of these rules and regulations except for the sections hereinafter listed.

Definitions Common to Parts I through IV, Recreational Vehicle. See WAC 296-48-051.

Part I—Plumbing Systems, Section 3, Definitions. Delete Anti-Siphon Trap Vent Device.

Part I—Plumbing Systems, Section 12.4. Delete Anti-Siphon Trap Vent Devices.

Part I—Plumbing Systems, Appendix, Table A-3. Delete reference to Anti-Siphon Trap Vent Device.

Part I—Plumbing Systems, Section 12.3.1. Delete Individual Vents. See WAC 296-48A-200.

Part II—Heating Systems, Section 5.1.13.1. Delete Natural Gas Connectors.

Part III—Electrical Systems. Delete Section 4.2.1. See WAC 296-48A-600.

Part III—Electrical Systems. Delete Section 7.6.4 and Exceptions No. 1 and No. 2. See WAC 296-48A-605.

Part III—Electrical Systems. Section 7.9.4. Delete Labeling at Electrical Entrance. See WAC 296-48A-615. [Order 75-21, § 296-48A-001, filed 7/16/75.]

WAC 296-48A-200 Individual vents. A one and one-quarter inch (1 1/4") minimum diameter vent pipe shall be required for all individually vented fixtures with one and one-half inch (1 1/2") or smaller traps. The continuous vent of wet-vented drainage systems shall be one and one-quarter inch (1 1/4") minimum diameter. [Order 75-21, § 296-48A-200, filed 7/16/75.]

WAC 296-48A-400 Sizing and capacity of gas piping. In order to determine the size of piping to be used in designing a gas piping system, the following factors must be considered:

(1) Allowable loss in pressure from the recreational vehicle gas supply connection to appliance.

(2) Maximum gas consumption to be provided.

(3) Length of piping.

(4) Type of gas. [Order 75-21, § 296-48A-400, filed 7/16/75.]

WAC 296-48A-405 Description of tables. (1) The quantity of gas to be provided at each outlet shall be determined directly from the manufacturer's Btu input rating of the appliance that will be installed.

(2) Capacities for combustion LP/Natural gas at low pressures (0.5 psig or less) in thousands of Btu per hour for different sizes and lengths are shown in ANSI A119.2, Part II, Table 5.1.4, for iron pipe or equivalent rigid pipe and for semi-rigid tubing. Table 5.1.4 is based upon a pressure drop of 0.5 inch water column. In using this Table, no additional allowance is necessary for an ordinary number of fittings.

(3) Capacities in thousands of Btu per hour of undiluted liquefied petroleum gases based on a pressure drop of 0.5 inch water column for different sizes and lengths are shown in Table 5.1.4 for iron pipe or equivalent rigid pipe and for semi-rigid tubing. In using this Table, no additional allowance is necessary for an ordinary number of fittings.

(4) For any gas piping system, for special gas appliances or for conditions other than those covered by Table 5.1.4, such as longer runs, greater gas demands, or greater pressure drops, the size of each gas piping system shall be determined by standard engineering methods acceptable to the department. [Order 75-21, § 296-48A-405, filed 7/16/75.]

WAC 296-48A-410 Use of capacity tables. To determine the size of each section of gas piping in a system within the range of the capacity tables, proceed as follows:

(1) Determine the gas demand of each appliance to be attached to the piping system when Table 5.1.4 is to be used to select the piping size.

(2) Measure the length of piping from the gas supply connection to the most remote outlet in the recreational vehicle.

(3) In the appropriate capacity table, select the column showing the measured length or the next longer length if the table does not give the exact length. This is the only length used in determining the size of any section of gas piping.

(4) Use this same vertical column to locate ALL gas demand figures for this particular system of piping.

(5) Starting at the most remote outlet, find in the vertical column just selected the gas demand for that outlet. If the exact figure of demand is not shown, choose the next larger figure below in the column.

(6) Opposite this demand figure, in the first column at the left, will be found the correct size of gas piping.

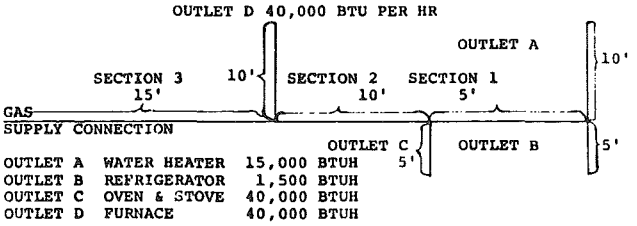
(7) Proceed in a similar manner for each outlet and each section of gas piping. For each section of piping, determine the total gas demand supplied by that section.

Example of Piping System Design:

Determine the required pipe size of each section and outlet of the piping system shown in Exhibit 1, with a designated pressure drop of 0.5 inch water column.

(EXHIBIT I)

FURNACE



(1) The length of pipe from the gas supply connection to the most remote outlet (A) is 40 feet. This is the only distance used.

(2) Using the column marked 40 feet in Table 5.1.4:

(a) **For Combination Natural/LP Gas systems:**
Outlet A, supplying 15,000 BTUH requires 1/4 inch pipe.
Outlet B, supplying 1,500 BTUH requires 1/4 inch pipe.
Section 1, supplying outlets A and B, or 16,500 BTUH, requires 1/4 inch pipe.
Outlet C, supplying 40,000 BTUH requires 3/8 inch pipe.
Section 2, supplying outlets A, B and C, or 56,500 BTUH requires 1/2 inch pipe.
Outlet D, supplying *40,000* BTUH requires 3/8 inch pipe.
Section 3, supplying outlets A, B, C and D, or 96,500 BUTH requires 3/4 inch pipe.

(b) **For LP Gas Systems:** (O.D. Tubing)
Outlet A, supplying 15,000 BTUH, requires 3/8 inch tubing.
Outlet B, supplying 1,500 BTUH, requires 3/8 inch tubing.
Section 1, supplying outlets A and B or 16,500 BTUH, requires 3/8 inch tubing.
Outlet C, supplying 40,000 BTUH, requires 1/2 inch tubing.
Section 2, supplying outlets A, B and C or 56,500 BTUH, requires 5/8 inch tubing.
Outlet D, supplying 40,000 BTUH, requires 1/2 inch tubing.
Section 3, supplying outlets A, B, C and D or 96,500 BTUH, requires 3/4 inch tubing.

[Order 75-21, § 296-48A-410, filed 7/16/75.]

WAC 296-48A-600 Low-voltage wiring materials. Copper or copper-clad aluminum conductors shall be used for low-voltage circuits. [Order 75-21, § 296-48A-600, filed 7/16/75.]

WAC 296-48A-605 Power-supply assembly. In accordance with ANSI A119.2, 1975, Part III—Electrical Systems, Sections 7.6.4 and 7.4.1.4, any recreational vehicle with a rating in excess of 30-amperes, 120 volts, shall use an approved, listed and appropriately rated 120/240 volt power-supply assembly.

EXCEPTION: For a dual supply source consisting of a generator and a power-supply cord, see ANSI A119.2, 1975, Part III, Section 7.8.

[Order 75-21, § 296-48A-605, filed 7/16/75.]

WAC 296-48A-610 Ground-fault circuit protection. All 120-volt single phase, 15- and 20-ampere receptacle outlets installed on the exterior, or in bathrooms of recreational vehicles shall have ground-fault circuit protection for personnel. [Order 75-21, § 296-48A-610, filed 7/16/75.]

WAC 296-48A-615 Labeling at the electrical entrance. Each recreational vehicle shall have, permanently affixed to the exterior skin, adjacent to the point of entrance of the power-supply assembly, a label which reads as appropriate, either:

"THIS CONNECTION IS FOR 110-125 VOLT AC. 60 HERTZ _____ AMPERE SUPPLY".

or

"THIS CONNECTION FOR 120/240 VOLT, 3-POLE 4-WIRE, 60 HERTZ _____ AMPERE SUPPLY".

The correct ampere rating shall be marked in the blank space.

NOTE: See WAC 296-48-761 for label size and type of material.

[Order 75-21, § 296-48A-615, filed 7/16/75.]

WAC 296-48A-700 Administrative——Authority for recreational vehicle code. This chapter is adopted pursuant to the provisions of chapter 157, Laws of 1967, effective July 1, 1968, entitled Sale of and Manufacturing of Mobile Homes and Travel Trailers, as amended by chapter 229, Laws of 1969, effective August 11, 1969, chapter 27, Laws of 1970, effective May 14, 1970, and chapter 82, Laws of 1971, effective August 9, 1971 (see RCW 43.22.340 et seq.) in order to implement, interpret, make specific and otherwise carry out the provisions relating to the manufacture, lease and sale of recreational vehicles in the State of Washington. [Order 76-26, § 296-48A-700, filed 8/23/76.]

WAC 296-48A-750 Conditions of reciprocity. (1) In accordance with the provisions of RCW 43.22.400, the Director of the Department of Labor and Industries has examined the statutes, rules and regulations of the states listed in subsection (2) of this section relating to recreational vehicles and finds that such statutes, rules and regulations provide standards of construction for recreational vehicles equal to those required under the provisions of RCW 43.22.340 through RCW 43.22.440 and, further, that such statutes, rules and regulations of the states listed in subsection (2) of this section are enforced by such states.

(2) Upon the effective date of this rule, and subject to the continued equality of standards of construction and enforcement of standards as prevails in this state, and subject to the provisions of a reciprocal agreement, the recreational vehicles of the following states bearing the insignia of such states shall constitute prima facie evidence of compliance with the statutes, the rules and regulations of this state relative to recreational vehicles and shall be eligible for the issuance of recreational vehicles insignia of approval by the department as provided by RCW 43.22.350.

(a) The states of Arizona, California, Idaho, Illinois, Indiana, Iowa, Kansas, Michigan, Montana, Nebraska, Nevada, New Mexico, Oklahoma, Oregon, Texas, Utah and Wyoming.

(3) Reciprocal agreements entered into by the Department of Labor and Industries pursuant to the provisions of RCW 43.22.400 and this rule with the states listed in subsection (2) of this section will be kept on file with the Factory-Built Housing, Mobile Home and Recreational Vehicle Section of the Division of Building and Construction Safety Inspection Services of the department and available for inspection and review during the regular business hours of such office. [Order 76-26, § 296-48A-750, filed 8/23/76.]

WAC 296-48A-755 Agreements with out-of-state jurisdictions. When an out-of-state jurisdiction, not covered under reciprocity, pursuant to RCW 43.22.400 accepts the State of Washington recreational vehicle insignia of approval, the department shall institute their agreement of acceptance in writing with that jurisdiction. [Order 76-26, § 296-48A-755, filed 8/23/76.]

WAC 296-48A-770 Definitions. (1) The definitions of WAC 296-48-051 are hereby incorporated by reference into this chapter, *Provided:* That wherever the words "mobile home(s)" appears in that section, the words "recreational vehicle(s)" shall be substituted therefor.

(2) RECREATIONAL VEHICLE: Is a motorhome, travel trailer, truck camper or camping trailer, with or without motive power, designed for human habitation for recreational or emergency occupancy, with a living area less than 220 square feet, excluding built-in equipment such as wardrobes, closets, cabinets, kitchen units or fixtures, bath and toilet rooms.

(3) RECREATIONAL VEHICLE SELF-CONTAINED: A vehicle equipped with a toilet and waste holding tank for the temporary retention of liquid born waste. Such tank may be an integral part of the toilet. [Order 76-26, § 296-48A-770, filed 8/23/76.]

WAC 296-48A-780 Enforcement. The department shall administer and enforce all the provisions of this chapter. Any officer, agent or employee of the department is authorized to enter any premises where recreational vehicles are manufactured, sold, offered for sale, rent or lease. He may examine any records and may inspect any recreational vehicles, equipment or installations to ensure compliance with the provisions of this chapter. When it becomes necessary to determine compliance, he may require that a portion or portions of such recreational vehicles be removed or exposed in order that an inspection may be made to determine compliance. [Order 76-26, § 296-48A-780, filed 8/23/76.]

WAC 296-48A-800 Approvals, inspections, quality control, identification. The provisions of WAC 296-48-605 through WAC 296-48-830 are hereby incorporated by reference into this chapter, *Provided:* That whenever the word "vehicle(s)" appears in the provisions of those sections, the words "recreational vehicle(s)" shall be substituted therefor. [Order 76-26, § 296-48A-800, filed 8/23/76.]

WAC 296-48A-990 Appendix.

Copy of ANSI A119.2 is available from:

NATIONAL FIRE PROTECTION ASSOCIATION
470 Atlantic Avenue, Boston, MA 02210

RECREATION VEHICLE INDUSTRY ASSOCIATION
P.O. Box 204, Chantilly, Virginia 22021
or
P.O. Box 4585, Anaheim, CA 92803

TRAILER COACH ASSOCIATION
3855 E. La Palma Ave., Anaheim, CA 92806

[Order 75-21, Appendix (codified as WAC 296-48A-990), filed 7/16/75.]

Chapter 296-48B WAC
STANDARDS FOR COMMERCIAL COACHES

WAC

296-48B-001 Administrative authority for commercial coach code.
296-48B-002 Administrative authority for commercial coach code——Enforcement.
296-48B-005 General.
296-48B-006 Approvals, inspections, quality control, identification.
296-48B-009 Definitions incorporated by reference.
296-48B-010 Definitions.
296-48B-015 Minimum requirements.
296-48B-020 Structural analysis.
296-48B-025 Standards for equipment and installations.
296-48B-030 Structural design——Requirements.
296-48B-032 New materials and methods.
296-48B-035 Design dead loads.
296-48B-040 Design live loads.
296-48B-050 Standard wind.
296-48B-055 Roof loads.
296-48B-060 Snow loads.
296-48B-065 Posting design loads.
296-48B-068 Design load deflection.
296-48B-070 Fastening of structural systems.
296-48B-075 Instructions.
296-48B-080 Walls.
296-48B-085 Drilling or notching of wood wall structural members.
296-48B-090 Firestopping.
296-48B-095 Interior walls and partitions.
296-48B-100 Floors.
296-48B-105 Drilling or notching of wood joist structural members.
296-48B-115 Roof trusses.
296-48B-120 Structural load test.
296-48B-125 Roof coverings.
296-48B-140 Flame-spread limitations and combustibility.
296-48B-142 Kitchen cabinet protection.
296-48B-143 Carpeting.
296-48B-145 Undervehicle closure material.
296-48B-150 Heat loss.
296-48B-160 Bathroom.
296-48B-165 Glass and glazed openings.
296-48B-175 Fire warning equipment——Automatic smoke detectors.
296-48B-177 Room and hallway sizes.
296-48B-178 Ceiling height.
296-48B-179 Light and ventilation.
296-48B-180 Exit facilities——Exits.
296-48B-185 Weather resistance.
296-48B-190 Windstorm protection.
296-48B-19001 Table——Ties required per side of single wide (1) Commercial Coach.
296-48B-19002 Table I——Appendix CC——Accepted engineering practice standards.
296-48B-19003 Table II——Appendix CC——Glazing in hazardous locations.
296-48B-19004 Table III——Appendix CC——Minimum uniformly distributed live loads.
296-48B-19005 Table IV——Appendix CC——Concentrated live loads.
296-48B-193 Interior privacy.
296-48B-196 Interior passage.
296-48B-200 Electrical——General.
296-48B-210 Definitions.
296-48B-215 Low-voltage systems——Low-voltage circuits.
296-48B-220 Wiring materials——Combination electrical systems.
296-48B-225 Generator installations——Mounting.
296-48B-230 Calculations——Branch circuit and feeder calculations.
296-48B-235 Disconnecting means and branch-circuit protective equipment——General.
296-48B-245 Power supply——Feeder assembly equipment.
296-48B-250 Identification of feeder assembly connection.
296-48B-255 Wiring methods——Wiring of expandable or multiple units.
296-48B-260 Under-chassis wiring.
296-48B-265 Rodent resistance.
296-48B-270 Electrical equipment——Lighting fixtures.
296-48B-275 Equipment mounting.
296-48B-280 Outdoor outlets, fixtures, air cooling equipment, etc.
296-48B-285 Grounding——General.
296-48B-290 Switch and receptacle plates.
296-48B-295 Testing——Dielectric strength test.
296-48B-400 Mechanical——General.
296-48B-405 Mechanical——Definitions.
296-48B-410 LPG equipment and installations——Construction of containers.
296-48B-415 Location of LP-Gas containers and systems.
296-48B-420 LP-Gas container valves and accessories.
296-48B-425 LP-Gas safety devices.
296-48B-430 LP-Gas system enclosure and mounting.
296-48B-435 LP-Gas system design and service line pressure.
296-48B-440 Electrical equipment.
296-48B-445 Gas piping systems——General.
296-48B-450 Piping design.
296-48B-455 Materials.
296-48B-460 Expandable or multiple commercial coaches.
296-48B-465 System sizing——Gas pipe sizing.
296-48B-467 Sizing and capacity of gas piping.
296-48B-468 Description of tables.
296-48B-469 Use of capacity tables.
296-48B-46901 Table H-2——Part I and Part II.
296-48B-470 Joints and installation——Joints for gas pipe.
296-48B-475 Tubing joints.
296-48B-480 Concealed tubing.
296-48B-485 Pipe-joint compound.
296-48B-490 Concealed joints.
296-48B-500 Hangers and supports.
296-48B-505 Electrical ground.
296-48B-510 Identification of gas supply connections.
296-48B-515 Gas piping system openings.
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WAC 296-48B-001 Administrative authority for commercial coach code. This chapter is adopted pursuant to the provisions of chapter 157, Laws of 1967, effective July 1, 1968, entitled Sale of and Manufacturing of Mobile Homes and Travel Trailers, as amended by chapter 229, Laws of 1969, effective August 11, 1969, chapter 27, Laws of 1970, effective May 14, 1970, and chapter 82, Laws of 1971, effective August 9, 1971 (see RCW 43.22.340 et seq.) in order to implement, interpret, make specific and otherwise carry out the provisions relating to the manufacture, lease and sale of commercial coaches in the state of Washington. [Order 76-26, § 296-48B-001, filed 8/23/76.]

WAC 296-48B-002 Administrative authority for commercial coach code——Enforcement. The department shall administer and enforce all the provisions of this chapter. Any officer, agent or employee of the department is authorized to enter any premises where commercial coaches are manufactured, sold, offered for sale, rent or lease. He may examine any records and may inspect any commercial coaches, equipment or installations to ensure compliance with the provisions of this chapter. When it becomes necessary to determine compliance, he may require that a portion or portions of such commercial coaches be removed or exposed in order that an inspection may be made to determine compliance. [Order 76-26, § 296-48B-002, filed 8/23/76.]

WAC 296-48B-005 General. (1) The provisions of this section relative to construction apply to all commercial coaches manufactured after July 1, 1970. The provisions of this section are also applicable to the alteration or conversion of any construction, fire safety equipment or plumbing, mechanical and electrical installation in any commercial coach bearing or required to bear a department insignia of approval.

(2) When a habitable room is part of a commercial vehicle, the habitable room(s) shall meet egress, ventilation, interior finish, automatic smoke detectors and applicable plumbing, mechanical and electrical requirements. [Order 75-40, § 296-48B-005, filed 12/4/75.]

WAC 296-48B-006 Approvals, inspections, quality control, identification. The provisions of WAC 296-48-605 through WAC 296-48-830 are hereby incorporated by reference into this chapter: *Provided*, That whenever the word "vehicle(s)" appears in the provisions of those sections, the words "commercial coach(es)" shall be substituted therefor. [Order 76-26, § 296-48B-006, filed 8/23/76.]

WAC 296-48B-009 Definitions incorporated by reference. (1) The definitions of WAC 296-48-051 are hereby incorporated by reference into this chapter: *Provided*, That whenever the words "mobile home(s)" appear in that section, the words "commercial coach(es) shall be substituted therefor.

(2) In the event of a conflict between a definition of WAC 296-48-051 and any definition included in this chapter, the latter shall apply. [Order 76-26, § 296-48B-009, filed 8/23/76.]

WAC 296-48B-010 Definitions. The following definitions shall apply to this article.

(1) CEILING HEIGHT: The clear vertical distance from the finished floor to the finished ceiling.

(2) COMMERCIAL COACH: Commercial coach is a vehicle, with or without motive power, designed and equipped for human occupancy for industrial, educational, professional or commercial purposes.

(3) CONSTRUCTION: The manufacture, fabrication, erection or building up of elements of a commercial coach subject to this chapter including but not limited to, structural, mechanical and electrical materials and installations.

(4) DEAD LOAD: The weight of all permanent construction including walls, floors, roof, partitions and fixed service equipment.

(5) DIAGONAL TIE: A tie intended primarily to resist horizontal or shear forces and which may secondarily resist vertical, uplift and overturning forces.

(6) DORMITORY: A room designed to be occupied by more than two guests.

(7) DWELLING UNIT: One or more habitable rooms which are designed to be occupied by one family with facilities for living, sleeping, cooking, eating and sanitation.

(8) EXIT: A continuous and unobstructed means of egress to a public way.

(9) GROSS FLOOR AREA: The net floor area within the enclosing walls of a room in which the ceiling height is not less than five feet.

(10) GUEST ROOM: Is any room or rooms used, or intended to be used by a guest for sleeping purposes. Every 100 square feet of superficial floor area in a dormitory shall be considered to be a guest room.

(11) HABITABLE ROOM: A room or enclosed floor space arranged for living, eating, food preparation or sleeping purposes (not including bathrooms, toilet compartment, laundries, pantries, foyers, hallways and other accessory floor spaces).

(12) INTERIOR FINISH: The surface material of walls, fixed or movable partitions, ceilings and other exposed interior surfaces affixed to the commercial coach structure including any material such as paint or wallpaper. Interior finish does not include decorations or furnishings which are not affixed to the commercial coach structure.

(13) LISTED: Equipment or materials included in a list published by a nationally recognized testing laboratory that maintains periodic inspection of production of listed equipment or materials and whose listing states either that the equipment or materials meet nationally recognized standards or has been tested and found suitable for use in a specified manner.

(14) LIVE LOAD: The weight superimposed by the use and occupancy of the commercial coach, including wind load and snow load, but not including dead load.

(15) OCCUPANCY: The purpose for which a commercial coach, subject to this chapter, is designed to be used.

(16) PERIMETER BLOCKING: Supports placed under exterior walls.

(17) SHEAR WALL: Any wall designed and constructed to transfer lateral loads.

(18) TIEDOWN: Any device designed for the purpose to anchor a commercial coach to ground anchors.

(19) WIND LOAD: The lateral or vertical pressure or uplift on the commercial coach due to wind blowing in any direction.

(20) WINDOW: A glazed opening on the exterior of the commercial coach, including glazed doors. [Order 76-26, § 296-48B-010, filed 8/23/76; Order 75-40, § 296-48B-010, filed 12/4/75.]

WAC 296-48B-015 Minimum requirements. (1) The design and construction of a commercial coach shall conform with the provisions of these rules and regulations. Requirements for any size, weight or quality of material modified by the terms of "minimum," "not less than," "at least," and similar expressions are minimum standards. The manufacturer or installer may exceed these standards provided such deviation does not result in any inferior installation or defeat the purpose and intent of this standard.

(2) All construction methods and installations shall be in conformance with this chapter and accepted engineering practices and provide minimum health and safety to the occupants of commercial coaches and the public and shall demonstrate acceptable workmanship reflecting journeyman quality of work of the various trades. [Order 75-40, § 296-48B-015, filed 12/4/75.]

WAC 296-48B-020 Structural analysis. The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests pursuant to section WAC 296-48B-120. [Order 75-40, § 296-48B-020, filed 12/4/75.]

WAC 296-48B-025 Standards for equipment and installations. Standards for equipment and installations are listed in Table 1, Appendix CC. Equipment and installations conforming to these standards or to other approved standards shall be considered acceptable by the department when listed or labeled and installed in accordance with the requirements of this chapter and the conditions of their approval, except where otherwise provided in this chapter. All equipment shall be clearly labeled to indicate compliance with applicable standards. [Order 76-26, § 296-48B-025, filed 8/23/76; Order 75-40, § 296-48B-025, filed 12/4/75.]

WAC 296-48B-030 Structural design——Requirements. Each commercial coach shall be designed and constructed as a completely integrated structure capable of sustaining the design load requirements of these rules and regulations and shall be capable of transmitting these loads to stabilizing devices without causing an unsafe deformation or abnormal internal movement of the structure or its structural parts. The commercial coach shall be capable of withstanding the adverse effects of transportation shock and vibration, both as an integrated structure and to its component parts. [Order 75-40, § 296-48B-030, filed 12/4/75.]

WAC 296-48B-032 New materials and methods. (1) Any new material or method of construction not provided for in this standard and any material or method of questioned suitability, proposed for use in the manufacture of the structure, shall nevertheless conform in performance to the requirements of this standard.

(2) Unless based on accepted engineering design for the use indicated, all new commercial coach materials, equipment systems or methods of construction not provided for in this standard shall be subjected to the tests specified in (4) below.

(3) Allowable Design Stress. The design stresses of all materials shall conform to accepted engineering practice. The use of materials not identified as to strength or stress grade shall be limited to the minimum allowable stresses under accepted engineering practice.

(4) Alternate Test Procedures. In the absence of listed and prescribed standards, the manufacturer shall develop or cause to be developed necessary tests, suitable to the department, to demonstrate the structural properties and the significant characteristics of the method employed. Such tests shall be made either by a department approved testing organization or by a licensed professional engineer or architect. Copies of the test results shall be submitted to the department for approval. [Order 75-40, § 296-48B-032, filed 12/4/75.]

WAC 296-48B-035 Design dead loads. Design dead loads shall be the actual dead load (see WAC 296-48B-010 DEFINITIONS) supported by the structural assembly under consideration. [Order 75-40, § 296-48B-035, filed 12/4/75.]

WAC 296-48B-040 Design live loads. The design live loads shall be as specified in WAC 296-48B-050, 296-48B-055, 296-48B-068, 296-48B-080, 296-48B-100, and 296-48B-120 and shall be considered to be uniformly distributed. The roof live load shall not be considered as acting simultaneously with the wind load, and the roof and the floor live loads shall not be considered as resisting the overturning moment due to wind. The roof live load and the floor live load shall be considered to act both simultaneously and separately in order to determine the critical design loading for stresses and deflections. [Order 76-26, § 296-48B-040, filed 8/23/76; Order 75-40, § 296-48B-040, filed 12/4/75.]

WAC 296-48B-050 Standard wind. When a commercial coach is not designated "Hurricane and Windstorm-Resistive," the commercial coach and each wind resisting part and portion thereof shall 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 296-48B-055, Roof Loads)

For exposures in areas where records or experience indicate that the commercial coach will be subjected to wind loads in excess of the above loads, the coach shall be designed for the loads to which it will be subjected. [Order 75-40, § 296-48B-050, filed 12/4/75.]

WAC 296-48B-055 Roof loads. Flat, curved and pitched roofs shall be designed to sustain all loadings as follows:

(1) All dead loads plus a minimum unit live load of 30 lb/ft^2 (2 months load duration).

(2) A vertical net uplift load of 9 lb/ft^2 (1 day load duration). [Order 75-40, § 296-48B-055, filed 12/4/75.]

WAC 296-48B-060 Snow loads. For exposures in areas where snow records or experience indicate that the commercial coach will be subjected to snow loads in excess of 30 lb/ft^2, the roof shall be designed for the loads to which it will be subjected. [Order 75-40, § 296-48B-060, filed 12/4/75.]

WAC 296-48B-065 Posting design loads. The manufacturer shall post the loads the commercial coach has been designed for as follows:

Roof Live Load ..... _____ psf
Floor Live Load ..... _____ psf
Wind Load ..... _____ psf

Design loads shall be posted on the exterior of the commercial coach. The design loads shall be shown on a label securely affixed to the rear of the vehicle on the lower left hand corner of the exterior wall not less than six inches above the floor line or on the exterior wall immediately adjacent to the main door not less than six inches above floor line.

Note: See WAC 296-48-761 for label size and type of material.

[Order 75-40, § 296-48B-065, filed 12/4/75.]

WAC 296-48B-068 Design load deflection. When a structural assembly is subjected to total design live loads, the deflection for structural framing members shall not exceed the following:

Floor L/240
Roof and Ceiling ..... L/180 (See section WAC 296-48B-115)
Headers, Beams, Girders ..... L/180 (Vertical Loads Only)
Walls and Partitions L/180

Where L = the clear span between supports or two times the length of a cantilever.

[Order 75-40, § 296-48B-068, filed 12/4/75.]

WAC 296-48B-070 Fastening of structural systems. Roof framing shall 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, so as to resist wind uplift, overturning and sliding as imposed by design loads in WAC 296-48B-050. (Directions for setup and anchorage shall accompany all commercial coaches.) [Order 75-40, § 296-48B-070, filed 12/4/75.]

WAC 296-48B-075 Instructions. The manufacturer shall provide printed instructions with each commercial coach specifying the following:

(1) The location and required capacity of stabilizing devices, (tiedowns, piers, blocking, etc.) on which the design is based.

(2) Devices and methods to be used in connecting all components and systems including, but not limited to, roofs, walls, floors, frames and utilities.

(3) Leveling, including releveling. [Order 75-40, § 296-48B-075, filed 12/4/75.]

WAC 296-48B-080 Walls. The walls shall be of sufficient strength to withstand the load requirements as defined in WAC 296-48B-050, 296-48B-055 and 296-48B-060 without exceeding the deflections specified in WAC 296-48B-110. The connections between the bearing walls, floor and roof framework members shall be fabricated in such a manner as to provide support for the material used to enclose the commercial coach and to provide for transfer of all lateral and vertical loads to the floor and chassis. [Order 75-40, § 296-48B-080, filed 12/4/75.]

WAC 296-48B-085 Drilling or notching of wood wall structural members. Except where substantiated by engineering designs, studs shall not be notched or drilled. [Order 75-40, § 296-48B-085, filed 12/4/75.]

WAC 296-48B-090 Firestopping. Firestopping shall be provided in multi-story commercial coaches to cut off all concealed draft openings in all stud walls and partitions, including furred spaces, so placed that the maximum vertical dimension of any concealed space is not over eight feet. [Order 76-26, § 296-48B-090, filed 8/23/76; Order 75-40, § 296-48B-090, filed 12/4/75.]

WAC 296-48B-095 Interior walls and partitions. Interior walls and/or partitions shall be constructed with structural capacity adequate for the intended purpose and shall be capable of resisting a horizontal load of not less than five pounds per square foot without exceeding the deflections specified in WAC 296-48B-068. [Order 75-40, § 296-48B-095, filed 12/4/75.]

WAC 296-48B-100 Floors. (1) Floor assemblies shall be designed in accordance with accepted engineering practice standards to support a minimum uniform and concentrated live load, per Tables 3 and 4, Appendix CC, plus the dead load of the materials. In addition (but not simultaneously), floors and floor sheathing shall be able to support a 200-pound concentrated load on a

one-inch diameter disc at the most critical location with a maximum deflection not to exceed one-eighth inch relative to floor framing. The floor sheathing shall be able to support a 600-pound concentrated load on a one-inch diameter disc at the most critical location. Joists of more than six inches depth shall be stabilized against overturning from superimposed loads as follows: At ends by solid blocking not less than two-inch thickness by full depth of joist, or by connecting to a continuous header not less than two-inch thickness and not less than the depth of the joist with connecting device; at eight-feet maximum intermediate spacing by solid blocking or by wood cross-bridging of not less than one inch by three inches, metal cross-bridging of equal strength, or by other approved methods.

(2) Wood floors or subfloors in kitchens, bathrooms (including toilet compartments), laundry rooms, water heater compartments and any other areas subject to excessive moisture shall be moisture resistant or shall be made moisture resistant by sealing or by an overlay of nonabsorbent material applied with water-resistant adhesive. [Order 76-26, § 296-48B-100, filed 8/23/76; Order 75-40, § 296-48B-100, filed 12/4/75.]

WAC 296-48B-105 Drilling or notching of wood joist structural members. Except where substantiated by engineering design, notches on the ends of joists shall not exceed one-fourth the joist depth. Holes bored in joists shall not be within 2 inches of the top or bottom of the joist, and the diameter of any such hole shall not exceed one-third of the depth of the joist. Notches in the top or bottom of the joists shall not exceed one-sixth the depth and shall not be located in the middle third of the span. Joists in transverse floor framing systems, which do not have perimeter blocking, shall not be drilled or notched without substantiation by engineering design or approved tests. [Order 75-40, § 296-48B-105, filed 12/4/75.]

WAC 296-48B-115 Roof trusses. All roof truss construction shall be first approved by a licensed professional engineer or architect and subsequently approved by the Mobile Home Section of the State of Washington. Roof trusses shall be tested as directed in NFPA 501B-1974 Appendix to Part "B". Initial certification tests shall be performed using certified minimum quality of materials (lowest of the grade) and workmanship.

Any one of the three following options may be used in production:

(1) Stress graded materials must be used in the manufacture of rafters and trusses.

When requested by the state enforcing agency (Washington State Department of Labor & Industries), representative trusses taken from the production line shall be tested and a report furnished to the department by the approved testing agency or a licensed architect or civil or structural engineer. Unless there are apparent problems with the trusses, the frequency of these tests shall not exceed two times per year per design, in addition to (4) below.

(2) Nonstress graded materials may be used, providing 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 12 hours.)

When requested by the state enforcing agency (Washington State Department of Labor & Industries), representative trusses taken from the production line shall be tested and a report furnished to the department by the approved testing agency or a licensed architect or civil or structural engineer. Unless there are apparent problems with the trusses, the frequency of these tests shall not exceed two times per year per design, in addition to (4) below.

(3) The manufacturer shall be responsible for employing an approved testing agency acceptable to the enforcing agency to certify the rafter and truss construction and to test the rafters and trusses as to Code required loads. The approved testing agency is to prepare an approved quality control program and to test the rafters and trusses in accordance with sound testing procedures.

When requested by the state enforcing agency (Washington State Department of Labor & Industries), representative trusses taken from the production line shall be tested and a report furnished to the department by the approved testing agency or a licensed architect or civil or structural engineer. Unless there are apparent problems with the trusses, the frequency of these tests shall not exceed two times per year per design, in addition to (4) below.

(4) The frequency of tests with test reports submitted to the department (for options 1 through 3 above) shall be not less than as follows:

(a) After the initial certification and tests of the rafter and truss system, the rafter and truss system must be tested and certified by an approved testing agency once during the following quarter.

(b) If the manufacturer meets the requirements of the first quarter tests and is certified by the approved testing agency for the first quarter tests, then the rafters and trusses of the manufacturer shall be tested once semiannually.

(c) Every manufacturer, regardless of prior testing history, shall submit to tests of rafters and trusses by an approved agency once every six months and the approved testing agency shall provide to the enforcing agency affidavits and test reports certifying compliance.

(d) All tests by the approved testing agency will be made on an unannounced basis.

(5) The manufacturer shall be required to maintain an acceptable quality level (AQL) not to exceed 1% utilizing acceptable sampling procedures. (AQL shall be defined as the maximum percentage of defective units.)

(6) All test reports are to be stamped, signed and dated by a licensed professional engineer. [Order 75-40, § 296-48B-115, filed 12/4/75.]

WAC 296-48B-120 Structural load test. Structural assemblies or subassemblies tested for qualification shall sustain the design dead load (see WAC 296-48B-035),

plus the superimposed design live loads (see WAC 296-48B-040) equal to 1.75 times the required live loads for a period of 12 hours without failure, unless otherwise specified herein. Failure shall be considered rupture, fracture or residual deflection which is greater than the limits set in WAC 296-48B-110. An assembly or subassembly to be tested shall be representative of the minimum quality of materials of the group of assemblies or subassemblies as ordinarily manufactured. Each test assembly, component or subassembly shall be identified as to type and quality or grade of material. Structural load tests or other tests based on nationally recognized standards may be approved. Submit test procedure to the Mobile Home Section of the State of Washington for approval prior to proceeding with the tests. [Order 75-40, § 296-48B-120, filed 12/4/75.]

WAC 296-48B-125 Roof coverings. (1) General. Roof covering shall be securely fastened in an approved manner to the supporting roof construction and shall provide weather protection for the commercial coach and the occupants. All roof decks shall be designed with sufficient slope or camber to assure adequate drainage, or shall be designed to support maximum loads including possible ponding of water due to deflection. Roof covering shall be installed per manufacturer's instructions and as approved by the department.

(2) Construction. All roofs shall be so framed and tied into the framework and supporting walls as to form an integral part of the commercial coach. All trusses shall be laterally braced.

(3) Roofing membranes shall be of sufficient rigidity to prevent deflection which would permit ponding of water or separation of seams due to snow and wind, erection or transportation forces.

(4) Cutting of roof framework members for passage of electrical, plumbing or mechanical systems shall not be allowed except where substantiated by engineering analysis.

(5) Electrical, plumbing or mechanical systems shall not penetrate the roofing membrane unless adequately sealed. [Order 76-26, § 296-48B-125, filed 8/23/76; Order 75-40, § 296-48B-125, filed 12/4/75.]

WAC 296-48B-140 Flame-spread limitations and combustibility. (1) The surface flame-spread rating of interior finish materials shall not exceed the following when tested by the Standard Method of Test for Surface Burning Characteristics of Building Materials, ASTM E84. Testing shall be by laboratories acceptable to the department.

(a) The interior finish of all walls and partitions shall not have a flame-spread rating exceeding 200 except as otherwise specified herein. The flame-spread limitation shall not apply to: molding, trim, windows, doors or series of doors not exceeding 4 feet in width, and permanently attached decorative items such as pictures or accent panels constituting not more than 10 percent of the aggregate wall surface in any room or space nor more than 32 square feet in surface area whichever is less.

(b) All ceiling interior finish shall not have a flame-spread rating exceeding 200, excluding molding and trim 2 inches or less in width.

(c) Furnace and water heater spaces shall be enclosed by walls, ceiling and doors having an interior finish with a flame-spread rating not exceeding 25.

(d) Combustible kitchen cabinet doors, countertops, exposed bottoms and end panels shall not exceed a flame-spread rating of 200. Cabinet rails, stiles, mullions and toe strips are exempted.

(e) Exposed interior finishes adjacent to the cooking range shall not have a flame-spread rating exceeding 50. Adjacent surfaces are the exposed vertical surfaces between the range top height and the overhead cabinets and/or ceiling and within 6 horizontal inches of the cooking range.

(f) Finish surfaces of plastic bath tubs, shower units and tub or shower doors shall not exceed a flame-spread rating of 200.

(2) Combustibility. The interior walls and ceiling encasing furnace and water heater enclosures (including doors) and the exposed wall adjacent to the cooking range as defined in WAC 296-48B-140(1)(e) shall be surfaces with 5/16 inch gypsum board or material having equivalent fire protective properties. At furnace and water heater spaces, all openings for pipes and vents shall be tight-fitted or firestopped. [Order 76-26, § 296-48B-140, filed 8/23/76; Order 75-40, § 296-48B-140, filed 12/4/75.]

WAC 296-48B-142 Kitchen cabinet protection. The bottom and sides of combustible kitchen cabinets over cooking ranges or tops including a space of 6 inches from the edge of the burners shall be protected with at least 1/4 inch thick asbestos millboard covered with not less than 26 gage sheet metal (.017 stainless steel, .024 aluminum or .020 copper) or equivalent protection. The protective metal over the range shall form a hood with not less than a 3-inch eyebrow (measuring horizontally from face of cabinet). The hood shall be centered over and at least as wide as the cooking range or top. [Order 75-40, § 296-48B-142, filed 12/4/75.]

WAC 296-48B-143 Carpeting. (1) Surface flammability of carpets and rugs shall at least meet the Department of Commerce Standard DOCFF 1 test.

(2) Carpeting shall not be used under a heat-producing appliance.

(3) Carpet and/or carpet pads shall not be installed in concealed spaces subject to excessive moisture such as under plumbing fixtures.

(4) Carpet and/or carpet pads shall not be installed beneath the bottom plate of shear, bearing or exterior walls. [Order 75-40, § 296-48B-143, filed 12/4/75.]

WAC 296-48B-145 Undervehicle closure material. Undervehicle closure material and method of construction shall be such as to resist damage which would permit penetration of the underside of the commercial coach by air, water, rodents, insects or dust. The closure material shall be listed and installed as follows:

(1) Fibrous material (with or without patches) shall meet or exceed the level of 48-inch pounds of puncture resistance as tested by the Beach Puncture Test in accordance with ASTM designation D 781-68.

(2) The material shall be installed in accordance with installation instructions furnished by the supplier of the material.

(3) The material shall be suitable for patches and the patch life shall be equivalent to the material life. Patch installation instructions shall be included in the commercial coach manufacturer's instructions. [Order 75-40, § 296-48B-145, filed 12/4/75.]

WAC 296-48B-150 Heat loss. The total calculated heat loss of the living unit at the outdoor design temperature as certified in WAC 296-48B-150(1) of this Part shall not exceed 40 Btu/hr/ft^2 of the total floor area or 275 Btu/hr lineal ft. of the perimeter of the space to be heated to 70° F, whichever is greater. The minimum total resistance value (R), excluding framing, of the wall (less windows and doors, ceiling, and floor shall not be less than:

Wall	8.0
Ceiling	16.0
Floor	10.0

(1) The commercial coach manufacturer shall permanently affix the following "Certificate" to an interior surface of the coach that is readily visible to the owner. The Certificate shall specify the following:

(a) The lowest outdoor design temperature (15 MPH wind) at which the commercial coach heat loss complies with this section.

(b) The lowest outdoor temperature (15 MPH wind) at which the installed heating equipment will maintain a 70° F temperature inside the coach with or without storm sash.

CERTIFICATE

Coach Mfgr. _____ Plant Location _____

Coach Model _____

The living area of this coach is designed to maintain comfort heating where the outdoor temperatures are not lower than _____ F when the coach is equipped with storm windows and not lower than _____ F when the coach is not equipped with storm windows.

Heating Equipment Mfgr. _____

Heating Equipment Model _____

The above heating equipment has the capacity to maintain an average 70 F temperature in this coach at outdoor temperatures of _____ F when the coach is equipped with storm windows and _____ F when coach is not equipped with storm windows.

The above information has been calculated assuming a maximum wind velocity of 15 MPH at standard atmospheric pressure.

(2) "R" values and "U" factors shall be calculated as outlined in the latest edition of the ASHRAE Handbook of Fundamentals.*

(3) Framing Heat Loss. In the absence of specific data, for the purpose of heat loss calculations, the following framing areas shall be assumed:

Wall	20% of net wall area (less windows)
Ceiling	5% of total ceiling area
Floor	10% of net floor area (less duct area)

*Thermal resistance (R) values and methods of determining corresponding thermal transmittance (U) values may be found in Chapter 20 of the 1972 ASHRAE Handbook of Fundamentals (American Society of Heating, Refrigerating and Air Conditioning Engineers, 345 East 47th Street, New York, NY 10017). Data on infiltration and ventilation are shown in Chapter 19. Outdoor winter design temperatures (99% values are recommended) are listed in Chapter 33.

(4) Infiltration Heat Loss. The following shall be used to estimate infiltration heat loss, or infiltration heat loss may be calculated using the method in the ASHRAE Handbook of Fundamentals:

Outside Design Temperature Degrees F	Infiltration Allowance Btu/hr
40	3330
30	4440
20	5550
10	6660
0	7770
minus 10	8880
minus 20	9990
minus 30	11100
minus 40	12210

(5) Duct Heat Loss. The supply duct heat loss shall be calculated separately using the actual duct surface area and the actual thickness of insulation between the duct and outside of the commercial coach. If there is an air space of 1/2 inch or less, the heat duct shall be assumed in contact with the insulation. If there is an air space of over 1/2 inch between the duct and the insulation, no special heat loss need be calculated—if the cavity in which the duct is located is assumed to be at 70°F. The average temperature inside the supply duct shall be assumed to be at least 130°F for the purpose of calculation. [Order 75-40, § 296-48B-150, filed 12/4/75.]

WAC 296-48B-160 Bathroom. Each bathroom shall be provided with artificial light and, in addition, be provided with external windows or doors having not less than 1/2 square feet of fully openable glazed area, except where a mechanical ventilation system is provided capable of producing a change of air every 12 minutes. Any mechanical ventilation system shall exhaust directly to the outside of the commercial coach. [Order 75-40, § 296-48B-160, filed 12/4/75.]

WAC 296-48B-165 Glass and glazed openings. (1) Application. The provisions of this section shall apply to the installation of glass or glazed openings including hazardous locations as indicated in Table 2, Appendix CC.

(2) Standards and Identification. Safety-glazing materials shall meet the requirements of American National Standards Institute (ANSI) Standard Z-97, 1-1972.

(3) Louvered Windows. Plate, float, sheet or patterned glass in jalousies and louvered windows shall be not thinner than nominal 3/16-inch and no more than 40 inches in length. Exposed edges shall be smooth.

(4) Windloads and Glass Area Limitations. Exterior glass and glazing shall be capable of withstanding a windload pressure of 20 pounds per square foot acting inward or outward.

(5) Glazing and Hazardous Locations. For safety glazing installed in hazardous locations such as sliding glass doors, storm doors, exit and entrance doors, and fixed glass panels located within 12 inches of the floor or equivalent surface, shower or tub enclosures or their doors to a height of 6 feet above the fixture floor shall meet the requirements set forth in Table 2, Appendix CC. [Order 75-40, § 296-48B-165, filed 12/4/75.]

WAC 296-48B-175 Fire warning equipment—— Automatic smoke detectors. (1) General. At least one listed smoke detector shall be installed in each commercial coach having a sleeping area to protect each separate bedroom.

(2) Smoke Detectors. Smoke detectors shall be either the ionization chamber or the photoelectric wall mounted type and shall comply with all the requirements of Underwriters' Laboratories Standard No. 217. Detectors shall bear the label of a testing and approval laboratory that indicates the smoke detectors have been tested and approved under the requirements of UL 217. The testing and approval laboratory shall be one which maintains a periodic follow-up service of the labeled devises to ensure compliance with the original approval.

(3) Installation. Smoke detectors shall be installed on an interior wall of the commercial coach. The top of the detector shall be 5 to 7 inches from the ceiling. The detector mounting shall be permanently attached to an electrical outlet box and the detector wired into a general electrical circuit. There shall be no switches in the circuit to the detector other than the circuit breaker serving the circuit. [Order 75-40, § 296-48B-175, filed 12/4/75.]

WAC 296-48B-177 Room and hallway sizes. (1) Rooms designed for sleeping purposes shall have a minimum gross square foot floor area as follows:

One person	50
Two persons	70
Each person in excess of two	50

(2) No habitable room, except a kitchen, shall be less than five feet in any clear horizontal dimension.

(3) Each toilet compartment shall be a minimum of 30 inches in width and have at least 21 inches of clear space in front of each toilet.

(4) Hallways shall have a minimum horizontal dimension of 32 inches. [Order 76-26, § 296-48B-177, filed 8/23/76.]

WAC 296-48B-178 Ceiling height. Every habitable room shall have a minimum ceiling height of not less than 7 feet, 0 inch. [Order 76-26, § 296-48B-178, filed 8/23/76.]

WAC 296-48B-179 Light and ventilation. Adequate provisions shall be made for light and ventilation in accordance with the following:

(1) Habitable Rooms. Habitable rooms shall be provided with exterior windows or doors having a total glazed area of not less than 10 percent of the floor area. An area equivalent to not less than 5 percent of the floor area shall be available for unobstructed ventilation. Glazed areas need not be openable where a mechanical ventilation system is provided and is capable of producing a change of air in the room(s) every thirty minutes with not less than one-fifth of the air supply taken from outside the commercial coach. [Order 76-26, § 296-48B-179, filed 8/23/76.]

WAC 296-48B-180 Exit facilities. (1) Commercial coaches shall have a minimum of two exterior doors located remote from each other and so arranged as to provide a means of unobstructed travel to the outside of the commercial coach.

(2) Exterior doors shall be constructed for exterior use and in no case provide less than a 35-inch wide by 79-inch high clear opening (36" x 80" door). Each swinging exterior door shall have a key-operated lock that has a deadlocking 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 of the lock shall be engaged or disengaged by the use of a lever, knob, button, handle, or other device from the side from which egress is to be made when the commercial coach is occupied. Locks shall not require the use of a key for operation from the inside.

(3) The department may grant a variance to the two door and/or the minimum door size and locking mechanism requirements for special commercial coach usage or conditions.

(4) Every room designed expressly for sleeping purposes, unless it has an exit door, shall have at least one outside window which can be opened from the inside without the use of tools to provide a clear opening of not less than 22 inches in least dimension and 5 square feet

in area with the bottom of the opening not more than 3 feet above the floor.

(a) Where a screen or storm window is required to be removed from this window to permit emergency egress, it shall be readily removable without requiring the use of tools. [Order 76-26, § 296-48B-180, filed 8/23/76; Order 75-40, § 296-48B-180, filed 12/4/75.]

WAC 296-48B-185 Weather resistance. Exterior covering shall be of moisture and weather-resistive materials attached with corrosion-resistant fasteners to resist wind and rain deterioration. Electro-plated, electro-deposited zinc, electro-galvanized, etc. staples shall not be considered as qualifying as corrosion resistant. Metal covering shall be of corrosion-resistant materials. [Order 76-26, § 296-48B-185, filed 8/23/76.]

WAC 296-48B-190 Windstorm protection. (1) Provisions for Support and Anchoring Systems. Each commercial coach shall have provisions for support and anchoring systems, which, when properly designed and installed, will resist overturning and lateral movement of the commercial coach as imposed by the respective design loads, and shall be designed by a licensed professional engineer or architect.

(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 shall provide printed instructions with each commercial coach specifying the location and required capacity of stabilizing devices on which the design is based.

(4) The provisions made for anchoring systems shall be based on the following design criteria for single-wide commercial coaches:

(a) The minimum number of ties required per side shall be in accordance with the following Table.

(b) Ties shall be as evenly spaced as practicable along the length of the commercial coach with not more than 8 feet open-end spacing on each end.

(c) When continuous straps are provided as vertical ties, such ties shall be positioned at rafters and studs. Where a vertical tie and diagonal tie are located at the same place, both ties may be connected to a single ground anchor, provided that the anchor used is capable of carrying both loadings.

(d) Add-on sections of expandable commercial coaches shall have provisions for vertical ties at the exposed ends.

(5) Double-wide commercial coaches require only the diagonal ties specified in the following table. These shall be placed along the outer side walls.

(6) Protection shall be provided at sharp corners where the anchoring system requires the use of external cables or straps. Protection shall also be provided to minimize damage to roofing or siding by the cable or strap.

(7) Anchoring equipment shall be capable of resisting an allowable working load equal to or exceeding 3,150 pounds and shall 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) Anchoring equipment exposed to weathering shall have a resistance to weather deterioration at least equivalent to that provided by a coating of zinc on steel of not less than 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, is judged to conform with the provisions of this paragraph. [See tables and appendices following this section.] [Order 76-26, § 296-48B-190, filed 8/23/76; Order 75-40, § 296-48B-190, filed 12/4/75.]

WAC 296-48B-19001 Table——Ties required per side of single wide (1) Commercial Coach.

Number of Ties Required Per Side of Single Wide (1) Commercial Coaches

This Table is based on a minimum working load per anchor of 3,150 pounds with a 50 percent overload (4,725 pounds total).

1	2	3	4	5
	Hurricane	Resistive	Non-Hurricane	Resistive
Length of Commercial Coach (Feet) (2) (4)	No. of Vertical Ties	No. of Diagonal Ties (3)	No. of Vertical Ties	No. of Diagonal Ties (3)
32-40	2	4	2	3
41-46	2	4	2	3
47-49	2	5	2	3
50-54	3	5	2	3
55-58	3	5	2	4
59-64	3	6	2	4
65-70	3	6	2	4
71-73	3	7	2	4
74-84	4	7	2	5

(1) Double-wide commercial coaches require only the diagonal ties specified in column 3 or 5, and these shall 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 shall deviate at least 40° from a vertical direction.

(4) Commercial coaches less than 32' long, the number of ties shall be according to engineering analysis approved by the department.

[Order 76-26, Table (codified WAC 296-48B-19001), filed 8/23/76; Order 75-40, Table, filed 12/4/75.]

WAC 296-48B-19002 Table I--Appendix CC--Accepted engineering practice standards.

TABLE I — APPENDIX CC

ACCEPTED ENGINEERING PRACTICE STANDARDS

This Reference Table is not a part of this Standard but is included for information purposes.

Aluminum

Aluminum Construction Manual, Specifications for Aluminum Structures AA–1971

Steel

Specification for the Design, Fabrication and Erection of Structural Steel for Buildings ..... AISC–1969+
Specification for the Design of Cold–Formed Steel Structural Members ..... AISI–1968++
Specification for the Design of Light–Gage Cold–Formed Stainless Steel Structural Members AISI–1968
Standard Specifications for Open Web Steel Joists, J– and H–Series ..... A15C & SJ1–1970
Structural Welding Code ..... AWS D1.0–72

Wood and Wood Products

Hardboard ..... AHA PS 58, 59, & 60–1973
Hardwood and Decorative Plywood ..... USDC PS 51–71
Structural Design Guide for Hardwood Plywood HPMA–SG–71
Timber, Structural Glued Laminated–Inspection AITC–200–1973
Timber, Timber Construction Manual AITC–1974
Timber, Structural Glued Laminated ..... USD PS, 56–73
Softwood Plywood—Construction & Industrial PS–74
Plywood Commercial/Industrial Construction Guide APA–Y300–1975
Plywood Residential Construction Guide APA–Y405–1974
Plywood Design Specification APA–Y510–1974
Plywood Design Specification Supplement No. 2 – "Plywood Beams" APA–S810–1974
Plywood Design Specification Supplement No. 3 – "Stressed Skin Panels" APA–U813–1975
Plywood Fabrication Specification GT–8 "Trussed Rafters" APA–W395–1976
Plywood Fabrication Specification BB–8 "Plywood Beams" APA–V335–1974
Plywood Fabrication Specification SS–8 "Stress Skin Panels" APA–V340–1974
All Plywood Beams for Mobile Homes, Report 124 ..... APA–Y490–1975
Plywood Diaphragm Construction ... APA–U310–1971
Stress Grade Lumber and its Fastenings -- National Design Specifications for ..... (N) FPA–1973*
Structural Design Data — Wood ..... (N) FPA–970
Span Tables for Joists and Rafters (PS 20–70) ..... (N) FPA–1970
Working Stresses for Joists and Rafters ..... (N) FPA–1971**
Timber Construction Standards AITC–100–1972
Design Specifications for Light Metal Plate Connected Wood Trusses TPI–74
Span Tables for Light Metal Plate Connected Wooden Trusses TPI–1972
Particleboard for Mobile Home Decking ..... NPA 1–73
Mat–Formed Wood Particleboard ..... CS 236–66

Fasteners

Nails, Brads, Staples and Spikes, Wire, Cut and Wrought–Pneumatic and Mechanically Driven Building Construction Fasteners F.S.FF–N–105b
I–SANTA 2–19–73

Fire Safety

Method of Test for Surface Burning Characteristics of Building Materials ..... ASTM E84–1970
NFPA No. 255–1972
ANSI A2.5–1970
UL 723–1971
Safety to Life from Fire in Buildings and Structures ..... NFPA No. 101–1973
ANSI A9.1–1971
Standard for the Installation, Maintenance and Use of Household Fire Warning Equipment ..... NFPA No. 74–1974

Windows and Glazing

Transparent Safety Glazing Material Used in Buildings ..... ANSI Z97.1–1972
Window Specifications for Utilization in Mobile and Factory–Built Homes ..... MHMA Spec. No. 1–71 – Rev. 1973

Unclassified

ASHRAE Handbook of Fundamentals — 1972 Building Code Requirements for Minimum Design Loads in Buildings and Other Structures ..... ANSI A58.1–1972
Gypsum Wallboard ..... ASTM C–36

\+ Supplements Nos. 1, 2 and 3—November 1, 1970, December 8, 1971 and June 12, 1974.
++ With Addendum No. 1, dated November 19, 1970.
* Supplement issued April, 1973.
** Supplement issued December, 1972.

AA – The Aluminum Association, 750 Third Ave., New York, N.Y. 10017.
AHA – American Hardboard Association, 20 No. Wacker Drive, Chicago, Illinois 60606.
AISC – American Institute of Steel Construction, 101 Park Ave., New York, N.Y. 10017.
AISI – American Iron and Steel Institute, 150 East 42nd Street, New York, N.Y. 10017.
AITC – American Institute of Timber Construction, 333 West Hampden Ave., Englewood, Colorado 80110.
ANSI – American National Standards Institute, 1430 Broadway, New York, N.Y. 10017.
APA – American Plywood Association, 1119 A Street, Tacoma, Washington 98401.
ASHRAE – American Society of Heating, Refrigeration and Airconditioning Engineers, 345 East 47th Street, New York, N.Y. 10017.
ASTM – American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.
AWS – American Welding Society, 2501 N.W. 7th Street, Miami, Florida 33125.
MHMA – Mobile Homes Manufacturers Association, 14650 Lee Road, Chantilly, Virginia 22021.
CS – Commercial Standards – available from Sup't. of Documents, U.S. Government Printing Office, Washington, D.C. 20402.
HPMA – Hardwood Plywood Manufacturers Assn., P.O. Box 6246, Arlington, Virginia 22206.
NFPA – National Fire Protection Assn., 470 Atlantic Avenue, Boston, Massachusetts 02210.
(N) FPA – National Forest Products Association (formerly National Lumber Manufacturers Assn.), 1619 Massachusetts Ave. N.W., Washington, D.C. 20036.
NPA – National Particleboard Association, 2306 Perkins Place, Silver Spring, Maryland 20910.
PFS – Plywood Fabricator Service, Inc., 1119 A Street, Tacoma, Washington 98401.
PS – Product Standard – available from Sup't. of Documents, U.S. Government Printing Office, Washington, D.C. 20402.
SJI – Steel Joist Institute, 2001 Jefferson Davis Highway, Arlington, Virginia 22202.
TPI – Truss Plate Institute, 919 Eighteenth Street N.W., Washington, D.C. 20006.
UL – Underwriters' Laboratories, Inc., 333 Pfingsten Road, Northbrook, Illinois 60062.
USDC – United States Department of Commerce, Washington, D.C. 20234.

[Order 75–40, Table I—Appendix CC (codified as WAC 296–48B–19002), filed 12/4/75.]

WAC 296–48B–19003 Table II--Appendix CC--Glazing in hazardous locations.

TABLE II—APPENDIX CC

Glazing in the following specific hazardous locations shall meet the following requirements

Specific Hazardous Locations	Size of Individual Glazed Area	Requirements[2]
Glazing in exit and entrance doors	Over 6 sq. ft.	Each glazed area shall pass the requirements of ANSI Standard Z97.1—1972 if not protected by a protective grille[1] firmly attached to stiles on each exposed side.
Glazing in storm doors	Over 2 sq. ft.	Each glazed area shall pass the requirements of ANSI Standard Z97.1—1972 if not protected by a protective grille[1] firmly attached to stiles on each exposed side.
Glazing in sliding exterior doors	All Sizes	Each glazed area shall pass the requirements of ANSI Standard Z97.1—1972.
Glazing in all unframed doors (swinging)	All Sizes	Each glazed area shall be fully tempered glass and pass the requirements of ANSI Standard Z97.1—1972.
Glazing in shower doors and tub enclosures	All Sizes	Each glazed area shall pass the test requirements of ANSI Standard Z97.1—1972.
Other fixed glazed panels located within 12 inches on either side of exit and entrance doors	All Sizes	Each glazed area within 18 inches of the floor shall pass the requirements of ANSI Standard Z97.1—1972 unless the glazed area is protected by a barrier within 12 inches immediately in front of the glazing.

[1]Shall be constructed and attached in such a manner so as to prevent human impact from being delivered to glass surface.

[2]Annealed glass less than single strength (SS) in thickness shall not be used. If short dimension is larger than 24 inches, annealed glass must be double strength (DS) or thicker.

[Order 75–40, Table II—Appendix CC (codified as WAC 296–48B–19003), filed 12/4/75.]

WAC 296-48B-19004 Table III——Appendix CC——Minimum uniformly distributed live loads.

TABLE III—APPENDIX CC

MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS

Occupancy or Use	Live Load psf
Apartments (see Residential)	
Assembly halls and other places of assembly:	
Fixed seating	50
Movable seating and other areas	100
Corridors (same as occupancy served except as indicated)	
Dining rooms and restaurants	100
Dwellings (see Residential)	
Hospitals	
Operating rooms	60
Private rooms	40
Wards	40
Hotels (see Residential)	
Libraries	
Reading rooms	60
Stack rooms	150
Manufacturing or Storage	
Light	125
Heavy	250
Office Units	
Offices (including job shacks)	50
Lobbies	100
Residential	
Multifamily units:	
Private apartments	40
Public rooms	100
Corridors	80
Single family units	40
Schools	
Classrooms	40
Corridors	80
Stores	
Retail	75
Theaters	
Aisles, corridors and lobbies	100

[Order 75-40, Table III——Appendix CC (codified as WAC 296-48B-19004), filed 12/4/75.]

WAC 296-48B-19005 Table IV——Appendix CC——Concentrated live loads.

TABLE IV—APPENDIX CC

CONCENTRATED LIVE LOADS

Location	Loads lb *
Office floors (except 8' and 10' wide units)	2,000
Schools and 10' wide office floors	1,000

*Uniformly distributed over a 2 1/2 foot square area placed anywhere on the floor without the uniform live load present.

[Order 75-40, Table IV——Appendix CC (codified as WAC 296-48B-19005), filed 12/4/75.]

WAC 296-48B-193 Interior privacy. A commercial coach interior door, when provided with a privacy lock, shall have a privacy lock that has an emergency release on the outside to permit entry when lock has been locked by a locking knob, lever, button, or other locking device on the inside. [Order 76-26, § 296-48B-193, filed 8/23/76.]

WAC 296-48B-196 Interior passage. Commercial coach interior doors having passage hardware shall open from either side by a single movement of the hardware mechanism. [Order 76-26, § 296-48B-196, filed 8/23/76.]

WAC 296-48B-200 Electrical——General. Electrical equipment and installations in or on a commercial coach shall be installed in accordance with requirements of the National Electrical Code, 1975 Edition, unless otherwise specifically exempted or required by these rules and regulations. The provisions of this section are also applicable to the alteration or conversion of electrical equipment and installations in any commercial coach bearing or required to bear a department insignia of approval.

NOTE: Any vehicle used or designated to be used as a place of employment may be subject to the requirements of the Washington Industrial Safety and Health Act, chapter 80, Laws of 1973.

[Order 75-40, § 296-48B-200, filed 12/4/75.]

WAC 296-48B-210 Definitions. Definitions contained in the National Electrical Code, 1975 Edition, and the following definitions shall apply to this section:

CONVERTER: A device which changes electrical energy from one form to another, as from alternating current to direct current.

FEEDER ASSEMBLY: The overhead or under-chassis feeder conductor, including the grounding conductor, together with the necessary fittings and equipment or a power-supply cord approved for mobile home use, designed for the purpose of delivering energy from the source of electrical supply to the distribution panelboard within the commercial coach.

LOW VOLTAGE: An electromotive force rated at 24 volts or less, supplied from a transformer, converter or battery.

N.E.C.: When used in this section shall mean the National Electrical Code, 1975 Edition. [Order 75-40, § 296-48B-210, filed 12/4/75.]

WAC 296-48B-215 Low-voltage systems——Low-voltage circuits. (1) Low-voltage circuits furnished and installed by the commercial coach manufacturer are subject to these rules and regulations.

*Exception: Vehicles containing only battery circuits of 24 volts or less supplying energy exclusively for the following are not subject to this section:

(a) Illuminating lights when the vehicle contains no other systems such as plumbing, heating or electrical over 24 volts.

(b) Circuits supplying running lights, taillights, stop lights, electrical braking or vehicle ignition systems.

(2) Low-Voltage Wiring Materials.

(a) Copper or copper-clad aluminum conductors shall be used for low-voltage circuits.

(b) The insulation of low-voltage conductors used in battery and direct current circuits shall be rated at least 60° C.

(c) Conductors furnished and installed by the commercial coach manufacturer shall have a minimum of 30 miles thermoplastic insulation or equal.

(d) The insulation of outdoor or under-chassis wire shall be moisture and heat resistant, Type THW or equivalent.

(e) Single-wire, low-voltage conductors shall be of the stranded type.

(3) Low-Voltage Wiring Methods.

(a) Conductors shall be protected against physical damage and shall be secured.

(b) Conductors shall be spliced or joined with approved splicing devices 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, joints and free ends of conductors shall be covered with an insulation equivalent to that on the conductors.

(c) Low-voltage circuits shall be physically separated by at least a 1/2 inch gap or other approved means, from wiring of circuits in excess of 24 volts.

This may be accomplished by clamping, routing or equivalent means which ensure permanent total separation.

(4) Battery-Installations. Storage batteries subject to the provisions of this standard shall be securely attached to the vehicle and installed in an area vaportight to the interior and ventilated directly to the exterior of the vehicle. When batteries are installed in a compartment, the compartment shall be ventilated with openings of not less than 2 square inches at the top and 2 square inches at the bottom. Batteries shall not be installed in a compartment containing spark or flame producing equipment.

(5) Overcurrent Protection.

(a) Low-voltage circuit wiring shall be protected by overcurrent protective devices rated not in excess of the ampacity of the conductors, as follows:

Wire Size	Area Cir. Mils	Ampacity	Wire Type
18	1620	6	Stranded only
16	2580	8	Stranded only
14	4110	15	Stranded or solid
12	6530	20	Stranded or solid
10	10380	30	Stranded or solid

(b) Circuit breakers or fuses shall be of an approved type, including automotive types. Fuseholders shall be clearly marked with maximum fuse size.

NOTE: For further information, see Society of Automotive Engineers (SAE) Standard J 5542-1973 and Underwriters' Laboratories, Inc. Standard 275B-1973.

(c) Higher current-consuming direct-current appliances such as pumps, compressors, heater blowers and similar motor-driven appliances shall be installed in accordance with the manufacturer's instructions.

(d) The overcurrent protective device shall be installed in an accessible location on the vehicle as close as practical to the point where the power supply connects to the vehicle circuits. If located outside the commercial coach, the device shall be protected against weather and physical damage.

(6) Switches shall be rated at not less than the connected load. [Order 75-40, § 296-48B-215, filed 12/4/75.]

WAC 296-48B-220 Wiring materials——Combination electrical systems. (1) General. Vehicle wiring suitable for connection to a battery or direct-current

supply source shall be permitted to be connected to a 115-volt source provided that the entire wiring system and equipment are rated and installed in full conformity with requirements of this section covering 115-volt electrical systems. Circuits fed from alternating-current transformers shall not supply direct-current appliances.

(2) Voltage Converters (115-Volt Alternating Current to Low-Voltage Direct Current). The 115-volt alternating current side of voltage converters shall be wired in full conformity with the provisions of this section for 115-volt electrical systems. Converters supplied as an integral part of a listed appliance shall not be subject to the above. All converters and transformers shall be listed and shall be used within their marked electrical ratings.

(3) Dual-Voltage Fixtures or Appliances. Fixtures or appliances having both 115-volt and low-voltage connections shall be listed or approved for dual voltage.

(4) Autotransformers. Autotransformers shall not be used.

(5) Receptacles and Plug Caps. When a commercial coach is equipped with a 120-volt or 120/240-volt alternating-current system and/or a low-voltage system, receptacles and plug caps of the low-voltage system shall differ in configuration from those of the 120- or 120/240-volt system.

(6) Identification. When a vehicle equipped with a battery or direct-current system has an external connection for low-voltage power, the receptacle shall have a configuration that will not accept 120-volt power. The vehicle shall have permanently affixed on the outside wall adjacent to the point of entrance of the power supply conductors a label which reads:

THIS CONNECTION IS FOR LOW-VOLTAGE BATTERY OR DIRECT CURRENT ONLY. DO NOT CONNECT TO 120 or 240 VOLTS AC.

Note: See WAC 296-48-761 for label size and type of material.

[Order 75-40, § 296-48B-220, filed 12/4/75.]

WAC 296-48B-225 Generator installations——Mounting. (1) Generators shall be mounted in such a manner as to be effectively bonded to the commercial coach chassis.

(2) Generator Protection. Equipment shall be installed to ensure that the generator is disconnected when the vehicle is energized from an outside source and to ensure that the outside source is disconnected when the vehicle is energized by the generator. The generator field shall be protected by appropriately rated, listed equipment.

(3) Installation of Generators. Internal-combustion-driven generator units (subject to the provisions of this Code) shall be secured in place to avoid displacement from vibration and road shock and shall be installed in a compartment which is vaportight to the interior of the vehicle. (See WAC 296-48B-215(4) for battery installations.)

(4) Ventilation of Generator Compartments. Compartments accommodating internal-combustion-driven generator units shall be provided with approved ventilation in accordance with instructions provided by the manufacturer of the generator unit.

(5) Location of Internal-Combustion-Engine Generator Exhaust. Exhaust from generator internal-combustion engines shall not terminate within 3 feet of the vehicle gasoline-tank filler-spout inlet.

(6) Supply Conductors. Supply conductors from the generator(s) to the junction box (having a blank cover) on the compartment wall shall be of the stranded type installed in flexible conduit. [Order 75-40, § 296-48B-225, filed 12/4/75.]

WAC 296-48B-230 Calculations——Branch circuit and feeder calculations. Branch circuit and feeder calculations shall be determined in accordance with Article 220 of the National Electrical Code. [Order 75-40, § 296-48B-230, filed 12/4/75.]

WAC 296-48B-235 Disconnecting means and branch-circuit protective equipment——General. (1) The branch-circuit equipment shall be permitted to be combined with the disconnecting means as a single assembly. Such a combination shall be permitted to be designated as a distribution panelboard. If a fused distribution panelboard is used, the maximum fuse size for the mains shall be plainly marked with lettering at least 1/4-inch high and visible when fuses are changed.

NOTE: See Article 110-22 of the National Electrical Code concerning identification of each disconnecting means and each service, feeder or branch circuit at the point where it originated and type marking needed.

(2) Plug fuses and fuseholders shall be tamper-resistant, Type "S," enclosed in dead-front fuse panelboards.

(3) Disconnecting Means. A single disconnecting means shall be provided in each commercial coach consisting of a circuit breaker or a switch and 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 shall be plainly marked "Main." This equipment shall 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 shall be insulated.

(4) The disconnecting equipment shall have a rating suitable for the connected load. The distribution equipment, either circuit breaker or fused type, shall be located a minimum of 24 inches from the bottom of such equipment to the floor level of the commercial coach. The main circuit breakers or switches shall be plainly marked "Main." There shall be a label attached to the panelboard stating:

This Panelboard shall be connected by a Feeder Assembly having Overcurrent Protection rated at not more than ---------- Amperes.

The correct ampere rating shall be marked in the blank space.

(5) Branch-circuit distribution equipment shall be installed in each commercial coach and shall include overcurrent protection for each branch circuit consisting of either circuit breakers or fuses.

(6) The branch-circuit overcurrent devices shall be rated:

(a) not more than the circuit conductors; and

(b) not more than 150 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.

NOTE: A device not approved for branch circuit protection, such as a thermal cutout or motor overload protective device, shall not be considered as the overcurrent device protecting the circuit.

(7) A 20-ampere fuse or circuit breaker shall 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 shall be considered protected by a 20-ampere fuse or circuit breaker.

(9) When circuit breakers are provided for branch-circuit protection, 240-volt circuits shall be protected by two-pole common or companion trip circuit breakers. [Order 75-40, § 296-48B-235, filed 12/4/75.]

WAC 296-48B-245 Power supply——Feeder assembly equipment. A commercial coach shall be provided with feeder assembly equipment, installed by the manufacturer in accordance with the National Electrical Code and the provisions of this chapter. The assembly shall consist of either:

(1) One overhead assembly containing the required number of insulated color-coded feeder conductors, one of which shall be a grounding conductor; or

(2) One undervehicle assembly consisting of conduit running from the commercial coach branch-circuit panelboard to a junction box mounted on the underside of the commercial coach.

The junction box shall be 10" x 10" x 4" for 100 amperes and 10" x 12" x 4" for 200 amperes. Conduit shall be sized in accordance with the National Electrical Code; or in accordance with the National Electrical Code; or

(3) Other installations approved by the department. [Order 75-40, § 296-48B-245, filed 12/4/75.]

WAC 296-48B-250 Identification of feeder assembly connection. (1) Each commercial coach equipped with a 120-volt electrical system shall have permanently affixed on the outside wall adjacent to the point of entrance of the feeder assembly, a label which reads:

"THIS CONNECTION IS FOR 110-125 VOLT AC SERVICE. DO NOT CONNECT TO HIGHER VOLTAGE."

(2) Each commercial coach equipped with a 120/240-volt electrical system shall have permanently affixed on the outside wall, adjacent to the point of entrance of the supply assembly or permanently installed feeders, a label which 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 shall have permanently affixed on the outside wall, adjacent to the point of entrance of the supply assembly or permanently installed feeders, a label which reads:

"THIS CONNECTION IS FOR 480/277 VOLT AC ---------- AMPERE SERVICE."

(The correct service rating shall be stamped in the blank space.)

NOTE: See WAC 296-48-761 for label size and type of material.

[Order 75-40, § 296-48B-250, filed 12/4/75.]

WAC 296-48B-255 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 shall be used for connecting such units to each other.

(2) Commercial coaches may have individual branch circuit panelboards installed in each unit subject to the requirements of WAC 296-48B-235, 296-48B-245 and 296-48B-250 of this chapter. [Order 75-40, § 296-48B-255, filed 12/4/75.]

WAC 296-48B-260 Under-chassis wiring. (1) Outdoor or under-chassis wiring (120/240 volts) exposed to moisture and mechanical damage shall be protected by rigid metal conduit, electrical metallic tubing or liquid-tight flexible metal conduit.

(2) The conductors shall be NMC, RW, TW or equivalent. [Order 75-40, § 296-48B-260, filed 12/4/75.]

WAC 296-48B-265 Rodent resistance. All exterior openings around wiring, conduit, cable boxes and equipment shall be sealed to resist the entrance of rodents. [Order 75-40, § 296-48B-265, filed 12/4/75.]

WAC 296-48B-270 Electrical equipment——Lighting fixtures. Combustible walls or ceiling finish, exposed between the edge of a fixture, canopy or pan and an outlet box shall be covered with non-combustible material. [Order 75-40, § 296-48B-270, filed 12/4/75.]

WAC 296-48B-275 Equipment mounting. Electrical equipment shall be securely mounted to prevent displacement during transit. [Order 75-40, § 296-48B-275, filed 12/4/75.]

WAC 296-48B-280 Outdoor outlets, fixtures, air cooling equipment, etc. (1) Outdoor fixtures and equipment shall be listed for outdoor use. Outdoor receptacle or convenience outlets shall be of a gasketed-cover type.

(2) A commercial coach designed to energize heating and/or air-conditioning equipment located outside the commercial coach shall have permanently affixed, adjacent to the point of connection, a label which reads:

"THIS CONNECTION IS FOR ---------- PHASE AIR-CONDITIONING EQUIPMENT RATED AT NOT MORE THAN ---------- AMPERES, AT ---------- VOLTS, 60 HERTZ."

(The correct voltage and ampere rating shall be given.)

NOTE: See WAC 296-48-761 for label size and type of material.

[Order 75-40, § 296-48B-280, filed 12/4/75.]

WAC 296-48B-285 Grounding——General. Grounding of both electrical and nonelectrical metal parts in a commercial coach shall be through connection to a grounding bus in the vehicle distribution panel. The grounding bus shall be grounded through the green-colored conductor in the supply cord or the feeder wiring to the service ground in the service-entrance equipment located adjacent to the vehicle location. Neither the frame of the vehicle nor the frame of any appliance shall be connected to the neutral conductor in the commercial coach.

(1) Insulated Neutral.

(a) The grounded circuit conductor (neutral) shall be insulated from the grounding conductors and from equipment enclosures and other grounded parts. The grounded (neutral) circuit terminals in the distribution panels and in ranges, clothes dryers, counter-mounted cooking units and wall-mounted ovens shall be insulated from the equipment enclosure. Bonding screws, straps or buses in the distribution panel or in appliances shall be removed and discarded.

(b) Connections of ranges and clothes dryers with 115/230 v, 3-wire ratings shall 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.

Type NM or Type SE cable shall not be used to connect a range or a dryer. This shall 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.

For 115-v rated devices, a 3-conductor cord and 2-pole, 3-wire grounding-type plug shall be permitted.

(2) Equipment Grounding Means.

(a) The green-colored grounding wire in the supply cord or permanent feeder wiring shall 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., shall be effectively bonded to the grounding terminal or enclosure of the distribution panel.

(c) Cord-connected appliances shall be grounded by means of an approved cord with grounding conductor and grounding-type attachment plug.

(3) Bonding of Noncurrent-Carrying Metal Parts.

(a) All exposed noncurrent-carrying metal parts that may become energized shall be effectively bonded to the grounding terminal or enclosure of the distribution panelboard. A bonding conductor shall be connected between each distribution panelboard and an accessible terminal on the chassis.

(b) Grounding terminals shall be of the solderless type and approved as pressure-terminal connectors recognized for the wire size used. The bonding conductor shall be solid or stranded, insulated or bare and shall be No. 8 copper minimum or equal. The bonding conductor shall be routed so as not to be exposed to physical damage.

(c) Metallic gas, water and waste pipes and metallic air circulating ducts shall be considered bonded if they are connected to the terminal on the chassis (see (3)(a) of this section) by clamps, solderless connectors or by suitable grounding-type straps.

(d) Any metallic roof and exterior covering shall be considered bonded if (1) the metal panels overlap one another and are securely attached to the wood or metal frame parts by metallic fasteners, and (2) if the lower panel of the metallic exterior covering is secured by metallic fasteners at a cross-member of the chassis by two metal straps per commercial coach unit or section at opposite ends. [Order 75-40, § 296-48B-285, filed 12/4/75.]

WAC 296-48B-290 Switch and receptacle plates. Metallic faceplates shall be used only with grounding-type devices or grounded metallic outlet boxes. [Order 75-40, § 296-48B-290, filed 12/4/75.]

WAC 296-48B-295 Testing——Dielectric strength test. (1) The wiring of each commercial coach shall be subjected to a 1-minute, 900-volt, dielectric strength test (with all switches closed) between live parts (including neutral) and the commercial coach ground. Alternatively, the test may be performed at 1,080 volts for 1 second. This test shall be performed after branch circuits are complete and after fixtures or appliances are installed.

EXCEPTION: Fixtures or appliances which are listed shall not be required to withstand the dielectric strength test.

(2) 480 Volts. Each commercial coach designed with a 480-volt electrical system shall be subjected to a one-

minute 1,275–volt dielectric strength test between current–carrying conductors and the coach ground. Alternatively, the test may be performed at 1,500 volts for one second.

(3) Low–Voltage Circuits. Low–voltage circuit conductors in each commercial coach shall withstand the applied potential without electrical breakdown of a one–minute, 500–volt or a one–second, 600–volt dielectric strength test. The potential shall be applied between live and grounded conductors.

NOTE: The test may be performed on running light circuits before the lights are installed provided the vehicle's outer covering and interior cabinetry has been secured. The braking circuit may be tested before being connected to the brakes provided the wiring has been completely secured.

[Order 75–40, § 296–48B–295, filed 12/4/75.]

WAC 296–48B–400 Mechanical——General. Mechanical equipment and installations in or on a commercial coach shall be installed in accordance with the requirements of these rules and regulations and the conditions of the mechanical equipment approval or listing. The provisions of this section are also applicable to the alteration or conversion of mechanical equipment and installations in any commercial coach bearing or required to bear a department insignia of approval.

NOTE: Any vehicle used or designated to be used as a place of employment may be subject to the requirements of the Washington Industrial Safety and Health Act, chapter 80, Laws of 1973.

[Order 75–40, § 296–48B–400, filed 12/4/75.]

WAC 296–48B–405 Mechanical——Definitions. The following definitions shall apply to this section.

ABSORBER (ADSORBER): That part of the low side of an absorption system used for absorbing (adsorbing) vapor refrigerant.

ABSORPTION SYSTEM: A refrigerating system in which the gas evolved in the evaporator is taken up by an absorber or adsorber.

ABSORPTION UNIT: A factory–built assembly of component parts designed to produce refrigeration for comfort cooling or comfort heating by the application of heat.

(1) Direct absorption unit is a unit in which the refrigerant evaporator is in direct contact with the air to be conditioned.

(2) Indirect absorption unit is a unit in which the refrigerant evaporator is not in direct contact with the air to be conditioned.

ACCESSIBLE: When applied to a fixture, connection, appliance or equipment, shall mean having access thereto but which may require the removal of an access panel, door or similar obstruction.

AIR–CONDITIONING OR COMFORT–COOLING EQUIPMENT: All of that equipment intended or installed for the purpose of processing the treatment of air so as to control its temperature, humidity, cleanliness or distribution to meet the requirements of the conditioned space.

AIR–HANDLING UNIT: A blower or fan used for the purpose of distributing conditioned air to a room or space.

ANTI–FLOODING DEVICE: A primary safety control which causes the liquid fuel flow to be shut off upon a rise in fuel level or upon receiving excess fuel and which operates before a hazardous discharge of fuel can occur.

APPLIANCE COMPARTMENT: A room having a floor area not in excess of twice the largest plan area of the appliance or appliances contained therein plus the clearances required in this part.

AUTOMATIC PILOT DEVICE: A device employed with gas–burning equipment that will either automatically shut off the gas supply to the burner(s) being served or automatically actuate, electrically or otherwise, a gas shut–off device when the pilot flame is extinguished.

AUTOMATIC PUMP (OIL LIFTER): A pump, not an integral part of the oil–burning appliance, that automatically pumps oil from the supply tank and delivers the oil by gravity under a constant head to an oil–burning appliance.

BTU: British Thermal Unit. The quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit.

BTUH: British Thermal Units per Hour.

BURNER: A device for the final conveyance of fuel or a mixture of fuel and air to the combustion zone.

CLASS O AIR DUCTS: Ducts of materials and connectors having a fire–hazard classification of zero.

CHIMNEY, FACTORY–BUILT: A chimney consisting entirely of factory–made parts, each designed to be assembled with the others without requiring field construction.

CLASS I AIR DUCTS: Ducts of materials and connectors having a flame–spread rating of not over 25 without evidence of continued progressive combustion and a smoke–developed rating of not over 50.*

CLASS II AIR DUCTS: Ducts of materials and connectors having a flame–spread rating of not over 50 without evidence of continued progressive combustion and a smoke–developed rating of not over 50 for the inside surface and not over 100 for the outside surface.*

CLEARANCE: The distance between the appliance, chimney, vent, chimney or vent connector or plenum and the nearest surface.

COMBUSTIBLE MATERIAL: Materials adjacent to or in contact with heat–producing appliances, vent connectors, chimneys, steam and hot water pipes, shall mean materials made of or surfaced with wood, compressed paper, plant fibers or other materials that will ignite and burn. Such material shall be considered combustible even though flameproofed, fire–retardant treated or plastered.

COMPRESSOR: A specific machine, with or without accessories, for compressing a given refrigerant vapor.

COMPRESSOR UNIT: A condensing unit less the condenser and liquid receiver.

CONDENSER: A vessel or arrangement of pipe or tubing in which vaporized refrigerant is liquefied by the removal of heat.

CONDENSING UNIT: A specific refrigerating machine combination for a given refrigerant, consisting of one or more power–driven compressors, condensers, liquid receivers (when required) and the regularly furnished accessories.

CONNECTOR–GAS APPLIANCE: 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 with the outlet.

DUCT: Conduits or passageways for conveying air to or from a heating, cooling, air conditioning or ventilation equipment, but not including the plenum.

EVAPORATOR: That part of the system in which liquid refrigerant is vaporized to produce refrigeration.

EXPANSION COIL: An evaporator constructed of pipe or tubing.

FUEL GAS PIPING SYSTEM: The arrangement of piping, tubing, fittings, connectors, valves and devices designed and intended to supply or control the flow of fuel gas to the appliance(s).

FUEL OIL PIPING SYSTEM: The arrangement of piping, tubing, fittings, connectors, valves and devices designed and intended to supply or control the flow of fuel oil to the appliance(s).

GAS: 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 which would ignite in the presence of oxygen.

GAS CLOTHES DRYER: A device used to dry wet laundry by means of heat derived from the combustion of fuel gases. Dryer classifications are as follows:

(1) Type 1. Factory–built package, multiple produced. Primarily used in family living environment. May or may not be coin–operated for public use. Usually the smallest unit physically and in function output.

(2) Type 2. Factory–built package, multiple produced. Used in business with direct intercourse of the function with the public. May or may not be operated by public or hired attendant. May or may not be coin–operated. Not designed for use in individual family living environment. May be small, medium or large in relative size.

GAS REFRIGERATION: A gas–burning appliance which is designed to extract heat from a suitable chamber.

GAS–SUPPLY CONNECTION: The terminal end or connection to which a gas–supply connector is attached.

GAS VENTS: Factory–built vent piping and vent fittings listed by an approved testing agency that are assembled and used in accordance with the terms of their listings, for conveying flue gases to the outside atmosphere.

(1) Type–B Gas Vent. A gas vent for venting gas appliances with draft hoods and other gas appliances listed for use with Type–B Gas Vents.

(2) Type–BW Gas Vent. A gas vent for venting listed gas–fired vented wall furnaces.

HEATING APPLIANCE: An appliance for comfort heating of a commercial coach or for water heating.

HEAT–PRODUCING APPLIANCE: All heating and cooking appliances and all fuel burning appliances.

HIGH SIDE: The parts of a refrigerating system under condenser pressure.

INPUT RATING: The maximum fuel–burning capacity of any warm–air furnace, recessed heater or burner expressed in British Thermal Units per Hour.

LIQUEFIED PETROLEUM GASES: The terms "Liquefied Petroleum Gases," "LPG" and "LP–GAS" as used in this standard shall mean and include any material which is composed predominantly of any of the following hydrocarbons, or mixtures of them: Propane, propylene, butanes (normal butane or isobutane), and butylenes.

LOW SIDE: The parts of a refrigerating system under evaporator pressure.

PLENUM: An air compartment which is part of an air–distributing system to which one or more ducts are connected.

(1) Furnace–supply plenum is a plenum attached directly to, or an integral part of, the air–supply outlet of the furnace.

(2) Furnace–return plenum is a plenum attached directly to or an integral part of, the return inlet of the furnace.

QUICK–DISCONNECT DEVICE: A hand–operated device which provides a means for connecting and disconnecting a gas supply or connecting gas systems and which is equipped with an automatic means to shut off the gas supply when the device is disconnected.

READILY ACCESSIBLE: Having direct access without the necessity of removing any panel, door or similar obstruction.

REFRIGERANT: A substance used to produce refrigeration by its expansion or vaporization.

REFRIGERATING SYSTEM: A combination of interconnected refrigerant–containing parts constituting one closed refrigerant circuit in which a refrigerant is circulated for the purpose of extracting heat.

ROOF JACK: That portion of a commercial coach heater flue or vent assembly, including the cap, insulating means, flashing and ceiling plate, located in and above the roof of a commercial coach.

SEALED ABSORPTION SYSTEM: A unit system for Group 2 refrigerants only in which all refrigerant–containing parts are made permanently tight by welding or brazing against refrigerant loss.

SEALED COMBUSTION SYSTEM APPLIANCE: An appliance which by its inherent design is constructed so that all air supplied for combustion, the combustion system of the appliance and all products of combustion are completely isolated from the atmosphere of the space in which it is installed.

SELF-CONTAINED SYSTEM: A complete factory-made and factory-tested system in a suitable frame or enclosure which is fabricated and shipped in one or more sections and in which no refrigerant-containing parts are connected in the field other than by companion or block valves.

UNIT SYSTEM: A self-contained system which has been assembled and tested prior to its installation and which is installed without connecting any refrigerant-containing parts. A unit system may include factory-assembled companion or block valves.

VENT CONNECTOR: Any pipe for conveying products of combustion from a fuel-burning appliance to a vent.

WATER HEATER: An appliance for heating water for domestic purposes other than for space heating.

*Flame-spread and smoke developed ratings are measured as specified in the Standard Method of Test for Surface Burning Characteristics of Building Materials (ANSI A2.5-1970; ASTM E84-1970; UL 723-1971; NFPA No. 255-1972).

[Order 75-40, § 296-48B-405, filed 12/4/75.]

WAC 296-48B-410 LPG equipment and installations——Construction of containers. Containers shall be constructed and marked in accordance with the specifications for LP-Gas containers of the U.S. Department of Transportation (DOT) or the Rules for Construction of Unfired Pressure Vessels, Section VIII, Division 1, ASME Boiler and Pressure Vessel Code. ASME containers shall have a design pressure of not less than 312.5 psig.

(1) Container supply systems shall be arranged for vapor withdrawal only.

(2) Container openings for vapor withdrawal shall be located in the vapor space when the container is in service or shall be provided with a suitable internal withdrawal tube which communicates with the vapor sauce in or near the highest point in the container when it is mounted in service position, with the commercial coach on a level surface. Containers shall be permanently and legibly marked in a conspicuous manner on the outside to show the correct mounting position and the position of the service outlet connection. The method of mounting in place shall be such as to minimize the possibility of an incorrect positioning of the container. [Order 75-40, § 296-48B-410, filed 12/4/75.]

WAC 296-48B-415 Location of LP-Gas containers and systems. (1) LP-Gas containers shall not be installed, nor shall provisions be made for installing or storing any LP-Gas container, even temporarily, inside any commercial coach except for listed, completely self-contained hand torches, lanterns or similar equipment with containers having a maximum water capacity of not more that 2 1/2 pounds (approximately one pound LP-Gas capacity).

(2) Containers, control valves and regulating equipment, when installed, shall 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. The compartment shall be ventilated at top and bottom to facilitate diffusion of vapors. The compartment shall be ventilated with two vents having an aggregate area of not less than two percent of the floor area of the compartment and shall open unrestricted to the outside atmosphere. The required vents shall 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 shall be located in the access door or wall with the bottom of the vent not more than 12 inches below the ceiling level of the compartment. All vents shall have an unrestricted discharge to the outside atmosphere. Access doors or panels of compartments shall not be equipped with locks or require special tools or knowledge to open.

(3) Permanent and removable fuel containers shall be securely mounted to prevent jarring loose, slipping or rotating and the fastenings shall 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 not less than four based on the ultimate strength of the material to be used. [Order 75-40, § 296-48B-415, filed 12/4/75.]

WAC 296-48B-420 LP-Gas container valves and accessories. (1) Valves in the assembly of a two-cylinder system shall be arranged so that replacement of containers can be made without shutting off the flow of gas to the appliance(s). This provision is not to be construed as requiring an automatic change-over device.

(2) Shutoff valves on the containers shall be protected in transit, in storage and while being moved into final utilization as follows:

(a) By setting into a recess of the container to prevent possibility of their being struck if container is dropped upon 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 shall be such that the blow will not be transmitted to the valve.

(3) Regulators shall be connected directly to the container shutoff valve outlets or mounted securely by means of a support bracket and connected to the container shutoff valve or valves with listed high-pressure connections. If the container is permanently mounted, the connector shall be as required above or with a listed semi-rigid tubing connector. [Order 75-40, § 296-48B-420, filed 12/4/75.]

WAC 296-48B-425 LP-Gas safety devices. (1) DOT containers shall be provided with safety-relief devices as required by the regulations of the U.S. Department of Transportation. ASME containers shall be provided with relief valves in accordance with Subsection 221 of Standard for the Storage and Handling of

Liquefied-Petroleum Gases (ANSI Z106.1-1974, NFPA No. 58-1974). Safety-relief valves shall have direct communication with the vapor space of the vessel.

(2) The delivery side of the gas-pressure regulator shall be equipped with a safety-relief device set to a discharge at a pressure not less than two times and not more than three times the delivery pressure of the regulator.

(3) Systems mounted on the "A" frame assembly shall be so located that the discharge from the safety-relief devices shall be into the open air and not less than three feet horizontally from any opening into the commercial coach below the level of such discharge. [Order 75-40, § 296-48B-425, filed 12/4/75.]

WAC 296-48B-430 LP-Gas system enclosure and mounting. (1) Housings and enclosures shall be designed to provide proper ventilation at least equivalent to that specified in WAC 296-48B-415(2).

(2) Doors, hoods, domes or portions of housings and enclosures required to be removed or opened for replacement of containers shall incorporate means for clamping them firmly in place and preventing them from working loose during transit.

(3) Provisions shall be incorporated in the assembly to hold the containers firmly in position and prevent their movement during transit.

(4) Containers shall be mounted on a substantial support or a base secured firmly to the commercial coach chassis. Neither the container nor its support shall extend below the commercial coach frame. [Order 75-40, § 296-48B-430, filed 12/4/75.]

WAC 296-48B-435 LP-Gas system design and service line pressure. (1) Systems shall be of the vapor-withdrawal type.

(2) Gas, at a pressure not over 14 inches water column (1/2 psi) shall be delivered from the system into the gas supply connection. [Order 75-40, § 296-48B-435, filed 12/4/75.]

WAC 296-48B-440 Electrical equipment. All electrical equipment installed in conjunction with gas equipment shall be listed for the purpose intended. [Order 75-40, § 296-48B-440, filed 12/4/75.]

WAC 296-48B-445 Gas piping systems——General. The requirements of this section shall govern the installation of all fuel gas piping attached to any commercial coach. Gas delivered into the gas supply system shall be at a pressure not exceeding 14 inch water column (1/2 psi). None of the requirements listed in this section shall apply to the piping supplied as a part of an appliance. [Order 75-40, § 296-48B-445, filed 12/4/75.]

WAC 296-48B-450 Piping design. Commercial coaches requiring fuel gas for any purpose shall be equipped with a gas-piping system that is designed for LP gas only, combination LP-natural-gas or natural gas. [Order 75-40, § 296-48B-450, filed 12/4/75.]

WAC 296-48B-455 Materials. All materials used for the installation, extension, alteration or repair of any gas-piping system shall be new and free from defects of internal obstructions. It shall not be permissible to repair defects in gas piping or fittings. Inferior or defective materials shall be removed and replaced with acceptable material. The system shall be made of materials having a melting point of not less than 1,450°F., except as provided in WAC 296-48B-470. They shall consist of one or more of the following materials:

(1) Steel or wrought-iron pipe shall comply with ANSI Standard B36.10-1970 for Wrought-Steel and Wrought-Iron Pipe. Threaded brass pipe in iron pipe sizes may be used.

(2) Fittings for gas piping shall be wrought iron, malleable iron, steel or brass (containing not more than 75 percent copper).

(3) Copper tubing shall be annealed type, Grade K or L, conforming to the Specifications for Seamless Copper Water Tube (ASTM B88-72), or shall comply with the Specifications for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service, ASTM B280-73. When used on systems designed for natural gas, such tubing shall be internally tinned.

(4) Steel tubing shall have a minimum wall thickness of 0.032 inch for tubing of 1/2 inch diameter and smaller and 0.049 inch for diameters 1/2 inch and larger. Steel tubing shall be constructed in accordance with ASTM Specification for Electric-Resistance-Welded Coiled Steel Tubing for Gas and Fuel Oil Lines (ASTM A539-73), and shall be externally corrosion protected. [Order 75-40, § 296-48B-455, filed 12/4/75.]

WAC 296-48B-460 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 shall be as follows:

(1) There shall be only one point of crossover which shall be readily accessible from the exterior of the commercial coach.

(2) The connector between units shall be a listed flexible connector for exterior use, sized in accordance with WAC 296-48B-465 of this section.

(3) Protective caps or plugs shall be permanently attached to the coach by means of a metal chain and used to seal the system when not in use. [Order 75-40, § 296-48B-460, filed 12/4/75.]

WAC 296-48B-465 System sizing——Gas pipe sizing. Gas piping systems shall be sized so that the pressure drop to any appliance inlet connection from any gas supply connection, when all appliances are in operation at maximum capacity, is not more than 0.5 inch water column as determined on the basis of test or in accordance with Table H-2. The natural gas supply connection(s) shall be not less than the size of the gas piping but shall be not smaller than 3/4 inch nominal pipe size. [Order 75-40, § 296-48B-465, filed 12/4/75.]

WAC 296-48B-467 Sizing and capacity of gas piping. In order to determine the size of piping to be used in designing a gas piping system, the following factors must be considered:

(1) Allowable loss in pressure from the commercial coach gas supply connection to appliance.

(2) Maximum gas consumption to be provided.

(3) Length of piping.

(4) Type of gas. [Order 75-40, § 296-48B-467, filed 12/4/75.]

WAC 296-48B-468 Description of tables. (1) The quantity of gas to be provided at each outlet shall be determined directly from the manufacturer's Btu input rating of the appliance that will be installed.

(2) Capacities for combustion LP/Natural gas at low pressures (0.5 psig or less) in thousands of Btu per hour for different sizes and lengths are shown in Table H-2 for iron pipe or equivalent rigid pipe and for semi-rigid tubing. Table H-2 is based upon a pressure drop of 0.5 inch water column. In using this Table, no additional allowance is necessary for an ordinary number of fittings.

(3) Capacities in thousands of Btu per hour of undiluted liquefied petroleum gases based on a pressure drop of 0.5 inch water column for different sizes and lengths are shown in Table H-2 for iron pipe or equivalent rigid pipe and for semi-rigid tubing. In using this Table, no additional allowance is necessary for an ordinary number of fittings.

(4) For any gas piping system, for special gas appliances or for conditions other than those covered by Table H-2, such as longer runs, greater gas demands or greater pressure drops, the size of each gas piping system shall be determined by standard engineering methods acceptable to the department. [Order 75-40, § 296-48B-468, filed 12/4/75.]

WAC 296-48B-469 Use of capacity tables. To determine the size of each section of gas piping in a system within the range of the capacity tables, proceed as follows:

(1) Determine the gas demand of each appliance to be attached to the piping system. When Table H-2 is to be used to select the piping size, calculate the gas demand in terms of thousands of BTUH for each piping system outlet.

(2) Measure the length of piping from the gas supply connection to the most remote outlet in the commercial coach.

(3) In the appropriate capacity table, select the column showing the measured length or the next longer length if the table does not give the exact length. This is the only length used in determining the size of any section of gas piping.

(4) Use this same vertical column to locate ALL gas demand figures for this particular system of piping.

(5) Starting at the most remote outlet, find in the vertical column just selected the gas demand for that outlet. If the exact figure or demand is not shown, choose the next larger figure below in the column.

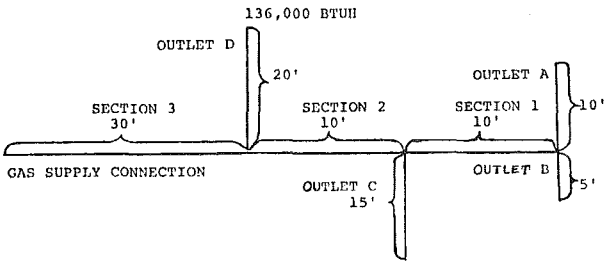
(6) Opposite this demand figure, in the first column at the left, will be found the correct size of gas piping.

(7) Proceed in a similar manner for each outlet and each section of gas piping. For each section of piping, determine the total gas demand supplied by that section.

Example of Piping System Design:

Determine the required pipe size of each section and outlet of the piping system shown in Exhibit I, with a designated pressure drop of 0.5 inch water column.

(EXHIBIT I)



OUTLET A	WATER HEATER	30,000 BTUH
OUTLET B	REFRIGERATOR	3,000 BTUH
OUTLET C	RANGE	73,000 BTUH
OUTLET D	FURNACE	136,000 BTUH

SOLUTION:

(1) The length of pipe from the gas supply inlet to the most remote outlet (A) is 60 feet. This is the only distance used.

(2) Using the column marked 60 feet in the Table:

Outlet A, supplying 30,000 BTUH, requires 3/8" iron pipe.

Outlet B, supplying 3,000 BTUH, requires 1/4" iron pipe.

Section 1, supplying outlets A and B, or 33,000 BTUH, requires 3/8" iron pipe.

Outlet C, supplying 73,000 BTUH, requires 3/4" iron pipe.

Section 2, supplying outlets A, B and C, or 106,000 BTUH, requires 3/4" iron pipe.

Outlet D, supplying 136,000 BTUH, requires 3/4" iron pipe.

Gas Supply Connection, Section 3, supplying outlets A, B, C and D, or 242,000 BTUH, requires 1" iron pipe. [See Table H-2 following this section.] [Order 75-40, § 296-48B-469, filed 12/4/75.]

WAC 296-48B-46901 Table H-2——Part I and Part II.

TABLE H-2

[CODIFICATION NOTE: The graphic presentation of these tables has been varied slightly in order that they 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 Part I and two tables covering Part II. Part I(a) and Part II(a) cover "Iron Pipe sizes-Length in Feet" and Part I(b) and Part II(b) covers "Tubing-Length in Feet."]

Part I

Maximum Capacity of Different Sizes of Pipe and Tubing in Thousands of BTU's Per Hour of Natural Gas For Gas Pressures of 0.5 Psig or Less and a Maximum Pressure Drop of 1/2 Inch Water Column

TABLE H-2: Part I(a)

Iron Pipe Sizes										
	Length in Feet									
I.D.	10	20	30	40	50	60	70	80	90	100
1/4"	43	29	24	20	18	16	15	14	13	12
3/8"	95	65	52	45	40	36	33	31	29	27
1/2"	175	120	97	82	73	66	61	57	53	50
3/4"	360	250	200	170	151	138	125	118	110	103
1"	680	465	375	320	285	260	240	220	215	195

TABLE H-2: Part I(b)

Tubing										
	Length in Feet									
O.D.	10	20	30	40	50	60	70	80	90	100
3/8"	27	18	15	13	11	10	9	9	8	8
1/2"	56	38	31	26	23	21	19	18	17	16
5/8"	113	78	62	53	47	43	39	37	34	33
3/4"	197	136	109	93	83	75	69	64	60	57
7/8"	280	193	155	132	117	106	98	91	85	81

Part II

Maximum Capacity of Different Sizes of Pipe and Tubing in Thousands of BTU's Per Hour of Undiluted Liquefied Petroleum Gas Based on a Maximum Pressure Drop of 1/2 Inch Water Column

TABLE H-2: Part II(a)

Iron Pipe Sizes										
	Length in Feet									
I.D.	10	20	30	40	50	60	70	80	90	100
1/4"	67	46	37	31	28	25	23	21	20	19
3/8"	147	101	81	70	62	56	51	48	45	42
1/2"	275	189	152	129	114	103	96	89	83	78
3/4"	567	393	315	267	237	217	196	185	173	162
1"	1071	732	590	504	448	409	378	346	322	307

TABLE H-2: Part II(b)

Tubing										
	Length in Feet									
O.D.	10	20	30	40	50	60	70	80	90	100
3/8"	39	26	21	19	—	—	—	—	—	—
1/2"	92	62	50	41	37	35	31	29	27	26
5/8"	199	131	107	90	79	72	67	62	59	55
3/4"	329	216	181	145	131	121	112	104	95	90
7/8"	501	346	277	233	198	187	164	155	146	138

[Order 75-40, Table H-2——Part I and Part II (codified as 296-48B-46901), filed 12/4/75.]

WAC 296-48B-470 Joints and installation——Joints for gas pipe. All pipe joints in the piping system, unless welded or brazed, shall be threaded joints that comply with ANSI Standard Pipe Threads (Except Dryseal) B2.1-1968. Right and left nipples or couplings shall not be used. Unions, if used, shall be of ground joint type. The material used for welding or brazing pipe connections shall have a melting temperature in excess of 1,000°F. [Order 75-40, § 296-48B-470, filed 12/4/75.]

WAC 296-48B-475 Tubing joints. (1) Tubing joints shall be made with either a single or a double flare of 45 degrees in accordance with SAE Standard J 533A or with other listed vibration-resistant fittings or joints may be brazed with material having a melting point exceeding 1,000°F. Metallic ball sleeve compression-type tubing fittings shall not be used.

(2) Steel tubing joints shall be made with a double-flare in accordance with SAE Standard J 533A. [Order 75-40, § 296-48B-475, filed 12/4/75.]

WAC 296-48B-480 Concealed tubing. Tubing shall not be run inside walls, floors, partitions or roofs. Where tubing passes through walls, floors, partitions, roofs or similar installations, such tubing shall be protected by the use of weather resistant grommets that shall snugly fit both the tubing and the hole through which the tubing passes. [Order 75-40, § 296-48B-480, filed 12/4/75.]

WAC 296-48B-485 Pipe-joint compound. Screw joints shall be made up tight with listed pipe-joint compound, insoluble in liquefied petroleum gas, and shall be applied to the male threads only. [Order 75-40, § 296-48B-485, filed 12/4/75.]

WAC 296-48B-490 Concealed joints. Piping or tubing joints shall not be located in any floor, wall partition or similar concealed construction space. [Order 75-40, § 296-48B-490, filed 12/4/75.]

WAC 296-48B-500 Hangers and supports. All gas piping shall 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. Solid-iron pipe gas-supply connection(s) shall be rigidly anchored to a structural member within six inches of the supply connection(s). [Order 75-40, § 296-48B-500, filed 12/4/75.]

WAC 296-48B-505 Electrical ground. Gas piping shall not be used for an electrical ground. [Order 75-40, § 296-48B-505, filed 12/4/75.]

WAC 296-48B-510 Identification of gas supply connections. A label shall be permanently attached on the outside of the exterior wall of the commercial coach adjacent to the gas supply connection which reads (as appropriate) either:

NOTE: See WAC 296-48-761 for label size and type of material.

LP-Gas System

This gas piping system is designed for use of liquefied petroleum gas only.

DO NOT CONNECT NATURAL GAS TO THIS SYSTEM.

CONTAINER SHUTOFF VALVES SHALL BE CLOSED DURING TRANSIT.

When connecting to lot outlet, use a listed gas supply connector for vehicles rated at

☐ 100,000 Btuh
or more
☐ 250,000 Btuh

Before turning on gas, make certain all gas connections have been made tight, all appliance valves are turned off, and any unconnected outlets are capped.

After turning on gas, test gas piping and connections to appliances for leakage with soapy water or bubble solution, and light all pilots.

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or

Combination LP-Gas and Natural Gas System

This gas piping system is designed for use of either liquefied petroleum gas or natural gas.

NOTICE: BEFORE TURNING ON GAS, BE CERTAIN APPLIANCES ARE DESIGNED FOR THE GAS CONNECTED AND ARE EQUIPPED WITH CORRECT ORIFICES. SECURELY CAP THIS INLET WHEN NOT CONNECTED FOR USE.

When connecting to lot outlet, use a listed gas supply connector for vehicles rated at

☐ 100,000 Btuh
or more
☐ 250,000 Btuh

Before turning on gas, make certain all gas connections have been made tight, all appliance valves are turned off, and any unconnected outlets are capped.

After turning on gas, test gas piping and connections to appliances for leakage with soapy water or bubble solution, and light all pilots.

The appropriate Btuh input rating shall be marked.

[Order 75-40, § 296-48B-510, filed 12/4/75.]

WAC 296-48B-515 Gas piping system openings. All openings in the gas piping system shall be closed gas-tight with threaded pipe plugs or pipe caps. [Order 75-40, § 296-48B-515, filed 12/4/75.]

WAC 296-48B-520 Appliance connections. All gas-burning appliances shall be connected to the gas piping system with materials as provided in WAC 296-48B-455 of this section or with listed gas appliance connectors. Gas appliance connectors shall not be run through walls, floors, ceilings or partitions. Aluminum tubing and connectors shall not be used in exterior locations. [Order 75-40, § 296-48B-520, filed 12/4/75.]

WAC 296-48B-525 Valves. (1) A shutoff valve shall be installed in the fuel piping outside of each gas appliance but inside the commercial coach structure, upstream of the union or connector in addition to any valve on the appliance. The shutoff valve shall be located within 6 feet of a cooking appliance and within 3 feet of any other appliance. A shutoff valve may serve more than one appliance if located as required above.

(2) Shutoff valves used in connection with gas piping shall be of a type designed and listed for use on LP gas. [Order 75-40, § 296-48B-525, filed 12/4/75.]

WAC 296-48B-530 Testing for leakage——Before appliances are connected. Piping system shall stand a pressure of at least six inches mercury or three PSI gage for a period of not less than ten minutes without showing any drop in pressure. Pressure shall be measured with a mercury manometer or slope gage calibrated so as to be read in increments of not greater than one-tenth pound or an equivalent device. The source of pressure shall be isolated before the pressure tests are made. Before a test is begun, the temperature of the ambient air and of the piping shall be approximately the same and constant air temperature shall be maintained throughout the test. [Order 75-40, § 296-48B-530, filed 12/4/75.]

WAC 296-48B-535 After appliances are connected. After gas appliances have been connected, the gas-piping system shall be subjected to a pressure test with the burner valves closed. Such test shall consist of air at not less than ten inches nor more than 14 inches pressure of

water column (six to eight ounces), the system shall hold this pressure for a period of not less than 10 minutes with no perceptible leakage. Before beginning test, temperature of gas-piping system and test air shall be equalized and maintained throughout the test.

NOTE: Appliance shut-off valves ahead of listed gas cooking appliances may be closed for performance of this test. When the test is satisfactorily performed in this manner, these valves shall be opened and while the system is under pressure, the appliance connectors shall be tested with an approved leak detector or approved bubble solution.

[Order 75-40, § 296-48B-535, filed 12/4/75.]

WAC 296-48B-540 Rodent resistance. All exterior openings around piping, ducts, plenums or vents shall be sealed to resist the entrance of rodents. [Order 75-40, § 296-48B-540, filed 12/4/75.]

WAC 296-48B-550 Oil piping systems——General. The requirements of this section shall govern the installation of all liquid fuel piping attached to any commercial coach. None of the requirements listed in this section shall apply to the piping in the appliance(s). [Order 75-40, § 296-48B-550, filed 12/4/75.]

WAC 296-48B-555 Oil piping systems——Expandable or multiple commercial coaches. When a commercial coach is composed of two or more units or includes expandable rooms, the oil-piping system shall be located only in the unit containing the oil-supply connection. [Order 75-40, § 296-48B-555, filed 12/4/75.]

WAC 296-48B-560 Oil piping systems——Materials. All materials used for the installation, extension, alteration or repair of any oil piping system shall be new and free from defects or internal obstructions. The system shall be made of materials having a melting point of not less than 1,450°F., except as provided in WAC 296-48B-570. They shall consist of one or more of the following materials:

(1) Steel or wrought-iron pipe shall comply with American National Standard for Wrought-Steel or Wrought-Iron Pipe, B36.10-1970. Threaded copper or brass pipe in iron pipe sizes may be used.

(2) Fittings for oil piping shall be wrought iron, malleable iron, steel or brass (containing not more than 75 percent copper).

(3) Copper tubing shall be annealed type, Grade K or L conforming to the Specifications for Seamless Copper Water Tube (ASTM B88-72) or shall comply with the specifications for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service, ASTM B280-73.

(4) Steel tubing shall have minimum wall thickness of 0.032 inch for diameters up to 1/2 inch and 0.049 inch for diameters 1/2 inch and larger. Steel tubing shall be constructed in accordance with the Specification for Electric-Resistance Welded Coiled Steel Tubing for Gas and Fuel Oil Lines (ASTM A539-73) and shall be externally corrosion protected. [Order 75-40, § 296-48B-560, filed 12/4/75.]

WAC 296-48B-565 Oil piping systems——Size of oil piping. The minimum size of all fuel-oil tank piping connecting outside tanks to the appliance shall be no smaller than three-eighth-inch OD copper tubing or one-fourth-inch ips. If No. 1 fuel oil is used with a listed automatic pump (fuel lifter), copper tubing shall be sized as specified by the pump manufacturer. [Order 75-40, § 296-48B-565, filed 12/4/75.]

WAC 296-48B-570 Oil piping systems——Joints for oil piping. All pipe joints in the piping system, unless welded or brazed, shall be threaded joints which comply with American National Standard for Pipe Threads (Except Dryseal), B2.1-1968. The material used for brazing pipe connections shall have a melting temperature in excess of 1,000°F. [Order 75-40, § 296-48B-570, filed 12/4/75.]

WAC 296-48B-575 Oil piping systems——Tubing joints. (1) Tubing joints shall be made with either a single or double flare of 45 degrees in accordance with SAE Standard J 533A or with other listed vibration-resistant fittings or joints may be brazed with material having a melting point exceeding 1,000°F. Metallic ball sleeve compression-type tubing fittings shall not be used.

(2) Steel tubing joints shall be made with a double flare in accordance with SAE Standard J 533A. [Order 75-40, § 296-48B-575, filed 12/4/75.]

WAC 296-48B-580 Oil piping systems——Pipe-joint compound. Threaded joints shall be made up tight with listed pipe joint compound which shall be applied to the male threads only. [Order 75-40, § 296-48B-580, filed 12/4/75.]

WAC 296-48B-585 Oil piping systems——Couplings. Pipe couplings and unions shall be used to join sections of threaded pipe. Right and left nipples or couplings shall not be used. [Order 75-40, § 296-48B-585, filed 12/4/75.]

WAC 296-48B-590 Oil piping systems——Grade of piping. Fuel oil piping installed in conjunction with gravity feed systems to oil heating equipment shall slope in a gradual rise upward from a central location to both the oil tank and the appliance in order to eliminate air locks. [Order 75-40, § 296-48B-590, filed 12/4/75.]

WAC 296-48B-595 Oil piping systems——Strap hangers. All oil piping shall be adequately supported by galvanized or equivalently protected metal straps or hangers at intervals of not more than 4 feet, except where adequate support and protection is provided by structural members. Solid-iron-pipe oil supply connection(s) shall be rigidly anchored to a structural member within 6 inches of the supply connection(s). [Order 75-40, § 296-48B-595, filed 12/4/75.]

WAC 296-48B-598 Oil piping systems——Testing for leakage. Before setting the system in operation, tank installations and piping shall be checked for oil leaks with fuel oil of the same grade that will be burned in the appliance. No other material shall be used for testing fuel oil tanks and piping. Tanks shall be filled to maximum capacity for the final check for oil leakage. [Order 75-40, § 296-48B-598, filed 12/4/75.]

WAC 296-48B-600 Appliances——Heat-producing. General. (1) Heat-producing appliances and vents, roof jacks and chimneys necessary for their installations in commercial coaches shall be listed or certified by a nationally recognized testing agency for use in commercial coaches. Air conditioning units, combination air conditioning and heating units shall be listed or certified by a nationally recognized testing agency for the application for which the unit is intended.

(2) Fuel-burning heat-producing appliances and refrigeration appliances, except ranges and ovens, shall be of the vented type and vented to the outside.

(3) Fuel-burning appliances shall not be converted from one fuel to another fuel unless converted in accordance with the terms of their listing and the appliance manufacturer's instructions.

(4) Gas-fired absorption comfort-cooling units shall meet all the requirements of American National Standard for Gas-Fired Absorption Summer Air Conditioning Appliances (ANSI Z21.40.1-1973).

(5) Mechanical comfort-cooling units shall meet all the requirements of the Standard for Unitary Air-Conditioning Equipment (ARI Standard 210-66).

(6) Direct refrigerating systems serving any air conditioning or comfort-cooling system installed in a commercial coach shall employ a type of refrigerant that ranks no lower than Group 5 in the Underwriters' Laboratories, Inc. "Classification of Comparative Life Hazard of Various Chemicals." [Order 75-40, § 296-48B-600, filed 12/4/75.]

WAC 296-48B-610 Appliances——Installation. (1) The installation of each appliance shall conform to the terms of its listing and the manufacturer's instructions. The installer shall leave the manufacturer's instructions attached to the appliance. Every appliance shall be secured in place to avoid displacement.

(2) All fuel-burning appliances, except ranges, ovens, illuminating appliances, clothes dryers, solid fuel-burning fireplaces and solid fuel-burning fireplace stoves, shall be installed to provide for the complete separation of the combustion system from the interior atmosphere of the commercial coach. Combustion air inlets and flue gas outlets shall be listed or certified as components of the appliance. 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 as to separate the appliance combustion system and venting system from the interior atmosphere of the commercial coach. There shall not be any door, removable access panel or other opening into the enclosure from the inside of the commercial coach. Any opening for ducts, piping, wiring, etc., shall be sealed.

(3) A forced air appliance and its return-air system shall be designed and installed so that negative pressure created by the air-circulating fan cannot affect its or another appliance's combustion air supply or act to mix products of combustion with circulating air.

(4) The air circulating fan of a furnace installed in an enclosure with another fuel-burning appliance shall be operable only when any door or panel covering an opening in the furnace fan compartment or in a return air plenum or duct is in the closed position.

NOTE: This does not apply if both appliances are direct vent system (sealed combustion system) appliances.

(5) If a warm air appliance is installed within an enclosure to conform to WAC 296-48B-610(2)(b), each warm-air outlet and each return air inlet shall extend to the exterior of the enclosure. Ducts, if used for that purpose, shall not have any opening within the enclosure and shall terminate at a location exterior to the enclosure.

(6) Cooling coils installed as a portion of, or in connection with, any forced-air furnace shall be installed on the downstream side unless the furnace is specifically otherwise listed.

(a) A cooling coil shall not be located in the air discharge duct or plenum of any forced-air furnace unless such furnace is listed for use with a cooling coil or listed for operation at not less than 0.5 inch water column external static pressure.

(b) If a cooling coil is installed within a forced-air furnace, the coil shall be listed for use with that furnace in the manner so installed or be approved for such use. [Order 75-40, § 296-48B-610, filed 12/4/75.]

WAC 296-48B-615 Appliances——Venting, ventilation and combustion air. (1) The venting as required by WAC 296-48B-600(2) shall be accomplished by one or more of the methods given in (a) and (b) below:

(a) An integral vent system listed or certified as part of the appliance.

(b) A venting system consisting entirely of listed components, including roof jack, installed in accordance with the terms of the appliance listing and the appliance manufacturer's instructions (see WAC 296-48B-610(2)).

(2) Venting and combustion air systems shall be installed in accordance with the following:

(a) Components shall be securely assembled and properly aligned using the method shown in the appliance manufacturer's instructions.

(b) Draft hood connectors shall be firmly attached to draft hood outlets or flue collars by sheet metal screws or by an equivalent means.

(c) Every joint of a vent, vent connector, exhaust duct and combustion air intake shall be secure and in alignment.

(3) Venting systems shall not terminate underneath a commercial coach.

(4) Venting system terminations shall be not less than three feet from any motor-driven air intake discharging into habitable areas.

(5) The area in which cooking appliances are located shall be ventilated by a metal duct which may be single wall, not less than 12.5 square inches in cross-sectional area (minimum dimension shall be two inches) located above the appliance(s) and terminating outside the commercial coach, or by listed mechanical ventilating equipment that is installed in accordance with the terms of listing and the manufacturer's instructions. Gravity or mechanical ventilation shall be installed within a horizontal distance of not more than ten feet from the vertical front of the appliance(s). [Order 75-40, § 296-48B-615, filed 12/4/75.]

WAC 296-48B-620 Appliances——Clearance-general. (1) Information on clearances, input rating, lighting and shut-down shall be attached to the appliances with the same permanence as the nameplate and so located that it is easily readable when the appliance is properly installed.

(2) Each fuel-burning appliance shall bear permanent marking designating the type(s) of fuel for which it is listed.

(3) Accessibility. Every appliance shall be accessible for inspection, service, repair and replacement without removing permanent construction. Sufficient room shall be available to enable the operator to observe the burner, control and ignition means while starting the appliance.

(4) Location. Heat-producing appliances shall be so located that no doors, drapes or other such material can be placed or swung closer to the front of the appliance than the clearances specified on the labeled appliances.

(5) Clearances. Clearances between heat-producing appliances and adjacent surfaces shall not be less than specified in the terms of their listing. Clearance spaces shall be framed in or guarded to prevent creation of storage space.

(6) Instructions. Operating instructions shall be provided with appliances. [Order 75-40, § 296-48B-620, filed 12/4/75.]

WAC 296-48B-675 Safety devices——Water heater relief valves. (1) All water heaters shall be installed with approved and listed fully automatic valve or valves designed to provide temperature and pressure relief.

(2) Any temperature relief valve or combined pressure and temperature relief valve installed for this purpose shall have the temperature sensing element immersed in the hottest water within the upper 6 inches of the tank. It shall 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°F.

(3) Relief valves shall be provided with full-sized drains which shall be directed downward and discharge beneath the commercial coach. Drain lines shall be of a material listed for hot water distribution and shall drain fully by gravity, shall not be trapped and shall not have their outlets threaded. [Order 75-40, § 296-48B-675, filed 12/4/75.]

WAC 296-48B-680 Air ducts——Duct material for circulating air supply system. Supply ducts shall be made from galvanized steel, tin-plated steel or aluminum or shall be listed Class 0, Class 1 or Class 2 air ducts. Class 2 air ducts shall be located at least 3 feet from the furnace bonnet or plenum. A duct system integral with the structure shall be of durable construction that can be demonstrated to be equally resistant to fire and deterioration. Ducts constructed from sheet metal shall be in accordance with Table H-3.

NOTE: Class 1 air ducts shall have a flame-spread rating of not over 25 without evidence of continual progressive combustion and a smoke-developed rating of not over 50.

Class 2 air ducts shall have a flame-spread rating of not over 50 without evidence of continued progressive combustion and a smoke-developed rating of not over 50 for the inside surface material and not over 100 for the outside surface material.

TABLE H-3

Minimum Metal Thickness for Ducts*

Duct Type	Diameter or 14 inches or less	Width over 14 inches
Round	0.013 in.	0.016 in.
Enclosed Rectangular	0.013 in.	0.016 in.
Exposed Rectangular	0.016 in.	0.019 in.

*When "nominal" thicknesses are specified, 0.003 inch shall be added to these "minimum" metal thicknesses.

[Order 75-40, § 296-48B-680, filed 12/4/75.]

WAC 296-48B-685 Air ducts——Sizing of ducts. Ducts shall be designed so that when a labeled forced-air furnace is installed and operated continually at its normal input rating in the commercial coach, with all registers in full open position, the static pressure measured in the duct plenum shall not exceed that shown in Table H-4 or exceed that shown on the label of the appliance. When an air-cooler coil is installed between the furnace and the duct plenum, the total static pressure between the furnace and the coil shall not exceed that shown on the label of the furnace. The minimum dimension of any branch duct shall be at least 1 1/2 inches, and of any main duct, 2 1/2 inches. [Order 75-40, § 296-48B-685, filed 12/4/75.]

WAC 296-48B-690 Air ducts——Airtightness of supply duct systems. A supply duct system shall be considered substantially airtight when the static pressure in

the duct system, with all registers sealed and with the furnace air circulator at high speed, is at least 80 percent of the static pressure measured in the furnace casing, with its outlets sealed and the furnace air circulator operating at high speed. For the purpose of this paragraph and WAC 296-48B-720, pressures shall be measured with a water manometer or equivalent device calibrated to read in increments not greater than 1/10 inch water column.

TABLE H-4

Maximum Allowable Static Pressures in Supply Duct Systems

Input to Forced-Air Furnace Btu/hr.	External Static Pressure Inches Water Column Measured at the Furnace Outlet	
	Temperature of Outlet Air Determined by Function of Limit Control	
	Above 165°F	165°F or Less
55,000 and under	0.10	0.20
Over 55,000 to 80,000	0.12	0.24
Over 80,000 to 100,000	0.15	0.30

[Order 75-40, § 296-48B-690, filed 12/4/75.]

WAC 296-48B-695 Air ducts——Expandable or multiple commercial coach connections. (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 section.

(2) Installation instructions for supporting the crossover duct from the commercial coach shall be provided for onsite installation. The duct shall not be in contact with the ground. [Order 75-40, § 296-48B-695, filed 12/4/75.]

WAC 296-48B-720 Air ducts——Return air systems. Provisions shall be made to permit the return of circulating air from all rooms and living spaces except toilet room(s), to the circulating air supply inlet of the furnace.

(1) Duct Material. Return ducts and any diverting dampers contained therein shall be in accordance with the following:

(a) Portions of return ducts directly above the heating surfaces or closer than 2 feet from the outer jacket or casing of the furnace shall be constructed of metal in accordance with Table H-3 or shall be listed Class 0 or Class 1 air ducts.

(b) Return ducts, except as required by (1) above, shall be constructed of one-inch (nominal) wood boards (flame-spread classification of not more than 200), other suitable material no more flammable than one-inch board or in accordance with Table H-3.

(c) The interior of combustible ducts shall be lined with noncombustible material at points where there might be danger from incandescent particles dropped through the register or furnace such as directly under floor registers and the bottom of vertical ducts or directly under furnaces having a bottom return.

(2) Sizing. The cross-sectional area of the return air duct shall not be less than 2 square inches for each 1,000 Btu per hour input rating of the appliance. Dampers shall not be placed in any return air duct, except that a diverting damper may be placed in a combination fresh air intake and return air duct so arranged that the required cross-sectional area will not be reduced at all possible positions of the damper.

(3) Permanent Uncloseable Openings. Living areas not served by return air ducts or closed off from the return opening of the furnace by doors, sliding partitions or other means shall be provided with permanent uncloseable openings in the doors or separating partitions to allow circulated air to return to the furnace. Such openings may be grilled or louvered. The net free area of each opening shall be not less than 1 square inch for every 5 square feet of total living area closed off from the furnace by the door or partition serviced by that opening. Undercutting doors connecting the closed-off space may be used as a means of providing return air area. However, in the event that doors are undercut, they shall be undercut a minimum of 2 inches and no more than 2 1/2 inches and no more than one-half of the free air area so provided shall be counted as return air area. [Order 75-40, § 296-48B-720, filed 12/4/75.]

WAC 296-48B-725 Air ducts——Joints and seams. Joints and seams of ducts shall be securely fastened and made substantially airtight. Slip joints shall have a lap of at least 1 inch and shall be individually fastened. Tape or caulking compound may be used for sealing mechanically secure joints. Where used, tape or caulking compound shall not be subject to deterioration under long exposures to temperatures up to 200°F. and to conditions of high humidity, excessive moisture or mildew. [Order 75-40, § 296-48B-725, filed 12/4/75.]

WAC 296-48B-730 Air ducts——Supports. Ducts shall be securely supported. [Order 75-40, § 296-48B-730, filed 12/4/75.]

WAC 296-48B-735 Air ducts——Registers or grills. Fittings connecting the registers or grills to the duct system shall be constructed of metal or material which complies with the requirements of Class 1 or 2 ducts under Underwriters' Laboratories, Inc. Standard for Air Ducts, UL181-1972. Registers or grills shall be constructed of metal or conform with the following:

(1) Be made of a material classified 94VE-0 or 94VE-1 when tested as described in Underwriters' Laboratories, Inc. Standard for Tests for Flammability of

Plastic Materials for Parts in Devices and Appliances. UL94–1974

(2) Floor register or grills shall resist without structural failure a 200 lb. concentrated load on a 2–inch diameter disc applied to the most critical area of the exposed face of the register or grill. For this test the register or grill is to be at a temperature of not less than 165°F. and is to be supported in accordance with the manufacturer's instructions. [Order 75–40, § 296–48B–735, filed 12/4/75.]

WAC 296–48B–740 Air ducts——Duct and plenum insulation. Every heating and cooling duct and plenum shall be installed in accordance with the following:

(1) Air supply ducts that are not within the coach insulation having an R factor of at least 4 shall be insulated.

(2) Supply ducts within the coach but not within the insulation described in (1) shall be insulated with rigid insulation having a thermal insulation (R) not less than 3 with a continuous vapor barrier having a perm rating of not more than 1.0.

(3) Supply ducts exposed directly to outside air, such as under chassis crossover ducts, shall be insulated with material having a thermal insulation (R) of not less than 4.0 with a continuous vapor barrier having a perm rating of not less than 1.0.

(4) Aluminum foil used as a vapor barrier shall be at least 2 mils in thickness. [Order 75–40, § 296–48B–740, filed 12/4/75.]

WAC 296–48B–800 Plumbing——Definitions. Definitions contained in the Uniform Plumbing Code, 1973 Edition, and the following definitions shall apply to this section:

DRAIN OUTLET: The discharge end of the commercial coach main drain to which a drain connector may be attached.

MAIN DRAIN: The principal artery of the commercial coach drainage system to which drainage branches may be connected.

UNIFORM PLUMBING CODE (U.P.C.): 1973 Edition, as published by the International Association of Plumbing and Mechanical Officials.

WATER–SUPPLY CONNECTION: The fitting or point of connection of the commercial coach water distribution system designed for connection to a water connector. [Order 75–40, § 296–48B–800, filed 12/4/75.]

WAC 296–48B–805 Plumbing——General. Plumbing fixtures, equipment and installations in commercial coaches shall conform to the provisions of the Uniform Plumbing Code, 1973 Edition, except parts 1 and 2, unless specifically exempted or required by this section. The provisions of this section are also applicable to the alteration or conversion of plumbing equipment and installations in any commercial coach bearing or required to bear a department insignia of approval. [Order 75–40, § 296–48B–805, filed 12/4/75.]

WAC 296–48B–810 Plumbing——Location of water–supply connections. (1) Each commercial coach equipped with a water distribution system shall have a water–supply connection which shall terminate within 18 inches of the outside wall of the commercial coach.

(2) Cap or Plug. Water–supply connections shall be equipped with a watertight cap or plug which shall be permanently attached to the vehicle. [Order 75–40, § 296–48B–810, filed 12/4/75.]

WAC 296–48B–815 Plumbing——Tub and shower enclosures. Wall surfacing for tub and shower enclosures shall meet the following:

(1) Material. The wall covering material must have an exposed surface that is impervious to water; the substrate material must be resistant to deterioration from exposure to high humidity and temporary water leakage.

(a) Strength. The complete wall assembly, including the wall covering substrate, shall be capable of withstanding a uniform load of five pounds per square foot applied perpendicular to the surface. The deflection, under load, shall not exceed 1/180 of the height of the wall, for the assembly; or 1/240 the distance between framing members, for the wall covering substrate.

(b) Surface Finish. The exposed surface must meet the minimum requirements of the American Hardboard Association PS59–73, Prefinished Hardboard Paneling, Class 1, as certified by the panel manufacturer.

(c) Size. The minimum thickness of the material shall be 1/8" nominal. The width to be sufficient to give continuous unbroken surface from corner to corner or end of tub in corner installation. In an installation incorporating a shower, the unbroken surface must continue to a height of at least 6' above the floor of the shower.

(d) Type. The substrate material shall also meet the requirements of the appropriate standard listed below.

(i) Hardboard: of high strength and water resistance to meet Commercial Standard CS–251–63 or AHA PS 58–73, either standard or tempered.

(ii) Softwood Plywood: must meet U.S. Product Standard P.S. 1–66, including exterior type glue line and grade A face veneer "suitable for painting."

(iii) Hardwood Plywood: must meet CA–35–61, Type II glue line and sound grade face veneer.

(iv) Other Materials: not meeting the (d)(i), (d)(ii), (d)(iii) above, shall meet the requirements of this code and their appropriate Product Standard, Industry Standard, Commercial Standard or Federal Specification.

(2) Installation. The material must be installed in conformance with this code and the application instructions provided by the material manufacturer. In case of conflict, this regulation shall take precedence.

(a) Framing. Wood framing shall be spaced not more than 16" o.c. Blocking shall be 1" x 3" or equal, installed horizontally at height to match rim of the tub or shower pan. All corners shall have sufficient framing members for attachment of corner mouldings.

(b) Fastening. All edges and ends of panel shall occur on framing members. Panels shall be applied to wood

framing members using water resistant, non-hard setting adhesive. Adhesive shall be applied to the face of all framing members except locations where panel edges fall beneath applied mouldings. Panels may also be applied over solid backing using an adhesive.

NOTE: Fasteners, if necessary, shall be used only in locations where they will be covered by applied mouldings and shall be used on not more than two adjacent edges. No other interior fasteners or fixtures, other than required functional plumbing fixtures, shall penetrate the face of the panel. Openings for these plumbing fixtures must be sealed with caulk.

(c) Corners and Edges. All corners and edges must be caulked or sealed against moisture penetration. A nonhard setting sealant material must be used with applied mouldings. Fastening of mouldings to framing shall not be greater than 6" o.c. [Order 75-40, § 296-48B-815, filed 12/4/75.]

WAC 296-48B-820 Drainage——Location of drain outlets. (1) Each commercial coach equipped with plumbing fixtures or equipment shall have only one drain outlet which shall terminate within 18 inches of the outside wall of the commercial coach.

(2) A multiple commercial coach may have more than one drain outlet when approved by the department. [Order 75-40, § 296-48B-820, filed 12/4/75.]

WAC 296-48B-825 Drainage——Cap or plug. Drain outlets shall be equipped with a watertight cap or plug which shall be permanently attached to the vehicle. [Order 75-40, § 296-48B-825, filed 12/4/75.]

WAC 296-48B-830 Drainage——Clearance from drain outlet. The drain outlet and couplers shall be provided with a minimum clearance of three inches in any direction from all parts of the structure or appurtenances and with not less than 18 inches unrestricted clearance directly in front of the drain outlet. [Order 75-40, § 296-48B-830, filed 12/4/75.]

WAC 296-48B-835 Drainage——Drainage systems materials. Plastic drain-waste-vent piping shall be permitted for domestic sewage as defined in the Uniform Plumbing Code. [Order 75-40, § 296-48B-835, filed 12/4/75.]

Chapter 296-49 WAC
GOVERNOR'S MOBILE HOME AND RECREATIONAL VEHICLE ADVISORY BOARD

WAC

296-49-005 Forward.
296-49-010 Definitions.
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296-49-020 Internal management.
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296-49-035 Appearance and practice before board.
296-49-040 Solicitation of business unethical.
296-49-045 Standards of ethical conduct.
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DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

296-49-001 Conditions of reciprocity. [Order 73-14, § 296-49-001 and 296-49-011, filed 7/31/73.] Recodified as WAC 296-48-011.

296-49-012 Agreements with out-of-state jurisdictions. [Order 73-14, § 296-49-012, filed 7/31/73.] Recodified as WAC 296-48-012.

WAC 296-49-005 Forward. The State Mobile Home and Travel Trailer Law, RCW 43.22.420, establishes the Governor appointed Mobile Home and Recreational Vehicle Advisory Board and fixes its administrative responsibilities. The Advisory Board's principal function is to assist the Director of Labor and Industries in adopting and promulgating reasonable rules and regulations in furtherance of safety to life and property with respect to plumbing, heating and electrical installations, minimum inspection procedures and the adoption of rules and regulations pertaining to the manufacture of mobile homes and recreational vehicles. While the Advisory Board will, upon request of the Director of the Department of Labor and Industries or the Mobile Home and Recreational Vehicle Section thereof, aid in the administrative interpretation of the National Codes and Rules and Regulations covering standards for plumbing, heating and electrical installations in the State of Washington, it will not function as board of appeal nor will it render decisions concerning the application or interpretation of any adopted Rules and Regulations to any person, firm or corporation engaged in the business of manufacturing mobile homes or recreational vehicles.

The primary purpose of the following rules is to provide a uniform procedure whereby persons, firms or corporations interested in communicating with the Department of Labor and Industries on any subject matter relative to Rules and Regulations which should be adopted, amended or repealed for plumbing, heating or electrical installations in the state of Washington or relative to the operation of the Mobile Home and Recreational Vehicle Section of such Department may be heard. [Order 70-3, § 296-49-005, filed 4/29/70.]

WAC 296-49-010 Definitions. Whenever used in these rules, the words:

BOARD: Shall mean the Washington State Mobile Home and Recreational Vehicle Advisory Board appointed by the Governor pursuant to RCW 43.22.420.

DEPARTMENT: Shall mean the Department of Labor and Industries of the State of Washington.

DIRECTOR: Shall mean the Director of the Department of Labor and Industries.

REGULAR MEETING: Shall mean the quarterly meetings held by the Board on the last Friday of the months February, May, August and November.

SPECIAL MEETING: Shall mean any meeting of the Board called by the chairman thereof or the Director and held at times other than the regular meetings. [Order 70-3, § 296-49-010, filed 4/29/70.]

WAC 296-49-015 Officers. In addition to the chairman and secretary of the Board, as provided for by RCW 43.22.420, the Board shall elect from its members a vice chairman who shall perform all functions of the chairman in his absence. [Order 70-3, § 296-49-015, filed 4/29/70.]

WAC 296-49-020 Internal management. The Board shall adopt written rules of procedure for its internal management which shall include, "Roberts' Rules of Order, Revised", copies of such rules of procedure shall be made available to interested persons upon written request. [Order 70-3, § 296-49-020, filed 4/29/70.]

WAC 296-49-025 Duties. (1) The Board shall study proposed rules and regulations submitted to it by the Director or by the Mobile Home and Recreational Vehicle Section of the Department and shall make recommendations to the Director concerning their adoption and promulgation.

(2) The Board shall further develop and submit for consideration to the Director administrative procedures, organizational plans and rules relating to improving the function of the Mobile Home and Recreational Vehicle Section.

(3) The Board shall at each regular or special meeting consider any written proposals made by any persons, firms or corporations for new rules or regulations or for changes in administrative procedures of the Mobile Home and Recreational Vehicle Section provided such proposals are submitted in writing to the secretary of the Board at least fifteen (15) days prior to any such meeting so that the same may be properly included on the agenda for such meeting. [Order 70-3, § 296-49-025, filed 4/29/70.]

WAC 296-49-030 Hearings. Any person, firm or corporation desiring to be heard on any subject matter relative to Rules or Regulations which should be adopted, amended or repealed for plumbing, heating and electrical installations in the state of Washington, or relative to the operation of the Mobile Home and Recreational Vehicle Section of such Department at any regular meeting of the Board shall present a written request to that effect to the secretary of the Board at least fifteen (15) days prior to the next regular meeting, setting forth a summary of any and all proposals on which the hearing is requested. [Order 70-3, § 296-49-030, filed 4/29/70.]

WAC 296-49-035 Appearance and practice before board. No person may appear in a representative capacity before the Board other than the following:

(1) Attorneys at law duly qualified and entitled to practice before the Supreme Court of the State of Washington.

(2) Attorneys at law duly qualified and entitled to practice before the highest court of record of any other state, if the attorneys at law of the state of Washington are permitted to appear in a representative capacity before administrative agencies of such other state, and if not otherwise prohibited by Washington State Law.

(3) A bona fide owner, officer, partner, or full time employee of an individual, firm, association, organization, partnership, or corporation who appears for such individual, firm, association, organization, partnership or corporation or a person (other than an attorney at law as provided in subparagraphs (1) and (2) above) appointed in writing to represent an individual, firm, association, organization, partnership or corporation. [Order 70-3, § 296-49-035, filed 4/29/70.]

WAC 296-49-040 Solicitation of business unethical. It shall be unethical for persons acting in a representative capacity before the Board to solicit business by circulars, advertisements or by personal communication or interviews not warranted by personal relations, provided that such representatives may publish or circulate business cards. It is equally unethical to procure business by solicitors of any kind. [Order 70-3, § 296-49-040, filed 4/29/70.]

WAC 296-49-045 Standards of ethical conduct. All persons appearing in proceedings before the Board in a representative capacity shall conform to the standards of ethical conduct required of attorneys before the courts of Washington. If any such person does not conform to such standards, the Board may decline to permit such person to appear in a representative capacity in any proceeding before the Board. [Order 70-3, § 296-49-045, filed 4/29/70.]

WAC 296-49-050 Appearance by former employee. No former employee of the Board or member of the Attorney General's staff may at any time after severing his employment with the Board or the Attorney General appear, except with the written permission of the Board, in a representative capacity on behalf of other parties in any proceeding wherein he previously took an active part as a representative of the Board. [Order 70-3, § 296-49-050, filed 4/29/70.]

WAC 296-49-055 Former employee as expert witness. No former employee of the Board shall at any time after severing his employment with the Board appear, except with the written permission of the Board, as an expert witness on behalf of other parties in any proceeding wherein he previously took an active part in the investigation as a representative of the Board. [Order 70-3, § 296-49-055, filed 4/29/70.]

WAC 296-49-060 Computation of time. In computing any period of time prescribed or allowed by the Board rules, by order of the Board or by any applicable statute, the day of the act, event, or default after which the designated period of time begins to run is not to be

included. The last day of the period so computed is to be included. [Order 70-3, § 296-49-060, filed 4/29/70.]

WAC 296-49-065 Administrative procedures act. All proceedings regarding supplemental rules and regulations shall comply, where applicable, with the provisions of the Administrative Procedures Act, chapter 34.04 RCW, and any amendments thereto. [Order 70-3, § 296-49-065, filed 4/29/70.]

Chapter 296-50 WAC
SAFETY STANDARDS——MANUFACTURE OF EXPLOSIVES

WAC

296-50-010 Foreword.
296-50-020 Introductory.
296-50-030 Management's responsibility.
296-50-040 Employee's responsibility.
296-50-050 Minimum requirements for first aid.
296-50-060 First aid kit.
296-50-070 First aid room.
296-50-080 General regulations.
296-50-090 Dope house.
296-50-100 Dynamite mixing house.
296-50-110 Dynamite pack machine house.
296-50-120 Gelatin mixing house.
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296-50-140 Handpack house.
296-50-150 Waste opening house.
296-50-160 Box packing house.
296-50-170 Powder repair shop.
296-50-180 Batch nitrator.
296-50-190 Separator and prewash operation.
296-50-200 N.G. neutralizing house and store house.
296-50-210 Acid operations.
296-50-220 Spare parts houses.
296-50-230 Nitrocotton screening and drying houses.

WAC 296-50-010 Foreword. These safety standards are promulgated under and by authority of RCW 49-.16.010, 49.16.080, 49.16.090, 49.16.100 and 49.16.050 by hearing held at Olympia June 28, 1957 for the purpose of direction and guidance of manufacturers of explosives in order to comply with RCW 49.16.030. ". . . to render the work and place of work safe . . . " They shall become effective August 15, 1957. Attention is called to RCW 70.74.010 which reads as follows: "The term 'explosive' or 'explosives' whenever used in this act, shall be held to mean and include any chemical compound or mechanical mixture, that is commonly used or intended for the purpose of producing an explosion that contains any oxidizing and combustible units, or other ingredients in such proportions, quantities or packing, that an ignition by fire, by friction, by concussion, by percussion or by detonator or any part of the compound or mixture may cause such a sudden generation of highly heated gases that the resultant gaseous pressures are capable of producing destructive effects on contiguous objects or of destroying life and limb." [Foreword, filed 3/23/60, effective 8/15/57.]

WAC 296-50-020 Introductory. For reasons of brevity the safety educational standards as set forth in the general safety standards of the state of Washington, are not reprinted here but attention is called to several educational requirements contained in the above named standards. [Introductory clause, filed 3/23/60, effective 8/15/57.]

WAC 296-50-030 Management's responsibility. (1) Report directly to the division of safety, Olympia, by telephone or telegraph (collect), immediately, any accident resulting in an immediate or probable fatality.

(2) Equipment involved in an accident resulting in an immediate fatality, shall not be moved, until a representative of the division of safety investigates the accident and releases such equipment, except where removal is essential to prevent further accident. Where necessary to remove the victim such equipment may be moved only to the extent of making possible such removal.

(3) Immediately upon notification of accident, department representative shall inform employer when investigator will be available. If circumstances exist whereby investigation will be delayed, department representative may permit employer to proceed with normal job operations.

(4) Upon arrival of division of safety investigator, employer shall assign to assist the investigator, the immediate supervisor and all employees who were eye witnesses to the accident, or whoever the investigator deems necessary to complete his investigation. Each witness shall give his own version and there shall be no discriminatory action taken for anyone testifying in any investigation.

(5) To prohibit any employee from working on or being in the vicinity of any job while under the influence of or affected by intoxicants. Employers shall be responsible for the actions of any employee known to be in an intoxicated condition while on the job.

(6) Assume the responsibility of work assignment so that no member of any production or maintenance crew shall be required to work in a position or location so isolated from other members of the crew that he is not in ordinary calling distance in case of an emergency.

(7) Make sure that every man has been trained for the work he is assigned to and has been thoroughly instructed in his duties and responsibilities. [Rule 1, filed 3/23/60, effective 8/15/57.]

WAC 296-50-040 Employee's responsibility. He shall not report to the job while under the influence of intoxicants and shall not use intoxicants or drugs covered by the federal narcotics act while on the job.

To advise inexperienced fellow employees of safe ways to do their work and warn them of dangers to be guarded against.

Employees shall wear, use and properly care for personal protective safety equipment issued to them and return same to employer on termination of employment.

Workmen exposed to overhead hazards shall wear approved safety hats.

Employees should wear safety shoes when their feet are exposed to hazards of falling materials.

Safety inspector plan.

Settlement of disputes (Safety inspectors).

Safety committee plan.
Settlement of disputes (Safety committee).
Safety educational reports.
Safety bulletin board. [Rule 2, filed 3/23/60, effective 8/15/57.]

WAC 296-50-050 Minimum requirements for first aid. (1) RCW 51.36.030 provides that: "Every employer, who employs less than fifty workmen, shall keep at his plant a first aid kit equipped as required by the department with materials for first aid to his injured workmen. Every employer who employs within a radius of one-half mile of any plant or establishment fifty or more workmen, shall keep one first aid station equipped as required by the department with materials for first aid to his injured workmen, and shall cooperate with the department in training one or more employees in first aid to the injured. The maintenance of such first aid kits and stations shall be deemed to be a part of any educational standards established under the provisions of sections 7734 and 7736."*

(2) Adequate provisions for the first aid treatment of injured persons shall be maintained at all times in every industrial establishment and on every operation covered by the Act.

(3) Employers shall arrange to have as many workmen as possible take a full course in first aid training.

(4) There shall be at least one employee who has either a Red Cross, U.S. bureau of mines, or department of labor and industries current first aid certificate available during all operating hours in each plant, department or branch establishment employing less than 15 persons. (A current first aid certificate is one which is less than 3 years old.)

(5) There shall be at least two employees who have either Red Cross, U.S. bureau of mines, or department of labor and industries current first aid certificates available during all operating hours in each plant, department, or branch establishment employing more than 15 persons. (A current first aid certificate is one which is less than 3 years old.) [Rule 3, filed 3/23/60, effective 8/15/57.]

***Reviser's note:** Section 7734 above is now RCW 49.16.050. Section 7736, which was repealed by Laws of 1927, section 19, page 762, read as follows: "The educational standards for coal mines and coal mining shall be prescribed by a board hereby created to be known as the 'State Mining Board' consisting of two members to be appointed by the state safety board."

For later law see RCW 43.22.120 et seq. and 78.40.780 et seq.

WAC 296-50-060 First aid kit. (1) A first aid kit shall be available on small construction jobs, line crews, and other transient or short duration jobs. On all such operations, or at small plants or division establishments employing less than fifty workmen, there shall be a first aid kit containing the following supplies or their equals as recognized by the plant or establishment medical director or medical consultant, or by the department of labor and industries.

1 package iodine applicators (not less than 6) and 1 package antiseptic applicators (not less than 6) containing some other approved antiseptic.
1 package aromatic spirits of ammonia ampoules and 1 package of ammonia inhalants in ampoules.
1 package water soluble base burn treatment.
6 triangle bandages 40" size.
1 tourniquet—buckle type.
1 1/2" x 5 yards Z. O. adhesive (sterilized).
6 compress bandages 4" x 4" pads (sterilized and individually wrapped in water proof packages).
4 compress bandages 2" x 2" pads (sterilized and individually wrapped in water proof packages).
2 2" roller bandages (sterilized).
6 3" x 3" gauze pads (sterilized and individually wrapped).
1 package 3/4" x 1" water proof adhesive compresses (100 in package).
1 pair scissors and 1 pair tweezers.
Proper antidotes for poisons to which workers may be exposed.
1 package approved eye dressing.
A chart showing clearly the pressure points and tourniquet points of the human body shall be fastened on the inside of the cover or door of the container for ready reference.

(2) All crew trucks, power shovels, cranes, locomotives, loaders, cats, logging trucks, speeders, freight trucks and similar equipment and vehicles shall be equipped with a standard dust and moisture proof first aid kit (a moisture proof kit is one having a rubber seal around the inside of either of the closing edges to keep moisture from entering kit when closed) containing the following items:
1 package iodine applicators (not less than 6) and 1 package antiseptic applicators (not less than 6) containing some other approved antiseptic.
4 triangle bandages 40".
3 2" compress bandages.
3 4" compress bandages.
1 package 3/4" or 1" waterproof adhesive compresses (16 in package).
1 tourniquet—buckle type.
1 pair scissors and 1 pair tweezers.
1 package aromatic spirits of ammonia ampoules for internal use.
1 package ammonia inhalants in ampoules.
1 package water soluble base burn treatment.
2 packages 3" x 3" sterile gauze pads—4 to a package.
1 package 18" x 36" gauze (sterile).
1 package 36" x 36" gauze (sterile).
1 package approved eye dressing.
2 2" roller bandages (sterilized).
1 chart showing clearly the pressure points and tourniquet points of the human body shall be fastened on the inside of the cover of the container for ready reference.

(3) In addition to the first aid kit which must be kept on the equipment or at the place of work, there shall be available within the closest practicable distance from the operations (not to exceed 1/2 mile) the following items:
1 set of arm and leg splints.
2 all wool blankets (properly protected and marked).
1 stretcher.

(4) First aid instructors will, upon request, be furnished to industries by the division of safety of the department of labor and industries.

(5) All foremen, supervisors, or persons in direct charge of crews should have either a Red Cross, U.S. bureau of mines, or department of labor and industries current first aid certificate; it being understood that a certificate is void 3 years from date of issue.

(6) Workers whose injuries require the use of a stretcher or ambulance or while being transported by other means shall be accompanied to the hospital by an attendant other than the driver. This attendant shall be first aid trained if possible, and shall ride with the patient.

(7) All ambulances used to transport injured workers shall be equipped with a fracture board as approved by the department of labor and industries.

(8) All drivers of ambulances transporting workmen covered by industrial insurance shall be trained in basic and advanced first aid as approved by the department of labor and industries.

(9) Immediate and proper transportation shall be provided for injured persons requiring the same, and such transportation shall have precedence over all other transportation under the control of the firm or party upon whose operation the accident occurs.

(10) All first aid kits shall be kept filled and maintained in proper condition.

(11) When practical, a poster shall be fastened and maintained either on or in the cover of each first aid cabinet and at or near all phones plainly stating the phone numbers of all available doctors, hospitals, and ambulance service within the district of the employer.

(12) Every fixed establishment employing more than 200 persons shall have a first aid room plainly designated as such. It shall be well lighted and well ventilated, kept spotlessly clean and orderly, provided with hot and cold running water, and fully equipped at all times. There shall be either a person who has a current first aid certificate, or a trained nurse in charge of the first aid room. [Rule 4, filed 3/23/60, effective 8/15/57.]

WAC 296-50-070 First aid room. (1) The minimum first aid supplies to be kept in the first aid room shall be:

1 package iodine applicators (not less than 24 in a package) and 1 package antiseptic applicators (not less than 24 in a package) containing some other approved antiseptic.

1 package aromatic spirits of ammonia ampoules and 1 package ammonia inhalants in ampoules.

2 packages water soluble base burn treatment.

6 triangle bandages 40" size.

1 tourniquet—Buckle type.

1 1" x 5 yds. Z. O. adhesive (sterilized).

1 2" x 5 yds. Z. O. adhesive (sterilized).

6 compress bandages 2" x 2" pads sterilized and individually wrapped in waterproof packages.

6 compress bandages 4" x 4" pads sterilized and individually wrapped in waterproof packages.

1 package approved eye dressing.

White vaseline.

2 each of 2", 3" and 4" roller bandages (sterilized).

12 3" x 3" sterile gauze pads (individually packaged).

18" x 36" sterile gauze.

1 pair scissors, 1 pair tweezers, medicine droppers, assorted safety pins and paper drinking cups.

1 bottle rubbing alcohol and 1 package absorbent cotton.

6 finger cots.

1 set arm and leg splints.

Proper antidotes for poisons to which workers may be exposed.

A chart clearly showing pressure and tourniquet points shall be fastened on inside of cover or door of materials container.

1 stretcher and 2 all wool blankets (properly protected and marked).

1 container, dust proof, to be used solely for storage of first aid materials.

1 cot, complete with springs, mattress, blankets and 2 pillows (if both men and women are employed in the plant or establishment, privacy shall be provided).

2 hot water bottles.

1 emergency first aid kit, 24 unit size.

Some means of sterilizing tweezers shall be provided for.

(2) The foregoing minimum safety educational and first aid program, of necessity, is briefly covered, and calls for less than average safety work. It is not anticipated that there will be conflict with other existing programs or requirements. It is expected that these minimum requirements will become the basis on which a more complete program, suited to the size and the needs of the individual establishment, will be set up.

(3) Where any firm or majority group of employees of any firm finds that these educational standards cannot be adhered to in the operation involved, an application for adoption of a different plan of safety organization (on the form furnished by the department) may be filed with the division of safety, department of labor and industries. After full investigation of the operation of the firm, and consultation with the management and employees, the department may, if it is found that these educational standards cannot be complied with, approve the plan proposed or another type of plan recommended by the department (at its option) provided it conforms to the following provisions:

(a) The plan provides full management–employee participation.

(b) The plan is based on sound principles of accident prevention.

(c) The result will not be less than that provided in these educational standards.

(d) Any plan approved may be canceled on 30 days' notice by the division of safety after consultation with the management and employees.

(4) No safety program will run itself. To be successful, the wholehearted interest of the employees' group and management must not only be behind the program,

but the fact must also be readily apparent to all. [Rule 5, filed 3/23/60, effective 8/15/57.]

WAC 296-50-080 General regulations. (1) Smoking is positively prohibited on the plant site except in buildings designated.

(2) No matches or lighters shall be permitted in the plant area except in locations designated by management.

(3) A search of the employees for matches shall be made frequently, and at no time shall the interval between searches exceed one month.

(4) Special clothing and shoes free of metal fasteners shall be worn by all employees regularly working in buildings where explosives are handled. Powder shoes shall not be re-soled. Any pockets provided should be constructed of cloth mesh.

(5) Neither the shoes or the special clothing as set forth in (4) above shall be worn off the premises but shall be left in the change room.

(6) New employee shall not handle explosives or operate any equipment in connection with the manufacture of explosives until he has received thorough instructions in accordance with established practices.

(7) Employees shall not engage in practical jokes or horseplay.

(8) All tools and brooms must be kept in their proper place when not in use.

(9) Gloves must be changed frequently.

(10) Oily rags, waste and refuse must be kept in special covered containers and contents removed to the waste quite frequently.

(11) All fire equipment such as extinguishers, hose, etc., shall be kept in good condition and inspected quarterly.

(12) All employees shall be instructed in the use of fire extinguishers and other fire apparatus.

(13) Great care shall be exercised in the handling and transportation of all explosives and acids.

(14) Any material known to be contaminated shall not be sent to the powder line.

(15) All major equipment used in connection with the manufacture of explosives shall be grounded and grounding inspected at regular intervals to be determined by management.

(16) Dope cans or buggies shall be kept covered or inverted at all times except when being filled or emptied.

(17) Breathing of fumes of oxides of nitrogen is to be avoided. Should an employee inhale a sufficient amount to cause irritation, the employee should cease work immediately and report to first aid station.

(18) Instruction shall be posted in the first aid station pertaining to the treatment of acid burns and nitric oxide vapors.

(19) Goggles shall be worn by employees grinding sulphur, and respirators shall be stand-by equipment in case of bad atmospheric conditions.

(20) All buildings used in the manufacture of explosives shall be kept clean at all times. Daily, weekly and other regular cleanup schedules shall be established.

(21) No explosives in excess of the normal house limit shall be allowed to remain in operating buildings over night.

(22) Suitable maintenance and lubricating schedules shall be set up for each piece of powder machinery.

(23) All electric switches operating equipment shall be turned off during lunch period and at termination of shift.

(24) Equipment in buildings where explosives are manufactured shall not be worked on unless switch is locked in open position, except for minor adjustments.

(25) Shield shall be provided around all acid valves.

(26) Respirators shall be washed daily and cartridges changed when once used.

(27) All safety doors and exits in the houses handling explosives shall be kept clear at all times. Two alternate exits such as chutes or outside stairways shall be provided for each floor.

(28) Rubber mats or suitable shoe cleaning devices shall be provided and used when entering and before leaving the building.

(29) Do not make any repairs to equipment or to buildings until they have been thoroughly cleaned.

(30) All tools shall be handled carefully and oil desensitizer used liberally on the parts being worked on.

(31) Extreme care shall be used by all employees in connection with the use of or repairing of acid equipment.

(32) Any unusual conditions occurring should be reported to supervision immediately.

(33) Goggles and rubber gloves should be worn when working on acid cars.

(34) Brooms should be washed frequently.

(35) Employees in powder operations shall not respond to fire alarms to fight fire in clothing contaminated with powder or nitro-cotton.

(36) Operations in all buildings when explosives are being manufactured shall be closed down when there is an electric storm in the vicinity; all light and power switches shall be pulled, and employees are to go to change house until storm is over, except N.G. line must be secured.

(37) Whenever the state explosive inspector enters the plant to inspect the powder line, arrangements shall be made previously by the inspector in setting the date and time of inspection. While the inspection is in progress, the powder line shall not operate.

(38) In order to guard against inadvertent trespasses, all explosive manufacturing plants must be enclosed on all sides by a substantial fence of at least four barbed wires with warning signs (White background—red letters) attached at 100 ft. intervals, reading as follows: EXPLOSIVES—DANGER—KEEP OUT.

If natural barriers such as rivers, lakes, high cliffs, etc., form a boundary line, no fencing shall be required. [Rules A-1 through A-38, filed 3/23/60, effective 8/15/57.]

WAC 296-50-090 Dope house. (1) Clean and inspect dope screens and brushes twice each shift. Leave screens out overnight. Oil machinery once per shift.

(2) Where electro magnets are used and when ammeter shows less than 3 amperes through magnets, trouble must be corrected before continuing operation.

(3) Keep spare screen on hand at all times for replacing screens with holes, or breaks. Remove defective screen from house immediately after it is replaced.

(4) All materials for delivery to the mixing house shall be thoroughly screened. Dope which falls on the floor under the screen should be swept up and hand screened into the mixing to which it belongs.

(5) Do not send hot dopes to mixing houses. Notify foreman or supervisor if unusual temperatures exist.

(6) Never slide sulfur over floor or down chutes or drop into an empty bin. (Sulfur is subject to static electricity and friction fires and must be handled carefully.) Keep bins full at all times.

(7) Keep dope cans or buggies covered or inverted at all times except when filling or emptying. Examine buggies' interior before filling.

(8) Collect all foreign objects from screen or magnet and send to powder line foreman. Report immediately any unusual material.

(9) Keep house clean and as free of dust as possible at all times.

(10) The following tools are permitted in this building:

Wooden or rubber mallets
Bronze bars on thong
Metal-clad thermometer on thong
Aluminum scoops or
Shovels of aluminum or wood
Brooms and counter brushes
Spare dope screen
Small scales
Wooden hoes

(11) Daily clean-up. Remove screen, clean (wash if necessary) and inspect. Leave screen out overnight. Clean scales, radiators and all interior with compressed air and brush. Brush dirt from exterior of screen and dope cans or buggies. Sweep floors and send all sweepings to waste shed when the accumulation justifies.

(12) Weekly clean-up. In addition to daily clean-up, blow and brush down ceiling, walls and equipment and clean platforms outside the house. Sweep motor room.

(13) Semiannual clean-up. Remove dopes and wash down house.

(14) Powder uniforms and shoes in accordance with WAC 296-50-080(4) must be worn by employees in this house. Goggles and respirators shall be provided for use where needed, particularly when blowing or brushing down a house.

(15) Never work on equipment without pulling switches and locking the starting equipment, except for minor repairs. Pull all electric switches at the end of operating day.

(16) Inspect screens twice each shift or oftener, reporting any holes or breaks immediately to supervisor. Remove defective screen from house for repairs immediately.

(17) Where electro magnets are used, make certain that magnet lights are on during operation of screens. Remove tramp iron from magnets twice per shift and deliver accumulation to the line foreman at regular intervals.

(18) Check grounding frequently. The safety of the powder lines is dependent on receiving supplies free of foreign materials. Do not send any material to the lines unless every reasonable precaution has been taken to eliminate contamination.

(19) Before starting repairs on equipment, such as bins, dryers and screens, adequate precautions should be taken to prevent contamination with foreign substances. Check house and equipment for loose parts after repairs are made.

(20) Keep house clean.

(21) Keep tools, brooms, implements, etc. (when not in use) in the boards, racks or paper bags provided for them.

(22) Keep materials neatly and safely piled and protected to prevent entrance of any foreign material.

(23) See that all fire-fighting equipment is maintained in adequate condition for use at all times.

(24) Keep all bearings well lubricated and free from dust accumulation.

(25) All material prepared for delivery to the powder lines must be screened through six mesh stainless steel screen.

(26) Oily waste and rags must be placed in covered cans provided for that purpose. Clean rags and waste shall be kept in separate covered cans.

(27) Keep oily waste cans outside of buildings.

(28) No welding or open lights to be used at any time in this house without it being washed down prior, and written permission by the management is required. [Rule B-1 through B-28, filed 3/23/60, effective 8/15/57.]

WAC 296-50-100 Dynamite mixing house. (1) Man limit—3 employees, except supervision and truckers, provided, however, that 5 men may be used in tray-bagging operations where open tray is used for bagging and the operation is entirely manual.

(2) Oil machines and inspect carefully before starting to see that all equipment is in proper operating condition and that no foreign material is in bowls. See that bonding is secure. Run bowls empty for a short interval.

(3) If machine is not operating satisfactorily, shut down and notify foreman.

(4) Inspect screens used over bowls carefully before starting operation and before each mixing.

(5) If powder does not appear normal or there is any indication that it will not work satisfactorily for cartridging machines, notify foreman.

(6) Clean accumulation of dopes from equipment over bowl and edge of bowl after each dope is dumped.

(7) Sweep floor after each mixing.

(8) Do not mix and hold more powder in the house than is necessary for smooth operation. Mixed powder must not be held in mixer, except under unusual circumstances.

(9) Do not clean bowl or wheels while mixer is in motion.

(10) Examine buggies interior before adding any powder.

(11) It is advisable to use a respirator while shoveling out powder or working over the bowl.

(12) Not more than one N.G. buggy shall be permitted in this house at a time.

(13) The following equipment is allowed in this building while machine is in operation:

Wooden shovels
Wooden hoe and wooden scraper
Floor broom
Whisk brooms on tongs
Aluminum dust pan
Wall thermometer in a case
Oil can
Nitro-cotton scale
Fibre hand scoop
Permissible flash light
Plastic bottles
Rubber mallet
Wooden box for rags and cloth

(14) All tools shall be handled carefully and oil desensitizer used liberally on the parts being worked on. Before resuming operation, all tools and pieces of equipment shall be accounted for to be certain they do not become a hazard to the operation.

(15) Daily clean-up. Remove all powder and nitrocotton from building and wipe inside of mixer and wheels. Wipe outside of N.G. buggy before returning to neutralizing house. Brush off powder buggies and trucks, and sweep floor thoroughly, sending sweepings to waste shed. Sweep platforms, track and motor rooms.

If mixer is operated more than one shift, the floor shall be thoroughly clean at end of earlier shift, and house left in orderly condition. Motors shall be stopped. Incoming operator shall inspect bowls and equipment before starting motors.

(16) The weekly clean-up shall be established in accordance with safe practices and such clean-up shall be agreed upon by management and the state safety inspector.

(17) Management is held responsible for the strict observance of all the above rules.

(18) See that all fire-fighting equipment is maintained in adequate condition for use at any time. [Rules C-1 through C-18, filed 3/23/60, effective 8/15/57.]

WAC 296-50-110 Dynamite pack machine house. (1) Man limit—3 employees, except supervision and truckers, provided that in cases where bag-packing and long length, large diameter cartridges are packed, 4 men shall be the limit.

(2) Before starting machine for the day or after repairs or changes, inspect it thoroughly for foreign material and see that all moving parts are oiled. Inspect inside of hopper, install stirrers and examine tamps. Operate machine empty for a short interval. It is very important that machine be accurately lined up and correctly timed.

(3) If machine is not operating satisfactorily, shut down and notify foreman. If any part of equipment is missing or tools unaccounted for, the machine must be shut down, the foreman called and all powder in the house screened, if the part is not located.

(4) Do not replace a broken shear-pin in drive shaft and restart machine until, (a) the foreman has been notified, (b) the powder has been cleaned from the hopper and sent to the waste opening house for screening and (c) you have assured yourself that machine is in satisfactory operating condition.

(5) Do not tighten tamps while machine is in motion.

(6) Keep floor clean. Remove powder from under front of machine as often as a hazard would indicate. Floor sweepings should be screened and sent to the waste house.

(7) Keep covers on buggies except when shoveling powder out, or filling with cartridged powder.

(8) Check drive to stirrers to see that there is no slippage. If it is slipping, shut down machine and notify foreman at once. Keep stirrer bearing well oiled. Applies to Starrett type of machine.

(9) No spare parts are to be kept in house, fan or motor rooms or in waste shed. Keep in parts house.

(10) The following miscellaneous equipment is allowed in house while machine is in operation:

Wooden or aluminum hoes
Wooden shovels
Wooden or aluminum floor scrapers
Floor brooms
Oil cans
Scale (Stick count) chart
Aluminum dust pans on thong
Whisk brooms on thong
Wall thermometer
Wooden tamp on thong

(11) All tools shall be handled carefully and oil desensitizer used liberally on the parts being worked on. Before resuming operation, all tools and pieces of equipment shall be accounted for to be certain they do not become a hazard to the operation.

(12) Clean-up for machine change or repairs. All powder must be cleaned from the hopper. Clean loose powder from machine and floor and remove all powder, including waste, from the house. When changing stirrers, tamps and nipple plate, it is necessary to clean the hopper thoroughly in addition to doing the above.

For major repairs to house or machine, make clean-up as specified below for weekly clean-up.

No powder shall be delivered to building until machine operator advises that machine is ready for operation.

(13) Remove all waste and cartridged powder from buildings before starting machine clean-up. Clean powder hoppers and stirrers. Clean off all parts of machine and radiators. Remove all dry clean powder recovered to the waste house for screening. Sweep floor thoroughly and send dirty sweepings to waste shed. Leave stirrers out for operators to install on the following operating day. Sweep outside platforms and track. If the house is operated two shifts, at the end of the first shift all powder is put into hopper and worked down to the allowable

limit and the floor swept. All waste and sweepings shall be removed.

(14) The weekly clean–up shall be established in accordance with safe practices and such clean–up shall be agreed upon by management and the state safety inspector.

(15) Management is responsible for the enforcement of all of the above rules.

(16) See that all fire–fighting equipment is maintained in adequate condition for use at any time. [Rules D–1 through D–16, filed 3/23/60, effective 8/15/57.]

WAC 296-50-120 Gelatin mixing house. (1) Man limit—3 employees, except supervision and truckers.

(2) Lubricate all machinery thoroughly and inspect bowls and stirrers carefully before starting up on each shift, to insure that all equipment is in good operating condition and the bowls are free of foreign material. Where figure eight type of mixer is used, house operator should check clearance of mixer paddles each morning before starting by passing the hand under and around end of paddles to determine if there is satisfactory clearance at these points. Run empty bowls for a short interval and lower and raise paddles.

(3) Dope screens above mixers. These screens shall be inspected daily and before each mixing.

(4) Shut down and notify foreman if machine is not working properly.

(5) Where figure eight mixer is used, stirrers must be locked. Lock wheels on both sides in the "up" position while digging out or dumping powder, and lock wheels on both sides in the "down" position before starting to mix. Removable covers must be in place over the mixing bowls while mixing is in operation.

(6) Floor around bowl shall be swept after each mixing and sweepings stored in a closed container and sent to the waste shed.

(7) Mixing house buggies shall be inspected for foreign material before filling from mixer.

(8) Wooden shovels or scraper should be used to remove powder from stirrers on figure eight mixer.

(9) Mixing bowl temperatures shall not exceed 130° F.

(10) Not more than one N.G. buggy shall be permitted in this house at a time. The buggy shall be removed from the house after emptying.

(11) Do not add any material; use brush or whisk broom on any object within the immediate vicinity of a figure eight mixer while it is in operation; do not take sample from bowl while it is in operation.

(12) Floors to be kept clean. Walls and equipment to be maintained reasonably free of dust.

(13) The following miscellaneous equipment is permitted in this building while machine is in operation:

Wooden or aluminum hoes
Wooden shovels
Wooden or aluminum floor scrapers
Floor brooms
Oil cans
Scale (Stick count) chart
Aluminum dust pans on thong
Whisk brooms on thong
Wall thermometer
Wooden tamp on thong

(14) All tools shall be handled carefully and oil desensitizer used liberally on the parts being worked on. Before resuming operation, all tools and pieces of equipment shall be accounted for to be certain they do not become a hazard to the operation.

(15) Daily clean–up. Clean thoroughly with solvent the inside of bowl and stirrers. Brush off powder buggies and trucks. Wipe outside of N.G. buggy before returning to store house. Brush down outside of bowls. Sweep floors, platforms, track and motor rooms. Send all sweepings to waste shed. It is recommended that goggles be used in clean–up operations.

If mixer is operated more than one shift, the floor shall be swept thoroughly at end of earlier shift and house left in orderly condition. Motors shall be stopped and electric switches disconnected. Incoming operator shall inspect bowls and equipment before starting motors.

(16) The weekly clean–up shall be established in accordance with safe practices and such clean–up shall be agreed upon by management and the state safety inspector.

(17) The management is held responsible for the strict observance of all of the above rules. [Rules E–1 through E–17, filed 3/23/60, effective 8/15/57.]

WAC 296-50-130 Gelatin cartridge machine house. (1) Man limit—3 employees, except supervision and truckers.

(2) Before starting machine for the day or after repairs or changes, inspect carefully to see that machine is well oiled and bowl is free of foreign material. For Starrett Stuffer type of machine, check rigidity of worms. Operate machinery empty for a short interval.

(3) If machine is not operating satisfactorily, shut down and notify foreman. Do not attempt to run powder which is too stiff.

(4) If any part of equipment is missing or tool unaccounted for, the machine must be shut down and the foreman called. Do not start it again until missing material is found or inspection of machine and powder has shown it safe to resume operations.

(5) When feeding powder into bowl, care should be exercised in keeping the hands well out of the bowl and away from worm to avoid injury.

(6) Clean tables and floor frequently, storing waste in closed containers for removal to waste shed.

(7) All tools shall be handled carefully and oil desensitizer used liberally on the parts being worked on. If removed string nipple plate nuts on a thong or aluminum wire and immerse in engine oil until plate is again assembled.

(8) Keep no spare parts in house, fan or motor houses or waste shed. Keep only in parts house.

(9) No tools are permitted in this building while the machine is running. The following miscellaneous equipment is allowed in house while machine is in operation:

Wooden shovel

Scale
Cartridge chart
Aluminum dust pan on thong
Floor brooms
Whisk brooms and counter brushes on thong
Oil can
Floor scraper
Wall thermometer
Brass screwdriver on counter-weight
Hand scraper

(10) On Starrett Stuffer machine make certain that auger is secured in threaded coupling before starting machine. Always check to see that machine is operating in proper direction so that auger will not screw out.

(11) Where Starrett Stuffer machine is used, make sure that auger, when out of place, has ample clearance between liner and check clearance between nipple plate by turning machine by hand after nipple plate is assembled.

(12) On Starrett Stuffer, always use a gasket which has been freshly lubricated with oil between nipple plate and bowl. Oil resistant synthetic rubber is preferable.

(13) All tools shall be handled carefully and oil desensitizer used liberally on the parts being worked on. Before resuming operation, all tools and pieces of equipment shall be accounted for to be certain they do not become a hazard to the operation.

(14) Daily clean-up. Remove all punched and unpunched powder from the house and cut off power to machine motor before starting the machine clean-up. Remove and clean the nipple plate and horizontal auger. Wipe inside and outside of bowl, vertical worms and inside of lower worm housing as well as possible with rags and solvent. Leave nipple off until start of next shift. Clean crimper and leave crimper head in oil overnight. Clean floor and table carefully and wipe with solvent if necessary. Send sweepings to waste shed.

(15) The weekly clean-up shall be established in accordance with safe practices and such clean-up shall be agreed upon by management and the state safety inspector.

(16) The management is responsible for the enforcement of the above rules.

(17) See that all fire-fighting equipment is maintained in adequate condition for use at any time. [Rules F-1 through F-17, filed 3/23/60, effective 8/15/57.]

WAC 296-50-140 Handpack house. (1) Man limit—3 employees, except supervision and truckers.

(2) Keep powder in buggies covered as much as possible.

(3) Keep floor and benches clean. Store sweepings in covered container and send to waste shed frequently.

(4) Spare equipment shall be stored in spare parts house. No parts shall be stored in waste shed, fan or motor rooms.

(5) The following miscellaneous equipment is allowed in this building:

Wooden shovels
Wooden or aluminum hoes
Wooden tamps
Whisk brooms on thong
Wooden or aluminum floor scrapers
Scale (Stick count) chart
Aluminum hand scoops
Floor brooms

(6) At end of day, remove powder from building, clean equipment and sweep floors, platforms and track thoroughly.

(7) The management is responsible for the enforcement of the above rules.

(8) See that all fire-fighting equipment is maintained in adequate condition for use at any time. [Rules G-1 through G-8, filed 3/23/60, effective 8/15/57.]

WAC 296-50-150 Waste opening house. (1) Man limit—3 employees, except supervision and truckers.

(2) Hardwood wedges and rubber mallets shall be used to open wooden cases.

(3) Open cartridges with short knife or wooden spatula attached to long rawhide thong or opening boards.

(4) Inspect screens before use and often during the day. Clean and deliver to repairman immediately any screen found to be defective.

(5) Screen all dynamite grades, except semi-gel, by brushing through the screen. Semi-gel may be opened and rolled with an all wood rolling pin on a table to facilitate inspection for foreign material, Semi-gel may also be screened. Gelatin grades shall be unrolled and inspected.

(6) Under normal conditions full size cartridges or large pieces of powder should not be sent to the burning ground but should be cut or broken into small pieces before delivery to waste shed.

(7) The following miscellaneous equipment is allowed in this building during opening operations:

Solid knives on thongs (or a cutting bench)
Wooden shovels
Wooden spatulas on thongs
Powder screens
Wooden floor scraper
Scale
Floor brooms
Whisk brooms on thong and aluminum scoop
Counter brush on thong
Brass picks on thong
Wall thermometer

(8) House shall be kept orderly and be cleaned thoroughly at end of shift.

(9) The management is held responsible for the strict observance of the above rules.

(10) See that all fire-fighting equipment is maintained in adequate condition for use at any time. [Rules H-1 through H-10, filed 3/23/60, effective 8/15/57.]

WAC 296-50-160 Box packing house. (1) Man limit—6 employees, except supervision and truckers.

(2) Paraffin temperature in the dip pot must not exceed 220 degrees F.

(3) Machines in this house shall be kept clean and the bearings oiled.

(4) No explosives in excess of the normal house limit shall be allowed to remain in building overnight.

(5) Do not handle cases roughly.

(6) Inspect cases carefully and remove all protruding nails.

(7) Keep floor swept and loose nails cleaned up.

(8) The following tools and miscellaneous equipment are permitted in this house:

1 Pair pliers
1 Screwdriver
1 Crescent or end wrench for nailing
1 Box scraper
1 Wire cutter
1 Butcher knife
Scales
Paraffin transfer tube
1 Floor scraper, aluminum
1 Metal–clad thermometer on thong
1 Oil can
1 Set stencils with brush and pot
2 Test weights—25 lbs. and 50 lbs.
Box lining forms
2 Floor brooms
2 Aluminum dust pans
Or other necessary items

(9) Daily clean–up. Clean nailing machine, roller conveyor, scales and radiators each evening with appropriate tools. Scrape and sweep floor. Shut off steam in paraffin heater kettle. Remove and clean dip tank screen. Remove sludge from the dip tank, mix with sawdust and transfer to waste shed. (At plants where paraffin is pumped to dip tank, leave tank empty overnight and noon.) Sweep platforms, track and magazine cars. Clean powder buggies and replace paper in bottom. If house is operated more than one shift, the floors shall be thoroughly cleaned at end of each shift.

(10) The management is responsible for the strict observance of all the above rules. [Rule I–1 through I–10, filed 3/23/60, effective 8/15/57.]

WAC 296-50-170 Powder repair shop. (1) This building is classed as an explosive building and general rules for powder apply here. Approved shoes and uniforms are required.

(2) No powder shall be brought into this building at any time.

(3) All parts shall be thoroughly cleaned of powder.

(4) Extreme care shall be taken in making repairs to any equipment having been in contact with dynamite or N.G. Careful inspection shall be made of all wooden parts before starting repairs. If they appear to be saturated with N.G., they shall be discarded and taken to the burning ground.

(5) Use engine oil liberally on tools being used and parts being repaired.

(6) Never make any repairs to a danger building or adjacent equipment while such is in operation and until you are familiar with the special rules applying to that operation.

(7) All tools, metallic parts and spare parts shall be checked into and out of explosive building before and after making repairs. Inspect thoroughly all repaired equipment before removal from this shop to operating building and spare parts storage.

(8) Keep benches clean and orderly and sweep floor often enough to keep clean.

(9) The responsibility for the observance of the above rules rests with the management. [Rules J–1 through J–9, filed 3/23/60, effective 8/15/57.]

WAC 296-50-180 Batch nitrator. (1) Every nitrator shall be provided with an auxiliary power unit capable of safely disposing of N.G. in process in the event of a power failure.

(2) Employees shall be limited to three excluding supervision.

(3) The nitrator temperature must never exceed 50° F. The charge should not be dropped at a temperature lower than 32° F. (34° F. in winter) as received in the separator except for regular N.G. (100% glycerin), which should not drop below 40° F. to prevent freezing.

(4) Nitrator operator shall give his undivided attention to a charge being nitrated and when drawing charge from nitrator to separator.

(5) Nitrator charge, N.G., or waste acid shall never be sent to the next operation until proper notification has been received that the store–house is ready to receive the charge.

(6) Open, wash, and inspect nitrator interior every 3 months. [Rules K–1 through K–6, filed 3/23/60, effective 8/15/57.]

WAC 296-50-190 Separator and prewash operation. (1) No prewash or soda water shall be heated above 140° F.

(2) N.G. gutter to neutralizers must be sponged at the end of shift.

(3) All sponges must be kept in weak soda water.

(4) Rubber gloves must be worn when washing gutter and equipment.

(5) Gutters should be painted as often as necessary to maintain them in good condition.

(6) When painting tank interiors, a life belt and a gas mask (or air line respirator) shall be worn. Two attendants must be present while a man is in tank.

(7) Daily clean–up. Clean house and all equipment at end of day and oil lead work when necessary. Remove, wash and leave out overnight the glycerin distributor. Check glycerin screen. Open drain on waste acid blow case and leave open overnight. Examine all tanks and catch boxes for slums and clean if any are present.

(8) Weekly clean–up. Clean and inspect all equipment, water drains, ditch, etc. Paint catch boxes and gutters if needed. Clean glycerin heater house.

(9) Periodic clean–up. Test air and steam accumulators (monthly). Empty and clean large drowners. Clean glycerin scale tanks. At least biennially examine interior of all acid blow cases.

(10) The management is held responsible for the enforcement of all these rules. [Rule K–7 through K–16, filed 3/23/60, effective 8/15/57.]

WAC 296-50-200 N.G. neutralizing house and store house. (1) Man limit—2 employees, except supervision.

(2) Start ventilator fan and wait a few minutes before entering house.

(3) Inspect all rubber hoses on tanks and buggies daily for any signs of leakage. Replace all hose where any sign of deterioration exists.

(4) Carrying of N.G. in buckets shall be avoided as much as possible.

(5) In case of N.G. spill, sponge up N.G. into a bucket and put in catch box, wipe thoroughly with sponge and soda ash solution and clean thoroughly with N.G. Remover. Report spills to management at once.

(6) N.G. sponges must be kept in weak soda solution when not in use, and wiping rags must be kept in closed container.

(7) Sweep up or mop floor and keep house clean and tidy at all times.

(8) Wash N.G. buggies at end of day. Always leave fresh or weak soda water in N.G. buggy tanks overnight.

(9) At the end of each week the catch boxes and all equipment not containing N.G. in storage must be emptied of water and thoroughly scrubbed out and refilled with fresh water.

(10) The following is the only miscellaneous equipment allowed in this building except when it is being cleaned for repairs:

Rubber buckets
Sample carrier
Hose
Plastic or rubber covered scale
Weights and balance
Clock in box
Lead pan for sample bottles
Blue litmus paper
2 brooms
Tank markers
Brom phenol blue solution
Thermometers
Hydrometers
Rubber covered flashlight on thong for wrist
Rubber dipper
2 dust pans

[Rules L-1 through L-10, filed 3/23/60, effective 8/15/57.]

WAC 296-50-210 Acid operations. (1) The greatest care must be observed in the handling and transportation of acids. Avoid doing things which will cause splashing.

(2) Wash acid or ammonia burns with great quantities of water over a long period of time, then report to hospital.

(3) Every employee working with acids should know the location of and how to operate the safety showers. Test them every shift and do not permit obstructions in front of them. If shower is not nearby, have bucket of water at hand for use in case of acid burns when making repairs or when operation is being carried on.

(4) Use water from drinking fountain to wash acid out of eye or use the eye cup and solution provided for this purpose. Report any accident immediately to foreman, supervisor or hospital.

(5) Nitrous fumes: Breathing of nitrous fumes is to be avoided and any man who has inhaled sufficient to cause even slight irritation should cease work immediately and report to the foreman and proceed to the plant hospital at once. He should not exert himself after exposure to the fumes because complete rest is the best first-aid treatment to prevent serious complications. Men exposed to red fumes, even though they do not produce coughing, must follow the above rule. When it is absolutely necessary to enter an area laden with these fumes, a gas mask must be worn.

(6) Know the location and use of the gas masks for acid and ammonia fumes and use them when fumes are strong. Return any mask that has been used to laboratory for inspection and repairs.

(7) Glasses shall be worn by all employees in acid area at all times except when performing duties requiring goggles. Approved type acid goggles must be worn whenever acid or ammonia is outside, or may get out of, its normal pipe line or tank. This includes taking samples, working on valves, gaskets or pumps, measuring tanks, or carrying on any work where acid or ammonia might reasonably be expected to come in contact with the eyes.

(8) Under especially hazardous conditions, a rubber suit and helmet must be worn.

(9) Employees should wear proper clothing and "safety" shoes. Hats with brims must be worn around operations for protection against drips from overhead lines and equipment. Rubber gloves should be worn when sampling acid and handling equipment contaminated with acid and anhydrous ammonia.

(10) All ladders other than step-ladders or special ladders must be equipped with spiked feet or other approved friction feet. When used on concrete or smooth floors, plants must be placed under the spiked feet and the ladder must be securely fastened to prevent slipping. If this cannot be done, another man must hold the ladder.

(11) Repair work on acid equipment must not be started unless water is at hand. Whenever possible, acid equipment should be washed off thoroughly with fresh water before repairs are started.

(12) Before opening a line for repairs, be certain that the line is drained, all valves are closed and locked, and motors or pumps which deliver acid through the lines are locked out. Remove blanks, valve tags and motor locks when work is completed.

(13) When braking flanges in a pipe line, or removing a flange from a vessel, make sure there is no pressure on the line or vessel. Do not take all bolts out. At least two nuts must remain on two bolts in a loosened condition until the joint is broken and possible pressure released. Stand away from the flange when actually breaking the line so that if acid spurts out it will not come in contact with you.

(14) Observe the following rules before entering any acid tank: (a) disconnect and blank off all connections, (b) wash and neutralize interior, (c) obtain permission to

enter from foreman or supervisor who has inspected the tank and seen that all precautions and preparations have been made, (d) be equipped with protective clothing, goggles, gas masks, if necessary, and safety harness with line attached. Two men shall be in attendance outside tank to render assistance, if required.

(15) Always wear a gas mask when entering a brick-line tank which has been used for acid.

(16) Acid samples must be conveyed in suitable carriers and rubber gloves must be worn while taking samples.

(17) It is recommended that safety shields be in place around bonnets of valves, pipe flanges and over pumps at all times. Tighten bolts on valves and pumps frequently, and repack when necessary.

(18) Report to your foreman or supervisor at once any unsafe condition or any apparatus which is leaking acid or seems likely to become leaky. Block off entire area whenever there is an acid leak.

(19) Do not use a carbon tetrachloride fire extinguisher where it may come in contact with acid. Carbon tetrachloride and acid react to form phosgene, a poisonous gas. [Rules M-1 through M-19, filed 3/23/60, effective 8/15/57.]

WAC 296-50-220 Spare parts houses. (1) No powder is to be brought into this building at any time.

(2) All powder is to be cleaned from spare parts before delivering to storage.

(3) Floors, benches, and racks shall be kept clean and in order.

(4) The following rules govern the cleaning of powder machine equipment for storage:

Parts are to be cleaned of all powder as they are removed from the machine unless special cleaning facilities are provided elsewhere. [Rules N-1 through N-4, filed 3/23/60, effective 8/15/57.]

WAC 296-50-230 Nitrocotton screening and drying houses. (1) Matches, torches, or other flame-producing devices are strictly prohibited in nitrocotton areas. Only nonsparking tools are permitted.

(2) The walls and floor of nitrocotton dryer building and screening building when in regular use should be washed or brushed down each week.

Hoops and nuts on nitrocotton barrels or containers must be wet with water prior to removing them and prior to placing them back on the containers, also the socket wrench used for this purpose must be wet with water.

(3) Extreme cleanliness must be maintained in all nitrocotton operations. Waste or dirty nitrocotton should never be mixed with other refuse or waste material.

(4) Dry nitrocotton is extremely hazardous and after cotton has been dried, extra-ordinary precautions must be observed in handling.

(5) Do not store nitrocotton in open containers.

(6) Employees whose clothing may contain or be covered with nitrocotton must not answer fire alarms, assist in fighting fires or leave plant until clothing has been changed.

(7) Under no condition is frozen nitrocotton to be opened and handled. It must be thawed before removing from drums and screening.

(8) Steel drums shall be opened outside, or at least in a place removed from the screening operation.

(9) The nitrocotton shall be taken from the drums by means of wooden tools or a fibre scoop, or brass cotton fork.

(10) All wet nitrocotton shall be screened before delivery to the drying and mixing houses.

(11) Dry nitrocotton containing less than 5% moisture shall never be screened.

(12) The drums, when emptied, must be thoroughly cleaned of all nitrocotton, both inside and out.

(13) Partially filled drums of unused nitrocotton shall be removed from screen room and carefully closed to prevent evaporation of moisture, taking the precaution of wetting clamp and drum before closing.

(14) Screened nitrocotton shall be placed in covered fibre cans, or aluminum barrels, or paper bags.

(15) The amount of nitrocotton in the screening house shall be held to a minimum and never exceed the posted limit.

(16) The screening house must be clean at all times.

(17) The following miscellaneous equipment is stored outside, in a cabinet, for opening drums before taking them into the building:

2 Brass socket wrenches on thong
1 Brass end wrench on thong
1 Wooden wedge
1 Rubber mallet

(18) Only screened nitrocotton shall be placed on the dryer.

(19) Wooden boxes, fibre cans and aluminum barrels are the only containers that may be taken into the dryer.

(20) Do not allow air temperature to exceed 135° F.

(21) Operators and visitors are not permitted to wear rubber soled shoes or overshoes in dry house.

(22) Care should be used in discharging dryer to keep friction to a minimum.

(23) Check ground connections from supporting screen under cloth.

(24) The miscellaneous equipment permitted in this house is a wooden hoe, a wooden shovel, and broom.

(25) Clean-up. The floors shall be kept clean at all times. The walls, ceilings, floors, and air ducts from the blower shall be washed at frequent intervals to prevent an accumulation.

(26) The management is held responsible for the observance of the above rules.

(27) See that all fire-fighting equipment is maintained in adequate condition for use at any time. [Rules O-1 through O-27, filed 3/23/60, effective 8/15/57.]

Chapter 296-52 WAC
SAFETY STANDARDS FOR THE POSSESSION AND HANDLING OF EXPLOSIVES

WAC

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WAC 296-52-010 Introduction. The subject code shall apply to all persons in the state of Washington and will be known as the "Safety Standards for the Possession and Handling of Explosives," hereinafter called the "Explosives Code." [Statutory Authority: Chapters 42-.30 and 43.22 RCW, RCW 49.17.040, 49.17.050 and 49.17.240. 78-07-052 (Order 78-10), § 296-52-010, filed 6/28/78; Order 70-4, § 296-52-010, filed 4/29/70.]

WAC 296-52-012 Incorporation of standards of national organizations and federal agencies. (1) 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.

(2) Whenever a provision of this chapter incorporates therein provisions of the Code of Federal Regulations (CFR) 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.

(3) 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.

(4) The above referenced information is available for your review at all Labor and Industries' Service Locations. [Order 75-41, § 296-52-012, filed 12/19/75.]

WAC 296-52-020 Purpose. It is the purpose of this code to implement the Washington State Explosives Act, chapter 70.74 RCW, as amended by chapter 72, Laws of 1970 2nd ex. sess. The Explosives Act shall be attached to this code, and both the act and the code shall be read and enforced jointly.

This code has been written by the Division of Safety and promulgated by the Department of Labor and Industries in accordance with RCW 70.74.020 (Explosives Act), RCW 49.16.050, 49.16.060, 49.16.070 and 49.16-.080 (Labor Regulations).

Advance notice was mailed as required by statute and public notice given as provided in RCW 42.32.010, on February 25, 1970.

A public hearing was conducted on March 26, 1970, at Olympia.

A copy of this code was filed with the Office of the Code Reviser on April 29, 1970, to become effective on May 29, 1970. [Order 70-4, § 296-52-020, filed 4/29/70.]

WAC 296-52-025 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 authorized representative may, pursuant to this section, RCW 49.17.080 and/or RCW 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 permit for variance shall be conspicuously posted on the premises and shall remain posted during the time it is in effect. All requests for variances from safety and health standards included in this or any other chapter of Title 296 WAC, shall be made in writing to the Director of

the Department of Labor and Industries at Olympia, Washington, or his duly authorized representative, the Supervisor, Division of Industrial Safety and Health, Department of Labor and Industries, Olympia, Washington. Variance application forms may be obtained from the Department upon request. [Order 75-41, § 296-52-025, filed 12/19/75.]

WAC 296-52-027 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 Bureau of Mines, 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 provision of this chapter. [Order 75-41, § 296-52-027, filed 12/19/75.]

WAC 296-52-030 Definitions. Definitions as used in this chapter, unless a different meaning is plainly required by the context:

(1) "Attend" shall mean the physical presence of an authorized person within the field of vision of explosives. The said attendant shall be awake, alert and not engaged in activities which may divert his attention so that in case of an emergency he can get to the explosives quickly and without interference, except for brief periods of necessary absence, during which absence simple theft of explosives is not ordinarily possible.

(2) "Authorized," "approved" or "approval" shall be held to mean authorized, approved, or approval by the Department of Labor and Industries or other approving agency or individual as specified by the provisions of this chapter.

(3) "Blaster" shall be held to mean that qualified person in charge of and responsible for the loading and firing of a blast.

(4) "Blasting agent" shall be held to mean and include any material or mixture consisting of a fuel and oxidizer, intended for blasting, not otherwise classified as an explosive, and in which none of the ingredients are classified as an explosive, provided that the finished product, as mixed and packaged for use or shipment, cannot be detonated when unconfined by means of a No. 8 test blasting cap.

(5) "Day Box" shall denote a box which is not approved as a magazine for unattended storage of explosives. Such box may be used for storage of explosives during working hours on a job site, provided that it shall always be guarded against theft, particularly in inhabited areas, and shall either be attended, locked or secured against outright lifting, as the risk demands. Caps shall be safely separated from other explosives. Such day boxes shall be marked with the word "Explosives".

(6) "Dealer" shall be held to mean and include any person who purchases explosives or blasting agents for the sole purpose of resale, and not for use or consumption.

(7) "Department" shall denote the Department of Labor and Industries.

(8) "Detonating Cord" (fuse) shall mean a round, flexible cord containing an explosive core which can be initiated with a blasting cap.

(9) "Detonator" shall mean a blasting cap, an electric blasting cap or a delay electric blasting cap.

(10) "Director" shall denote the Director of the Department of Labor and Industries, or his designated representative.

(11) "Division" shall denote the Division of Industrial Safety and Health of the Department.

(12) "Efficient artificial barricade" shall be held to mean an artificial mound or properly revetted wall of earth of a minimum thickness of not less than three feet or such other artificial barricade as approved by the Department of Labor and Industries.

(13) "Explosive" or "explosives" whenever used in this chapter shall be held to mean and include any chemical compound or mechanical mixture that is commonly used or intended for the purpose of producing an explosion, that contains any oxidizing and combustible units, or other ingredients, in such proportions, quantities or packing, that an ignition by fire, by friction, by concussion, by percussion, or by detonation of any part of the compound or mixture may cause such a sudden generation of highly heated gases that the resultant gaseous pressures are capable of producing destructive effects on contiguous objects or of destroying life or limb. In addition, the term "explosives" shall include all material which is classified as class A, class B, and class C explosives by the federal Department of Transportation; *Provided*, That for the purposes of this chapter small arms ammunition, small arms ammunition primers, smokeless powder not exceeding fifty pounds, and black powder not exceeding five pounds shall not be defined as explosives. Classification of explosives shall include but not be limited to the following:

NOTE: Classification of explosives is described by the U.S. Department of Transportation as follows (see 49 CFR Chapter I):

(i) Class A Explosives: (Possessing detonating hazard) dynamite, nitroglycerin, picric acid, lead azide, fulminate of mercury, black powder exceeding five pounds, blasting caps in quantities of 1001 or more, and detonating primers.

(ii) Class B Explosives: (Possessing flammable hazard) propellant explosives, including smokeless propellants exceeding fifty pounds.

(iii) Class C Explosives: (Including certain types of manufactured articles which contain class A or class B explosives, or both, as components but in restricted quantities) blasting caps in quantities of 1000 or less.

(14) "Explosive-actuated power devices" shall be held to mean any tool or special mechanized device which is actuated by explosives, but not to include propellant-actuated power devices.

(15) "Explosives manufacturing building" shall be held to mean and include any building or other structure (excepting magazines) containing explosives, in which the manufacture of explosives, or any processing involving explosives, is carried on, and any building where explosives are used as a component part or ingredient in the manufacture of any article or device.

(16) "Explosives manufacturing plant" shall be held to mean and include all lands, with the buildings situated thereon, used in connection with the manufacturing or processing of explosives or in which any process involving explosives is carried on, or the storage of explosives thereat, as well as any premises where explosives are used as a component part or ingredient in the manufacture of any article or device.

(17) "Factory building" shall denote the same as "Manufacturing Building".

(18) "Forbidden or not acceptable explosives" shall be held to mean and include explosives which are forbidden or not acceptable for transportation by common carriers by rail freight, rail express, highway, or water in accordance with the regulations of the federal Department of Transportation.

(19) "Fuel" shall be held to mean and include a substance which may react with the oxygen in the air or with the oxygen yielded by an oxidizer to produce combustion.

(20) "Handling" shall denote any one or more of manufacturing, buying, selling, transporting, storing or using of explosives.

(21) "Handloader" shall be held to mean and include any person who engages in the noncommercial assembling of small arms ammunition for his own use, specifically the operation of installing new primers, powder, and projectiles into cartridge cases.

(22) "Handloader components" means small arms ammunition, small arms ammunition primers, smokeless powder not exceeding fifty pounds, and black powder as used in muzzle loading firearms not exceeding five pounds.

(23) "Highway" shall be held to mean and include any public street, public alley, or public road.

(24) "Inhabited building" shall be held to mean and include only a building regularly occupied in whole or in part as a habitation for human beings, or any church, schoolhouse, railroad station, store, or other building where people are accustomed to assemble, other than any building or structure occupied in connection with the manufacture, transportation, storage, or use of explosives.

(25) "Magazine" shall be held to mean and include any building or other structure, other than a factory building, used for the storage of explosives.

(26) "Motor vehicle" shall be held to mean and include any self-propelled automobile, truck, tractor, semi-trailer or full trailer, or other conveyance used for the transportation of freight.

(27) "Mudcap" shall be held to mean covering the required number of cartridges that have been laid on top of a boulder with a three or four inch layer of mud (free from rocks or other material which might constitute a missile hazard). Mudcapping is also commonly known as "bulldozing" and "dobying".

(28) "Natural barricade" shall be held to mean and include any natural hill, mound, wall, or barrier composed of earth or rock or other solid material of a minimum thickness of not less than three feet.

(29) "Oxidizer" shall be held to mean a substance that yields oxygen readily to stimulate the combustion of organic matter or other fuel.

(30) "Permanent magazines" shall denote magazines that are permanently fastened to a foundation and that are left unattended. The capacity of said permanent magazines shall not exceed the limits stated in RCW 70.74.040. Permanent magazines shall be approved and licensed.

(31) "Person" shall be held to mean and include any individual, firm, copartnership, corporation, company, association, joint stock association, and including any trustee, receiver, assignee, or personal representative thereof.

(32) "Person responsible", for an explosives magazine, shall mean the legal person who actually operates the magazine and who is responsible for the proper storage, protection and removal of the explosives. The responsible person may be the owner or the lessee or the authorized operator of the magazine.

(33) "Portable magazines" also called "Field" magazines shall denote magazines that are designed to be unattended and that are not permanently fastened to a foundation. Said magazines shall be so constructed or secured that they can not be readily lifted and carried away by unauthorized persons. The capacity of said portable magazines shall be limited to the amount of explosives required for efficient operation. Portable magazines shall be approved and licensed.

(34) "Possess" shall denote in this code the physical possession of explosives in one's hand, vehicle, magazine or building.

(35) "Primer" shall be held to mean a cartridge or container of explosives into which a detonator or detonating cord is inserted or attached and whose purpose is to initiate the main explosive charge.

(36) "Propellant-actuated power device" shall be held to mean and include any tool or special mechanized device or gas generator system which is actuated by a propellant or which releases and directs work through a propellant charge.

(37) "Public conveyance" shall be held to mean and include any railroad car, streetcar, ferry, cab, bus, airplane, or other vehicle which is carrying passengers for hire.

(38) "Public utility transmission system" shall mean power transmission lines over 10 KV, telephone cables, or microwave transmission systems, or buried or exposed pipelines carrying water, natural gas, petroleum, or crude oil, or refined products and chemicals, whose services are regulated by the utilities and transportation commission, municipal, or other publicly owned systems.

(39) "Purchaser" shall be held to mean any person who buys, accepts, or receives any explosives or blasting agents.

(40) "Pyrotechnics" shall be held to mean and include any combustible or explosive compositions or manufactured articles designed and prepared for the purpose of producing audible or visible effects which are commonly referred to as fireworks.

(41) "Railroad" shall be held to mean and include any steam, electric, or other railroad which carries passengers for hire.

(42) "Railroad freight car" shall denote cars that are built for and loaded with explosives and operated in accordance with DOT rules.

(43) "Semiconductive hose" means a hose with an electrical resistance high enough to limit flow of stray electric currents to safe levels, yet not so high as to prevent drainage of static electric charges to ground; hose of not more than 2 megohms resistance over its entire length and of not less than 5,000 ohms per foot meets the requirement.

(44) "Shall" means that the rule establishes a minimum standard which is mandatory. The Department welcomes better or higher standards than the minimums. If extenuating circumstances make even the minimum standard impractical, supporting evidence shall be submitted in writing to the Department for review and granting of a variance in accordance with WAC 296-52-025.

(45) "Small arms ammunition" shall be held to mean and include any shotgun, rifle, pistol, or revolver cartridge, and cartridges for propellant-actuated power devices and industrial guns. Military-type ammunition containing explosive bursting charges, incendiary, tracer, spotting, or pyrotechnic projectiles is excluded from this definition.

(46) "Small arms ammunition primers" shall be held to mean small percussion-sensitive explosive charges encased in a cup, used to ignite propellant powder and shall include percussion caps as used in muzzle loaders.

(47) "Smokeless propellants" shall be held to mean and include solid chemicals or solid chemical mixtures in excess of fifty pounds which function by rapid combustion.

(48) "Special industrial explosive devices" means explosive-actuated power devices and propellant-actuated power devices.

(49) "Special industrial explosives materials" means shaped materials and sheet forms and various other extrusions, pellets, and packages of high explosives, which include dynamite, trinitrotolvene (TNT), pentaerythritol tetranitrate (PETN), hexahydro-1, 3, 5-trinitro-s-triazine (RDX), and other similar compounds used for high-energy-rate forming, expanding, and shaping in metal fabrication, and for dismemberment and quick reduction of scrap metal.

(50) "Trailer" shall denote semi-trailers or full trailers as defined by DOT, that are built for and loaded with explosives and operated in accordance with DOT rules.

(51) "Unclassified explosives" shall be held to mean any two components which, when mixed become capable of detonation by a No. 6 test blasting cap.

(52) "User" shall be held to mean and include any natural person, manufacturer, or blaster who acquires, purchases, or uses explosives as an ultimate consumer or who supervises such use.

(53) "Water gels or slurry explosives" comprise a wide variety of materials used for blasting. They all contain substantial proportions of water and high proportions of ammonium nitrate, some of which is in solution in the water. Two broad classes of water gels are:

(i) Those which are sensitized by a material classed as an explosive, such as TNT or smokeless powder,

(ii) Those which contain no ingredient classified as an explosive; these are sensitized with metals such as aluminum or with other fuels. Water gels may be premixed at an explosives plant or mixed at the site immediately before delivery into the bore hole.

(54) "DOT specification" are regulations of the Department of Transportation published in 49 CFR Chapter I. [Order 75-41, § 296-52-030, filed 12/19/75; Order 70-4, § 296-52-030, filed 4/29/70.]

WAC 296-52-040 User's (blaster's) license. RCW 70.74.020, applies.

(1) The application for a user's (blaster's) license to use, blast or dispose explosives and blasting agents shall be made by means of a form substantially similar to that shown in Fig. 1, of this code. (See Appendix)

Application forms may be obtained at any of the Department district offices, or from explosives dealers.

A "hand loader" as defined in RCW 70.74.010, does not require a user's license.

An applicant shall submit to the Department either a certification from another state; or a certification by a public agency, corporation or blaster's school; or a resume of successful blasting experience, properly witnessed. If said certifications are not satisfactory, the Department may establish an Examination Board which shall prepare an examination procedure for certification.

The Department will issue a user's license card which shall state the limitations imposed on the licensee and shall be presented by the user to authorized persons, upon request, together with valid personal identification.

The user's license shall be valid for one year.

Request for renewal may be made at any of the Department district offices, or from explosives dealers.

(2) The request for an inspection of compounds, mixtures or materials that may become explosive due to drying out or undergoing other physical changes within the definition of RCW 70.74.020, shall be made by any possessor of suspect compounds to the chief explosives inspector by means of a form similar to that shown in Fig. 2, of this code. (See Appendix)

(3) The safety rules on using, blasting or disposing explosives in specific industries are stated in chapters listed under WAC 296-52-010.

The safety rules on radio transmission in the vicinity of explosives blasting operations are stated in WAC 296-40-395 (Construction Code). [Order 70-4, § 296-52-040, filed 4/29/70.]

WAC 296-52-043 Use of explosives and blasting agents. (1) General Provisions. (a) While explosives are being handled or used, smoking shall not be permitted and no one near the explosives shall carry matches, open light or flame producing devices. No person shall be allowed to handle explosives while under the influence of intoxicating liquors, narcotics, or other dangerous drugs. This rule does not apply to persons taking prescription drugs and/or narcotics as directed by a physician providing such use shall not endanger the worker or others.

(b) Original containers or Class II magazines shall be used for taking detonators and other explosives from storage magazines to the blasting area.

(c) When blasting is done in congested areas or in close proximity to a structure, railway, or highway or any other installation that may be damaged, the blast shall be covered before firing with a mat constructed so that it is capable of preventing fragments from being thrown.

(d) Persons authorized to prepare explosive charges or conduct blasting operations shall use every reasonable precaution, including but not limited to warning signals, flags, barricades, or woven wire mats to insure the safety of the general public and workmen.

(e) Blasting operations shall be conducted during daylight hours whenever possible.

(f) Whenever blasting is being conducted in the vicinity of gas, electric, water, fire alarm, telephone, telegraph, and steam utilities, the user (blaster) shall notify the appropriate representatives of such utilities at least 24 hours in advance of blasting, specifying the location and intended item of such blasting. Verbal notice shall be confirmed with written notice.

(g) Due precautions shall be taken to prevent accidental discharge of electric blasting caps from current induced by radar, radio transmitters, lightning, adjacent powerlines, dust storms, or other sources of extraneous electricity. These precautions shall include:

(i) The suspension of all blasting operations and removal of persons from the blasting area during the approach and progress of an electric storm.

(ii) The posting of signs, warning against the use of mobile radio transmitters, on all roads shall be in accordance with the applicable provisions of the American National Standards Institute D6.1–1971, Manual on Uniform Traffic Control Devices for Streets and Highways, as amended by Washington State Department of Highways Manual M24-01 (HT), (February 22, 1972).

(iii) Ensuring that mobile radio transmitters which are less than 100 feet away from electric blasting caps, when the caps are in other than original containers, shall be deenergized and effectively locked;

(iv) Compliance with the recommendations of The Institute of the Makers of Explosives (IME) with regard to blasting in the vicinity of radio transmitters as stipulated in Radio Frequency Energy—A Potential Hazard in the Use of Electric Blasting Caps, IME Publication No. 20, March 1971.

(v) When electric blasting caps are being used in blasting operations in the proximity of fixed radio transmitters, the following table of distances must be observed, unless it is determined by designated test procedures that there is not sufficient radio frequency energy present to create a hazard. The test procedure shall be to attach a No. 47 Radio Pilot Lamp in place of the cap in the blasting circuit progressively as the circuit is connected, starting with the initial hole. In the event the lamp glows, the length of the wires connecting the circuit shall be altered by adding or cutting off wire until the lamp does not glow. A radio frequency field strength meter may be used in lieu of the test lamp.

(A) Electromagnetic Radiation. Blasting operations or storage of electrical detonators shall be prohibited in vicinity of operating radio frequency (RF) transmitter stations except where the clearances given below can be observed.

Transmitter Power Except FM Mobile (Watts)	Minimum Distance (Feet)
5–25	100
25–50	150
50–100	220
100–250	350
250–500	450
500–1,000	650
1,000–2,500	1,000
2,500–5,000	1,500
5,000–10,000	2,200
10,000–25,000	3,500
25,000–50,000	5,000
50,000–100,000	7,000

Transmitter Power FM Mobile (Watts)	Minimum Distance (Feet)
1–10	5
10–30	10
30–60	15
60–250	30

(vi) When necessary to perform blasting operations at distances less than those shown in table, detonating type fuse or other approved type systems shall be used.

(h) The employer shall permit only authorized and qualified persons to handle and use explosives.

(i) All explosives shall be accounted for at all times. Explosives not being used shall be kept in a locked magazine, unavailable to persons not authorized to handle them. The employer shall maintain an inventory and use record of all explosives. Appropriate authorities shall be notified of any loss, theft, or unauthorized entry into a magazine.

(j) No fire shall be fought where the fire is in imminent danger of contact with explosives. All employees shall be removed to a safe area and the fire area guarded against intruders.

(k) Detonators shall be short-circuited in holes which have been primed and shunted until wired into the blasting circuit.

(l) Explosives shall not be handled near open flames, sparks or electric circuits.

(m) Delivery and issue of explosives shall only be made by and to authorized persons and into authorized magazines or approved temporary storage or handling area.

(n) All loading and firing shall be directed and supervised by licensed persons thoroughly experienced in this field.

(o) User (blaster) qualifications:

(i) A user (blaster) shall be able to understand given written and oral orders.

(ii) A user (blaster) shall be in good physical condition and not be addicted to narcotics, intoxicants, or similar types of drugs. This rule does not apply to persons taking prescription drugs and/or narcotics as directed by a physician providing such use shall not endanger the worker or others.

(iii) A user (blaster) shall be qualified by reason of training, knowledge, or experience, in the field of transporting, storing, handling, and use of explosives, and have a working knowledge of State and local laws and regulations which pertain to explosives.

(iv) User (blaster) shall be required to furnish satisfactory evidence of competency in handling explosives and performing in a safe manner the type of blasting that will be required.

(v) The user (blaster) shall be knowledgeable and competent in the use of each type of blasting method used.

(2) Storage at Use Sites. (a) Empty boxes and paper and fiber packing materials which have previously contained high explosives shall not be used again for any purpose, but shall be destroyed by burning at an approved isolated location out of doors, and no person shall be nearer than 100 feet after the burning has started.

(b) Containers of explosives shall not be opened in any magazine or within 50 feet of any magazine. In opening kegs or wooden cases, no sparking metal tools shall be used; wooden wedges and either wood, fiber or rubber mallets shall be used. Nonsparking metallic slitters may be used for opening fiberboard cases.

(c) Should cartridges or packages of explosives show signs of discoloration or deterioration, the manufacturer or the Department shall be notified. Such explosives must be carefully set aside and must not be used.

(3) Loading of Explosives or Blasting Agents. (a) Procedures that permit safe and efficient loading shall be established before loading is started.

(b) All drill holes shall be sufficiently large to admit freely the insertion of the cartridges of explosives.

(c) Tamping shall be done only with wood rods or with approved plastic tamping poles without exposed metal parts, but nonsparking metal connectors may be used for jointed poles. Violent tamping shall be avoided. The primer shall never be tamped.

(d) No holes shall be loaded except those to be fired in the next round of blasting. After loading, all remaining explosives and detonators shall be immediately returned to an authorized magazine.

(e) Drilling shall not be started until all remaining butts of old holes are examined for unexploded charges, and if any are found, they shall be refired before work proceeds.

(f) When a charge of explosives has been exploded in a bore hole to enlarge or "spring" it, an interval of at least two (2) hours must be allowed to pass before an additional charge of explosives can be loaded into the hole.

NOTE: Where it is necessary to clear obstacles for the moving of equipment there may be an exception made to this rule provided the sprung hole is thoroughly wet down with water before it is loaded.

(g) No person shall be allowed to deepen drill holes which have contained explosives or blasting agents.

(h) No explosives or blasting agents shall be left unattended at the blast site, unless properly stored.

(i) Users (blasters) shall not load, store or use explosives closer than the length of the steel being used for drilling and in no event nearer than ten feet of drilling operations.

(j) Machines and all tools not used for loading explosives into bore holes shall be removed from the immediate location of holes being loaded with explosives. Equipment shall not be operated within 50 feet of loaded holes except when equipment is needed to add burden or mats.

(k) No activity of any nature other than that which is required for loading holes with explosives shall be permitted in the blast area.

(l) Powerlines and portable electric cables for equipment being used shall be kept a safe distance from explosives or blasting agents being loaded into drill holes. Cables in the proximity of the blast area shall be deenergized and locked out.

(m) Holes shall not be drilled where there is danger of intersecting a charged or misfired hole.

(n) When loading a long line of holes with more than one loading crew, the crews shall be separated by practical distance consistent with efficient operation and supervision of crews.

(o) No explosives for underground operations other than those in Fume Class 1, as set forth by the Institute of Makers of Explosives, shall be used; however, explosives complying with the requirements of Fume Class 2 and Fume Class 3 may be used if adequate ventilation has been provided.

(p) Warning signs, indicating a blast area, shall be maintained at all approaches to the blast area. The warning sign lettering shall not be less that 4 inches in height on a contrasting background.

(q) A bore hole shall never be sprung when it is adjacent to or near a hole that is loaded. Flashlight batteries shall not be used for springing holes.

(r) Drill holes which have been sprung or chambered, and which are not water–filled, shall be allowed to cool before explosives are loaded.

(s) No loaded holes shall be left unattended.

(t) The user (blaster) shall keep an accurate, up–to–date record of explosives, blasting agents, and blasting supplies used in a blast and shall keep an accurate running inventory of all explosives and blasting agents stored on the operation.

(u) When loading blasting agents pneumatically over electric blasting caps, semiconductive delivery hose shall be used and the equipment shall be bonded and grounded.

(4) Initiation of explosive charges – electric blasting.

(a) Only electric blasting caps shall be used for blasting operations in congested districts, or on highways, or adjacent to highways open to traffic, except where sources of extraneous electricity make such use dangerous. Blasting cap leg wires shall be kept short–circuited (shunted) until they are connected into the circuit for firing.

(b) Before adopting any system of electrical firing, the user (blaster) shall conduct a thorough survey for extraneous currents, and all dangerous currents shall be eliminated before any holes are loaded.

(c) In any single blast using electric blasting caps, all caps shall be of the same style or function, and of the same manufacture.

(d) Electric blasting shall be carried out by using blasting circuits or power circuits in accordance with the electric blasting cap manufacturer's recommendations.

(e) The firing line shall be checked with a blasting galvanometer equipped with a silver chloride cell or other approved systems, especially designed for this purpose, before being connected to firing line.

(f) The circuit including all caps shall be tested with a blasting galvanometer equipped with a silver chloride cell or other approved systems, especially designed for this purpose, before being connected to firing line.

(g) When firing a circuit of electric blasting caps, care shall be exercised to ensure that an adequate quantity of delivered current is available, in accordance with the manufacturer's recommendations.

(h) Connecting wires and lead wires shall be insulated single solid wires of sufficient current–carrying capacity, and shall not be less than twenty (20) gauge (American Wire gauge) solid core insulated wire.

(i) Firing line or leading wires shall be solid single wires of sufficient current–carrying capacity, and shall be not less than fourteen (14) gauge (American Wire gauge) solid core insulated wire. Bus wires – depends on the size of the blast, fourteen (14) gauge (American Wire gauge) copper is recommended.

(j) The ends of lead wires which are to be connected to a firing device shall be shorted by twisting them together or otherwise connecting them before they are connected to the leg wires or connecting wires, and they shall be kept in the possession of the person who is doing the loading until loading is completed and the leg wires attached. Lead wires shall not be attached to the firing device until the blaster is ready to fire the shot and must be attached by the user (blaster) themselves.

(k) The ends of the leg wires on electric detonators shall be shorted in a similar manner and not separated until all holes are loaded and the loader is ready to connect the leg wires to the connecting wires or lead wires.

(l) When firing electrically, the insulation on all firing lines shall be adequate and in good condition.

(m) A power circuit used for firing electric blasting caps shall not be grounded.

(n) In underground operations when firing from a power circuit, a safety switch shall be placed at intervals in the permanent firing line. This switch shall be made so it can be locked only in the "Off" position and shall be provided with a short–circuiting arrangement of the firing lines to the cap circuit.

(o) In underground operations there shall be a "lightning" gap of at least 5 feet in the firing system ahead of the main firing switch; that is, between this switch and the source of power. This gap shall be bridged by a flexible jumper cord just before firing the blast.

(p) When firing from a power circuit, the firing switch shall be locked in the open or "Off" position at all times, except when firing. It shall be so designed that the firing lines to the cap circuit are automatically short–circuited when the switch is in the "Off" position. Keys to this switch shall be entrusted only to the user (blaster).

(q) Blasting machines shall be in good condition and the efficiency of the machine shall be tested periodically to make certain that it can deliver power at its rated capacity.

(r) When firing with blasting machines, the connections shall be made as recommended by the manufacturer of the electric blasting caps used.

(s) The number of electric blasting caps connected to a blasting machine shall not be in excess of its rated capacity. Furthermore, in primary blasting, a series circuit shall contain no more caps than the limits recommended by the manufacturer of the electric blasting caps in use.

(t) The user (blaster) shall be in charge of the blasting machines, and no other person shall connect the leading wires to the machine.

(u) Users (blasters), when testing circuits to charged holes, shall use only blasting galvanometers equipped with a silver chloride cell or other approved systems, especially designed for this purpose.

(v) Whenever the possibility exists that a leading line or blasting wire might be thrown over a live powerline by the force of an explosion, care shall be taken to see that the total length of wires are kept too short to hit the lines, or that the wires are securely anchored to the ground. If neither of these requirements can be satisfied, a nonelectric system shall be used.

(w) In electrical firing, only the person making leading wire connections shall fire the shot. All connections shall be made from the bore hole back to the source of firing current, and the leading wires shall remain shorted and not be connected to the blasting machine or other source of current until the charge is to be fired.

(x) After firing an electric blast from a blasting machine, the leading wires shall be immediately disconnected from the machine and short-circuited.

(y) When electric blasting caps have been used, workers shall not return to misfired holes for at least thirty minutes.

(5) Use of Safety Fuse. (a) A fuse that is deteriorated or damaged in any way shall not be used.

(b) The hanging of fuse on nails or other projections which will cause a sharp bend to be formed in the fuse is prohibited.

(c) Before capping safety fuse, a short length shall be cut from the end of the supply reel so as to assure a fresh cut end in each blasting cap.

(d) Only a cap crimper of approved design shall be used for attaching blasting caps to safety fuse. Crimpers shall be kept in good repair and accessible for use.

(e) No unused cap or short capped fuse shall be placed in any hole to be blasted; such unused detonators shall be removed from the working place and disposed of or properly stored.

(f) No fuse shall be capped, or primers made up, in any magazine or near any possible source of ignition.

(g) Capping of fuse and making of primers shall only be done in a place selected for this purpose and at least one hundred (100) feet distant from any storage magazine.

(h) Fuse must be cut long enough to reach beyond the collar of the bore hole and in no case less than three (3) feet long except that a fuse not less than eighteen (18) inches long may be used for choker holes where not more than one (1) stick or cartridge of explosives is used.

(i) At least two persons shall be present when multiple cap and fuse blasting is done by hand lighting methods.

(j) Not more than 12 fuses shall be lighted by each blaster when hand lighting devices are used. However, when two or more safety fuses in a group are lighted as one by means of igniter cord, or other similar fuse-lighting devices, they may be considered as one fuse.

(k) The so-called "drop fuse" method of dropping or pushing a primer or any explosive with a lighted fuse attached is prohibited.

(l) Cap and fuse shall not be used for firing mudcap charges unless charges are separated sufficiently to prevent one charge from dislodging other shots in the blast.

(m) When blasting with safety fuses, consideration shall be given to the length and burning rate of the fuse. Sufficient time, with a margin of safety, shall always be provided for the blaster to reach a place of safety.

(n) The burning rate of the safety fuse in use at any time shall be measured, posted in conspicuous locations, and brought to the attention of all workers concerned with blasting. No fuse shall be used that burns faster than one foot (1') in thirty seconds or slower than one foot (1') in fifty-five seconds.

(o) For use in wet places the joint between the cap and fuse shall be waterproofed with a compound prepared for this purpose.

(p) In making up primers only nonsparking skewers shall be used for punching the hole in the cartridge to insert the capped fuse.

(q) Only sufficient primers for one day's use shall be made up at one time. They shall be stored in a box type magazine in which no other explosives are stored.

(r) Any loose cartridges of explosives, detonators, primers and capped fuse unused at the end of the shift shall be returned to their respective magazines and locked up.

(6) Use of Detonating Cord. (a) Care shall be taken to select a detonating cord consistent with the type and physical condition of the bore hole and stemming and the type of explosives used.

(b) Detonating cord shall be handled and used with the same respect and care given other explosives.

(c) For quantity and distance purposes detonating fuse up to 60 grains per foot should be calculated as equivalent to 9 lbs. of high explosives per 1,000 feet. Heavier cord loads should be rated proportionately.

(d) If using a detonating type cord for blasting the double-trunk-line or loop systems shall be used.

(e) Trunk lines in multiple-row blasts shall make one or more complete loops, with crossties between loops at intervals of not over two hundred feet (200').

(f) All detonating cord knots shall be tight and all connections shall be kept at right angles to the trunk lines.

(g) The line of detonating cord extending out of a bore hole or from a charge shall be cut from the supply spool before loading the remainder of the bore hole or placing additional charges.

(h) Detonating cord shall be handled and used with care to avoid damaging or severing the cord during and after loading and hooking-up.

(i) Detonating cord connections shall be competent and positive in accordance with approved and recommended methods. Knot-type or other cord-to-cord connections shall be made only with detonating cord in which the explosive core is dry.

(j) All detonating cord trunklines and branchlines shall be free of loops, sharp kinks, or angles that direct the cord back toward the oncoming line of detonation.

(k) All detonating cord connections shall be inspected before firing the blast.

(l) When detonating cord millisecond-delay connectors or short-interval-delay electric blasting caps are used with detonating cord, the practice shall conform strictly to the manufacturer's recommendations.

(m) When connecting a blasting cap or an electric blasting cap to detonating cord, the cap shall be taped or otherwise attached securely along the side or the end of the detonating cord, with the end of the cap containing the explosive charge pointed in the direction in which the detonation is to proceed.

(n) Detonators for firing the trunkline shall not be brought to the loading area nor attached to the detonating cord until everything else is in readiness for the blast.

(7) Firing the Blast. (a) A code of blasting signals equivalent to Table T-1 shall be posted on one or more

conspicuous places at the operation, and all employees shall be required to familiarize themselves with the code and conform to it. Danger signs shall be placed at suitable locations.

(b) All charges shall be covered with blasting mats before firing, where blasting may cause injury or damage by flying rock or debris.

(c) Before a blast is fired, a loud warning signal shall be given by the blaster in charge, who has made certain that all surplus explosives are in a safe place and all employees, vehicles, and equipment are at a safe distance, or under sufficient cover.

(d) Flagmen shall be safely stationed on highways which pass through the danger zone so as to stop traffic during blasting operations.

(e) It shall be the duty of the blaster to fix the time of blasting.

(f) Before firing an underground blast, warning shall be given, and all possible entries into the blasting area, and any entrances to any working place where a drift, raise, or other opening is about to hole through, shall be carefully guarded. The blaster shall make sure that all employees are out of the blast area before firing a blast.

TABLE T-1

WARNING SIGNAL —	A 1-minute series of long blasts 5 minutes prior to blast signal.
BLAST SIGNAL —	A series of short blasts 1 minute prior to the shot.
ALL CLEAR SIGNAL —	A prolonged blast following the inspection of blast area.

(8) Inspection after Blasting. (a) Immediately after the blast has been fired, the firing line shall be disconnected from the blasting machine, or where power switches are used, they shall be locked open or in the off position.

(b) Sufficient time shall be allowed, for the smoke and fumes to leave the blasted area before returning to the shot. An inspection of the area and the surrounding rubble shall be made by the user (blaster) to determine if all charges have been exploded before employees are allowed to return to the operation, and in tunnels, after the muck pile has been wetted down.

(9) Misfires. (a) If a misfire is found, the user (blaster) shall provide proper safeguards for excluding all employees from the danger zone.

(b) No other work shall be done except that necessary to remove the hazard of the misfire and only those employees necessary to do the work shall remain in the danger zone.

(c) No attempt shall be made to extract explosives from any charged or misfired hole; a new primer shall be put in and the hole reblasted. If refiring of the misfired hole presents a hazard, the explosives may be removed by washing out with water or, where the misfire is under water, blown out with air.

(d) If there are any misfires while using cap and fuse, all employees shall remain away from the charge for at least one hour. Misfires shall be handled under the direction of the person in charge of the blasting.

(e) When electric blasting caps have been used, workers shall not return to misfired holes for at least thirty minutes. All wires shall be carefully traced and a search made for unexploded charges.

(f) If explosives are suspected of burning in a hole, all persons in the endangered area shall move to a safe location and no one shall return to the hole until the danger has passed, but in no case within one hour.

(g) No drilling, digging, or picking shall be permitted until all missed holes have been detonated or the authorized representative has approved that work can proceed.

(10) Underwater Blasting. (a) A user (blaster) shall conduct all blasting operations.

(b) Loading tubes and casings of dissimilar metals shall not be used because of possible electric transient currents from galvanic action of the metals and water.

(c) Only water-resistant blasting caps and detonating cords shall be used for all underwater blasting. Loading shall be done through a nonsparking metal loading tube when tube is necessary.

(d) No blast shall be fired while any vessel under way is closer than 1,500 feet to the blasting area. Those on board vessels or craft moored or anchored within 1,500 feet shall be notified before a blast is fired.

(e) No blast shall be fired while any swimming or diving operations are in progress in the vicinity of the blasting area. If such operations are in progress, signals and arrangements shall be agreed upon to assure that no blast shall be fired while any persons are in the water.

(f) Blasting flags shall be displayed.

(g) The storage and handling of explosives aboard vessels used in underwater blasting operations shall be according to provisions outlined herein on handling and storing explosives.

(h) When more than one charge is placed under water, a float device shall be attached to an element of each charge in such manner that it will be released by the firing. Misfires shall be handled in accordance with the requirements of WAC 296-52-043(9).

(11) Blasting in Excavation Work in Pressurized Air Locks.

(a) Detonators and explosives shall not be stored or kept in tunnels, shafts, or caissons. Detonators and explosives for each round shall be taken directly from the magazines to the blasting zone and immediately loaded. Detonators and explosives left over after loading a round shall be removed from the working chamber before the connecting wires are connected up.

(b) When detonators or explosives are brought into an air lock, no employee except the powderman, user (blaster), lock tender and the employees necessary for carrying, shall be permitted to enter the air lock. No other material, supplies, or equipment shall be locked through with the explosives.

(c) Detonators and explosives shall be taken separately into pressure working chambers.

(d) The user (blaster) or powderman shall be responsible for the receipt, unloading, storage, and on-site transportation of explosives and detonators.

(e) All metal pipes, rails, air locks, and steel tunnel lining shall be electrically bonded together and grounded at or near the portal or shaft, and such pipes and rails shall be cross-bonded together at not less than 1,000-foot intervals throughout the length of the tunnel. In addition, each air supply pipe shall be grounded at its delivery end.

(f) The explosives suitable for use in wet holes shall be water-resistant and shall be Fume Class 1, or other approved explosives.

(g) When tunnel excavation in rock face is approaching mixed face, and when tunnel excavation is in mixed face, blasting shall be performed with light charges and with light burden on each hole. Advance drilling shall be performed as tunnel excavation in rock face approaches mixed face, to determine the general nature and extent of rock cover and the remaining distance ahead to soft ground as excavation advances.

(12) Vibration and Damage Control. (a) Blasting operations in or adjacent to cofferdams, piers, underwater structures, buildings, structures, or other facilities shall be carefully planned with full consideration for all forces and conditions involved.

(13) Black Blasting Powder shall not be used for blasting except when a desired result cannot be obtained with another type of explosive such as in quarrying certain types of dimension stone.

(14) In the use of black blasting powder:

(a) Containers shall not be opened in, or within fifty (50') feet of any magazine; within any building in which a fuel-fired or exposed-element electric heater is in operation; where electrical or incandescent-particle sparks could result in powder ignition; or within fifty (50') feet of any open flame.

(b) Granular powder shall be transferred from containers only by pouring.

(c) Spills of granular powder shall be cleaned up promptly with nonsparking equipment, contaminated powder shall be put into a container of water and its content disposed of promptly after the granules have disintegrated, or the spill area shall be flushed with a copious amount of water to completely disintegrate the granules.

(d) Containers of powder shall be kept securely closed at all times other than when the powder is being transferred from or into a container.

(e) Containers of powder transported by vehicles shall be in a wholly enclosed cargo space.

(f) Misfires shall be disposed of by:

(i) Washing the stemming and powder charge from the bore hole, and

(ii) Removal and disposal of the initiator as a damaged explosive.

(iii) Bore holes of shots that fire but fail to break, or fail to break promptly, shall not be recharged for at least twelve hours. [Order 76-6, § 296-52-043, filed 3/1/76; Order 75-41, § 296-52-043, filed 12/19/75.]

WAC 296-52-050 Transportation. (1) This section covers the transportation of explosives or blasting agents on vehicles not exempted under RCW 70.74.191. (a) No employee shall be allowed to smoke, carry matches or any other flame-producing device, or carry any firearms or loaded cartridges while in or near a motor vehicle transporting explosives; or drive, load, or unload such vehicle in a careless or reckless manner.

(b) Explosives shall not be carried or transported in or upon a public conveyance or vehicle carrying passengers. Explosives shall not be carried on any vehicle while vehicle is being used to transport workers other than driver and two (2) persons.

(c) Explosives shall not be transferred from one vehicle to another within the confines of any jurisdiction (city, county, State, or other area) without informing the fire and police departments thereof. In the event of breakdown or collision the local fire and police departments shall be promptly notified to help safeguard such emergencies. Explosives shall be transferred from the disabled vehicle to another, only when proper and qualified supervision is provided.

(d) Blasting caps or electric blasting caps shall not be transported over the highways on the same vehicles with other explosives.

(2) Transportation Vehicles. (a) Vehicles used for transporting explosives shall be strong enough to carry the load without difficulty and be in good mechanical condition. If vehicles do not have a closed body, the body shall be covered with a flameproof and moisture-proof tarpaulin or other effective protection against moisture and sparks. All vehicles used for the transportation of explosives shall have tight floors and any exposed spark-producing metal on the inside of the body shall be covered with wood or other nonsparking materials to prevent contact with packages of explosives. Packages of explosives shall not be loaded above the sides of an open-body vehicle.

(b) Every vehicle used for transporting explosives and oxidizing materials listed in (i) of this subdivision shall be marked as follows:

(i) Exterior markings or placards required on applicable vehicles shall be as follows for the various classes of commodities:

Commodity	Type of marking or placard
Explosives, Class A, any quantity or a combination of Class A and Class B explosives.	Explosives A (Red letters on white background).
Explosives, Class B, any quantity.	Explosives B (Red letters on white background).

Commodity	Type of marking or placard
Oxidizing material (blasting agents, ammonium nitrate, etc.), 1,000 pounds or more gross weight.	Oxidizers (Yellow letters on black background).

(ii) Each marking or placard shall consist of letters not less than 4 inches high, in the color specified, using approximately a 5/8–inch stroke. The placard must be larger than the lettering required thereon by at least one inch at the top and bottom sides. Such marking or placard described in subdivision (i) shall be contained in an area on the vehicle which has no other marking, lettering, or graphic display, for at least 3 inches in each direction.

(iii) Such markings or placards shall be displayed at the front, rear, and on each side of the motor vehicle or trailer, or other cargo carrying body while it contains explosives or other dangerous articles of such type and in such quantity as specified in (i) of this sub–division. The front marking or placard may be displayed on the front of either the truck, truck body, truck tractor or the trailer.

(iv) Any motor vehicle, trailer, or other cargo–carrying body containing more than one kind of explosive as well as an oxidizing material requiring a placard under the provisions of subdivision (i), the aggregate gross weight of which totals 1,000 pounds or more, shall be marked or placarded "Dangerous" as well as "Explosive A" or "Explosive B" as appropriate. If explosives Class A and explosives Class B are loaded on the same vehicle, the "Explosives B" marking need not be displayed.

(v) In any combination of two or more vehicles containing explosives or other dangerous articles each vehicle shall be marked or placarded as to its contents and in accordance with (i) and (iii) of this subdivision.

(c) Each motor vehicle used for transporting explosives shall be equipped with a minimum of two extinguishers, each having a rating of at least 10–BC.

(i) Only extinguishers listed or approved by Underwriters Laboratories, Inc., or the Factory Mutual Engineering Corp. shall be deemed suitable for use on explosives–carrying vehicles.

(ii) Extinguishers shall be filled and ready for immediate use and located near the driver's seat. Extinguishers shall be examined periodically by a competent person.

(d) A motor vehicle used for transporting explosives shall be given the following inspection to determine that it is in proper condition for safe transportation of explosives:

(i) Fire extinguishers shall be filled and in working order.

(ii) All electrical wiring shall be completely protected and securely fastened to prevent short–circuiting.

(iii) Chassis, motor, pan, and underside of body shall be reasonably clean and free of excess oil and grease.

(iv) Fuel tank and feedline shall be secure and have no leaks.

(v) Brakes, lights, horn, windshield wipers, and steering apparatus shall function properly.

(vi) Tires shall be checked for proper inflation and defects.

(vii) The vehicle shall be in proper condition in every other respect and acceptable for handling explosives.

(3) Operation of Transportation Vehicles. (a) Vehicles transporting explosives shall only be driven by and be in the charge of a driver who is not less than 21 years of age, physically fit, careful, capable, reliable, able to read and write the English language, and not addicted to the use, or under the influence of intoxicants, narcotics, or other dangerous drugs. This rule does not apply to persons taking prescription drugs and/or narcotics as directed by a physician providing such use shall not endanger the worker or others. They shall be familiar with the traffic regulations, State laws, and the provisions of this section.

(b) Except under emergency conditions, no vehicle transporting explosives shall be parked before reaching its destination, even though attended, on any public street adjacent to or in proximity to any bridge, tunnel, dwelling, building, or place where people work, congregate, or assemble.

(c) Every motor vehicle transporting any quantity of Class A or Class B explosives shall, at all times, be attended by a driver or other attendant of the motor carrier. This attendant shall have been made aware of the class of the explosive material in the vehicle and of its inherent dangers, and shall have been instructed in the measures and procedures to be followed in order to protect the public from those dangers. He shall have been made familiar with the vehicle he is assigned, and shall be trained, supplied with the necessary means, and authorized to move the vehicle when required.

(i) For the purpose of this subdivision, a motor vehicle shall be deemed "attended" only when the driver or other attendant is physically on or in the vehicle, or has the vehicle within his field of vision and can reach it quickly and without any kind of interference; "attended" also means that the driver or attendant is awake, alert, and not engaged in other duties or activities which may divert his attention from the vehicle, except for necessary communication with public officers, or representatives of the carrier, shipper, or consignee, or except for necessary absence from the vehicle to obtain food or to provide for their physical comfort.

(ii) However, an explosive–laden vehicle may be left unattended if parked within a securely fenced or walled area properly barricaded with all gates or entrances locked where parking of such vehicle is otherwise permissible, or at a magazine site established solely for the purpose of storing explosives.

(d) No spark–producing metal, spark–producing tools, oils, matches, firearms, electric storage batteries, flammable substances, acids, oxidizing materials, or corrosive compounds shall be carried in the body of any motor truck and/or vehicle transporting explosives, unless the loading of such dangerous articles and the explosives

comply with U.S. Department of Transportation regulations.

(e) Vehicles transporting explosives shall avoid congested areas and heavy traffic. Where routes through congested areas have been designated by local authorities such routes shall be followed.

(f) Delivery shall only be made to authorized persons and into authorized magazines of authorized temporary storage or handling area.

(4) Explosives at piers, railway stations, and cars or vessels not otherwise specified in this standard. (a) Railway Cars. Except in an emergency and with permission of the local authority, no person shall have or keep explosives in a railway car unless said car and contents and methods of loading are in accordance with the U.S. Department of Transportation Regulations for the Transportation of Explosives, 49 CFR Chapter I.

(b) Packing and Marking. No person shall deliver any explosive to any carrier unless such explosive conforms in all respects, including marking and packing, to the U.S. Department of Transportation Regulations for the Transportation of Explosives.

(c) Marking Cars. Every railway car containing explosives which has reached its destination, or is stopped in transit so as no longer to be in interstate commerce, shall have attached to both sides and ends of the car, cards with the words "Explosives—Handle Carefully–Keep Fire Away" in red letters at least 1-1/2 inches high on a white background.

(d) Storage. Any explosives at a railway facility, truck terminal, pier, wharf, harbor facility, or airport terminal, whether for delivery to a consignee, or forwarded to some other destination, shall be kept in a safe place, isolated as far as practicable and in such manner that they can be easily and quickly removed.

(e) Hours of Transfer. Explosives shall not be delivered to or received from any railway station, truck terminal, pier, wharf, harbor facility, or airport terminal between the hours of sunset and sunrise. (RCW 70.74-.020, 70.74.160, 70.74.191, 70.74.320, 70.74.340 and 70.74.350 apply.) [Order 75-41, § 296-52-050, filed 12/19/75; Order 70-4, § 296-52-050, filed 4/29/70.]

WAC 296-52-060 More stringent ordinances prevail. RCW 70.74.201, applies.

The relation between the enforcing agencies is clarified in WAC 296-52-400. [Order 70-4, § 296-52-060, filed 4/29/70.]

WAC 296-52-080 Temporary permit for existing storage facilities. RCW 70.74.010, applies.

The application for the temporary storage permit shall be made in writing. A temporary permit shall be void after August 11, 1970. [Order 70-4, § 296-52-080, filed 4/29/70.]

WAC 296-52-090 Construction of magazines. (1) Construction of Permanent Storage Facilities. (a) Definition. A Class 1 storage facility shall be a permanent structure; a building, an igloo or Army-type structure, a tunnel, or a dugout. It shall be bullet-resistant, fire-resistant, weather-resistant, theft-resistant, and well ventilated.

(b) Buildings. All building type storage facilities shall be constructed of masonry, wood, metal, or a combination of these materials and shall have no openings except for entrances and ventilation. Ground around such storage facilities shall slope away for drainage.

(c) Masonry Wall Construction. Masonry wall construction shall consist of brick, concrete, tile, cement block, or cinder block and shall be not less than 6 inches in thickness. Hollow masonry units used in construction shall have all hollow spaces filled with well tamped coarse dry sand or weak concrete (a mixture of one part cement and eight parts of sand with enough water to dampen the mixture while tamping in place). Interior wall shall be covered with a nonsparking material.

(d) Fabricated Metal Wall Construction. Metal wall construction shall consist of sectional sheets of steel or aluminum not less than number 14 gauge, securely fastened to a metal framework. Such metal wall construction shall be either lined inside with brick, solid cement blocks, hardwood not less than 4 inches in thickness or material of equivalent strength, or shall have at least a 6 inch sand fill between interior and exterior walls. Interior walls shall be constructed of or covered with a non sparking material.

(e) Wood Frame Wall Construction. The exterior of outer wood walls shall be covered with iron or aluminum not less than number 26 gauge. An inner wall of nonsparking materials shall be constructed so as to provide a space of not less than 6 inches between the outer and inner walls, which space shall be filled with coarse dry sand or weak concrete.

(f) Floors. Floors shall be constructed of a nonsparking material and shall be strong enough to bear the weight of the maximum quantity to be stored.

(g) Foundations. Foundations shall be constructed of brick, concrete, cement block, stone, or wood posts. If piers or posts are used, in lieu of a continuous foundation, the space under the buildings shall be enclosed with metal.

(h) Roof. (i) Except for buildings with fabricated metal roofs, the outer roof shall be covered with no less than number 26-gauge iron or aluminum fastened to a 7/8 inch sheathing.

(ii) Where it is possible for a bullet to be fired directly through the roof and into the storage facility at such an angle that the bullet would strike a point below the top of inner walls, storage facilities shall be protected by one of the following methods:

(A) A sand tray shall be located at the tops of inner walls covering the entire ceiling area, except that necessary for ventilation, lined with a layer of building paper, and filled with not less than 4 inches of coarse dry sand.

(B) A fabricated metal roof shall be constructed of 3/16 inch plate steel lined with 4 inches of hardwood or material of equivalent strength (For each additional 1/16 inch of plate steel, the hardwood or material of equivalent strength lining may be decreased one inch).

(i) Doors. All doors shall be constructed of 1/4 inch plate steel and lined with 2 inches of hardwood or material of equivalent strength. Hinges and hasps shall be attached to the doors by welding, riveting or bolting (nuts on inside of door). They shall be installed in such a manner that the hinges and hasps cannot be removed when the doors are closed and locked.

(j) Locks. Each door shall be equipped with two mortise locks; or with two padlocks fastened in separate hasps and staples; or with a combination of mortise lock and a padlock, or with a mortise lock that requires two keys to open; or a three–point lock. Locks shall be five–tumbler proof. All padlocks shall be protected with 1/4 inch steel caps constructed so as to prevent sawing or lever action on the locks or hasps.

(k) Ventilation. Except at doorways, a 2 inch air space shall be left around ceilings and the perimeter of floors. Foundation ventilators shall be not less than 4 by 6 inches. Vents in the foundation, roof, or gables shall be screened and offset.

(l) Exposed Metal. No sparking metal construction shall be exposed below the top of walls in the interior of storage facilities, and all nails therein shall be blind–nailed or countersunk.

(m) Igloos, Army–type Structures, Tunnels and Dugouts. Storage facilities shall be constructed of reinforced concrete, masonry, metal or a combination of these materials. They shall have an earthmound covering of not less than 24 inches on the top, sides and rear. Interior walls and floors shall be covered with a nonsparking material. Storage facilities of this type shall also be constructed in conformity with the requirements of subsection (1), subdivisions (a),(b),(f),(i),(j),(k) and (l) of this section.

(2) Construction of Portable (Field) Storage Facilities. (a) Definition. A Class 2 storage facility shall be a box, a trailer, a semitrailer or other mobile facility. It shall be bullet–resistant, fire–resistant, weather–resistant, theft–resistant, and well ventilated. Except as provided in subsection (3) of this section, hinges and hasps shall be attached to the covers or doors in the manner prescribed in subsection (1), subdivision (i) and the locking system shall be that prescribed in subsection (1) subdivision (j).

(b) Outdoor Storage Facilities. Outdoor storage facilities shall be at least 1 cubic yard in size and supported in such a manner so as to prevent direct contact with the ground. The sides, bottoms, tops and covers or doors shall be constructed of 1/4 inch steel and shall be lined with 2 inches of hardwood or material of equivalent strength. Edges of metal covers shall overlap sides at least one inch. The ground around such storage facilities shall slope away for drainage. When unattended, vehicular storage facilities shall have wheels removed or shall be otherwise effectively immobilized by kingpin locking devices or other methods approved by the Division of Industrial Safety and Health.

(3) Class 3 Storage for 1,000 or Less Blasting Caps in a Locked Uninhabited Building. Storage facilities for blasting caps in quantities of 1,000 or less shall have sides, bottoms, and covers constructed of number 12 gauge metal and lined with a nonsparking material. Hinges and hasps shall be attached thereto by welding. A single five–tumble proof lock shall be sufficient for locking purposes.

(4) Construction of Blasting Agent Storage Facilities.

(a) A Class 4 storage facility may be a building, an igloo, or Army–type structure, a tunnel, a dugout, a box, a trailer, or a semi–trailer or other mobile facility and shall be fire–resistant, weather–resistant, theft–resistant, and ventilated. They shall be constructed of masonry, metal–covered wood, fabricated metal, or a combination of these materials. The walls and floors of such storage facilities shall be lined with a nonsparking material. The doors or covers shall be metal or solid wood covered with metal. The foundations, locks, lock protection, hinges, hasps, and interior shall be in conformity with the requirements of subsection (1), subdivisions (g),(i),(j),(k), and (l).

(b) Outdoor Storage Facilities. The ground around such storage facilities shall slope away for drainage. When unattended, vehicular storage facilities shall have wheels removed or otherwise effectively immobilized by kingpin locking devices or other methods approved by the Division of Industrial Safety and Health.

(5) Smoking and Open Flames. (a) Smoking, matches, open flames, and spark–producing devices shall not be permitted in, or within 50 feet of, any outdoor storage facility.

(6) Quantity and Storage Restrictions. (a) General. Explosive materials in excess of 300,000 pounds and blasting caps in excess of 20 million shall not be stored in one storage facility. Blasting caps shall not be stored with other explosive materials in the same storage facility.

(7) Construction of Day Box Storage Facilities. (a) A temporary storage facility shall be a "day–box" or other portable facility. It shall be constructed in the same manner prescribed for Class 2 outdoor storage facilities in subsection (2), except that it may be less than one cubic yard in size, and shall be bullet–resistant, fire–resistant, weather–resistant, theft–resistant, and well ventilated. Hinges, hasps, locks, and lock protection shall be in conformity with the requirements of subsection (1), subdivisions (i) and (j) of this section.

(b) The ground around such storage facilities shall slope away for drainage.

(c) No explosive materials shall be left in such facilities if unattended. The explosive materials contained therein must be removed to licensed storage facilities for unattended storage.

(d) When used for temporary storage at a site for blasting operations, magazines shall be located away from neighboring inhabited buildings, railways, highways, and other magazines. A distance of at least one hundred and fifty (150) feet shall be maintained between magazines and the work in progress when the quantity of explosives kept therein is in excess of 25 pounds, and at least 50 feet when the quantity of explosives is 25 pounds, or less.

(8) Cap Day Box. (a) Temporary storage facilities for blasting caps in quantities of 100 or less shall have sides,

bottoms and covers constructed of number 12 gauge metal and lined with a nonsparking material. Hinges and hasps shall be attached thereto by welding. A single five-tumbler proof lock shall be sufficient for locking purposes.

(b) No explosive materials shall be left in such facilities if unattended. The explosive materials contained therein must be removed to licensed storage facilities for unattended storage.

(9) Storage Within Magazines. (a) Packages of explosives shall be laid flat with top side up. Black powder when stored in magazines with other explosives shall be stored separately. Black powder stored in kegs shall be stored on ends, bungs down, or on side, seams down. Corresponding grades and brands shall be stored together in such a manner that brands and grade marks show. All stocks shall be stored so as to be easily counted and checked. Packages of explosives shall be piled in a stable manner. When any kind of explosive is removed from a magazine for use, the oldest explosive of that particular kind shall always be taken first.

(b) Packages of explosives shall not be unpacked or repacked in a magazine nor within 50 feet of a magazine or in close proximity to other explosives. Tools used for opening packages of explosives shall be constructed of nonsparking materials, except that metal slitters may be used for opening fiberboard boxes. A wood wedge and a fiber, rubber, or wood mallet shall be used for opening or closing wood packages of explosives. Opened packages of explosives shall be securely closed before being returned to a magazine.

(c) Magazines shall not be used for the storage of any metal tools nor any commodity except explosives, but this restriction shall not apply to the storage of blasting agents and blasting supplies.

(d) Magazine floors shall be regularly swept, kept clean, dry, free of grit, paper, empty used packages, and rubbish. Brooms and other cleaning utensils shall not have any spark-producing metal parts. Sweepings from floors of magazines shall be properly disposed of. Magazine floors stained with nitroglycerin shall be cleaned according to instructions by the manufacturer.

(e) When any explosive has deteriorated to an extent that it is in an unstable or dangerous condition, or if nitroglycerin leaks from any explosives, then the person in possession of such explosive shall immediately proceed to destroy such explosive in accordance with the instructions of the manufacturer. Only experienced persons shall be allowed to do the work of destroying explosives.

(f) When magazines need inside repairs, all explosives shall be removed therefrom and the floors cleaned. In making outside repairs, if there is a possibility of causing sparks or fire the explosives shall be removed from the magazine. Explosives removed from a magazine under repair shall either be placed in another magazine or placed a safe distance from the magazine where they shall be properly guarded and protected until repairs have been completed, when they shall be returned to the magazine.

(g) Smoking, matches, open flames, spark-producing devices, and firearms (except firearms carried by guards) shall not be permitted inside of or within 50 feet of magazines. The land surrounding a magazine shall be kept clear of all combustible materials for a distance of at least 25 feet. Combustible materials shall not be stored within 50 feet of magazines.

(h) Magazines shall be in the charge of a competent person at all times who shall be at least 21 years of age, and who shall be held responsible for the enforcement of all safety precautions.

(i) Explosives recovered from blasting misfires shall be placed in a separate magazine until competent personnel has determined from the manufacturer the method of disposal. Caps recovered from blasting misfires shall not be reused. Such explosives and caps shall then be disposed of in the manner recommended by the manufacturer.

(10) Magazine heating systems requirements, NFPA Code No. 495, "Manufacture, Transportation, Storage and Use of Explosive Materials, 1973". The following will apply:

(a) Magazines requiring heat shall be heated by either hot water radiant heating within the magazine building; or air directed into the magazine building over either hot water or low pressure steam (15 psig) coils located outside the magazine building.

(b) The magazine heating systems shall meet the following requirements:

(i) The radiant heating coils within the building shall be installed in such a manner that the explosive materials or their containers cannot contact the coils and air is free to circulate between the coils and the explosive materials or their containers.

(ii) The heating ducts shall be installed in such a manner that the hot air discharge from the duct is not directed against the explosive materials or their containers.

(iii) The heating device used in connection with a magazine shall have controls which prevent the ambient building temperature from exceeding 130°F.

(iv) The electric fan or pump used in the heating system for a magazine shall be mounted outside and separate from the wall of the magazine and shall be grounded.

(v) The electric fan motor and the controls for electrical heating devices used in heating water or steam shall have overloads and disconnects, which comply with the National Electrical Code, (National Fire Protection Association, NFPA No. 70-1971). All electrical switch gear shall be located a minimum distance of 25 feet from the magazine.

(vi) The heating source for water or steam shall be separated from the magazine by a distance of not less than 25 feet when electrical and 50 feet when fuel-fired. The area between the heating unit and the magazine shall be cleared of all combustible materials.

(vii) The storage of explosive materials and their containers in the magazine shall allow uniform air circulation so temperature uniformity can be maintained throughout the explosive materials.

(11) Lighting. No lighting shall be placed or used in a storage facility of Class 1, 2, 3 or 4 except battery-activated safety lanterns.

(12) Underground Storage. (a) Explosives and related materials shall be stored in approved facilities required under the applicable provisions of WAC 296-61-280(7),(8), Safety Standard Metal and Nonmetallic Mines, Quarries, Pits, and Crushing Operations.

(b) No explosives or blasting agents shall be permanently stored in any underground operation until the operation has been developed to the point where at least two modes of exit have been developed.

(c) Permanent underground storage magazines shall be at least 300 feet from any shaft, adit, or active underground working area.

(d) Permanent underground magazines containing detonators shall not be located closer than 50 feet to any magazine containing other explosives or blasting agents.

(e) Upon the approach of an electrical storm, unless a greater hazard would be created thereby, explosives at the adit or the top of any shaft leading to where persons are working shall be moved away from such location a distance equal to that required for inhabited buildings, as listed in the American table of distances for storage of explosive materials. [Order 75-41, § 296-52-090, filed 12/19/75; Order 70-4, § 296-52-090, filed 4/29/70.]

WAC 296-52-095 Storage of explosives. (1) General Provisions. (a) All Class A, Class B, Class C explosives, and special industrial explosives, and any newly developed and unclassified explosives, shall be kept in magazines which meet the requirements of this section as defined in RCW 70.74.030, 70.74.040, 70.74.050, 70-.74.061, 70.74.100 and the following shall apply.

NOTE: 70.74.297 Separate storage of components capable of detonation when mixed. Any two components which, when mixed, become capable of detonation by a number 6 cap must be stored in separate locked containers or in a licensed, approved magazine. [1972 1st ex.s. c 88 § 4.]

(b) Blasting caps, electric blasting caps, detonating primers and primed cartridges shall not be stored in the same magazine with other explosives.

(c) Ground around magazines shall slope away for drainage. The land surrounding magazines shall be kept clear of brush, dried grass, leaves, and other materials for a distance of at least 25 feet.

(d) Magazines as required by this chapter shall be of four classes as defined in WAC 296-52-090.

(e) All explosive manufacturing buildings and magazines in which explosives or blasting agents, except small arms ammunition and smokeless powder are had, kept, or stored, must be located at distances from inhabited buildings, railroads, highways, and public utility transmission systems in conformity with the following quantity and distance tables, and these tables shall be the basis on which applications for license for storage shall be made and license for storage issued, as provided in RCW 70.74.110 and 70.74.120. All distances prescribed in the following quantity and distance tables are unbarricaded, and, if there is an efficient artificial barricade or natural barricade between the explosives manufacturing building or magazine and another explosives manufacturing building or magazine, building, railroad, highway, or public utility transmission system, the distance prescribed in the following quantity and distance tables may be reduced by one-half. Blasting and electric blasting caps in strength through number 8 should be rated as one and one-half pounds of explosives per one thousand caps. Blasting and electric blasting caps of strength higher than number 8 should be computed on the combined weight of explosives.

(f) When two or more storage magazines are located on the same property, each magazine must comply with the minimum distances specified from inhabited buildings, railways, and highways, and in addition, they should be separated from each other by not less than the distances shown for "Separation of Magazines," except that the quantity of explosives contained in cap magazines shall govern in regard to the spacing of said cap magazines from magazines containing other explosives. If any two or more magazines are separated from each other by less than the specified "Separation of Magazines" distances, then such two or more magazines, as a group, must be considered as one magazine, and the total quantity of explosives stored in such group must be treated as if stored in a single magazine located on the site of any magazine of the group, and must comply with the minimum of distances specified from other magazines, inhabited buildings, railways and highways. [Order 75-41, § 296-52-095, filed 12/19/75.]

WAC 296-52-100 Quantity and distance tables for storage.

TABLE H-21
AMERICAN TABLE OF DISTANCES FOR STORAGE OF EXPLOSIVES

As revised and approved by the Institute of Makers of Explosives, June 5, 1964.

Column 1 Quantity that may be had, kept or stored		Column 2 Distance From Nearest Inhabited Building	Column 3 Distance From Nearest Railroad	Column 4 Distance From Nearest Highway & Pub. Util. Trans. System
EXPLOSIVES				
Pounds over	Pounds not over	Feet	Feet	Feet
2	5	140	60	60
5	10	180	70	70
10	20	220	90	90
20	30	250	100	100
30	40	280	110	110
40	50	300	120	120
50	75	340	140	140
75	100	380	150	150
100	125	400	160	160
125	150	430	170	170

Column 1 Quantity that may be had, kept or stored EXPLOSIVES Pounds over	Pounds not over	Column 2 Distance From Nearest Inhabited Building Feet	Column 3 Distance From Nearest Railroad Feet	Column 4 Distance From Nearest Highway & Pub. Util. Trans. System Feet
150	200	470	190	190
200	250	510	210	210
250	300	540	220	220
300	400	590	240	240
400	500	640	260	260
500	600	680	270	270
600	700	710	290	290
700	800	750	300	300
800	900	780	310	310
900	1,000	800	320	320
1,000	1,200	850	340	330
1,200	1,400	900	360	340
1,400	1,600	940	380	350
1,600	1,800	980	390	360
1,800	2,000	1,010	410	370
2,000	2,500	1,090	440	380
2,500	3,000	1,160	470	390
3,000	4,000	1,270	510	420
4,000	5,000	1,370	550	450
5,000	6,000	1,460	590	470
6,000	7,000	1,540	620	490
7,000	8,000	1,600	640	500
8,000	9,000	1,670	670	510
9,000	10,000	1,730	690	520
10,000	12,000	1,750	740	540
12,000	14,000	1,770	780	550
14,000	16,000	1,800	810	560
16,000	18,000	1,880	840	570
18,000	20,000	1,950	870	580
20,000	25,000	2,110	940	630
25,000	30,000	2,260	1,000	680
30,000	35,000	2,410	1,050	720
35,000	40,000	2,550	1,100	760
40,000	45,000	2,680	1,140	800
45,000	50,000	2,800	1,180	840
50,000	55,000	2,920	1,220	880
55,000	60,000	3,030	1,260	910
60,000	65,000	3,130	1,290	940
65,000	70,000	3,220	1,320	970
70,000	75,000	3,310	1,350	1,000
75,000	80,000	3,390	1,380	1,020
80,000	85,000	3,460	1,410	1,040
85,000	90,000	3,520	1,440	1,060
90,000	95,000	3,580	1,460	1,080
95,000	100,000	3,630	1,490	1,090
100,000	110,000	3,670	1,540	1,100
110,000	120,000	3,710	1,580	1,110
120,000	130,000	3,750	1,620	1,120
130,000	140,000	3,780	1,670	1,130
140,000	150,000	3,800	1,700	1,140
150,000	160,000	3,870	1,740	1,160
160,000	170,000	3,930	1,780	1,180
170,000	180,000	3,980	1,810	1,200
180,000	190,000	4,020	1,840	1,210
190,000	200,000	4,060	1,870	1,220
200,000	210,000	4,110	1,910	1,240
210,000	230,000	4,200	1,960	1,270
230,000	250,000	4,310	2,020	1,300
250,000	275,000	4,430	2,080	1,340
275,000	300,000	4,550	2,150	1,380

(1972 1st ex.s. c 88 § 7; 1969 ex.s. c 137 § 10; 1931 c 111 § 5; RRS § 5440–5.)

[Order 75–41, § 296–52–100, filed 12/19/75; Order 70–4, § 296–52–100, filed 4/29/70.]

WAC 296-52-110 Limit on storage quantity. RCW 70.74.040, applies. [Order 70–4, § 296–52–110, filed 4/29/70.]

WAC 296-52-120 Quantity and distance tables for factory buildings. RCW 70.74.050, applies. [Order 70–4, § 296–52–120, filed 4/29/70.]

WAC 296-52-140 Quantity and distance table for separation between magazines. Magazines containing blasting caps and electric blasting caps shall be separated from other magazines containing like contents, or from magazines containing explosives by distances based on the following:

(1) Blasting caps in strengths through number 8 should be rated at one and one–half pounds of explosive per one thousand caps;

(2) For strengths higher than number 8, use the total combined weight of explosives;

(3) Magazines in which explosives are kept and stored shall be detached from other structures and separated from other magazines in conformity with the quantity and distance table set forth below:

TABLE H–21
QUANTITY AND DISTANCE TABLE FOR SEPARATION BETWEEN MAGAZINES CONTAINING EXPLOSIVES

Pounds Over	Pounds Not Over	Separation Distance in Feet Between Magazines Not Barricaded	Barricaded
2	5	12	6
5	10	16	8
10	20	20	10
20	30	22	11
30	40	24	12
40	50	28	14
50	75	30	15
75	100	32	16
100	125	36	18
125	150	38	19
150	200	42	21
200	250	46	23
250	300	48	24
300	400	54	27
400	500	58	29
500	600	62	31
600	700	64	32
700	800	66	33
800	900	70	35
900	1,000	72	36
1,000	1,200	78	39
1,200	1,400	82	41
1,400	1,600	86	43
1,600	1,800	88	44
1,800	2,000	90	45
2,000	2,500	98	49
2,500	3,000	104	52
3,000	4,000	116	58

Pounds Over	Pounds Not Over	Separation Distance in Feet Between Magazines Not Barricaded	Barricaded
4,000	5,000	122	61
5,000	6,000	130	65
6,000	7,000	136	68
7,000	8,000	144	72
8,000	9,000	150	75
9,000	10,000	156	78
10,000	12,000	164	82
12,000	14,000	174	87
14,000	16,000	180	90
16,000	18,000	188	94
18,000	20,000	196	98
20,000	25,000	210	105
25,000	30,000	224	112
30,000	35,000	238	119
35,000	40,000	248	124
40,000	45,000	258	129
45,000	50,000	270	135
50,000	55,000	280	140
55,000	60,000	290	145
60,000	65,000	300	150
65,000	70,000	310	155
70,000	75,000	320	160
75,000	80,000	330	165
80,000	85,000	340	170
85,000	90,000	350	175
90,000	95,000	360	180
95,000	100,000	370	185
100,000	110,000	380	195
110,000	120,000	410	205
120,000	130,000	430	215
130,000	140,000	450	225
140,000	150,000	470	235
150,000	160,000	490	245
160,000	170,000	510	255
170,000	180,000	530	265
180,000	190,000	550	275
190,000	200,000	570	285
200,000	210,000	590	295
210,000	230,000	630	315
230,000	250,000	670	335
250,000	275,000	720	360
275,000	300,000	770	385

(1969 1st ex.s. c 137 § 11.)

NOTE 1. "Natural Barricade" means natural features of the ground, such as hills, or timber of sufficient density that the surrounding exposures which require protection cannot be seen from the magazine when the trees are bare of leaves.

NOTE 2. "Artificial barricade" means an artificial mound or revetted wall of earth of a minimum thickness of three feet.

NOTE 3. "Barricaded" means that a building containing explosives is effectually screened from a magazine, building, railway, or highway, either by a natural barricade, or by an artificial barricade of such height that a straight line from the top of any sidewall of the building containing explosives to the eave line of any magazine, or building, or to a point 12 feet above the center of a railway or highway, will pass through such intervening natural or artificial barricade.

NOTE 4. This table applies only to the manufacture and permanent storage of commercial explosives. It is not applicable to transportation of explosives, or any handling or temporary storage necessary or incident thereto. It is not intended to apply to bombs, projectiles, or other heavily encased explosives.

(4) WAC 296-52-095(1) does not apply to:

(a) Stocks of small arms ammunition, propellant-actuated power cartridges, small arms ammunition primers in quantities of less than 750,000, smokeless propellants in quantities of less than 150 pounds or black powder, as used in muzzle loading firearms, in quantities of less than 25 pounds;

(b) Explosive-actuated power devices when in quantities less than 50 pounds net weight of explosives;

(c) Fuse lighters and fuse igniters;

(d) Safety fuses other than cordeau detonant fuses. [Order 75-41, § 296-52-140, filed 12/19/75; Order 70-4, § 296-52-140, filed 4/29/70.]

WAC 296-52-150 Storage of blasting caps with other explosives prohibited. RCW 70.74.100, applies.

The safe handling of explosives in magazines shall be done in accordance with WAC 296-40-360 (Construction Code). [Order 70-4, § 296-52-150, filed 4/29/70.]

WAC 296-52-160 License for manufacturing. RCW 70.74.110, applies.

The application for license for manufacturing explosives and/or blasting agents shall be made on a form substantially similar to that shown in Fig. 3, of this code.

The manufacturer's license shall be valid for one year. Request for renewal may be made at any of the Department district offices.

A copy of the plan of the plant submitted with said application and approved by the Department shall be kept in the plant open to inspection by the Department.

The manufacturing of explosives is covered by chapters 296-50 WAC and 296-51 WAC. [Order 70-4, § 296-52-160, filed 4/29/70.]

WAC 296-52-165 Blasting agents. (1) General. Unless otherwise set forth in this section, blasting agents, excluding water gels, shall be transported, stored, and used in the same manner as explosives. Water gels are covered in WAC 296-52-167.

(2) Fixed Location Mixing. (a) Buildings or other facilities used for mixing blasting agents shall be located, with respect to inhabited buildings, passenger railroads, and public highways, in accordance with Table H-21. In determining the distance separating highways, railroads, and inhabited buildings from potential explosions (as prescribed in Table H-21), the sum of all masses which may propagate (i.e., lie at distances less than prescribed in Table H-22) from either individual or combined donor masses are included. However, when the ammonium

nitrate must be included, only 50 percent of its weight shall be used because of its reduced blast effects.

(b) Buildings used for the mixing of blasting agents shall conform to the requirements of this section.

(i) Buildings shall be of non-combustible construction or sheet metal on wood studs.

(ii) Floors in a mixing plant shall be of concrete or of other nonabsorbent materials.

(iii) All fuel oil storage facilities shall be separated from the mixing plant and located in such a manner that in case of tank rupture, the oil will drain away from the mixing plant building.

(iv) The building shall be well ventilated.

(v) Heating units which do not depend on combustion processes, when properly designed and located, may be used in the building. All direct sources of heat shall be located outside the mixing building.

(vi) All internal-combustion engines used for electric power generation shall be located outside the mixing plant building, or shall be properly ventilated and isolated by a firewall. The exhaust systems on all such engines shall be located so any spark emission cannot be a hazard to any materials in or adjacent to the plant.

(c) Equipment used for mixing blasting agents shall conform to the requirements of this subdivision.

(i) The design of the mixer shall minimize the possibility of frictional heating, compaction, and especially confinement. All bearings and drive assemblies shall be mounted outside the mixer and protected against the accumulation of dust. All surfaces shall be accessible for cleaning.

(ii) Mixing and packaging equipment shall be constructed of materials compatible with the fuel-ammonium nitrate composition.

(iii) Suitable means shall be provided to prevent the flow of fuel oil to the mixer in case of fire. In gravity flow systems an automatic spring-loaded shutoff valve with fusible link shall be installed.

(d) The provisions of this subdivision shall be considered when determining blasting agent compositions.

(i) The sensitivity of the blasting agent shall be determined by means of a No. 8 test blasting cap at regular intervals and after every change in formulation.

(ii) Oxidizers of small particle size, such as crushed ammonium nitrate prills or fines, may be more sensitive than coarser products and shall, therefore, be handled with greater care.

(iii) No hydrocarbon liquid fuel with flashpoint lower than that of No. 2 diesel fuel oil 125°F. minimum shall be used.

(iv) Crude oil and crankcase oil shall not be used.

(v) Metal powders such as aluminum shall be kept dry and shall be stored in containers or bins which are moisture-resistant or weathertight. Solid fuels shall be used in such manner as to minimize dust explosion hazards.

(vi) Peroxides and chlorates shall not be used.

(e) All electrical switches, controls, motors, and lights located in the mixing room shall conform to the requirements in WAC 296-24-950 through WAC 296-24-955; otherwise they shall be located outside the mixing room. The frame of the mixer and all other equipment that may be used shall be electrically bonded and be provided with a continuous path to the ground.

(f) Safety precautions at mixing plants shall include the requirements of this subdivision.

(i) Floors shall be constructed so as to eliminate floor drains and piping into which molten materials could flow and be confined in case of fire.

(ii) The floors and equipment of the mixing and packaging room shall be cleaned regularly and thoroughly to prevent accumulation of oxidizers or fuels and other sensitizers.

(iii) The entire mixing and packaging plant shall be cleaned regularly and thoroughly to prevent excessive accumulation of dust.

(iv) Smoking, matches, open flames, spark-producing devices, and firearms (except firearms carried by guards) shall not be permitted inside of or within 50 feet of any building or facility used for the mixing of blasting agents.

(v) The land surrounding the mixing plant shall be kept clear of brush, dried grass, leaves, and other materials for a distance of at least 25 feet.

(vi) Empty ammonium nitrate bags shall be disposed of daily in a safe manner.

(vii) No welding shall be permitted or open flames used in or around the mixing or storage area of the plant unless the equipment or area has been completely washed down and all oxidizer material removed.

(viii) Before welding or repairs to hollow shafts, all oxidizer material shall be removed from the outside and inside of the shaft and the shaft vented with a minimum one-half inch diameter opening.

(ix) Explosives shall not be permitted inside of or within 50 feet of any building or facility used for the mixing of blasting agents.

(3) Bulk Delivery and Mixing Vehicles. (a) The provisions of this subsection shall apply to off-highway private operations as well as to all public highway movements.

(b) A bulk vehicle body for delivering and mixing blasting agents shall conform with the requirements of this subdivision (b).

(i) The body shall be constructed of noncombustible materials.

(ii) Vehicles used to transport bulk premixed blasting agents on public highways shall have closed bodies.

(iii) All moving parts of the mixing system shall be designed as to prevent a heat buildup. Shafts or axles which contact the product shall have outboard bearings with 1-inch minimum clearance between the bearings and the outside of the product container. Particular attention shall be given to the clearances on all moving parts.

(iv) A bulk delivery vehicle shall be strong enough to carry the load without difficulty and be in good mechanical condition.

(c) Operation of bulk delivery vehicles shall conform to the requirements of WAC 296-52-050(2)(b). These include the placarding requirements as specified by Department of Transportation.

(i) The operator shall be trained in the safe operation of the vehicle together with its mixing, conveying, and related equipment. The employer shall assure that the operator is familiar with the commodities being delivered and the general procedure for handling emergency situations.

(ii) The hauling of either blasting caps or other explosives but not both, shall be permitted on bulk trucks provided that a special wood or nonferrous-lined container is installed for the explosives. Such blasting caps or other explosives shall be in DOT-specified shipping containers: see 49 CFR Chapter I.

(iii) No person shall smoke, carry matches or any flame-producing device, or carry any firearms while in or about bulk vehicles effecting the mixing transfer or down-the-hole loading of blasting agents at or near the blasting site.

(iv) Caution shall be exercised in the movement of the vehicle in the blasting area to avoid driving the vehicle over or dragging hoses over firing lines, cap wires, or explosive materials. The employer shall assure that the driver, in moving the vehicle, has assistance of a second person to guide the driver's movements.

(v) No intransit mixing of materials shall be performed.

(d) Pneumatic loading from bulk delivery vehicles into blastholes primed with electric blasting caps or other static-sensitive systems shall conform to the requirements of this subdivision.

(i) A positive grounding device shall be used to prevent the accumulation of static electricity.

(ii) A discharge hose shall be used that has a resistance range that will prevent conducting stray currents, but that is conductive enough to bleed off static buildup.

(iii) A qualified person shall evaluate all systems to determine if they will adequately dissipate static under potential field conditions.

(e) Repairs to bulk delivery vehicles shall conform to the requirements of this section.

(i) No welding or open flames shall be used on or around any part of the delivery equipment unless it has been completely washed down and all oxidizer material removed.

(ii) Before welding or making repairs to hollow shafts, the shaft shall be thoroughly cleaned inside and out and vented with a minimum one-half-inch diameter opening.

(4) Bulk Storage Bins. (a) The bin, including supports, shall be constructed of compatible materials, waterproof, and adequately supported and braced to withstand the combination of all loads including impact forces arising from product movement within the bin and accidental vehicle contact with the support legs.

(b) The bin discharge gate shall be designed to provide a closure tight enough to prevent leakage of the stored product. Provision shall also be made so that the gate can be locked.

(c) Bin loading manways or access hatches shall be hinged or otherwise attached to the bin and be designed to permit locking.

(d) Any electrically driven conveyors for loading or unloading bins shall conform to the requirements of WAC 296-24-950 through WAC 296-24-955. They shall be designed to minimize damage from corrosion.

(e) Bins containing blasting agent shall be located, with respect to inhabited buildings, passenger railroads, and public highways, in accordance with Table H-21 and separation from other blasting agent storage and explosives storage shall be in conformity with Table H-22.

(f) Bins containing ammonium nitrate shall be separated from blasting agent storage and explosives storage in conformity with Table H-22.

TABLE H-22
TABLE OF RECOMMENDED SEPARATION DISTANCES OF AMMONIUM NITRATE AND BLASTING AGENTS FROM EXPLOSIVES OR BLASTING AGENTS[1] [6]

Donor weight		Minimum separation distance of receptor when barricaded[2] (ft.)		Minimum thickness of artificial barricades[5] (in.)
Pounds over	Pounds not over	Ammonium nitrate[3]	Blasting agent[4]	
	100	3	11	12
100	300	4	14	12
300	600	5	18	12
600	1,000	6	22	12
1,000	1,600	7	25	12
1,600	2,000	8	29	12
2,000	3,000	9	32	15
3,000	4,000	10	36	15
4,000	6,000	11	40	15
6,000	8,000	12	43	20
8,000	10,000	13	47	20
10,000	12,000	14	50	20
12,000	16,000	15	54	25
16,000	20,000	16	58	25
20,000	25,000	18	65	25
25,000	30,000	19	68	30
30,000	35,000	20	72	30
35,000	40,000	21	76	30
40,000	45,000	22	79	35
45,000	50,000	23	83	35
50,000	55,000	24	86	35
55,000	60,000	25	90	35
60,000	70,000	26	94	40
70,000	80,000	28	101	40
80,000	90,000	30	108	40
90,000	100,000	32	115	40
100,000	120,000	34	122	50
120,000	140,000	37	133	50
140,000	160,000	40	144	50
160,000	180,000	44	158	50
180,000	200,000	48	173	50
200,000	220,000	52	187	60
220,000	250,000	56	202	60
250,000	275,000	60	216	60
275,000	300,000	64	230	60

Notes to Table of Recommended Separation Distances of Ammonium Nitrate and Blasting Agents from Explosives or Blasting Agents:

NOTE 1. These distances apply to the separation of stores only. Table H-21 shall be used in determining separation distances from inhabited buildings, passenger railways, and public highways.

NOTE 2. When the ammonium nitrate and/or blasting agent is not barricaded, the distances shown in the table shall be multiplied by six. These distances allow for the possibility of high velocity metal fragments from mixers, hoppers, truck bodies, sheet metal structures, metal containers, and the like which may enclose the "donor". Where storage is in bullet–resistant magazines recommended for explosives or where the storage is protected by a bullet–resistant wall, distances, and barricade thicknesses in excess of those prescribed in Table H–21 are not required.

NOTE 3. The distances in the table apply to ammonium nitrate that passes the insensitivity test prescribed in the definition of ammonium nitrate fertilizer promulgated by the National Plant Food Institute*; and ammonium nitrate failing to pass said test shall be stored at separation distances determined by competent persons. (*Definition and Test Procedures for Ammonium Nitrate Fertilizer, National Plant Food Institute, November 1964.)

NOTE 4. These distances apply to nitro–carbo–nitrates and blasting agents which pass the insensitivity test prescribed in the U.S. Department of Transportation (DOT) regulations.

NOTE 5. Earth, or sand dikes, or enclosures filled with the prescribed minimum thickness of earth or sand are acceptable artificial barricades. Natural barricades, such as hills or timber of sufficient density that the surrounding exposures which require protection cannot be seen from the "donor" when the trees are bare of leaves, are also acceptable.

NOTE 6. When the ammonium nitrate must be counted in determining the distances to be maintained from inhabited buildings, passenger railways and public highways, it may be counted at one–half its actual weight because its blast effect is lower.

NOTE 7. Guide to use of table of recommended separation distances of ammonium nitrate and blasting agents from explosives or blasting agents.

(a) Sketch location of all potential donor and acceptor materials together with the maximum mass of material to be allowed in that vicinity. (Potential donors are high explosives, blasting agents, and combination of masses of detonating materials. Potential acceptors are high explosives, blasting agents, and ammonium nitrate.)

(b) Consider separately each donor mass in combination with each acceptor mass. If the masses are closer than table allowance (distances measured between nearest edges), the combination of masses becomes a new potential donor of weight equal to the total mass. When individual masses are considered as donors, distances to potential acceptors shall be measured between edges. When combined masses within propagating distance of each other are considered as a donor, the appropriate distance to the edge of potential acceptors shall be computed as a weighted distance from the combined masses:

(i) Calculation of weighted distance from combined masses:

Let M_2, M_3 .... M_n be donor masses to be combined.

M_1 is a potential acceptor mass.

D_{12} is distance from M_1 to M_2 (edge to edge).

D_{13} is distance from M_1 to M_3 (edge to edge), etc.

To find weighted distance $[D_{1(2,3\ldots n)}$ from combined masses to M_1, add the products of the individual masses and distances and divide the total by the sum of the masses thus:

$$D_{1(2,3,\ldots j)} = \frac{M_2xD_{12}xD_{13}\ldots+M_nxD_{1n}}{M_2+M_3\ldots+M_n}$$

Propagation is possible if either an individual donor mass is less than the tabulated distance from an acceptor or a combined mass is less than the weighted distance from an acceptor.

(c) In determining the distances separating highways, railroads, and inhabited buildings from potential explosions (as prescribed in Table H–21), the sum of all masses which may propagate (i.e., lie at distances less than prescribed in the Table) from either individual or combined donor masses are included. However, when the ammonium nitrate must be included, only 50 percent of its weight shall be used because of its reduced blast effects. In applying Table H–21 to distances from highways, railroads, and inhabited buildings, distances are measured from the nearest edge of potentially explodable material as prescribed in Table H–21, Note 4.

(d) When all or part of a potential acceptor comprises Explosives Class A as defined in DOT regulations, storage in bullet–resistant magazines is required. Safe distances to stores in bullet–resistant magazines may be obtained from the intermagazine distances prescribed in Table H–21.

(e) Barricades must not have line-of-sight openings between potential donors and acceptors which permit blast or missiles to move directly between masses.

(f) Good housekeeping practices shall be maintained around any bin containing ammonium nitrate or blasting agent. This includes keeping weeds and other combustible materials cleared within 25 feet of such bin. Accumulation of spilled product on the ground shall be prevented.

(5) Storage of Blasting Agents and Supplies. (a) Blasting agents and oxidizers used for mixing of blasting agents shall be stored in the manner set forth in this subsection.

(i) Blasting agents or ammonium nitrate, when stored in conjunction with explosives, shall be stored in the manner set forth in WAC 296-52-090(1)(a) for explosives. The mass of blasting agents and one-half the mass of ammonium nitrate shall be included when computing the total quantity of explosives for determining distance requirements.

(ii) Blasting agents, when stored entirely separate from explosives, may be stored in the manner set forth in WAC 296-52-090(4)(a) or in one-story warehouses (without basements) which shall be:

(a) Noncombustible or fire resistive;

(b) Constructed so as to eliminate open floor drains and piping into which molten materials could flow and be confined in case of fire;

(c) Weather resistant;

(d) Well ventilated; and

(e) Equipped with a strong door kept securely locked except when open for business.

(iii) Semitrailer or full-trailer vans used for highway or onsite transportation of the blasting agents are satisfactory for temporarily storing these materials, provided they are located in accordance with Table H-21 with respect to inhabited buildings, passenger railways, and public highways and according to Table H-22 with respect to one another. Trailers shall be provided with substantial means for locking, and the trailer doors shall be kept locked, except during the time of placement and removal of stocks of blasting agents.

(b) Warehouses used for the storage of blasting agents separate from explosives shall be located as set forth in this subdivision.

(i) Warehouses used for the storage of blasting agents shall be located in accordance with the provisions of Table H-21 with respect to inhabited buildings, passenger railways, and public highways, and according to Table H-22 with respect to one another.

(ii) If both blasting agents and ammonium nitrate are handled or stored within the distance limitations prescribed in Table H-21, one-half the mass of the ammonium nitrate shall be added to the mass of the blasting agent when computing the total quality of explosives for determining the proper distance.

(c) Smoking, matches, open flames, spark producing devices, and firearms are prohibited inside of or within 50 feet of any warehouse used for the storage of blasting agents. Combustible materials shall not be stored within 50 feet of warehouses used for the storage of blasting agents.

(d) The interior of warehouses used for the storage of blasting agents shall be kept clean and free from debris and empty containers. Spilled materials shall be cleaned up promptly and safely removed. Combustible materials, flammable liquids, corrosive acids, chlorates, or nitrates shall not be stored in any warehouse used for blasting agents unless separated therefrom by a fire resistive separation of not less than 1 hour resistance. The provisions of this subdivision shall not prohibit the storage of blasting agents together with non-explosive blasting supplies.

(e) Piles of ammonium nitrate and warehouses containing ammonium nitrate shall be adequately separated from readily combustible fuels.

(f) Caked oxidizers, either in bags or in bulk, shall not be loosened by blasting.

(g) Every warehouse used for the storage of blasting agents shall be under the supervision of a competent person who shall be not less than 21 years of age.

(6) Transportation of Packaged Blasting Agents. (a) When blasting agents are transported in the same vehicle with explosives, all of the requirements of WAC 296-52-050 shall be complied with.

(b) Vehicles transporting blasting agents shall only be driver at least twenty-one (21) years of age who is capable, careful, reliable, and in possession of a valid motor vehicle operator's license. Such a person shall also be familiar with the States vehicle and traffic laws.

(c) No matches, firearms, acids, or other corrosive liquids shall be carried in the bed or body of any vehicle containing blasting agents.

(d) No person shall be permitted to ride upon, drive, load, or unload a vehicle containing blasting agents while smoking or under the influence of intoxicants, narcotics, or other dangerous drugs.

(e) It is prohibited for any person to transport or carry any blasting agents upon any public vehicle carrying passengers for hire.

(f) Vehicles transporting blasting agents shall be in safe operating condition at all times.

(g) When offering blasting agents for transportation on public highways the packaging, marking, and labeling of containers of blasting agents shall comply with the requirements of DOT.

(h) Vehicles used for transporting blasting agents on public highways shall be placarded in accordance with DOT regulations.

(7) Use of Blasting Agents. Persons using blasting agents shall comply with all of the applicable provisions of WAC 296-52-043. [Order 76-6, § 296-52-165, filed 3/1/76; Order 75-41, § 296-52-165, filed 12/19/75.]

WAC 296-52-167 Water gel (slurry) explosives and blasting agents. (1) General Provisions. Unless otherwise set forth in this section, water gels shall be transported, stored and used in the same manner as explosives or blasting agents in accordance with the classification of the product.

(2) Types and Classifications. (a) Water gels containing a substance in itself classified as an explosive shall be classified as an explosive and manufactured, transported, stored, and used as specified for "explosives" in this section, except as noted in subdivision (d).

(b) Water gels containing no substance in itself classified as an explosive and which are cap-sensitive as defined in WAC 296-52-030 under Blasting Agent shall be classified as an explosive and manufactured, transported, stored and used as specified for "explosives" in this section.

(c) Water gels containing no substance in itself classified an an explosive and which are not cap-sensitive as defined in WAC 296-52-030 under Blasting Agent shall be classified as blasting agents and manufactured, transported, stored, and used as specified for "blasting agents" in this section.

(d) When tests on specific formulations of water gels result in Department of Transportation classification as a Class B explosive, bullet-resistant magazines are not required, see WAC 296-52-090(4)(a).

(3) Fixed Location Mixing. (a)(i) Buildings or other facilities used for mixing water gels shall be located with respect to inhabited buildings, passenger railroads and public highways, in accordance with Table H-21.

(ii) In determining the distances separating highways, railroads, and inhabited buildings from potential explosions (as prescribed in Table H-21), the sum of all masses that may propagate (i.e., lie at distances less than prescribed in Table H-22) from either individual or combined donor masses are included. However, when the ammonium nitrate must be included, only 50 percent of its weight shall be used because of its reduced blast effects.

(b) Buildings used for the mixing of water gels shall conform to the requirements of this subdivision.

(i) Buildings shall be of noncombustible construction or sheet metal on wood studs.

(ii) Floors in a mixing plant shall be of concrete or of other nonabsorbent materials.

(iii) Where fuel oil is used all fuel oil storage facilities shall be separated from the mixing plant and located in such a manner that in case of tank rupture, the oil will drain away from the mixing plant building.

(iv) The building shall be well ventilated. Heating units that do not depend on combustion processes, when properly designed and located, may be used in the building. All direct sources of heat shall be provided exclusively from units located outside of the mixing building.

(v) All internal-combustion engines used for electric power generation shall be located outside the mixing plant building, or shall be properly ventilated and isolated by a firewall. The exhaust systems on all such engines shall be located so any spark emission cannot be a hazard to any materials in or adjacent to the plant.

(c) Ingredients of water gels shall conform to the requirements of this subdivision.

(i) Ingredients in themselves classified as Class A or Class B explosives shall be stored in conformity with WAC 296-52-095.

(ii) Nitrate-water solutions may be stored in tank cars, tank trucks, or fixed tanks without quantity or distance limitations. Spills or leaks which may contaminate combustible materials shall be cleaned up immediately.

(iii) Metal powders such as aluminum shall be kept dry and shall be stored in containers or bins which are moisture-resistant or weathertight. Solid fuels shall be used in such manner as to minimize dust explosion hazards.

(iv) Ingredients shall not be stored with incompatible materials.

(v) Peroxides and chlorates shall not be used.

(d) Mixing equipment shall comply with the requirements of this subdivision.

(i) The design of the processing equipment, including mixing and conveying equipment, shall be compatible with the relative sensitivity of the materials being handled. Equipment shall be designed to minimize the possibility of frictional heating, compaction, overloading, and confinement.

(ii) Both equipment and handling procedures shall be designed to prevent the introduction of foreign objects or materials.

(iii) Mixers, pumps, valves, and related equipment shall be designed to permit regular and periodic flushing, cleaning, dismantling, and inspection.

(iv) All electrical equipment including wiring, switches, controls, motors, and lights, shall conform to the requirements of WAC 296-24-950 through WAC 296-24-955.

(v) All electric motors and generators shall be provided with suitable overload protection devices. Electrical generators, motors, proportioning devices, and all other electrical enclosures shall be electrically bonded. The grounding conductor to all such electrical equipment shall be effectively bonded to the service-entrance ground connection and to all equipment ground connections in a manner so as to provide a continuous path to ground.

(e) Mixing facilities shall comply with the fire prevention requirements of this subdivision.

(i) The mixing, loading, and ingredient transfer areas where residues or spilled materials may accumulate shall be cleaned periodically. A cleaning and collection system for dangerous residues shall be provided.

(ii) A daily visual inspection shall be made of the mixing, convening, and electrical equipment to establish that such equipment is in good operating condition. A program of systematic maintenance shall be conducted on regular schedule.

(iii) Heaters which are not dependent on the combustion process within the heating unit may be used within the confines of processing buildings, or compartments, if provided with temperature and safety controls and located away from combustible materials and the finished product.

(4) Bulk Delivery and Mixing Vehicles. (a) The design of vehicles shall comply with the requirements of this subdivision.

(i) Vehicles used over public highways for the bulk transportation of water gels or of ingredients classified

as dangerous commodities, shall meet the requirements of the Department of Transportation and shall meet the requirements of WAC 296–52–050 and WAC 296–52–165 of this section.

(ii) When electric power is supplied by a self–contained motor generator located on the vehicle the generator shall be at a point separate from where the water gel is discharged.

(iii) The design of processing equipment and general requirements shall conform to subsection (3)(c) and (d).

(iv) A positive action parking brake which will set the wheel brakes on at least one axle shall be provided on vehicles when equipped with air brakes and shall be used during bulk delivery operations. Wheel chocks shall supplement parking brakes whenever conditions may require.

(b) Operation of bulk delivery and mixing vehicles shall comply with the requirements of this subdivision.

(i) The placarding requirements contained in DOT regulations apply to vehicles carrying water gel explosives or blasting agents.

(ii) The operator shall be trained in the safe operation of the vehicle together with its mixing, conveying, and related equipment. The operator shall be familiar with the commodities being delivered and the general procedure for handling emergency situations.

(iii) The hauling of either blasting caps or other explosives, but not both, shall be permitted on bulk trucks provided that a special wood or nonferrous–lined container is installed for the explosives. Such blasting caps or other explosives shall be DOT–specified shipping containers; see 49 CFR Chapter I.

(iv) No person shall be allowed to smoke, carry matches or any flame–producing device, or carry any firearms while in or about bulk vehicles effecting the mixing, transfer, or down–the–hole loading of water gels at or near the blasting site.

(v) Caution shall be exercised in the movement of the vehicle in the blasting area to avoid driving the vehicle over or dragging hoses over firing lines, cap wires, or explosive materials. The employer shall furnish the driver the assistance of a second person to guide the driver's movements.

(vi) No intransit mixing of materials shall be performed.

(vii) The location chosen for water gel or ingredient transfer from a support vehicle into the bore hole loading vehicle shall be away from the blasthole site when the bore holes are loaded or in the process of being loaded. [Order 75–41, § 296–52–167, filed 12/19/75.]

WAC 296–52–170 Storage magazine license. RCW 70.74.120, applies.

A separate application shall be made for each and every magazine.

The application for a license to operate a permanent or portable storage magazine for explosives shall be made by the person responsible for the storage of the explosives, on a form substantially similar to that shown in Fig. 4, of this code.

The exact location of the storage magazine shall be submitted with the application, as well as, the kind and maximum quantity of explosives stored, and the distance to nearby structures and other magazines, as outlined in Fig. 4.

The said license shall be renewed annually, not later than the anniversary date.

A license fee shall be paid for one (1) year, as shown in WAC 296–52–180, and shall accompany the application.

One (1) set of two (2) durable identification labels, showing the magazine license number, will be furnished by the Department for each and every magazine with the first application.

One (1) label shall be attached permanently to the inside of a door or lid of the magazine, and the second label shall be attached permanently and conspicuously on the outside of the magazine, least subject to damage. This license number will stay with each magazine during its life.

If said labels should be destroyed accidentally, the Department will furnish new labels on request.

If the magazine is used or leased by a person other than the owner, such other person shall then be responsible for the safe operation of the magazine, and for obtaining of the license.

When the responsibility for a magazine is transferred from one person to another, the transferor shall immediately notify the Department, stating the magazine license number. The transferee shall execute a new application (Fig. 4), and pay the fee for one (1) year, based on WAC 296–52–180.

When a magazine is moved, altered or destroyed, the responsible person shall notify the Department stating the magazine license number. When a magazine is altered, the alterations made shall be stated.

The moving of a magazine on a job site within a reasonable distance from its original location stated on the application is permitted without notifying the Department; provided, that the new location complies with the Explosives Act and Explosives Code, and that the magazine can be quickly located for an inspection. [Order 70–4, § 296–52–170, filed 4/29/70.]

WAC 296–52–180 Storage magazine license fees. RCW 70.74.140, applies.

The annual license fee for operating each magazine has been established by the Department and shall be as shown in the following table:

Maximum Weight (pounds) of explosives permitted in each magazine	Maximum Number of blasting caps permitted in each magazine	Annual Fee (dollars) for each magazine
200	133,000	5.00
600	400,000	10.00
1,000	667,000	15.00
2,000	1,330,000	20.00
4,000	2,670,000	25.00
6,000	4,000,000	30.00
8,000	5,230,000	35.00
10,000	6,670,000	40.00

Maximum Weight (pounds) of explosives permitted in each magazine	Maximum Number of blasting caps permitted in each magazine	Annual Fee (dollars) for each magazine
20,000	13,330,000	45.00
Max. 300,000	Max. 200,000,000	50.00

[Order 70-4, § 296-52-180, filed 4/29/70.]

WAC 296-52-190 Dealer's license. (RCW 70.74-.130 and 70.74.230, apply.)

(1) The application for a dealer's license to buy explosives for the sole purpose of resale shall be made by a form substantially similar to that shown in Figure 5, of this code.

(2) The license shall be renewable annually, not later than the anniversary date.

(3) A dealer's record of all explosives purchased and sold as defined in RCW 70.74.010, shall be kept on file and a copy transmitted not later than the tenth (10th) of every month to the Department, by means of a form substantially similar to that shown in Figure 7, of this code.

(4) The purchaser's license number shall be stated on said dealer's record, and the signature of the person authorized by the purchaser to physically receive the explosives.

(5) All explosives containers received by a dealer for storage, sale or use in the State of Washington, shall be stamped immediately with the said dealer's name and address.

(6) Display. No person shall sell, display or expose for sale any explosive or blasting agent on any highway, street, sidewalk, public way or public place. [Order 76-6, § 296-52-190, filed 3/1/76; Order 70-4, § 296-52-190, filed 4/29/70.]

WAC 296-52-200 Annual inspection. RCW 70.74-.150, applies. [Order 70-4, § 296-52-200, filed 4/29/70.]

WAC 296-52-220 Purchaser's license. RCW 70.74-.135, applies.

The application for a purchaser's license shall be made by a legal person, including public agencies, by means of a form substantially similar to that shown in Fig. 6, of this code.

Application forms may be obtained at all Department district offices, and from explosives dealers.

The Department will grant a purchaser's license after all legal requirements have been fulfilled.

When an order for explosives is placed in person, or by telephone, or in writing by a purchaser, the seller shall request proper authorization and identification from the purchaser and shall record the purchaser's license number.

The individual who physically receives the purchased explosives shall prove to the satisfaction of the seller that he, personally, is the purchaser, or the person authorized by the purchaser to receive said purchased explosives. Such authorization procedure shall be approved by the Department. Said receiver of explosives shall identify himself properly and shall sign the seller's record with his legal signature.

If the explosives are delivered by the seller or seller's authorized agent to an explosives magazine, the license number of said magazine and the legal signature of the recipient, properly authorized and identified, shall be obtained. [Order 70-4, § 296-52-220, filed 4/29/70.]

WAC 296-52-230 Unlawful access to explosives. RCW 70.74.160, applies.

The unlawful entry into an explosives magazine or an actual or suspected theft of explosives shall be reported immediately to the Department and to the local law enforcement agency. [Order 70-4, § 296-52-230, filed 4/29/70.]

WAC 296-52-260 Coal mining code unaffected. RCW 70.74.210, applies. [Order 70-4, § 296-52-260, filed 4/29/70.]

WAC 296-52-270 Shipments out-of-state. RCW 70.74.230, applies. [Order 70-4, § 296-52-270, filed 4/29/70.]

WAC 296-52-330 Explosives containers to be marked--Penalty. RCW 70.74.300, applies.

In addition, every explosives container received by a dealer shall be marked as described in WAC 296-52-190. [Order 70-4, § 296-52-330, filed 4/29/70.]

WAC 296-52-350 Small arms ammunition, primers, and propellants--Transportation regulations. RCW 70-.74.320, applies. [Order 70-4, § 296-52-350, filed 4/29/70.]

WAC 296-52-360 Small arms ammunition, primers, and propellants--Separation from flammable materials. RCW 70.74.330, applies. [Order 70-4, § 296-52-360, filed 4/29/70.]

WAC 296-52-370 Small arms ammunition, primers, and propellants--Smokeless propellants and black powder, transportation, storage and display requirements. RCW 70.74.340 applies. The requirements for small arms propellants (Class B) are tabulated as follows:

All such propellants shall be packed in DOT approved shipping containers.

	Maximum pounds permitted	Special Restrictions
Private residence	25	No restrictions
	50	In Department approved strong box.
Private Car	25	
	50	In Department approved strong box.

	Maximum pounds permitted	Special Restrictions
Dealer's Warehouse	150	
Dealer's Display	75	In one (1) pound cans.
Dealer's Car	150	In compliance with DOT regulations.

Commercial stocks of smokeless propellants over 20 pounds and not more than 150 pounds shall be stored in portable wooden boxes having walls of at least one (1) inch nominal thickness.

Approved magazine	(As permitted by storage license)

The requirements for black powder are tabulated as follows:
All black powder shall be packed in DOT approved shipping containers.

	Maximum pounds permitted	Special Restrictions
Private Residence	5	Without restrictions
Private Car	5	Without restrictions
Dealer's Warehouse	25	
Dealer's Display	4	In one (1) pound cans
Dealer's Car	25	
Approved magazine	(As permitted by storage license)	

[Order 76-6, § 296-52-370, filed 3/1/76; Order 70-4, § 296-52-370, filed 4/29/70.]

WAC 296-52-380 Small arms ammunition, primers, and propellants--Small arms ammunition primers, transportation, storage, and display requirements. RCW 70-.74.350, applies. The requirements for primers are tabulated, in part, as follows:

All primers shall be stored and transported in DOT approved shipping containers, separate from flammable materials.

	Maximum Number of Primers	Special Restrictions
Private Residence	10,000	
Private Car	25,000	
Dealer's Building	750,000	In separate piles of less than 100,000
Dealer's Display	10,000	
Approved magazine	(As permitted by storage license)	

[Order 76-6, § 296-52-380, filed 3/1/76; Order 70-4, § 296-52-380, filed 4/29/70.]

WAC 296-52-390 Storage of ammonium nitrate. (1) Scope and Definitions. (a) Except as provided in subdivision (d) of this section applies to the storage of ammonium nitrate in the form of crystals, flakes, grains, or prills including fertilizer grade, dynamite grade, nitrous oxide grade, technical grade, and other mixtures containing 60 percent or more ammonium nitrate by weight but does not apply to blasting.

(b) This section does not apply to the transportation of ammonium nitrate.

(c) This section does not apply to storage under the jurisdiction of and in compliance with the regulations of the U.S. Coast Guard (see 46 CFR Parts 146-149).

(d) The storage of ammonium nitrate and ammonium nitrate mixtures that are more sensitive than allowed by the "Definition of Test Procedures for Ammonium Nitrate Fertilizer" is prohibited.

(e) Nothing in this section shall apply to the production of ammonium nitrate or to the storage of ammonium nitrate on the premises of the producing plant, provided that no distinct undue hazard to the public is created.

(f) The definition and test procedures for ammonium nitrate fertilizer are those found in the bulletin, "Definition and Test Procedures for Ammonium Nitrate Fertilizer", available from the National Plant Food Institute, 1700 K Street N.W., Washington, D.C. 20006. This definition limits the contents of organic materials, metals, sulfur, etc., in a product that may be classified ammonium nitrate fertilizer.

(g) The standards for ammonium nitrate (nitrous oxide grade) are those found in the "Specifications, Properties, and Recommendations for Packaging, Transportation, Storage, and Use of Ammonium Nitrate", available from the Compressed Gas Association, Inc., 500 Fifth Avenue, New York, NY 10036.

(2) General Provisions. (a) This subsection applies to all persons storing, having, or keeping ammonium nitrate, and to the owner or lessee of any building, premises, or structure in which ammonium nitrate is stored in quantities of 1,000 pounds or more.

(b) Approval of large quantity storage shall be subject to due consideration of the fire and explosion hazards, including exposure to toxic vapors from burning or decomposing ammonium nitrate.

(c) Storage buildings shall not have basements unless the basements are open on at least one side. Storage buildings shall not be over one story in height.

(d) Storage buildings shall have adequate ventilation or be of a construction that will be self-ventilating in the event of fire.

(e) The wall on the exposed side of a storage building within 50 feet of a combustible building, forest, piles of combustible materials and similar exposure hazards shall be of fire-resistive construction. In lieu of the fire-resistive wall, other suitable means of exposure protection

such as a free standing wall may be used. The roof coverings shall be class C or better, as defined in Roof Coverings, NFPA 203-1970.

(f) All flooring in storage and handling areas, shall be of noncombustible material or protected against impregnation by ammonium nitrate and shall be without open drains, taps, tunnels, pits, or pockets into which any molten ammonium nitrate could flow and be confined in the event of fire.

(g) The continued use of an existing storage building or structure not in strict conformity with this section may be approved in cases where such continued use will not constitute a hazard to life or adjoining property.

(h) Buildings and structures shall be dry and free from water seepage through the roof, walls, and floors.

(3) Storage of Ammonium Nitrate in Bags, Drums, or Other Containers. (a) Bags and containers used for ammonium nitrate must comply with specifications and standards required for use in interstate commerce (see 49 CFR Chapter I).

(b) Containers used on the premises in the actual manufacturing or processing need not comply with provisions of (3)(a).

(c) Containers of ammonium nitrate shall not be accepted for storage when the temperature of the ammonium nitrate exceeds 130°F.

(d) Bags of ammonium nitrate shall not be stored within 30 inches of the storage building walls and partitions.

(e) The height of piles shall not exceed 20 feet. The width of piles shall not exceed 20 feet and the length 50 feet except that where the building is of noncombustible construction or is protected by automatic sprinklers the length of piles shall not be limited. In no case shall the ammonium nitrate be stacked closer than 36 inches below the roof or supporting and spreader beams overhead.

(f) Aisles shall be provided to separate piles by a clear space of not less than 3 feet in width. At least one service or main aisle in the storage area shall be not less than 4 feet in width.

(4) Storage of Bulk Ammonium Nitrate. (a) Warehouses shall have adequate ventilation or be capable of adequate ventilation in case of fire.

(b) Unless constructed of noncombustible material or unless adequate facilities for fighting a roof fire are available, bulk storage structures shall not exceed a height of 40 feet.

(c) Bins shall be clean and free of materials which may contaminate ammonium nitrate.

(d) Due to the corrosive and reactive properties of ammonium nitrate, and to avoid contamination, galvanized iron, copper, lead, and zinc shall not be used in a bin construction unless suitably protected. Aluminum bins and wooden bins protected against impregnation by ammonium nitrate are permissible. The partitions dividing the ammonium nitrate storage from other products which would contaminate the ammonium nitrate shall be of tight construction.

(e) The ammonium nitrate storage bins or piles shall be clearly identified by signs reading "Ammonium Nitrate" with letters at least 2 inches high.

(f) Piles or bins shall be so sized and arranged that all material in the pile is moved out periodically in order to minimize possible caking of the stored ammonium nitrate.

(g) Height or depth of piles shall be limited by the pressure-setting tendency of the product. However, in no case shall the ammonium nitrate be piled higher at any point than 36 inches below the roof or supporting and spreader beams overhead.

(h) Ammonium nitrate shall not be accepted for storage when the temperature of the product exceeds 130°F.

(i) Dynamite, other explosives, and blasting agents shall not be used to break up or loosen caked ammonium nitrate.

(5) Contaminants. (a) Ammonium nitrate shall be in a separate building or shall be separated by approved type firewalls of not less than 1 hour fire-resistance rating from storage or organic chemicals, acids, or other corrosive materials, materials that may require blasting during processing or handling, compressed flammable gases, flammable and combustible materials or other contaminating substances, including but not limited to animal fats, baled cotton, baled rags, baled scrap paper, bleaching power, burlap or cotton bags, caustic soda, coal, coke, charcoal, cork, camphor, excelsior, fibers of any kind, fish oils, fish meal, foam rubber, hay, lubricating oil, linseed oil, or other oxidizable or drying oils, naphthalene, oakum, oiled clothing, oiled paper, oiled textiles, paint, straw, sawdust, wood shavings, or vegetable oils. Walls referred to in this subdivision need extend only to the underside of the roof.

(b) In lieu of separation walls, ammonium nitrate may be separated from the materials referred to in item (a) of this subdivision by a space of at least 30 feet.

(c) Flammable liquids such as gasoline, kerosene, solvents, and light fuel oils shall not be stored on the premises except when such storage conforms to WAC 296-24-330, and when walls and sills or curbs are provided in accordance with items (a) or (b) of this subdivision.

(d) LP-Gas shall not be stored on the premises except when such storage conforms to WAC 296-24-475.

(e) Sulfur and finely divided metals shall not be stored in the same building with ammonium nitrate except when such storage conforms to chapter 296-52 WAC.

(f) Explosives and blasting agents shall not be stored in the same building with ammonium nitrate except on the premises of makers, distributors, and user-compounders of explosives or blasting agents.

(g) Where explosives or blasting agents are stored in separate buildings, other than on the premises of makers, distributors, and user-compounders of explosives or blasting agents, they shall be separated from the ammonium nitrate by the distances and/or barricades specified in Table H-22 of WAC 296-52-165, but by not less than 50 feet.

(h) Storage and/or operations on the premises of makers, distributors, and user-compounders of explosives or blasting agents shall be in conformity with chapter 296-52 WAC.

(6) General Precautions. (a) Electrical installations shall conform to the requirements of chapter 296-46 WAC for ordinary locations. They shall be designed to minimize damage from corrosion.

(b) In areas where lightning storms are prevalent, lightning protection shall be provided. (See the Lightning Protection code, NFPA 78-1968.)

(c) Provisions shall be made to prevent unauthorized personnel from entering the ammonium nitrate storage area.

(7) Fire Protection. (a) Not more than 2,500 tons of bagged ammonium nitrate shall be stored in a building or structure not equipped with an automatic sprinkler system. Sprinkler systems shall be of approved type and installed in accordance with the Standard for the Installation of Sprinkler Systems, NFPA 13-1969.

(b) Suitable fire control devices such as small hose or portable extinguishers shall be provided throughout the warehouse and in the loading and unloading areas. See the Standard for the Installation of Portable Fire Extinguishers, NFPA 10-1970, and Standard for the Installation of Standpipe and Hose Systems, NFPA 14-1970.

(c) Water supplies and fire hydrants shall be available in accordance with recognized good practices. [Order 76-6, § 296-52-390, filed 3/1/76; Order 75-41, § 296-52-390, filed 12/19/75; Order 70-4, § 296-52-390, filed 4/29/70.]

WAC 296-52-400 Enforcement. The Department of Labor and Industries, through the Division of Safety, shall enforce the entire code, particularly all items affecting persons covered under Title 51 RCW, the transportation and storage of explosives not exempted under RCW 70.74.191, and the licensing required under this code.

Other law enforcement agencies, city, municipal, county, Washington State, other states and federal are obliged, under their own laws, codes, and ordinances, to enforce specific aspects of the possession and handling of explosives (RCW 70.74.201).

The Division of Safety shall cooperate with all other law enforcement agencies in carrying out the intent of the Explosives Code and the Explosives Act. [Order 70-4, § 296-52-400, filed 4/29/70.]

WAC 296-52-9001 Appendix Figure 1--Application for user's (blaster's) license.

Exp. No. 620 Appendix Figure-1

State of Washington
DEPARTMENT OF LABOR AND INDUSTRIES
Division of Industrial Safety and Health

APPLICATION FOR USER'S (BLASTER'S) LICENSE

Application for a User's (Blaster's) License for the sole purpose of using, blasting or disposing explosives and blasting agents, as defined in RCW 70.74.010 and 70-.74.020 (Explosives Act), and WAC 296-52-040 (Explosives Code).

A "hand loader" as defined in RCW 70.74.010, does not require a user's license.

THIS LICENSE IS VALID FOR ONE (1) YEAR AND SHALL BE RENEWED BY APPLICATION THE ANNUAL FEE IS THREE (3) DOLLARS AND MUST ACCOMPANY APPLICATION

Renewal: Yes _____ If yes, give user's license number _____

Renewal: No _____

1. Name of user: _____
   Birth Date: _____
2. Mailing address: _____
   Zip Code: _____ Phone: _____
3. Driver's License No.: _____
   State: _____ Citizen of _____
4. I have a user's (blaster's) certificate issued by: _____
   Limited to: _____
   _____ Valid to (date): _____

An applicant shall submit to the Department either a certification from another state; or certification by a public agency, corporation or blaster's school; or a resume of successful blasting experience, properly witnessed. If said certification are not satisfactory, the Department may establish an Examination Board which shall prepare an examination procedure for certification.

5. My experience record is as follows; (most recent experience first): _____

From Mo/Yr	To Mo/Yr	Type of explosives used	Type of blasting work done (Give details on separate sheet)
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

6. Present employer or self-employed: _____
   Address: _____
7. I want to do the following types of blasting. (Give details on separate sheet): _____
8. I will use the following types of explosives: _____
9. I will supervise persons using explosives who are not licensed to blast: Yes _____ No _____
10. I will supervise persons over 18 and under 21 years of age: Yes _____ No _____

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11. Explosives must be used the same day purchased or be stored in a licensed, approved magazine complying with the requirements of the Quantity and Distance Table RCW 70.74.030). Storage of explosives otherwise is in violation of chapter 296-52 WAC and chapter 70.74 RCW and subjects the possessor to prosecution.

    WAC 296-62-150: Storage of blasting caps with other explosives prohibited.

    Blasting caps (detonators) must be stored in licensed, approved magazine.

12. APPLICANT SWEARS THAT THE FOLLOWING ARE TRUE:
    (a) I am a user who uses explosives as an ultimate consumer, or who supervises such use;
    (b) I am physically and mentally fit to handle explosives safely;
    (c) I am experienced in the use and disposal of the explosives within the limits stated in my license:
    (d) I will follow the rules of the Explosives Act and of the Safety Codes of the State of Washington;
    (e) I will not sell, barter, give or dispose explosives to anyone within the State of Washington, except to employees under my direct supervision;
    (f) I have not been convicted of a crime involving moral turpitude;
    (g) I am not disloyal to the United States;
    (h) I will not transfer my User's license to anyone else;
    (i) The statements made in this application are true; and,
    (j) I will advise the Department when any of these facts change.

Applicant's signature: _____ Date: _____

The applicant is known to me personally, and the statements made by him are true, to the best of my knowledge.

Witness' Signature: _____ Date: _____
Title: _____ Phone: _____
Address: _____ Zip Code _____

Please make $3.00 check payable to Department of Labor and Industries and mail with application to:

Department of Labor & Industries
Division of Industrial Safety & Health
Chief Explosives Inspector
P.O. Box 207
Olympia, Washington 98504

or to any one of the Department district offices.

APPLICANT—DO NOT WRITE BELOW THIS LINE

User's license granted: Yes _____ No _____
Class: _____ Grade _____
If not granted, Department shall state reasons: _____
_____
Signature: _____ Title _____
License number issued _____
Date Issued _____

[Order 75-41, Appendix Figure 1 (codified as WAC 296-52-9001), filed 12/19/75; Order 70-4, Appendix Figure 1, filed 4/29/70.]

WAC 296-52-9002 Appendix Figure 2--Request for inspection.

Appendix Figure-2

State of Washington
DEPARTMENT OF LABOR AND INDUSTRIES
Division of Safety

REQUEST FOR INSPECTION

Request for inspection of compounds or materials that may become an explosive due to drying out or undergoing other physical changes within the definition of RCW 70.74.020 (Explosives Act), and WAC 296-52-040(2) (Explosives Code).

Name of applicant: _____
Individual: _____ Corporation: _____
Partnership: _____
Mailing address: _____
_____
Washington State explosives license (type): _____
_____
Number: _____ Expires (date) _____
Kinds of compounds handled: _____
_____
Condition of compounds: _____
_____
Place where compounds are kept: _____
_____
_____

Mail to:

Department of Labor & Industries
Division of Safety
Chief Explosives Inspector
P.O. Box 207
Olympia, Washington 98501

APPLICANT - DO NOT WRITE BELOW THIS LINE

Explosives Inspector's Report

Action taken: _____
_____
_____
Observations and recommendations: _____
_____
_____
Inspector's signature: _____
Date: _____ At: _____

[Order 70-4, Appendix Figure 2 (codified as WAC 296-52-9002), filed 4/29/70.]

WAC 296-52-9003 Appendix Figure 3--Application for license to manufacture explosives.

Appendix Figure-3

State of Washington
DEPARTMENT OF LABOR AND INDUSTRIES
Division of Safety

APPLICATION FOR LICENSE TO MANUFACTURE EXPLOSIVES

We apply for a license to manufacture explosives and/or blasting agents listed below, in the State of Washington, within the terms of RCW 70.74.110 (Explosives Act), and WAC 296-52-160 (Explosives Code).

Applicant—Fill in the required information. Use additional sheets as needed:

1. Name of firm: _____
   Corporation: _____ Partnership: _____
   Or: _____
2. Mailing address: _____
3. Names of corporate officers or partners — Address — Title — Citizen of
   _____
   _____
   _____
   _____
   _____
   _____
4. Kinds of explosives manufactured: _____
   _____
5. Address of manufacturing plant: _____
   _____
6. Reason for desiring to manufacture explosives: _____
   _____
7. A plan of the proposed plant is attached, showing:

   (a) manufacturing building; (b) factory building; (c) storage magazines; (d) nearby railroads, highway, inhabited buildings and public utility transmission systems; (e) the distance between all of the above; (f) the maximum amounts and kinds of explosives expected in each building and magazine; and, (g) the nature of work carried on in each building and the natural and artificial barricades.

   A copy of this plan, approved by the Department, shall be kept in the plant, open to inspection by the Department.

8. We assert that:
   (a) We will abide by the Explosives Act and by the Safety Codes of the State of Washington;
   (b) We will not sell, barter, give or dispose explosives to any person within the State of Washington who does not have a license to purchase explosives;
   (c) We are experienced in the manufacture of the explosives listed on this application;
   (d) We have not been convicted of a crime involving moral turpitude;
   (e) We are not disloyal to the United States;
   (f) The statements made in this application are true to the best of our knowledge; and,
   (g) We will advise the Department of Labor and Industries when any of the above stated facts change.

Signed by authorized agent: _____
Title: _____ Date: _____
At: _____

APPLICANT – DO NOT WRITE BELOW THIS LINE

Explosives Inspector's Report

Plan approved: Yes _____ No _____

Comments: _____
_____
_____
_____
_____

Inspector's signature: _____
Date: _____ At: _____

This license shall continue in full force and effect until surrendered or canceled because of failure to comply with any of the conditions necessary for the granting of a license.

Direct all correspondence pertaining to this license to the following address:

Department of Labor and Industries
Division of Safety
Chief Explosives Inspector
P.O. Box 207
Olympia, Washington 98501

In your correspondence, please refer to the following Manufacturer's License No. _____

[Order 70-4, Appendix Figure 3 (codified as WAC 296-52-9003), filed 4/29/70.]

WAC 296-52-9004 Appendix Figure 4--Application for license to operate a storage magazine for explosives.

Exp. No. 623 Appendix Figure-4

State of Washington
DEPARTMENT OF LABOR AND INDUSTRIES
Division of Industrial Safety and Health

APPLICATION FOR LICENSE TO OPERATE A STORAGE MAGAZINE FOR EXPLOSIVES

(Each and every magazine requires a separate application).

We apply for a license to operate a storage magazine in the State of Washington for the explosives listed below, within the terms of RCW 70.74.120 (Explosives Act), and WAC 296-52-170 (Explosives Code).

This license is valid for one (1) year and shall be renewed annually. Refer to WAC 296-52-180 (Explosives Code) for fee schedule.

The magazine is now ready for inspection: Yes _____ No _____
The magazine will be ready for inspection on (date): _____
Exact location of magazine (section, township, road, nearby landmark, etc.): _____
_____ COUNTY _____

Name, address and telephone number of person to contact for inspection: _____
_____

1. Name of applicant: _____
2. Mailing address: _____
   _____
3. Individual: _____ Corporation: _____
   Partnership: _____
4. Names of Corporate Officers or Partners | Residence Address | Title | Citizen of

   _____
   _____
   _____
   _____
   (Use additional sheets, if necessary)

If the magazine is used or leased by a person other than the owner, such other person shall then be responsible for the safe operation of the magazine, and for obtaining of the license.

When the responsibility for a magazine is transferred from one person to another, the transferor shall immediately notify the Department, stating the magazine license number. The transferee shall execute a new application and pay the fee for one (1) year.

5. Name and address of owner of magazine, if other than applicant: _____
   _____
6. Magazine: Permanent _____ Portable _____
7. Magazine license number: _____ This license number will stay with each magazine during its life.
8. Reason for desiring to store explosives: _____
   _____
9. Kinds of explosives stored: _____
   _____
10. Maximum quantity stored at any one time:
    Explosives (pounds): _____
    Detonators (number): _____

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11. Distance from nearest—
    Inhabited building: _____ feet;
    Railroad: _____ feet; Highway: _____ feet;
    Public utility: _____ feet; Explosives manufacturing building: _____ feet;
    Other magazine: _____ feet.
12. We assert that:
    (a) We are using the subject magazine for storage of explosives and are responsible for the magazine;
    (b) We will abide by the Explosives Act and the Code;
    (c) We will attach the magazine license labels furnished by the Department conspicuously to the inside and to the outside of the magazine and protect them from damage;
    (d) We will attach the other magazine label permanently and conspicuously on the outside of the magazine;
    (e) We will not sell, barter, give or dispose explosives to any person within the State of Washington who does not hold a license to purchase explosives;
    (f) We are experienced in the safe handling of the explosives listed in this application;
    (g) We have not been convicted of a felony involving force or violence;
    (h) We are not disloyal to the United States;
    (i) The statements made in this application are true to the best of our knowledge;
    (j) We will advise the Department when any of the above stated facts change, including a substantial change in the location of the magazine on a large job or lot

Signed by authorized agent: _____
Title: _____ Date: _____
At: _____

Mail application to:

Department of Labor & Industries
Division of Industrial Safety & Health
Chief Explosives Inspector
P.O. Box 207

Olympia, Washington 98504

on receipt of your completed application(s), you will be billed at the rate prescribed by law and each magazine for which you have applied for license will be inspected.

APPLICANT—DO NOT WRITE BELOW THIS LINE

Explosives Inspector's Report

Magazine inspected (date): _____ Location: _____

Magazine construction approved: Yes _____ No _____
If *No*, comment: _____

Inspector's signature: _____
Date: _____

[Order 75-41, Appendix Figure 4 (codified as WAC 296-52-9004), filed 12/19/75; Order 70-4, Appendix Figure 4, filed 4/29/70.]

WAC 296-52-9005 Appendix Figure 5--Application for dealer's license.

Appendix Figure-5

State of Washington
DEPARTMENT OF LABOR AND INDUSTRIES
Division of Safety

APPLICATION FOR DEALER'S LICENSE

We apply for a Dealer's or Distributor's License to buy explosives and/or blasting agents for the sole purpose of selling them within the terms of RCW 70.74.130 (Explosives Act), and WAC 296-52-190 (Explosives Code).

Renewal: Yes _____ No _____ Dealer's License No. _____

1. Name of firm: _____
   Corporation: _____ Partnership: _____
   Or: _____
2. Mailing address: _____

3. Names of corporate officers or partners | Address | Title | Citizen of

4. Kinds of explosives dealt in: _____

5. Ultimate use of explosives: _____

6. Location of magazine(s): _____
   License No. _____ Estimated amount of explosives bought per month (pounds): _____

7. We assert that:
   (a) We will abide by the Explosives Act and the Safety Codes of the State of Washington;
   (b) We will not sell, barter, give or dispose explosives to any person within the State of Washington who does not hold a valid license to purchase or use explosives;
   (c) We will send a monthly record of all explosives purchased and sold by us, not later than the tenth (10th) of the following month, to the Department;
   (d) We are experienced in the buying and selling of explosives;
   (e) We have not been convicted of a crime involving moral turpitude;
   (f) We are not disloyal to the United States; and,
   (g) The statements made above are true, and we will advise the Department when any of the above stated facts change.

Signature of Dealer: _____
Title: _____ Date: _____
At: _____

APPLICANT – DO NOT WRITE BELOW THIS LINE

Explosives Inspector's Report

Dealer's license approved: Yes _____ No _____

If not approved, state reasons: _____

Inspector's signature: _____
Date: _____ At: _____

Send your request for renewal not later than (date): _____, to the following address:

Department of Labor & Industries
Division of Safety
Chief Explosives Inspector
P.O. Box 207
Olympia, Washington 98501

In your correspondence, please refer to the following Dealer's License No. _____.

[Order 70-4, Appendix Figure 5 (codified as WAC 296-52-9005), filed 4/29/70.]

WAC 296-52-9006 Appendix Figure 6--Application for license to purchase explosives.

Exp. No. 625 Appendix Figure-6

State of Washington
DEPARTMENT OF LABOR AND INDUSTRIES
Division of Industrial Safety and Health

APPLICATION FOR LICENSE TO PURCHASE EXPLOSIVES

We apply for a license to purchase explosives under the terms of RCW 70.74.135 (Explosives Act), and WAC 296-52-220 (Explosives Code). No license is required for purchasing hand loading components.

THIS LICENSE IS VALID FOR ONE (1) YEAR AND SHALL BE RENEWED BY APPLICATION. THE ANNUAL FEE IS TWO (2) DOLLARS AND MUST ACCOMPANY APPLICATION.

Renewal: Yes ____ If yes, give purchaser's license number _____

Renewal: No _____

1. Name of purchaser: _____
   Individual _____ Corporation _____
   Partnership _____ Or _____
2. Birth Date (If Individual) _____ Citizen of _____
3. Mailing address: _____
   _____ Zip Code _____ Phone _____
4. Names of corporate officers, partners or officials | Residence Address | Title | Citizen of

   _____
   _____
   _____
   _____
5. Location where explosives are to be used: _____
   _____
6. Kind of explosives to be purchased: _____
   _____
   _____
7. Reason for desiring to purchase explosives: _____
   _____
8. Persons valid user's license number: _____
9. Name of person to be using explosives: _____
10. Explosives must be used the same day purchased or be stored in a licensed, approved magazine complying with the requirements of the Quantity and Distance Table (RCW 70.74.030). Storage of explosives otherwise is in violation of chapter 296-52 WAC and chapter 70.74 RCW and subjects the possessor to prosecution.

    WAC 296-52-150: Storage of blasting caps with other explosives prohibited.

    Blasting caps (detonators) must be stored in licensed, approved magazine.
11. APPLICANT SWEARS THAT THE FOLLOWING ARE TRUE:
    (a) We wish to purchase the explosives for the purpose as stated in Number 7;
    (b) We will not sell, barter, give or dispose explosives to anyone in the State of Washington except to authorized employees for ultimate use (blasting);

PLEASE COMPLETE THE REVERSE SIDE

LI-447-15

(c) We will follow the rules of the Explosives Act and the Safety Codes of the State of Washington;
(d) One or more of our officers or employees are experienced in the use of explosives;
(e) We have suitable facilities for explosives and will store unused explosives in an approved magazine;
(f) We have not been convicted of a crime involving moral turpitude;
(g) We are not disloyal to the United States;
(h) The statements made are true;
(i) We will advise the Department if any of the stated facts change;
(j) Explosives will be received for us only by persons who are authorized by us, and who have positive identification; and
(k) Individual or employee using explosives has a valid user's license issued by The Department of Labor and Industries, Explosives Section.

Signature of applicant or authorized agent:
_____ Title: _____
Driver's License number (if individual): _____
State: _____ Date: _____
The applicant is known to me personally, and the statements made are true to the best of my knowledge.

Signature of witness _____
Date: _____ Title: _____
Phone: _____
Address: _____ Zip Code: _____

Please make $2.00 check payable to Department of Labor and Industries and mail with application to:

Department of Labor & Industries
Division of Industrial Safety & Health
Chief Explosives Inspector
P.O. Box 207
Olympia, Washington 98504

or to any one of the Department district offices.

APPLICANT—DO NOT WRITE BELOW THIS LINE

Purchaser's license granted: Yes _____ No _____
If not granted, Department shall state reasons: _____
_____

Signature: _____ Title: _____

License Number Issued _____
Date Issued _____

[Order 75-41, Appendix Figure 6 (codified as WAC 296-52-9006), filed 12/19/75; Order 70-4, Appendix Figure 6, filed 4/29/70.]

WAC 296-52-9007 Appendix Figure 7--Dealer's record.

Appendix Figure-7

State of Washington
DEPARTMENT OF LABOR AND INDUSTRIES
Division of Safety

DEALER'S RECORD

We transmit our monthly Dealer's Record of all explosives, bought and sold, in accordance with RCW 70.74-.230 (Explosives Act), and WAC 296-52-270 (Explosives Code).

1. Name of firm: _____
   Individual _____ Corporation _____
   Partnership _____ Or _____

2. Mailing address: _____
   _____

3. Record of explosives purchased:

Date	Name of Vendor	Dealer's License No.	Amount & Kind

(Use additional sheets, if necessary)

4. Record of explosives sold:

Date	Name of Purchaser	Purchaser's License No.	Receiver's Name	Amount & Kind

(Use additional sheets, if necessary)

Signature: _____ Title: _____
Date: _____

Send this Dealer's Record not later than the tenth (10th) day of every month to:

Department of Labor & Industries
Division of Safety
Chief Explosives Inspector
P.O. Box 207
Olympia, Washington 98501

In your correspondence, refer to Dealer's License No. _____.

[Order 70-4, Appendix Figure 7 (codified as WAC 296-52-9007), filed 4/29/70.]

Chapter 296-54 WAC
SAFETY STANDARDS--LOGGING OPERATIONS

WAC

296-54-45001	Pulpwood logging.
296-54-501	Scope and application.
296-54-503	Variance.
296-54-505	Definitions applicable to this chapter.
296-54-507	Management's responsibility.
296-54-509	Employee's responsibility.
296-54-511	Personal protective equipment.
296-54-513	Safety educational and first aid requirements.
296-54-515	General requirements.
296-54-517	Camps.
296-54-519	Transportation of crews by motor vehicle.
296-54-521	Transportation of crews by use of speeders and trailers.
296-54-523	Methods of crew transportation other than those specified.
296-54-525	Railroad construction and maintenance.
296-54-527	Truck roads.
296-54-529	Falling and bucking—General.
296-54-531	Falling and bucking—Power saws and power equipment.
296-54-533	Falling and bucking—Springboards and tree jacking.
296-54-535	Tree pulling.
296-54-537	Mechanized falling.
296-54-539	Climbing equipment and passline.
296-54-541	Selection of spar, tail and intermediate trees.
296-54-543	General requirements.
296-54-545	Rigging—Wood spar trees.
296-54-547	Rigging—Tail tree.
296-54-549	Lines, straps and guyline attachments—Steel spars.
296-54-551	Yarding, loading and skidding machines—General requirements.
296-54-553	Yarding, loading and skidding machines—Mobile towers and boom-type yarding and loading machines.
296-54-555	Yarding—General requirements.
296-54-557	Yarding—Tractors and skidders.
296-54-559	Yarding—Helicopters and helicopter cranes.
296-54-561	Log loading—General requirements.
296-54-563	Log loading—Special requirements.
296-54-565	Log loading—Self-loading log trucks.
296-54-567	Motor truck log transportation—General requirements.
296-54-569	Motor truck log transportation—Brake requirements.
296-54-571	Motor truck log transportation—Trailer hitches and safety chains.
296-54-573	Motor truck log transportation—Reaches and bunks.
296-54-575	Motor truck log transportation—Stakes, stake extensions and chock blocks.
296-54-577	Motor truck log transportation—Wrappers and binders.
296-54-579	Motor truck log transportation—Miscellaneous requirements.
296-54-581	Motor truck log transportation—Steered trailers.

APPLICANT—DO NOT WRITE BELOW THIS LINE

Purchaser's license granted: Yes _____ No _____
If not granted, Department shall state reasons: _____
_____

Signature: _____ Title: _____

License Number Issued _____
Date Issued _____

[Order 75-41, Appendix Figure 6 (codified as WAC 296-52-9006), filed 12/19/75; Order 70-4, Appendix Figure 6, filed 4/29/70.]

WAC 296-52-9007 Appendix Figure 7--Dealer's record.

Appendix Figure-7

State of Washington
DEPARTMENT OF LABOR AND INDUSTRIES
Division of Safety

DEALER'S RECORD

We transmit our monthly Dealer's Record of all explosives, bought and sold, in accordance with RCW 70.74-.230 (Explosives Act), and WAC 296-52-270 (Explosives Code).

1. Name of firm: _____
   Individual _____ Corporation _____
   Partnership _____ Or _____

2. Mailing address: _____
   _____

3. Record of explosives purchased:

Date	Name of Vendor	Dealer's License No.	Amount & Kind

(Use additional sheets, if necessary)

4. Record of explosives sold:

Date	Name of Purchaser	Purchaser's License No.	Receiver's Name	Amount & Kind

(Use additional sheets, if necessary)

Signature: _____ Title: _____
Date: _____

Send this Dealer's Record not later than the tenth (10th) day of every month to:

Department of Labor & Industries
Division of Safety
Chief Explosives Inspector
P.O. Box 207
Olympia, Washington 98501

In your correspondence, refer to Dealer's License No. _____.

[Order 70-4, Appendix Figure 7 (codified as WAC 296-52-9007), filed 4/29/70.]

Chapter 296-54 WAC
SAFETY STANDARDS--LOGGING OPERATIONS

WAC

296-54-45001	Pulpwood logging.
296-54-501	Scope and application.
296-54-503	Variance.
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296-54-511	Personal protective equipment.
296-54-513	Safety educational and first aid requirements.
296-54-515	General requirements.
296-54-517	Camps.
296-54-519	Transportation of crews by motor vehicle.
296-54-521	Transportation of crews by use of speeders and trailers.
296-54-523	Methods of crew transportation other than those specified.
296-54-525	Railroad construction and maintenance.
296-54-527	Truck roads.
296-54-529	Falling and bucking—General.
296-54-531	Falling and bucking—Power saws and power equipment.
296-54-533	Falling and bucking—Springboards and tree jacking.
296-54-535	Tree pulling.
296-54-537	Mechanized falling.
296-54-539	Climbing equipment and passline.
296-54-541	Selection of spar, tail and intermediate trees.
296-54-543	General requirements.
296-54-545	Rigging—Wood spar trees.
296-54-547	Rigging—Tail tree.
296-54-549	Lines, straps and guyline attachments—Steel spars.
296-54-551	Yarding, loading and skidding machines—General requirements.
296-54-553	Yarding, loading and skidding machines—Mobile towers and boom-type yarding and loading machines.
296-54-555	Yarding—General requirements.
296-54-557	Yarding—Tractors and skidders.
296-54-559	Yarding—Helicopters and helicopter cranes.
296-54-561	Log loading—General requirements.
296-54-563	Log loading—Special requirements.
296-54-565	Log loading—Self-loading log trucks.
296-54-567	Motor truck log transportation—General requirements.
296-54-569	Motor truck log transportation—Brake requirements.
296-54-571	Motor truck log transportation—Trailer hitches and safety chains.
296-54-573	Motor truck log transportation—Reaches and bunks.
296-54-575	Motor truck log transportation—Stakes, stake extensions and chock blocks.
296-54-577	Motor truck log transportation—Wrappers and binders.
296-54-579	Motor truck log transportation—Miscellaneous requirements.
296-54-581	Motor truck log transportation—Steered trailers.

296-54-583 Stationary log truck trailer loading.
296-54-585 Log unloading, booms, and rafting grounds—Storage and sorting areas—General requirements.
296-54-587 Water dumps.
296-54-589 Boom and rafting grounds.
296-54-591 Boats and mechanical devices on waters.
296-54-593 Dry land sorting and storage.
296-54-595 Railroad operations.
296-54-597 Railroad maintenance—Loading or unloading.
296-54-599 Truck and equipment maintenance shops.
296-54-601 Signals and signal systems.
296-54-603 Electric signal systems.
296-54-605 Radio systems used for voice communication, activation of audible signals, or equipment.
296-54-607 Radio signal systems—Specifications and test procedures.
296-54-990 Map.
296-54-99001 Appendix I—Figure 1—Rigging up, wrapping a guyline.
296-54-99002 Appendix I—Figure 2—High lead yarding system.
296-54-99003 Appendix I—Figure 3—North Bend yarding system.
296-54-99004 Appendix I—Figure 4—Slack skyline yarding system.
296-54-99005 Appendix I—Figure 5—Standard signals for tractor logging.
296-54-99006 Appendix I—Figure 6—Standard signals for loading logs.
296-54-99007 Appendix I—Figure 7—Heel boom loading.
296-54-99008 Appendix I—Figure 8—Guyline loading.
296-54-99009 Appendix I—Figure 9—Hayrack boom loading.
296-54-99010 Appendix I—Figure 10—Spreader bar loading.
296-54-99011 Appendix I—Figure 11—Placement and number of binders.
296-54-99012 Appendix I—Figure 12—Standard signals for high lead logging.

DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

296-54-001 Scope and application. [Order 72-14, § 296-54-001, filed 7/31/72, effective 9/1/72; Rules (part), filed 6/2/67, effective 7/10/67.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-003 Waiver and variance. [Order 72-14, § 296-54-003, filed 7/31/72, effective 9/1/72; Rules (part), filed 6/2/67, effective 7/10/67.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-010 Definitions of terms used in the logging standards for the purpose of this chapter. [Order 76-29, § 296-54-010, filed 9/30/76; Order 72-14, § 296-54-010, filed 7/31/72, effective 9/1/72; Rules (part), filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/30/62; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-020 Introduction. [Order 72-14, § 296-54-020, filed 7/31/72, effective 9/1/72; Rules (part), filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-030 Management's responsibility. [Order 72-14, § 296-54-030, filed 7/31/72, effective 9/1/72; Rules, § I, filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-040 Employee's responsibility. [Order 72-14, § 296-54-040, filed 7/31/72, effective 9/1/72; Rules, § II, filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-050 through 296-54-125 Safety and first aid. [Rules (part), filed 7/6/61, 3/23/60.] Decodified. See chapter 296-25 WAC, General Safety Standards.

296-54-051 Safety educational and first aid requirements. [Order 72-14, § 296-54-051, filed 7/31/72, effective 9/1/72.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-052 General requirements. [Order 72-14, § 296-54-052, filed 7/31/72, effective 9/1/72.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-130 Camps. [Order 72-14, § 296-54-130, filed 7/3/72, effective 9/1/72; Rules, § IV, filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-140 Railroad and truck road construction and maintenance—Railroads. [Order 72-14, § 296-54-140, filed 7/31/72, effective 9/1/72; Rules, § V (part), filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-150 Truck roads. [Order 72-14, § 296-54-150, filed 7/31/72, effective 9/1/72; Rules, § V (part), filed 6/2/67, 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-160 Transportation of crews—General requirements. [Order 72-14, § 296-54-160, filed 7/31/72, effective 9/1/72; Rules, § VI (part), filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-170 Transportation of crews by use of speeders and trailers. [Order 72-14, § 296-54-170, filed 7/31/72, effective 9/1/72; Rules, § VI (part), filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61, 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-180 Transportation of crews by motor vehicles. [Order 72-14, § 296-54-180, filed 7/31/72, effective 9/1/72; Rules, § VI (part), filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-185 Methods of crew transportation other than those specified. [Order 72-14, § 296-54-185, filed 7/31/72, effective 9/1/72.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-190 Rigging. [Order 72-14, § 296-54-190, filed 7/31/72, effective 9/1/72; Rules, § VIII, filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60; Addendum, filed 3/30/62.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-195 Additional requirements for portable spars and boom type yarding and loading machines. [Order 72-14, § 296-54-195, filed 7/31/72, effective 9/1/72.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-200 Yarding. [Order 72-14, § 296-54-200, filed 7/31/72, effective 9/1/72; Rules, § XII, filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part),

filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17-.040, 49.17.150, and 49.17.240.

296-54-202 Yarding—Signal transmission, signaling equipment and related items. [Rules AB-2 through AB-11, effective 1/2/65; Rules L-4, L-5, L-6, L-16, L-22 through L-27, filed 7/6/61; Rules (part), filed 3/23/60.] Superseded by Rules, filed 6/27/67, effective 7/10/67. See WAC 296-54-350 through 296-54-393.

296-54-210 Tractor logging. [Order 72-14, § 296-54-210, filed 7/31/72, effective 9/1/72; Rules, § XIII, filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-215 Canopy guards, barricades, seat belts, screens and other items required for industrial equipment. [Order 72-14, § 296-54-215, filed 7/31/72, effective 9/1/72.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-216 Roll-over protective structures and overhead protection. [Order 72-14, § 296-54-216, filed 7/31/72, effective 9/1/72.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17-.040, 49.17.150, and 49.17.240.

296-54-217 Braking systems for tractors and other mobile equipment. [Order 72-14, § 296-54-217, filed 7/31/72, effective 9/1/72.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-218 Emergency steering. [Order 72-14, § 296-54-218, filed 7/31/72, effective 9/1/72.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-220 Log loading. [Order 72-14, § 296-54-220, filed 7/31/72, effective 9/1/72; Rules, § XIV, filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-230 Lines, blocks and shackles. [Order 72-14, § 296-54-230, filed 7/31/72, effective 9/1/72; Rules, § IX, filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-240 Yarding, loading, and skidding units. [Order 72-14, § 296-54-240, filed 7/31/72, effective 9/1/72; Rules, § X, filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-250 New and used boiler or pressure vessels. [Rules (part), filed 7/6/61, 3/23/60.] Superseded by Rules, filed 6/27/67, effective 7/10/67. See WAC 296-54-240(9) and chapter 70.79 RCW.

296-54-260 Falling—Bucking. [Order 72-14, § 296-54-260, filed 7/31/72, effective 9/1/72; Rules, § VII, filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-270 Moving machines. [Order 72-14, § 296-54-270, filed 7/31/72, effective 9/1/72; Rules, § XI, filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-280 General requirements. [Order 76-29, § 296-54-280, filed 9/30/76; Order 72-14, § 296-54-280, filed 7/31/72, effective 9/1/72; Rules, § XIX, filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-281 Water dumps. [Order 72-14, § 296-54-281, filed 7/31/72, effective 9/1/72.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-282 Boom and rafting grounds. [Order 76-7, § 296-54-282, filed 3/1/76; Order 72-14, § 296-54-282, filed 7/31/72, effective 9/1/72.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-284 Dry land sorting and storage. [Order 72-14, § 296-54-284, filed 7/31/72, effective 9/1/72.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-286 Boats and mechanical devices on water. [Order 76-7, § 296-54-286, filed 3/1/76; Order 72-14, § 296-54-286, filed 7/31/72, effective 9/1/72.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-290 Electrical logging equipment. [Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-300 Explosives. [Order 72-14, § 296-54-300, filed 7/31/72, effective 9/1/72; Rules, § XX, filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-310 Railroad operations. [Order 72-14, § 296-54-310, filed 7/31/72, effective 9/1/72; Rules, § XVI, filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-320 Railroad maintenance, loading or unloading. [Order 72-14, § 296-54-320, filed 7/31/72, effective 9/1/72; Rules, § XVII, filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17-.040, 49.17.150, and 49.17.240.

296-54-330 Motor truck log transportation. [Order 72-14, § 296-54-330, filed 7/31/72, effective 9/1/72; Rules, § XV, filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-335 Stationary log truck trailer loading. [Order 72-14, § 296-54-335, filed 7/31/72, effective 9/1/72.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-340 Maintenance shops. [Order 72-14, § 296-54-340, filed 7/31/72, effective 9/1/72; Rules, § XVIII, filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-350 Signals and signal systems. [Order 72-14, § 296-54-350, filed 7/31/72, effective 9/1/72; Rules, § XXI (part), filed 6/2/67, effective 7/10/67; Rules (part),

filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-360 Skidder whistle signals. [Order 72-14, § 296-54-360, filed 7/31/72, effective 9/1/72; Rules, § XXI (part), filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-370 Slackline whistle signals. [Order 72-14, § 296-54-370, filed 7/31/72, effective 9/1/72; Rules, § XXI (part), filed 6/2/67, effective 7/10/67; Rules (part), filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-380 High lead logging whistle signals. [Order 72-14, § 296-54-380, filed 7/31/72, effective 9/1/72; Rules, § XXI (part), filed 6/2/67, effective 7/10/67; Rules AB-1, effective 1/2/65; Rule Z-3, filed 7/6/61; Rules (part), filed 3/23/60.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-390 High lead whistle signal—General whistle signals. [Rules (part), filed 7/6/61, 3/23/60.] Superseded by Rules, filed 6/27/67, effective 7/10/67. For later enactment see WAC 296-54-391 through 296-54-393.

296-54-391 General requirements for signaling and signal equipment. [Rules, § XXI (part), filed 6/2/67, effective 7/10/67.] Repealed by omission, Order 72-14, filed 7/31/72.

296-54-392 Electric signal systems. [Order 72-14, § 296-54-392, filed 7/31/72, effective 9/1/72; Rules, § XXI (part), filed 6/2/67, effective 7/10/67.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-393 Radio systems used for voice communications, activation of audible signals or equipment. [Order 72-14, § 296-54-393, filed 7/31/72, effective 9/1/72; Rules, § XXI (part), filed 6/2/67, effective 7/10/67.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-39301 Form No. 157—Application for permit to operate radio signal system in designated area. [Order 72-14, Form No. 157 (codified as WAC 296-54-39301), filed 7/31/72, effective 9/1/72.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-399 Special rigging standards. [Rules (part), filed 7/6/61, 3/23/60. Recodified from WAC 296-54-400 to avoid duplication of numbering.] Superseded by Rules, filed 6/27/67, effective 7/10/67. See WAC 296-54-190.

296-54-400 Radio-signaling systems—Minimum requirements. [Order 72-14, § 296-54-400, filed 7/31/72, effective 9/1/72.] Repealed by 79-10-081 (Order 79-14), filed 9/21/79. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240.

296-54-450 Rules and regulations of the state board of health concerning labor camps. [Rules (part), filed 7/6/61, 3/23/60.] Decodified. See WAC 296-54-130, and chapters 296-26 and 248-60 WAC.

WAC 296-54-45001 Pulpwood logging. (1) Application. (a) General. This section applies to pulpwood logging operations including, but not limited to the operations of felling, limbing, marking, bucking, loading, skidding, prehauling and other operations associated with the preparation and movement of pulpwood timber from the stump to the point of delivery. The provisions of this section do not apply to logging operations relating to sawlogs, veneer bolts, poles, piling and other forest products.

(b) Standards Incorporated by Reference. Standards covering issues of occupational safety and health which are of general application without regard to any specific industry are incorporated by reference in subsections of this section and made applicable to pulpwood logging.

(2) Definitions Applicable to this Section. (a) "Arch" means an extension to rear section of a vehicle used in skidding used to raise the forward part of a load clear of the ground.

(b) "Back cut" means the final cut in a felling operation made on the opposite side from the undercut.

(c) "Backfill" means excavated material used to build up a road higher than the original level.

(d) "Ballistic nylon" means a fabric of high tensile properties designed to provide protection from lacerations.

(e) "Borrow" means road construction material which is taken to another location for use. The source area is called "borrow pit".

(f) "Buck" means the process of severing a tree into sections (logs or bolts).

(g) "Choker" means a length of wire rope or chain with a loop or noose at one end used to secure trees or sections of trees for skidding.

(h) "Debark" means the action of removing bark from trees or sections of trees. Debark generally denotes mechanical means as opposed to manual peeling. Synonyms are "bark" and "barking".

(i) "Fairlead" means an arrangement of horizontal, and sometimes vertical, rollers usually mounted at the end of an arch to allow free play of wire rope during winching.

(j) "Fell" means the process of severing a tree from the stump so that it drops to the ground. Note that "fell" and "feller" are used in this standard. The terms "fall" and "faller" are commonly used in the Western United States and they have the same meaning as "fell" and "feller".

(k) "Grade" means the slope of a surface such as a roadway. Also, the elevation of a real or planned surface or structure. (See slope.)

(l) "Guarded" means protected by a cover, shield, rail, or other device, or by location, so as to reduce the probability of injury.

(m) "Guyline" means a line used to stay or support spar trees, booms, etc.

(n) "Landing" means any area where wood is concentrated. It is also called "yard," "deck," "brow."

(o) "Lodged tree" means a tree that has not fallen to the ground after being partly or wholly separated from its stump or otherwise displaced from its natural position.

(p) "Pickaroon" means a device with a head similar to an axe but with a point rather than a blade mounted on the end of a handle which is used to assist in the lifting and placement of bolts of wood.

(q) "Prehaul" means the hauling of forest products by off-the-road vehicles, nonhighway transport, or other movement prior to highway or rail movement, where the

pulpwood travels clear of the ground. The term "forward" has the same meaning.

(r) "Pulpwood" means portions of a tree cut into short (normally 4 ft.) lengths to facilitate hand handling. It is intended to be used in the making of pulp rather than any lumber or veneer type finished product.

(s) "Riprap" means rock, metal stripping, or wooden timbers used to contain and stabilize earth embankments and fills.

(t) "Root wad" means the ball of roots which extends above ground level when a tree is pushed over by wind or other means.

(3) Additional Definitions. (a) "Skid" means the movement of bolts, logs, or trees by pulling or towing across the terrain. It may be accomplished by a stationary machine, a moving vehicle, or animal. The term is also called "yarding". The definitive feature is contact between the terrain and the product during movement.

(b) "Slope" is a term of measurement in percent and means the increase in height over the distance measured. An increase of 1 foot over a distance of 5 feet is expressed as a 20 percent slope (see grade).

(c) "Snag" means any dead standing tree or portion thereof remaining standing.

(d) "Spring pole" means a section of tree, sapling, limb, etc., which is, by virtue of its arrangement with relation to other material, under tension.

(e) "Undercut" means a notch cut in a tree to guide the tree in felling.

(f) "Widow maker" means an overhanging limb or section of tree which could become dislodged and drop to the ground (see also "lodged tree").

(g) "Wood hook" and "pulp hook" mean a device to be held in one hand which is fitted with a pointed section. The device is used to assist in the manual piling and handling of bolts of wood (see Pickaroon).

(4) General Requirements. (a) Clothing, Personal Protective Devices, and First Aid. (i) Gloves shall be provided for use when working with wire rope in any form.

(ii) The employer shall ensure that employees exposed to the danger of foot injury due to falling or rolling pulpwood shall wear foot protection which equals or exceeds the crushing and impact specifications of ANSI Z41.1–1967.

(iii) Safety helmets of approved design in accordance with American National Standard for Safety Requirements for Industrial Head Protection, Z89.1–1969 shall be provided and worn.

(iv) Eye or face protection in accordance with American National Standard for Practice for Occupational and Educational Eye and Face Protection, Z87.1–1968 shall be provided and used where chips and sawdust or flying particles are present.

(v) Dust masks in accordance with American National Standard Practices for Respiratory Protection, Z88.2–1969 shall be provided and used where exposure exceeds the limits specified in the General Occupational Health Standards, chapter 296–62 WAC.

(vi) Protection against the effects of noise exposure shall be provided and used when the sound levels exceed those shown in WAC 296–62–09011, Table 7, of the General Occupational Health Standards, when measured on the A scale of a standard sound level meter at slow response.

(vii) First aid kits in compliance with the requirements of the General Safety and Health Standards, WAC 296–24–065, shall be provided at the work site and on all transport vehicles. In all areas where poisonous snakes may exist, snake bite kits shall be a part of the regular first–aid equipment. First–aid kits shall be regularly inspected and replenished.

(b) Handtools. (i) The employer shall be responsible for the condition of tools when furnished by him and the user shall inspect any tool prior to using it to determine that it is in proper operating condition. Defective tools shall be removed from service.

(ii) Handles shall be sound, straight and tight fitting.

(iii) Driven tools shall be dressed to remove any mushrooming.

(iv) Cutting tools shall be kept sharp and properly shaped.

(v) Wood hooks and pickaroons of good grade steel shall be used.

(vi) Tools shall be used for purposes for which they were designed.

(vii) Hand tools shall be sheathed or boxed if transported in a vehicle with personnel. If not contained in a box, the sheathed tools shall be fastened to the vehicle.

(viii) Proper storage facilities shall be provided for hand tools. Tools shall be stored in the provided location at all times when not in use.

(c) Environmental Conditions. (i) All work shall terminate and employees moved to a place of safety during electrical storms and periods of high winds or when other unusual weather conditions are dangerous to personnel.

(ii) Dead, broken, or rotted limbs or trees that are a hazard (widow makers) shall be felled or otherwise removed before commencing logging operations, building roads, trails or landing, in their vicinity.

(d) Work Areas. (i) All persons shall be instructed to work within the vocal range of other workers unless a procedure has been established for periodically checking their location and welfare.

(ii) All persons shall be accounted for at the end of each work day.

(iii) An approved (Underwriters' Laboratories or Factory Mutual Engineering Corp.) fire extinguisher shall be provided at locations where machines are operating and/or on each vehicle.

(iv) Fuel shall be stored only in approved (Underwriters' Laboratories or Factory Mutual Engineering Corp.) well–marked containers. The provisions of the General Safety and Health Standards, WAC 296–24–330 through WAC 296–24–33019, shall be applied in the storage and use of flammable fuel.

(e) Chain Saw Operations. (i) Chain saw operators shall be instructed to inspect saws daily to assure that all handles and guards are in place and tight, that all controls function properly and that the muffler is operative. Defective equipment shall not be used.

(ii) Chain saw operators shall be instructed to follow manufacturer's instructions as to operation and adjustment.

(iii) Chain saw operators shall be instructed to fuel the saw only in safe areas and not under conditions conducive to fire such as near persons smoking, hot engine, etc.

(iv) Chain saw operators shall be instructed to hold the saw with both hands during operation.

(v) Chain saw operators shall be instructed to start the saw at least 10 feet away from fueling area.

(vi) Chain saw operators shall be instructed to start the saw only on the ground or when otherwise firmly supported.

(vii) Chain saw operators shall be instructed to be certain of footing and to clear away brush which might interfere before starting to cut.

(viii) Chain saw operators shall be instructed not to use engine fuel for starting fires or as a cleaning solvent.

(ix) Chain saw operators shall be instructed to shut off the saw when carrying it for a distance greater than from tree to tree or in hazardous conditions such as slippery surfaces or heavy underbrush. If the operator is carrying a running saw, the saw shall be at idle speed.

(x) Chain saw operators shall be instructed to carry the saw in a manner to prevent contact with the chain and muffler.

(xi) Chain saw operators shall be instructed not to use the saw to cut directly overhead or at a distance that would require the operator to relinquish a safe grip on the saw.

(xii) Supervision shall be adequately maintained to assure that the instructions required by this chapter are followed.

(f) Stationary and Mobile Equipment Operation. (i) Equipment operators shall be instructed as to the manufacturers' recommendations for equipment operation, maintenance, safe practices, and site operating procedures.

(ii) Equipment shall be kept free of flammable material.

(iii) Equipment shall be kept free of any material which might contribute to slipping and falling.

(iv) Engine of equipment shall be shut down during fueling, servicing, and repairs except where operation is required for adjustment.

(v) The operator shall inspect the equipment he will be operating at the start of each shift for evidence of failure or incipient failure. Equipment found to have defects which might affect the operating safety shall not be used.

(vi) The equipment operator shall walk completely around machine and assure that no obstacles or personnel are in the area before startup.

(vii) The equipment operator shall start and operate equipment only from the operator's station or from safe area recommended by the manufacturer.

(viii) A seat belt shall be provided on mobile equipment.

(ix) The equipment operator shall check all controls for proper function and response before starting working cycle.

(x) The equipment operator shall ground or secure all movable elements when not in use.

(xi) The foreman shall advise the equipment operator of the load capacity, operating speed and stability limitations of the equipment.

(xii) The equipment operator shall maintain adequate distance from other equipment and personnel.

(xiii) Where signalmen are used, the equipment operator shall operate the equipment only on signal from the designated signalman and only when signal is distinct and clearly understood.

(xiv) The equipment operator shall not operate movable elements (boom, grapple, load, etc.) close to or over personnel.

(xv) The equipment operator shall signal his intention before operation when personnel are in or near the working area.

(xvi) The equipment operator shall dismount and stand clear for all loading and unloading of his mobile vehicle by other mobile equipment. The dismounted operator shall be visible to loader operator.

(xvii) The equipment operator shall operate equipment in a manner that will not place undue shock loads on wire rope.

(xviii) The equipment operator shall not permit riders or observers on the machine unless approved seating and protection is provided.

(xix) The equipment operator shall shut down the engine when the equipment is stopped, apply brake locks and ground moving elements before he dismounts.

(xx) The equipment operator shall when any equipment is transported from one job location to another, transport it on a vehicle of sufficient rated capacity and the equipment shall be properly secured during transit.

(xxi) When any equipment is being moved or operated in the vicinity of an electric distribution line a minimum clearance of ten feet shall be maintained between the electric distribution line and all elements of the machine.

(g) Explosives. Only trained and experienced personnel shall handle or use explosives. Usage shall comply with the requirements of chapter 296-52 WAC and chapter 70.74 RCW.

(5) Equipment Protective Devices——Stationary and Mobile Equipment. (a) Operator's Manual. There shall be an operator's manual or operating instructions with each machine. It will describe operation, maintenance, and safe practices.

(b) On all mobile equipment specified in WAC 296-54-216, Rollover Protective Structures (ROPS) shall be installed and maintained in accordance with the provisions of that section. On equipment requiring ROPS, the provisions of WAC 296-54-210, WAC 296-54-215, WAC 296-54-217 and WAC 296-54-218 shall also apply.

(c) Equipment on which ROPS are not required shall be equipped with the following operator protective devices:

(i) Protective Canopy. A protective canopy shall be provided for the operator of mobile equipment. It shall be so constructed as to protect the operator from injury due to falling trees or limbs, saplings or branches which might enter the compartment side areas, and snapping winch lines or other objects.

(A) The canopy shall be of adequate size so as not to impair the operator's movements.

(B) The canopy framework shall consist of at least two arches, either transverse or longitudinal. If transverse, one arch shall be installed behind the operator and one immediately in front of the operator. They shall be joined at the top by at least two longitudinal braces. There shall be two braces which shall act as deflecting guards extending from the leading edge of the forward arch to the front part of the frame of the tractor. If longitudinal arches are used, they shall be extended from behind the operator to the front part of the frame and each arch shall have an intermediate support located immediately ahead of the operator so that ingress or egress is not impeded. Regardless of the type of construction used, the fabrication and method of connecting to the tractor shall be of such design as to develop a strength equivalent to the upright members.

(C) The overhead covering shall be solid material and extend the full width of the canopy.

(D) The lower portion of cab shall be completely enclosed with solid material, except at entrances, to prevent the operator from being injured from obstacles entering the cab.

(E) The upper rear portion of cab shall be fully enclosed with open mesh material with openings of such a size as to reject the entrance of an object larger than 1 3/4 inch in diameter. It shall provide maximum rearward visibility.

(F) Open mesh shall be extended forward as far as possible from the rear corners of the cab sides so as to give the maximum protection against obstacles, branches, etc., entering the cab area.

(G) Deflectors shall also be installed ahead of the operator to deflect whipping saplings and branches. These shall be located so as to not impede ingress or egress from the compartment.

(H) The entrance opening of the canopy shall be not less than 52 inches in vertical height.

(I) Where glass is used it shall be safety glass. An approved substitute may be used.

(aa) An additional metal screen shall be used where glass alone is not adequate operator protection.

(bb) Provision shall be made to clean glass to assure adequate visibility.

(ii) Guards. Guards shall be provided for exposed moving elements such as shafts, pulleys, belts, conveyors and gears in accordance with WAC 296-24-205 through WAC 296-24-20527 and American National Standard Safety Code for Conveyors, Cableways, and Related Equipment, B20.1-1957. Guards shall be in place at all times machine is in operation.

(iii) Mufflers. Mufflers provided by the manufacturer or their equivalent shall be in place at all times the machine is in operation.

(iv) Guylines. Guylines shall be arranged in such manner that stresses will be imposed on not less than two guylines. Stumps used for anchoring guylines shall be carefully chosen as to position and strength. They shall be tied back if necessary. Standing trees shall not be used for this purpose.

(v) Stability and Reliability. Crane and loader stability and boom reliability shall be in accordance with American National Standard Safety Code for Cranes, Derricks and Hoists Overhead and Gantry Cranes, B30.2.0-1967, and American National Standard Safety Code for Cranes, Derricks and Hoists——Crawler, Locomotive, and Truck Cranes, B30.5-1968.

(6) Pulpwood Harvesting. (a) Felling, General. (i) Work areas shall be assigned such that a tree cannot fall into an adjacent work area. The recommended distance between workers is twice the height of trees being felled.

(ii) When trees may fall into public roads a flagman shall be assigned to direct traffic.

(iii) Workers shall not approach a feller closer than twice the height of trees being felled until the feller has acknowledged the signal of approach.

(iv) Lodged trees shall be pulled to the ground at first opportunity with mechanical equipment or animal.

(v) Workers shall not work under a lodged tree.

(vi) Special precautions shall be taken to prevent felling trees into powerlines.

(vii) If a tree does make contact with a powerline the power company shall be notified immediately and all personnel shall remain clear of the area until power company personnel advises that conditions are safe.

(b) Manual Felling. (i) The feller shall plan a retreat path and clear the path as necessary before cut is started.

(ii) The feller shall appraise situation for dead limbs, the lean of tree to be cut, wind conditions, location of other trees and other hazards and exercise proper precautions before cut is started.

(iii) Undercuts shall be about one-third the diameter of the tree to guide tree and reduce possibility of splitting. (Local practice where small diameter trees are felled without being undercut is acceptable if the direction of fall is controlled by the practice.)

(iv) Back or felling cut shall be parallel to the inner edge of the undercut and approximately two inches higher than the undercut.

(v) The saw shall be shut off before feller starts his retreat.

(vi) On terrain where trees are likely to slide or roll fellers shall fell trees from the uphill side and arrange to keep uphill from previously felled trees.

(c) Bucking. (i) Bucking on slopes shall be from the uphill side unless the log has been securely blocked to prevent rolling or swinging.

(ii) Spring poles and trees under stress shall be cut so that employee is clear when the tension is released. (This is accomplished by cutting under the bend.)

(iii) Trees piled for bucking shall be piled in an orderly parallel manner that minimizes hazard to employees.

(d) Limbing. Spring poles and limbs under stress shall be cut in such a manner that the employee is clear when tension is released.

(e) Mechanical Debarking and Delimbing. Guarding shall be provided so as to protect employees from flying chunks, logs, chips, bark, limbs, and other material and to prevent the worker from contacting moving parts.

(f) Skidding and Prehauling, General. (i) Only a designated, trained operator shall operate a skid or prehaul machine.

(ii) Choker setters shall work on uphill side of log.

(iii) No passenger personnel shall ride on a prehaul vehicle, logs, pallets, skid pans or other load unless adequate seating and protection is provided except on animal powered wagons.

(iv) Chokers shall be positioned near the end of the log or tree length to allow turning of the prehaul vehicle, to prevent the penetration of the operator station and to reduce possibility of striking the wheel or track.

(v) During winching, the equipment shall be positioned so that the winch line is in alignment with the long axis of the prehaul machine.

(vi) A stuck or inoperative vehicle shall be towed. A loaded pallet shall not be pushed.

(vii) Stakes shall not be added to permit a load beyond the rated capacity of pallets and trailers.

(viii) The operator shall be instructed to be observant and cautious of height of load and vehicle when traveling under trees, limbs, and other overhead obstructions.

(g) Skidding and Prehauling Equipment Requirements. (i) Arches, fairleads, drawbars, hitches and bumpers or fenders shall be designed and constructed to allow a minimum radius vehicle turn without the load contacting a rear tire or the rear of a track assembly.

(ii) Towed equipment such as skid pans, pallets and trailers shall be attached in such a manner as to allow a full 90° turn, prevent overrunning of the towed vehicle, and assure control of the towed equipment.

(iii) Animal towed equipment shall be equipped with a hand brake within reach of the driver.

(iv) Prehaulers shall have a means for securely retaining pallets or pulpwood.

(v) Prehaulers shall have a means of securely retaining loader for transport when so equipped.

(vi) Provision shall be made to securely fasten and to protect all tools and material on the carrier.

(h) Personnel Transport. (i) The driver shall be licensed as required by the Washington State Department of Motor Vehicles.

(ii) Explosives or flammable liquids shall not be transported on crew vehicles except as specifically provided for in WAC 296-54-160.

(iii) Seats shall be securely fastened.

(i) Off Highway Truck Transport. Truck drivers shall be instructed to stop their vehicles, dismount, check and tighten loose load binders, either just before or immediately after leaving a private road to enter a public road.

(j) Manual Loading. (i) The carrier shall be positioned to provide a safe working clearance between carrier and pile.

(ii) Proper lifting techniques shall be used, i.e., straight back and bend knees.

(iii) The stick shall be placed in the carrier in such manner that it is or will be properly secured.

(iv) Manual handling shall be limited to a weight consistent with correct lifting practices and individual lifting capacity.

(k) Machine Loading. (i) Piles shall be located to provide a safe work area.

(ii) Only the machine operator and slingman where used, shall be in the work area.

(iii) The load shall be positioned for balance and to prevent slippage or loss. Slings shall be placed to secure and balance the load.

(l) Storage. Piles shall be located and constructed in a manner to provide safe working area around them.

(m) Banding and Piling Bundles. (i) Steel bands used in the making of bundles shall have a 5 to 1 safety factor for the weight of the bundles and shall be free of any visible defect which might detract from their designed strength.

(ii) Bands shall be placed when bundle is close to ground.

(iii) No part of the body shall be under the bundle at any time. Bundles shall be placed on runners. Bundles may be double stacked with top end bundle one half or more back from the lower rank end bundle.

(n) Chipping (In-woods Locations). (i) Access covers or doors shall not be opened until the drum or disk is at a complete stop.

(ii) Infeed and discharge ports shall be designed to prevent contact by personnel with disc, knives, or blower blades.

(o) Roads and Trails, General. (i) Roads shall be maintained and hazardous conditions corrected.

(ii) Where vision is limited warnings shall be posted.

(iii) Curve radii shall be the maximum consistent with terrain.

(iv) When night work is necessary, lighting shall be provided in accordance with WAC 296-54-280.

(v) Local road standards and maximum weight of traffic expected shall be used as guides for materials, construction features and drainage.

(p) Road and Trail Pioneering and Earthwork. (i) Banks at the borrow area shall be sloped to prevent slides.

(ii) Backfill shall be firmly compacted.

(iii) Roadside banks shall be sloped or stabilized to prevent slides.

(iv) Overhanging banks, large rocks and debris shall be removed or secured.

(v) Where riprap is used the material and design shall assure containment of material.

(vi) Trees or snags which may fall into the road shall be felled.

(q) Road and Trail Drainage. (i) Drainage shall be provided to prevent washouts and landslides.

(ii) Culverts shall be of adequate strength and of a size to handle maximum runoff.

(iii) Where necessary, ditches and banks shall be stabilized by vegetation, riprap, or other adequate means.

(r) Road and Trail Surfacing. Road surface shall be properly compacted, graded and crowned.

(s) Bridges. (i) Bridges shall be constructed in accordance with the provisions of WAC 296-54-150.

(ii) Bridges shall be decked and curbed. [Order 76-7, § 296-54-45001, filed 3/1/76; Order 74-20, § 296-54-450 (codified WAC 296-54-45001), filed 5/6/74. See disposition this chapter concerning WAC 296-54-450.]

WAC 296-54-501 Scope and application. The requirements of this chapter augment those requirements of the general safety standards promulgated by the department of labor and industries, division of industrial safety and health, applicable to this industry, and apply to all persons, firms, corporations or others engaged in logging operations that come within the jurisdiction of the department of labor and industries. The requirements herein contained do not apply to log handling at sawmills, plywood mills, pulp mills or other manufacturing operations governed by their own specific safety standards.

The safety requirements herein contained are not to be construed to imply that other safe work practices, procedures or methods should not be employed where such methods, means or practices may be required to prevent accidents. Both employers and employees have a duty to do whatever is reasonable and practical to avoid causing accidents. These requirements are minimum safety requirements and shall augment other safety standards developed by the department which are of a general nature and apply to all industrial operations such as those contained in the General Safety Standards, chapter 296-24 WAC; Occupational Health Standards, chapter 296-62 WAC; and Precautionary Labeling of Containers of Hazardous Materials, chapter 296-64 WAC, or others which may be applicable. Regulations adopted by the department concerning certain types of equipment or conditions, such as Metal and Nonmetallic Mines, Quarries, Pits and Crushing Operations, chapter 296-61 WAC, and Possession, Handling and Use of Explosives, chapter 296-52 WAC shall be complied with when applicable.

Some of the factors involving safe practices are use of good judgment, and the avoidance of taking chances. Accidents can be avoided in many instances by everyone conscientiously applying their knowledge of safety.

Copies of all Society of Automotive Engineers Reports (SAE) referred to in these standards are on file in all district offices of the division of industrial safety and health of the department of labor and industries, and may be reviewed by any interested person. Individuals desiring to obtain copies of such material shall arrange to do so directly from the publishers or from other sources. The division of industrial safety and health will not assume the responsibility of acquiring such material for uses other than its own needs.

NOTE: Safety standards for pulpwood logging are contained in a separate edition titled "Safety Standards for Pulpwood Logging", WAC 296-54-450.

[Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-501, filed 9/21/79.]

WAC 296-54-503 Variance. The assistant director may, upon receipt of application and after adequate investigation by the department, permit a variation from these requirements when an approved alternate means or manner of protection is provided, which affords an equivalent measure of safety as required by the rule from which a variance is requested. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-503, filed 9/21/79.]

WAC 296-54-505 Definitions applicable to this chapter. (1) A-frame - a structure made of two independent columns fastened together at the top and separated by a reasonable width at the bottom to stabilize the unit from tipping sideways.

(2) Alternate communication system - a system approved by the department of labor and industries, which by voice or other media than horn or whistle, provides a safe and reliable method of communication between crew members.

(3) A side - any place of activity involving a group in the yarding and loading of logs.

(4) An operation - any place where logging or log related activities are taking place.

(5) Approved - approved by the department of labor and industries, division of industrial safety and health.

(6) Arch - any device attached to the back of a vehicle and used for raising one end of logs to facilitate movement.

(7) Authorized person - a person approved or assigned by the employer to perform a specific type of duty(s) or to be at a specific location at a certain time(s).

(8) Back line - that section of the haulback that runs between the spar tree and the corner block.

(9) Ballistic nylon - a fabric of high tensile properties designed to provide protection from lacerations.

(10) Barrier - a fence, wall or railing to prevent passage or approach.

(11) Base of tree - that portion of a natural tree not more than three feet above ground level.

(12) Bight of the line - any area where a person is exposed to a controlled or uncontrolled moving line.

(13) Binder - a hinged lever assembly for connecting the ends of a wrapper to tighten the wrapper around the load of logs or materials.

(14) Boomboat - any boat used to push or pull logs, booms, bundles, or bags, in booming ground operations.

(15) Boomscooter - a small boat, usually less than fourteen feet in length, equipped with an outboard motor, having directional pushing capabilities of 360 degrees.

(16) Brailing - when tiers of logs, poles, or piles are fastened together with a type of dogline and the ends of the side members are then fastened together for towing.

(17) Brow log - a log or a suitable substitute placed parallel to any roadway at a landing or dump to protect

the carrier and facilitate the safe loading or unloading of logs, timber products, or materials.

(18) Bullbuck – the supervisor of the cutting crew.

(19) Butt welding – the practice of welding something end to end.

(20) Cable tree thinning – the selective thinning of a timber stand utilizing mobile yarding equipment specifically designed or adapted for the purpose. Such systems may be of the skyline, slackline, or modified slackline, overhead cable system.

(21) Choker – a length of wire rope with attachments for encircling the end of a log to be yarded.

(22) Chunking – the clearing of nonusable material from a specified area.

(23) Cold deck – any pile of logs which is yarded and left for future removal.

(24) Competent person – one who is capable of identifying hazards in the surrounding or working conditions which are unsanitary, hazardous or dangerous.

(25) Corner block – the first block the haulback passes through on its way to the tail block.

(26) Crew bus or vehicle – any vehicle furnished by or for the employer that will transport five or more persons.

(27) Crotch line – two short lines attached to the same ring or shackle, used for loading or unloading.

(28) Danger trees – trees with evidence of deterioration or physical damage to the root system or stem, as well as the degree and/or direction of lean. (See Snag)

(29) Directional falling – a mechanical means to control the direction of falling timber.

(30) Dog line – type of line used to fasten logs or timber products together by the use of dogs.

(31) Donkey – any machine with a series of drums used to yard logs.

(32) Double ended logs – two logs end to end on the same lay.

(33) Droplines – a short line attached to the carriage or carriage block which is used as an extension to the main line.

(34) Drum – a mechanical device on which line is spooled or unspooled.

(35) Dry land storage – decks of logs stored for future removal or use.

(36) Dutchman – (a) A block used to change direction of line lead.

(b) A method of falling timber consisting of inserting a piece of material into one side of the undercut to assist in pulling a tree against the lean or a section of the undercut can be left in a corner to accomplish the same purpose.

(37) Experienced person – a person who has been trained and has participated in the subject process for a period of time long enough to thoroughly acquaint the person with all facets of the process.

(38) F.O.P.S. – Falling object protective structure.

(39) Fair lead – sheaves, rolls, or a combination thereof arranged to receive a line coming from any direction for proper line spooling on to a drum.

(40) Front end loader – a mobile machine mounted on a wheeled or tracked chassis, equipped with a grapple, tusk, bucket, or fork-lift device, and employed in the loading, unloading, stacking, or sorting of logs or materials.

(41) Guard rail – a railing to restrain a person.

(42) Guyline – a line used to support or stabilize a spar.

(43) Gypsy drum – a mechanical device wherein the line is not attached to the drum and is manually spooled to control the line movement on and off the drum.

(44) Haulback – a line used to pull the buttrigging and mainline to the logs to be yarded.

(45) Haulback block – any block the haulback line passes through including the corner block and tailblock.

(46) Hay rack – (a) A type of loading boom where two tongs are used and logs are suspended.

(b) A transporting vehicle with multiple sets of bunks attached to a rigid frame usually used for hauling logs.

(47) Hazardous falling area – the area within a circle centered on the tree being felled and having a radius not less than twice the height of that tree.

(48) Head tree – the tree where yarding and/or loading takes place. (See Spar tree)

(49) Heel boom – a type of loading boom where one tong is used and one end of the log is pulled up against the boom.

(50) High lead – a system of logging wherein the main line is threaded through the main line block, which is attached near the top of the spar, to obtain a lift of the logs being yarded.

(51) Hobo log and/or hitchhiker – a free or unattached log that is picked up by a turn and is transported with the turn.

(52) Hooktender – the worker that supervises the method of moving the logs from the woods to the landing.

(53) Hot deck – a landing where logs are being moved.

(54) Hydraulic jack – a mechanical device, powered by internal pressure, used to control the direction in which a tree is to be felled.

(55) In the clear – being in a position where the possibility of harmful physical contact is minimized.

(56) Jackstrawed – trees or logs piled in an unorderly manner.

(57) Jaggers – any projecting broken wire in a strand of cable.

(58) Kerf – that portion of timber products taken out by the saw teeth.

(59) Knob – a metal ferrule attached to the end of a line.

(60) Landing – any place where logs are laid after being yarded, awaiting subsequent handling, loading, and hauling.

(61) Lift tree – an intermediate support for skylines.

(62) Loading boom – any structure projecting from a pivot point to guide a log when lifted.

(63) Lodged tree – a tree leaning against another tree or object which prevents it from falling to the ground.

(64) Log bronco – a sturdily built boat usually from twelve to twenty feet in length, used to push logs or bundles of logs in a generally forward direction in booming and rafting operations.

(65) Log dump – a place where logs are removed from transporting equipment. It may be either dry land or water, parbuckled over a brow log or removed by machine.

(66) Logging machine – a machine used or intended for use to yard, move, or handle logs, trees, chunks, trailers, and related materials or equipment. This shall include self–loading log trucks only during the loading and unloading process.

(67) Logs – tree segments suitable for subsequent processing into lumber, pulpwood, or other wood products, including but not limited to poles, piling, peeler blocks and bolts.

(68) Log stacker – a mobile machine mounted on a wheeled or tracked chassis, equipped with a frontally mounted grapple, tusk, or forklift device, and employed in the loading, unloading, stacking, or sorting of logs.

(69) Long sticks – an overlength log that creates a hazard by exceeding the safe perimeters of the landing.

(70) Mainline – the line attached to the buttrigging used to pull logs to the landing.

(71) Mainline block – the block hung in the spar through which the mainline passes.

(72) Mainline train – any train that is made up for travel between the woods and log dump.

(73) Matchcutting – the felling of trees without using an undercut.

(74) Mechanized falling – falling of standing timber by a self–propelled mobile wheeled or tracked machine equipped with a shear or other powered cutting device.

(75) Mechanized feller – any such machine as described in WAC 296–54–535 and 296–54–537, and includes feller/bunchers and similar machines performing multiple functions.

(76) Mobile log loader – a self–propelled log loading machine mounted on wheels or tracks, incorporating a grapple–rigged Bohemian, goose neck, or straight boom fabricated structure, employed in the loading or unloading of logs by means of grapples or tongs.

(77) Mobile yarder – a logging machine mounted on wheels, tracks, or skids, incorporating a vertical or inclined spar, tower, or boom, employed in skyline, slackline, high lead, or grapple overhead cable yarding systems.

(78) Must – the same as "shall" and is mandatory.

(79) New area or setting – a location of operations when both the loading station and the yarder are moved.

(80) Pass line – a small line threaded through a block at the top of the spar to assist the high climber.

(81) Permissible (as applied to any device, equipment or appliance) – such device, equipment, or appliance has the formal approval of the United States Bureau of Mines, American Standards Association, or National Board of Fire Underwriters.

(82) Portable spar or tower – a movable engineered structure designed to be used in a manner similar to which a wood spar tree would be used.

(83) Qualified person – a person, who by possession of a recognized degree, certificate, professional standing, or by extensive knowledge, training, and experience, has successfully demonstrated ability to solve or resolve problems relating to the subject matter, the work, or the project.

(84) Reach – a steel tube or wood timber or pole connected to the truck and inserted through a tunnel on the trailer. It steers the trailer when loaded and pulls the trailer when empty.

(85) Receding line – the line on a skidder or slackline comparable to the haulback line on a yarder.

(86) Reload – an area where logs are dumped and reloaded or transferred as a unit to another mode of transportation.

(87) Rollway – any place where logs are dumped and they roll or slide to their resting place.

(88) R.O.P.S. – Roll over protection structure.

(89) Rub tree – a tree used to guide a turn around a certain area.

(90) Running line – any line which moves.

(91) SAE – Society of automotive engineers.

(92) Safety factor – the ratio of breaking strength to a safe working strength or loading.

(93) Safety glass – a type of glass that will not shatter when broken.

(94) Sail block – a block hung inverted on the sail guy to hold the tong block in proper position.

(95) Scaler – the person who measures the diameter and length of the logs, determines specie and grade, and makes deductions for footage calculations.

(96) Shall – a requirement that is mandatory.

(97) Shear log – a log placed in a strategic location to divert passage of objects.

(98) Shore skids – any group of timbers spaced a short distance apart on which logs are rolled.

(99) Signal person – the person designated to give signals to the machine operator.

(100) Siwash – to change the lead of a line with a physical object such as a stump or tree instead of a block.

(101) Skidder – a machine or animal used to move logs or trees to a landing.

(102) Skidding – movement of logs or trees on the surface of the ground to the place where they are to be loaded.

(103) Skyline – the line suspended between two points on which a block or carriage travels.

(104) Slackline – a form of skyline where the skyline cable is spooled on a donkey drum and can be raised or lowered.

(105) Slack puller – any weight or mechanical device used to increase the movement of a line when its own weight is inadequate.

(106) Snag – a dead standing tree or a portion thereof. (See Danger tree)

(107) Snorkel – a loading boom modified to extend its limitations for the purpose of yarding.

(108) Spar – a device rigged for highlead, skyline or slackline yarding.

(109) Spar tree – (See Spar).

(110) Speeder – a small self–powered vehicle that runs on a railroad track.

(111) Spike – a long heavy nail similar to a railroad spike.

(112) Springboard – a board with an iron tip used by fallers to stand on while working above ground level.

(113) Square lead – the angle of 90 degrees.

(114) Squirrel – a weight used to swing a boom when the power unit does not have enough drums to do it mechanically.

(115) Squirrel tree – a topped tree, guyed if necessary, near the spar tree in which the counter balance (squirrel) of a tree rigged boom is hung.

(116) Stiff boom – two or more boom sticks wrapped together on which boom persons walk or work.

(117) Strap – any short piece of line with an eye or "D" in each end.

(118) Strawline – a small line used for miscellaneous purposes.

(119) Strap socket or D – a socket with a closed loop and arranged to be attached to the end of a line by the molten zinc, or an equivalent method. It is used in place of a spliced eye.

(120) Strip – a definite location of timber on which one or more cutting crews work.

(121) Swamping – the falling or cutting of brush around or along a specified place.

(122) Swifter – a piece of equipment used to tie the side sticks of a log raft together to keep the raft from spreading.

(123) Swing cut – a back cut in which the holding wood on one side is cut through.

(124) Tail block – the haulback block at the back end of the show.

(125) Tail hold – an anchor used for making fast any line or block.

(126) Tail tree – the tree at the opposite end from the head tree on which the skyline or other type rigging is hung.

(127) Tight line – when either the mainline or haulback are held and power is exerted on the other or when power is exerted on both at the same time.

(128) Tong line block – the block hung in a boom through which the tong line operates.

(129) Tongue – a device used to pull and/or steer a trailer.

(130) Topping – cutting off the top section of a standing tree prior to rigging the tree for a spar or tail tree.

(131) Tower – (See Portable spar or tower).

(132) Tractor – a machine of wheel or track design used in logging.

(133) Tractor logging – the use of any wheeled or tracked vehicle in the skidding or yarding of logs.

(134) Transfer (as used in loading) – changing of logs in a unit from one mode of transportation to another.

(135) Tree jack – a grooved saddle of wood or metal rollers contained within two steel plates, attached to a tree with a strap, used as a guide for skyline, sail guy, or similar static line. It is also formed to prevent a sharp bend in the line.

(136) Tree plates – steel bars sometimes shaped as elongated J's, which are fastened near the top of a tree to hold guylines and prevent them from cutting into the tree when tightened. The hooks of the J are also used to prevent the mainline block strap from sliding down the tree.

(137) Tree pulling – a method of falling trees in which the tree is pulled down with a line.

(138) Tug – a boat, usually over twenty feet in length, used primarily to pull barges, booms of logs, bags of debris, or log rafts.

(139) Turn – any log or group of logs attached by some means to power and moved from a point of rest to a landing.

(140) "V" lead – a horizontal angle of less than 90 degrees formed by the projected lines of the mainline from the drum of the logging machine through the block or fairlead and the yarding load or turn.

(141) WAC – Washington Administrative Code.

(142) Waistline – that portion of the haulback running between the corner block and the tail block.

(143) Wrapper – a cable assembly or chain used to contain a load of logs.

(144) Wrapper rack – barrier used to protect a person while removing binders and wrappers from a loaded logging truck.

(145) Yarder – a machine with a series of drums used to yard logs. (See Donkey)

(146) Yarding – the movement of logs from the place they are felled to a landing. [Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 43.22 and 42.30 RCW. 80-11-057 (Order 80-15), § 296-54-505, filed 8/20/80. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-505, filed 9/21/79.]

WAC 296-54-507 Management's responsibility. In addition to observance of the general safety and health standards:

(1) The employer shall assume the responsibility of safety training for new employees.

(2) The employer shall assume the responsibility of work assignments so that no employee shall be allowed to work in a position or location so isolated that he is not within ordinary calling distance of another employee who can render assistance in case of emergency. In any operation where cutting, yarding, loading, or a combination of these duties is carried on, there shall be a minimum of two employees who shall work as a team and shall be in visual or hearing contact with one another to allow prompt awareness of injury or cessation of work activity of one employee by the other. No employee shall be left alone for a period of time to exceed fifteen minutes without visual or hearing contact. In addition, there shall be some system of back-up communication in the near proximity to enable an employee to call for assistance in case of emergency.

NOTE: This does not apply to operators of motor vehicles, watchmen or certain other jobs which, by their nature, are singular employee assignments. However, a definite procedure for checking the welfare of all employees during their working hours shall be instituted and all employees so advised.

(3) The employer shall establish a method of checking the employees in from the woods at the end of each shift. Each immediate supervisor shall be responsible for his crew being accounted for. This standard also includes operators of all movable equipment.

(4) Prior to the commencement of logging operations in a new area or setting, a safety meeting shall be held and a plan shall be developed and implemented whereby management shall ascertain by direct supervision that the work is being carried out with special emphasis on safety and safe work practices.

(5) When extreme weather or other extreme conditions are such that additional hazards arise, additional precautions shall be taken to assure safe operations. If the operation cannot be made safe because of the aforementioned conditions, the work shall be discontinued until safe to resume.

(6) Danger trees within reach of landings, roads, rigging, buildings or work areas shall be either felled before regular operations begin or work shall be arranged so that employees shall not be exposed to hazards involved.

(7) Management shall ensure that intoxicating beverages and narcotics are not permitted or used by employees on or in the vicinity of the work site. Management shall cause employees under the influence of alcohol or narcotics to be removed from the work site. This requirement does not apply to employees taking prescription drugs and/or narcotics as directed by a physician providing such use shall not endanger the employee or others. [Statutory Authority: RCW 49.17.040, 49.17-.050, 49.17.240, and chapters 43.22 and 42.30 RCW. 80-11-057 (Order 80-15), § 296-54-507, filed 8/20/80. Statutory Authority: RCW 49.17.040, 49.17-.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-507, filed 9/21/79.]

WAC 296-54-509 Employee's responsibility. (1) Employees shall coordinate and cooperate with management and other employees in an attempt to eliminate accidents.

(2) Employees shall study and observe all safe work practices governing their work.

(3) They should offer safety suggestions, wherein such suggestions may contribute to a safer work environment.

(4) Intoxicating beverages and narcotics shall not be permitted or used by employees in or around the work sites. Employees under the influence of alcohol or narcotics shall not be permitted on the work site. This rule does not apply to employees taking prescription drugs and/or narcotics as directed by a physician providing such use shall not endanger the employee or others.

(5) Employees shall conduct themselves in a workmanlike manner while on the work site. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-509, filed 9/21/79.]

WAC 296-54-511 Personal protective equipment. (1) General requirements.

(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 provided, 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 are required to 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. All safety belts and attachments shall meet the requirements of section 3 of ANSI A10.14-1975.

(2) Eye and face protection. Protective eye and/or face equipment shall be required and worn where there is a probability of injury that can be prevented by such equipment. In such cases, employers shall make conveniently available a type of protector suitable for the work to be performed, and employees shall use such protectors. Suitable eye protectors shall be provided and worn where machines or operations present the hazard of flying objects, glare, liquids, injurious radiation, or a combination of these hazards.

(3) Respiratory protection. In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective shall be to prevent atmospheric contamination. This shall be accomplished as far as feasible by accepted engineering control measures (for example: Enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used pursuant to The General Safety and Health Standards, WAC 296-24-081.

(4) Occupational head protection. Hard hats meeting the specifications contained in American National Standards Institute (ANSI) Z89.1-1969, shall be worn by all employees involved in the logging operation or any of its related activities unless such employees are protected by F.O.P.S., cabs or canopies. Hard hats shall be maintained in serviceable condition.

(5) Personal flotation devices. Employees working on, over or along water, where the danger of drowning exists, shall be provided with and shall wear approved personal flotation devices in accordance with General Safety and Health Standards, WAC 296-24-086.

(6) Occupational footwear.

(a) All employees whose duties require them to walk on logs or boomsticks, shall wear sharp-calked shoes, or the equivalent, except when conditions such as ice, snow, etc., render calks ineffective. When calks are ineffective and other footwear does not afford suitable protection, workers shall not be required to work on logs or boomsticks.

(b) When nonslip type shoes or boots afford a greater degree of employee protection than calk shoes, such as at scaling stations, log sorting yards, etc., then this type footwear may be worn in lieu of calk shoes providing firm ankle support and secure footing are maintained.

(7) Leg protection. Employees whose normal duties require them to operate a power saw shall wear a flexible ballistic nylon pad or pads, sewn or otherwise fastened into the trousers, or other equivalent protection, that will protect the vulnerable area of the legs.

(8) Hand protection. All employees handling lines or other rough materials where there is a reasonable possibility of hand injury, shall wear suitable gloves or other hand protection to prevent injury.

(9) Hearing protection. Employees shall be protected against the effects of exposure to noise which exceeds the permissible noise exposures shown in the following table and chapter 296-62 WAC:

PERMISSIBLE NOISE EXPOSURES

Duration per day Hours	Sound Level dBA**
8	90
6	92
4	95
3	97
2	100
1-1/2	102
1	105
3/4	107
1/2	110
1/4	115*

* Ceiling Value: No exposure in excess of 115 dBA.

** Sound level in decibels as measured on a standard sound level meter operating on the A-weighting network with slow meter response.

(10) Protective clothing. Employees working on landings or in log sorting yards, when working on or from the ground, shall wear highly visible hard hats and/or yellow or orange vests, or similarly colored garments, to enable equipment operators to readily see them. It is recommended that such hard hats and vests or outer garments be of a luminous or reflectorized material. Employees performing duties of a flagperson shall wear a hard hat and vest or garment of contrasting colors. Warning vests and hard hats worn at night shall be of a reflectorized material. [Statutory Authority: RCW 49-.17.040, 49.17.050, 49.17.240, and chapters 43.22 and 42.30 RCW. 80-11-057 (Order 80-15), § 296-54-511, filed 8/20/80. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-511, filed 9/21/79.]

WAC 296-54-513 Safety educational and first aid requirements. See The General Safety and Health Standards, WAC 296-24-040 through 296-24-065. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-513, filed 9/21/79.]

WAC 296-54-515 General requirements. (1) Emergency stops. Speed limiting devices, safety stops or emergency shut down devices or shut off valves shall be provided, with the controls so located that in the event of an emergency, the prime mover may be shut down from a safe place.

(2) Machine operators. Machine operators shall be experienced in operating the equipment they are using, except that inexperienced persons may operate the equipment to gain experience while in training and may do so only while working under immediate supervision of an experienced authorized person.

(3) Refueling vehicles. Vehicles shall not be fueled while the motors are running with the exception of helicopters, which is permitted under certain conditions. (See WAC 296-54-559(36).)

(4) Hydraulic lines. If failure of hydraulic lines would create a hazard to an equipment operator while at the operating station, safeguards shall be installed in such a manner as to eliminate the hazard. All hydraulic lines shall be maintained free of leaks and shall be shielded from damage wherever possible.

(5) Defective equipment. Equipment in need of repair shall be reported to management in writing as soon as possible and such equipment shall not be used until repairs are completed if there is a possible hazard to safety of the operator or other employees.

(6) Lock out - tag out. Procedures for lock out - tag out shall be established and implemented to prevent the accidental starting of equipment that is shut down for repairs, maintenance or adjustments.

(7) Control marking. The controls of all machines shall be marked as to their purpose in the operation of the machine.

(8) Metal objects. Metal objects driven into trees or logs shall be removed immediately after serving their intended purpose.

(9) Fire protection. An approved, fully charged and maintained, fire extinguisher shall be available at locations where machines are operating or on each vehicle.

(10) Hand tools. Hand and portable powered tools and other hand-held equipment shall be maintained and used in accordance with the General Safety and Health Standards, WAC 296-24-650.

(11) Storage, handling and marking of fuel. Fuel shall be stored, handled and marked in accordance with WAC 296-24-330.

(12) Smoking prohibited. Smoking shall be prohibited in battery charging areas and within fifty feet of all refueling operations. Precautions shall be taken to prevent open flames, sparks or electric arcs in battery charging or refueling areas.

(13) Charging batteries. When charging batteries, the vent caps shall be kept in place to avoid electrolyte spray. Care shall be taken to ensure caps are functioning. The battery (or compartment) cover(s) shall be open to dissipate heat.

(14) Uncovered batteries. Tools and other metallic objects shall be kept away from the tops of uncovered batteries. [Statutory Authority: RCW 49.17.040, 49.17-.050, 49.17.240, and chapters 43.22 and 42.30 RCW.

80-11-057 (Order 80-15), § 296-54-515, filed 8/20/80. Statutory Authority: RCW 49.17.040, 49.17-.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-515, filed 9/21/79.]

WAC 296-54-517 Camps. Rules, regulations and standards for camps shall be in accordance with WAC 296-24-125. [Statutory Authority: RCW 49.17.040, 49-.17.050, 49.17.240, and chapters 43.22 and 42.30 RCW. 80-11-057 (Order 80-15), § 296-54-517, filed 8/20/80. Statutory Authority: RCW 49.17.040, 49.17-.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-517, filed 9/21/79.]

WAC 296-54-519 Transportation of crews by motor vehicle. (1) Seats. Anchored seats shall be provided for each person when riding in any vehicle.

(2) Seat belts. The driver of a crew vehicle shall be provided with and shall wear a seat belt at all times the crew vehicle is in motion.

(3) Barricade. After May 1, 1980, a substantial barricade shall be provided behind the driver of a crew bus or vehicle that will transport nine or more passengers. The barricade shall extend from the floor to at least a level even with the top of the driver's head.

(4) Safe entrance and exits. Adequate provisions shall be made for safe entrance and exits.

(5) Enclosed racks. When equipment or tools are carried inside the vehicle, they shall be stored in enclosed racks or boxes, which shall be properly secured to the vehicle.

(6) Vehicle to be stopped. Persons shall not enter or exit from any vehicle until the vehicle is completely stopped.

(7) Keep within vehicle. Persons shall keep all parts of the body within the vehicle.

(8) Stoves prohibited. Provisions shall be made for heat and light in the passenger portion of the vehicle. Use of stoves in vehicles is prohibited.

(9) Emergency exit. On vehicles designed to transport nine or more passengers, an emergency exit not less than six and one-half square feet in area, with the smaller dimension being not less than 18 inches, shall be placed at the back of the vehicle or near the back on the side opposite the regular entrance. The route to and egress from the exit must be unobstructed at all times.

(10) Fire extinguisher. When no fuel is transported in the crew vehicle, a minimum rated 5/BC dry chemical fire extinguisher shall be kept in the passenger compartment. When fuel is transported on the crew vehicle in accordance with subsection (14) of this section, a minimum rated 10/BC dry chemical fire extinguisher shall be kept in the passenger compartment. The extinguishing agent shall be nontoxic and preferably a noncorrosive type.

(11) Crew and emergency vehicles. Vehicles designed to transport five or more passengers shall be equipped with stretchers, two blankets, and first-aid kits. If used as a means of transporting injured persons, it shall be designed to enable persons to pass a loaded stretcher into the vehicle. Provisions shall be made for proper securing of the stretcher.

(12) Exhaust systems. Exhaust systems shall be designed and maintained to eliminate the exposure of passengers to toxic agents.

(13) Limitation of transportation of explosives. Explosives shall not be carried on any vehicle while the vehicle is being used to transport workers other than the driver and two persons.

(14) Limitation of transportation of fuels. Fuels shall be transported or stored only in approved safety containers. Enclosed areas where fuels are carried or stored shall be vented in such a manner that a hazardous concentration of fumes cannot accumulate. All containers or drums shall be properly secured to the vehicle while being transported. Commercially built vehicles of the pick-up or flatbed type with a seating capacity of not to exceed six persons may be used to carry fuels in or on the bed of such vehicles, providing such fuels are not carried in the crew compartment. Van-type vehicles may be used to carry fuels only when a vapor-proof bulkhead is installed between the passenger compartment and storage compartment. Not more than forty-two gallons of gasoline may be carried or stored in the compartment and each container shall have a capacity not exceeding seven gallons.

(15) Motor vehicle laws. Motor vehicles used as crew vehicles regularly for the transportation of workers shall be covered against the weather and equipped and operated in conformity with applicable state of Washington motor vehicle laws.

(16) Operator's license. All operators of crew vehicles shall be experienced drivers and shall possess a current valid drivers license.

(17) Daily vehicle check. Operators of crew vehicles shall check brakes and lights daily and shall keep windshields and mirrors clean.

(18) Good repair. Crew vehicles shall be maintained in good repair and safe condition.

(19) Dump trucks. Dump trucks shall only be used in an emergency to transport workers and shall be equipped with adequate safety chains or locking devices which will eliminate the possibility of the body of the truck being raised while employees are riding in the truck. Emergency shall mean any unforeseen circumstances which calls for immediate action when danger to life or danger from fire exists.

(20) Means of signaling. An effective means of signaling shall be provided for communication between the driver and the passengers being transported when they are in separate compartments.

(21) Load limit. The passenger load limit of a crew vehicle shall not exceed the seating capacity of the vehicle.

(22) Vehicle check. Crew vehicles shall be thoroughly inspected by a mechanic for defects which could create a hazardous condition for operation. Such inspections shall be carried out at least every month. Defects known to the operator shall be reported in writing to the mechanic or person in charge. If defects are found, they shall be

corrected before the vehicle is used for the transportation of crews. [Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 43.22 and 42.30 RCW. 80-11-057 (Order 80-15), § 296-54-519, filed 8/20/80. Statutory Authority: RCW 49.17.040, 49.17-.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-519, filed 9/21/79.]

WAC 296-54-521 Transportation of crews by use of speeders and trailers. (1) Braking systems. All speeders shall be equipped with two separate and independently operated braking systems either of which shall be of sufficient capacity to lock all wheels when speeder is fully loaded.

(2) Sanding methods. All speeders used for transporting crews shall be equipped with methods for sanding tracks, operative for both directions of travel.

(3) Lights, windshield wipers. Electric lights of sufficient candle power and range so that vehicle can be stopped within the range of the beam, and which will shine in the direction of travel, shall be provided on all speeders. Adequate tail lights shall be installed and maintained in good order. Automatic windshield wipers of sufficient capacity to maintain clear visibility shall be installed on all speeders.

(4) Trailers. When trailers are coupled behind speeders, they shall be equipped with two separate and independent braking systems, either shall be of sufficient capacity to lock all wheels when the trailer is fully loaded. One of these shall be power operated and shall be controlled from the speeder; the other manually operated from the trailer. One man shall be designated to operate this brake in case of emergency.

(5) Trailer coupling. All trailers shall be coupled to speeders with metal couplings and safety chains or straps of sufficient strength to withstand the impact caused by a broken coupling.

(6) Trailer not to coast. No trailer shall coast or be used as a crew car without being attached to a speeder. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-521, filed 9/21/79.]

WAC 296-54-523 Methods of crew transportation other than those specified. Special approval. Persons or firms desiring to transport crews by methods other than those specified in these rules shall so inform the division of industrial safety and health, department of labor and industries, so that an evaluation of that method may be made. Should the proposed method be found to afford a measure of safety acceptable to the division of industrial safety and health, department of labor and industries, a written order stating that finding shall be issued to the person or firm concerned by the division of industrial safety and health and the proposed method may be utilized. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-523, filed 9/21/79.]

WAC 296-54-525 Railroad construction and maintenance. (1) Construction. All construction shall be according to safe logging practice as to size of rails, ties, track accessories and methods of installing same.

(2) Rail guards. Rail guards shall be placed on main lines and spurs, consistent with type of traffic and general local conditions.

(3) Rail anchors. Rail anchors of approved design shall be installed wherever practicable.

(4) Frogs, switches and guard rail ends. Frogs, switches and ends of guard rails shall have either patent or wooden foot guard blocking installed.

(5) Slip plates. Slip plates shall be used under all switches and switch points.

(6) Wire for telephone lines. All above ground wire for permanent telegraph or telephone lines used for dispatching must be well strung on insulators and shall be clear of ground and obstruction.

(7) Insulators. Where telephone lines are strung under or near power lines, foot stools mounted on insulators in front of telephone boxes must be used, unless other protection is provided, which affords a substantially equivalent measure of safety.

(8) Trestles. Foundations, pile trestles, framed bent trestles, mud sills, or other framework of all structures shall be adequate to support the maximum imposed loads without exceeding the maximum safe working unit stresses. Such structure shall be maintained in good condition and repair and shall be inspected at least annually by a qualified person and a record maintained of inspection which shall be made available to the division of industrial safety and health on request.

(9) Wooden guard. Outside wooden guard rails shall be installed on all railroad bridges except that outside wooden rails will not be required where inside steel guard rails are used. They shall extend not less than six inches above the top of the ties and shall be bolted or spiked to ties at intervals of not more than five feet. Spacer blocks shall be used unless ties are spiked to stringers, or guard rails are dapped to avoid need for spacer blocks.

(10) Bridge ties. Regular bridge ties of not less than ten feet in length shall be used on all railroad bridges constructed after the effective date of these standards.

(11) Safety platforms. On trestles and bridges whose length exceeds two hundred fifty feet, safety platforms providing safe standing space for two persons shall be installed and spaced so that a person on the trestle or bridge is never more than one hundred twenty-five feet from a safety platform or the end of the bridge or structure.

(12) Bridges and trestles used as footways. All railroad bridges and trestles used habitually as footways shall be provided with a plank walkway not less than twelve inches wide and two inches thick, located between the rails, and shall extend from end to end of bridge or trestle.

(13) Walkway. A suitable substantial walkway not less than three feet wide with handrail shall be installed on bridges or trestles where train crews are required to perform routine inspection or repair work on trains.

Substantial platforms and handrails shall be provided where switches are located on bridges or trestles. Adequate clearance shall be allowed for the throw of the switch.

(14) Clearing right of way. All dangerous trees, snags or brush shall be cleared a safe distance from both sides of the track and any obstruction that will create a transportation hazard shall be removed.

(15) Secure footing at switches. Material shall be provided which will promote secure footing at places alongside the track where employees customarily perform duties, such as inspect loads, set brakes by hand or throw switches.

(16) Clearance between tracks. The distance between any main tracks and side track shall be such that there shall be a clearance of four feet between bunk ends and locomotive cabs.

(17) Clearances. The minimum horizontal clearances on each side of the center line of standard gauge mainline railroads shall be eight feet, and the vertical clearance shall be twenty-two feet above the top of each rail (in accordance with standard railroad engineering practices).

(18) Derailers.

(a) Derailers shall be installed and used on all landings, passing tracks and spurs where cars are left on a grade.

(b) These derails shall be located in such a manner that they will be close to standing equipment and will not operate to create a hazard to buildings and other railroad lines.

(c) Derailers shall not be located on the inside rail on a sharp curve.

(d) Derail signs shall be set on both sides of the track even with derailer.

(e) When a derailer is no longer needed, it shall be removed or rendered inoperative. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-525, filed 9/21/79.]

WAC 296-54-527 Truck roads. (1) Truck road grades. Truck road grades shall not be too steep for safe operation of logging or work trucks which operate over them and shall not exceed twenty percent in any case unless a positive means of lowering trucks is provided.

(2) Truck road surfaces.

(a) Truck roads shall be of sufficient width and evenness to insure the safe operation of equipment.

(b) Hazards such as broken planking, deep holes, large rocks, logs, etc., which prevent the safe operation of equipment, shall be immediately corrected.

(c) Road width. On blind curves, truck roads shall be of sufficient width for two trucks to pass, or some type of signal system shall be maintained or speed limited to such that the vehicle can be stopped in one-half the visible distance.

(3) Safe roadways. All danger trees shall be felled a safe distance back from the roadway. Rocks, which present a hazard, shall be cleared from banks. Brush and other materials that obstruct the view at intersections or on sharp curves shall be cleared. (This subsection is applicable only to those portions of roads under direct control of the employer.)

(4) Bridges. All structures shall be adequate to support the maximum imposed loads without exceeding the maximum safe working unit stresses. All bridges shall have an adequate number of reflectors to clearly define the entrance to the bridge. All structures shall be maintained in good condition and repair and shall be inspected at least annually by a qualified authorized person and a record maintained of each inspection, which shall be made available to the Division of Industrial Safety and Health, Department of Labor and Industries on request.

(5) Shear rails. Shear rails shall be installed on both outside edges of bridges. The shear rails must be securely fastened and made of material capable of withstanding the impact generated by contact with the wheels of a loaded vehicle. The top of shear rails shall be not less than fifteen inches above the bridge surface. Bridges in use prior to the effective date of these regulations with outside shear rails of a minimum of ten inches high or center type shear rails of not less than five inches high are permissible until such time repairs are needed.

(6) Control of dust on logging roads. Measures shall be instituted which will minimize dust to such degree that visibility will not be reduced beyond the point where an operator can safely operate a vehicle. Vehicle operators shall govern the speed of vehicles by road conditions.

(7) Fenders. Pneumatic-tired equipment shall be equipped with fenders as described in the Society of Automotive Engineers Technical Report J321a. [Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 43.22 and 42.30 RCW. 80-11-057 (Order 80-15), § 296-54-527, filed 8/20/80. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-527, filed 9/21/79.]

WAC 296-54-529 Falling and bucking--General. (1) Before starting to fall or buck any tree or snag, the cutter shall survey the area for possible hazards and proceed according to safe practices. Snags which are unsafe to cut shall be blown down with explosives or felled by other safe methods.

(2) Workers shall not approach a faller within reach of the trees being felled unless a signal has been given and acknowledged by the faller that it is safe to approach.

(3) Before falling or bucking any tree, sufficient work area shall be swamped and an adequate escape path shall be made. An escape path shall be used as soon as the tree or snag is committed to fall, roll or slide.

(4) Warning to be given. Fallers shall give timely and adequate warning prior to falling each tree; such warning shall be given with the saw motor at idle or shut off. Persons in the area shall give response to the faller and shall also notify him when they are in the clear.

(5) A competent person, properly experienced in this type of work, shall be placed in charge of falling and bucking operations. Inexperienced workers shall not be

allowed to fall timber or buck logs unless working under the direct supervision of an experienced worker.

(6) Snags that have loose bark in the area of the proposed cut shall have the bark removed before being felled. When a snag has elevated loose bark which cannot be removed, the buddy system shall be used to watch for and give warning of falling bark or other hazards.

(7) Tools of fallers and buckers, such as axes, sledges, wedges, saws, spring boards, etc., must be maintained in safe condition. Case hardened or battered sledges and wedges shall not be used. All tools shall be used for their intended purposes.

(8) Trees shall not be felled if the falling tree can endanger any worker or strike any line or any unit in the operation.

(9) When practical, strips shall be laid out so cutters face out into opening when starting strip, and all trees shall be felled into the open whenever conditions permit.

(10) Trade leaners. Cutters shall not fall into another strip; leaners on the line shall be traded.

(11) When there is danger from kickback of a sapling, the same must be either undercut or felled.

(12) Cutters shall place an adequate undercut and leave sufficient holding wood to insure the tree will fall in the intended direction. When required, mechanical means shall be used to accomplish this objective.

(13) Cutters shall be careful their chopping range is unobstructed.

(14) Cutters shall confer with their supervisor regarding a safe manner of performing the work and in unusually hazardous situations shall not proceed with the work until their method has been approved by their supervisor.

(15) The person in charge of cutting crews shall regularly inspect the work of the cutting crews and shall be responsible for seeing the work is performed in a proper and safe manner.

(16) Common sense and good judgment must of necessity govern the safety of cutters as affected by weather conditions. At no time shall they work if wind is strong enough to prevent the falling of trees in the desired direction or when vision is impaired by dense fog or darkness.

(17) Cutters shall be assigned to work in locations where they are in contact with others or their welfare shall be checked on as provided for by WAC 296-54-507(2).

(18) Persons in charge of cutting crews shall account for all persons in their crews being on hand when work ceases as provided for by WAC 296-54-507(3).

(19) All fallers and buckers shall have a current first-aid card.

(20) All fallers and buckers shall carry or have with them in near proximity at all times, an axe, a minimum of two wedges, a whistle and a first-aid kit. The whistle shall be carried on their person.

(21) Special precautions shall be taken to prevent trees from falling into power lines. If it appears that a tree will hit a power line, the power company shall be notified before it is attempted to fall the tree. If an unsuspected tree does contact a power line, the power company shall be notified immediately and all persons shall remain clear of the area until the power company personnel advise that conditions have been made safe to resume operations.

(22) Wedges shall be of soft metal, hardwood or plastic.

(23) Wedges shall be driven with a hammer or other suitable tool. Double-bitted axes or pulaskies shall not be used for this purpose.

(24) While wedging, fallers shall watch for falling limbs or other material that might be jarred loose. Cutting of holding wood in lieu of using wedges is prohibited.

(25) Undercuts are required except in matchcutting, and shall be large enough to safely guide trees and eliminate the possibility of splitting. Trees with no perceptible lean having undercuts to a depth of one-fourth of the diameter of the tree with a face opening equal to one-fifth of the diameter of the tree, will be assumed to be within reasonable compliance with this rule. Swing cuts are prohibited except by an experienced person.

(26) Undercuts shall be completely removed except when a dutchman is required on either side of the cut.

(27) Backcuts shall be as level as possible and shall be approximately two inches higher than the undercut, except in tree pulling.

(28) Trees with face cuts or backcuts shall not be left standing. When a tree is not completely felled, the faller shall clearly mark the tree, shall discontinue work in the hazardous area and notify his immediate supervisor. The supervisor shall be responsible for notifying all workers who might be endangered and shall take appropriate measures to ensure that the tree is safely felled before other work is undertaken in the hazardous area.

(29) To avoid use of wedges, which might dislodge loose bark or other material, snags shall be felled in the direction of lean unless other means (mechanical or dynamite) are used.

(30) Lodged trees shall be clearly marked and identified by a predetermined method and all persons in the area shall be instructed not to pass or work within two tree lengths of such trees except to ground them.

(31) Work areas shall be assigned so that a tree cannot fall into an adjacent occupied work area. The distance between work areas shall be at least twice the height of the trees being felled. A greater distance may be required on downhill slopes depending on the degree of the slope and on the type of trees and other considerations.

(32) Where felled trees are likely to roll and endanger workers, cutting shall proceed from the bottom toward the top of the slope, and performed uphill from previously felled timber.

(33) Cutters shall not be placed on a hillside immediately below each other or below other operations where there is probable danger.

(34) Fallers shall be informed of the movement and location of buckers or other cutters placed, passing or approaching the vicinity of trees being felled.

(35) A flagperson(s) shall be assigned on roads where hazardous conditions are created from falling trees.

Where there is no through traffic, such as on a dead end road, warning signs or barricades shall be used.

(36) No tree or danger tree shall be felled by one cutter where and when the assistance of a fellow cutter is necessary to minimize the dangers or hazards involved.

(37) Cutters shall be in the clear as the tree falls.

(38) Undercuts and backcuts shall be made at a height above the highest ground level to enable the cutter to safely begin the cut, control the tree, and have freedom of movement for a quick escape to be in the clear from a falling tree.

(39) When falling, a positive means, method or procedure that will prevent accidental cutting of necessary holding wood shall be established and followed. Particular care shall be taken to hold enough wood to guide the tree or snag and prevent it prematurely slipping or twisting from the stump.

(40) The undercut shall not be made while buckers or other workers are in an area into which the tree could fall.

(41) Matchcutting should not be permitted and shall be prohibited for trees larger than six inches in diameter breast high.

(42) The tree (and root wad if applicable) shall be carefully examined to determine which way the logs (and root wad) will roll, drop, or swing when the cut is completed. No worker shall be allowed in this danger zone during cutting.

(43) Logs shall be completely bucked through whenever possible. If it becomes hazardous to complete a cut, then the log shall be marked and identified by a predetermined method. Rigging crews shall be instructed to recognize such marks and when possible, cutters shall warn the rigging crew of locations where such unfinished cuts remain.

(44) Cutters shall give timely warning to all persons within range of any log which may have a tendency to roll after being cut off.

(45) Propping of logs or trees as a means to protect workers downslope from the logs or trees, shall be prohibited.

(46) Logs shall not be jackstrawed when being bucked in piles or decks at a landing. [Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 43-.22 and 42.30 RCW. 80-11-057 (Order 80-15), § 296-54-529, filed 8/20/80. Statutory Authority: RCW 49-.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-529, filed 9/21/79.]

WAC 296-54-531 Falling and bucking--Power saws and power equipment. (1) Operators shall inspect chain saws daily to ensure that handles and guards are in place, and controls and other moving parts are functional.

(2) Fuel outdoors. The chain saw shall be fueled outdoors at least fifty feet from persons smoking or from other potential sources of ignition.

(3) Chain saws shall not be operated unless equipped with a muffler.

(4) Idler end of power chain saw blade on all two-man machines shall be adequately guarded.

(5) Combustion-engine type power saws shall be equipped with a positive means of stopping the engine.

(6) Electric power saws shall be equipped with an automatic (deadman type) control switch. Saws with faulty switches shall not be used.

(7) Unless the carburetor is being adjusted, the saw shall be shut off before any adjustments or repairs are made to the saw, chain or bar.

(8) Combustion-engine type power saws shall be equipped with a clutch.

(9) The chain saw clutch shall be properly adjusted to prevent the chain from moving when the engine is at idle speed.

(10) Power chain saws with faulty clutches shall not be used.

(11) The bar shall be handled only when the power chain saw motor is shut off.

(12) Power chain saws shall have the drive end of the bar guarded.

(13) Combustion-engine driven power saws shall be equipped with an automatic throttle control (deadman type), which will return the engine to idle speed upon release of the throttle (idle speed is when the engine is running and the chain does not rotate on the bar).

(14) When falling of tree is completed, the power saw motor shall be at idle or shutoff. Where terrain or brush creates a hazardous condition, the power saw motor shall be shutoff while the operator is traveling to the next cut. The power saw motor shall also be shutoff while fueling.

(15) Saw pinching and subsequent chain saw kickback shall be prevented by using wedges, levers, guidelines, and saw placement, or by undercutting.

(16) Cutters shall not use the chain saw to cut directly overhead or at a distance that would require the operator to relinquish a safe grip on the saw.

(17) Reserve fuel shall be handled and stored in accordance with WAC 296-24-37009.

(18) Hand-held files shall be equipped with a handle.

(19) Only experienced cutters shall buck windfalls. [Statutory Authority: RCW 49.17.040, 49.17.050, 49-.17.240, and chapters 43.22 and 42.30 RCW. 80-11-057 (Order 80-15), § 296-54-531, filed 8/20/80. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-531, filed 9/21/79.]

WAC 296-54-533 Falling and bucking--Springboards and tree jacking. (1) Springboards shall be of clear, straight-grained sound stock of sufficient length, width and strength and shall be replaced when they will no longer safely support the expected load at the extreme end.

(2) Springboard irons shall be well lipped and firmly attached with bolts or a means of attachment furnishing equivalent strength.

(3) Two workers shall be present when falling any tree or snag when springboards are used.

(4) Power saw chains shall be stopped while shifting springboards.

(5) Jack plates shall be used with hydraulic tree jacks and the base plate shall be seated on solid wood inside the bark ring as close to level as possible.

(6) Two workers shall be present at all times during the use of tree jacks.

(7) Wedges shall be used as a follow-up method while using tree jacks. The wedges shall be continuously moved in as the tree is jacked.

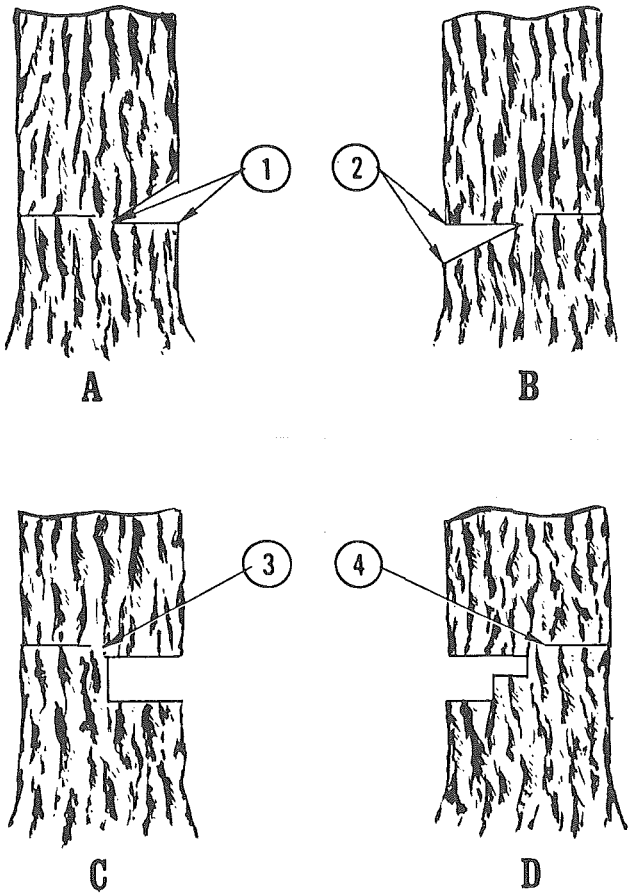
(8) Effective January 1, 1980, all hydraulic tree jacks shall be equipped with an operable velocity fuse (check valve) and the pump shall be equipped with an operable pressure gauge.

(9) When tree jacking, the facecut shall be nominally one-fourth the diameter of the tree.

(10) The vertical height of the facecut shall be not less than one-fifth of the diameter of the tree when tree jacking.

NOTE: See Figure No. 1, for illustrations of undercuts.

UNDERCUTS



(A) **Conventional undercut.** Can be made with parallel saw cut and axe diagonal cut or both cuts with the saw. Generally used on trees of small diameter.

(B) **Both cuts made with the saw.** Leaves square-end log. Same as (A), except that waste is put on the stump.

(C) **Two parallel cuts with the saw.** The material between the cuts is chipped out with an axe-adz (pulaski) combination. Used on trees over 30 inches in diameter.

(D) **Three parallel cuts with the saw, leaving a step.** Same in principle as (C). Used on trees of very large diameters.

Item

1 Undercut Depth
2 Undercut Height
3 Holding Wood
4 Backcut

[Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-533, filed 9/21/79.]

WAC 296-54-535 Tree pulling. (1) The cutter shall be responsible for determining if a tree can be safely pulled. If, for any reason, the cutter believes the tree pulling cannot be completed safely, the tree shall be conventionally felled.

(2) When using radio positive radio communications shall be maintained at all times between the tree pulling machine and cutter when tree pulling. An audible signal shall be blown when the initial pull is made on the tree and the line is tightened. Hand signals, in lieu of radio communications and an audible signal, may be used only if the cutter is clearly visible to the tree puller operator.

(3) A choker, choker bell, or a line and sleeve shackle shall be used as the means of attachment around the tree when tree pulling. The bight on the line shall be only that necessary to hold the choker or line around the tree.

(4) The tree pulling machine shall be equipped with a torque converter, fluid coupler, or an equivalent device to insure a steady even pull on the line attached around the tree.

(5) The tree pulling line shall have as straight and direct path from the machine to the tree as possible. Physical obstructions which prevent a steady even pull on the tree pulling line shall be removed or the line shall be rerouted.

(6) Siwashing, in lieu of a block, in order to change tree pulling lead, is prohibited. [Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 43-.22 and 42.30 RCW. 80-11-057 (Order 80-15), § 296-54-535, filed 8/20/80. Statutory Authority: RCW 49-.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-535, filed 9/21/79.]

WAC 296-54-537 Mechanized falling. (1) When using selfpropelled mobile falling devices, a watchman and/or warning signs shall be posted at appropriate locations indicating that devices of this type are being used to fall trees.

(2) Self-propelled mobile falling equipment used for falling trees shall be designed in a manner or shall have auxiliary equipment installed which will cause the tree to fall in the intended direction.

(3) Mechanized falling shall be conducted in such a manner as not to endanger persons or equipment.

(4) Where a mechanized feller incorporates a cab structure having a single entrance door, it shall be equipped with an alternate means of escape from the cab should the door be blocked in the event of vehicle rollover or fire. Cab doors shall be fitted with latches operable from both sides of the door. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-537, filed 9/21/79.]

WAC 296-54-539 Climbing equipment and passline. (1) Standard climbing equipment shall be furnished by the employer; however, this shall not be construed to mean that the climber may not use his own equipment, provided it meets the following standards and is permitted by the employer. The climbing ropes shall be of steelcore type. The climber may fasten his rope by passing it through "D" rings fastened to the belt and around his body before tying it to itself. When topping standing trees, it is recommended that a steel chain of 3/16-inch or larger, with appropriate fittings attached, shall be used in addition to the climbing rope. All climbing equipment shall be maintained in good condition. An extra set of climbing equipment shall be kept at the climbing operation and another person with climbing experience shall be present.

(2) A person shall ride only the passline to thread lines, oil blocks or to inspect rigging.

(3) No one shall work directly under a tree except when directed by the climber. Warning shall be given prior to intentionally dropping any objects or when objects are accidentally dropped.

(4) Running lines shall not be moved while the climber is working in the tree, except such "pulls" as he directs and are necessary for his work.

(5) One experienced person shall be dispatched to transmit the climber's signals to the machine operator and shall not otherwise be occupied during the time the climber is in the tree, nor shall the machine operator be otherwise occupied while the climber is using the passline. The designated signalman shall position himself clear of hazards from falling, flying or thrown objects.

(6) Long or short splices and knots in passline are not permitted. Chains used in passlines shall be in good condition and shall not contain cold shuts or wire strands.

(7) The climber shall be an experienced logger with proper knowledge of logging methods and the safety of rigging spar and tail trees.

(8) Trees shall not be topped during windy weather.

(9) At no time shall topping, rigging-up, or stripping work be done when visibility is impaired.

(10) When the friction lever and passline drum is on the opposite side of the machine from the operator, an experienced person shall operate the friction lever while the engineer operates the throttle. While being used, the passline drum shall be properly attended by another person to guide the passline onto the passline drum with a tool suitable for the purpose.

(11) The use of a gypsy drum for handling persons in the tree is prohibited.

(12) Danger trees leaning towards and within reach of landings, roads, rigging or work areas shall either be felled before the regular operations begin or work shall be arranged so that workers will not be exposed to hazards involved.

(13) Noisy equipment such as power saws, tractors and shovels shall not be operated around the area where a climber is working when such noise will interfere with the climber's signals.

(14) Climbing and passline equipment shall not be used for other purposes.

(15) Defective climbing equipment shall be immediately removed from service.

(16) The climber shall be equipped with a climbing equipment assembly having a breaking strength of not less than five thousand four hundred pounds.
The equipment shall include:

(a) A safety belt with double "D" rings;

(b) Steel spurs long and sharp enough to hold in any tree in which they are used; and

(c) A climbing rope made of wire-core hemp, wire or chain construction.

(17) When the climber is using a chain saw in the tree, the climbing rope shall be made of material that cannot be severed by the saw.

(18) Lineman hooks shall not be used as spurs.

(19) When power saws are used in topping or limbing standing trees, the weight of the saw shall not exceed thirty pounds.

(20) Tools used by the climber, except the power saw, shall be safely secured to his belt when not in use.

(21) Snaps shall not be used on a climber's rope unless a secondary safety device between the belt and snap is used.

(22) A climber's rope shall encircle the tree before the climber leaves the ground except when the climber is riding the passline.

(23) While the climber is working in the tree, persons shall keep at sufficient distance from the tree to be clear of falling objects.

(24) When used, passline fair-leads shall be kept in alignment and free from fouling at all times.

(25) Spikes, used by the climber as a temporary aid in hanging rigging, shall be removed before the tree is used for logging.

(26) Loose equipment, rigging or material shall either be removed from the tree or securely fastened.

(27) All spar trees shall be equipped with passlines that shall:

(a) Be not less than 5/16-inch and not be over 1/2-inch in diameter;

(b) Not be subjected to any sawing on other lines or rigging, and kept clear of all moving lines and rigging;

(c) Be of one continuous length and in good condition with no splices, knots, molles, or eye-to-eye splices between the ends;

(d) Be long enough to provide three wraps on the drum before the climber leaves the ground.

(28) Drums used for passlines shall have sufficient flange depth to prevent the passline from running off the drum at any time.

(29) Passline chains shall:

(a) Be not less than 5/16-inch alloy or 3/8-inch high test chain and shall not contain cold shuts or wire strands;

(b) Be attached to the end of the passline with a screw-pin shackle, a slip-pin shackle with a nut and molle, or a ring large enough to prevent going through the pass block; and

(c) Be fitted with links or rings to prevent workers from being pulled into the passline block.

(30) Pass blocks shall:

(a) Be inspected before placing in each spar and the necessary replacements or repairs made before they are hung;

(b) Have the shells bolted under the sheaves;

(c) Have the bearing pin securely locked and nuts keyed or the block be of the type which positively secures the nut and pin;

(d) Equipped with sheaves not less than six inches in diameter; and

(e) Comply with applicable portions of WAC 296-54-543(6) pertaining to blocks.

(31) When workers are required to go up vertical metal spars, passlines, chains and blocks shall be provided and used. [Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 43.22 and 42.30 RCW. 80-11-057 (Order 80-15), § 296-54-539, filed 8/20/80. Statutory Authority: RCW 49.17.040, 49.17-.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-539, filed 9/21/79.]

WAC 296-54-541 Selection of spar, tail and intermediate trees. (1) Douglas fir or spruce shall be used as spar, tail, or intermediate support trees when they are available. If other species must be used, additional guylines, tree plates, or other precautions shall be taken to insure the tree will withstand the strains to be imposed.

(2) Spar, tail and intermediate support trees shall be examined carefully for defects before being selected. They shall be sound, straight, green and of sufficient diameter to withstand the strains to be imposed.

(3) Trees having defects that impair their strength shall not be used for spar, tail or intermediate support trees. Raised trees shall be identified and marked as such.

(4) Before raising spar trees, dummy trees shall be topped and guyed with three guylines equivalent in breaking strength to the mainline. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-541, filed 9/21/79.]

WAC 296-54-543 General requirements. (1) Rigging.

(a) Rigging shall be arranged and operated so rigging or loads will not foul, or saw against lines, straps, blocks or other equipment.

(b) A thorough inspection of all blocks, straps, guylines and other rigging shall be made before they are placed in positions for use. Inspections shall include an examination for damaged, cracked or worn parts, loose nuts and bolts, and of lubrication, and the condition of straps and guylines. All necessary repairs or replacements for safe operation shall be made before the rigging is used.

(c) Rigging equipment, when not in use, shall be stored so as to not present a hazard to employees.

(d) Running lines shall be arranged so workers will not be required to work in the bight. When this is not possible, workers shall move out of the bight of lines before the lines are tightened or moved.

(2) Shackles.

(a) Shackles with screw pins should have either a molle or cotter key when used to fasten guylines to spar trees.

(b) All shackles used to hang blocks, jacks, or rigging on trees or loading booms shall have the pins fastened by a nut secured with a cotter pin or molle. When used, molles shall be as large as the pin hole will accommodate and with the loose ends rolled in.

(c) The size of the opening between the jaws of shackles used to hang blocks, jacks, rigging, and for joining or attaching lines, shall not be more than one inch greater than the size of the rope, swivel, shackle, or similar device to which it is attached.

(d) All shackles used for mainline or skyline extensions shall be of a type designed for that purpose.

(e) Shackles used other than for mainline extension connections, shall be of the screw-pin type or with the pin secured by a nut and cotter pin or molle, except as specified elsewhere for specific purposes.

(f) Shackles, swivels, links and tree plates shall be replaced or repaired when they will not safely support the imposed strains of their intended use.

(g) Shackles shall not be loaded in excess of the working load recommended by the manufacturer.

(h) All shackles must be made of forged steel or material of equivalent strength and one size larger than the line it connects.

(3) Straps.

(a) Safety straps of appropriate size shall be placed on all high lead blocks; also other blocks whenever practicable. Safety straps shall be shackled, with closed end of shackle up, to a guyline which extends as near as possible at right angles with power unit, but shall not be placed on a guyline having an extension within one hundred feet of the tree. When the top guyline on which the safety strap of the high lead block is fastened is changed, safety strap must be attached to another guyline or loosened guyline tightened after change.

(b) All tree straps shall be at least 1/4-inch larger than the pulling line. If impossible to use safety strap, all tree straps shall be 1/2-inch larger than the pulling line.

(c) All straps in back of show must be as large as the running line.

(d) All blocks other than passline and straw line lead blocks shall be hung in both eyes or "D's" of straps. Threading eye through eye is prohibited.

(e) Skyline jack shall not be hung by double strap through shackle and hanging jack in two eyes.

(f) Tree straps shall initially be made of new wire rope when made up. They shall be replaced when there is evidence of damage or broken wires.

(g) A guyline safety strap or equivalent device shall be installed at the top of metal spars to prevent guylines from falling more than five feet in case of structural or mechanical failure of the guyline attachment.

(h) Metal spar guyline safety straps or equivalent devices shall be equal to the strength of the guyline.

(i) Nylon straps may be used in accordance with manufacturer recommendations.

(j) Nylon straps shall be removed from service when the wear reaches the limits prescribed by the manufacturer. The person responsible for inspecting the condition of rigging shall be aware of these limits.

(4) Guylines.

(a) All component parts of the guyline system on head tree shall be of equal or greater strength than the mainline and guylines shall be properly spaced to effectively oppose the pull of the mainline.

(b) Guylines on wood spar trees shall be secured to solid stumps with not less than two and one-half complete wraps with at least six staples or eight railroad spikes driven solidly into sound wood on the first and last wrap. The bark shall be removed and the stump adequately notched or other equivalent means shall be used to prevent movement of the line on the stump or tree. Guyline stumps shall be inspected periodically. Guylines may be secured to properly installed "deadmen" when suitable stumps are not available. It is permissible, on the tail tree, to secure the guylines by placing three wraps around a tree or stump and securing them properly by use of clamps.

(c) When a mainline of 7/8-inch or less is used, the spar shall be supported by at least five top guylines or other positive means of supporting the spar.

(d) When tail hold on skyline is choked on stump, there shall be no excessive bight against shackle.

(e) In removing guylines and skylines from stumps, etc.:

(i) A reversed safety wrap shall be put on and secured before loosening the last wrap.

(ii) An experienced person shall be in charge loosening guylines or skylines using proper precautions, and giving warning before lines are released.

(iii) Safety holdbacks shall be used when necessary for the safety of workers.

(iv) Powder or power shall be used for releasing the last wrap on skylines.

(f) Guylines shall be used with any logging equipment when required by the equipment manufacturer.

(g) Guying shall not be less than the minimum recommended by the equipment manufacturer.

(h) Top guys on vertical metal and wooden spars which require five or more guylines shall be so arranged that at least three guys oppose the pull of the load, with at least one guyline anchored adjacent to the yarding quarter.

(i) Guylines shall be of plow steel or better material, and shall be maintained in good condition.

(j) When side blocking or lateral yarding, lateral stability to the head spar tree shall be insured by guylines sufficient in number, breaking strength and spacing.

(k) All guylines shall be kept well tightened while the spar, tree, equipment or rigging they support is in use.

(l) All trees that interfere with proper alignment, placement or tightening of guylines shall be felled.

(m) Guylines shall be hung in a manner to prevent a bight or fouling when they are tightened.

(n) All spliced guyline eyes shall be tucked at least three times.

(o) Extensions to guylines shall be:

(i) Equal in strength to the guyline to which they are attached; and

(ii) Connected only by a shackle connecting two spliced eyes or by double-end hooks. Connections shall have at least one and one-half times the strength of the guyline.

(p) Portable metal spars and their appurtenances shall be inspected by a qualified person each time the spar is lowered and at any time its safe condition is in doubt. When damage from over-stress is noted or suspected, the part in question shall be inspected by a suitable method and found to be safe, or the part repaired or replaced before the spar is again used.

(q) No person shall go up a raised metal spar unless suitable passline equipment is provided and used.

(r) Repairs, modifications or additions which affect the capacity or safe operation of metal spars shall be made only under the direction of a registered engineer and within the manufacturer's recommendations.

(i) In no case shall the original safety factor of the equipment be reduced.

(ii) If such modifications or additions are made, the identification plate required by WAC 296-54-553(1) shall reflect such changes.

(s) When using skylines 7/8-inch or smaller, tail trees shall be supported by at least two guylines when the rigging is placed on the tail tree at a height greater than five times the tree diameter (dbh) or higher than ten feet from the highest ground point, whichever is lower.

(t) When using skylines one inch or larger, tail trees shall be supported by at least four guylines when the rigging is placed on the tail tree at a height greater than five times the tree diameter (dbh) or higher than ten feet from the highest ground point whichever is lower.

(u) Tail trees shall be supported by additional guylines if necessary to insure stability of the tree.

(v) Wood head spar trees shall be guyed as follows:

(i) All spar trees one hundred ten feet and over in height shall be provided with a minimum of six top guys and three buckle guys, each of which shall be substantially equal in strength to the strength of the mainline. This requirement, however, shall not be construed as applying where more than three buckle guys are specifically required.

(ii) Spar trees used for loading and yarding at the same time, or for loading and swinging at the same time, or supporting a skyline yarding system, shall have not less than six top and four buckle guylines each of which shall be substantially equal in strength to the strength of the mainline.

(iii) Spar trees under one hundred ten feet high used only for yarding with heavy equipment (over 7/8-inch

mainline) shall have not less than six top guys each of which shall be substantially equal in strength to the strength of the mainline.

(iv) Spar trees used for yarding with light equipment (7/8–inch or smaller mainline) shall be guyed in such a manner that strains will be imposed on not less than two guylines. If less than five top guys are used, guylines shall be at least 1/4–inch larger than the mainline.

(v) More guylines shall be added if there is any doubt as to the stability of any spar tree, raised tree, tail trees and lift trees, or other equipment or rigging they support.

(w) Guylines shall alternately be passed around the wood spar in opposite directions to prevent twisting of the spar.

(x) Guylines shall be attached to the upper portion of the wood spar by means of shackles.

(y) A–frames shall be guyed by at least two quarter–guylines and one snap guyline or equivalent means to prevent A–frame from tipping back.

(5) Anchoring.

(a) Stump anchors used for fastening guylines and skylines shall be carefully chosen as to position, height and strength. When necessary, stump anchors shall be tied back in a manner that will distribute the load.

(b) Stump anchors shall be barked where attachments are to be made, or devices designed to accomplish the same purpose shall be used.

(c) Stump anchors shall be notched to a depth not greater than one and one–half times the diameter of the line to be attached.

(d) Deadman anchors may be used if properly installed. Guylines shall not be directly attached to deadman anchors. Suitable straps or equally effective means shall be used for this purpose.

(e) Rock bolts and other types of imbedded anchors may be used if properly designed and installed.

(f) Stumps, trees and imbedded type guyline anchors shall be regularly inspected while the operation is in progress. Insecure or hazardous anchors shall be immediately corrected.

(g) Workers shall not stand close to the stump, or in the bight of lines as the guyline or wraps are being tightened.

(6) Blocks.

(a) All blocks shall:

(i) Not be used for heavier strains or lines than those for which they are constructed;

(ii) Be fitted with line guards and shall be designed and used in a manner that prevents fouling, with the exception of special line blocks not designed with line guards;

(iii) Be kept in proper alignment when in use;

(iv) Have bearing and yoke pins of a material that will safely withstand the strains imposed and shall be securely fastened;

(v) Have sheaves of a size designed for the size of the wire rope used.

(b) Blocks with cracked or excessively worn sheaves shall not be used.

(c) Lead blocks used for yarding, swinging, loading and unloading used in wood spars shall:

(i) Be of the type and construction designed for this purpose;

(ii) Be bolted with not less than two bolts through the shells below the sheaves in a manner that will retain the sheave and line in case of bearing pin failure (this does not apply to haulback lead blocks); and

(iii) Mainline blocks shall have a sheave diameter of not less than twenty times the diameter of the mainline.

(d) Block bearing shall be kept well lubricated.

(e) All blocks must be of steel construction or of material of equal or greater strength and so hung that they will not strike or interfere with other blocks or rigging.

(f) All pins in blocks shall be properly secured by "Molle Hogans" or keys of the largest size the pin hole will accommodate. When blocks are hung in trees, threaded pins and nuts shall be used.

(g) Sufficient corner or tail blocks to distribute the stress on anchors and attachments shall be used on all logging systems.

(h) Blocks used to lead lines directly to yarding, loading or unloading machines other than passline or strawline blocks shall be hung by the following method: In both eyes or "D"s of straps; threading eye through eye is prohibited.

(i) Tail, side or corner blocks used in yarding shall be hung in both eyes of straps.

(7) Wire Rope.

(a) Wire rope shall be of the same or better grade as originally recommended by the equipment manufacturer.

(b) Wire rope shall be removed from 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 3/64–inch for diameters to and including 3/4–inch, 1/16–inch for diameters 7/8–inch to 1–1/8–inch, inclusive, 3/32–inch for diameters 1–1/4–inches 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;

(vi) In standing ropes, when twelve and one–half percent of the wires are broken within a distance of one wrap (lay); and

(vii) Corroded, damaged or improperly applied end connections.

(c) Wire rope shall be kept lubricated as conditions of use require.

(8) Splicing Wire Rope.

(a) Marlin spikes or needles in good condition and large enough for the size of the line being spliced, shall be used for splicing.

(b) When available, and practical to use, a patented wire cutter shall be used. If using a wire axe to cut cable, the hammer used to strike the axe shall be made of soft nonspalling type material. Eye and face protection shall be worn in accordance with WAC 296-54-511(2).

(c) Short splices, eye to eye splices, cat's paws, knots, molles and rolled eyes are prohibited except for use in the moving of slack lines. Knots will be permitted for use on single drum tractors and grapple pick-up lines when properly tied.

(d) Wire rope 1/2-inch or less in diameter may be tucked two times provided the rope is used only as straw line.

(e) Splices other than eye splices in lang lay lines are prohibited. Eye splices in lang lay lines shall be tucked at least four times.

(f) Long splices shall be used for permanently joining "regular lay" running lines.

(g) When U-bolt wire rope clips (clamps) are used to form eyes on high strength wire rope, an additional clip (clamp) for each grade of line above improved plow steel shall be used over and above the following table: (See Figure No. 2, following this section, for proper application of wire rope clips.)

Improved Plow Steel Diameter of Rope	Number of Clips Drop Forged	Required Other Material	Minimum Space Between Clips
3/8 to 5/8 inch	3	4	3-3/4 inches
3/4 inch	4	5	4-1/2 inches
7/8 inch	4	5	5-1/4 inches
1 inch	5	6	6 inches
1-1/8 inch	6	6	6-3/4 inches
1-1/4 inch	6	7	7-1/2 inches
1-3/8 inch	7	7	8-1/4 inches
1-1/2 inch	7	8	9 inches

(h) All line eye splices shall be tucked at least three full tucks. D's and knobs are recommended for line ends.

(i) Two lines may be connected by a long splice, or by shackles or patent links of the next size larger than the line being used where practical. Double "Molle Hogans" may be used on drop lines only and single "Molle Hogans" may be used on strawline.

(j) Splicing of two lines together for loading line or pass line is prohibited.

(k) Safe margin of line must be used for making long splices. The following table shows comparative safe lengths as to size of cable in making long splices:

Rope Diameter	To Be Unravelled	Total Length
1/4"	8'	16'
3/8"	8'	16'
1/2"	10'	20'
5/8"	13'	26'
3/4"	15'	30'
7/8"	18'	36'
1 "	20'	40'
1-1/8"	23'	46'
1-1/4"	25'	50'
1-3/8"	28'	56'
1-1/2"	30'	60'
1-5/8"	33'	66'
1-3/4"	35'	70'
1-7/8"	38'	76'
2 "	40'	80'

(9) Miscellaneous Requirements.

(a) All lines, straps, blocks, shackles, swivels, etc., shall be inspected frequently and shall be used only when found to be in good condition. Such items shall be of sufficient size and strength as to safely withstand the stress which can be imposed by the maximum pull of the power unit against such equipment or devices as rigged or used in that particular logging operation.

(b) When used or second-hand cables are purchased,they shall not be used for any purpose until inspection determines they will withstand the maximum imposed strain.

(c) Skyline shall be anchored by placing three full wraps around tail hold and staples or spikes shall be used to securely hold each wrap or choked and secured with a shackle or three wraps and at least three clamps securely tightened.

(d) When using haulback lines greater than 7/8-inch diameter on interlocking drum-type yarders, additional precautions shall be taken to prevent the corner blocks or tail blocks from dislodging the anchors to which the blocks are secured.

(e) Where "dutchman" is used, either for yarding or on skyline, a block of heavy construction must be used. Regular tree shoe or jack may be used for "dutchman" on skyline. Cable must be fastened securely.

(f) Choker drops shall be connected to the butt rigging by knobs or shackles. The use of molles or cold shuts is prohibited in all components of the butt rigging. All butt rigging shall be designed to prevent loss of chokers and defective swivels shall not be used. Open hooks shall not be used to connect lines to the buttrigging.

(g) When heel tackle is fastened near machine, safety line must be placed in such manner that in case of breakage, lines shall not strike power unit and endanger operator.

(h) Only in case of necessity shall any metallic object be driven into a log. The metal must be removed immediately when splice or other work is completed. Stumps shall be used whenever possible for splicing.

PUT CLIPS ON RIGHT

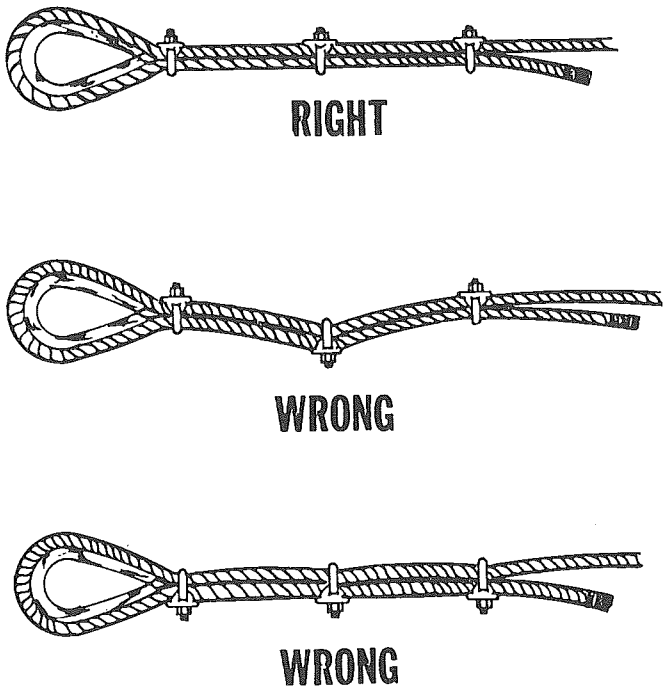


Figure No. 2

Clips should be spaced at least six rope diameters apart to get the maximum holding power and should always be attached with the base or saddle of the clip against the longer or "live" end of the rope. The "U" bolt goes over the dead end. This is the only right way. Do not reverse the clips or stagger them. Otherwise the "U" bolt will cut into the live rope when the load is applied. After the rope has been used and is under tension, the clips should again be tightened to take up any looseness caused by the tension reducing the rope diameter. Remember that even when properly applied, a clip fastening has only about eighty percent (80%) of the strength of the rope and far less than that when on wrong.

[Statutory Authority: RCW 49.17.040, 49.17.050, 49-.17.240, and chapters 43.22 and 42.30 RCW. 80-11-057 (Order 80-15), § 296-54-543, filed 8/20/80. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-543, filed 9/21/79.]

WAC 296-54-545 Rigging--Wood spar trees. (1) Wood spar trees shall be of sound material of sufficient size and strength to withstand any stresses which may be imposed by any equipment used for that specific operation. The top of the tree shall extend not more than sixteen feet above the top guylines on spar trees over fifty feet in height. Spar trees less than fifty feet in height shall extend no more than eight feet above the top guylines. School marms used as spar trees shall be topped at the forks. Spar trees, except cedar, must be barked where guylines, straps, bull blocks and tree plates are placed.

(2) Spar trees must be topped and limbs must be cut off close so that running lines will not foul or saw on protruding knots.

(3) At least four tree plates shall be placed under top guylines on spar trees over fifty feet in height and at least three tree plates shall be used on spar trees less than fifty feet in height.

(4) Tree plates shall be equipped with lugs or other suitable means of holding them in place.

(5) When spar trees are raised, stumps used for snubbing shall be properly notched. Guylines shall be held by some mechanical means. Snubbing by hand is prohibited.

(6) All rub trees shall be limbed and topped.

(7) Guylines.

(a) Wood spar trees using a line greater than 7/8-inch and used as loading and yarding trees shall have at least six top guys and four buckle guys, providing a sail guy is used.

(b) Wood spar trees using a mainline greater than 7/8-inch and used only as yarding trees shall have at least six top guys and, at least three buckle guys shall be used.

(c) Wood spar trees used for loading only with crotch line, spreader bar or swinging boom shall have at least four top guys and, at least three buckle guys shall be used.

(d) Wood spar trees used for any skyline system of logging shall have additional guylines as are necessary to assure rigidity of tree at skyline jack, skidding block, receding and transfer line blocks, and loading rigging.

(e) Wood spar trees used for transfer shall have at least five top guys and, at least three buckle guys shall be used.

(f) When high lead block is hung below buckle guys, at least three top guys of equal strength to the mainline shall be used to keep the top from swaying.

(g) When buckle guys are required, they shall be installed on the tree where they will provide the maximum effectiveness.

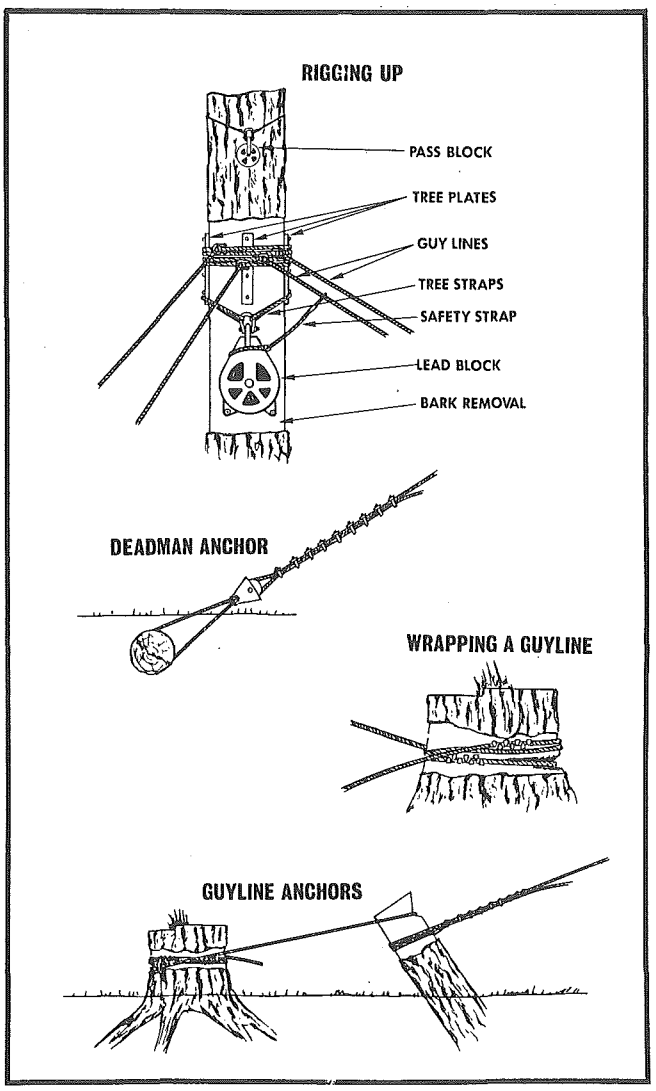
(8) Loose material such as bark, spikes, straps or chains not in use and slabs caused by bumping logs of chafing straps must be removed from the spar tree. Heavy bark shall be removed from trees used for a permanent installation. [Statutory Authority: RCW 49.17-.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-545, filed 9/21/79.]

WAC 296-54-547 Rigging--Tail tree. (1) No work shall continue on tail tree while the climber is working on the head tree or vice versa, if trees are connected by any line.

(2) Tail trees shall be adequately guyed to withstand any stress to which the tree may be subjected. Live (slackline) or standing skylines may be anchored to the base of standing trees only if no part of the tree will enter the work area (cutting unit) if pulled over. The guyline shall be anchored as low as possible to the base of the tree. If using a live (slackline) standing or running (Grabinski) skyline, the tail tree need not be topped provided the slackline or skyline passes through a jack or block on the tree before being anchored. At least two guylines shall be installed to support the tail tree and may be anchored to the base of standing trees if the

above conditions are complied with. Attaching the end of the skyline or slackline to the base of the tail tree is prohibited.

NOTE: See Figure No. 3 for rigging illustrations.



[Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-547, filed 9/21/79.]

WAC 296-54-549 Lines, straps and guyline attachments--Steel spars. (1) When in use, steel tower guyline safety straps shall have a minimum amount of slack.

(2) A safety strap shall be installed on steel towers at the bight of the guylines to prevent the guylines from falling in the case of failure of guyline attachments, guyline lug rings or collar plates, where such exist. Such devices shall have a breaking strength at least equivalent to that of the guylines.

(3) The use of cable clips or clamps for joining the ends of steel tower guylines safety straps is prohibited, unless used to secure end of rolled eye. [Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 43.22 and 42.30 RCW. 80-11-057 (Order 80-15), § 296-54-549, filed 8/20/80. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-549, filed 9/21/79.]

WAC 296-54-551 Yarding, loading and skidding machines--General requirements. (1) Yarding, loading and skidding machines shall be operated only by experienced authorized personnel, except that inexperienced personnel may operate machines in accordance with WAC 296-54-515(2).

(2) Overhead protection and other barriers shall be installed to protect the operator from lines, limbs and other moving materials on or over all yarding, loading or skidding machines. Construction shall be so the view of the operator is not impaired. Barriers shall consist of metal screen constructed of 1/4-inch diameter woven wire material with maximum two inch openings or 3/4-inch diameter steel rod with eight inch maximum openings. Such barriers shall be installed no closer than four inches to the glass.

(3) When using a yarder, loader or skidding machine, the location of the machine or position of the yarder shall be such that the operator will not be endangered by incoming logs or debris.

(4) Logging machines and their components shall be securely anchored to their bases.

(5) A safe and adequate means of access and egress to all parts of logging machinery where persons must go shall be provided and maintained in a safe condition.

(6) Any logging equipment having a single cab entrance door, shall be equipped with an alternate means of escape from the cab should the door be blocked in the event of vehicle rollover or fire. Door latches shall be operable from both sides.

(7) Logging machines shall be kept free of flammable waste materials and any materials which might contribute to slipping, tripping or falling.

(8) Logging machine engines shall be stopped during inspection or repairing, except where operation is required for adjustment.

(9) Grab rails shall be provided and maintained in good repair on all walkways of stationary units elevated more than four feet. Walkway surfaces on such units shall be of the slip-proof type.

(10) Standard safeguards shall be provided at every place on a machine where persons may be exposed to contact with revolving parts or pinchpoints during normal operations.

(11) To protect workers from exposure to the hazardous pinchpoint area between the rotating superstructure and the nonrotating undercarriage of any logging machine, signs shall be conspicuously posted on all sides of that type machine warning workers: "DANGER - STAY CLEAR."

(12) Items of personal property, tools or other miscellaneous materials shall not be stored on or near any logging machine if retrieval of such items would expose a worker to the hazardous pinchpoint referred to in subsection (11) of this section.

(13) Workers shall approach the hazardous pinchpoint area referenced in subsection (11) of this section, only after informing the operator of their intent and receiving acknowledgment from the operator that he understands their intention. All such machines shall be stopped while any worker is in the hazardous pinchpoint area.

(14) A minimum distance of thirty-six inch clearance shall be maintained between the counterweight of a loading machine and trees, logs, banks, trucks, etc., while the machine is in operation. If this clearance cannot be maintained, suitable barricades with warning signs attached, similar to a standard guardrail, shall be installed to isolate the hazardous area. "DANGER—36 Inch Clearance" shall be marked in contrasting colors on sides and face of counterweight on shovels, loaders and other swing-type logging equipment. This requirement shall not apply when:

(a) The distance from the highest point of the undercarriage to the lowest point of the rotating superstructure is greater than 18-inches. This applies only to that portion of the rotating superstructure that swings directly over the undercarriage;

(b) The distance from the ground to the lowest point of the rotating superstructure is greater than five feet six inches. This applies only to that portion of the rotating superstructure that swings directly over the undercarriage; or

(c) On crawler-type track-mounted logging machines only, the rotating superstructure is positioned at a right angle to the tracks, and the distance from the side of the cab to the extreme end of the track is four feet or less. This exemption shall apply to side barricades only; barricades between the tracks at both ends of any crawler-type logging machine are required regardless of the right angle dimension.

(15) Logging machines shall not be operated until all guards have been installed, safety devices activated and maintenance equipment removed.

(16) Stationary logging machines shall be securely anchored to prevent movement of the machine while yarding or skidding.

(17) Ends of drum lines shall be securely fastened to the drum and at least three wraps shall be maintained on the drum at all times. (This rule does not apply to tractor winch lines.)

(18) Such units shall not be tied to any part of the towing unit, when they are being moved on truck and trailer units.

(19) Logs shall not be moved, swung or held over any persons.

(20) Brow logs in the loading or unloading area shall be blocked or secured to prevent movement. Log decks shall be maintained in a safe condition and shall not present a hazard of logs rolling or sliding on workers.

(21) Brakes shall be set and brake locking devices engaged on logging machines when the operator leaves his normal operating position.

(22) Guyline drum controls and outrigger controls shall be separated, color coded or marked in a manner that will prevent engaging of the wrong control.

(23) Exhaust pipes shall be located or insulated to protect workers from accidental contact with the pipes or muffler and shall direct exhaust gases away from the operator and other persons.

(24) Glass on logging machines shall be safety glass or equivalent and shall be free of deposits of oil, mud, or defects that could endanger the operator or other persons.

(25) Broken or defective glass shall be removed and replaced.

(26) Where safety glass or equivalent, does not provide adequate operator protection from flying chokers, chunks, saplings, limbs, etc., an additional metal screen and/or barrier shall be provided over the safety glass. The operator's vision shall not be impaired. Barriers shall consist of 1/4-inch diameter woven wire material with maximum two inch openings, 3/4-inch diameter steel rod with eight inch maximum openings in any direction or barriers so designed and constructed to provide equivalent operator protection. Such barriers shall be installed no closer than four inches to the glass to enable keeping the glass clean.

(27) Except for hydraulic drums, brakes shall be installed on all logging machines and maintained in effective working condition. Brake levers shall be provided with a ratchet or other effective means for securely holding drums. Brakes shall be tested prior to putting the machine in operation. If defective, they shall be repaired immediately.

(28) A stable base shall be provided under outriggers or leveling pads and a means shall be provided to hold outriggers in both the retracted and extended position.

(29) Abrasive contact with hydraulic hose, tubing or fittings shall be eliminated before further use and defective hydraulic hoses, lines and fittings shall be replaced.

(30) When moving logging machines, the driver or operator shall have a clear and unobstructed view of the direction of travel. When this is not possible, a signalperson with a clear and unobstructed view of the direction of travel shall be designated and used to direct movement of the machine.

(31) Where a signalperson is used, the equipment operator shall move the equipment only on signal from the designated signalperson and only when the signal is distinct and clearly understood.

(32) When moving power units, persons other than the operator and the person in charge shall not be permitted to ride thereon.

(33) All obstructions which may reach the operator while moving machines, shall be removed.

(34) Only shackles with threaded pins shall be used for connecting moving rigging.

(35) Anchors used for moving power units shall be carefully chosen and must be stable.

(36) When snubbing a machine down a steep slope, use the mainline for snubbing and pull with the haulback whenever possible.

(37) Self-powered mobile logging machines of the type where towers or spars can be raised, shall not travel on steep road grades unless they are securely snubbed or towed.

(38) When moving, all persons working on the landing shall stay in the clear of the machine and shall inform the operator of their intention to approach or be near the machine.

(39) Service brakes shall be provided on crawler crane-type logging machines that will bring the machine to a complete stop from normal travel speeds.

(40) A traction lock or brake or an equivalent locking and braking system shall be provided on crawler crane-type machines that is capable of holding the machine stationary under normal working conditions, and on any grade the machine is capable of negotiating.

(41) No modifications or additions which affect the capacity or safe operation of the equipment shall be made by the employer without written approval of the manufacturer or a qualified engineer. 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.

(42) Equipment shall be classed and used according to the manufacturer's rating. Where low gear ratios or other devices are installed to increase the line pull in accordance with subsection (42) of this section, the size of the rigging shall be increased accordingly so that it will safely withstand the increased strains.

(43) Every tractor, skidder, front-end loader, scraper, grader and dozer shall be equipped with a roll-over protective structure (R.O.P.S.). Such structures shall be installed, tested and maintained in accordance with:

(a) WAC 296-155-950 through 296-155-965 of the Safety Standards for Construction, if manufactured prior to the effective date of this chapter.

(b) The Society of Automotive Engineers SAE 1040a-1975, "Performance Criteria for Roll-over Protective Structures (ROPS) for Earthmoving, Construction, Logging and Industrial Vehicles," if manufactured after the effective date of this chapter.

(44) The ROPS shall be of sufficient height and width so that it will not impair the movements of the operator or prevent his immediate escape from the vehicle in emergencies and shall allow as much visibility as possible. Clearance above the deck and the ROPS of the vehicle at points of egress shall not be less than fifty-two inches.

(45) Certified roll-over protective systems shall be identified by a metal tag permanently attached to the ROPS in a position where it may be easily read from the ground. The tag shall be permanently and clearly stamped, etched or embossed indicating the name and address of the certifying manufacturer or registered professional engineer, the ROPS model number (if any) and the vehicle make, model or serial number the ROPS is designed to fit.

(46) Roll-over protective structure systems shall be maintained in a manner that will preserve their original strength. Welding shall be performed by qualified welders only. (A qualified welder is defined under "Welder Qualification" in American Welding Society A.W.S. A3.0-69.)

(47) Every tractor, skidder, front-end loader, log stacker, forklift truck, scraper, grader and dozer shall be equipped with a FOPS. Such structures shall be installed, tested and maintained in accordance with the Society of Automotive Engineers SAE J231-1971, "Minimum Performance Criteria for Falling Object Protective Structures (F.O.P.S.)."

(48) Vehicles equipped with ROPS or FOPS as required in subsections (43) and (47) of this section, shall comply with the Society of Automotive Engineers SAE J397a-1972, "Deflection Limiting Volume for Laboratory Evaluation of Roll-over Protective Structures (ROPS) and Falling Object Protective Structures (FOPS) of Construction and Industrial Vehicles."

(49) The opening in the rear of the ROPS on the crawler or rubber-tired tractors (skidders) shall be covered with 1/4-inch diameter woven wire having not less than 1-1/2-inches or more than 2-inch mesh, or material which will afford equivalent protection for the operator. The covering shall be affixed to the structural members so that ample clearance is provided between the screen and the back of the operator. Structural members shall be free from projections which would tend to puncture or tear flesh or clothing. Suitable safeguards or barricades shall be installed, in addition to the screen, to protect the operator when there is a possibility of being struck by any material that could enter from the rear.

(50) Crawler and rubber-tired tractors (skidders) working in areas where limbs or brush may endanger the operator shall be guarded. Shear or deflector guards shall be installed on each side of the vehicle at an angle leading forward and down from the top front edge of the canopy of the vehicle, which will tend to slide the brush or limbs up and over the top of the canopy. Open mesh material with openings of a size that will reject the entrance of an object larger than 1-3/4-inches in diameter, shall be extended forward as far as possible from the rear corners of the cab sides to give the maximum protection against obstacles, branches, etc. entering the cab area. Deflectors shall also be installed ahead of the operator to deflect whipping saplings and branches. These shall be located so as not to impede ingress or egress from the compartment area. The floor and lower portion of the cab shall be completely enclosed with solid material, except at entrances, to prevent the operator from being injured by obstacles which otherwise could enter the cab compartment.

(51) Enclosures for agricultural and industrial tractors manufactured after September 1, 1972, shall be constructed, designed and installed as detailed in the Society of Automotive Engineers Technical Report J168.

(52) (a) All bidirectional machines, such as rollers, compactors, front-end loaders, log stackers, log loaders, bulldozers, shovels, 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.

(b) No employer shall permit earthmoving, compacting, or yarding 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. [Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 43.22 and 42.30 RCW. 80-11-057 (Order 80-15), § 296-54-551, filed 8/20/80. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-551, filed 9/21/79.]

WAC 296-54-553 Yarding, loading and skidding machines--Mobile towers and boom-type yarding and loading machines. (1) Portable (mobile) tower specification plate. A specification plate shall be permanently attached to the base of each portable (mobile) tower so it can be easily read by a person standing on the ground or on the base platform. It shall contain the following information:

(a) Name and address of manufacturer and model number;

(b) The maximum diameter of the mainline or skyline for which the unit is designed and size of haulback and mainline to be used together if drums are interlocking or automatic tensioning type;

(c) The number and size of guylines required to stabilize the unit;

(d) The maximum length and capacity of a loading boom or similar equipment which may be attached if the structure is engineered for such;

(e) If the unit is designed for use on any skyline system of logging; and

(f) Maximum degree of inclination from vertical at which the spar (tower) may be used.

(2) The critical parts of portable spars (towers) shall be inspected by a qualified person at reasonable intervals while in service and each time the spar (tower) is lowered. If indication of failure or weakness is noted or suspected, the part shall be inspected by an approved method and found to be safe, or it shall be repaired or replaced before the operation is allowed to proceed.

(3) Blocks and fair leads shall be so located that there will be no chafing or sawing of any line or part of the structure.

(4)(a) Power guylines used for stabilizing any unit may be choked around an adequately notched stump if using a shackle or approved choker attachment. Three full wraps or more must be placed around an adequately notched stump to secure the guyline if clamps are used. Guyline extensions shall be property shackled to the guylines.

(b) When using a deadman anchor to support a guyline, the connection shall be made by properly shackling both eyes of the anchor strap to the guyline.

(c) If guylines on metal spars or towers are not power guylines, they shall be secured to stumps or anchorages in the same manner as guylines on wood spar trees.

(5) Power driven devices shall be securely anchored when used to tighten guylines. Holding of such devices manually is prohibited.

(6)(a) Machines or equipment shall be stabilized by their design or the attachment of guylines or other devices which will prevent the machine from overturning. Machine operators shall be advised of the stability limitations of the equipment.

(b) If stabilization of a machine is dependent upon the use of hydraulic outriggers, a pilot operated hydraulic check valve or other locking device shall be installed to prohibit the outrigger from retracting in case a hydraulic line breaks, except when proper blocking is provided.

(7) A qualified person shall direct each raising or lowering of a portable spar or tower.

(8) All persons not engaged in the actual raising or lowering of portable spars or towers shall stay in the clear during such operations.

(9) Guylines required in rigging spars or towers shall be evenly spooled to prevent fouling.

(10) Portable spars or towers shall be leveled to provide even line spooling and avoid excessive stress on component parts.

(11) The portable spar or tower shall be lowered or supported so the stability of the machine is not impaired during movement of the portable spar or tower.

(12) Guylines of portable spars or towers shall not be anchored to standing trees if the unit is used for yarding as a head tree.

(13) Timbers used for masts or booms shall be straight-grained, solid, and capable of withstanding the working load.

(14) Boom points of timber booms shall be equipped with metal straps, plates, or other devices as needed to properly secure eyebolts and fittings used to support lines, blocks, or other rigging.

(15) All mobile vehicles on which yarding equipment, towers, spars, masts or booms are installed, shall be maintained in a safe operating condition.

(16) A-frames shall be secured against displacement and the tops shall be securely bolted or lashed to prevent displacement.

(17) When any portable-type tower, A-frame or spar is used, the base shall be securely and solidly supported.

(18) All loading, unloading and skidding machines shall be equipped with a horn or whistle which is audible above the surrounding noise level. Such horn or whistle shall be maintained in an operative condition. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-553, filed 9/21/79.]

WAC 296-54-555 Yarding--General requirements. (1) Workers shall be alert and be positioned in the clear where they will not be exposed to the hazards of moving logs, saplings, root wads, chunks, rigging, or any other material which might be put in motion by the rigging or turn, before the "go ahead" signal is given. They shall remain in the clear at all times while the rigging is moving.

(2) No person shall be near rigging which is stopped at a hangup, until the rigging has been slacked to reduce the hazard.

(3) No person shall stand or remain within the bight of any running line, nor in a position where he could be struck by a line were it to break or come loose.

(4) Whenever possible, chokers shall be set from the uphill side of a log. Persons shall not be on the lower side of a log which appears to be unstable or likely to roll.

(5) Wire rope used for chokers shall not exceed seventy-five percent of the breaking strength of the mainline.

(6) Chokers shall be placed near the end of the log whenever possible.

(7) When pulling lines, do not stand close to fair leads or blocks.

(8) Lines shall not be guided on drums with hands or feet. The use of a bar or equivalent means is recommended.

(9) Yarding with more than one unit on any one head spar is prohibited.

(10) The angle between the power unit, the high lead block, and the mainline road shall not exceed a square lead on rigged spars. When using portable spars or towers, the location of the machine or position of the operator shall be such that the operator shall not be endangered by incoming logs.

(11) When there is danger of tail block straps slipping up or off the stump or tree, the stump or tree shall be adequately notched or the line properly wrapped and secured. When the tail tree or stump is not secure, it shall be tied back.

(12) When yarding is being done during the hours of darkness, the area shall be provided with illumination which will allow persons to safely perform their duties. The source of illumination shall be located and directed creating a minimum of shadows and glare. If using a portable tail-hold, lights shall be directed on the equipment to allow the person to visually ascertain that the tail-hold equipment remains stabilized.

(13) No person shall be required or allowed to ride on a turn of logs or rigging excepting the passline. The practice of holding on to moving rigging or chokers to assist a person by being pulled uphill shall be prohibited.

(14) Wire rope shall be wound evenly on the drum and not be allowed to lap one layer on another in an irregular manner. Sheaves shall be smooth and free from defects that could cause rope damage.

(15) Chaser shall be sure that turns are safely landed before approaching to remove the chokers.

(16) Signaling machine operator at landings by throwing bark, chips or other material in the air is prohibited. Whistle or hand signals shall be used at all times.

(17) Logs shall not be landed while loaders or chasers are working in the chutes. Logs shall not be removed from yarder tree by the loader or tractors while the chaser is unhooking a turn from the yarder.

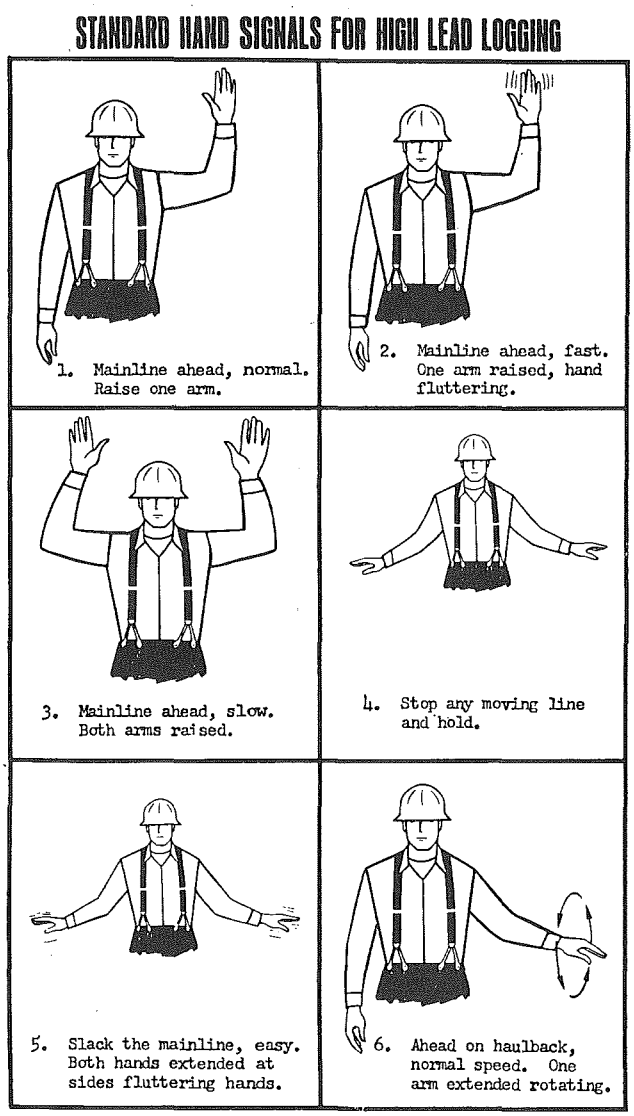
(18) Landings shall be as level as possible and of sufficient size to safely accommodate the majority of type turns to be yarded. At least two-thirds of the log shall rest on the ground or other substantial material when landed. Logs shall be set on the ground or deck and not dropped when being landed. Long sticks shall be safely removed before additional logs are landed.

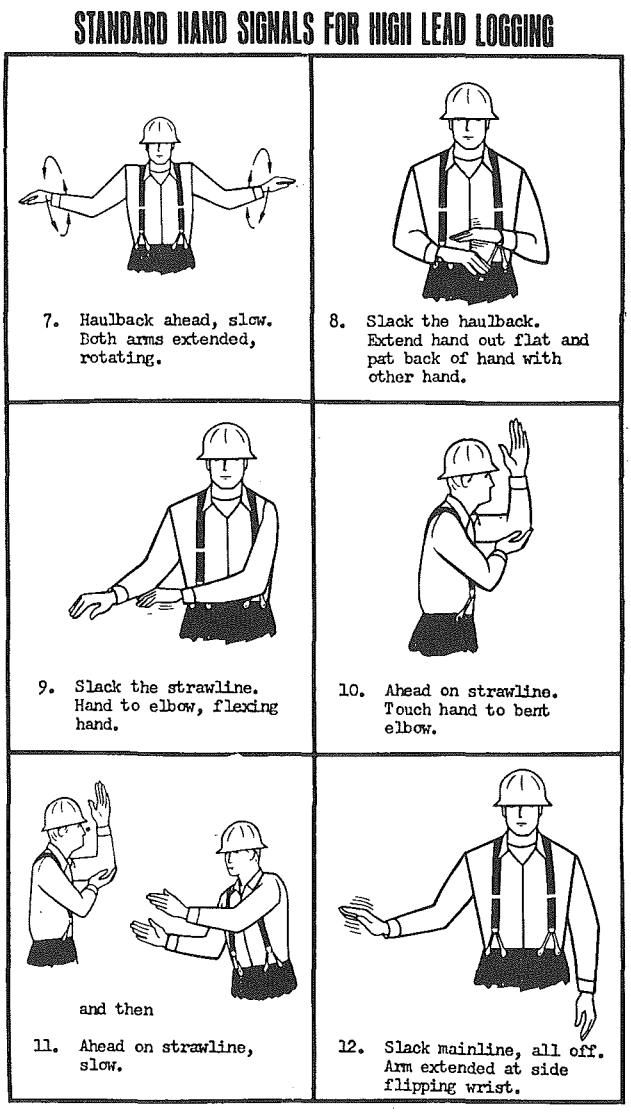
(19) Chokers shall not be used on a grapple system when the yarder operator cannot clearly see the persons setting the choker, unless conventional whistle signals are used.

(20) Landings shall be free of root wads, limbs, tops, etc., that constitute a safety hazard.

(21) When shorter logs are yarded in the same turn with long sticks, the shorter logs shall be landed and chokers released before the long stick choker is released.

NOTE: See Figures No. 4-A and 4-B for Standard Hand Signals for High Lead Logging.





[Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 43.22 and 42.30 RCW. 80-11-057 (Order 80-15), § 296-54-555, filed 8/20/80. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-555, filed 9/21/79.]

WAC 296-54-557 Yarding--Tractors and skidders. (1) Operators shall ensure that all persons are safely in the clear before initiating or continuing the movement of any mobile equipment.

(2) No person shall ride on any mobile equipment, except where adequate and protected seats, or other safe facilities have been provided.

(3) While in use, tractors and skidders shall be maintained in a safe operable condition, with all guards in proper places.

(4) No person shall be under a tractor or other mobile equipment, or be placed in a hazardous position around the equipment without first making certain it cannot move or be moved by another person.

(5) Prior to working on tractor or skidder blades, arches, or other equipment, the equipment must be blocked up lowered to the ground or otherwise secured against slipping or falling. Prior to working on hydraulic equipment, the pressure shall be relieved.

(6) When making repairs to tractor or skidder equipment, such as blades, arches, etc., the engine shall be stopped. The engine may be run when necessary for making adjustments to the engine or equipment.

(7) Operators shall operate and control their machines in a safe manner and avoid operations in areas where machine stability may not be maintained.

(8) The following safe work procedures shall be adhered to:

(a) When hobo logs are picked up with a log turn, the turn shall be dropped to free the hobo.

(b) No line shall be allowed to trail behind the tractor or skidder where it may hang up and snap forward.

(c) Winching at a severe angle, which could cause a hang-up to upset the machine, shall be avoided.

(d) Grapple skidded log turns shall be evenly bunched with squared butt ends, securely grappled and safely positioned before travel commences.

(e) Before climbing or descending grades, the proper gear shall be selected to allow the engine to govern the tractor speed.

(f) On side hills, an abrupt turn uphill shall be avoided. The tractor or skidder shall be backed downhill first then turned uphill. The turn may be slacked off as necessary to permit this maneuver.

(g) The operator shall, before leaving a tractor or skidder, lower the blade to the ground and apply the parking brake.

(h) Tractor or skidder speed shall be adjusted to the circumstances prevailing. Excessive or uncontrolled speed shall be avoided.

(i) Winch lines on logging tractors or skidders shall be attached to the drum with a break-away device.

(9) When hand signals are required for giving instructions to the tractor or skidder operator, the signals as illustrated in Figure No. 5 shall be used.

(10) Tractor and skidder brakes shall stop and hold the machine on any grade over which the machine is being operated. They shall be effective whether or not the engine is running and regardless of the direction of travel.

(11) Tractors and skidders shall be provided with a brake locking device that will hold the machine indefinitely on any grade on which it is being operated.

(12) Operating a tractor or skidder with defective steering or braking devices is prohibited.

(13) Arches shall be equipped with line guards.

(14) Where tractor and skidder operators or helpers, because of the nature or their work duties, are required to wear calk soled footwear, the decks and operating foot controls shall be covered with a suitable nonslip material.

(15) Glass used in windshields or in cabs shall be of "safety glass." Broken or cracked glass shall be replaced as soon as practical. Barriers shall provided, as needed, to protect the glass from being broken by using screen, bars or other material. The protective material shall be a type that will not create a hazard by undue impairment of the operators' vision.

(16) Barriers shall be constructed of at least 1/4-inch diameter woven wire with two inch maximum openings or other material providing equivalent protection. The barrier shall be installed at least four inches from the glass to provide space to clean the glass.

(17) Enclosed-type cabs installed on mobile equipment shall have two means of exit. One may be deemed as an emergency exit and be available for use at all times, regardless of the position of the side arms or other movable parts of the machine. (An easily removable window will be acceptable as the emergency exit if it is of adequate size for a person to readily exit through.)

(18) Seat belts shall be installed on tractors and other mobile equipment equipped with a roll-over protective system and shall be worn by the operator and passenger(s) at all times the vehicle is in motion. The seat belts and assemblies shall be designed, constructed and maintained to conform to the requirements specified in the Society of Automotive Engineers Technical Report J386 or J333a. Seat belts need not be provided for equipment which is designed for stand-up operations.

(19) If the equipment operator and person in charge of the jobsite agree that life safety of the operator is jeopardized by wearing a seat belt, the seat belt need not be worn.

(20) Seat belts required by subsection (18) of this section, shall have buckles of the quick release type, designed to minimize the possibility of accidental release.

(21) Before a tractor or skidder is started or moved, the operator shall be certain nothing is in the way that could be set in motion by the movement of the machine thereby endangering persons.

(22) A log or turn shall not be moved until all persons are in the clear (behind the turn and on the uphill side on sloping ground).

(23) Before the engine is shut-down, the brake locks shall be applied and all elements such as blades, buckets, grapples and shears shall be lowered to the ground.

(24) Tractors or skidders shall not be operated within a radius of two tree heights of trees being felled unless called upon by the cutter or faller to ground lodged trees. All cutters shall be notified of the tractor or skidder entrance into the area and all felling within two tree lengths of the tractor or skidder shall be stopped.

(25) Except where 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 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:

(a) For lines rated 50 kV or below, minimum clearance between the lines and any part of the equipment or machine shall be ten feet;

(b) For lines rated over 50 kV, minimum clearance between the lines and any part of the equipment or machine shall be ten feet plus 0.4 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 with no load and boom or extended equipment lowered, the equipment clearance shall be a minimum of four feet for voltages less than 50 kV, and 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) A person shall be designated to observe clearance of the equipment and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means;

(e) 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 it is not an energized line and it has been visibly grounded.

(26) Log piles and decks shall be located and constructed to provide working areas around them that will accommodate the safe movement of personnel and machinery.

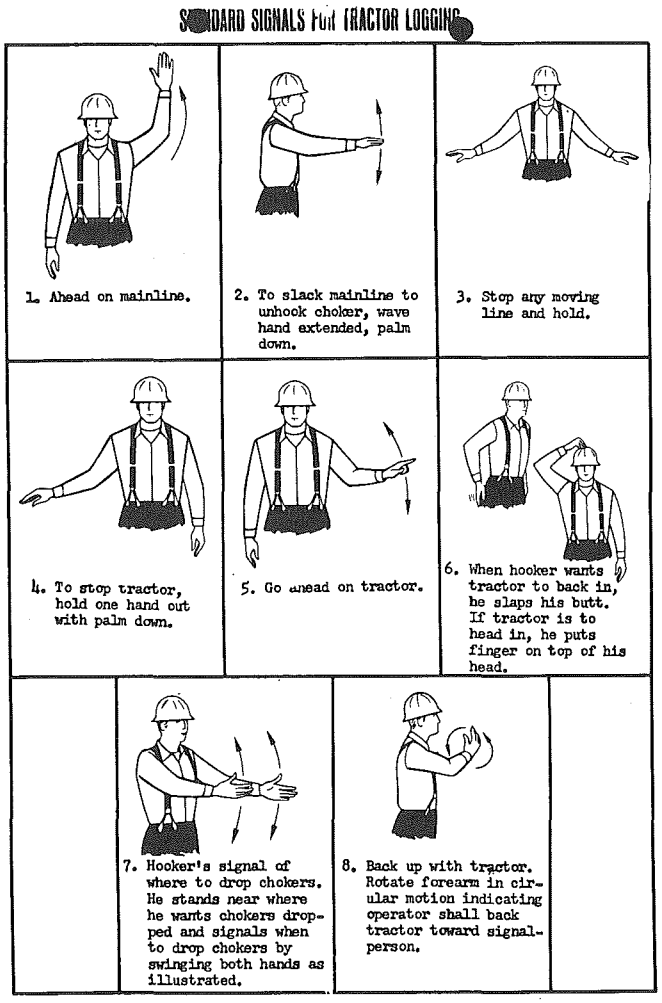
(27) Braking systems required by subsection (10) of this section, shall be capable of stopping the equipment fully loaded as specified in the Society of Automotive Engineers Technical Reports listed in subdivisions (a), (b), (c) or (d) of this subsection and shall be installed by June 30, 1973. All rubber-tired tractors or other types of mobile equipment listed below, manufactured after the effective date of these standards, shall have braking systems and requirements specified in the applicable Technical Reports of the Society of Automotive Engineers as follows:

(a) Brake systems for off-highway, rubber-tired, self-propelled scrapers shall meet or exceed the requirements outlined in SAE Technical Report J319b.

(b) Brake systems for off-highway, rubber-tired, front-end loaders, log stackers and dozers (skidders) shall meet or exceed the requirements outlined in SAE Technical Report J237.

(c) Brake systems for rubber-tired, self-propelled graders shall meet or exceed the requirements outlined in SAE Technical Report J236.

(d) Brake systems for off-highway trucks and wagons shall meet or exceed the requirements outlined in SAE Technical Report J166.



[Statutory Authority: RCW 49.17.040, 49.17.050, 49-.17.240, and chapters 43.22 and 42.30 RCW. 80-11-057 (Order 80-15), § 296-54-557, filed 8/20/80. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-557, filed 9/21/79.]

WAC 296-54-559 Yarding--Helicopters and helicopter cranes. (1) Helicopters and helicopter cranes shall comply with any applicable regulations of the Federal Aviation Administration.

(2) 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) A take-off path from the log pickup point shall be established, and shall be made known to all workers in that area before the first turn of logs is moved.

(4) The helicopter flight path to and from the drop zone shall be designated and no equipment or personnel (other than flight personnel necessary to assist landing and take-off) will occupy these areas during helicopter arrival or departure.

(5) The approach to the landing shall be clear and long enough to prevent tree tops from being pulled into the landing.

(6) The helicopter shall not pass over an area in which cutters are working at a height which would cause the rotor wash to inhibit a cutter's ability to safely control a tree or dislodge limbs.

(7) Drop zones shall be twice the nominal length of logs to be landed.

(8) The drop zone shall be no less than one hundred twenty-five feet from the loading or decking area.

(9) Separate areas shall be designated for landing logs and fueling the helicopter(s).

(10) The yarding helicopter shall be equipped with a siren to warn workers of any hazardous situation.

(11) Workers shall remain in the clear as chokers are being delivered, and under no circumstances will workers move under the helicopter that is delivering the chokers or take hold of the chokers before they have been released by the helicopter.

(12) Log pickup shall be arranged in a manner that the hook up crew will not work on slopes below felled and bucked timber.

(13) If the load must be lightened, the hook shall be placed on the ground on the uphill side of the turn before the hooker approaches to release the excess logs.

(14) Landing crew shall be in the clear before logs are dropped.

(15) One end of all the logs in the turn shall be touching the ground and lowered to an angle of not more than 45° from the horizontal before the chokers are released.

(16) Logs shall be laid on the ground and the helicopter will be completely free of the choker(s) before workers approach the logs.

(17) If the load will not release from the hook, the load and the hook shall be on the ground before workers approach to release the hook manually.

(18) Loads 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.

(19) 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.

(20)(a) Personal protective equipment for employees receiving the load shall consist of complete eye protection and hard hats secured by chinstraps, and high visibility vests or outer garments.

(b) Loose-fitting clothing likely to flap in the downwash, and thus be snagged on hoist line, shall not be worn.

(21) Every practical precaution shall be taken to provide for the protection of employees from flying objects in the rotor downwash. All loose gear within one hundred feet of the place of lifting of the load, depositing the load, and all other areas susceptible to rotor downwash shall be secured or removed.

(22) Good housekeeping shall be maintained in all helicopter loading and unloading areas.

(23) 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.

(24) Employees shall not perform work under hovering craft except for that limited period of time necessary to guide, secure, hook and unhook loads. Regardless of whether the hooking or unhooking of a load takes place on the ground 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 hooking or unhooking loads.

(25) 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.

(26) The weight of an external load shall not exceed the manufacturer's rating.

(27) 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.

(28) 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.

(29) 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 6.

(30) No unauthorized person shall be allowed to approach within fifty feet of the helicopter when the rotor blades are turning.

(31) 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.

(32) Sufficient ground personnel shall be provided, when required, for safe helicopter loading and unloading operations.

(33) 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.

(34) Open fires shall not be permitted in an area that could result in such fires being spread by the rotor downwash.

(35) Under no circumstances shall the refueling of any type helicopter with either aviation gasoline or Jet B (Turbine) type fuel be permitted while the engines are running.

(36) Helicopters using Jet A (Turbine–Kerosene) type fuel may be refueled with engines running provided the following criteria is met:

(a) No unauthorized persons shall be allowed within fifty feet of the refueling operation or fueling equipment.

(b) 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.

(c) All fueling personnel shall be thoroughly trained in the refueling operation and in the use of the available fire extinguishing equipment they may be expected to utilize.

(d) There shall be no smoking, open flames, exposed flame heaters, flare pots or open flame lights within fifty feet of the refueling area or fueling equipment. All entrances to the refueling area shall be posted with "NO SMOKING" signs.

(e) Due to the numerous causes of static electricity, it shall 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. The use of conductive hose shall not be accepted to accomplish this bonding. All grounding and bonding connections shall be electrically and mechanically firm, to clean unpainted metal parts.

(f) To control spills, fuel shall be pumped either by hand or power. Pouring or gravity flow shall not be permitted. Selfclosing nozzles or deadman controls shall be used and shall not be blocked open. Nozzles shall not be dragged along the ground.

(g) 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.

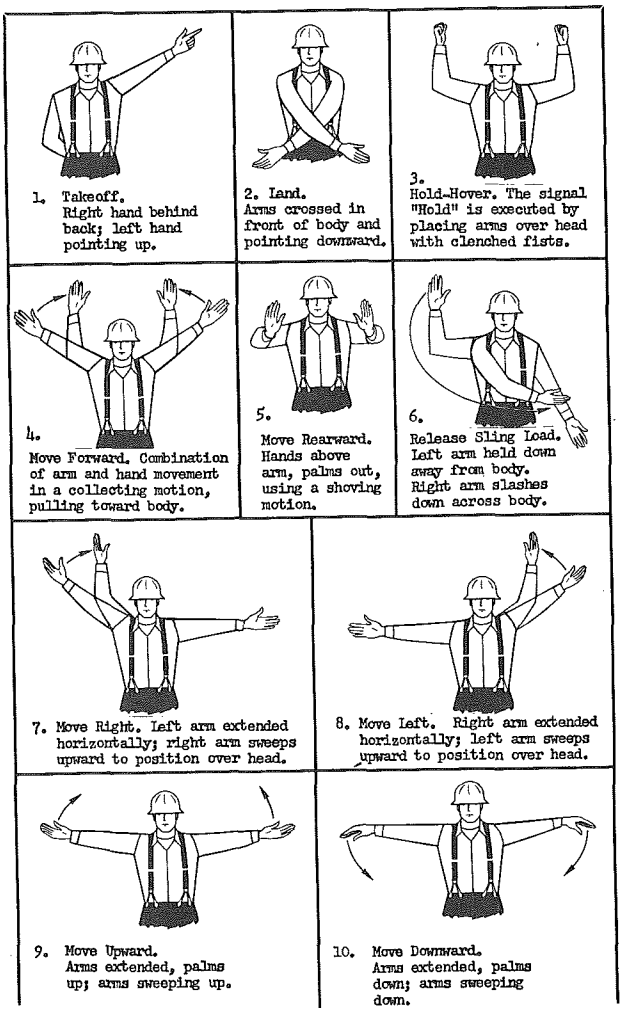
(h) When ambient temperatures have been in the 100 degree F. range for an extended period of time, all refueling of helicopters with the engines running shall be suspended until such time as conditions become suitable to resume refueling with the engines running.

(37) Helicopters with their engines stopped being refueled with aviation gasoline or Jet B (Turbine) type fuel, shall also comply with subsection (36) (a) through (g) of this section.

(38) Hook on persons in logging operations shall wear contrasting colored hard hats, with chinstraps, and high visibility vests or outer garments to enable the helicopter operator to readily identify their location.

(39) Riding the load or hook of a helicopter is prohibited except in the case of an emergency with the proper safety gear.

HELICOPTER HAND SIGNALS



[Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79–10–081 (Order 79–14), § 296–54–559, filed 9/21/79.]

WAC 296–54–561 Log loading—General requirements. (1) Loading operators shall have a clear view of the landing and of the cars or trucks being loaded.

(2) Persons shall not ride logs, tongs, grapples or other loading devices.

(3) The use of plain spiked loading hooks without a bell is prohibited for loading logs.

(4) All limbs or knots that would project beyond the stakes or legal height shall be removed before the log is loaded on the car or truck.

(5) When the loading operator is not able to see the loading operation, signals shall be given by a designated person, who shall have a clear view of the operations and shall be visible to the operator. Hand signals used shall be as illustrated in Figure No. 7, following WAC 296–54–565.

(6) Logs shall not be swung or suspended over occupied equipment by loading machines on landings. Persons shall not stand or walk under suspended logs.

(7) No one shall ride loads while cars or trucks are being spotted or dropped, except those whose regular duties require them to do so.

(8) Cars and trucks shall not be moved until the head loader or loading machine operator is positive that all persons are in the clear.

(9) When grapples, trip tongs or similar devices are used in the loading operation, they shall be lowered to the ground whenever the machine is unattended. If the device can tip or fall over, it shall be laid on its side on the ground.

(10) While logs are being loaded, no one shall remain on the load, chain deck or behind the cab protector. Any unattached material shall be removed from the top of the cab protector before the truck is moved from the landing.

(11) To control the movement of a log truck being loaded, a positive audible means of communication shall be established between the truck driver and the loading machine operator. The established means of communication shall be familiar to all employees on the landing and shall include a danger signal to warn employees in case of an emergency. If a movable loader is being used, the loader operator shall sound a warning signal before moving the loader. The signals so used shall be easily distinguishable from other whistle or horn signals used in the landing area.

(12) When signals are used at a landing, reload or deck to control the movement of logging trucks in accordance with subsection (11) of this section, the following signals shall be used:

1 short	Stop
1 short	Ahead
2 shorts	Back
2 shorts then 2 shorts ...	Wrapper
3 shorts	Check Scales
1 long–repeated	Danger
1 long	Loader Moving

(13) No person shall be permitted alongside or underneath trucks being loaded or on the load until communication has been established with the loading machine operator and truck driver and assurance has been received that it is safe to be there.

(14) Power saws shall not be operated on top of loaded logging trucks.

(15) Standing underneath a suspended trailer or its reach is prohibited.

(16) The outside bunklogs (bottom tier) shall be loaded tight against the stakes.

(17) Logs shall be loaded in a manner to prevent undue strain on wrappers, binders, bunk stakes and chains or straps.

NOTE: Logs shall be considered to be "within the stakes" when one–half the log diameter is below the top of the stakes.

(18) Logs in any tier or layer unsecured by stakes or chalk blocks shall be well saddled and have their diameter centers inside the diameter centers of the outer logs of the next lower tier or layer.

(19) Bunk and wing logs shall extend not less than twelve inches beyond the front and rear bunks or stakes. On rigid type bunks, they shall extend not less than six inches beyond the front and rear bunks or stakes.

(20) Double ended logs, above the stakes, shall not be loaded on the side of the load from which the binders or wrappers are intended to be released from.

(21) Logs shall be loaded in a manner that will not impair full and free movement of the truck and trailer.

(22) Each log not contained within the stakes shall be secured with at least two wrappers before the truck leaves the immediate landing area.

(23) Loads or logs shall not be moved or shifted while wrappers and binders are being applied or adjusted.

(24) Stable loads. Loads shall be built up or loaded in a manner to be stable without the use of wrappers. Wrappers shall be considered only as precautionary measures to ensure stability of the load.

(25) Loading equipment maintained. All loading machines and equipment shall be maintained in a safe condition. The critical parts of such equipment, such as bolts in base plates, etc., that cannot be inspected while in operation, shall be inspected at reasonable intervals by a qualified person when the machine is shutdown. If indications of failure or weakness is noted or suspected, the parts in question shall be examined by an approved method and if found to be defective, shall be repaired or replaced before the equipment is put back into operation.

(26) Tongs pulling out. Where there is a danger of tongs or hooks pulling out of the log, straps shall be used. Tongs may be used on extra–large logs provided the logs are barked and notched to provide a secure hold. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79–10–081 (Order 79–14), § 296–54–561, filed 9/21/79.]

WAC 296-54-563 Log loading--Special requirements. (1)(a) Loading machines shall be equipped with an effective parking braking system which is not dependent on the air or hydraulic pressure which is used to stop the machine while traveling.

(b) A braking system shall be installed on the load line and boom supporting equipment which shall be capable of stopping and holding, in any position, the maximum load for which the loading machine is designed. The equipment shall be of such design as to lower the boom with power. Booms not having power down shall be dogged before workers enter the hazardous area around the boom. Workers shall not be under any boom while it is being held by the brake.

(2) A minimum distance of thirty–six–inch clearance shall be maintained between the counterweight of a loading machine and trees, logs, banks, trucks, etc., while the machine is in operation. If this clearance cannot be maintained, suitable barricades with warning signs attached, similar to a standard guardrail, shall be installed to isolate the hazardous area. "DANGER –

36-Inch Clearance" shall be marked in contrasting colors on sides and face of counterweight on shovels, loaders and other swing-type logging equipment.

(3) Persons shall not work under a slack puller. A warning line, of sufficient length to reach the ground at all positions, shall be hung from any slack puller.

(4) Where a backstop of a loading machine is so constructed that it could crush the operator's cab should the heel boom be pulled or pushed too far backward, positive boom stops shall be installed.

(5) All mobile fork-lift type log handling machines shall be equipped with a means or mechanism to prevent the logs from leaving or rolling off the forks, and shall be used at all times while moving logs. [Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 43.22 and 42.30 RCW. 80-11-057 (Order 80-15), § 296-54-563, filed 8/20/80. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-563, filed 9/21/79.]

WAC 296-54-565 Log loading--Self-loading log trucks. (1) A safe means of access and egress shall be provided to the operator's loading work station.

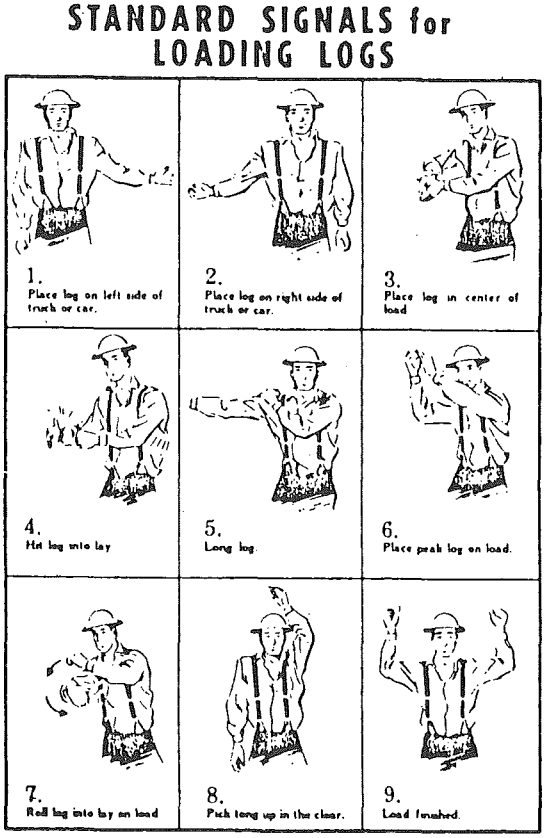
(2) Self-loading log truck operators shall not unload their own load unless a positive means of securing the logs has been provided when binders and wrappers are removed.

(3) New self-loading log trucks purchased and put in operation after January 1, 1980, shall be equipped with:

(a) A check valve installed on the jib boom; and

(b) A seat that is offset from the point of attachment of the boom. The seat and boom structure shall rotate concurrently.

(4) The operator of a self-loading log truck shall not heel the log over his head.

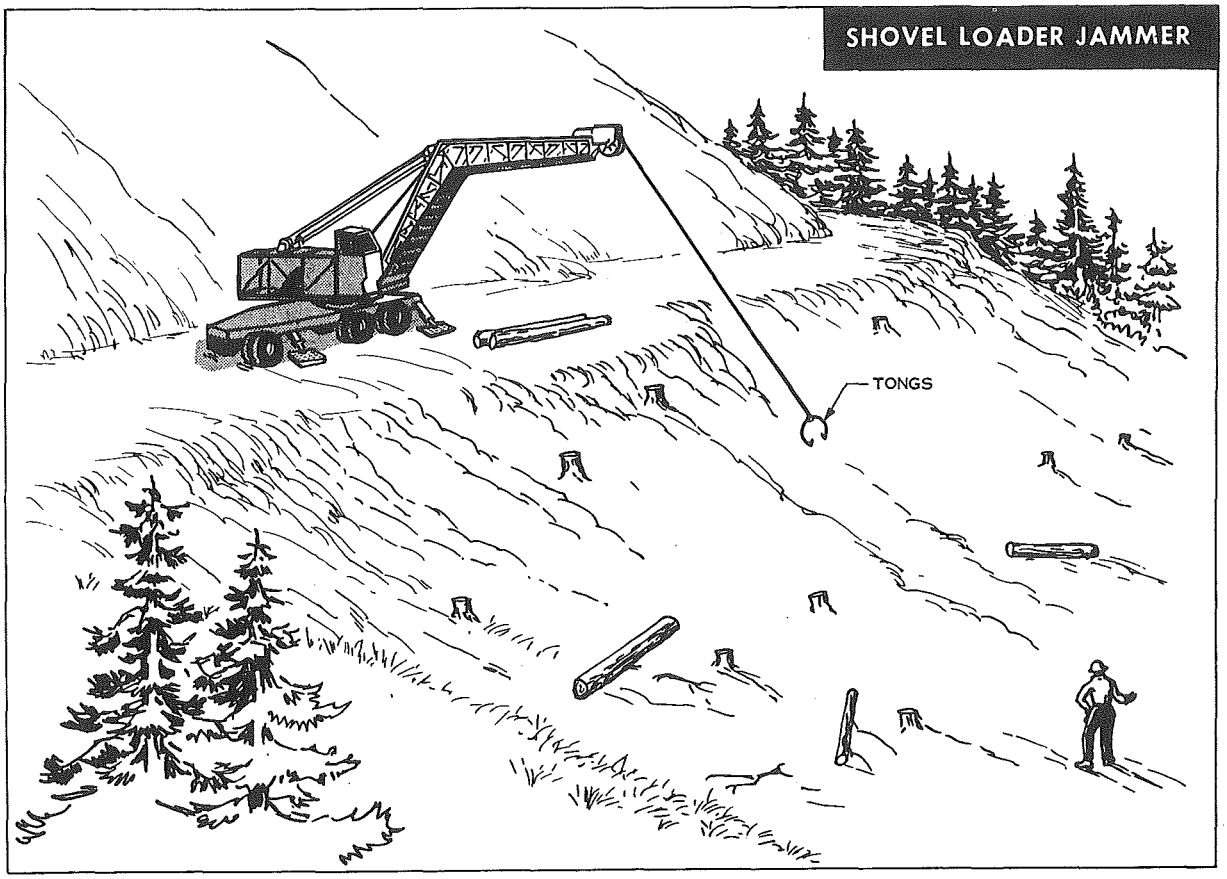


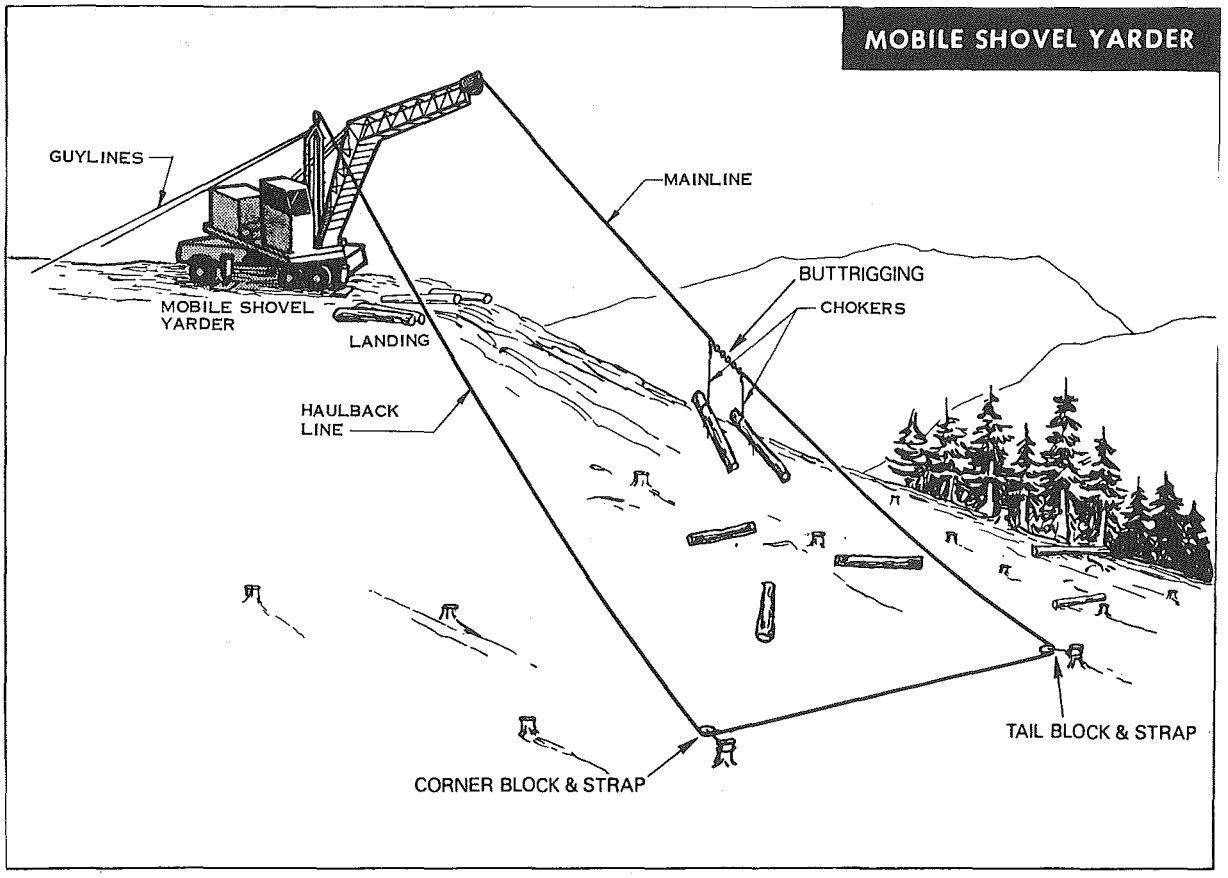
[Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-565, filed 9/21/79.]

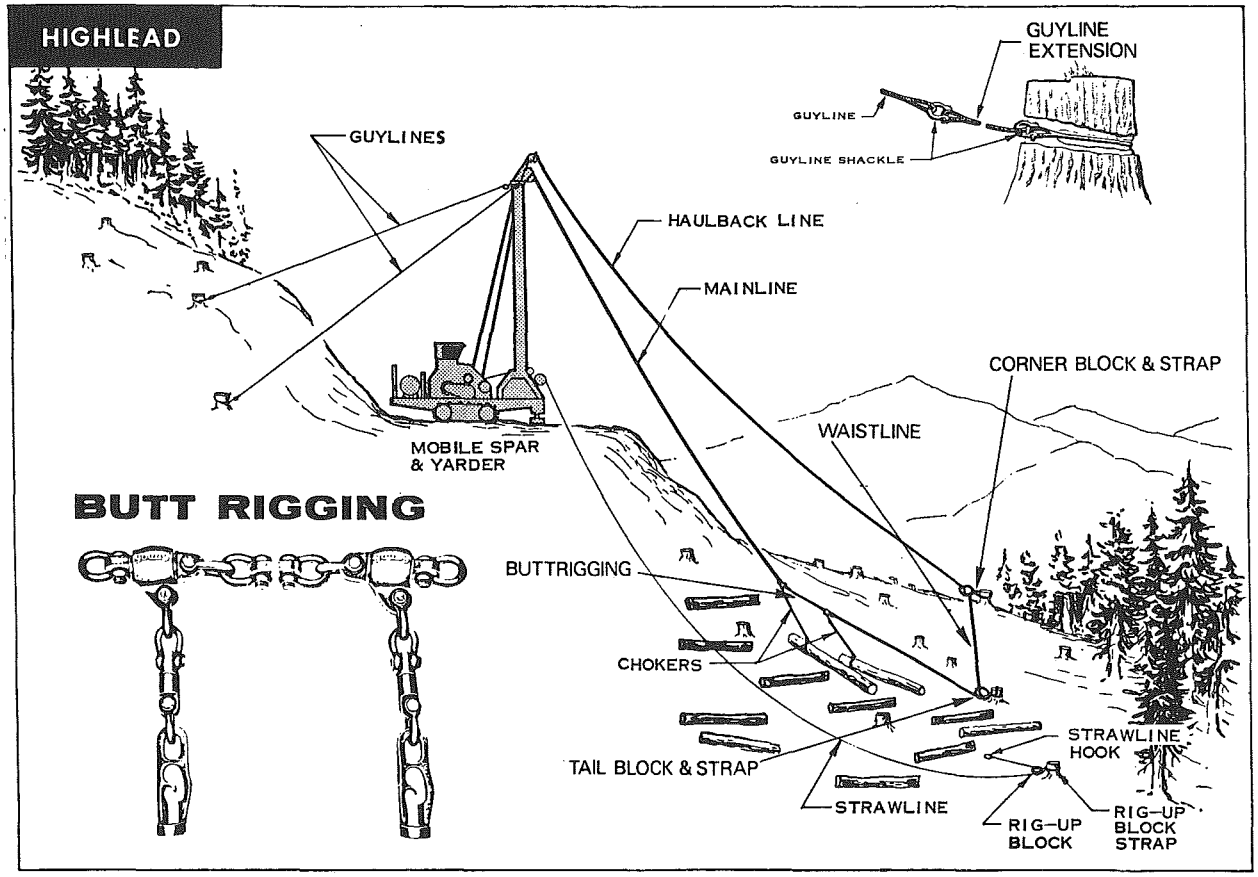
WAC 296-54-567 Motor truck log transportation--General requirements. (1) Prior to use, the operator shall make a complete daily inspection of the truck and trailer with particular attention to steering apparatus, lights and reflectors, brake boosters, brake hoses and connections, reaches, and hitches (couplings). The brakes shall be tested before and after movement of the vehicle. The operator shall submit a written list of necessary repairs to a person designated by the employer.

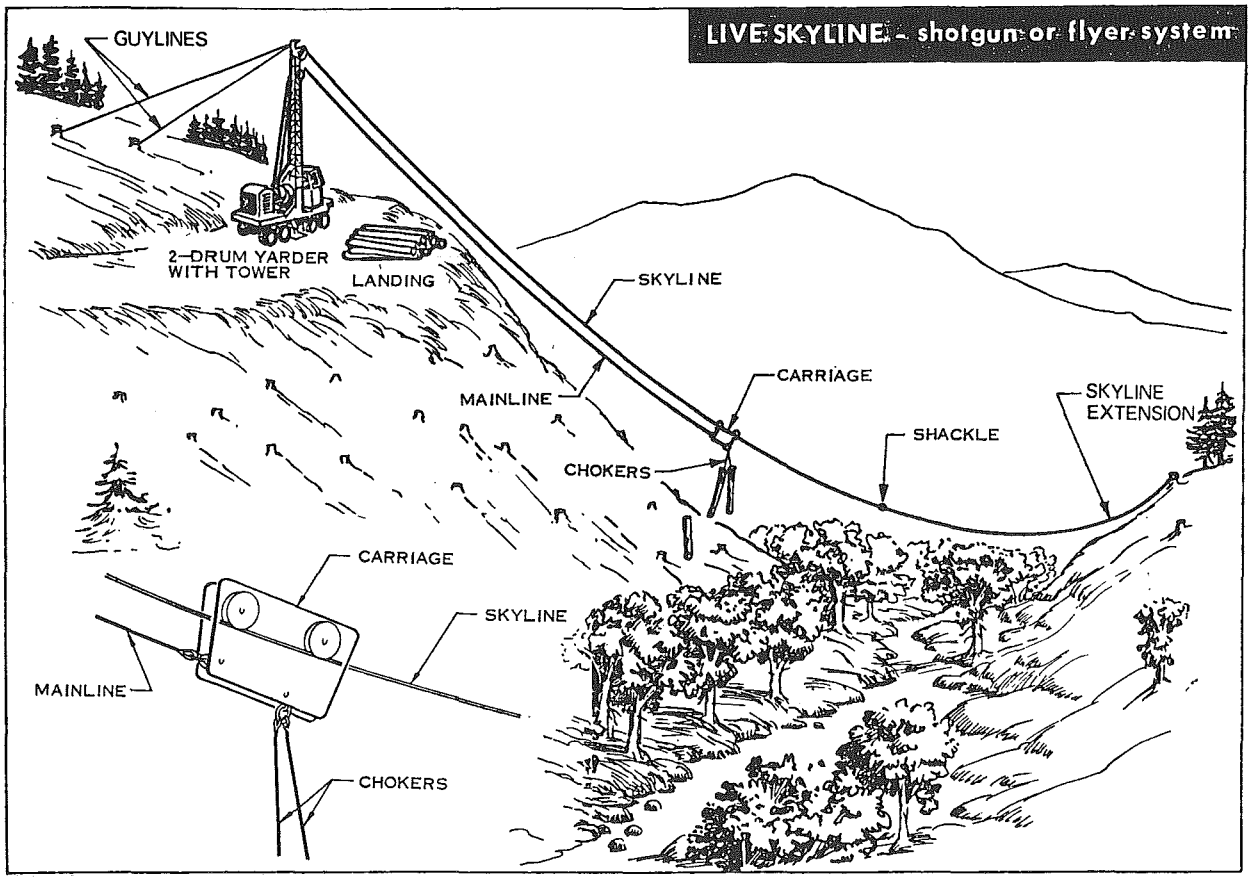
NOTE: See Figures No. 8-A through 8-P, for Illustrations of Various Types of Cable Logging Systems.

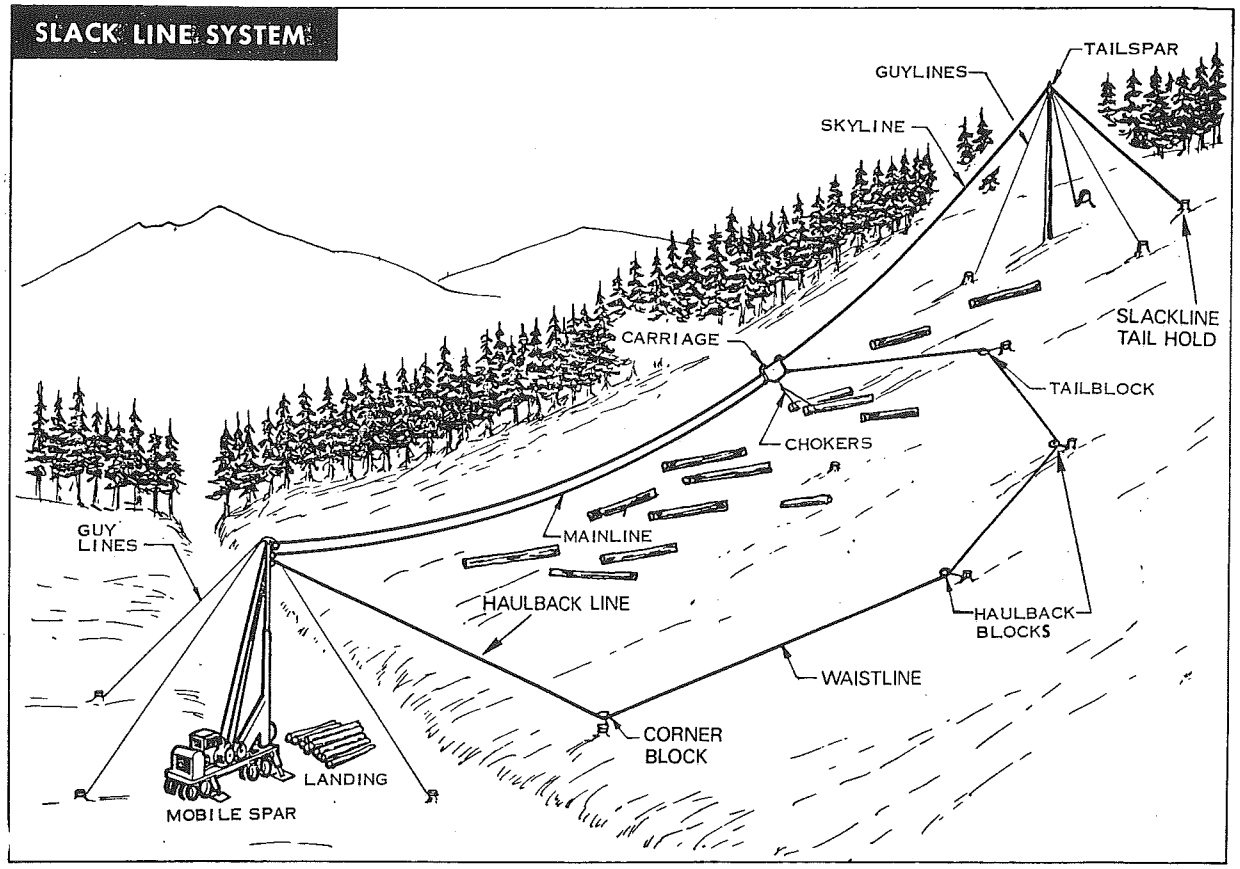
See Figures No. 8-Q through 8-U, for Illustrations of Whistle Signals used on Various Cable Logging Systems.

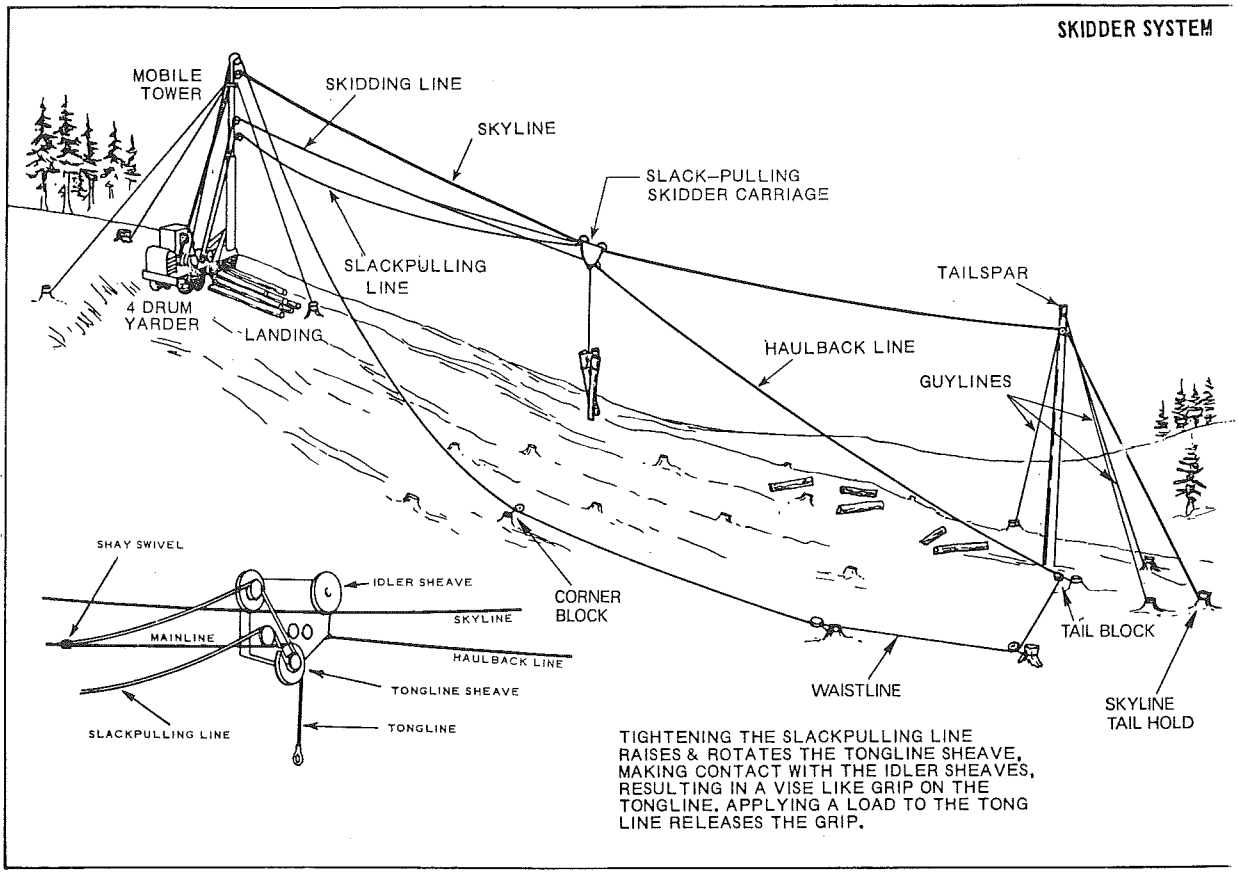

SHOVEL LOADER JAMMER
TONGS

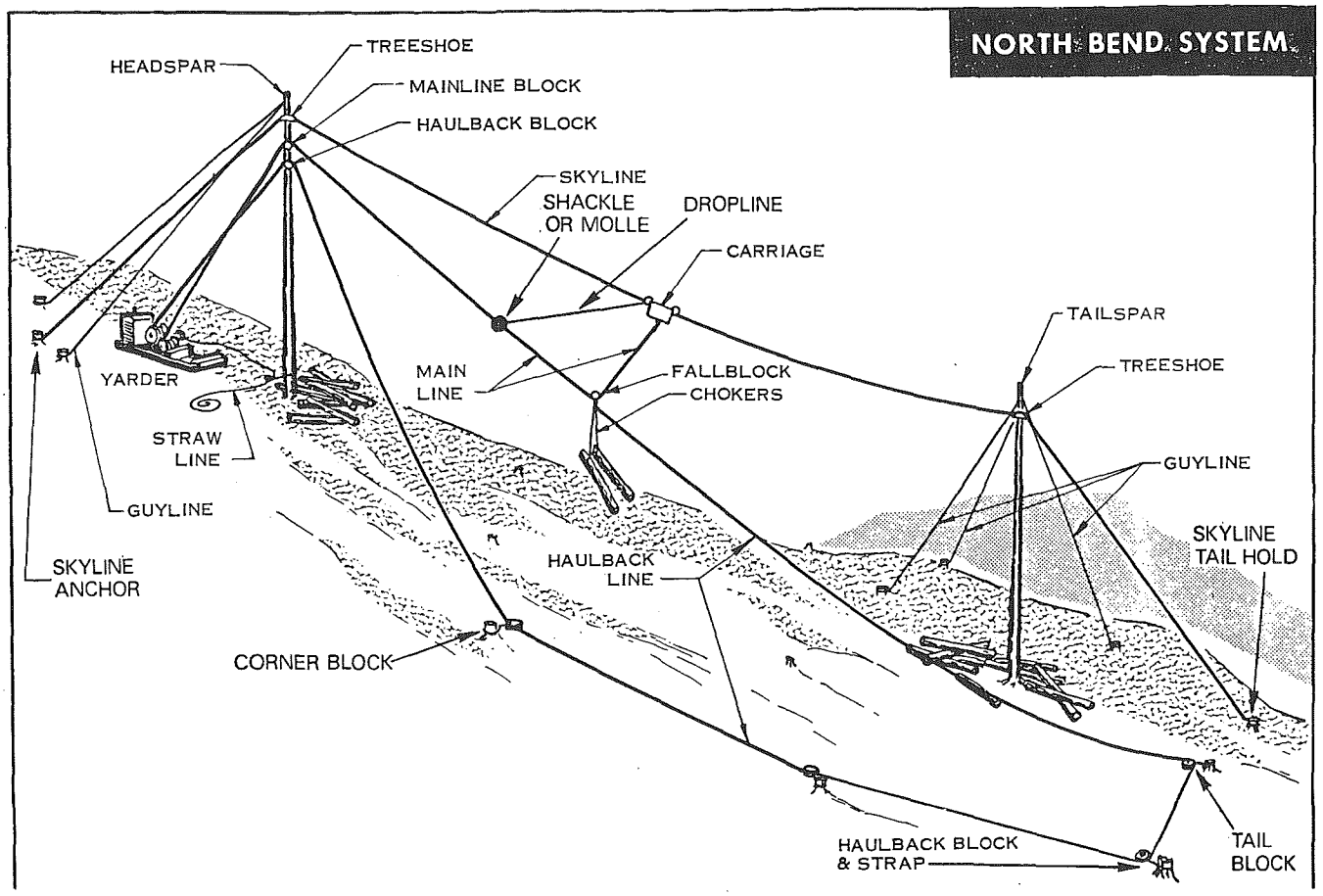

MOBILE SHOVEL YARDER
GUYLINES
MAINLINE
BUTTRIGGING
CHOKERS
MOBILE SHOVEL YARDER
LANDING
HAULBACK LINE
TAIL BLOCK & STRAP
CORNER BLOCK & STRAP

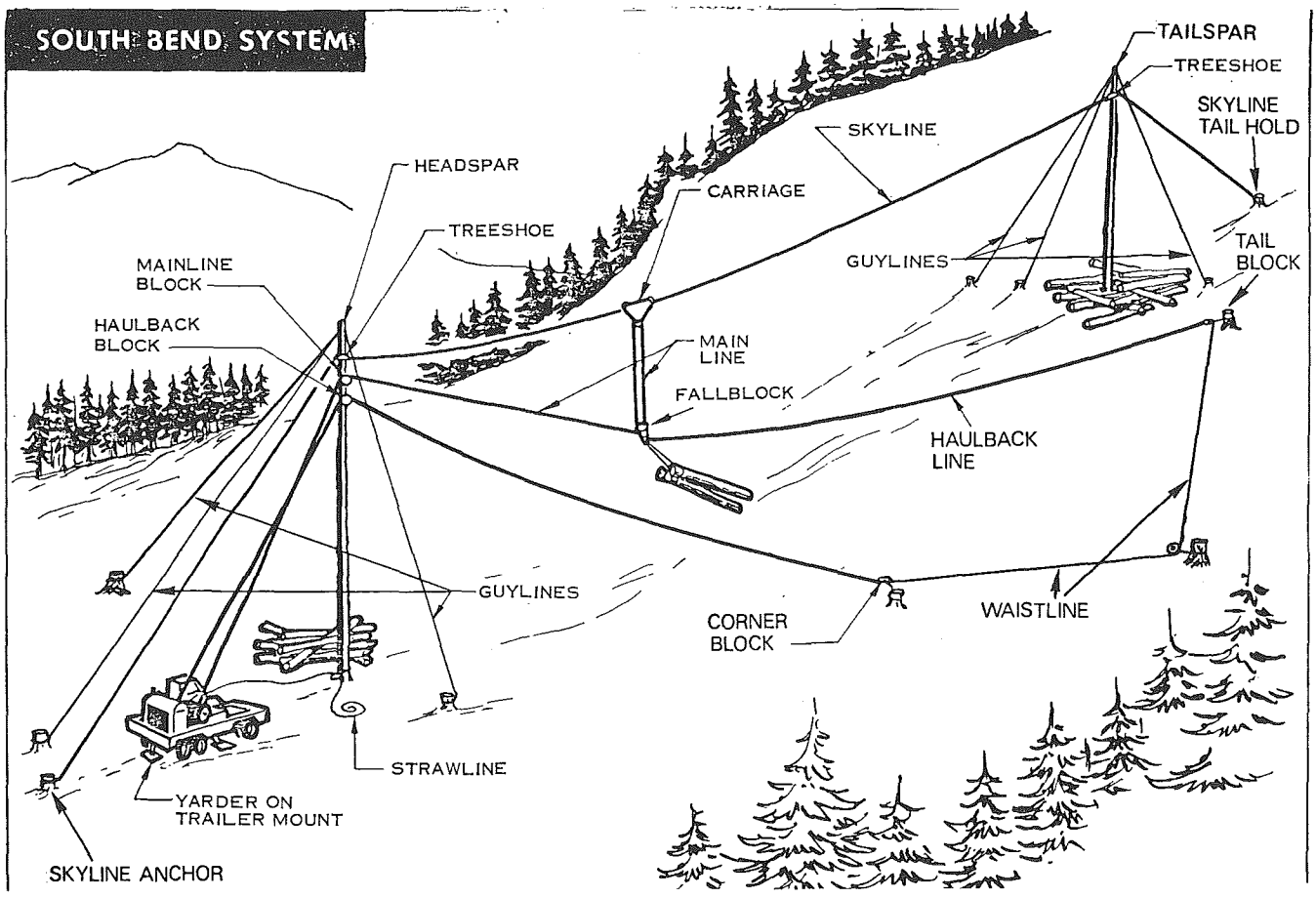

HIGHLEAD
GUYLINE EXTENSION
GUYLINE
GUYLINE SHACKLE
GUYLINES
HAULBACK LINE
MAINLINE
CORNER BLOCK & STRAP
WAISTLINE
MOBILE SPAR & YARDER
BUTT RIGGING
BUTTRIGGING
CHOKERS
STRAWLINE HOOK
TAIL BLOCK & STRAP
STRAWLINE
RIG-UP BLOCK
RIG-UP BLOCK STRAP


LIVE SKYLINE - shotgun or flyer system
GUYLINES
2-DRUM YARDER WITH TOWER
LANDING
SKYLINE
CARRIAGE
MAINLINE
SKYLINE EXTENSION
SHACKLE
CHOKERS
CARRIAGE
SKYLINE
MAINLINE
CHOKERS


SLACK LINE SYSTEM
TAILSPAR
GUYLINES
SKYLINE
SLACKLINE TAIL HOLD
CARRIAGE
TAILBLOCK
CHOKERS
GUY LINES
MAINLINE
HAULBACK LINE
HAULBACK BLOCKS
WAISTLINE
CORNER BLOCK
LANDING
MOBILE SPAR

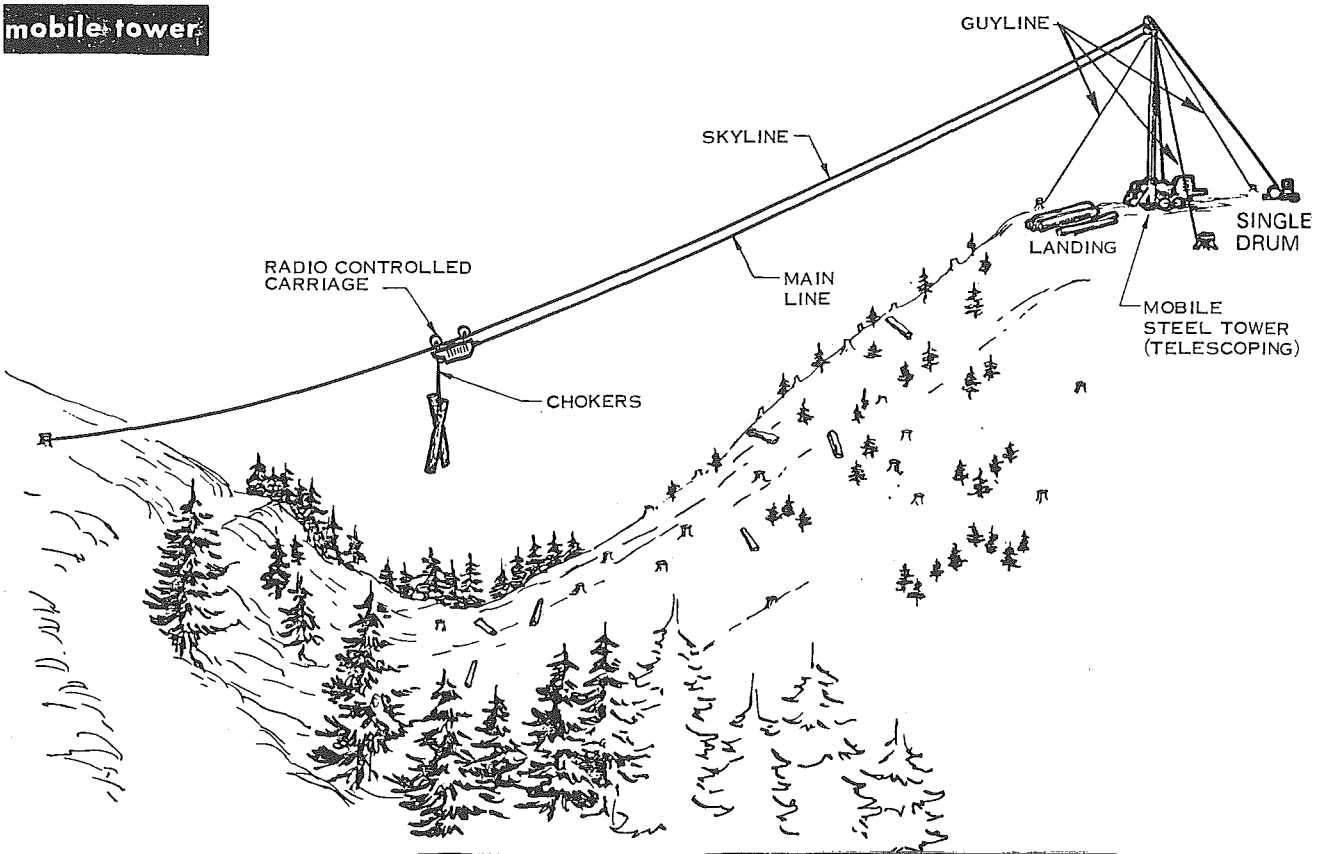

SKIDDER SYSTEM
MOBILE TOWER
SKIDDING LINE
SKYLINE
SLACK-PULLING SKIDDER CARRIAGE
SLACKPULLING LINE
TAILSPAR
4 DRUM YARDER
LANDING
HAULBACK LINE
GUYLINES
SHAY SWIVEL
IDLER SHEAVE
SKYLINE
MAINLINE
HAULBACK LINE
TONGLINE SHEAVE
SLACKPULLING LINE
TONGLINE
CORNER BLOCK
TAIL BLOCK
WAISTLINE
SKYLINE TAIL HOLD
TIGHTENING THE SLACKPULLING LINE RAISES & ROTATES THE TONGLINE SHEAVE, MAKING CONTACT WITH THE IDLER SHEAVES, RESULTING IN A VISE LIKE GRIP ON THE TONGLINE. APPLYING A LOAD TO THE TONG LINE RELEASES THE GRIP.


NORTH BEND SYSTEM
HEADSPAR
TREESHOE
MAINLINE BLOCK
HAULBACK BLOCK
SKYLINE
SHACKLE OR MOLLE
DROPLINE
CARRIAGE
TAILSPAR
TREESHOE
YARDER
MAIN LINE
FALLBLOCK
CHOKERS
STRAW LINE
GUYLINE
GUYLINE
SKYLINE TAIL HOLD
SKYLINE ANCHOR
HAULBACK LINE
CORNER BLOCK
HAULBACK BLOCK & STRAP
TAIL BLOCK

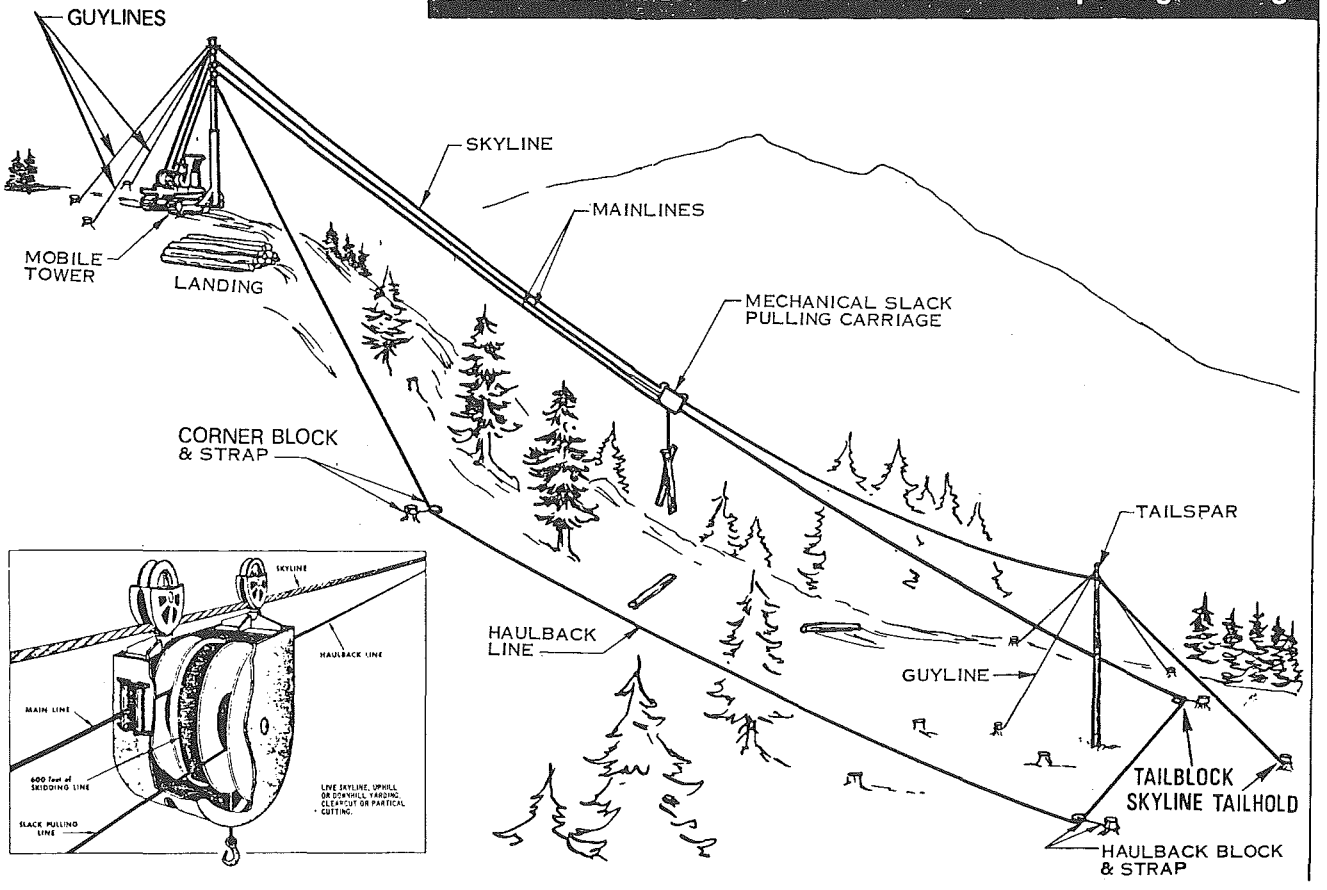

SOUTH BEND SYSTEM
TAILSPAR
TREESHOE
SKYLINE TAIL HOLD
SKYLINE
HEADSPAR
CARRIAGE
TREESHOE
GUYLINES
TAIL BLOCK
MAINLINE BLOCK
HAULBACK BLOCK
MAIN LINE
FALLBLOCK
HAULBACK LINE
GUYLINES
WAISTLINE
CORNER BLOCK
STRAWLINE
YARDER ON TRAILER MOUNT
SKYLINE ANCHOR

STANDING SKYLINE -- RADIO CONTROLLED CARRIAGE

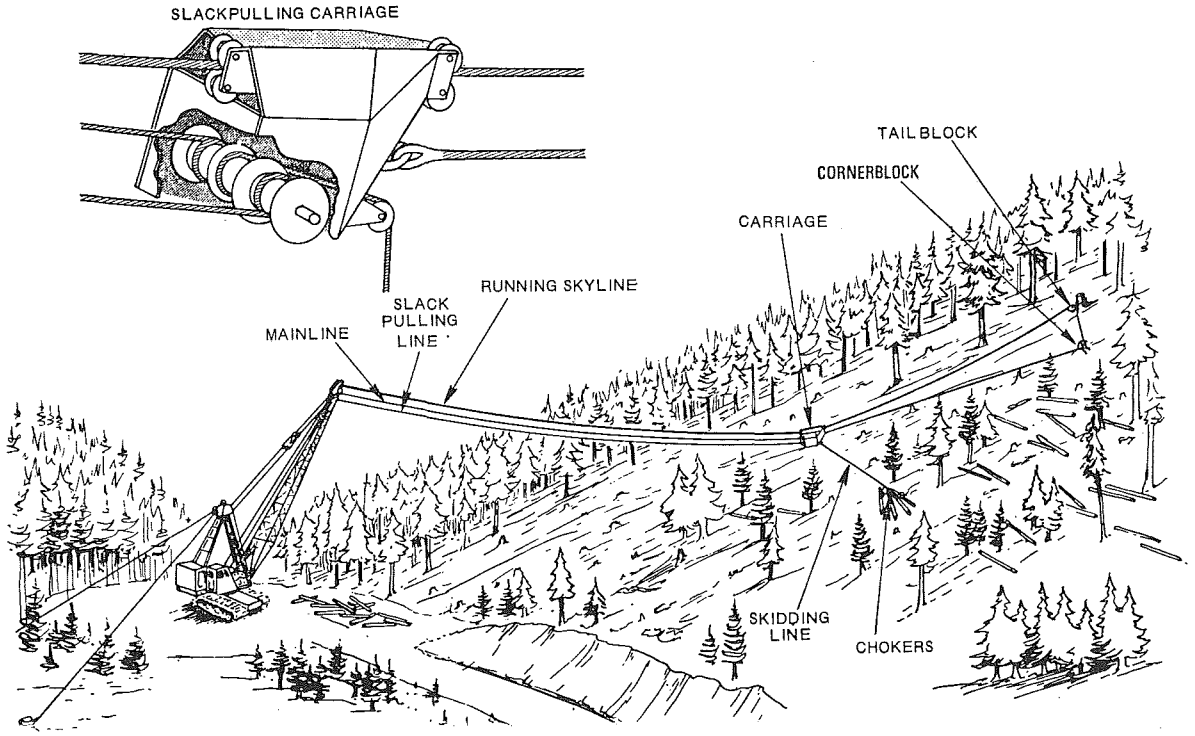
mobile tower

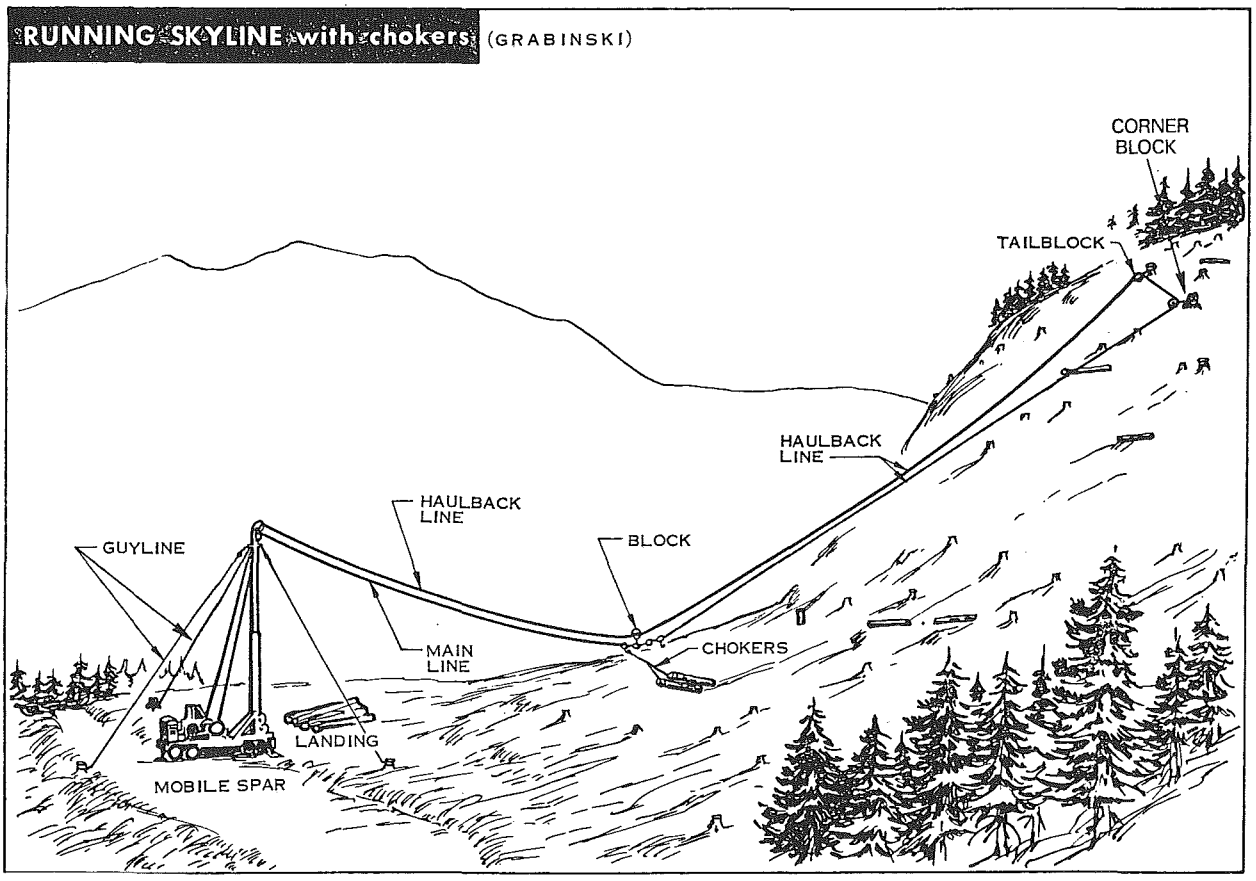


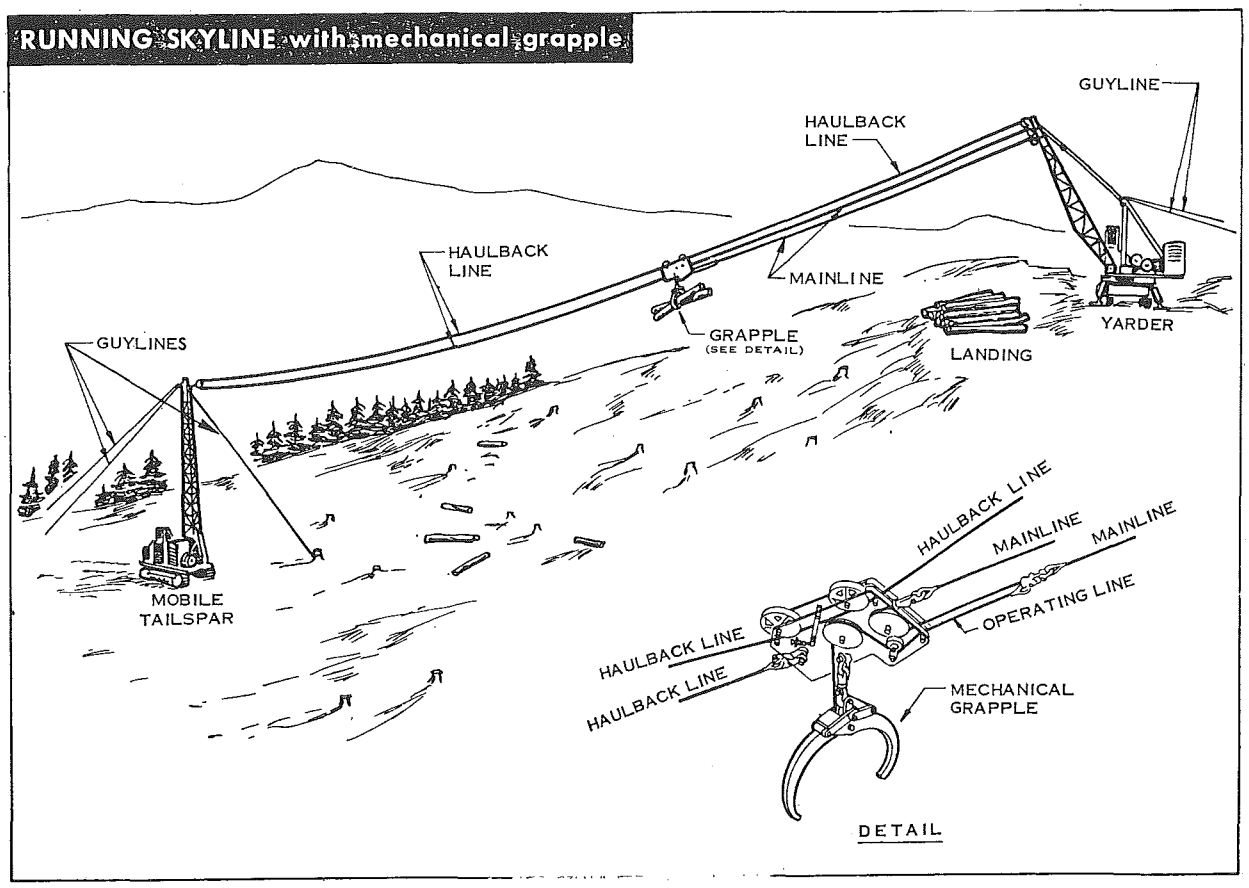
SIDE MOUNT TOWER with mechanical slack pulling carriage

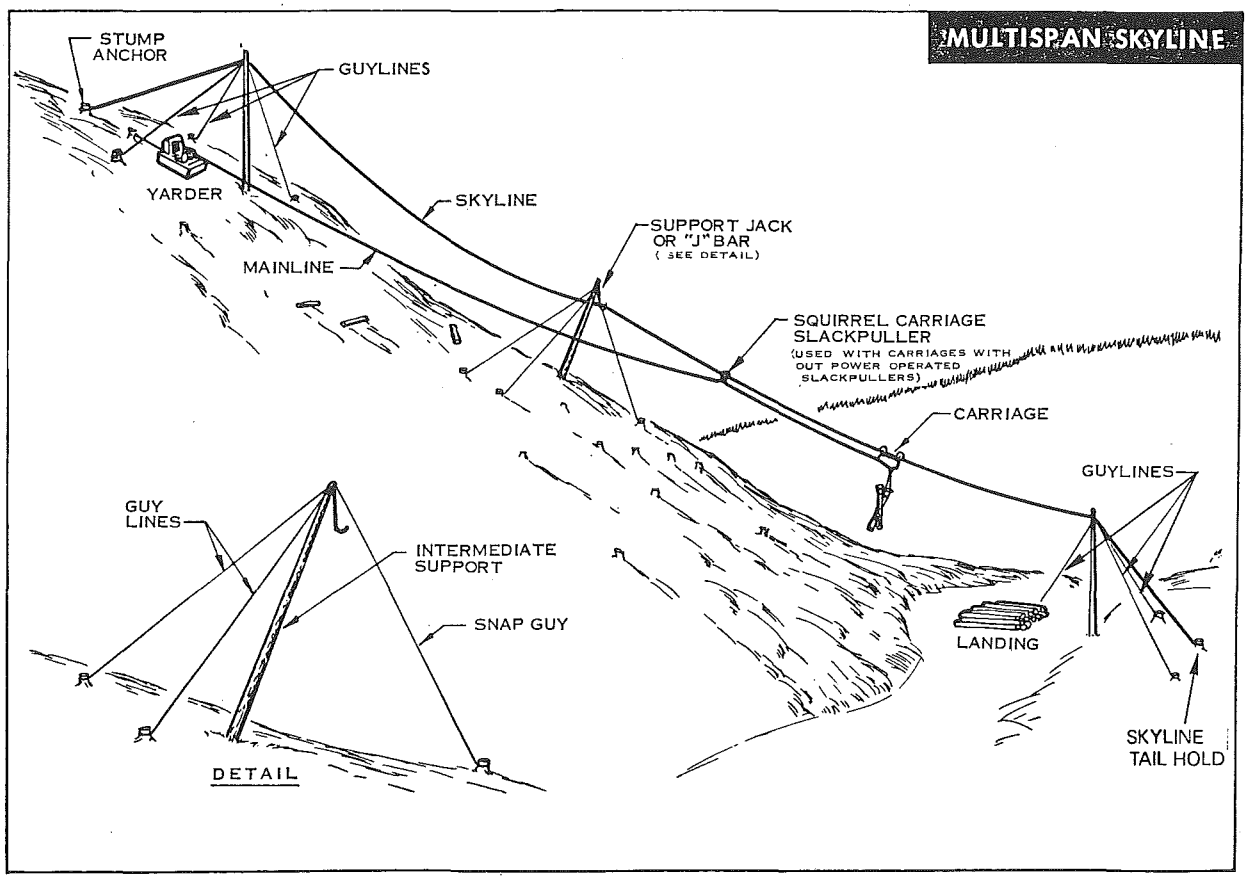


PARTIAL CUTTING WITH RUNNING SKYLINE

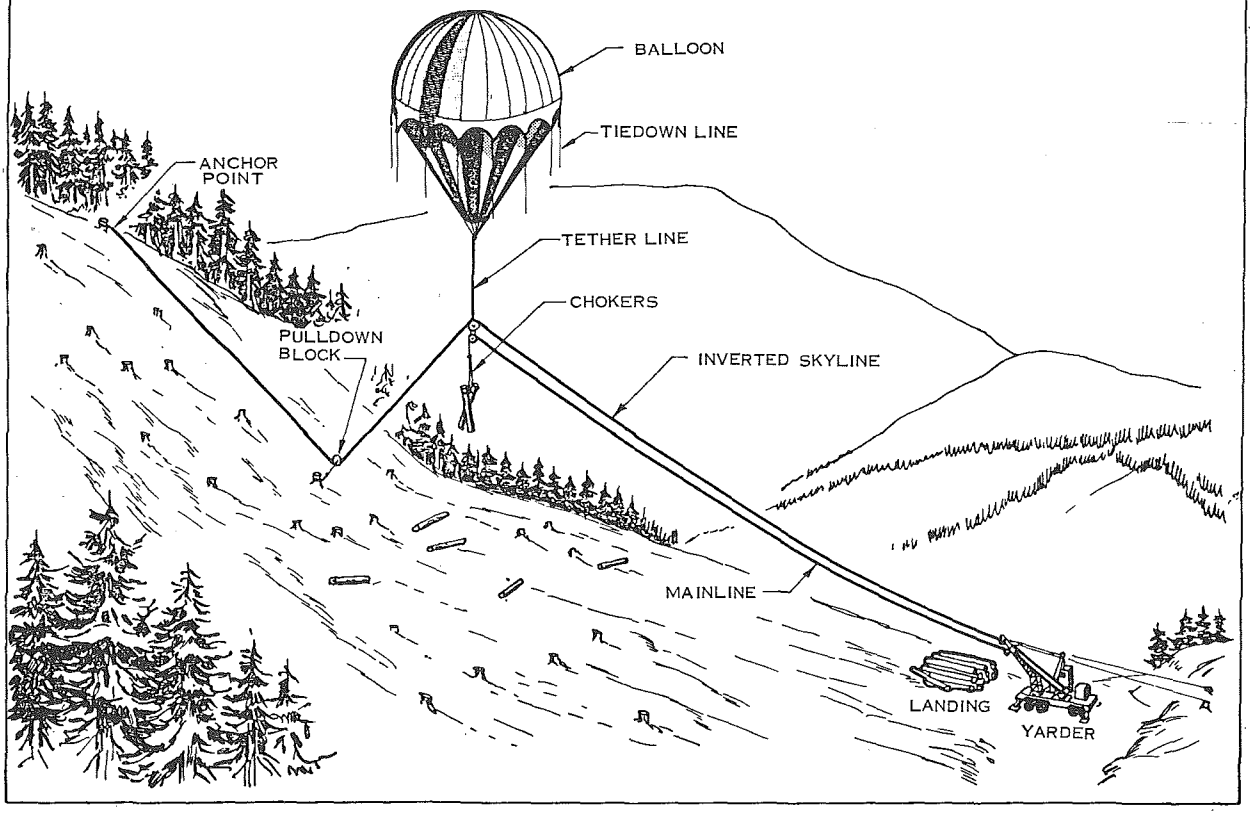




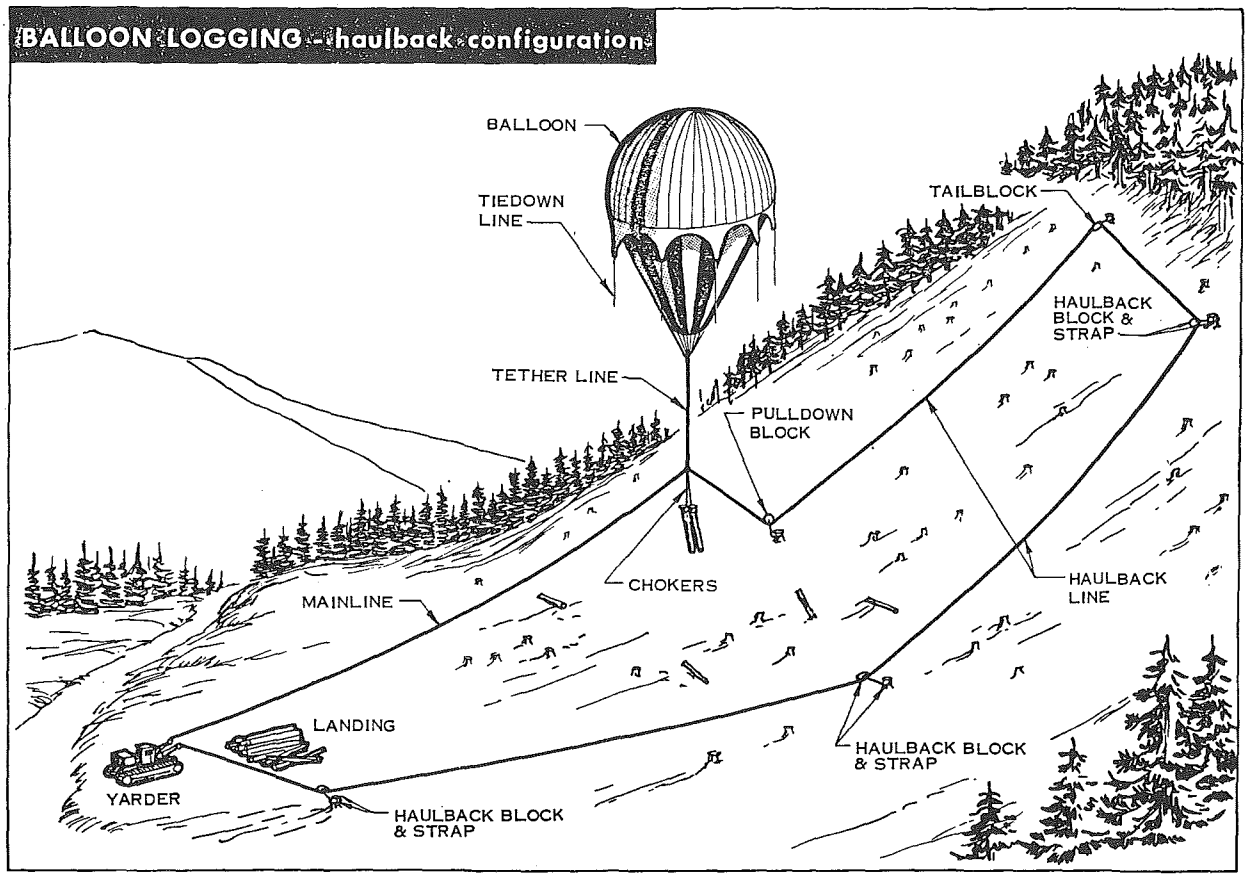

RUNNING SKYLINE with mechanical grapple
GUYLINE
HAULBACK LINE
HAULBACK LINE
MAINLINE
GUYLINES
GRAPPLE (SEE DETAIL)
YARDER
LANDING
MOBILE TAILSPAR
HAULBACK LINE
MAINLINE
MAINLINE
OPERATING LINE
HAULBACK LINE
HAULBACK LINE
MECHANICAL GRAPPLE
DETAIL


MULTISPAN SKYLINE
STUMP ANCHOR
GUYLINES
YARDER
SKYLINE
SUPPORT JACK OR "J" BAR (SEE DETAIL)
MAINLINE
SQUIRREL CARRIAGE SLACKPULLER (USED WITH CARRIAGES WITH OUT POWER OPERATED SLACKPULLERS)
CARRIAGE
GUYLINES
GUY LINES
INTERMEDIATE SUPPORT
SNAP GUY
LANDING
SKYLINE TAIL HOLD
DETAIL

BALLOON LOGGING -- inverted skyline configuration



BALLOON LOGGING -- haulback configuration



HIGH LEAD LOGGING WHISTLE SIGNALS
— Means longer spacing between signals.

1 short	Stop all lines.
3 short—3 short	Ahead slow on mainline.
3 short	Ahead on mainline.
2 short	Ahead on haulback.
2 short—2 short	Ahead slow on haulback.
3 short—1 short	Ahead on strawline.
3 short—1 short—3 short	Ahead slow on strawline.
4 short or more	Slack mainline.
2 short—4 short	Slack haulback.
3 short—1 short—4 short	Slack strawline.
3 short—2 short	Standing tight line.
1 short—1 short	Tight line while lines are running, or break if running tight.
3 short	When rigging is in: strawline back on haulback.
3 short / plus "X" number of shorts	When rigging is in: indicates number of sections of strawline back on rigging.
3 short—1 short—2 short	Strawline back on rigging.
1 short	When rigging is in: Chaser inspect and repair rigging.
2 short	When rigging is in: no chokers back.
2 short—1 short / plus "X" number of shorts	Number of chokers back.
2 short—4 short	When rigging is in: slack haulback–hold all lines until 2 short blown.
3 medium	Hooker.
3 medium—4 short	Hooker and his crew.
5 long	Climber.
4 long	Foreman.
1 long—1 short	Start or stop work.
7 long—2 short	Man injured, call transportation and stretcher.
1 long—1 short repeated	Fire.
Grabinski System	
2 short—1 short	Slack mainline and haulback together.
2 long	Take off or put on rider block.

Figure 8-Q

1 short—2 short	Pick up skidding line, easy.
2 short—1 short	Shake up carriage to clear choker.
2 short—2 short	Ahead on receding line.
3 short	Ahead on carriage, holding at present level, using interlock.
3 short—3 short	Ahead easy on skidding line.
2 short—2 short—2 short	Slack skyline, cable down.
2 short—2 short—2 short —1 short	Pick up skyline, cable up.
2 short—2 short—4 short	Slack receding line.
2 short—4 short	Slack skidding line.
2 short—2 short—1 short	Tighten all lines.
1 short—4 short	Slack off slack puller.
1 short—2 short	Pick up slack puller when slack.
2 short—2 short / plus "X" number of shorts	When carriage is in: number of chokers wanted.
2 short—2 short—1 long	Bull choker.
1 short	When carriage is in: inspect butt rigging.
2 short—4 short / 1 short	For each additional ten feet of tong line.
1 long / plus "X" number of shorts	Number of coils of strawline wanted.
5 Medium	Tail or second rigger.
5 medium—4 short	Tail or second rigger and his crew.
2 medium	Skidder head rigger.
3 medium—4 short	Hooker and his crew.
2 long	Ahead on transfer.
2 long—4 short	Slack transfer
1 short—3 short	Ahead on carriage with slack puller line.
1 long	Ahead on strawline.
1 long—4 short	Slack strawline.
1 long—3 short	Ahead easy on strawline.
5 long	Climber.
4 long	Foreman.
1 long—1 short	Start or stop work.
7 long—2 short	Man injured, call transportation and stretcher.
1 long—1 short repeated	Fire.

Figure 8-R

SKIDDER WHISTLE SIGNALS
— Means longer spacing between signals.

1 short	Stops moving carriage–Stops or goes ahead on slack puller, as case may be, if carriage is stopped.
2 short	Go ahead on skidding line holding carriage.

SLACKLINE WHISTLE SIGNALS
— Means longer spacing between signals.

2 short—2 short—2 short —1 short	First cable up when road has been changed and tail hold made fast.
2 short—2 short—2 short	Drop skyline.
1 short	Stop any moving line.

1 long	When logging, slack skyline.
2 short	Ahead on skyline.
1 long—2 short	Ahead easy on skyline.
3 short	Ahead on skidding line, holding haulback.
3 short—3 short	Ahead easy on skidding line with slack haulback.
4 short	Slack skidding line.
2 short—2 short / 2 short—2 short	Ahead easy on haulback with slack skidding line.
2 short—2 short	Ahead on haulback.
2 short—2 short—4 short	Slack haulback.
2 short / 3 short	Pick up skyline and skid.
2 short / 2 short—2 short	Pick up skyline and skin.
3 short—1 short	When carriage is in: strawline back on haulback.
3 short—1 short—2 short	When carriage is in: strawline back on carriage.
3 short—1 short	When strawline is out: ahead on strawline.
3 short—2 short	Tight line.
3 short—1 short—4 short	Slack strawline.
3 short—1 short—3 short	Pull easy on strawline.
2 long	Ahead on transfer.
2 long—4 short	Slack transfer.
2 long—2 short—2 short	When carriage is in: transfer back on carriage.
1 long / plus "X" number of shorts	When carriage is in: number of coils.
2 short—2 short—1 short / plus "X" number of shorts	When carriage is in: number of chokers.
1 short	When carriage is in: inspect rigging, repair and send back.
2 short—2 short—4 short	When carriage is in: slack haulback and hold all lines until 1 short is blown–then send back.
3 short—3 short	When carriage is in: send back powder.
5 medium	Tail rigger.
5 medium—4 short	Tail rigger and his crew.
3 medium	Head hooker.
3 medium—4 short	Second hooker and his crew.
5 long	Climber.
4 long	Foreman.
1 long—1 short	Start or stop work.
7 long—2 short	Man injured, call transportation and stretcher.
1 long—1 short repeated	Fire.

Figure 8–S

RUNNING SKYLINE WHISTLE SIGNALS

— Means longer spacing between signals

1 short	Stop all moving lines
2 short	Skin carriage back
2 short—1 short	Slack haulback
2 short—2 short	Skin carriage easy
2 short—3 short	Standing tight line
1 short—2 short	Ahead on drop line
4 short	Slack drop line
1 short—4 short	Slack both mainlines
1 short—1 short	Stop drop line going up and move carriage forward
3 short	Move carriage forward
3 short—3 short	Move carriage forward easy
3 short—1 short	When strawline is out: Ahead on strawline
3 short—1 short—4 short	Slack strawline
3 short	When carriage is in: Strawline
3 short—X short	When carriage is in: Number sections
3 short—1 short—2 short	When carriage is in: Strawline back on carriage
2 short—X short	When carriage is in: Number of chokers
4 short	When carriage is in: Inspect rigging, repair and send back
1 short	When carriage is in: Hold all lines until 2 shorts, then send back
3 medium	Head hooker
3 medium—4 short	Hooker and his crew
4 long	Foreman
1 long—1 short	Start or stop work
7 long—2 short	Man injured; call transportation and stretcher
1 long—1 short (repeated)	Fire
3 short—1 long	Acknowledged by engineer to signify hazardous turn

Figure 8–T

TENSION SYSTEM SIGNALS

4	Release tension
1 short	Stop carriage and start unspooling tong line
1 short	Stop tong line
1 short	Resume unspooling tong line
1 short	Will stop any moving line or slack tong line when carriage is stopped
2 short—2 short	Go into interlock and go back

2 short—4 short	Slack haulback and let carriage down
After Turn is Set	
2 short	Go ahead on tong line
2 short—3 short	Go ahead easy on tong line
3 short	Go into interlock and take carriage to landing
3 short—3 short	Ahead on carriage easy
1 short—2 short	Increase tension on tong line when carriage is going in
short—1 short	Decrease tension on tong line when carriage is going in

Figure 8-U

(2) Any defective parts that would make the vehicle unsafe to operate, shall be replaced or repaired before the vehicle is placed in service.

(3) All motor vehicles operated on public roads shall comply with the rules of the regulatory body having jurisdiction. Motor vehicles used on roads not under the control of the state department of transportation, counties or cities shall be equipped with accessories necessary for a safe operation including operable head lamps and at least two tail lamps and brake lamps which shall emit a red light plainly visible from a distance of one thousand feet to the rear and shall also have two reflectors visible at night from three hundred fifty feet when directly in front of properly adjusted motor vehicle head lamps.

(4) Truck tires worn beyond a point of safety or not meeting the safety requirements of the jurisdiction having authority as to tread wear and tire conditions, shall not be used.

(5) The driver shall do everything reasonably possible to keep his truck under control at all times and shall not operate in excess of a speed at which he can stop the truck in one-half the distance between him and the range of unobstructed vision.

(6) The area between the truck frame members, extending from the cab rearward as far as necessary to provide a safe work area, shall be covered with suitable nonslip type material. Log trucks which have logs scaled at stations shall be provided with a platform on each side extending outward from the frame members at least eighteen inches, and shall be eighteen inches long or as near this dimension as the design of the truck will permit. The treading surface of the platforms shall be of nonslip type material and the platform shall be capable of safely supporting a five hundred pound load.

(7) To protect the operator of vehicles from loads, a substantial bulkhead shall be provided behind the cab which shall extend up to the height of the cab.

(8) If logs must be scaled or branded while the loading operation is being carried on, the loading operation shall cease while the scaling or branding is being done so that the scaler or person doing the branding is not subjected to any hazards created by the loading operation.

(9) When at the dump or reload or where logs are scaled or branded on the truck, the logs shall be scaled or branded before the binders are released.

(10) All vehicles, where vision of the operator in the direction of travel is impaired by the load or vehicle, shall be moved only on a signal from a worker who shall have a clear view in the direction in which the vehicle is to be moved.

(11) Where a bridge or other roadway structure is posted with a load limit sign, log truck drivers or operators of other heavy equipment are prohibited from driving a load in excess of the posted limit over such structure.

(12) Persons shall be allowed to ride only when in the cab of the log truck.

(13) All trucks shall keep to the right side of the road except where the road is plainly and adequately posted for left side travel.

(14) A method shall be provided to assure that the trailer will remain mounted on the truck while driving on highways or logging roads.

(15) When trucks are towed on any road, the person guiding the vehicle being towed shall, by prearranged signals, govern the speed of travel. The towing of vehicles shall be done at a reasonable speed and in a prudent manner. A tow cable or chain over fifteen feet in length shall have a white flag affixed at the approximate center, however, it is recommended that a rigid tow bar be used for this purpose.

(16) All air lines, air chambers and systems shall be free of leaks and be able to maintain air pressure on constant brake application with the motor shut-off for one minute, or air pressure does not drop more than 4 p.s.i. in one minute with the engine running at idling speed and the service brake applied.

(17) All rubber-tired motor vehicles shall be equipped with fenders. Mud flaps may be used in lieu of fenders whenever the motor vehicle is not designed for fenders.

(18) Seat belts and anchorages meeting the requirements of 49 CFR Part 571 (D.O.T. Federal Motor Vehicle Safety Standards) shall be installed and used in all motor vehicles.

(19) All trucks shall be equipped with doors with operable latches, or a safety bar or strap shall be provided in lieu of the door.

(20) All trucks shall be equipped with a means to protect the operator from inclement weather.

(21) Log trucks shall not approach a landing while there is danger from incoming logs.

(22) Log truck drivers shall stop their vehicle, dismount, check and tighten loose load wrappers and binders, either just before or immediately after leaving a private road to enter a public road. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-567, filed 9/21/79.]

WAC 296-54-569 Motor truck log transportation—Brake requirements. (1) Motor logging trucks and trailers shall be equipped with brakes or other control methods which will safely stop and hold the maximum load on the maximum grade. When unattended trucks are

parked on a grade, in addition to setting the brakes, the wheels shall be chocked or blocked.

(2) Logging truck tractors having more than two axles need not have brakes on the steering axle wheels.

(3) All trucks equipped with air brakes shall be also equipped with a readily visual or audible low air pressure warning device in good working order.

(4) Engine-type brakes shall be considered as auxiliary controls, not a substitute for the requirement for a service brake system.

(5) Brake drums shall be maintained free of cracks, breaks or defects. Defective brake drums, cans, shoes or air lines shall be immediately repaired or replaced. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-569, filed 9/21/79.]

WAC 296-54-571 Motor truck log transportation--Trailer hitches and safety chains. (1) All log truck and trailer combinations shall be equipped with approved hitches (couplings) which shall:

(a) Be capable of withstanding, in any direction, the potential stresses imposed;

(b) Be of a design which would not be rendered inoperative by dirt and debris and shall be locked securely and positively;

(c) Be attached to the truck frame or extension of the truck frame by means of not less than four machine bolts and nuts (120,000 p.s.i. material or better) 3/4-inch diameter or larger, secured by lock nuts. Other means of attachment furnishing strength equal to or greater than the above may be accepted if of approved design and application; and

(d) Hitches (couplings) or parts that are broken, cracked, excessively worn, or otherwise defective hitches shall be repaired before use.

(2) Each log truck and trailer combination or log truck and independent trailer combination shall be provided with two or more safety chains or cables with a rated breaking strength of not less than the gross weight of the towed vehicle, be capable of holding the trailer in line in case of failure of the hitch assembly, and be as follows:

(a) Be permanently attached to the frame of the truck or an extension of the truck frame;

(b) Form a separate continuous connection between the truck frame or extension of the truck frame and the reach or trailer;

(c) Be attached not more than twelve inches from the eye of the reach or trailer;

(d) Be of a length short enough to prevent the trailer reach or tongue from contacting the ground in the event of disengagement from the truck;

(e) Be of a design to provide a positive connection that cannot be rendered inoperative by any condition of use or exposure.

(3) Safety chains and cables shall be replaced immediately if they contain cut, cracked, or excessively worn links, or frayed, stranded, or otherwise defective wire rope.

(4) Butt welding of safety chain links to reach truck frame, or extension of truck frame is prohibited.

(5) Cold-shuts may be used in safety chains provided they are welded shut and one size larger than the chain being used.

(6) There shall be no welding or hole drilling in frames on which the manufacturer recommends this not be done. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-571, filed 9/21/79.]

WAC 296-54-573 Motor truck log transportation--Reaches and bunks. (1) Log trailers shall be connected to tractors by reaches of a size and strength to withstand all normal imposed stresses. Spliced wooden reaches shall not be used. Proper repair of metal reaches by welding will be permitted if done by a qualified welder.

(2) Hand-holds or other facilities shall be installed on trailer tongues or trailer reaches if workers are required to manually assist in coupling them to their tractors or trucks.

(3) A positive means, other than clamp and in addition to the clamp, shall be installed on the reach of log truck trailers when the trailers are being towed without a load.

(4) Persons shall never enter the area below a suspended load of logs. At dumps where the load must remain suspended above the bunks until the truck is moved away, and when the trailer is the type with a compensating pin in the reach, a method shall be utilized which will allow the trailer to be towed away from the danger area.

(5) The reaches of unloaded trailers being towed shall be provided with and use a minimum one-inch pin near the end or an equally effective means to prevent pulling or stripping through the tunnel.

(6) Reach locks, clamps, or tighteners shall be of the type that will securely lock the reach in the tunnel.

(7) No reach of less than the maximum size usable in the tunnel of a trailer shall be permitted.

(8) Alteration of trailer tunnel to permit reduction of reach size is prohibited.

(9) Every truck or truck and trailer engaged in the transportation of logs loaded lengthwise, shall be equipped with bunks and chock blocks or stakes.

(10) Log bunks or any part of bunk assembly bent enough to cause bunks to bind, shall be straightened. Bunks shall be sufficiently sharp to prevent logs from slipping. Trip type stakes shall be properly secured and locked in a manner which will prevent them from accidentally tripping or falling.

(11) All trucks with swivel type bunks shall have bunk locks or an equivalent system of holding the bunks in place while loading logs.

(12) The bunks or bolsters of any truck or trailer shall be either curved upward or straight. Bunks with ends lower than their centers are prohibited.

(13) Sufficient clearance between the bunk and bunk rider shall be maintained to prevent bunk binding.

(14) Trailer bunks shall be provided with a false or tilt bunk. The channel of the bunk shall be kept reasonably free of debris.

(15) Stakes and stake extensions shall be installed and maintained so that the angle between bunks and stakes (and extensions if used) shall not exceed ninety degrees when loaded.

(16) Frames, reaches, bunks and running gear of log trucks shall be maintained free of cracks, breaks and defects. If defects are found, they shall be immediately repaired or the part replaced. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-573, filed 9/21/79.]

WAC 296-54-575 Motor truck log transportation--Stakes, stake extensions and chock blocks. (1) Trucks and trailers shall be equipped with bunk stakes or chock blocks of strength and sized material to perform their intended function.

(2) Stake extensions shall not be used unless all component parts of the bunking system are of sufficient size and strength to support the added stresses involved. Stake extensions shall be secured by safety chains or other devices to prevent their accidental displacement.

(3) The linkage used to support the stakes or chocks must be of adequate size and strength to withstand the maximum imposed impact load. Molles or cold shuts are prohibited in chains or cables used for linkage.

(4) Stake chains or cables shall be equal to or better than "high test" steel chain or "plow steel" wire rope, and shall be of a size necessary to meet the requirements of a safe working load of not less than six thousand six hundred pounds. (3/8-inch alloy chain, 7/16-inch high test chain of welded link construction, and 5/8 inch improved plow steel cable in 6 x 19 and 6 x 37 construction meet this requirement.)

(5) Bunk chains containing cut, cracked, excessively worn, or otherwise defective links, shall be immediately removed from service. Molles, cold-shuts (welded or otherwise), or bolts are not permitted in bunk chains.

(6) The use of frayed, stranded, or otherwise defective wire rope for chock block cable or stake straps is prohibited.

(7) Only chain links approved for welding (and properly welded) or approved repair links which will develop a strength equivalent to the chain, are permissible for repairs or attachments to stake chains or binder chains.

(8) Chains or cables used to secure stakes or chock blocks shall be secured in a manner which will not necessitate hammering directly on them to release the stakes or blocks. Keyhole slots and similar methods of securing chains are prohibited.

(9) Deformed or defective stakes, stake securing or stake locking devices, or bunks shall be immediately repaired or removed from service. [Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 43-.22 and 42.30 RCW. 80-11-057 (Order 80-15), § 296-54-575, filed 8/20/80. Statutory Authority: RCW 49-.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-575, filed 9/21/79.]

WAC 296-54-577 Motor truck log transportation--Wrappers and binders. (1) On log trucks equipped with stakes, the following requirements shall apply:

(a) In the hauling of a one log load, one wrapper chain or cable shall be required and secured to the rear bunk. The log shall be properly blocked or secured in a manner which will prevent it from rolling or shifting. An additional wrapper secured to the front bunk is optional.

(b) In the hauling of two log loads, not less than two wrapper chains or cables shall be used to secure the load. The logs shall be properly blocked to prevent them from rolling or shifting.

(c) On loads consisting of three or four logs not over forty-four feet in length, the load shall be secured by not less than two properly spaced wrapper chains or cables. Ends of short logs not secured by such wrappers shall be secured with extra wrappers. If any log is over forty-four feet in length, the load shall be secured by not less than three properly spaced wrappers.

(d) Loads consisting of five or more logs, when the logs are all seventeen feet or less in length, shall be secured by not less than two properly spaced wrappers. Loads consisting of five or more logs, when any log is over seventeen feet in length, shall be secured by not less than three properly spaced wrappers.

(2) On log trucks equipped with chock blocks, the following requirements shall apply:

(a) In the hauling of a one log load, one wrapper chain or cable shall be required and secured to the rear bunk and the log shall be properly blocked in a manner to prevent it from rolling or shifting.

(b) One additional wrapper chain or cable shall be required on log trucks using chock blocks over and above the requirements in subdivisions (1) (c) and (d) of this section.

(3) In the case of short logs loaded crosswise, the following method of securing the load shall be used if the truck or trailer is not provided with solid ends of a height sufficient to prevent any log in the load from rolling off: Not less than two chock blocks shall be used at each open end of the vehicle and the load shall be held with at least two wrapper chains or cables. The wrappers shall be firmly attached to the end of the truck or trailer. Rigid standards or stakes may be used in lieu of chock blocks but each such standard or stake shall be either rigidly connected to the bed of the truck or trailer or shall be placed in a tight-fitting socket at least 12 inches in depth. Other means furnishing equivalent security may be acceptable.

(4) When two wrappers are required, they shall be applied within six feet of the front and rear bunks. When more than two wrappers are required, the front and back binder shall be applied within six feet of the front and rear bunks.

(5) To properly secure short logs, binders shall be placed near the end, not less than twelve inches from the end of the log.

(6) No log loaded on top or in outside saddles of a load shall be transported unless secured by not less than two wrapper chains or cables, one of which shall be placed near each end of such log.

(7) All wrappers and binders shall be fastened in place prior to tightening to prevent the displacement of logs on the top of the load.

(8) All wrapper chains or cables, except in the case of one log loads, shall entirely surround the load. This does not apply to gut–wrappers.

(9) Gut–wrappers, when used, shall be adjusted so as to be tightened by, but not carry the weight of the logs above them.

(10) A warning shall be given before throwing wrappers over the load and care shall be taken to avoid striking other persons with the wrapper.

(11) Wrappers and binders shall be placed and tightened around the completed load before the truck leaves the immediate loading area.

(12) While moving logs, poles, or log chunks within sorting or mill yards, that could roll or slide off the truck due to snow or ice conditions, or the logs or log chunks do not extend beyond the stakes, at least two wrappers and binders shall be used regardless of the height of the load.

(13) Wrapper chains or cables, binders, fasteners, or attachments thereof, used for any purpose as required by these standards, shall have a minimum breaking strength of not less than fifteen thousand pounds and shall be rigged so that it can be safely released.

NOTE: 3/8–inch Hi–Test steel chain, 7/16–inch improved Plow Steel wire rope of 6x19 or 6x37 construction, or materials having equivalent strength, when in compliance with the requirements herein contained, will be acceptable. (The diameter of the wire rope is immaterial as long as it meets the minimum breaking strength requirements.)

(14) A loaded logging truck required to have wrappers by this section, may be moved within the loading area without wrappers only if such movement does not present a hazard to workers.

(15) For the purposes of this standard, applied bundle straps or banding are not acceptable as wrappers and binders.

(16) All loose ends of wrapper chains or cables shall be securely fastened so as to prevent their swinging free in a manner that will create a hazard.

(17) Binders for securing wrappers on logging trucks shall be fitted with hooks of proper size and design for the wrapper chain being used.

(18) Wrappers shall be removed from service when any of the following conditions exist:

(a) Excessively worn links on chains;

(b) Deformed or stretched chain links;

(c) Cracked chain links;

(d) Frayed, stranded, knotted, or otherwise defective wire rope.

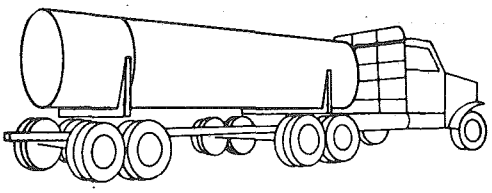
(19) Pipe extension handles (swedes) for tightening or securing binders shall be limited to not longer than thirty–six inches. Care shall be taken that a sufficient amount of the pipe extends over the binder handle.

(20) Defective binders shall be immediately removed from service.

NOTE: See Figures 9–A and 9–B for Illustrations of Placement and Number of Wrappers.

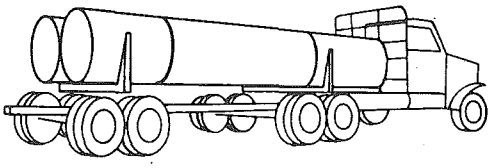
PLACEMENT AND NUMBER OF WRAPPERS

One Log Load



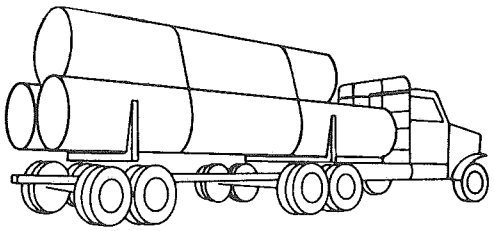
One wrapper required which shall be secured to the rear bunk. The Log shall be blocked or secured in a manner to prevent it from rolling or shifting. An additional wrapper secured to the front bunk is optional.

Two Log Load



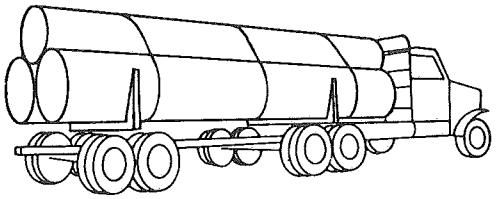
A minimum of two wrappers required. Logs shall be blocked to prevent them from rolling or shifting. If all logs are not contained by the stakes, additional wrappers required.

Three Or Four Log Load 44 Ft. Or Less



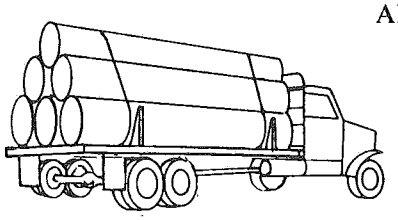
A minimum of two wrappers required. If all logs are not contained by the stakes, additional wrappers required.

Three Or Four Log Loads More Than 44 Feet



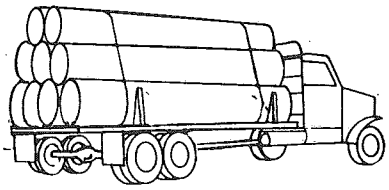
A minimum of three wrappers required. If all logs are not contained by the stakes, additional wrappers required.

Five Or Six Log Load
All Logs 17 Feet Or Less



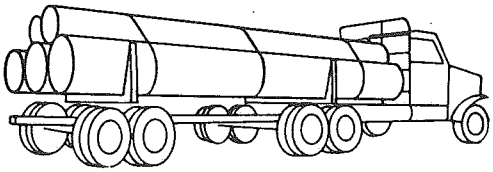
A minimum of two wrappers required. If all logs are not contained by the stakes, additional wrappers required.

Seven Or More Log Load
All Logs 17 Feet Or Less



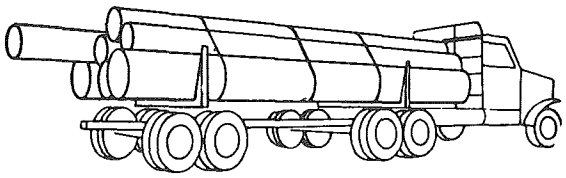
A minimum of two wrappers required. If all logs are not contained by the stakes, additional wrappers required.

Five Or More Log Load
If Any Logs Are More Than 17 Feet



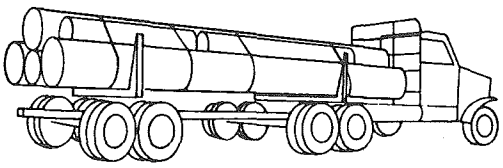
A minimum of three wrappers are required. If all logs are not contained by the stakes, additional wrappers required.

Proper Support For Logs



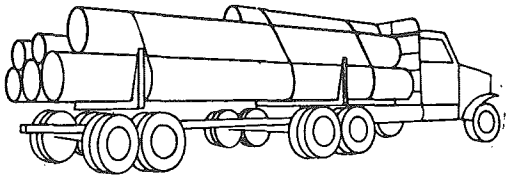
Not more than approximately one–third the weight of any log shall extend beyond the end of the logs or bunk supporting it.

Outside Logs Or Top Logs



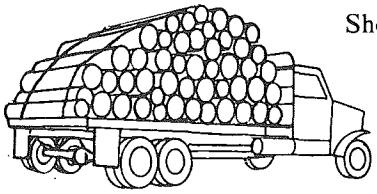
All outside (wing) or top logs shall be secured by a wrapper near but not within 12 inches of each end.

A Wrapper Shall Be Near Each Bunk



Each load shall be secured by having a wrapper within 6 feet of each bunk except on one log loads.

Short Logs Loaded Crosswise



A minimum of two wrappers are required and two chocks or stakes shall be used on the open end of the truck.

NOTE: All loads of logs on logging trucks equipped with chock blocks instead of stakes, shall have at least one additional wrapper over and above the requirements for trucks equipped with stakes, excepting on one and two log loads and trucks with short logs loaded crosswise.

[Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79–10–081 (Order 79–14), § 296–54–577, filed 9/21/79.]

WAC 296–54–579 Motor truck log transportation—Miscellaneous requirements. (1) No truck wheel shall have more than twenty–five percent of the lugs missing or defective.

(2) All truck wheels shall be maintained free of cracks, breaks, or defects.

(3) Windshields on all equipment shall be provided with windshield wipers in good working condition.

(4) Mule train trailers shall have a platform on the trailer tongue at least twelve inches by twenty–four inches made of nonslip material and capable of supporting at least three hundred pounds. The platform shall be of the self–cleaning type.

(5) Logs shall be loaded so that not more than approximately one–third of the weight of any log shall extend beyond the end of the logs or bunk supporting it.

(6) Trailer loading and unloading straps, links, or chains shall be fastened securely to the trailer frame and used in hoisting the trailer. The connections shall be maintained in good condition and shall not be attached to the trailer bunk. The use of molles for this purpose is prohibited.

(7) In unloading trailers from trucks, trailers shall be hoisted clear, the truck driven forward a safe distance, and the trailer lowered to within one foot of the roadway before persons approach the trailer or reach.

(8) Trailer hoisting or unloading straps shall be constructed and installed in a manner enabling the loading or unloading machine to engage the strap without manual personal contact.

(9) All motor vehicles shall be equipped with a horn that is audible above the surrounding noise level. The horn shall be sounded before operating the vehicle in reverse gear and sounded intermittently during the entire backing operation. The horn shall be maintained in an

operative condition. [Statutory Authority: RCW 49.17-.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-579, filed 9/21/79.]

WAC 296-54-581 Motor truck log transportation--Steered trailers. Steered trailers, not controlled from the truck cab, shall be designed, constructed, and operated as follows:

(1) A secure seat with substantial foot rest shall be provided for the operator at the rear of the bunk. Any arrangement that permits the operator to ride in front of the bunk is prohibited unless a false bunk or other adequate protection is provided for the operator.

(2) The seat for the operator shall be so arranged that he has an unobstructed exit from both sides and the rear.

(3) The bunk support shall be so constructed that the operator has a clear view ahead at all times.

(4) Adequate means of communication shall be provided between the operator and the truck driver.

(5) Eye protection and respirator shall be provided for the operator.

(6) The trailer shall be equipped with fenders or splash plates to protect the operator from mud and dust so far as possible.

(7) If used during periods of reduced visibility on roads not under the control of the state department of transportation, counties, or cities, the trailer shall be equipped with head, tail, turn and stop lights. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-581, filed 9/21/79.]

WAC 296-54-583 Stationary log truck trailer loading. (1) All loading devices shall be designed, constructed, and maintained in such a manner as to have a five to one safety factor for its rated load capacity.

(2) Loaders shall be constructed of such height and width that they can be safely used to load the maximum-sized trailers they will be expected to handle without hanging up or striking the equipment.

(3) Electric-powered trailer loading devices shall be equipped with a switch or device which will govern the upper direction of travel of the load line to a safe limit.

(4) Electric motors used for hoisting purposes shall be equipped with approved overload switches or breakers.

(5) All electrical switch controls shall not exceed twenty-four volts. All control switches shall be of the momentary contact type which require continuous manual pressure for hoist to operate.

(6) Pendent-type control switches shall be suspended by a chain or other suitable device which will prevent placing a strain on the electrical cable.

(7) Pendents shall be so installed that when retracted the control switch shall not touch the ground.

(8) All electrical equipment shall be weatherproof-type or adequately protected from the weather, and shall meet or exceed the requirements of the National Electrical Code as promulgated by the Director of the Department of Labor and Industries pursuant to RCW 19.28.060.

(9) Trailer loaders, except A-frame type or bridge crane, shall be equipped with reach guides or devices which will keep reach in proper alignment. A tag rope or other safe guidance device shall be used to guide trailers being loaded by use of an A-frame type loader.

(10) Access roads and the area around the trailer loading devices shall be kept free of standing water and debris and maintained in good repair.

(11) The maximum capacity load to be lifted shall be posted in a conspicuous location where it can be easily seen by any person operating the hoist.

(12) Trailer loading equipment shall be periodically inspected at least every thirty days and shall be maintained in good repair. A written report shall be made and signed by the person making the inspection and kept on file by the company for twelve months.

(13) A lifting test shall be conducted annually on each loading device and a written record showing the date, name of person conducting the test, amount of weight lifted and results shall be kept in the office of the employer or at the site. The test weight shall be at least one hundred twenty-five percent of the maximum rated load but not more than one hundred thirty percent of the maximum rated load.

(14) Each drum shall be designed and arranged in such a manner that the line will maintain lead and spool evenly without chafing, crossing or kinking.

(15) A braking system shall be installed which shall have the capability of safely braking and holding one and one-half times weight of the full rated load.

(16) When trailers are to be loaded after dark, sufficient lights shall be provided for a safe operation. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-583, filed 9/21/79.]

WAC 296-54-585 Log unloading, booms, and rafting grounds--Storage and sorting areas--General requirements. (1) At no time shall one person be permitted to work alone.

(2) (a) Employees working on over or along water, where the danger of drowning exists, shall be provided with and shall wear approved personal flotation devices.

(b) Employees are not considered exposed to the danger of drowning when:

(i) The water depth is known to be less than chest deep on the exposed individual;

(ii) When working behind standard height and strength guardrails;

(iii) When working inside operating cabs or stations which eliminate the possibility of accidentally falling into the water;

(iv) When wearing approved safety belts with lifeline attached so as to preclude the possibility of falling into the water.

(c) Prior to and after each use, personal flotation devices shall be inspected for defects which would reduce their designed effectiveness. Defective personal flotation devices shall not be used.

(d) To meet the approved criteria required by subdivision (a), a personal flotation device shall be approved

by the United States 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 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.

(3) In operations where regular logging machinery, rigging, etc., is used, the applicable sections of these rules shall apply.

(4) Artificial lights shall be provided and used where work is to be done between the hours of sunset and sunrise. Such lights shall be located in a manner that will be reasonably free of glare and provide uniform distribution of illumination and avoid sharply defined shadows.

(5) On all log dumps, adequate power for the method used for unloading shall be provided. All machines used for hoisting, reloading or lowering purposes shall be of approved design and sufficient power to control or hold the maximum load imposed in mid-air.

(6) Binders shall not be released from any load until an effective safeguard is provided.

(7) All mobile log handling machines shall be equipped with a means or mechanism which will prevent the logs from accidentally leaving the forks, and shall be used.

(8) The operator of the unloading machine shall have an unobstructed view of the unloading area or shall make certain no one is in the area where the logs are to be unloaded. Rearview mirrors shall be installed on mobile log handling equipment to assist the operator in ascertaining that the area behind the machine is clear before backing up.

(9) Unloading lines shall be so arranged that it is not necessary for the workman to attach them on the pond or dump side of the load.

(10) Life rings with a minimum of ninety feet of one-fourth-inch line with a minimum breaking strength of five hundred pounds attached, shall be provided at convenient points adjacent to water which is five feet or more in depth. Life rings shall be a minimum of thirty inches outside diameter and seventeen inches inside diameter and be maintained so as to retain a thirty-two pound positive buoyancy. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-585, filed 9/21/79.]

WAC 296-54-587 Water dumps. (1) All water dumps shall have brow logs except when logs are lifted from the load. If portable equipment is used, adequate stops shall be provided to prevent equipment from running off the dump.

(2) Where necessary for persons to walk alongside loads and equipment on trestles or fills, a minimum twenty-two inch wide walkway shall be provided, unless otherwise specified.

(3) All decks and plankways on log dumps must be kept in good repair and free from bark and other debris. Roadways shall not be inclined more than one inch to twelve inches across the driving surface.

(4) The use of small bridge-over logs, planking or timbers, between regular foot logs, or walkways, which will not support the weight of at least three persons are prohibited. All regular foot logs shall be barked on upper side.

(5) Electric powered hoists using hand-held cord remote controls in grounded locations, shall be actuated by circuits operating at no more than twenty-four volts. All control switches shall be of the momentary contact type which requires continuous manual pressure for the hoist to operate.

(6) Roadbeds at log dumps shall be hard packed gravel, heavy planking, or equivalent material, and shall be of sufficient width and even surface to insure safe operation of equipment.

(7) Where logs are unloaded on to rollways, sufficient space shall be provided between the top of the skids and the ground to clear the body of a person.

(8) When a brow log is used with a parbuckle system, all persons are prohibited from going between the brow log and the load of logs at any time.

(9) A positive safeguard shall be provided to prevent logs from leaving the loads on the side opposite the dump. Unloading lines, crotch lines or equally effective means shall be arranged and used in a manner to prevent any log from swinging or rolling back.

(10) All persons shall remain in the clear until all moving equipment has come to a complete stop.

(11) Logs shall not be unloaded by peaves or similar manual methods, unless means are provided and used that eliminate the danger from rolling or swinging logs. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-587, filed 9/21/79.]

WAC 296-54-589 Boom and rafting grounds. (1) Breaking of log jams by peavy method is prohibited, except in river drive or when jam occurs away from mechanical means or the dump.

(2) Wooden pike poles shall be of continuous, straight-grained No. 1 material. Defective poles, blunt or dull pikes shall not be used. Conductive pike poles shall not be used where there is a possibility of coming in contact with energized electrical conductors.

(3) Stiff booms shall be made by fastening not less than two boom sticks together. The width of a stiff boom shall be not less than thirty-six inches measured outside to outside of the logs. The boom sticks shall be fastened together with not less than 4" x 6" cross ties, or cable lashings notched into the boom sticks may be used when stiff booms are exposed to heavy swells. Stiff booms shall be kept free of loose bark and shall be maintained in good repair.

(4) A walkway thirty-six inches wide with standard hand railing shall be provided from the shore end of stiff boom to shore.

(5) All sorting gaps shall have a substantial stiff boom on each side of gaps. Such stiff booms or walkways shall be planked over.

(6) (a) Boom sticks shall be reasonably straight with no protruding knots or loose bark. They shall be capable

of supporting above the water line at either end the weight of one worker and equipment or two hundred fifty pounds.

(b) Foot logs shall be reasonably straight with no protruding knots or loose bark and shall be of sufficient size to support above the water line at either end the weight of two workers and equipment or five hundred pounds.

(7) Boom sticks which have been condemned as unsafe shall be marked by three chopped crosses ten feet from the butt end, and such sticks shall not be used as boom sticks.

(8) Gaps between boom sticks shall not exceed twenty–four inches. All wire shall be removed from boom sticks and boom chains before they are re–used or hung in rafting stalls.

(9) When permanent cable swifters are used they shall be arranged so that they are within easy reach of rafter without rolling boom sticks on which they are fastened. When cables become hazardous to use because of jaggers, they shall be discarded.

(10) When floating donkeys or other power–driven machinery is used on boom, it shall be placed on a raft or float with enough buoyancy to keep the deck of such raft or float well above water. Wherever persons walk, the deck of the raft or float shall be planked over with not less than two inch planking, and kept in good repair.

(11) When doglines used in rafting, brailing or stowing logs become hazardous to use because of jaggers, they shall be discarded.

(12) Storing, sorting or any boom work, other than boom boat operations, shall require a minimum of two persons.

(13) Sufficient walkways and floats shall be installed and securely anchored, to provide safe passage for workers.

(14) Walkways alongside sorting gaps shall not be less than four feet wide. Other walkways shall be not less than twenty–two inches wide. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79–10–081 (Order 79–14), § 296–54–589, filed 9/21/79.]

WAC 296-54-591 Boats and mechanical devices on waters. (1) Prior to starting the boat motor, any spilled fuel shall be removed and vapors shall be exhausted from any area in which they may accumulate.

(2) The bilge area shall be kept clean and oil, grease, fuel, or highly combustible materials shall not be allowed to accumulate.

(3) Adequate ventilation equipment shall be provided and used for the bilge area to prevent the accumulation of toxic or explosive gases or vapors.

(4) Adequate ventilation equipment shall be provided and used for the cabin area on enclosed–cabin type boats to prevent an accumulation of harmful gases or vapors.

(5) Deck and cabin lighting shall be provided and used where necessary to provide safe levels of illumination aboard boats. Boats operated during the period from sunset to sunrise, or in conditions of restricted visibility, shall display navigation lights as required by the United States Coast Guard. Searchlights or floodlights shall be provided to facilitate safe navigation and to illuminate working or boarding areas adjacent to the craft.

(6) On craft used by workers wearing calked shoes, all areas where the operator or workers must stand or walk shall be made of or be covered with wood or other suitable matting or nonslip material and such covering shall be maintained in good condition.

(7) Each boat shall be provided with a fire extinguisher and life ring with at least fifty feet of one–fourth inch line attached. On log broncs, boomscooters, or other small boomboats where all occupants are required to wear life saving devices and a life ring would present a tripping hazard, the life ring may be omitted.

(8) (a) Along docks, walkways, or other fixed installations on or adjacent to open water more than five feet deep, approved life rings with at least ninety feet of one–fourth inch line attached, shall be provided. The life rings shall be spaced at intervals not to exceed two hundred feet and shall be kept in easily visible and readily accessible locations.

(b) When employees are assigned work at other casual locations where exposure to drowning exists, at least one approved life ring with at least ninety feet of line attached, shall be provided in the immediate vicinity of the work assigned.

(c) Where work is assigned over water where the vertical drop from an accidental fall would exceed fifty feet, special arrangements shall be made with and approved by the Department of Labor and Industries prior to such assignment.

(d) Lines attached to life rings on fixed installations shall be at least ninety feet in length, at least one–fourth–inch in diameter, and have a minimum breaking strength of five hundred pounds. Similar lines attached to life rings on boats shall be at least fifty feet in length.

(e) Life rings must be United States Coast Guard approved thirty–inch size.

(f) Life rings and attached lines shall be maintained to retain at least seventy–five percent of their designed buoyancy and strength.

(9) Log broncs, boomscooters, and boomboats shall not be loaded with personnel or equipment so as to adversely affect their stability or seaworthiness.

(10) Boats shall not be operated at an excessive speed or handled recklessly. [Statutory Authority: RCW 49-.17.040, 49.17.150, and 49.17.240. 79–10–081 (Order 79–14), § 296–54–591, filed 9/21/79.]

WAC 296-54-593 Dry land sorting and storage. (1) Unauthorized foot and vehicle traffic shall not be permitted in the sorting or storage area.

(2) Logs shall be stored in a safe and orderly manner. Roadways and traffic lanes shall be kept clear of protruding ends of logs and debris.

(3) Dry deck log storage areas shall be kept orderly and maintained in a condition conducive to safe operation of mobile equipment. Roadways and walkways shall have a smooth hard–packed surface wide enough to permit a safe operation. Bark, mud, and other debris shall

not be allowed to accumulate to the extent it constitutes a hazard to the operation.

(4) At log dumps, sorting and storage areas, an effective means shall be provided and used to control dust.

(5) Only an authorized person shall operate or ride any lift truck, log stacker, or log unloader.

(6) Signaling log unloader operators at dry deck areas by throwing bark or chips in the air is prohibited. Hand, horn signals or other safe, effective means shall be used at all times.

(7) Unnecessary talking to operator while engaged in operating controls of log stacker or log unloader is forbidden.

(8) Lift forks and arms of unloading machines shall be lowered to their lowest position, and all equipment brakes set prior to the operator leaving his machine unattended.

(9) Log unloaders or stackers shall not be moved about the premises for distances greater than absolutely necessary with the lift extended above the drivers head or with loads lifted higher than is necessary for vision.

(10) When truck drivers are out of the cab, they shall be in the clear, and in view of the log unloader before the lift forks are moved under the load and the lift is made.

(11) Where logs are offloaded onto a dry deck by means of unloading lines, a mechanism shall be used which is self-releasing. Employees shall be prohibited from ascending dry decks to release unloading lines.

(12) Persons shall not position themselves in the hazardous area near or under loads of logs being lifted, moved or suspended.

(13) Jackets or vests of fluorescent or other high visibility material shall be worn by persons working on dry land log storages. Hard hats shall be of a contrasting color or shall have high visibility tape affixed thereon.

(14) Log unloaders and log stackers designed in a manner whereby logs being handled may jeopardize the safety of the operator shall be provided with overhead protection and any other safeguards needed to afford adequate protection.

(15) Log unloaders and log stackers shall be equipped with a horn or other audible warning device. If vision is impaired or restricted to the rear, the warning device shall be sounded before operating the vehicle in reverse gear and sounded intermittently during the entire backing operation. The warning device shall be maintained in an operative condition.

(16) Each log-handling machine shall be equipped with a braking system which is capable of stopping and holding the machine with maximum load on any grade on which it may be required to work.

(17) A limit stop, which will prevent the lift arms from over-traveling, shall be installed on electric powered log unloaders.

(18) Shear guards shall be installed on unloading machines and similar types of equipment on which the arms pivot and move alongside the operator creating a pinch point at that location.

(19) All fork-lift type machines shall be equipped with grapple arms and the arms shall be used whenever logs are being moved.

(20) When log trucks are loaded by the use of a log stacker and the lay of any log is higher than the stakes, the log stacker shall remain against the completed load, or other suitable protection provided, to prevent the logs from falling until at least two wrappers and binders have been applied.

(21) All binders and wrappers shall remain on the load until an approved safeguard has been provided to prevent logs from rolling off the side of the truck or trailer when binders are released. A shear log, or equivalent means, shall be provided to ensure the log truck will be stationed close enough to the wrapper rack so that a log cannot fall between the log truck and the wrapper rack when removing binders and wrappers. At least one binder shall remain secured while relocating or tightening other binders. Crotch lines, fork lifts, log stackers, log unloaders, or other effective means shall be used for this purpose.

(22) An extra wrapper or metal band of equal strength shall be placed to hold the logs when it is necessary to remove a wrapper to prevent it from being fouled by the unloading machine.

(23) Machines of the type having arms which block the regular exit when in the up position, shall have an emergency exit installed.

(24) Seat provided. Riding on any part of a log handling machine except under the canopy guard is prohibited.

(25) Identification tags shall not be applied or pulled unless logs are resting in a stationary place, such as bunks, cradles, skids, or sorting tables.

(26) No person shall approach the immediate vicinity of a forklift-type log handling machine without first notifying the operator of his intention and receiving an acknowledgement from the operator.

(27) When fork-lift-type machines are used to load, unload, or handle trailers, a positive means of holding the lifting attachment to the fork shall be installed and used.

(28) When dry land log dumps use unloading methods similar to those of water dumps, the safety standards for water dumps shall apply to dry land dumps.

(29) When logs are handled between the hours of sunset and sunrise or other periods of poor visibility, illumination shall be provided consistent with chapter 296-62 WAC, General Occupational Health Standards, pertaining to illumination.

(30) Air operated stake releases shall be in conformity with the following requirements:

(a) The air supply shall be taken from the "wet" air reservoir or from the accessory air line to a spring loaded, normally closed control valve.

(b) The control valve shall be located in the cab, positioned so that it is accessible only from the operator's position.

(c) The control valve shall be fitted with a spring loaded cover or be otherwise guarded against inadvertent operation.

(d) A separate air line shall extend from the control valve to the tractor and trailer stake release chambers. The air line shall be clearly identified or installed in such a manner as to preclude it from being mistaken for the service or emergency air line. [Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 43-.22 and 42.30 RCW. 80-11-057 (Order 80-15), § 296-54-593, filed 8/20/80. Statutory Authority: RCW 49-.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-593, filed 9/21/79.]

WAC 296-54-595 Railroad operations. (1) All persons employed in any service on trains or rail operations, which are not engaged in interstate commerce, are subject to and shall be conversant with all rules and special instructions.

(2) Employees must render every assistance in their power in carrying out these rules and special instructions and must report to the proper official any violation thereof.

(3) Accidents, detention of trains or speeders, failure in supply of fuel or water, defects in track, bridges, or signals, must be properly reported to the supervisor by the quickest possible method.

(4) Any logging railroad may maintain a special set of operating rules applicable to their operation, provided that said rules are acceptable to the division of industrial safety and health, department of labor and industries.

(5) Each logging railroad operation which has more than one piece of railroad equipment in operation, must have a dispatcher on duty. All equipment must receive clearance from dispatcher.

(6) Train crew size shall be dependent upon the number of persons needed to safely operate the train under all prevailing conditions; however, when necessary to set hand brakes, two or more persons shall be assigned to set the brakes and give signals.

(7) All locomotives shall be equipped with sanding devices for both rails, front and rear, in proper working order. Clean, dry sand should be used.

(8) Locomotives shall be equipped with power brakes (air or steam) on all driving wheels. Tenders also shall have power brakes.

(9) All locomotives and speeders, operating between sunset and sunrise or other periods of reduced visibility, shall be equipped with and use head lights which shine in the direction of travel. The lights shall be of sufficient candlepower so the train can be stopped within range of the light beam. Cab lights shall be provided and maintained so the operators can see from their required positions the gauges and equipment necessary for operation.

(10) All locomotives shall be equipped with proper grab irons, hand holds, steps, and running boards.

(11) All locomotives shall be equipped with automatic couplers, suitable for low or high draw-bars.

(12) On all rolling stock, wheels which have sharp or badly worn flanges, shall be replaced. Avoid the use of flat wheels.

(13) All locomotives with tender shall have an apron of proper length and width to insure safety and which shall be roughened to insure secure footing.

(14) Handholds and footboards shall be provided on locomotive cranes, except where cab overhangs end of car.

(15) Trains and speeders shall not exceed a safe speed.

(16) A terminal test of air brakes shall be made by trainmen before leaving the terminal. Enginemen shall not proceed until they are satisfied by brake action that brakes are able to control the train.

(17) All of the cars in a train shall have their brakes in good operating condition.

(18) On railroads where joint operations of two or more firms are necessary, trains shall not be dispatched less than fifteen minutes apart. Red lights shall be displayed on the rear of such trains at night or when visibility is poor.

(19) Whenever cars are left on grades, derailers shall be provided. Derail signs shall be placed near derailers. In setting out equipment, care shall be used in seeing that proper clearance is provided.

(20) Standard pressure for mountain grades requires a pressure of ninety pounds in train pipe, one hundred ten pounds in main reservoirs (low pressure) and one hundred thirty pounds in high pressure to insure quick releasing of brakes and recharging of auxiliaries. Engineer shall see that his engine carries these pressures and that sanders, both forward and rear, are in working order. On all heavy grades the high pressure retaining valve must be used and before train is started from landing, a test of brakes must be made and piston travel adjusted, if necessary, and retaining valves put up. Engineer shall start train away from landing slowly, giving wheels a chance to roll before applying brakes and, to avoid skidding of wheels, using sand freely. Brakes should then be applied immediately and released, allowing the retaining valves to hold the train while train pipe and auxiliaries are being recharged. Train speed should be held to the required rate by setting and releasing brakes as it is necessary to control train.

(21) When it is necessary to leave loads on pass while switching a side, loads must be left close to derailer, air set and sufficient hand brakes set up, before cutting engine from train.

(22) Enginemen must see car or signalman when making couplings, giving trainmen ample time to align drawheads and open knuckles of coupler, especially on curves, except when using radios.

(23) Drawbars should not be aligned with the foot while cars or engines are in motion. Trainmen shall not climb between cars while in motion. Enginemen shall not drift too close to switches which are to be thrown. Position of switch points should always be observed after throwing switch. Switch lever should be pushed firmly into the notch before leaving the switch. No persons except trainmen, unless authorized, shall ride on engine foot-boards. No object shall be thrown from train or engine while in motion. Bell shall be rung or whistle blown, before moving locomotive.

(24) No equipment shall be pushed ahead of locomotive unless a brakeman is on head car in constant view of

engineer or second brakeman in position to intercept and pass signal to engineer.

(25) In addition to air brakes, hand brakes must be provided on all cars and maintained in good working order.

(26) Hand brakes must be easily accessible to brakemen when cars are loaded. When wheels or staff brakes are used they should be placed on the side opposite the brow log at the dump to prevent their damage when cars are unloaded. All switch throws, walkways and cleared areas for brakemen shall be on the hand brake side.

(27) All brake hickeys shall be made from three-fourths inch hexagon steel (high grade) and be twenty-four inches with a good claw on one end to fit the wheel and a knob on opposite end to prevent slipping from brakeman's hand.

(28) All railroad trucks and cars, where brakes are set by hand while in motion, shall have good footboards and toeboards on the brake end.

(29) A ten inch bunk block is recommended on all trucks to prevent logs from slipping over block.

(30) All cars other than logging trucks must have hand hold and foot steps to permit persons to get on and off easily and safely.

(31) All cars and trucks regularly operated must have automatic couplers.

(32) Locomotives and cabooses shall carry the following equipment:

1 Red Light (Lantern Type)
3 Red Flags
At least 3 fuses

(33) When a train stops between telephones, or where the rear of a train extends beyond yard limits, the rear of the train must be properly protected.

(34) Whistle sign board shall be placed one thousand two hundred feet from each side of highway crossings.

(35) A rail clamp shall be placed to hold cars left on a grade on main line or spurs.

(36) All cars and trucks shall be legibly numbered so that those with defects may be reported and taken out of service. Each locomotive, speeder, or other self-propelled vehicles shall be numbered, or otherwise made readily identifiable.

(37) All cars used for hauling logs shall be equipped with patent stake bunks, or bunks with chock blocks and/or chains, so constructed that block can be released from opposite end of bunk unless solid stakes are used.

(38) All main line trains of more than ten loaded cars shall have a caboose at the rear of the train.

(39) All operations having both truck roads and railroads, shall post signs at intersections same as public crossings.

Engine whistle signals. The following engine whistle signals are established as standard and are taken from the American Association of Railroads. The signals prescribed are illustrated by "o" for short sounds and "–" for long sounds. Audible whistle shall be sounded when approaching camps, junctions, grade crossings and other prescribed places in conformity with the American Association of Railroads:

One short	(o) Stop, apply brakes.
Two long	(––) Release brakes.
Three long	(–––) When running, train parted, to be repeated until answered by hand signal.
Two short	(oo) Answer to any signals not otherwise provided for.
Three short	(ooo) When train is standing back.
Four short	(oooo) Call for signals.
Two long, two short	(––oo) Approaching highway crossing at grade.
One long	(–) Approaching station, rollway, chute, crossing, junctions, and derailers. When standing, air leak.
Six long	(––––––) Repeated at intervals, call for section men, train derailed.
One long, three short	(–ooo) Flagman to go back and protect rear of train.
Four long	(––––) Foreman.
Five long	(–––––) Flagman to return from any direction.
Long, short	(–o–o–o) Repeated four or more times, fire alarm.
Seven long, two short	(–––––––oo) Repeated, man hurt.
One long, one short	(–o) Repeated at intervals, closing down.
Groups of shorts repeated	(ooooooo) Danger of runaway.

Unnecessary use of whistle is prohibited.

[Statutory Authority: RCW 49.17.040, 49.17.050, 49-.17.240, and chapters 43.22 and 42.30 RCW. 80-11-057 (Order 80-15), § 296-54-595, filed 8/20/80. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-595, filed 9/21/79.]

WAC 296-54-597 Railroad maintenance--Loading or unloading. (1) Track gangs, bridge crews, etc., when working on railroads in use shall place a yellow caution flag by day and a yellow lantern by night a sufficient distance both directions from the crew to protect them against approaching equipment. The operator of said equipment shall acknowledge the signal by two short blasts of the whistle or horn and proceed with caution.

When said crews are removing or replacing a rail or are performing any other work that would make it necessary for approaching equipment to come to a stop, they shall place a red flag by day and a red lantern by night in the center of the track a sufficient distance in both directions from the crew to protect them against said equipment. The operator of approaching equipment shall acknowledge the signal by one short blast of the whistle or horn and shall come to a dead stop and remain standing until the signal is removed by the person who placed it, or until investigation proves that the track is safe for passage. If a flagman is used, the above provision need not apply.

(2) Where clearance is scant, warning signs or signals shall be posted.

(3) Switch throws should be kept well oiled and targets and signs in good legible condition.

(4) Standard clearances shall be maintained at all points on the right of way except where necessarily restricted where loading or unloading operations are performed or at water tanks, fuel tanks, etc. Warning signs shall be posted at all such locations.

(5) Whenever workmen are repairing, working on or in railroad equipment, loading or unloading cars or performing other duties where there is danger of the railroad equipment being struck by other moving railroad equipment; proper means, methods or safeguards shall be used to protect such workmen. A derail shall be used to prevent other rail equipment from contacting such cars or equipment or endangering the workmen. After cars are spotted, blue flags shall be placed in the center of the tracks at least fifty feet from the end car during the day and blue lights shall be installed at such locations at night. Flags, lanterns and derails shall be removed only by the person placing them unless they are to remain posted for a longer period of time, in which case one person on each oncoming shift shall be responsible to ascertain that they are in place and he shall not remove such safeguards until he investigates to make certain all persons are in the clear. Operators of approaching equipment shall not pass or remove a flag or lantern which is properly posted. Cars or other equipment shall not be placed where it will obscure the signal from an operator controlling approaching equipment. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-597, filed 9/21/79.]

WAC 296-54-599 Truck and equipment maintenance shops. It is recognized that the usual hazards encountered in maintenance shops performing work on logging and related equipment would be very similar to those found in general repair, machine or welding shops; therefore, the rules contained in the general safety and health standards and other applicable safety standards promulgated and administered by the department of labor and industries shall apply to such places of work. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-599, filed 9/21/79.]

WAC 296-54-601 Signals and signal systems. (1) Standard hand or whistle signals as described or illustrated herein, shall be used for the movement of rigging, logs, or equipment when using a high lead, slackline, or cable skidder system for yarding. For Hand Signal illustrations, see Figure 4.

(2) Voice communications may be used for yarding under the following conditions:

(a) Voice communications by use of radio frequencies may be used to transmit instructions and directions to the yarder operator when using a grapple type logging system, providing no person is in a hazardous area near live rigging.

(b) Voice communication may be used to instruct the yarder operator when picking up an occasional log with the use of a choker on a grapple system, providing the grapple is on the ground prior to the setting of the choker and that no lines are moved by the operator until the person setting the choker has returned to a safe location away from any running lines. At no time shall chokers be used on the grapple system during the hours of darkness or during periods of reduced visibility to such extent that the yarder operator cannot clearly see the workmen setting the choker. When a number of logs are required to be yarded by using chokers instead of the grapple, the requirements specified for high lead type of logging shall apply.

(c) Voice communications by use of radio frequencies may be used to transmit instructions and directions to the yarder operator when using a balloon system for yarding. The person operating the radio shall ascertain that all crew members are in the clear before transmitting instructions which would cause any line or turn to move. The person giving such instructions shall keep the crew members informed as to which movements will commence. The whistle shall be blown before moving any running line.

(d) The federal communications commission rules require that assigned call letters be used in conjunction with voice communications.

(3) Voice communications on the same radio frequencies used to transmit skyline, highlead, slackline, or skidder whistle signals (154.57 and 154.60 MHz Channels), shall be prohibited.

NOTE: If voice is received on 154.57 or 154.60 MHz Channels, it is recommended the Assistant Director, Department of Labor and Industries, Division of Industrial Safety and Health, P.O. Box 207, Olympia, Washington 98504, (Phone 206/753-6500) be contacted as soon as possible to enable the department to ascertain the source of the voice transmission.

(4) If a standard signal is not listed for an unusual or new situation, a hand or whistle signal other than any listed for the type of yarding being done may be used for the specific situation only. Any special signals so developed shall be understood by all persons required to work in the area which may be affected by their use.

(5) A copy of the standard hand and whistle signals shall be posted on the yarder and at places where crews

congregate. For tractor logging operations, hand signals shall be posted at places frequented by the crew members such as in crew buses, etc.

(6) Only one workman in any crew shall give signals at the point where chokers are being set. Any person is authorized to give a stop signal when a workman is in danger or other emergency condition is apparent.

(7) Hand signals are permitted only when the signal person is in plain sight of the machine operator and when visibility is such that the signals are discernible. Hand signals may be used at any time as an emergency stop signal.

(8) Throwing of any type of material as a signal is prohibited.

(9) The use of a jerk wire signal system for any type of yarding operation is prohibited.

(10) All persons shall be in the clear before any signal is given to move the rigging, logs, or turns, and movement of rigging, logs, or turns shall not commence until after the proper signals have been given.

(11) Machine operators shall not move any line unless the signal received is clear and distinct. If in doubt, the operator shall repeat the signal as understood and wait for confirmation.

(12) A horn or whistle which is automatically activated by the radio or electric signaling system shall be used on each yarder used for skyline, high lead, skidder or slackline system of yarding, except where hand signals are permissible. The horn or whistle shall emit a sound which will be clearly audible to all persons in the affected area. Such a horn or whistle shall also be required on combination yarding and loading machines and tree pullers. Audible signals are not necessary on grapple or other yarding systems where persons are not exposed to the movement of logs or rigging.

(13) Each unit of the signal or control system in use, shall be tested daily before operations begin. Audible signals used for test purposes shall not include signals used for the movement of lines or materials.

(14) Citizen band (CB) radios shall not be used to activate any signal, machine, or process, either automatically or by voice. This shall not prohibit the use of CB radios for communication between sides, vehicles, work units, or for emergency situations.

(15) When audible whistle signals are being used simultaneously by yarding and loading machines at a landing, signal whistle or horn tones used in connection with machine movements shall be so differentiated as to distinctively identify any intended work movement of either machine. [Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, and chapters 43.22 and 42.30 RCW. 80-11-057 (Order 80-15), § 296-54-601, filed 8/20/80. Statutory Authority: RCW 49.17.040, 49.17-.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-601, filed 9/21/79.]

WAC 296-54-603 Electric signal systems. (1) Where an electrical signal system is used, all wire and attachments shall be of the weatherproof type and all connections shall be weatherproof.

(2) Electric signal systems shall be properly installed and adjusted. They shall be protected against accidental signaling and shall be maintained in good operating condition at all times. Sufficient signal wire shall be provided to enable good voice contact between the whistle punk and rigging crew at all times. [Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-603, filed 9/21/79.]

WAC 296-54-605 Radio systems used for voice communication, activation of audible signals, or equipment. (1) Every employer who uses a radio signaling or control system (voice or functions) shall comply with or exceed the minimum requirements specified in this section.

(2) A valid operating permit shall be obtained by the owner from the division of industrial safety and health, department of labor and industries, prior to putting into use any radio signaling or control system (voice or functions) intended to be used in conjunction with any type of cable logging operation. Permits will be issued only for systems licensed for such use and using those carrier frequencies as authorized by the Federal Communications Commission. In addition, permits will be granted only when tone or function frequencies are compatible with other radio systems in use and when in compliance with all other applicable requirements contained in this safety standard.

(3) The division of industrial safety and health reserves the right to designate the use of radio frequencies for certain purposes or functions, for example, certain frequencies may be used for voice transmission of instruction, others for tone coded functions, or activation of signaling devices. No single tone sets shall be permitted for logging purposes. The division may also designate which tone frequencies may be used for the activation of a signaling device or for control of equipment on certain federal communication assigned carrier frequencies.

(4) A list of tone frequencies which may be used with any Federal Communications Commission assigned carrier frequencies will be made available by the division of industrial safety and health to any interested person, firm, or corporation upon request.

(5) The division of industrial safety and health shall assign the area or areas in which a radio signaling system may be used and shall so mark on the permit. Radio signaling systems shall not be used in any area other than indicated on the permit. (See Figure 16 for map of areas.)

(6) The person or firm name on the permit shall be the same as the person or firm operating the radio signaling system except for loaner or rental sets. A person or firm using a loaner or rental set shall be responsible for the radio signal system as if they were the owner of the set. The application for a permit to use a radio signaling system shall contain the following information:

(a) Name and address of applicant.

(b) The radio frequencies of the radio signaling device in MHz.

(c) The tone frequency or frequencies of the radio signaling system used to activate a horn, whistle, or control equipment in Hz. The security gate, or pulse tone, shall be shown first.

(d) The name of the manufacturer of the radio signaling system.

(e) The serial number of the receiving unit.

(f) The state assigned area or location in which the unit will operate.

(g) Indicate type of signaling used.

(h) From whom the system was purchased or acquired, and the date of acquisition of the system.

(i) Intended use and function of system.

NOTE: See Sample Form No. 157, "Application for Permit to Operate Radio Signal System in Designated Area," Figure 10 following this section.

(7) The permit granted by the department shall be attached to the case of the receiver of the radio signaling system for which it is granted.

NOTE: See sample S.F. Form No. 158, "Permit to Operate Multi-Tone Radio Signal System in Designated Area," Figure 11 following this section.

(8) Each radio receiver shall have its radio carrier frequency in MHz and tone frequency(s) in Hz indicated on the outside case of the receiver. The manufacturer's name and serial number shall also be permanently indicated on the outside of the case. When the duration or width of the tone frequencies performs a function, the one duration/width shall also be permanently indicated on the outside of the receiver case. Each transmitter shall be identified with its receiver. Two or more receivers in operation simultaneously on the same tone frequency shall be prohibited.

(9) It shall be the responsibility of the owner of any radio signaling system to notify the division of industrial safety and health, department of labor and industries, immediately, if the signal system is:

(a) Permanently retired (in what manner and date retired).

(b) Sold (submit name and address of purchaser and date sold).

(c) Removed from the state (name of state to which moved and date moved).

(d) Stolen (date).

(10) Two operable transmitters shall be carried by separate individuals at the point where chokers are being set at all times when transmitters are being used for tone signaling by persons around the live rigging in the choker setting area. Only one radio transmitter shall be required if in the possession of a signalperson who has no other duties and remains in an area where there are no hazards created by the moving rigging or logs. If the total crew consists of a yarder operator and one person in the rigging, only one transmitter is required provided a positive system is instituted and used to check on the well-being of the person in the rigging.

(11) When interference, overlap, fadeout, or blackout of radio signals is encountered, the use of the device shall be discontinued immediately. The use of the device shall not be resumed until the source of trouble has been detected and corrected.

(12) All radio signaling systems put into use for the first time after the effective date of these safety standards, shall meet or exceed the minimum performance specifications contained in WAC 296-54-607 of these safety standards, and, when altered or repaired, shall continue to meet such specifications.

(13) At least one make and model of each signaling system shall be tested and certified that it meets or exceeds the minimum requirements for performance as specified in WAC 296-54-607. A copy of such performance report shall be signed by the person or persons who tested the unit or components and shall be sent to the Division of Industrial Safety and Health, Department of Labor and Industries, P.O. Box 207, Olympia, Washington 98504.

(14) Radio equipment shall not be used without displaying a permit as required by this standard. The permit shall be prominently displayed on the outside case of the receiver of the unit or, for radio controlled carriages, on the transmitter in the yarder.

(15) Adjustments, repairs, or alterations of radio signaling devices shall be done only by or under the immediate supervision and responsibility of a person holding a first-class or second-class commercial radio operator's license, either radio-telephone or radio-telegraph, issued by the Federal Communications Commission. Persons who do not possess the technical ability or do not have the proper equipment to cause the signaling systems to function within required tolerances shall not attempt to repair, alter, or adjust such systems.

(16) Radio frequencies assigned to systems for which voice communications may be used to give signals to the yarder operator, shall not be the same frequencies as those assigned for whistle signals used in skyline, highlead, slackline, or cable skidder systems.

(17) When hazardous interference is created by moving a voice communication system into an area where a system is already in use on the same frequency, use of the newly-moved system shall be immediately discontinued until the problem of interference has been corrected.

(18) Before moving any unit from one assigned geographical area to another (see area map, Figure 12 following this section), a new permit shall be applied for and secured from the Division of Industrial Safety and Health, Department of Labor and Industries, P.O. Box 207, Olympia, Washington 98504.

Form No. 157. 5-71

STATE OF WASHINGTON

DEPARTMENT OF LABOR AND INDUSTRIES DIVISION OF SAFETY

APPLICATION FOR PERMIT TO OPERATE RADIO SIGNAL SYSTEM IN DESIGNATED AREA

Radio Carrier Frequency..... Serial No.....

Tone Coding Frequency.....Hz.....Name of Manufacturer of Signal System.....

Firm Name..... Address..... By.....

Intended Function of Unit: Voice communication ☐ Whistle signal ☐ Control Equipment ☐

Area in which Unit will be Operated:..... 1 ☐ ..... 2 ☐ ..... 3 ☐ .....
(Area map included in Safety Standards for Logging Operations)

Type of Tone: Sequential ☐ Simultaneous ☐ If other specify type.....

System to be Used For: Grapple ☐ Skyline, Highlead, Slackline, Skidder ☐ Balloon ☐

System Purchased or Acquired From.....

Date System Purchased or Acquired: Day..... Month..... Year.....

Mail Permit to.....

Date Application Mailed to Division of Safety ...../...../.....
Day Mo. Year

Date Permit Issued ...../...../.....
Day Mo. Year
DIV. OF SAFETY USE ONLY

3

Figure No. 10

STATE OF WASHINGTON
DEPT. OF LABOR & INDUSTRIES DIV. OF SAFETY

PERMIT #

TO OPERATE MULTI-TONE RADIO SIGNAL SYSTEM IN DESIGNATED AREA.

Model ..... Serial.....

Carrier Frequency ..... MHz

Tones ..... Hz

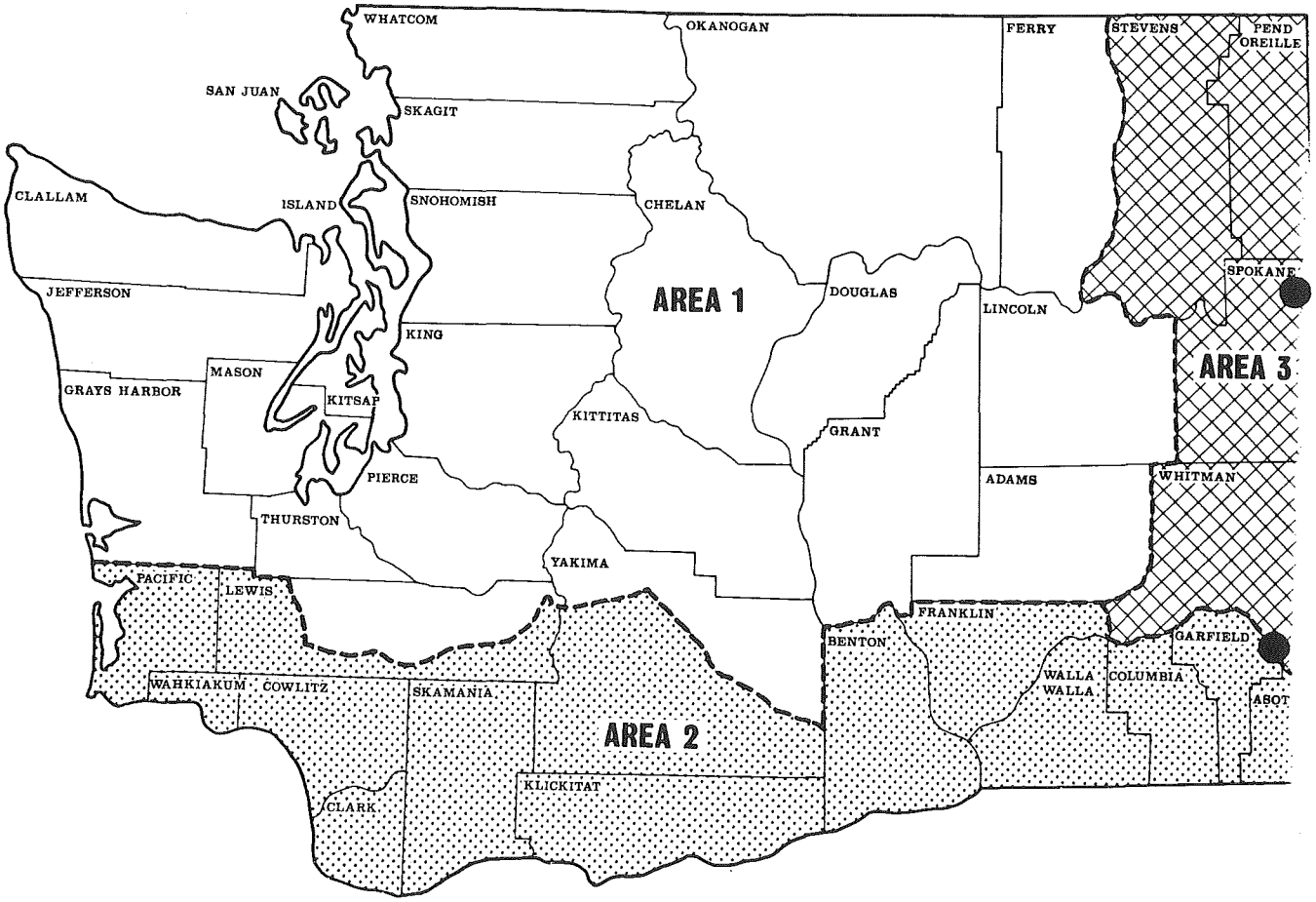
AREA

Firm Name .....

Issued by .....

S. F. No. 158—12-71—25C. 38416.

AREAS FOR USE OF RADIO SIGNALING SYSTEMS FOR LOGGING OPERATIONS



State of Washington
Department of Labor and Industries
Division of Industrial Safety and Health

A permit issued by the Division of Industrial Safety Health shall be attached to the outside of the receiver which shall indicate the area in which the radio signaling equipment may by used.

[Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-605, filed 9/21/79.]

WAC 296-54-607 Radio signal systems--Specifications and test procedures. All radio-signaling systems put into use for the first time after the effective date of these rules shall meet or exceed the following requirements, specifications, tolerance, and tests and such systems, when altered or repaired, shall meet the same minimum requirements.

(1) Radio-signaling systems used to transmit whistle signals or control functions of equipment associated with skyline, highlead, slackline, or cable skidder systems of logging shall transmit and decode only by the use of authorized multi-tone frequencies. Only sequential tones may be used to transmit signals or control equipment when utilizing carrier frequencies of 154.57 or 154.60 MHz.

(2) The receiver sensitivity shall be capable of attaining .6 microvolt, or greater, for 12 db SINAD ratio for VHF frequencies and .7 microvolt, or greater, for UHF frequencies. Effective January 1, 1984, all radio systems receiver sensitivity shall be capable of attaining .4 microvolt, or greater, for 12 db SINAD ratio for VHF frequencies and .5 microvolt, or greater, for UHF frequencies. When interference is a factor, the receiver may be desensitized in the furtherance of safety by a person qualified in accordance with WAC 296-54-605(15).

(3) The receiver spurious attenuation shall be at least 40 db when measured by the 20 db quieting method. On all new radio systems put into service after the effective date of these standards, the receiver spurious attenuation shall be at least 60 db when measured by the 20 db quieting method. Effective January 1, 1984, all new radio signal systems shall be required to have receiver spurious attenuation of at least 70 db when measured by the 20 db quieting method and shall have image response attenuation of 60 db when measured by the 20 db quieting method. Effective January 1, 1989, all radio

signal systems shall be required to have receiver spurious attenuation of at least 70 db when measured by the 20 db quieting method and image response attenuation of 60 db when measured by the 20 db quieting method.

NOTE: Spurious response attenuation is a measure of the receiver's ability to discriminate between a desired signal to which it is resonant and an undesired signal at any other frequency to which it is also responsive.

(4) The receiver selectivity shall be more than 40 db plus or minus 30 KHz. All new radio signal systems put into service after the effective date of these standards, the receiver selectivity shall be at least 60 db plus or minus 30 KHz. Effective January 1, 1984, all new radio signal systems purchased and used shall have receiver selectivity of at least 80 db plus or minus 30 KHz. Effective January 1, 1989, all radio signal systems shall have receiver selectivity of at least 80 db plus or minus 30 KHz, when measured by the E.*I.A. SINAD method.

(5) The receiver–decoder tone frequency stability shall not exceed .006 (.6%) above or below the assigned tone frequency.

(6) The drift of a transmitter–encoder tone shall not exceed .006 (.6%) above or below the assigned tone frequency.

(7) Parts of the radio–signaling system affected by moisture, which may be subjected to the entrance of moisture during use, shall be weatherproofed. Transmitters shall be tested within fifteen minutes after being subjected to the following conditions and shall have the ability to continue functioning properly. The transmitter and receiver shall be placed in a humidity chamber for eight hours where the humidity has been maintained at not less than ninety percent and where a 40°C. temperature has been maintained.

(8) Radio–signaling system units shall operate within tolerances specified at any temperature within the range of –30°C. to +60°C.

(9) Switches of transmitters used to send whistle signals or activate equipment associated with high lead, slackline, or cable skidder systems of logging shall be designed in such a manner whereby two buttons, motions or a combination of these shall be required simultaneously to cause activation of the system. Arrangement of the activating switches shall be such that the operator can transmit signals easily but cannot easily activate a control or command function accidentally.

(10) All receivers intended to be mounted on or in the yarder or similar equipment, and all portable transmitters, shall continue to maintain specified mechanical and electrical performance during and after being subjected to vibration of the magnitude and amplitude as follows:

The equipment shall be vibrated with simple harmonic motion having an amplitude of 0.015" (total excursion 0.03") with the frequency varied uniformly between 10 and 30 Hz and an amplitude of 0.0075" (total excursion 0.015") with the frequency varied uniformly between 30 and 60 Hz. The entire cycle of frequencies for each group (i.e., 10 to 30 cycles and 30 to 60 cycles) shall be accomplished in five minutes and repeated three times. The above motion shall be applied for a total period of thirty minutes in each direction, namely, the directions parallel to both axes of the base and perpendicular to the plane of the base.

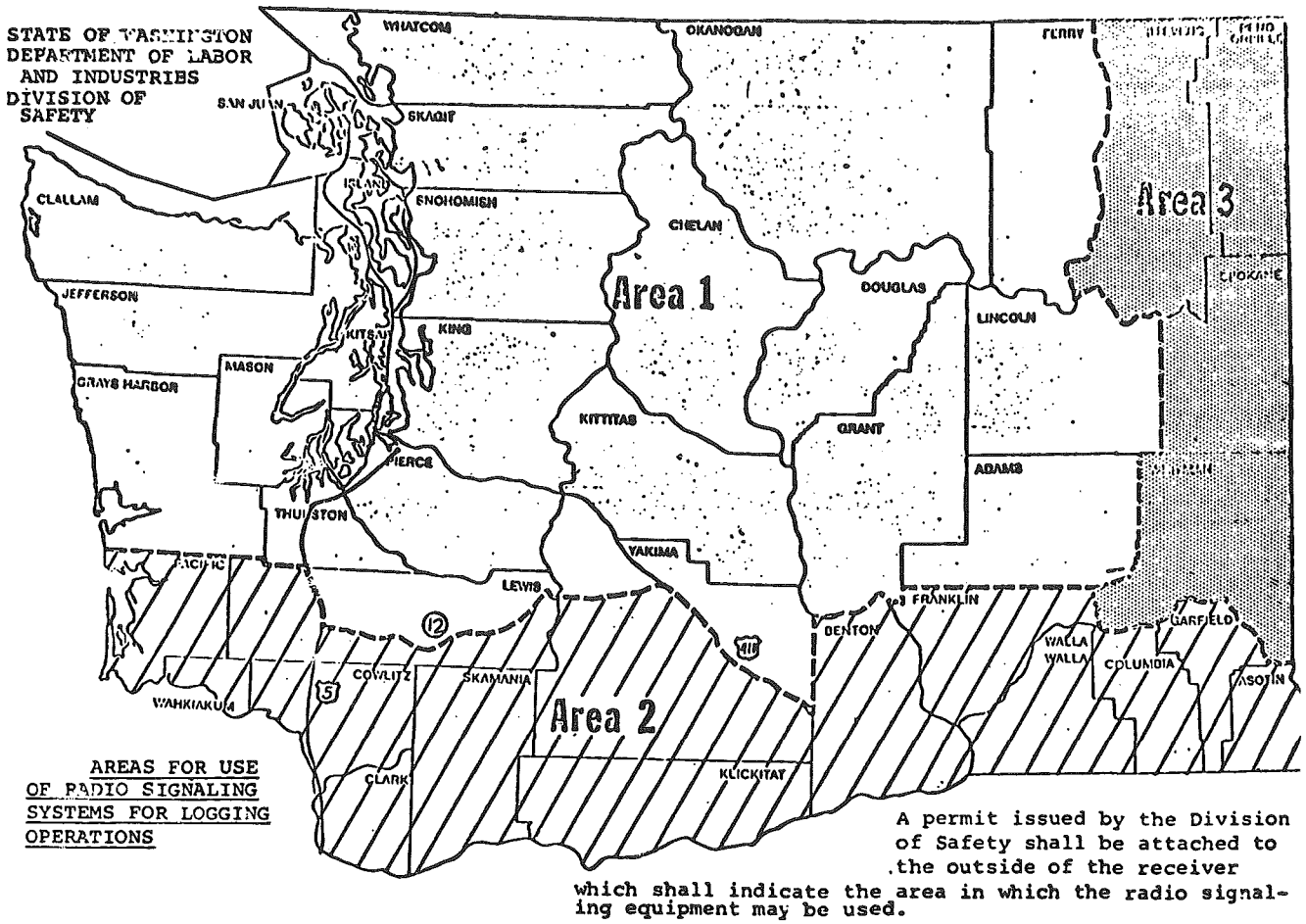
(11) All portable transmitters shall continue to maintain specified mechanical and electrical performance after being subjected to a shock test as follows:

The equipment shall be dropped once on each of five surfaces from a height of four feet onto a smooth concrete floor.

(12) Transmitters operating on carrier frequencies of 154.57 MHz and on 154.60 MHz shall be limited on maximum power output not to exceed 500 mW measured at the antenna terminals.

(13) To minimize the possibility of interference with other signaling systems, the input power of transmitters operating in the 450 MHz range should be limited to only the amount needed to transmit to the receiver of the system effectively. [Statutory Authority: RCW 49-.17.040, 49.17.150, and 49.17.240. 79-10-081 (Order 79-14), § 296-54-607, filed 9/21/79.]

WAC 296-54-990 Map.



[Order 72-14, Map (codified as WAC 296-54-990), filed 7/31/72, effective 9/1/72.]

WAC 296-54-99001 Appendix I--Figure 1--Rigging up, wrapping a guyline.

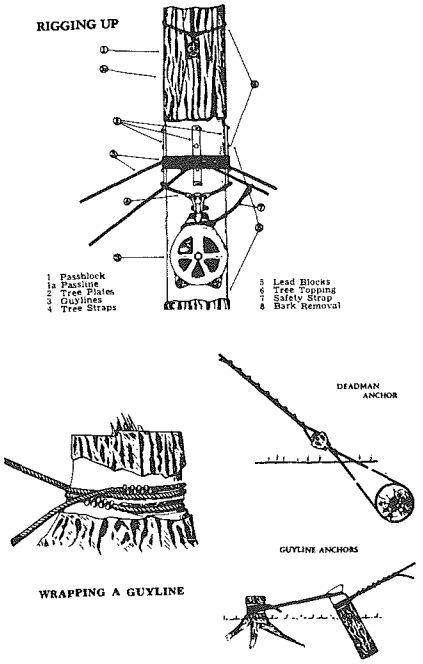


Figure 1.

[Order 72-14, Figure 1 (codified as WAC 296-54-99001), filed 7/31/72, effective 9/1/72.]

WAC 296-54-99002 Appendix I--Figure 2--High lead yarding system.

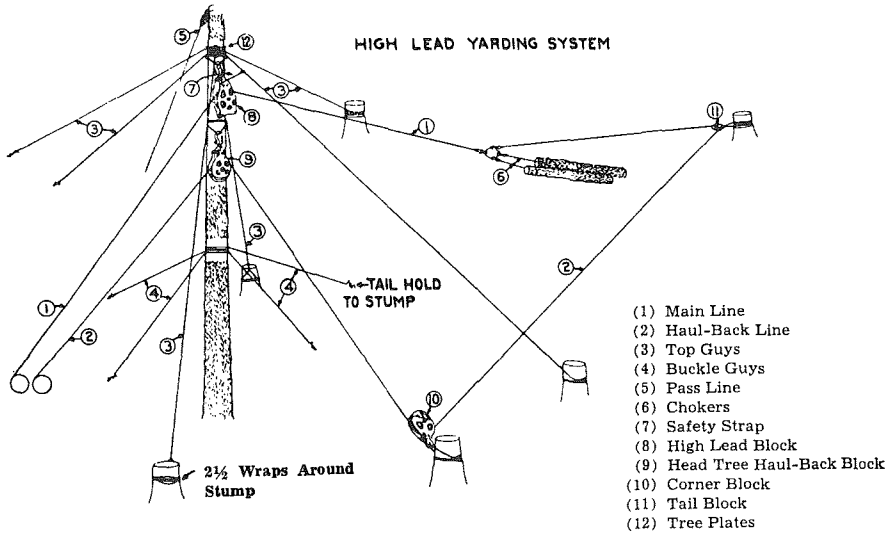


Figure 2.

[Order 72-14, Figure 2 (codified as WAC 296-54-99002), filed 7/31/72, effective 9/1/72.]

WAC 296-54-99003 Appendix I--Figure 3--North Bend yarding system.

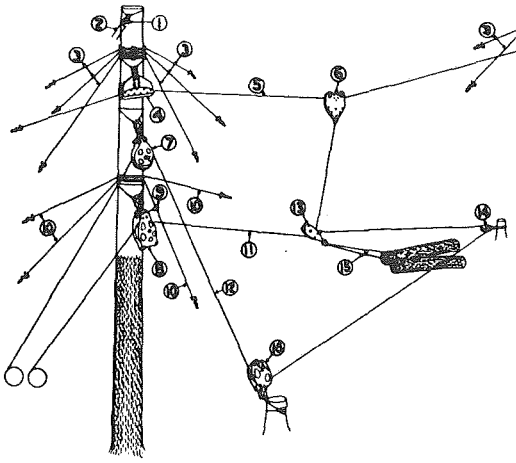


Figure 3.

[Order 72-14, Figure 3 (codified as WAC 296-54-99003), filed 7/31/72, effective 9/1/72.]

WAC 296-54-99004 Appendix I--Figure 4--Slack skyline yarding system.

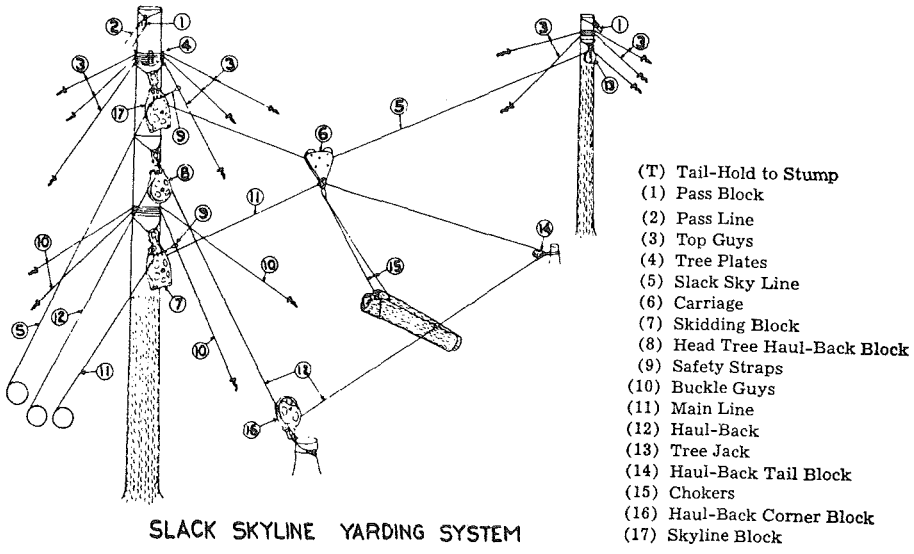


Figure 4.

[Order 72-14, Figure 4 (codified as WAC 296-54-99004), filed 7/31/72, effective 9/1/72.]

WAC 296-54-99005 Appendix I--Figure 5--Standard signals for tractor logging.

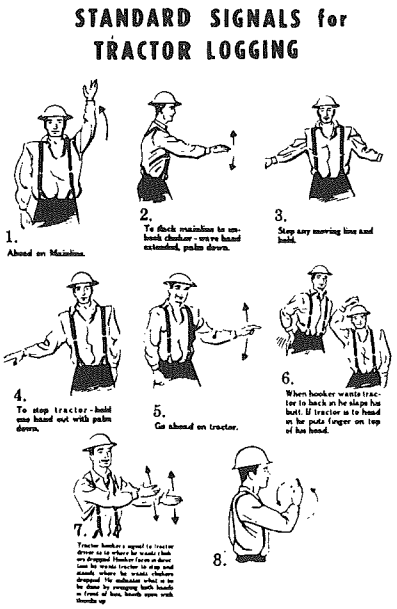


Figure 5.

[Order 72-14, Figure 5 (codified as WAC 296-54-99005), filed 7/31/72, effective 9/1/72.]

WAC 296-54-99006 Appendix I--Figure 6--Standard signals for loading logs.



Figure 6.

[Order 72-14, Figure 6 (codified as WAC 296-54-99006), filed 7/31/72, effective 9/1/72.]

WAC 296-54-99007 Appendix I--Figure 7--Heel boom loading.

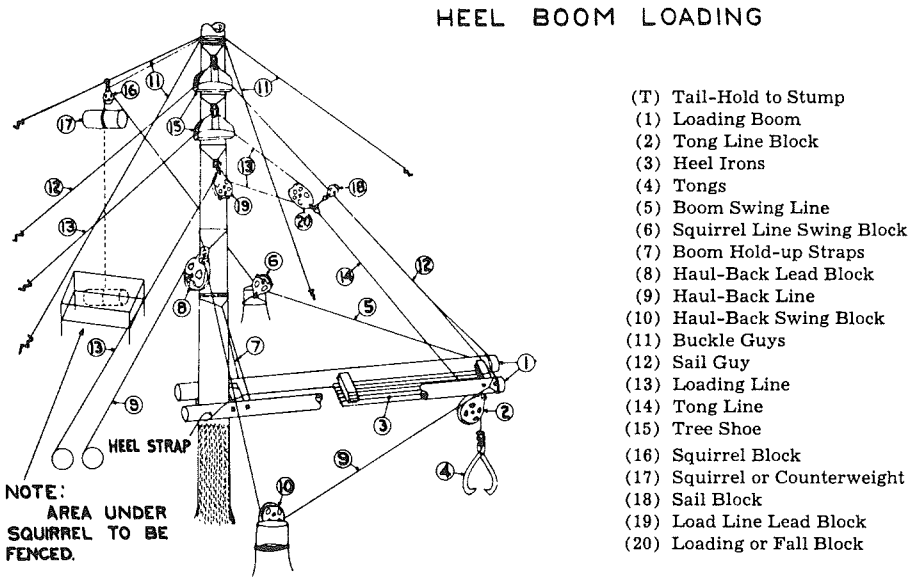


Figure 7.

[Order 72-14, Figure 7 (codified as WAC 296-54-99007), filed 7/31/72, effective 9/1/72.]

WAC 296-54-99008 Appendix I--Figure 8--Guyline loading.

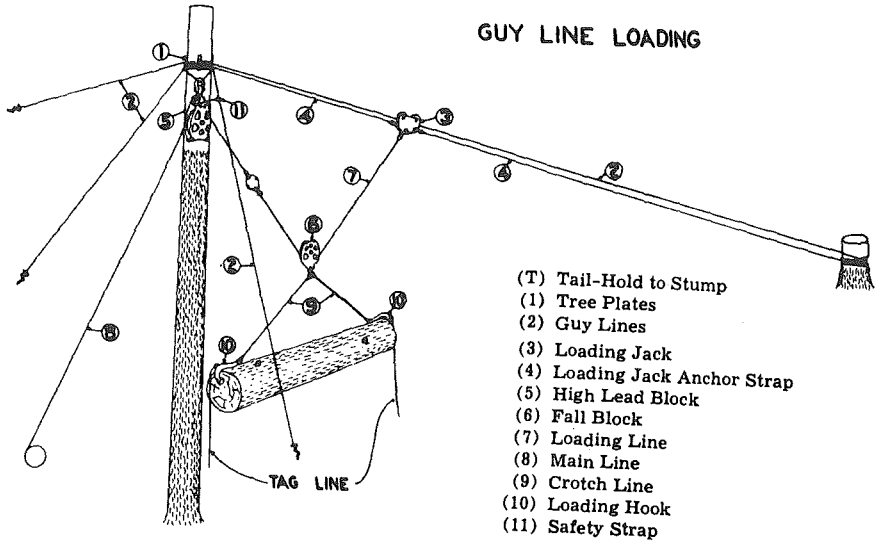


Figure 8.

[Order 72-14, Figure 8 (codified as WAC 296-54-99008), filed 7/31/72, effective 9/1/72.]

WAC 296-54-99009 Appendix I--Figure 9--Hayrack boom loading.

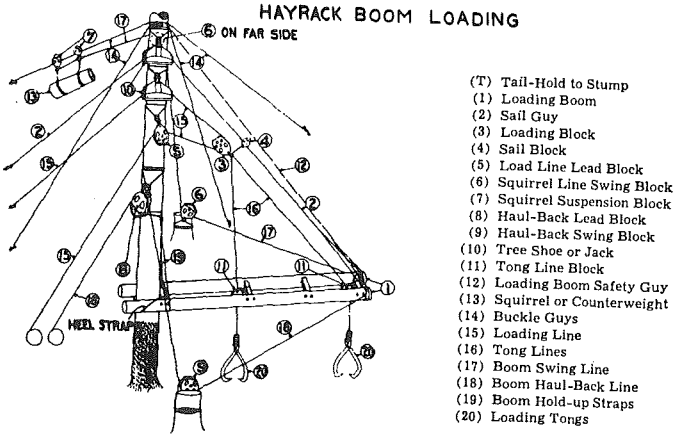


Figure 9.

[Order 72-14, Figure 9 (codified as WAC 296-54-99009), filed 7/31/72, effective 9/1/72.]

WAC 296-54-99010 Appendix I--Figure 10--Spreader bar loading.

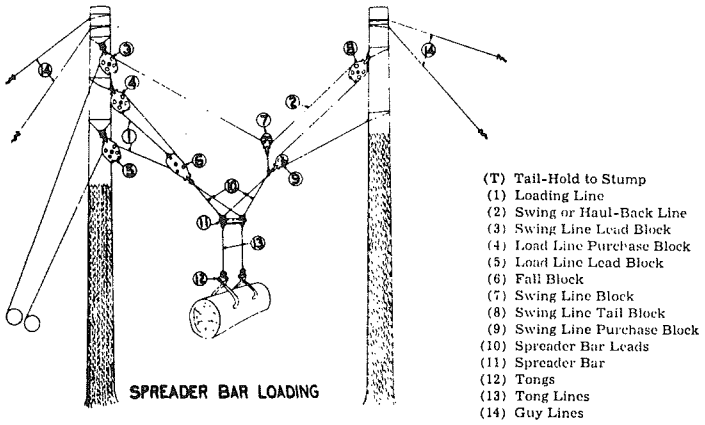
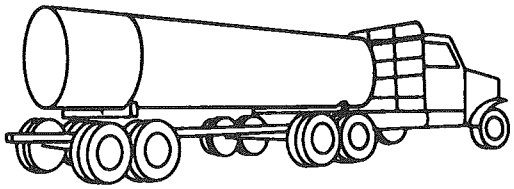


Figure 10.

[Order 72-14, Figure 10 (codified as WAC 296-54-99010), filed 7/31/72, effective 9/1/72.]

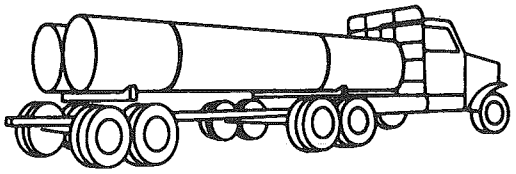
WAC 296-54-99011 Appendix I--Figure 11--Placement and number of binders.

ONE LOG LOAD



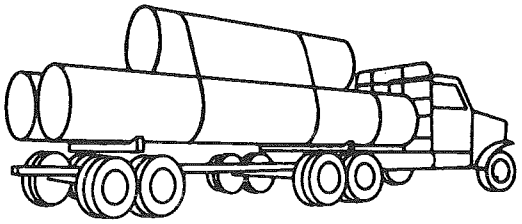
One binder required which shall be secured to rear bunk. Log shall be blocked to prevent it from rolling or shifting.

TWO LOG LOAD



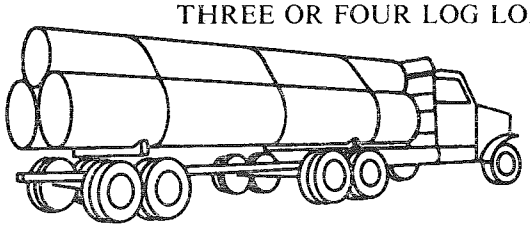
A minimum of two binders required. Logs shall be blocked to prevent them from rolling or shifting.

THREE OR FOUR LOG LOAD FORTY-FOUR FEET OR LESS



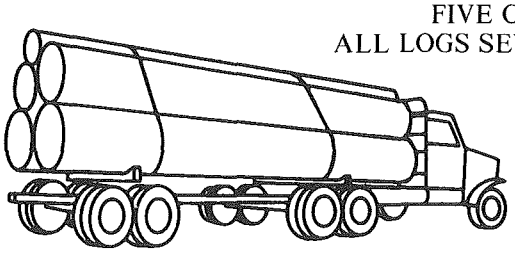
A minimum of two binders required.

THREE OR FOUR LOG LOADS MORE THAN FORTY-FOUR FEET



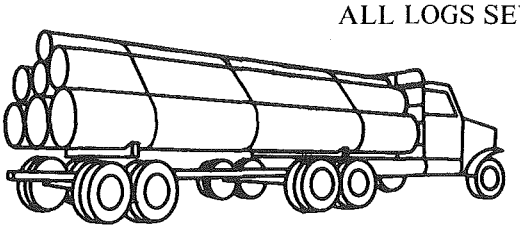
A minimum of three binders required.

FIVE OR SIX LOG LOAD
ALL LOGS SEVENTEEN FEET OR LESS



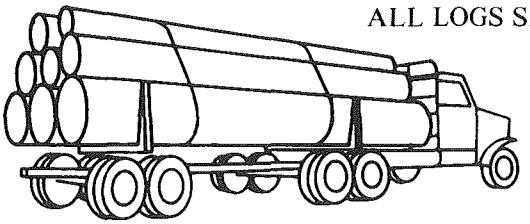
A minimum of two binders required.

SEVEN OR MORE LOG LOAD
ALL LOGS SEVENTEEN FEET OR LESS



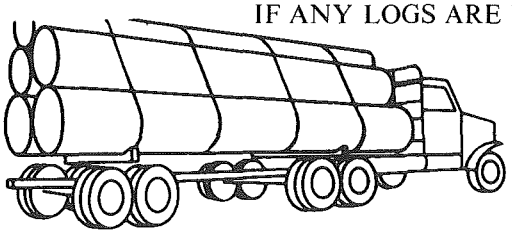
When using chock blocks a minimum of three binders required.

SEVEN OR MORE LOG LOAD
ALL LOGS SEVENTEEN FEET OR LESS



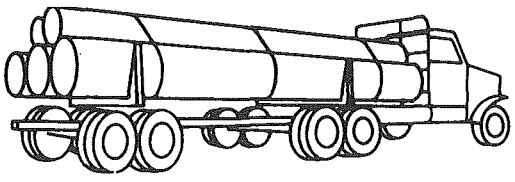
When using stakes a minimum of two binders required.

FIVE OR MORE LOG LOAD
IF ANY LOGS ARE MORE THAN SEVENTEEN FEET



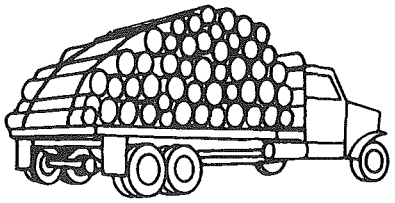
A minimum of four binders are required if using chock blocks.

FIVE OR MORE LOG LOAD
IF ANY LOGS ARE MORE THAN SEVENTEEN FEET



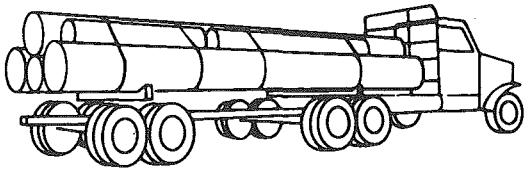
A minimum of three binders are required when using stakes.

SHORT LOGS LOADED CROSSWISE



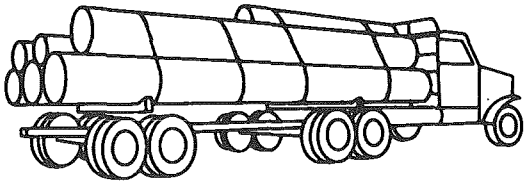
A minimum of two binders are required and two chocks or stakes shall be used on the open end of the truck.

OUTSIDE LOGS OR TOP LOGS



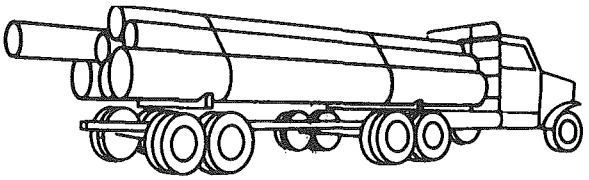
All outside or top logs shall be secured by a binder near but not within 12 inches of each end.

A BINDER SHALL BE NEAR EACH BUNK



Each load shall be secured by having a binder within 6 feet of each bunk except on one log loads.

PROPER SUPPORT FOR LOGS



Not more than approximately one-third the weight of any log shall extend beyond the end of the logs or bunk supporting it.

Figure 11.

PLACEMENT AND NUMBER OF BINDERS

[Order 72-14, Figure 11 (codified as WAC 296-54-99011), filed 7/31/72, effective 9/1/72.]

WAC 296-54-99012 Appendix I--Figure 12--Standard signals for high lead logging.

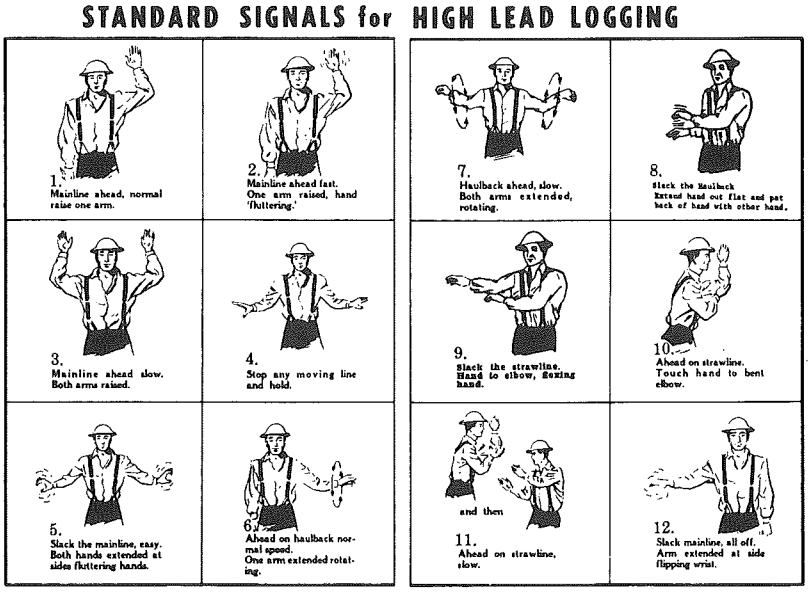


Figure 12.

[Order 72-14, Figure 12 (codified as WAC 296-54-99012), filed 7/31/72, effective 9/1/72.]

Chapter 296-56 WAC

SAFETY STANDARDS——LONGSHORE, STEVEDORE AND RELATED WATERFRONT OPERATIONS

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296-56-99006 Form——Appendix G——Standard procedure——Testing and inspection cargo spouts, suckers and similar equipment longshore, stevedore and related waterfront operations.

DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

296-56-001 through 296-56-400. [Filed 3/23/60.] Superseded by Safety Standards for Longshore, Stevedore and Related Waterfront Operations, filed 9/24/65. See WAC 296-56-401 et seq.

296-56-445 Radio controlled cranes. [Order 69-3, § 296-56-445, filed 5/26/69, effective 7/1/69.] Repealed by Order 74-14, filed 4/22/74.

296-56-450 Posting claim procedure. [§ II, Rule 2.010, filed 9/24/65; Rules (part), filed 3/23/60.] Repealed by Order 74-14, filed 4/22/74.

296-56-460 Minimum requirements for first aid——First aid training. [§ III, Rule 3.010, filed 9/24/65; Rules (part), filed 3/23/60.] Repealed by Order 74-14, filed 4/22/74.

296-56-470 Hard hats——General safety standards. [Order 69-3, § 296-56-470, and Appendix A (Forms), filed 5/26/69, effective 7/1/69; § III, Rules 4.010-4.230, filed 9/24/65; Rules (part), filed 3/23/60.] Repealed by Order 74-14, filed 4/22/74. See WAC 296-56-990 through 296-56-99006.

296-56-530 Cranes and crane operations. [§ X, Rules 10.010——10.060, filed 9/24/65; Rules (part), filed 3/23/60.] Repealed by Order 74-14, filed 4/22/74.

296-56-540 Application for waiver or variances. [Rules (part), filed 9/24/65; Rules (part), filed 3/23/60.] Repealed by Order 74-14, filed 4/22/74.

296-56-550 Practical application. [Rules (part), filed 9/24/65; Rules (part), filed 3/23/60.] Repealed by Order 74-14, filed 4/22/74.

296-56-570 Glossary. [Glossary, filed 9/24/65; Rules (part), filed 3/23/60.] Repealed by Order 74-14, filed 4/22/74.

296-56-590 Standard signals for longshore crane operations. Decodified——See WAC 296-56-990 through 296-56-99006.

WAC 296-56-401 Scope and application. (1) The rules included in this chapter apply throughout the State of Washington, to any and all Waterfront Operations under the jurisdiction of the Department of Labor and Industries, Division of Industrial Safety and Health.

(2) These minimum requirements are promulgated to augment the General Safety and Health Standards, and any other Safety and Health Standards promulgated by the Department of Labor and Industries which are applicable to all places of employment under the jurisdiction of the Department of Labor and Industries. The rules of this chapter, and the rules of chapter 296-24 WAC and chapter 296-62 WAC are applicable to all longshore, stevedore and related waterfront operations, Provided that such rules shall not be applicable to those operations under the exclusive safety jurisdiction of the federal government.

(3) The provisions of this chapter shall prevail in the event of a conflict with, or duplication of, provisions contained in chapter 296-24 WAC and chapter 296-62 WAC.

(4) These standards are consolidated with the intent that they will meet or exceed all mandatory requirements included in 29 CFR, Part 1918. [Order 74-14, § 296-56-401, filed 4/22/74; Order 69-3, § 296-56-401, filed 5/26/69, effective 7/1/69; Rules (part), filed 9/24/65; Rule (part), filed 3/23/60.]

WAC 296-56-405 Practical application. If there is a question concerning the application of these rules to any given set of facts and it is not fully decided to the satisfaction of all concerned, the question shall be referred to the Supervisor of Industrial Safety and Health, Department of Labor and Industries. [Order 74-14, § 296-56-405, filed 4/22/74.]

WAC 296-56-410 Introduction. The history of experience of longshoring and related waterfront operations reveals the fact that positive steps toward the prevention of accidents can be made most effective when practices, methods, equipment, and design of port facilities are guided by expert cause analyses of current and past accidents. In the process of achieving a safe place to work and a safe working environment, planning and designing for safety are the responsibility and function of management. [Order 74-14, § 296-56-410, filed 4/22/74; Introduction, filed 9/24/65; Rules (part), filed 3/23/60.]

WAC 296-56-412 Variance and procedure. Any employer may apply to the director for an order for a variance from any rule or regulation establishing a safety and health standard promulgated under this chapter. Affected employees shall be given notice of each such application and in the manner prescribed by section 8 of the act shall be informed of their right to request a hearing on any such application. The director

shall issue such order granting a variance, after opportunity for an inspection, if he determines or decides after a hearing has been held, if request for hearing has been made, that the applicant for the variance has demonstrated by a preponderance of the evidence 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 employees which are as safe and healthful as those which would prevail if he complied with the safety and health standard or standards from which the variance is sought. The order so issued shall prescribe the conditions the employer must maintain, and the practices, means, methods, operations, and processes which he must adopt and utilize to the extent they differ from the standard in question. At any time after six months has elapsed from the date of the issuance of the order granting a variance upon application of an employer, employee or the director on his own motion, after notice has been given in the manner prescribed for the issuance of such order may modify or revoke the order granting the variance from any standard promulgated under the authority of this chapter. [Order 74-14, § 296-56-412, filed 4/22/74.]

WAC 296-56-415 Definitions. (1) "Shall" indicates provisions which are mandatory.

(2) "Employer" means an employer any of whose employees are employed, in whole or in part, in longshoring operations or related employments. See also section 2(3), chapter 80, Laws of 1973, Washington Industrial Safety and Health Act.

(3) "Employee" means any longshoreman, or other person engaged in longshoring operations or related employments. See also section 2(4), chapter 80, Laws of 1973, Washington Industrial Safety and Health Act.

(4) "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.

(5) "Longshoring operations" means the loading, unloading, moving, or handling of cargo, ship's stores, gear, etc., on the docks from or to any vessel.

(6) "Related employments" means any employments performed as an incident to or in conjunction with longshoring operations including, but not restricted to, securing cargo, rigging, and employment as a porter, checker, watchman or lineman.

(7) "Gangway" means any ramp-like or stair-like means of access provided to enable employees or other personnel to board or leave a vessel, including accommodation ladders, gangplanks and brows.

(8) "Bulling" means the horizontal dragging of cargo across a surface with none of the weight of the cargo supported by the fall.

(9) "Crane" means a mechanical device with a boom or moving overhead trolley 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.

(10) "Derrick" means 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 shall include shear legs.

(11) "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 spouts covered by this definition.

(12) "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.

(13) "Hazardous cargo" includes:

(a) Any packaged commodity in the "List of explosives and other dangerous articles and combustible liquids" of the "dangerous cargoes" regulations of the U.S. Coast Guard (46 CFR 146.04-5) requiring a label. The exemptions mentioned at the foot of the list are exempted from this definition.

(b) Any packaged commodity in the list identified in (13)(a) of this section, not requiring a label but classed as a combustible liquid by Coast Guard Regulation 46 CFR 146.

(c) Any packaged liquid commodity in the list identified in (13)(a) of this section not requiring a label but classed as a hazardous article; or

(d) Any article not properly described by a name in that list but which is properly classified under the definition of those categories of dangerous articles given in 46 CFR 146.03-8 and is included in (13)(a), (b), or (c) of this section.

(14) "Active work area" means those fixed areas where workers are performing their normal work tasks.

(15) "Approved" means approved by the Director of the Department of Labor and Industries or his 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 296-24-006 shall apply.

(16) "Direct employer" means the stevedore company, steamship company or other employer on whose payroll the employee appears for the job concerned.

(17) "Dock" means any wharf, pier, terminal, warehouse, or any other place where cargo is stored, assembled, received, or prepared for transfer to or from a vessel, railway car or truck.

(18) "Dock facilities" means all piers, wharves, sheds, aprons, dolphins, cranes or other gear or equipment owned or controlled by the dock or facility owner, where

cargo is stored, loaded, moved or handled to or from a vessel.

(19) "Flammable solid" means a solid substance other than one classified as an explosive, which is likely, under conditions incident to transportation, to cause fires through friction, absorption of moisture, or spontaneous chemical changes.

(20) "Jobs of short duration" means the job is not anticipated to exceed one shift consisting of not more than eight (8) hours.

(21) "Longshoreman" means any person who is employed for the purpose of loading or unloading or handling cargo on a dock only or in other operations as defined herein.

(22) "Oxidizing material" means a substance, such as chlorate, permanganate peroxide, or a nitrate that yields oxygen readily to stimulate the combustion of organic matter.

(23) "Dolphin" means a spar or spars used in mooring a vessel.

(24) "Bullrail" means a curb on the edge of the dock surface.

(25) "Bunk" means a device with stanchions that maintains a stabilized load of logs.

(26) "Qualified person" means persons who have demonstrated their abilities and experience and is granted authorization to examine and test cranes, cargo spouts and is certificated by the Department of Labor and Industries, Division of Industrial Safety and Health. [Order 74-14, § 296-56-415, filed 4/22/74.]

WAC 296-56-420 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 through the Division of Industrial Safety and Health or by statute.

(1) The provisions of the General Safety and Health Standards as regards to the "Safety Educational Standards" section, WAC 296-24-040, shall not apply to employees actually engaged in longshore and stevedore activities, but shall apply to other waterfront activity covered by those standards.

(2) Unless a first-aid room is close at hand and a qualified attendant is 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 shall be kept in the immediate vicinity of the vessel and at least one employee holding a currently valid first-aid certificate shall be close at hand.

(3) 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 include a sufficient quantity of at least the following types of items:

Gauze roller bandages, 1 inch by 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.

(4) The contents of the first-aid kit shall be checked before being sent out on each job to ensure that all expended items have been replaced.

(5) There shall be available for each vessel being worked one Stokes basket stretcher, or its equivalent on the dock, permanently equipped with bridles for attaching to the hoisting gear, except that there need be no more than two stretchers on each pier. Stretchers shall be kept close to the vessels. [Order 76-7, § 296-56-420, filed 3/1/76; Order 74-14, § 296-56-420, filed 4/22/74; Rules (part), filed 9/24/65; Rules (part), filed 3/23/60.]

WAC 296-56-430 Management's responsibility. (1) It shall be the responsibility of management to establish and supervise:

(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.

(d) A system for reporting and recording accidents that will fulfill statistical requirements of State regulations.

(e) Shall report directly by telephone or telegraph (collect) to Olympia, Division of Industrial Safety and Health, fatals or potentially fatal accidents and shall make every effort not to move equipment, machine or materials involved unless failure to move would interfere with appropriate removal of victim. [Order 74-14, § 296-56-430, filed 4/22/74; Rules (part), filed 9/24/65; Rules (part), filed 3/23/60.]

WAC 296-56-432 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 should offer safety suggestions, wherein such suggestions may contribute to a safer work environment.

(4) 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.

(5) Employees shall properly care for all personal protective equipment.

(6) Employees shall make a prompt report to their immediate supervisor, of each industrial injury or occupational illness, regardless of the degree of severity. [Order 74-14, § 296-56-432, filed 4/22/74.]

WAC 296-56-435 Accident prevention program. (1) An accident prevention program, wherein there is equitable management–employee participation, shall be established in all establishments, industrial plants, or operations.

(2) It shall be the responsibility of the employer to initiate and maintain such accident prevention programs as may be necessary to comply with this section. The Division of Industrial Safety and Health may be contacted for assistance in initiating and maintaining an effective accident prevention program.

(3) All accident prevention programs shall be tailored to the needs of the particular operation.

(4) Employer and employee representatives, as elected, delegated or appointed, shall attend and actively take part in frequent and regular safety committee meetings.

(5) Accident prevention programs shall provide for employer–employee safety meetings and frequent and regular safety inspections of job sites, materials, equipment, and operating procedures.

(6) A record of safety activities, such as inspections and meetings, shall be maintained by the employer for a period covering the previous twelve months and shall be made available, upon request, to non–compliance personnel of the Department of Labor and Industries.

(7) The employees shall individually comply with all safety rules and cooperate with management in carrying out of the accident prevention program.

(8) To make effective the preceding statement and promote on–the–job accident prevention, committees shall be established in each port. These committees shall consist of an equal number of port or stevedore company and longshoremen representatives at the job level with the industry or company safety supervisor serving as secretary and coordinator. A function of this committee is to obtain the interest of the workers in accident prevention by providing for their actual participation in the program, to direct their attention to the real causes of accidents, and provide a means for making practical use of their intimate knowledge of working conditions and practices.

(9) It is further intended that this program will produce mutually practical and effective recommendations regarding correction of accident–producing circumstances and conditions. [Order 74–14, § 296–56–435, filed 4/22/74.]

WAC 296-56-436 General safety requirements. (1) Unsafe Work Area. (a) No person shall be required to work on the dock, under or in an area of ship's gear that is defective or is being unsafely operated.

(b) Gear or equipment, when not in use, shall be removed from the work areas, or shall be so placed as not to present a hazard.

(c) Slippery conditions shall be eliminated as they occur.

(d) Loose paper, dunnage and debris shall be collected as the work progresses and be kept clear of the work area.

(e) Nails: (i) Nails which are protruding from shoring or fencing in the work areas shall be bent over or otherwise rendered harmless.

(ii) Dunnage, lumber, or shoring material in which there are visibly protruding nails shall be removed from the immediate work area, or, if left in that area, the nails shall be bent over or otherwise rendered harmless.

(f) Employees shall not be exposed to ice which may fall on them from any overhead structures.

(g) Longshoring operations shall not be carried on when chipping or scaling of decks, bulkheads or sides of vessels creates excessive noise which interferes with communication of warnings or instructions.

(h) Longshoring operations shall not be carried on where employees are exposed to injurious light rays, hot metal, or sparks any of which result from welding or cutting. (Refer to WAC 296–24–70003, Eye Protection.)

(i) Longshoring operations shall not be carried on where employees are exposed to unsafe concentrations of dust or vapors from sand blasting, spray painting or other sources.

(2) Pre–Inspection of Working Areas. Before allowing employees to enter or work in stowage spaces or areas in which explosives, poisonous, noxious, dusty or gaseous cargoes have been previously stored or placed, the making of such spaces free of known safety or explosive hazards shall be the responsibility of the employer.

(3) Longshoring operations shall not be carried on in the immediate vicinity of uncovered garbage or in the way of overboard discharges from sanitary lines unprotected by a baffle or splash boards. [Order 76–7, § 296–56–436, filed 3/1/76; Order 74–14, § 296–56–436, filed 4/22/74.]

WAC 296-56-43801 Eye protection. (1) When, because of the nature of the cargo being handled, an eye hazard from flying particles or heavy dust exists, employees shall be protected by eye protection equipment meeting the specifications prescribed by the American National Standard (ANSI) Practice for Occupational and Educational Eye and Face Protection, Z87.1 (1968).

(2) Eye protection equipment shall be maintained as necessary to provide complete protection for employee.

(3) Eye protection equipment which has previously been used shall be cleaned and disinfected before it is issued by the employer to another employee.

(4) 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 or hazards involved. Prescription ground safety lenses shall meet the impact test as prescribed by American National Standard (ANSI) Practice, Z87.1–1968. [Order 74–14, § 296–56–43801, filed 4/22/74.]

WAC 296-56-43803 Respiratory protection. (1) General. (a) Except as provided in (3)(c) of this section,

respiratory protective equipment required by this part shall carry U.S. Bureau of Mines approval for the use intended. In cases where the U.S. Bureau of Mines does not issue approval against the particular hazard, equipment shall be approved by the Department of Labor and Industries. Respiratory protective equipment shall be used only for the purpose intended and no modification of the equipment shall be made.

(b) Respiratory protective equipment shall be inspected regularly and maintained as necessary to provide complete protection for employee. Gas mask canisters and chemical cartridges shall be replaced as necessary so as to provide complete protection. Mechanical filters shall be cleaned or replaced as necessary so as to avoid undue resistance to breathing.

(c) Respiratory protective equipment which has been previously used shall be cleaned and disinfected before it is issued by the employer to another employee.

(d) Employees required to use respiratory protective equipment shall be instructed in its use.

(2) Canister Masks. (a) In concentrations of ammonia of less than 3 percent, or of other gases less than 2 percent, by volume a canister type gas mask equipped with the proper type of canister shall be used. Different canisters are approved for use against the following gases and groups of gases: acid gases, hydrocyanic acid gas, chlorine gas, organic vapors, ammonia gas, carbon monoxide or combination of the above. (Refer to the General Occupational Health Standards chapter 296-62 WAC for classification.

(b) In low concentrations (less than 0.1 percent by volume, but above the Threshold Limit Value of the gas), a chemical cartridge respirator equipped with the type of cartridge approved for use against the particular gases or groups of gases listed in (2)(a) of this section shall be used.

(3) Protection Against Dusts. (a) For protection against pneumoconiosis producing dusts, a respirator equipped with the type of filter approved for such purpose shall be used.

(b) For protection against toxic dusts, a respirator equipped with the type of filter approved for such purpose shall be used.

(c) For protection against nuisance dusts, a respirator equipped with the type of filter required in (3)(a) of this section or a suitable dust mask shall be used. [Order 74-14, § 296-56-43803, filed 4/22/74.]

WAC 296-56-43805 Protective clothing. (1) Employees handling cargo shall be protected by impervious clothing when exposed to ruptured, leaking or inadequate containers, the contents of which may cause burns, skin irritation or be otherwise injurious to health.

(2) Protective clothing which has been previously worn shall be cleaned and disinfected before it is issued by the employer to another employee. Harmful cleaning material residuals shall be entirely removed prior to reissue. [Order 74-14, § 296-56-43805, filed 4/22/74.]

WAC 296-56-43807 Foot protection. (1) 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.

(2) Employees working regularly in jobs covered by these standards shall provide appropriate footwear, including safety-toed shoes when engaged in moving of lumber, handling of rails, moving heavy objects, and other similarly hazardous types of work. Sneakers, house slippers, and similar footwear shall not be worn by any person covered by these standards. [Order 74-14, § 296-56-43807, filed 4/22/74.]

WAC 296-56-43809 Head protection. (1) Employees shall be protected by protective hats meeting the specifications contained in the American National Standard Safety Requirements for Industrial Head Protection, Z89.1 (1969).

(2) Protective hats which have been previously worn shall be cleaned and disinfected before they are issued by the employer to another employee. [Order 74-14, § 296-56-43809, filed 4/22/74.]

WAC 296-56-43811 Required clothing, caps, etc. Workers shall wear clothing designed to protect them from hazards to which they may be exposed while performing their duties. Consideration must be given to temperatures in certain areas in which persons work. Workers whose hair is long enough to be caught in machinery or equipment around which they work shall wear caps, hair nets or other protection which will adequately confine the hair while performing their duties. [Order 74-14, § 296-56-43811, filed 4/22/74.]

WAC 296-56-43813 Protection from falling. Employees doing maintenance work on cranes, spouts or similar types of equipment, 8 feet from the ground or surface and not in an area that is protected by any standard safeguards such as walkways with standard railings, ladders with protective cages, shall wear a safety belt and lanyard which can be attached to the structure for their protection from falling. [Order 74-14, § 296-56-43813, filed 4/22/74.]

WAC 296-56-43815 Personal flotation devices. (1) Employees working on, over or along water, where the danger of drowning exists, shall be provided with and shall wear approved personal flotation devices.

(a) Employees are not considered exposed to the danger of drowning when;

(i) The water depth is known to be less than chest deep on the exposed individual;

(ii) When working behind standard height and strength guardrails;

(iii) When working inside operating cabs or stations which eliminate the possibility of accidentally falling into the water;

(iv) When wearing approved safety belts with lifeline attached so as to preclude the possibility of falling into the water.

(b) Prior to and after each use, personal flotation devices shall be inspected for defects which would reduce

their designed effectiveness. Defective personal flotation devices shall not be used.

(c) To meet the approved criteria required by subdivision (1), a personal flotation device shall be approved by the United States 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 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.

(2) Life Ring. (a) Along docks, walkways or other fixed installations on or adjacent to open water more than five (5) feet deep, approved life rings with line attached shall be provided. The life rings shall be spaced at intervals not to exceed 200 feet and shall be kept in easily visible and readily accessible locations.

(b) When employees are assigned work at other casual locations where exposure to drowning exists, at least one approved life ring with line attached shall be provided in the immediate vicinity of the work assigned.

(c) Work assigned over water where the vertical drop from an accidental fall would exceed 50 feet, shall be subject to specific procedures as approved by the Department.

(d) Lines attached to life rings shall be at least 90 feet in length, at least 1/4 inch in diameter and have a minimum breaking strength of 500 pounds.

(e) Life rings must be United States Coast Guard approved 30 inch size.

(f) Life rings and attached lines must be maintained to retain at least 75 percent of their designed buoyance and strength. [Order 76-7, § 296-56-43815, filed 3/1/76.]

WAC 296-56-440 Minimum safety requirements for docks and dock facilities. Nothing contained in this section shall be construed to mean that the direct employer or employees are responsible for the repair, construction of or otherwise bringing into compliance, facilities over which they have no control.

(1) Working Prohibited on Unsafe Docks or Dock Facilities. Employers shall not require employees to perform work on docks or dock facilities which said direct employer knows or should have known do not meet the minimum safety requirements outlined in this section, except for maintenance workers.

(2) Known Unsafe Conditions by Employees. Employees shall not work on docks or dock facilities which they know or should have known do not meet the minimum safety requirements outlined in this section.

(3) Bulletin Boards. At each dock, pier, warehouse or designated area at the job site, there shall be installed a safety bulletin board.

(4) Posting of Notices. It shall be the responsibility of the employer to post at prominent places in or adjacent to the work area, legible notices stating:

(a) The location of stretchers, blankets and first-aid equipment and telephones. (Where possible, directional arrows should point to locations.)

(b) The phone numbers of doctors, ambulance services and hospitals within the area and the phone numbers of the police department or other law enforcement agencies. (Where possible, the emergency phone numbers shall be posted adjacent to telephones which would be used for emergency calls and on or inside the cover of first-aid cabinets.)

(5) Ventilation. All areas where employees are required to work shall be ventilated as required by the "General Occupational Health Standards", chapter 296-62 WAC.

(6) Lighting. All areas shall be adequately lighted to meet the requirements of this code.

(a) Active work areas shall be lighted in such a manner the general area being worked will be illuminated at a minimum intensity of approximately five (5) foot candles measured thirty (30) inches above the dock floor. Supplemental lighting shall be utilized for conditions where more than the minimum intensity is necessary for a safe operation.

(b) A minimum of three foot candles (3 F.C.) illumination measured in the manner described above shall be maintained at all points along the bull rail.

(c) The quality of light shall be such that it is reasonably free from glare, and has correct direction, diffusion and distribution.

(d) Lighting shall not be obstructed by any placement of cargo, structures or other objects which will create a shadow in the work area. Portable lighting shall be provided in these areas that do not meet minimum requirements of this subdivision.

(7) Portable Illumination. (a) All walking and working areas shall be illuminated.

(b) Portable lights shall meet the following requirements:

(i) Portable lights shall be equipped with reflectors and guards to prevent flammable and other material from coming in contact with the bulb, except that guards are not required where the construction of the reflector is such that the bulb is recessed.

(ii) Portable lights shall be equipped with heavy duty electric cords and may be suspended by such cords only when the means of attachment of the cord to the light is such as to prevent the light from being suspended by the electrical connections. All connections and insulation shall be maintained.

(iii) Lighting wires and fixtures for portable lights shall be so arranged as to be free from contact with drafts, running gear, or other moving equipment.

(8) Washroom Facilities. All docks, warehouses or similar working areas shall be equipped with clean, ventilated washroom facilities with hot running water provided.

(9) Toilet and Sanitary Facilities. All docks, warehouses, or similar working areas shall be provided with proper toilet and sanitary facilities. Such facilities shall be kept in good repair and in a sanitary condition. (Refer to the General Safety and Health Standards, WAC 296-24-12013.)

(10) Lunchroom Facilities. Lunchroom facilities for all docks must be separated from the toilet facilities.

Both facilities may be located in the same building, providing they are separated by a solid wall. A reasonably tight fitted door may be installed in such wall between the facilities.

(a) General. In all places of employment where employees are permitted to lunch on the premises, sufficient space for that purpose shall be provided for the maximum number of employees who may use such space at one time. Such space shall be physically separate from any location where there is exposure to toxic materials.

(b) Waste Disposal Containers. Covered receptacles constructed of a smooth, corrosion-resistant, easily cleanable, or disposable material, shall be provided by the employer and used by the employees for the disposal of all waste food. Such receptacles shall be emptied not less than once daily and shall be maintained in a clean and sanitary manner.

(c) Location. (i) No food shall be stored or eaten where there are present any toxic materials or substances that may be injurious to health.

(A) No food shall be stored or eaten in any toilet room.

(B) In every establishment where there is exposure to injurious dusts or other toxic materials, a separate lunchroom shall be maintained unless it is convenient for the employees to lunch away from the premises. The following number of square feet per person, based on the maximum number of persons using the room at one time, shall be required:

Number of persons	Square feet per person
25 or less	13.
26-74	12.
75-149	11.
150 and over	10.

(11) Dock and Warehouse Floors. All dock and warehouse floors shall be constructed and maintained in such a way that they will safely support all cargo and equipment to be used on them. Floors shall be kept free from protruding nails, splinters, loose boards, or any other articles or substance that would create a tripping or slipping hazard.

(12) Warehouse Door Counterbalances. Counterbalances for warehouse doors shall be enclosed or the area below the counterbalance shall be safeguarded in such a manner as to render it impossible for a person to position any portion of his body below the suspended counterbalance.

(13) Aisleways and Fire Exits. All fire exits and aisleways of all docks and warehouses shall be clearly marked and kept clear. All main aisleways shall be wide enough to permit passage of a fire truck.

(a) There shall be a 28" clearance maintained where employees use a passageway to an exit. Refer to the General Safety and Health Standards WAC 296-24-56511.

(14) Posting Load Capacities. Load capacities of all cargo docks shall be prominently posted in terms of pounds per square foot.

(15) Life Rings. On all docks, spaced at intervals not to exceed two hundred (200) feet, and so located to be readily available in case of emergency, there shall be at least one life ring of an approved standard type with 90 feet of line attached.

(16) Life Ladders. On all docks spaced at intervals not to exceed four hundred (400) feet, there shall be provided substantial built-in-place ladders to reach lowest water use. When portable ladders are to be used, ladder may be bolted to the bullrail or dock structure or ladder can be secured to an embedded eye bolt in a concrete dock surface. The immediate area where such ladders or fastenings are located shall be painted with a bright color or of a color which contrasts with the surrounding area. There shall be a ladder at each end of the dock.

(17) Bull Rails. All docks shall have bull rails which will prevent any mobile equipment being safely operated on the dock from crossing the bull rail.

(18) Saveall and Safety Net Fastenings. All bull rails shall be provided with rings every twenty (20) feet or other safe means for securing safety nets and savealls.

(19) Power Outlets. Power outlets installed to supply power to vessels shall be located in such a manner that the workers will not be in contact with supply lines. Unprotected power lines shall not be driven over by equipment. If located on the underside or waterside of the bull rail, a well lighted walkway with hand rails shall be provided to the power outlets. Refer to the General Safety and Health Standards, WAC 296-24-75007 and WAC 296-24-75011.

(20) Warning System. Where railway tracks are installed on docks and switching on such tracks creates a hazard to workers or equipment moving about on the dock, or moving from inside a warehouse onto the dock a warning system shall be installed to warn persons that a switch is being made. This warning may be done by the installation of flashing light, warning gongs, or other methods.

(21) Maximum Speed. The maximum speed for forklift jitneys on all docks shall not exceed eight (8) miles per hour. This speed limit shall be prominently posted on such docks.

(22) Speed bumps shall be located in truck and vehicle traffic lanes, where such speed bumps do not interfere with the normal traffic pattern of cargo moving equipment such as fork lifts, straddle carriers and yard container trucks without shock absorbers, which may cause an accident when crossing the speed bump by tipping over or spilling a load of cargo.

(23) All steel plates, boards, etc. used to temporarily cover small holes or weakened surfaces shall be secured in such a manner as to prevent accidental movement.

(24) All large openings or weakened surfaces shall be barricaded on all exposed sides with barricades equipped with blinkers, flashing lights, or reflectors.

(25) Areas around bitts or cleats where workers perform their duties as line handlers shall be lighted as required in this section and have a non-slip surface around each bitt or cleat.

(26) Walkways on which mooring hausers must be moved may have the handrail omitted on the line handling side provided a 6" toeboard is installed. [Order 74-14, § 296-56-440, filed 4/22/74; Order 69-3, § 296-56-440, filed 5/26/69, effective 7/1/69; § I, Rules 1.010-1.030, filed 9/24/65; Rule (part), filed 3/23/60.]

WAC 296-56-442 Crane and spout certification, application. The following rules WAC 296-56-44201 through WAC 296-56-44209 shall apply to any fixed or movable shoreside crane, cargo spout, or suckers, derricks or similar types of equipment used to handle cargo or materials between a dock and vessel or vessel to vessel. All such equipment shall be tested and/or inspected, and certificated in accordance with the requirements specified in the following rules.

These rules shall not apply to small industrial crane trucks as described and illustrated in USASI B56.1-1969, Fork Lifts and Other Cargo Moving Vehicles, huletts, dock leg elevators, bulk coal loading facilities, vertical pocket conveyors, or facilities used for the transfer of bulk liquids. [Order 74-14, § 296-56-442, filed 4/22/74.]

WAC 296-56-44201 Qualifications of persons making inspections, issuance of certificates, posting certificates, etc. (1) Inspection and test certificates shall be issued only for that equipment which meets or exceeds the requirements as specified in these rules. All inspection and test certificates shall be issued through the office of the Supervisor of Industrial Safety and Health, Department of Labor and Industries, and shall be valid for a period of not to exceed one year from the date of issuance.

Equipment requiring certification shall be inspected by representatives of the Division of Industrial Safety and Health; or individuals who have received a "certificate of competency" from the Supervisor of Industrial Safety and Health indicating that they are qualified and capable of performing such work.

When deficiencies are found they shall be noted on forms provided for such purpose by the Division of Industrial Safety and Health. Copies shall be delivered to the owner of the equipment and the Division of Industrial Safety and Health at the Olympia office by the person conducting such tests and/or inspections.

A certificate of unit test and/or examination of equipment shall not be issued for any equipment found not to be in compliance with the provisions of this chapter.

Persons desiring a "certificate of competency" shall demonstrate and document their capabilities and qualifications to the Supervisor of Industrial Safety and Health who will issue such certificates to those persons whom he considers qualified. The Supervisor of Industrial Safety and Health reserves the right to revoke such certificates at any time for cause. A "Certificate of Competency" shall be issued for a period of not to exceed three years. Applications for renewal may be made not more than sixty days prior to the expiration date shown on the certificate.

The Supervisor of Industrial Safety and Health, or his representative, reserves the right to inspect such equipment or to witness or attend any test or inspection in order to ascertain the adequacy of any certification activity performed.

(2) Unless otherwise exempted, all cranes or derricks required to be certificated by these regulations shall have a current test certificate posted in the operator's cab or station and no person shall be required to operate such crane or derrick unless a current valid certificate is posted. [Order 74-14, § 296-56-44201, filed 4/22/74.]

WAC 296-56-44203 Unit proof load test and inspection. Cranes and derricks shall be proof load tested, rated and certificated in tons (2,000 lbs. = 1 ton). Cranes and derricks shall be inspected and unit proof load tested prior to being put into use, after any significant modification or repairs of structural parts, or when deemed necessary by the Supervisor of Industrial Safety and Health; however, each crane or derrick shall be unit proof load tested at least once during each twelve-month period. Unit proof load tests shall be carried out by the use of weights as a dead load. When use of weights for unit proof load tests is not possible or reasonable a dynamometer or other recording test equipment may be used. Such equipment shall be tested for accuracy with certified calibrating equipment within twelve months prior to being used and a copy of the certified calibration test shall have been available to authorized representatives of the Division of Industrial Safety and Health upon request.

The weight of the objects used for a dead load weight test shall be certified and a record of the weight shall be made available upon request. Any replacements or repairs deemed necessary by the person conducting a test shall be carried out before application of the required proof load unit test.

(1) The proof load test for derricks shall be conducted as follows:

Safe Working Load	Proof Load
to 20 tons	25% in excess
20-50 tons	5 tons in excess
over 50 tons	10% in excess of manufacturer's recommended lifting capacity.

Proof load 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 all directions. The weight of auxiliary handling devices such as spreader bars, robots, clams, magnets or other gear shall be considered a part of the load. Brakes shall be tested by holding the proof load suspended without other mechanical assistance. After satisfactory completion of a unit proof load test the derrick and all component parts thereof shall be carefully examined and, if necessary, non-destructive tests may be conducted to assure that the equipment is safe for use and has not been damaged in the unit proof load testing process.

(2) Unit proof load tests for 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.

Unit proof load tests for cranes 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. (The 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.) Trolley equipped cranes shall be subject to a proof load of 25% in excess of the manufacturer's specifications shall be subject to approval by the certificating authority. 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.

(3) 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.

(4) 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.

(5) Safe working load ratings shall not be increased beyond the manufacturer's ratings or original design limitations without prior approval by the accredited certification agency. Such prior approval shall be based on the manufacturer's approval of such increase or documented engineering design analysis or both. All necessary structural changes shall be completed prior to approval by the accredited certification agency. [Order 74-14, § 296-56-44203, filed 4/22/74.]

WAC 296-56-44205 Examination and inspection of cranes and derricks. An examination shall be carried out in conjunction with each annual 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: (Refer to WAC 296-56-44201 for definition of accredited person.)

(1) All functional operating mechanisms shall be examined for improper function, maladjustment, and excessive component wear, with particular attention to sheaves, pins, and drums. The examinations shall include operation with partial load, in which all functions and movements, including, where applicable, maximum possible rotation in both directions, are performed.

(2) All safety devices shall be examined for malfunction.

(3) Lines, tanks, valves, drains, pumps, and other parts of air or hydraulic systems shall be examined for deterioration or leakage.

(4) Rope reeving shall comply with the manufacturer's recommendations.

(5) Deformed, cracked, or excessively corroded members in crane structure and boom shall be repaired or replaced as necessary.

(6) Loose bolts, rivets, or other connections shall be corrected.

(7) Worn, cracked, or distorted parts affecting safe operation shall be corrected.

(8) All brakes, used to control the load, boom or travel of the crane, shall be tested. Air, hydraulic, or electrically operated brakes shall be of such design as to set and stop the load if the source of power fails.

(9) Brake and clutch system parts, linings, pawls, and ratchets shall be examined for excessive wear and free operation.

(10) Load, boom angle, or other indicators shall be checked over their full range. Defects in such indicators shall be immediately corrected.

(11) 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.

(12) 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, shall be made.

(13) All platforms, steps and footwalks located on cranes where workers are exposed to the hazard of slipping shall be of a non-slip material. Wire rope used for railings on cranes shall be kept taut at all times.

NOTE: In critical areas such as footwalks along booms, a grating material should be used.

(14) It shall be ascertained that no counterweights in excess weight of the manufacturer's specifications shall be fitted or used.

(15) Such other examination or supplemental functional tests shall be made as may be deemed necessary by the accredited person under the circumstances.

(16) Wire Rope. (a) All wire rope shall be inspected once a month, dependent upon conditions to which the wire ropes are subjected, and at intervals not exceeding a twelve-month period. Records of inspection of wire rope shall be kept and shall be available to the Department of Labor and Industries Representative. Records

shall be kept for one year. Refer to the General Safety and Health Standards. WAC 296-24-240.

(b) Wire rope shall not be used if in any length of eight diameters, the total number of visible broker 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.

(c) Documentation, available for inspection, shall include wire rope test certificates relating to any replacements made since the last unit test or annual examination as required.

(d) 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 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 shall have the capacity to handle 4 times the heaviest expected load and verified by wire rope test certificate.

(e) 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.

(17) Accessory components, such as hooks, shall be carefully examined periodically and at the time of annual examination and inspection. Cracked or deformed hooks shall be discarded immediately and not reused on any equipment subject to the provisions of this chapter.

(18) In the event that heat treatment of any loose gear is recommended by the manufacturer, the latest heat treatment certificate, attesting to compliance with the manufacturer's specifications shall be part of the available documentation. Heat treatment shall be carried out in accordance with the specifications of the manufacturer by persons competent to perform such work.

(19) Replacement parts shall be of equal or better quality than the original equipment and suitable for the purpose. Repairs or modifications shall be such as to render the equipment equal to or better than the original construction or design. [Order 74-14, § 296-56-44205, filed 4/22/74.]

WAC 296-56-44207 Equipment and information to be installed or posted on cranes or derricks. (1) The following requirements shall be met in the use of cranes hoisted aboard a vessel for use thereon or used to service a vessel from the dock, shore, or another vessel, and in the use of any other crane or derrick not a part of a vessel's permanent equipment, but used in longshoring operations.

(a) The crane weight shall be posted on all mobile cranes hoisted aboard vessels for temporary use thereon.

(b) The rated safe working loads of each crane and derrick, for the conditions of use, shall not be exceeded.

(c) No counterweights in excess of manufacturer's (or design) specifications shall be fitted. All equipment shall be used in accordance with manufacturer's (or design) specifications and recommendations.

(d) Pulling of barges or rail cars, and pulling of cargo in such a way as to exert side loading stresses upon crane booms shall not be permitted.

(e) No crane or derrick shall be used in any case where a visible defect affecting safe use exists.

(f) All crane controls should be in the same location on all cranes so that different crane operators can perform these operations safely.

(2) Unless exempted by the provisions of (2)(h) of this section, every crane used to load or discharge cargo into or out of a vessel shall be fitted with a load indicating device or alternative device in proper working condition which shall meet the following criteria:

(a) The type or model of any load indicating device which is used may be such as to provide (i) a direct indication in the cab of actual weight hoisted or a means of determining this by reference to crane ratings posted and visible to the operator, except that the use of a dynamometer or simple scale alone will not meet this requirement, or (ii) an automatic weight-moment device or computer providing indications in the cab according to the radius and load at the moment; or alternatively (iii) a device may be used which shall prevent an overloaded condition.

(b) Accuracy of the load indicating device, weight-moment device, or overload protection device shall be such that any indicated load (or limit), including the sum of actual weight hoisted and additional equipment or "add ons" such as slings, sensors, blocks, etc., is within the range from no less than 95 percent of the actual true total load (5 percent overload) to 110 percent of the actual true total load (10 percent underload). Such accuracy shall be required over the range of the daily operating variables to be expected under the conditions of use.

(c) The device shall permit the operator to determine before making any lift that the indicating or substitute system is operative. In the alternative, if the device is not so mounted or attached and does not include such means of checking, it shall be certified by the manufacturer to remain operable within the limits stated in (2)(b) of this section for a specific period of time. Checks for accuracy, using known values of load, shall be performed at the time of every certification survey (see WAC 296-56-442 through WAC 296-56-44209) and at such additional times as may be recommended by the manufacturer.

(d) When the load indicating device or alternative system is so arranged in the supporting system (crane structure) that its failure could cause the load to be dropped, its strength shall not be the limiting factor of the supporting system (crane structure).

(e) Marking shall be conspicuously placed giving (i) units of measure in pounds or both pounds and kilograms, (ii) capacity of the indicating system, (iii) accuracy of the indicating system, and (iv) operating instructions and precautions. Data providing (i) the means of measurement, (ii) capacity of the system, (iii) accuracy of the system, and (iv) operating instructions and precautions shall similarly be provided in the case of systems utilizing indications other than actual weights. If the system used provides no readout, but is such as to automatically cease crane operation when the rated load limit under any specific condition of use is reached, marking shall be provided giving the make and model of device installed, a description of what it does, how it is operated, and any necessary precautions regarding the system. All weight indications, other types of loading indications, and other data required shall be readily visible to the operator.

(f) All load indicating devices shall be operative over the full operating radius. Overall accuracy shall be based on actual applied load and not on full scale (full capacity) load.

NOTE: For example, if accuracy of the load indicating device is based on full scale load and the device is arbitrarily set at plus or minus 10 percent it would accept a reading between 90,000 and 110,000 lbs., at full capacity of a machine with 100,000 lbs., maximum rating, but would also allow a reading between zero and 20,000 lbs., at that outreach (radius) at which the rating would be 10,000 lbs. capacity——an unacceptable figure. If, however, accuracy is based on actual applied load under the same conditions, the acceptable range would remain the same with the 100,000 lb. load but becomes a figure between 9,000 and 11,000 lbs., a much different and acceptable condition, at the 10,000-lb. load.

(g) When the device uses the radius as a factor in its use or in its operating indications, the indicated radius (which may be in feet and/or meters, or degrees of boom angle, depending on the system used) shall be a figure which is within the range of a figure no greater than 110 percent of the actual radius to a figure which is no less than 97 percent of the actual (true) radius. When radius is presented in degrees, and feet or meters are required for necessary determinations, a conversion chart shall be provided.

(h) The load indicating device requirements of this subsection do not apply to a crane (i) of trolley equipped bridge type while handling containers known to be and identified as empty, or loaded, and in either case in compliance with the provisions of WAC 296-56-50023(2) or while hoisting other lifts by means of lifting beam supplied by the crane manufacturer for the purpose and in all cases within the crane rating; (ii) while handling bulk commodities or cargoes by means of clamshell bucket or magnet; (iii) while used to handle or hold hoses in connection with transfer of bulk liquids or other hose handled products; or (iv) while the crane is used exclusively to handle cargo or equipment the total actual gross weight of which is known by means of marking of the unit or units hoisted, when such total actual gross weight never exceeds 11,200 lbs., and when 11,200 lbs., is less than the rated capacity of the crane at the maximum outreach that is possible under the conditions of use at the time.

(3) Cranes or derricks having a movable working boom shall have a radius or boom angle indicator installed. This shall be located where the operator can readily read it while in his normal operating position.

There shall also be installed 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. All precautions or warnings shall be included. The length of each boom section shall be plainly marked on the section.

(4) Limit switches shall be installed on the main line and whip line assemblies which will deactivate the hoisting power when a load reaches the upper limits of travel and at such other places as required by this chapter. Line limit switches shall be tested prior to or at the beginning of each shift to determine if they are functioning properly. Any malfunction shall be reported to the person in charge immediately and shall be repaired at the first reasonable opportunity.

(5) Each crane or derrick shall be equipped with sufficient lights to maintain five foot candles in the working area around the load hook. All crane ladders and machinery houses shall be illuminated at a minimum of 2 candle power.

Light fixtures connected to the boom, gantry legs, or machinery house shall be provided with safety devices which will prevent the light fixture from falling in case of bracket failure.

(6) When there is a possibility of raising a crane boom to an angle above horizontal at which it may endanger the operator or create other hazards, a mechanical device (boom stop or limit switch) shall be installed which will stop the upward travel. If 2 stops are provided, each shall exert uniform resistance to prevent twist torque.

(7) Operating controls shall be marked as to function or an explanation of the controls shall be posted in full view of the operator.

(8) On cranes having accessory components controlled by the operator, by switches or levers, shall have them located as far as practicable in the same location in all cranes serving the same function.

(9) A communications system shall be installed on all gantry type cranes to provide a positive method of communication between the crane operator's cab and the base of the gantry.

(10) When two or more gantry type cranes are operated on the same runway, hydraulic or spring loaded bumpers or other effective means, shall be installed to prevent the cranes from being damaged in the event of a collision.

(11) Electronic devices may be installed to prevent collision subject to approval of the accredited certification agency.

(12) All trucks on rail gantry cranes shall be guarded to protect employees from exposed moving parts, such as gears, set screws, projecting keys, chain sprockets and wheels.

(13) On all rail gantry cranes, truck guards shall extend on the ends of the trucks, close to the top of the rail to prevent worker's feet from being caught between the rail and wheel. This subsection would not apply if rail sweeps are present.

(14) Wire loop guards shall be installed on ends of all crane trucks to alert workers of moving crane by contact.

(15) All hydraulic cylinders used to control crane booms or to provide crane stability (outriggers) shall be equipped with a pilot operated check valve or a device which will prevent the boom or outrigger from retracting in case of failure of a component of the hydraulic system.

(16) Warning Device. Except for floor operated cranes, a gong or other effective warning signal shall be provided for each crane equipped with powered traveling mechanism.

(17) A wind indicating device shall be provided which will give a visible or audible alarm to the crane operator at a predetermined wind velocity. (Refer to WAC 296-24-23503.)

(18) Gantry cranes shall be provided with automatic rail clamps or other devices to prevent the crane from moving when not being used on when power is off. (Refer to WAC 296-24-23503.)

(19) Rail stops shall be provided and shall be of a height at least equal to the radius of the wheel. An automatic electronic travel limit switch may be used; however, this device does not eliminate the requirements of rail stops in this subsection unless approved by the Department of Labor and Industries. [Order 74-14, § 296-56-44207, filed 4/22/74.]

WAC 296-56-44209 Cargo spouts, suckers and similar types of equipment. All cargo spouts, suckers and similar types of equipment shall be identified by number, manufacturer or by another method acceptable to the Division of Industrial Safety and Health. All component parts of the equipment, including the supporting structures or members, shall be examined annually by persons qualified by the Division of Industrial Safety and Health. The equipment shall not be considered satisfactory unless, in the opinion of the person authorized to make the examination, it is deemed fit to serve its intended function. The certificate of examination by the Division of Industrial Safety and Health shall note the condition of the equipment, and shall be kept at the office where the equipment is located and made available upon request by any authorized representative of any regulatory agency. [Order 74-14, § 296-56-44209, filed 4/22/74.]

WAC 296-56-446 Cranes and Crane Operations——Scope and application. All sections of this chapter which include WAC 296-56-446 in the section number apply to Cranes and Crane Operations. [Order 74-14, § 296-56-446, filed 4/22/74.]

WAC 296-56-44601 Operators. New operators shall be trained in safe crane operation before being permitted to operate a crane. The training method shall be approved by the Office of the Supervisor of the Division of Industrial Safety and Health. [Order 74-14, § 296-56-44601, filed 4/22/74.]

WAC 296-56-44603 Signalmen. A signalman shall be required when a crane operator's visibility is obstructed. When a signalman is required to transmit hand signals, he shall be in such a position that the operator can plainly see the signals. [Order 74-14, § 296-56-44603, filed 4/22/74.]

WAC 296-56-44605 Signals. All operators and signalmen shall use standard signals as illustrated for longshore crane operations. (See Appendix C and D, at the end of this chapter.) [Order 74-14, § 296-56-44605, filed 4/22/74.]

WAC 296-56-44607 Signalman for power units. Where power units, such as cranes and winches are utilized and signaling is required, the operator shall have definite instructions as to who is authorized to give signals. The operator shall take signals only from such authorized person. In case of emergency, any worker shall be authorized to give a stop signal.

(1) No draft shall be hoisted unless the winch or crane operator(s) can clearly see the draft itself or see the signals of any signalman associated with the operation.

(2) Loads requiring continuous manual guidance while in motion shall be provided with tag lines. [Order 74-14, § 296-56-44607, filed 4/22/74.]

WAC 296-56-44609 Radio communication. When practical and safe, crane operators shall be provided with a radio or telephone to be in contact with the signalman or crane chaser in those cases where a signalman or crane chaser is required. [Order 74-14, § 296-56-44609, filed 4/22/74.]

WAC 296-56-44611 Obstructions. Obstructions shall not be placed in the immediate active travel area of the crane or within two (2) feet of moving or traveling parts which would create an area where a worker could be pinned, except this shall not apply to crane legs which travel within two (2) feet of the face of the dock, or where less than two (2) feet clearance between crane legs and the gang planks exists. When such condition exists, it shall be called to the attention of the workers and the workers shall use extreme caution whenever they are in these areas. [Order 74-14, § 296-56-44611, filed 4/22/74.]

WAC 296-56-44613 Crane clearance. A distance of 30 inches shall be maintained within the swing radius between the outermost part of a revolving crane and any stationary object where the area is accessible to workers. When clearance equal to or greater than 30 inches cannot be maintained, the area of reduced clearance shall be guarded or barricaded whenever the crane is in operation. [Order 74-14, § 296-56-44613, filed 4/22/74.]

WAC 296-56-44615 Qualifications of machinery operators. (1) Only those employees considered to be competent by reason of training or experience, and 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, or any power-operated vehicle, or to give signals to the operator of any hoisting apparatus.

(2) 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 or a power-operated vehicle.

(3) No minor under 18-years of age shall be employed in occupations involving the operation of any power-operated hoisting apparatus or assisting in such operations by performing work such as hooking on or landing drafts, rigging gear, etc. [Order 74-14, § 296-56-44615, filed 4/22/74.]

WAC 296-56-44617 Radio controls. Any person, firm or corporation desiring to use radio frequencies for controlling the operation of a crane or other equipment, shall have received prior approval for such use from the Division of Industrial Safety and Health, Department of Labor and Industries. [Order 74-14, § 296-56-44617, filed 4/22/74.]

WAC 296-56-455 Inspection of stevedore equipment or gear——Scope and application. All sections of this chapter which include WAC 296-56-455 in the section number apply to Inspection of Stevedore Equipment and Gear. [Order 74-14, § 296-56-455, filed 4/22/74.]

WAC 296-56-45501 General requirements. (1) All gear and equipment provided by the employer shall be inspected by the employer or his authorized representative before each use and, at periodic intervals during its use. Any gear which is found upon such inspection to be visibly unsafe shall not be used.

(2) All special stevedoring gear provided by the employer, the strength of which depends upon components other than commonly used stock items such as shackles, ropes or chains, shall be tested as a unit in the following manner before being put into use, and if an interval of time exists between testing and use, that could cause deterioration, such gear shall be tested to rule out the deterioration.

(a) Gear intended to handle lifts up to and include 20 short tons (40,000 lbs.) shall be tested to 25 percent in excess of its safe working load.

(b) Gear intended to handle lifts over 20 short tons (40,000 lbs.) but not exceeding 50 short tons (100,000 lbs.) shall be tested to 5 short tons (10,000 lbs.) in excess of its safe working load.

(c) Gear intended to handle lifts over 50 short tons (100,000 lbs.) shall be tested to 10 percent in excess of its safe working load.

(d) The employer shall maintain a record of the dates and results of the tests with each unit of gear concerned clearly identifiable. The records shall be available for examination by representatives of the Division of Industrial Safety and Health personnel and the employee Safety Committee.

(3) The safe working load of gear as specified in WAC 296-56-455 through WAC 296-56-45511 shall not be exceeded.

(4) The weight shall be plainly marked on any article of stevedoring gear hoisted by ship's gear and weighing in excess of 2,000 lbs. [Order 74-14, § 296-56-45501, filed 4/22/74.]

WAC 296-56-45503 Fiber rope and fiber rope slings. (1) Table G-1 shall be used to determine the safe working load of various sizes of manila rope and 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 (5) is maintained.

(2) Where synthetic fiber ropes are substituted for manila ropes of less than three (3) inches circumference, the substitute shall be of equal size. Where synthetic fiber ropes are substituted for manila ropes of three (3) inches circumference or more, the size of the synthetic rope is to be determined from the formula:

$$C = \sqrt{(0.6C_3^2 + 0.4C_m^2)}$$

Where C = The required circumference of the synthetic rope in inches.

C_3 = The circumference to the nearest one-quarter inch of a synthetic rope having a breaking strength not less than the breaking strength of the size manila rope that would be required by (1) of this section.

C_m = The circumference of manila rope in inches which would be required by (1) of this section.

[Order 76-7, § 296-56-45503, filed 3/1/76; Order 74-14, § 296-56-45503, filed 4/22/74.]

WAC 296-56-45505 Wire rope and wire rope slings. (1) Tables G-2 through G-5 shall be used to determine the safe working loads of various sizes and classifications of improved plow steel 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 (5) is maintained.

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

In making such a substitution it should be ascertained that the inherent characteristics of the synthetic fiber are suitable for the intended service of the rope.

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.	10.	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
[Part One]

Rope Dia. Inches	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.

(A) – Socket or Swaged Terminal Attachment.
(B) – Mechanical Sleeve Attachment.
(C) – Hand Tucked Splice Attachment.

TWO - LEG BRIDLE OR BASKET HITCH
[Part Two]

Rope Dia. Inches	45° A	45° B	45° C	30° A	30° B	30° 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 A	Vertical B	Vertical C	Choker A	Choker B	Choker 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
[Part One]

Rope Dia. Inches	Vertical A	Vertical B	Vertical C	60° A	60° B	60° C
6x19 CLASSIFICATION						
1/4	1.1	1.0	.99	.95	.88	.85
3/8	2.4	2.2	2.1	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.	32.	28.	30.	27.	24.
1-3/4	48.	43.	38.	41.	37.	33.
2	62.	55.	49.	53.	48.	43.

(A) - Socket or Swaged Terminal attachment.
(B) - Mechanical Sleeve attachment.
(C) - Hand Tucked Splice attachment.

TWO – LEG BRIDLE OR BASKET HITCH
[Part Two]

Rope Inches	45° Dia. A	B	C	30° 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.

(2) Protruding ends of strands in splices on slings and bridles shall be covered or blunted.

(3) Where "U" bolt wire rope clips are used to form eyes. Table G–6 shall be used to determine the number and spacing of clips. The "U" bolt shall be applied so that "U" section is in contact with the dead end of the rope.

(4) Wire rope shall not be secured by knots, except on haul back lines on scrapers.

(5) The following limitations shall apply to the use of wire rope:

(a) An eye splice made in any wire rope shall have not less than three full tucks. 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 and which is not otherwise prohibited.

(b) Except for eye splices in the ends of wires and for endless rope slings, each wire rope used in hoisting or lowering, or in bulling cargo, shall consist of one continuous piece without knot or splice.

(c) Eyes in wire rope bridles, slings, or bull wires shall not be formed by wire rope clips or knots.

(d) Wire rope shall not be used as cargo handling 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.

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)
1/2	3	4	3
5/8	3	4	3 3/4
3/4	4	5	4 1/2
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

[Order 74–14, § 296–56–45505, filed 4/22/74.]

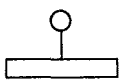
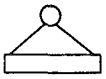
WAC 296-56-45507 Chains and chain slings. (1) Tables G–7 and G–8 shall be used to determine the maximum safe working loads of various sizes of wrought iron and alloy steel chains and chain slings, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products. Proof coil steel chain, also known as common or hardware chain, or other chain not recommended for slinging or hoisting by the manufacturer, shall not be used for hoisting purposes.

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	2.1	3.7	3.0	2.1
* 9/16	2.7	4.6	3.8	2.7
5/8	3.3	5.7	4.7	3.3
3/4	4.8	8.3	6.7	4.8
7/8	6.5	11.2	9.2	6.5
1	8.5	14.7	12.0	8.5
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	33.5	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

(2) All sling chains, including end fastenings, shall be given a visual inspection before being used. 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.

(3) Interlink wear, not accompanied by stretch in excess of five (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, has been reached.

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	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

(4) Chain slings shall be removed from service when, due to stretch, the increase in length of a measured section exceeds five (5) percent; when a link is bent, twisted or otherwise damaged; or when raised scarfs or defective welds appear.

(5) All repairs to chains shall be made under qualified supervision. Links or portions of the chain found to be defective, as described in (4) of this section, shall be replaced by links having same dimensions and materials. Before repaired chains are returned to service, they shall be proof tested to the proof test load recommended by the manufacturer.

(6) Wrought iron chains in constant use shall be annealed or normalized at intervals not exceeding 6 months when recommended by the manufacturer. The chain manufacturer shall be consulted for recommended procedures for annealing or normalizing. Alloy chains shall not be annealed.

(7) 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 74-14, § 296-56-45507, filed 4/22/74.]

WAC 296-56-45509 Shackles. (1) Table G-10 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 (5) is maintained.

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

(2) Screw pin shackles provided by the employer and used aloft, except in cargo hook assemblies, shall have their pins moused. [Order 74-14, § 296-56-45509, filed 4/22/74.]

WAC 296-56-45511 Hooks other than hand hooks. (1) 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 employers shall maintain a record of the dates and results of such tests.

(2) Loads shall be applied to the throat of the hook since loading the point overstresses and bends or springs the hook.

(3) Hooks shall be inspected once a month to see that they have not been bent by overloading. Bent or sprung hooks shall not be used.

(4) Crane Hooks. (a) Magnetic particle or other suitable crack detecting inspection should be performed at least once each year. When testing by X-ray, the pertinent provisions of the Atomic Energy Commission's Standards for Protection Against Radiation, relating to protection against occupational radiation exposure, shall apply.

(b) Any activity which involves the use of radioactive materials or X-rays, 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.

(5) Teeth of case hooks shall not be split, cracked, or deformed.

(6) Jaws of patent clamp type plate hooks shall be kept in safe condition so that they will grip plates securely. [Order 74-14, § 296-56-45511, filed 4/22/74.]

WAC 296-56-45513 Cargo boards and other type pallet boards. The term "cargo board" shall mean the typical wing or lip type stevedore board hoisted to or from vessels by means of a bar bridle. "Other pallet boards" include all other platforms used to hold cargo for the purpose of transporting it from place to place.

(1) All pallets and cargo boards shall be of such material and construction as to safely support and carry loads being handled on them.

(2) All cargo boards shall be sheathed (decked) top and bottom with the top sheathing being of two (2) inch lumber and with the top sheathing extending at least six (6) inches beyond the end stringers.

(3) The outer sheathing boards or boards adjacent thereto on cargo boards shall be fastened to the stringers by bolts and nuts. Other sheathing shall be fastened by bolts and nuts, drive screws (helically threaded nails), annular threaded nails, or fastenings of equivalent strength.

(4) Pallet boards, other than cargo boards, may be hoisted if safe means are provided for the type of board used.

(5) Loaded cargo or pallet boards which do not meet the requirements of this section shall be reboarded or placed on cargo boards meeting the requirements before being hoisted, provided weight of the load can be safely distributed on the cargo board.

(6) Cargo boards which are not loaded and secured so that the load will not tip or fall shall not be hoisted.

(7) Bridles used to handle flush end or box type pallets shall be of such a design as to prevent them from becoming disengaged from the pallet under load.

NOTE: In areas where the two lip cargo board is being used, that practice shall remain. The Department of Labor and Industries recommends the use of the two lip cargo board.

[Order 74-14, § 296-56-45513, filed 4/22/74.]

WAC 296-56-45515 Chutes, gravity conveyors and rollers. (1) Chutes used in the manual handling of cargo shall be adequate for the use to which they are put and shall be kept free of splinters and sharp edges.

(2) Chutes shall be equipped with sideboards of sufficient height to prevent cargo from falling off.

(3) Chutes and gravity roller sections shall be firmly placed or secured to prevent displacement.

(4) Gravity rollers shall be of sufficient strength for the weight of material which is placed upon them. Rollers shall be locked in position to prevent them from falling or jumping out of the frame.

(5) Frames shall be kept free of burrs and sharp edges.

(6) When necessary, provision shall be made for braking objects at the delivery end of the roller or chute. [Order 74-14, § 296-56-45515, filed 4/22/74.]

WAC 296-56-45517 Disposition of defective material or gear. If tools, materials, appliances, or any gear are found unsafe at any time during the operation, workers shall report the same immediately to the person in charge of the work, who shall mark or so place any unsafe or doubtful gear so that it will not be used. [Order 74-14, § 296-56-45517, filed 4/22/74.]

WAC 296-56-46001 Keep clear of lines. When using a bull line, shovel line, or bucket line, the longshoreman shall stand out of the bight and clear of the throw of the lead and hook. [Order 74-14, § 296-56-460 (codified as WAC 296-56-46001), filed 4/22/74.]

WAC 296-56-461 Greasing power units. Power units on cranes, winches, etc., shall be greased, oiled, and cleaned only when the power is off, unless it is necessary for the machinery to be in motion for proper lubrication. [Order 74-14, § 296-56-461, filed 4/22/74.]

WAC 296-56-462 Use of tools. (1) Cutting Tools. Where necessary to cut wooden strips, cutting tools shall be provided. Such strips shall not be broken upon a person's knee, nor shall they be broken by jumping on them.

(2) Guards For Circular Saws. Portable circular saws shall be guarded in accordance with the provisions of the General Safety and Health Standards, WAC 296-24-65501.

(3) Moving With Chain Saw Running Prohibited. No person shall walk from one area to another with a chain saw while it is running.

(4) Tools For Breaking Bands. Only tools designed for the specific operation shall be provided and used for the unfastening and breaking off of metal car strips, bands, or wires.

(5) Tools, General. Employers shall not issue or permit the use of visibly unsafe tools.

(6) Portable Electric Tools. Portable electric tools which are held in the hand shall be equipped with switches of a type which must be manually held in a closed position. [Order 76-7, § 296-56-462, filed 3/1/76; Order 74-14, § 296-56-462, filed 4/22/74.]

WAC 296-56-465 Jacob's ladders. (1) Jacob's ladders shall be of the double rung or flat tread type. They shall be well maintained and properly secured, to the dock.

(2) A Jacob's ladder shall either hang without slack from its lashings or be pulled up entirely. [Order 74-14, § 296-56-465, filed 4/22/74.]

WAC 296-56-467 Secure storage. Storage of material shall not create a hazard. Bags, containers, bundles, etc., stored in tiers shall be stacked, blocked, interlocked and limited in height so that they are stable and secure against sliding or collapse. [Order 74-14, § 296-56-467, filed 4/22/74.]

WAC 296-56-475 Standard gauge railroad operations——Scope and application. All sections of this chapter which include WAC 296-56-475 in the section number apply to Standard Gauge Railroad Operations. [Order 74-14, § 296-56-475, filed 4/22/74.]

WAC 296-56-47501 Warning flags or light. A blue flag, bright colored flag or blue light shall be displayed at one or both ends of an engine, car(s), or train, to indicate that workers are under or about the railway equipment. When such warning devices are displayed, the equipment shall not be coupled to, or moved. On a deadend spur, a blue light or flag may be displayed adjacent to the switch opening while cars are being loaded or unloaded. [Order 74-14, § 296-56-47501, filed 4/22/74.]

WAC 296-56-47503 Signals unobscured. Equipment which would obscure signals shall not be placed on the track. [Order 74-14, § 296-56-47503, filed 4/22/74.]

WAC 296-56-47504 Derails. Work being carried on, in, or under cars which subjects employees to the hazard of moving railroad equipment shall be protected by flags and derails set a minimum of 50 feet from one or both ends of the worksite. Where the spur track switch is less than 50 feet from the work location, the switch padlocked in the open position will take the place of the derail and the blue flag shall be placed at that point. [Order 74-14, § 296-56-47504, filed 4/22/74.]

WAC 296-56-47505 Signals displayed by each maintenance crew. Each maintenance crew shall display and remove its own set of blue signals. [Order 74-14, § 296-56-47505, filed 4/22/74.]

WAC 296-56-47507 Warning device. A flashing warning light or other device shall be installed near any opening which leads to a passageway crossing railroad tracks adjacent to the building. Such light or device shall be activated prior to any switching or movement of railroad equipment to warn workers of the dangerous condition in the area. [Order 74-14, § 296-56-47507, filed 4/22/74.]

WAC 296-56-47509 Audible warning system. A clearly audible warning system shall be employed when cars are being moved in areas where workers are in the vicinity of the tracks. When the audible warning signal may not be heard above the surrounding noises, a person shall be delegated and stationed close enough to the track crew to warn them, by contact, of the oncoming equipment. [Order 74-14, § 296-56-47509, filed 4/22/74.]

WAC 296-56-47511 Passageway across railroad tracks required. Employees shall not crawl or climb under, over, or through railroad cars when passing to or from their places of work. Regular passageways shall be established and used. [Order 74-14, § 296-56-47511, filed 4/22/74.]

WAC 296-56-47513 Cars to be immobilized. Spotted cars shall either have brakes set, wheels blocked, or shall be coupled to other immobilized cars to prevent each car from rolling. [Order 74-14, § 296-56-47513, filed 4/22/74.]

WAC 296-56-47515 Working in railroad cars. Employees, while loading or unloading railroad cars, shall stand outside the car when drafts of long, heavy or awkward cargo which creates a hazard, are being hoisted or lowered. [Order 74-14, § 296-56-47515, filed 4/22/74.]

WAC 296-56-47517 Safety observer on railroad switching. When persons are required to work between railway cars, underneath railway cars or in areas where switching is done, there shall be a person who shall be charged with the responsibility to warn of an approaching switch of the railway car or cars, unless other reasonable and practical safeguards are provided. [Order 74-14, § 296-56-47517, filed 4/22/74.]

WAC 296-56-47519 Warning at road crossing. An audible whistle, horn or bell shall be sounded by the locomotive engineer to give adequate warning prior to switching across any road crossing. In the case of pushing cars with a locomotive, a signalman shall be located at the crossing to give signals in conjunction with other warnings by the engineer. [Order 74-14, § 296-56-47519, filed 4/22/74.]

WAC 296-56-47521 Preparation of cars for moving. All insecure and overhanging stakes and wire straps

shall be removed from the car and stacked or placed in an orderly manner away from the working area before cars are moved. [Order 74-14, § 296-56-47521, filed 4/22/74.]

WAC 296-56-47523 Flying switches. Flying switches shall not be used when switching railroad equipment in congested areas or across roadways or walkways. [Order 74-14, § 296-56-47523, filed 4/22/74.]

WAC 296-56-47525 Car opening devices. All box car doors and associated mechanisms shall be carefully inspected before workers attempt to open or close them. If the door is not free and cannot be opened by hand, equipment shall be provided, and a safe method shall be used to open or close the door. [Order 74-14, § 296-56-47525, filed 4/22/74.]

WAC 296-56-47527 Safe car floors. Machines shall not be used and persons shall not work in railway cars when the floor has holes or has been weakened structurally or slippery or tripping conditions exist. [Order 74-14, § 296-56-47527, filed 4/22/74.]

WAC 296-56-47529 Clearance from railroad tracks. Materials shall not be stacked or piled closer than 8 1/2' from the center line of the railroad tracks. [Order 74-14, § 296-56-47529, filed 4/22/74.]

WAC 296-56-47531 Safety while moving cars. Persons shall stand clear of moving railroad cars. [Order 74-14, § 296-56-47531, filed 4/22/74.]

WAC 296-56-480 Mobile vehicles——Scope and application. All sections of this chapter which include WAC 296-56-480 in the section number apply to Mobile Vehicles. [Order 74-14, § 296-56-480, filed 4/22/74; Order § V, Rules 5.010-5.280 filed 9/24/65; Rules (part), filed 3/23/60.]

WAC 296-56-48001 Traffic lanes. (1) Clear Lanes. All cargo, gear, and equipment not in use shall be kept clear of traffic lanes.

(2) Traffic Way Designation. Regular traffic lanes shall be established and clearly designated.

(3) Traffic System. A system of one-way traffic or circular traffic shall be established.

(4) Follow Traffic Lanes. All vehicles shall follow designated traffic lanes. [Order 74-14, § 296-56-48001, filed 4/22/74.]

WAC 296-56-48003 Duties of operator. (1) A power-driven vehicle operator's special duties are:

(a) To operate the vehicle in a safe manner.

(b) To test brakes, steering gear, lights, horns, or other warning devices, clutches, etc., before starting work.

(c) To not move a vehicle while an unauthorized rider is on the vehicle.

(d) To slow down upon approaching blind corners or other places where vision is limited.

(e) To obey all speed and traffic regulations and other applicable rules.

(f) To have the vehicle at all times under control so that it can be brought to an emergency stop in the clear space in front of the vehicle.

(g) To back down any incline of two percent or more when traveling with a load on the fork lift jitney.

(2) Unobstructed View. When traveling, power-propelled vehicles shall at all times be operated in a manner giving the operator a reasonably unobstructed view in the direction of travel, or where this is impractical, the operator shall be directed in travel, by a person designated to do so.

(3) Employee Riding Safety. Operators and authorized passengers shall not be permitted to ride with legs or arms extending outside any vehicle nor shall they be permitted to ride while standing unless the vehicle is designed to be operated from a standing position.

(4) Moving Vehicles. Vehicles shall be controlled manually while being pushed or towed except when a tow bar is used. Special precautions shall be taken when pushing vehicles where view is obstructed. Vehicles shall not be pushed with blades of a forklift.

(5) Moving Highway Trailers. In all cargo operations involving the use of highway trailers, such trailers shall be moved in such a manner that at all times the moving trailer is completely under control. Special caution shall be exercised when such trailers are moving on inclines. Trailers shall be loaded in a manner which will prevent the cargo from shifting, and the load in the trailer shall be evenly distributed so as not to cause the trailer to tip to one side.

(6) Prohibited Forms of Riding. Riding on tongue or handles of trailers or forks of power propelled vehicles is prohibited.

(7) Regular Seats for Riders. No one except the operator shall ride on power-driven vehicles unless regular seats are provided to accommodate passengers.

(8) Jumping On or Off Moving Vehicles. Employees shall not jump on or off moving vehicles.

(9) When a powered industrial truck is left unattended, load engaging means shall be fully lowered, controls shall be neutralized, power shall be shut off, and brakes set. Wheels shall be blocked if the truck is parked on an incline.

(10) 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.

(11) When the operator of an industrial truck is dismounted and within 25 feet of the truck still in view, the load engaging means shall be fully lowered, controls neutralized, and the brakes set to prevent movement.

(12) Reporting Defects. If power-driven vehicle is at any time found to be in any way unsafe, the operator shall report same immediately to the person in charge and such vehicle shall not be used for production work until it has been made safe.

(13) Only trained and authorized operators shall be permitted to operate a powered industrial truck. Methods shall be devised to train operators in the safe operation of powered industrial trucks. [Order 74-14, § 296-56-48003, filed 4/22/74.]

WAC 296-56-48005 Vehicle equipment and maintenance. (1) Horns and Lights. (a) All power-propelled vehicles shall be provided with horns or other warning devices.

(b) Power-propelled vehicles used for night work, when required to travel away from an illuminated work area shall be equipped with a light or lights directed in the direction of travel as required to safely travel about the area.

(2) Guards on Operator's Platform. Every power truck operated from an end platform or standing position shall be equipped with a substantial guard securely attached to the platform or frame of the vehicle in such a manner as to protect the operator from falling objects and so designed that the operator can easily mount or dismount from the operating station.

(3) Seat Cushions. All vehicles having a driver's seat shall be provided with resilient seat cushions fixed in place.

(4) Securing of Counterbalances. Counterbalances of all power-driven vehicles shall be properly secured, but may be a removable type which may be removed, if desired, prior to hoisting.

(5) Exhaust Pipes and Mufflers. Exhaust pipes and mufflers of internal combustion engines, where workers are exposed to contact shall be isolated or insulated. Exhaust pipes shall be constructed to discharge not less than seventy-two (72) inches above the floor on jitneys and eighty-four (84) inches on lift jitneys, or less than twenty (20) inches from the floor.

(6) Ventilation Where Internal Combustion Type Vehicles are Used. Internal combustion type engines may be used only in areas where adequate ventilation is provided.

(a) Concentration levels of carbon monoxide gas created by powered industrial truck operations shall not exceed the levels specified in WAC 296-62-075 (General Occupational Health Standards).

(b) When disputes arise concerning degree of concentration and methods of sampling to ascertain the conditions should be referred to a qualified industrial hygienist.

(7) Brakes on Power Driven Vehicles. Both foot and emergency brakes, where installed on power-driven vehicles shall be kept in proper operating condition at all times.

(8) Cargo Truck Couplings. Couplings installed on cargo trucks (4-wheelers) shall be of a type which will prevent accidental disengaging.

(9) Operating Levers. Operating levers on power-driven vehicles shall be so placed as not to project toward the operator's body.

(10) Front Axle Assembly Secure. The front axle assembly on all trailers shall be securely fastened to the truck bed.

(11) Air Line Hook-Up. Tractors hauling heavy duty highway trailers shall have an air line brake hook-up.

(12) Floor Mats. On power-driven vehicles where the operator stands on a platform, resilient foot mats shall be securely attached.

(13) Cleaning Vehicles. All power propelled vehicles shall be cleaned at frequent intervals to remove any accumulation of dust and grease that may present a hazard. [Order 74-14, § 296-56-48005, filed 4/22/74.]

WAC 296-56-490 Lift jitneys. (1) Lifting Capacity of Vehicle to be Observed. At no time shall a load in excess of the manufacturer's lifting capacity rating be lifted, carried, or moved by a lift jitney.

(2) Posting Rated Capacity. The rated lifting capacity of all lift jitneys shall at all times be posted on the vehicle in such a manner that it is readily visible to the operator.

(3) Limited Use of Lift Jitney. Lift jitneys shall not be used to carry loose loads of pipe, steel, iron, or lumber unless adequate clearance is provided and the loads are secure.

(4) Supplies to Ship's Rail. Cargo or supplies shall not be hoisted to or from ship's rail with a lift jitney. This does not apply to ramp or side port loading.

(5) Position of Jitney Forks. When standing, lift jitney forks shall be lowered to floor. When moving, lift jitney forks shall be kept as low as possible.

(6) Hoisting of Persons on Vehicle Forks Prohibited. Persons shall not be hoisted by standing directly on forks of vehicles. A platform or structure built specifically for hoisting persons may be used. Such structure must be securely attached to the forks and shall have standard guard rails installed on sides not used by workers while performing their duties. Four inch high toeboards shall be required where there are tools and equipment which may fall off platform.

(7) Jitney Use in Gangplank Moving. Not less than two lift jitneys shall be used to place or remove gangplanks unless fork width prevents tipping and manufacturer's rated lifting capacity of the fork lift is not exceeded.

(8) Overhead Guards on Lift Jitneys. There shall be on all lift trucks, an overhead guard for the protection of the operator and such overhead protection shall be of such design as to meet with the requirements of Part II, ANSI B56.1-1969. This guard may be removed only when it cannot be used due to the nature of the work and loads shall be maintained in such a manner so as not to create a hazard to the operator.

(9) Lift Fork Frame Guards. To prevent material from falling on the driver, on jitneys without overhead guards, there shall be attached to the carriage of all lift jitneys, a guard extending a minimum of forty (40) inches above the lift fork frame, unless forklift is working in box cars or trailers, where overhead clearance is restricted.

(10) Jitney Seat Covers. Seats on lift jitneys and seats on jitneys shall be provided with a removable waterproof cover when they are exposed to the weather.

(11) Raised Equipment to be Blocked. Workers shall not work below the raised bed of a dump truck, raised buckets of front end loaders, raised blades of tractors or in similar positions without blocking the equipment in a manner that will prevent it from falling. When working under equipment suspended by use of jacks, safety standards or blocking shall also be used in conjunction with the jack.

(12) Precautions to be Taken While Inflating Tire. Unmounted split rim wheels shall be placed in a safety cage or other device shall be used which will prevent a split rim from striking the worker if it should dislodge while the tire is being inflated.

(13) Reporting Suspected Defects. If, in the opinion of the operator, a power-driven vehicle is unsafe, the operator shall report the suspected defect immediately to the person in charge. Any defect which would make the vehicle unsafe to operate under existing conditions shall be cause to take the vehicle out of service and it shall not be put back into use until it has been made safe. [Order 74-14, § 296-56-490, filed 4/22/74; § VI, Rules 6.010-6.100, filed 9/24/65; Rules (part), filed 3/23/60.]

WAC 296-56-495 Changing and charging storage batteries. (1) Battery charging installations shall be located in areas designated for that purpose.

(2) Facilities shall be provided for flushing and neutralizing spilled electrolyte, for fire protection, for protecting charging apparatus from damage by trucks, and for adequate ventilation for dispersal of fumes from gassing batteries.

(3) When racks are used for support of batteries, they should be made of materials nonconductive to spark generation or be coated or covered to achieve this objective.

(4) A conveyor, overhead hoist, or equivalent material handling equipment shall be provided for handling batteries.

(5) Reinstalled batteries shall be properly positioned and secured in the truck.

(6) A carboy tilter or siphon shall be provided for handling electrolyte.

(7) When charging batteries, concentrated acid shall be poured into water; water shall not be poured into concentrated acid.

(8) Trucks shall be properly positioned and 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. Care shall be taken to assure that vent caps are functioning. The battery (or compartment) cover(s) shall be open to dissipate heat.

(10) Smoking shall be prohibited in the charging area.

(11) Precautions shall be taken to prevent open flames, sparks, or electric arcs in battery charging areas.

(12) Tools and other metallic objects shall be kept away from the top of uncovered batteries. [Order 74-14, § 296-56-495, filed 4/22/74.]

WAC 296-56-500 Handling of cargo——Scope and application. All sections of this chapter which include WAC 296-56-500 in the section number apply to Handling of Cargo. [Order 74-14, § 296-56-500, filed 4/22/74; § VII, Rules 7.010-7.110, filed 9/24/65; Rules (part), filed 3/23/60.]

WAC 296-56-50001 Non-use of defective slings. A slung load or draft shall not be lifted with a sling having a kink or knot in it. Chain shall not be shortened by wiring, bolting or tying. Chains shall not be repaired by bolting two links together or by the use of wire. Wire slings shall not be used when they are defective. [Order 74-14, § 296-56-50001, filed 4/22/74.]

WAC 296-56-50003 Landing loads. Persons assisting in landing a load shall face the load and use caution to prevent themselves from getting in a position where they may be caught between the load and a fixed object. [Order 74-14, § 296-56-50003, filed 4/22/74.]

WAC 296-56-50005 Secure hoisted cargo. Any cargo which may reasonably be expected to spread or fall when being hoisted or moved shall be secured or pallitized. Materials or means used for securing cargo shall be of adequate strength to keep the material from spreading or falling.

(1) Cargo handling bridles, such as pallet bridles, which are to remain attached to the hoisting gear while hoisting successive drafts, shall be attached by shackles, or other positive means shall be taken to prevent them from becoming accidentally disengaged from the cargo hook.

(2) Drafts of lumber, pipe, dunnage and other pieces, the top layer of which is not bound by the sling, shall be slung in such a manner as to prevent sliders. Double slings shall be used on unstrapped dunnage, except when, due to the size of hatch or deep tank openings, it is impractical to use them.

(3) Case hooks shall not be used for handling cases into or out of the vessel, unless the cases are specifically designed to be handled by this means. [Order 74-14, § 296-56-50005, filed 4/22/74.]

WAC 296-56-50007 Hoisting material by bands or fasteners. (1) Bales of cotton, wool, cork, gunny bags or similar materials may be hoisted by bands providing each band is of sufficient strength to support the load and that two hooks are used and hooked into separate bands.

(2) Bundles of aluminum, steel or similar items shall not be hoisted by bands or ties unless the material used to contain the bundle is designed for such purpose and has an adequate factor of safety to safely handle the load.

(3) Loads requiring continuous manual guidance while in motion shall be provided with tag lines. [Order 76-7, § 296-56-50007, filed 3/1/76; Order 74-14, § 296-56-50007, filed 4/22/74.]

WAC 296-56-50009 Slings for handling pulp. When hoisting pulp with a roller bridle, the sling shall be of such length as necessary to keep the bridle rollers a sufficient distance apart to keep side pressure on the load. [Order 74-14, § 296-56-50009, filed 4/22/74.]

WAC 296-56-50010 Containerized cargo secured by bands or wire. Each band or wire shall have a known breaking strength and shall not be used beyond the manufacturer's rated capacity. Such capacities shall be considered when lifting with one hook or multiple hooks. [Order 74-14, § 296-56-50010, filed 4/22/74.]

WAC 296-56-50011 Securing glass cases. Any time cases of glass over three (3) feet high are stored in warehouses or loaded in rail cars, they shall at all times be secured so as to prevent them from falling on the workers. [Order 74-14, § 296-56-50011, filed 4/22/74.]

WAC 296-56-50013 Hoisting bulk cargo. (1) Drafts shall be so built or such means shall be taken as to prevent cargo from falling from the draft.

(2) Hand loaded buckets or tubs used in handling bulk cargo shall not be loaded above their rims. [Order 76-7, § 296-56-50013, filed 3/1/76; Order 74-14, § 296-56-50013, filed 4/22/74.]

WAC 296-56-50015 Hand and eye protection on wire rope. (1) Wire bridles shall have a covering of marline, rubber hose, or other suitable protection over hook splice to protect the workers' hands.

(2) Jaggers on wire rope shall not be cut off with wire cutters unless employee is provided with eye protection.

(3) Protruding ends of strands in splices on slings and bridles shall be covered or blunted. [Order 74-14, § 296-56-50015, filed 4/22/74.]

WAC 296-56-50017 Car plates. Whenever workers are required to move cargo into or out of a railway car, a railway car plate shall be used which shall meet the following specifications:

(1) All car plates shall be strong enough to carry maximum loads with a safety factor of three (3).

(2) All car plates shall be provided with positive stops to prevent shifting of plates. One set of these stops shall be adjustable to take care of different spaces between car door and platform.

(3) Car plates shall be so shaped that edges will always bear on floor of car and platform to prevent "teetering" or rocking.

(4) All car plates shall have skid resistant surfaces.

(5) All car plates are to be provided with toe or guard plates at the sides with a minimum height of four inches (4").

(6) All car plates must bear no less than six inches (6") back from edge of platform.

(7) Maximum capacity of car plates shall be marked in a conspicuous place.

(8) Car plates shall be provided with an appropriate fixture to enable the plates to be lifted and moved by fork trucks. [Order 74-14, § 296-56-50017, filed 4/22/74.]

WAC 296-56-50019 Dockboards (bridge plates). (1) Portable and powered dockboards shall be strong enough to carry the load imposed on them.

(2) Portable dockboards shall be secured in position, either by being anchored or equipped with devices which will prevent their slipping.

(3) Powered dockboards shall be designed and constructed in accordance with Commercial Standards CS202-56 (1956) "Industrial Lifts and Hinged Loading Ramps" published by the U.S. Department of Commerce.

(4) Handholds or other effective means, shall be provided on portable dockboards to permit safe handling. [Order 74-14, § 296-56-50019, filed 4/22/74.]

WAC 296-56-50021 Trucks and railroad cars. (1) The brakes of highway trucks shall be set and wheel chocks placed under the rear wheels to prevent the trucks from rolling while they are boarded with powered industrial trucks.

(2) Wheel stops or other recognized positive protection shall be provided to prevent railroad cars from moving during loading or unloading operations.

(3) Fixed jacks shall be necessary to support a semi-trailer and prevent up-ending during the loading or unloading when the trailer is not coupled to a tractor.

(4) Positive protection shall be provided to prevent railroad cars from being moved while dockboards or bridge plates are in position. [Order 74-14, § 296-56-50021, filed 4/22/74.]

WAC 296-56-50023 Hazardous cargo. (1) Prior to the start of cargo handling operations a responsible representative of the employer shall ascertain from labels on the cargo, from the dangerous cargo manifest, or from other shipping documents, what hazardous cargoes, if any, are to be handled and the general nature of the hazard. He shall inform employees of the general nature of the hazard, the importance to the employees of preventing damage to the cargo, and the special precautions to be taken. The responsible representative of the employer aboard the vessel shall instruct the employees to notify him of any leaks or spills.

(2) Drafts of cargo ascertained by the employer to be hazardous shall be so slung and secured that neither the draft nor individual packages can fall as a result of tipping the draft or slacking the supporting gear.

(3) If a cargo ascertained by the employer to be hazardous is spilled or any of its containers has or develops a serious leak, the employees shall be removed from the hold or compartment until the employer has ascertained the specific hazards, has provided such personal protective equipment and clothing and such ventilation and fire protective equipment as may be necessary to avoid, or protect against, the hazard, and has instructed the employees as to the safe method of cleaning up and disposing of a spill or handling and disposing of the leaking containers. The actual work of clean up or disposal shall

be carried out under the personal supervision of a reasponsible representative of the employer. [Order 74-14, § 296-56-50023, filed 4/22/74.]

WAC 296-56-50025 Recouping broken cargo. Any cargo found to be sufficiently broken to constitute a hazard shall be immediately repaired or shall be set aside at a safe distance away from the working area so it can be later repaired. Area shall be cleaned of spilled cargo. [Order 74-14, § 296-56-50025, filed 4/22/74.]

WAC 296-56-50027 Containerized cargo. (1) For the purpose of this section, the term "container" means a reusable cargo container of rigid construction and rectangular configuration, intended to contain one or more articles of cargo or bulk commodities for shipment aboard a vessel, and capable of utilization for this purpose by one or more other modes of transport without intermediate reloading. The term includes completely enclosed units, open top units, half or other fractional height units, units incorporating liquid or gas tanks, and any other variations serving the same basic purpose and fitting into the container system, demountable or with attached wheels. The term, however, does not include cylinders, drums, crates, cases, cartons, packages, sacks, unitized loads or any other of the usual forms of packaging.

(2) On every cargo container there shall be permanently marked in pounds (a) the weight of the container when empty, (b) the maximum cargo weight that the container is intended and designed by its manufacturer to carry, and (c) the sum of these two weights.

(3) No container shall be loaded aboard or discharged from any vessel by means of hoisting by ship's cargo handling gear or by shore crane or derrick unless the following conditions have been met:

(a) In the case of an empty container, it shall be ascertained from the carrier that such is the case and the container shall be identified before loading or discharge either by marking, in cargo stowage plans, by both means, or otherwise in such manner that every supervisor and foreman on the site and in charge of loading or discharging, and/or every crane or other hoisting equipment operator, and signalman, if any, shall be enabled to know that such container is empty.

(b) In the case of a loaded container, either the actual gross weight shall be plainly marked so as to be visible to the crane or other hoisting equipment operator or signalman, if any, and/or to every supervisor and foreman on the site and in charge of loading or discharging; or the cargo stowage plan or equivalent permanently recorded display serving the same purpose shall be provided to the crane or other hoisting equipment operator and signalman, if any, and to every supervisor and foreman on the site and in charge of loading or discharging, and contain the actual gross weight, the exact stowage position, and the serial number or other positive identification of that specific container.

(c) Every outbound loaded container received at a marine terminal ready to load aboard a vessel without further consolidation or loading shall be weighed to obtain the actual gross weight, either at the terminal or elsewhere before loading aboard a vessel. The open type vehicle carrying container and those built specifically and used solely for the carriage of compressed gases are excepted from (2)(c), (d) and (e) of this section.

(d) When container weighing scales are located at a marine terminal, any outbound container with a load consolidated at that terminal shall be weighed to obtain an actual gross weight before loading aboard a vessel.

(e) When there are no container weighing scales located at a marine terminal at which outbound containers are loaded with cargo, or where container loads are completed or consolidated there or elsewhere, and no weighing facility is available and located in a reasonably accessible location, the actual gross weight may be calculated, providing that accurate weights of all contents are known and a list of same, including the empty container weight, is totaled and posted on the container in a conspicuous place with identification of the source and date of calculation. Such list of contents may refer to cartons, cases, or other means of packaging but need not specifically identify the commodity or commodities involved except as otherwise required by law. Container weights so arrived at shall be subject to random sample weight checks at the nearest weighing facility. In cases where such weight checks or experience otherwise indicate consistently inaccurate weights arrived at by this means, the weight of containers so calculated at the source from which the inaccurate weights originated may no longer be recognized as true gross weights, in which case such containers may not be loaded aboard a vessel unless actual gross weights have been obtained by weighing. This procedure shall be continued until the Washington State Department of Labor and Industries, Division of Industrial Safety and Health is satisfied by reasonable experience thereunder that correct weights will be furnished.

(f) In the case of loaded inbound containers from foreign ports, they shall, if they have not been weighed, have the calculated weight posted in the manner prescribed by (2)(e) of this section. All loaded inbound containers from foreign ports shall be subject to random sample weight checks at a time satisfactory to the Washington State Department of Labor and Industries, Division of Industrial Safety and Health, which may be at any time up to unloading the contents of the container at the terminal or until the container is delivered unopened to the land carrier. When such checks indicate a pattern of significant and continuing inaccuracy or when the provisions of (2)(g) of this section are not met, such suitable means as are acceptable to the Division of Industrial Safety and Health to protect the safety of the workers involved shall be taken during discharge to assure safety and such means shall be continued until the Division of Industrial Safety and Health is satisfied by experience thereunder that correct weights will be furnished.

(g) The identification and documentation provisions of (2)(a) and (b) of this section shall apply to containers originating from foreign ports.

(h) Any scale used within the United States to weigh containers for the purpose of the requirements of this section shall meet the accuracy standards of the state or local public authority in which the scale is located.

(4) No container shall be hoisted if its actual gross weight exceeds the weight marked as required in (1)(c) of this section, or if it exceeds the capacity of the crane or other hoisting device intended for use, under the conditions in which said crane or other hoisting device is used. All hoisting of containers shall be by means which will safely do so without probable damage to the container, and using the lifting fittings provided.

(5) All outbound containers shall be inspected before loading for any visible defects in structural members and fittings, which would render unsafe their handling in loading. To the extent it is practicable, inbound containers shall be similarly inspected before discharge. Any outbound container found to have such a defect shall either be discharged by such special means as to insure safety or shall be emptied before discharge.

(6) Before commencing to load grain which has been fumigated, the employer shall ascertain from the elevator operator that the cargo is free from hazardous concentrations of fumigants.

(a) The employer shall not load tobacco until the carrier has provided written notification as to whether or not the cargo has been fumigated. If the tobacco has been fumigated with any toxic fumigant, the employer shall not commence loading until written warranty has been received from the fumigation facility that the aeration of the cargo has been such as to reduce the concentration of the fumigant to a safe limit. Such notification and warranty shall be maintained for at least 30 days after the loading of the tobacco has been completed, and shall be available for examination by representatives of the Department of Labor and Industries.

(b) Before commencing to load cargo other than cargo mentioned in (6) or (6)(a) of this section, which has been fumigated at the loading port, the employer shall ascertain that such cargo does not contain a hazardous concentration of fumigants. [Order 74-14, § 296-56-50027, filed 4/22/74.]

WAC 296-56-510 Handling explosives or hazardous materials. (1) Dangerous or Explosive Nature to be Made Known. All workers handling explosive or other hazardous material which is properly labeled pursuant to the Washington State Labeling Code promulgated by the Department of Labor and Industries, or the Explosive Act, or the Federal and Washington State Food, Drug and Cosmetic Acts, the Federal Insecticide, Fungicide and Rodenticide Act, the Washington Pesticide Act, the Federal Hazardous Substances Labeling Act, the Interstate Commerce Commission and Foreign Commerce regulations, or explosives or other dangerous cargo which is reasonably known by the employers to be mislabeled or to be lacking a required label, shall be thoroughly informed by the employer of the explosive or dangerous nature of the cargo.

(2) Preparation and Handling of Explosives or Hazardous Materials. In all shipping operations including, but not limited to, handling, storing, and preparation, compliance with the standards of the Interstate Commerce Commission, the United States Coast Guard, or the safety rules developed by the Institute of Makers of Explosives shall be deemed proper and safe methods of operation.

(3) Handling of Breakage. If breakage should occur while handling explosives or other hazardous materials, the foreman shall order the work in the immediate area to cease until the hazard has been removed. It shall be the responsibility of the employer to use a safe method of handling such breakage and placing the same in a location safely remote from the work area.

(4) No Smoking. All workers supervising or engaged in the handling, hoisting, stowing of explosives, combustible oxidizing materials or flammable materials shall smoke only in designated areas.

(5) Loading Chute. In chuting packaged explosives, care must be exercised to make sure that one package shall have been taken from the mat before starting another. Each package shall have been completely removed from the mat before another is placed on the chute.

(6) Specifications for Chutes. In the loading of explosive merchandise in package form where chutes are used, the chutes shall be constructed only of wood. All fastenings thereon shall be of wooden pins, dowelings, or pegs. Metal fastenings may be used, provided they are countersunk.

(7) Mattress Landing Buffer. The bottoms of the chutes shall be provided with a stuffed mattress not less than four (4) inches thick and of sufficient width and length to allow for safe landing of packages.

(8) Drafts of cargo ascertained by the employer to be hazardous shall be so slung and secured that neither the draft nor individual packages can fall as a result of tipping the draft or slacking the supporting gear. [Order 74-14, § 296-56-510, filed 4/22/74; § VIII, Rules 8.010-8.070, filed 9/24/65; Rules (part), filed 3/23/60.]

WAC 296-56-520 Log handling on docks. (1) Binders Required. Two binders shall remain on all logging trucks and rail cars securing the logs while moving on the dock. When logs are unloaded a positive means must be used to safeguard against logs rolling off while binders are being removed.

(2) Slings. A sling especially designed to hoist logs or two slings shall be used for hoisting logs.

(3) Log Storage for Loading. Logs placed adjacent to the bull rail on the dock for loading onto a vessel shall not be over one log high unless placed in bunks or so stacked as not to roll or otherwise create a hazard to workers.

(4) Skids Required. When workers are required to sling up from the dock the logs shall be on skids at least eighteen (18) inches high or in bunks or similar devices. When logs are placed in bunks or similar devices, they shall not be over the top of the stanchions.

(5) Proper Arrangement of Lines. When hoisting logs, the lines shall be arranged and fastened in such a manner that they will not be subjected to undue strains or kinking.

(6) Bull Winches. When bull winches are used on the dock, they shall be secured by no less than two separate lines from the rear and one line from each side. All turnbuckles used shall be secured and moused.

(7) Size of Gear. All lines, blocks, and shackles and similar gear used in log operations shall be in good condition and shall be of sufficient size, strength, and material to withstand one and one-half times the maximum stress imposed.

(8) Securing of Shackles. Shackles with threaded pins or with nuts secured by keys or wire strands shall be used for connecting moving tackle. [Order 74-14, § 296-56-520, filed 4/22/74; § IX, Rules 9.010-9.090, filed 9/24/65; Rules (part), filed 3/23/60.]

WAC 296-56-535 Petroleum docks. (1) Pipe lines which transport petroleum liquids from or to a wharf shall be equipped with valves on shore so located as to be readily accessible and not endangered by a fire on the wharf.

(2) Drip pans, buckets, or other means shall be provided and shall be used to prevent oil spillage upon wharves during loading, disconnecting and draining hoses. After transfer is completed the contents of drip pans and buckets shall be removed and taken to a place of disposal.

(3) Package goods, freight or ship stores shall not be loaded or discharged during the bulk handling of oils or other inflammable liquids, in such a manner that the sling loads will endanger the hose.

(4) Water lights for use at petroleum wharves shall not be a type which create a source of ignition. [Order 74-14, § 296-56-535, filed 4/22/74.]

WAC 296-56-53501 Boat marinas. (1) All hoisting equipment including derricks, cranes or other devices used for boat launching, handling cargo or supplies shall be inspected once a month and the records of this inspection be made available to the marine dock inspector upon request. (Refer to WAC 296-56-44205.)

(2) Floating docks will not be required to have bull rails unless lift trucks or other power driven equipment is used on the dock.

(3) No smoking signs shall be posted in areas where fueling or inflammable material is present.

(4) Inflammable material or petroleum products shall be stored in a fireproof storage room or shed.

(5) Slippery surfaces shall be cleaned up and non-slip material shall be used if necessary. [Order 74-14, § 296-56-53501, filed 4/22/74.]

WAC 296-56-53503 Canneries and cold storage docks. (1) Hoisting equipment used to load or unload cargo or supplies or fishing vessels shall be inspected once a month and the record of inspection be made available to the marine dock inspector upon request. (Refer to WAC 296-56-44205.)

(2) Slippery surfaces shall be cleaned up and non-slip material shall be used if necessary. [Order 74-14, § 296-56-53503, filed 4/22/74.]

WAC 296-56-560 Excerpts from Revised Code of Washington. (1) Hours of Operators of Power Equipment in Waterfront Operations. RCW 49.28.100 It shall be unlawful for any employer to permit any of his employees to operate on docks, in warehouses and/or in or on other waterfront properties any power-driven mechanical equipment for the purpose of loading cargo on, or unloading cargo from, ships, barges, or other watercraft, or of assisting in such loading or unloading operations, for a period in excess of twelve and one-half hours at any time without giving such person an interval of eight hours rest: Provided, however, The provisions of this section and RCW 49.28.110 shall not be applicable in cases of emergency including fire, violent storms, leaking or sinking ships or services required by the armed forces of the United States.

(2) RCW 51.28.010 Notice of Accident. Whenever any accident occurs to any workman it shall be the duty of such workman or someone in his behalf to forthwith report such accident to his employer, superintendent or foreman in charge of the work, and of the employer to at once report such accident and the injury resulting therefrom to the department and also to any local representative of the department.

NOTE: This section applies only to those accidents occurring to workers covered by Title 51 RCW.

[Order 74-14, § 296-56-560, filed 4/22/74; Rules (part), filed 9/24/65; Rules (part), filed 3/23/60.]

WAC 296-56-990 Form——Appendix A——Certificate of competency.

APPENDIX A

CERTIFICATE OF COMPETENCY

Presented by

THE STATE OF WASHINGTON

DEPARTMENT OF LABOR AND INDUSTRIES

to

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who has demonstrated his abilities and documented his experience to the Department of Labor and Industries' Division of Industrial Safety and Health and is hereby granted authorization to examine and test equipment which is required to be certificated by rules contained in the Washington State Safety Standards for Longshore, Stevedore and Related Waterfront Operations. Unless revoked by the Supervisor of Industrial Safety and

Health prior to this date, this certificate shall expire ----------.

DIRECTOR

DATE SUPERVISOR OF INDUSTRIAL SAFETY AND HEALTH

[Order 74-14, Appendix A (codified as WAC 296-56-990), filed 4/22/74; Form, filed 5/26/69, effective 7/1/69.]

WAC 296-56-99001 Form——Appendix B—— Notice of deficiencies found on certification examination.

APPENDIX B

Washington State Department of Labor and Industries

Division of Industrial Safety and Health

NOTICE OF DEFICIENCIES FOUND ON CERTIFICATION EXAMINATION

Owner ----------

Identification, location, and specific description of equipment ----------

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The undersigned, being authorized to do so, hereby tenders notification of the following listed uncorrected deficiencies, found upon (test and examination) (examination) of the described equipment in accordance with the requirements of Washington State Safety Standards for Longshore, Stevedore and Related Waterfront Operations, as applicable, to constitute in the opinion of the undersigned a currently unsatisfactory condition: -----

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Under the applicable requirements of Safety Standards for Longshore, Stevedore and Related Waterfront Operations, the issuance of any certificate of (test and examination) (examination) is prohibited until such time as correction of deficiencies has been verified by the undersigned. It is further required that the certificating authority notify the Supervisor of Industrial Safety and Health, Washington State Department of Labor and Industries, of the above circumstances, by copy of this notice.

Name and Address of Certificated or otherwise authorized person making the test and/or examination ------

---.

Position of person making the test and/or examination -----.

Signature ----------
Person conducting examination

Date ----------

NOTE: This notice is for use and issuance only by persons specifically authorized by the Supervisor to conduct examinations of equipment required to be certificated. Use of this notice by unauthorized persons is prohibited.

Original to: Owner.
Copies to: Division of Industrial Safety and Health File.
Person Performing Test and/or Examination.

[Order 74-14, Appendix B (codified as WAC 296-56-99001), filed 4/22/74; Order 69-3, filed 5/26/69, effective 7/1/69.]

WAC 296-56-99002 Form——Appendix C—— Standard signals for longshore crane signals.

APPENDIX C
STANDARD SIGNALS FOR LONGSHORE CRANE SIGNALS



HOIST THE LOAD



LOWER THE LOAD



HOIST THE LOAD SLOWLY



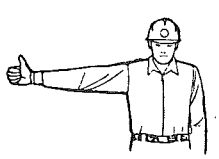
LOWER THE LOAD SLOWLY



USE MAIN HOOK



USE WHIP HOOK



RAISE THE BOOM



LOWER THE BOOM

[Order 74-14, Appendix C (codified as WAC 296-56-99002), filed 4/22/74; Rules (part), filed 9/24/65; Rules (part), filed 3/23/60.]

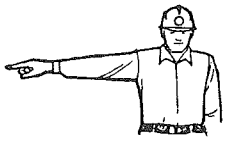
WAC 296-56-99003 Form——Appendix D—— Standard signals for longshore crane signals.

APPENDIX D

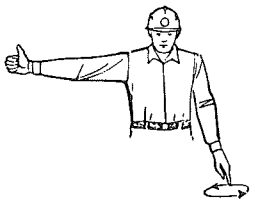
STANDARD SIGNALS FOR LONGSHORE CRANE SIGNALS



STOP



SWING LOAD IN DIRECTION FINGER POINTS



FOR MOBILE CRANES
LOWER THE LOAD AND RAISE THE BOOM



FOR MOBILE CRANES
HOIST THE LOAD AND LOWER THE BOOM



FOR MOBILE CRANES
LOCK THE CRAWLER BELT ON SIDE INDICATED BY RAISED FIST TRAVEL OTHER CRAWLER BELT IN DIRECTION INDICATED BY REVOLVING FIST



FOR MOBILE CRANES
TRAVEL BOTH CRAWLER BELTS IN DIRECTION INDICATED BY REVOLING FISTS

[Order 74-14, Appendix D (codified as WAC 296-56-99003), filed 4/22/74; Rules (part), filed 9/24/65; Rules (part), filed 3/23/60.]

WAC 296-56-99004 Form——Appendix E—— Certificate of unit test and/or examination of crane, derrick, or other material handling device.

APPENDIX E

WASHINGTON STATE DEPARTMENT OF LABOR AND INDUSTRIES
DIVISION OF SAFETY

Certificate No. _____
This Certificate Expires on _____
Day Month Year

CERTIFICATE OF UNIT TEST AND/OR EXAMINATION OF CRANE, DERRICK, OR OTHER MATERIAL HANDLING DEVICE

1. Owner _____

2. Description (check): Crane _____ Derrick _____
Other (describe) _____
Location: (a) Remains at work site _____ (b) Changes work site _____
If (b) describe: _____
If crane, type (truck, rail, etc.): _____
Manufacturer _____
Model _____ Serial No. _____
If derrick, describe: _____
If spout or other device, describe: _____
Identification _____

3. Service status at time of examination (check)
Lifting _____ Clamshell _____ Magnet _____
Other (describe) _____

4. Boom at time of examination (except bridge cranes): Length _____ Type _____

5. Test load applied (leave blank if only examination conducted)

RADIUS	PROOF LOADS	RATED LOADS
_____	_____	_____
_____	_____	_____
_____	_____	_____

Means of application of proof load: _____
Basis for assigned load ratings: _____

6. Remarks and/or limitations imposed: _____
_____

I certify that on the _____ day of _____, 19__, the above described device was (tested and examined) (examined) by the undersigned or his authorized representative: that said (test and examination)(examination) met in all respects with the requirements specified in the Safety Standards for Longshore, Stevedore and Related Waterfront Operations.
(2), that any deficiencies considered to constitute an unsatisfactory condition have been corrected; and that the device has been found in compliance in all applicable respects with the governing requirements.

Name and Address of certificated or otherwise authorized person making the test and/or examination _____

_____

_____

Position of person making the test and/or examination _____

_____

Signature _____
Supervisor of Safety

Date _____

NOTE: This certificate may be issued only by the Supervisor of Safety, Department of Labor and Industries. Use of this certificate by unauthorized persons is prohibited. Violators may subject themselves to the penalties provided by law.

Original to owner
Copies to: Safety Division File
Person Performing Test and/or Examination

No.M-507

[Order 74-14, Appendix E (codified as WAC 296-56-99004), filed 4/22/74; Form, filed 5/26/69, effective 7/1/69.]

WAC 296-56-99005 Form--Appendix F--Standard procedure--Testing and examination cranes, derricks, or material handling devices longshore, stevedore, and related waterfront operations.

APPENDIX F

DEPARTMENT OF LABOR AND INDUSTRIES
DIVISION OF SAFETY
P.O. Box 207, Olympia, Washington 98501

STANDARD PROCEDURE—TESTING AND EXAMINATION CRANES, DERRICKS, OR MATERIAL, HANDLING DEVICES LONGSHORE, STEVEDORE, AND RELATED WATERFRONT OPERATIONS

1. EQUIPMENT IDENTIFICATION
Name, address of OWNER _____

_____

Manufacturer _____
Model No. _____ Serial No. _____

2. (a) DESCRIPTION: CRANE _____
DERRICK _____
OTHER (Describe)
_____

(b) LOCATION: 1) Remains at work site _____
2) Changes work site _____

(c) If 2 above, describe _____

(d) If crane, state type, rail, steam, etc. _____

(e) If derrick, describe type _____

(f) If spout, describe type _____

(g) Powered by: Diesel _____
Diesel electric _____
Supplied electricity__Steam _____
Other _____

(h) Service status at time of test: Lifting _____
Clamshell _____ Magnet _____ Other _____
Describe _____

(i) Boom length at time of test: Main hoist _____
Whip _____ Jib _____

(j) Type of boom construction _____

(k) [Table]

WIRE ROPE	No. Parts	Diam.	No. Strands	Wires Per Strand	Type Core	Break Strength
Main hoist						
Whip						
Boom						
Boom pendants						

ATTACHED MANUFACTURER'S CERTIFICATE OF WIRE ROPE:
Yes _____ No _____

3. The following items must be inspected where applicable; if not applicable, so indicate:

	Accepted	Rejected	N/A
(a) Durable rating chart visible to operator			
(b) Boom angle indicator			
(c) Radius indicator			
(d) Operator controls marked or explanation of controls in operator's view			
(e) Main hoist wire limit control			
(f) Whip hoist wire limit control			
(g) Travel alarm			
(h) Outrigger locks			
(i) All pins and shafts			
(j) Counterweight			
(k) Hydraulic system			
(l) Air system			
(m) Electrical system			
(n) Blocks and sheaves			
(o) All deadending of cables			
(p) All hook safety latches & straps			
(q) All brakes			
(r) Boom light fixture safety lines			

	Accepted	Rejected	N/A
(s) Intercom system dock to cab	---------	---------	--
(t) Cable clamps, proper size, type, spacing	---------	---------	--
(u) All clutches, dogs, gauges ...	---------	---------	--
(v) Weight indicator in proper working order	---------	---------	--

4. TEST REQUIRED: Proof load test for cranes shall be based on manufacturer's load ratings to be applied at 10% excess at maximum and minimum radius and at any intermediate radii deemed necessary at time of certification. A derrick shall be proof load tested in excess of safe working load: to 20T——proof load 25% excess; to 50T——proof load 5 T excess; over 50T——10% excess. Bridge type cranes——25% in excess of manufacturer's ratings.

RADIUS In feet	TEST LOAD Tons	Lbs.	MANUF. RATING	RATED CAPACITY Tons	Lbs.	IDENTIFY MAIN OR WHIP LINE
----------	------	------	---------	------	------	----------
----------	------	------	---------	------	------	----------
----------	------	------	---------	------	------	----------

Means of application of proof load _____
Basis for assigned load ratings——Designate owner or manufacturer _____

Remarks _____

I hereby certify the above tests and/or examinations have been conducted in accordance with the Washington State Safety Standards for Longshore, Stevedore and Related Waterfront Operations, chapter 296-56 WAC.

_____, 19__

_____
Signature and Title of Certified Inspector
Address _____
_____

M-508 (Rev. 2-71)

[Order 74-14, Appendix F (codified as WAC 296-56-99005), filed 4/22/74.]

WAC 296-56-99006 Form--Appendix G--Standard procedure--Testing and inspection cargo spouts, suckers and similar equipment longshore, stevedore and related waterfront operations.

APPENDIX G

STANDARD PROCEDURE—TESTING & INSPECTION CARGO SPOUTS, SUCKERS AND SIMILAR EQUIPMENT LONGSHORE, STEVEDORE AND RELATED WATERFRONT OPERATIONS

*NOTE: Separate testing data sheet for each device required.

Name and Address of Owner _____
_____

Manufactured by _____ Manufacturer's Serial No. _____ Model No. _____

Manufacturer's Maximum Rated Capacity _____ (lbs. or tons per hour)

Equip. No. _____ Type of Equip. _____ (Spout, Sucker, etc.)

Location of Equip. _____ Remains at Location: YES _____ NO _____

Bulk Loading/Unloading Spout _____ Sucker _____ Conveyor _____ Chip Spout _____

Material Handled: Cement _____ Grain _____ Ore _____ Scrap Metal _____ Other _____

If spout or sucker, indicate Dia. _____" Nontelescopic _____ Length _____Ft. Telescopic _____ Maximum Length _____Ft. Minimum Length _____Ft. Hinged Spout (Spoon) at Disch./Suct. End: Yes _____ No _____

Spout/Sucker Mounted _____Ft. above Dock on Fixed Steel Structure _____.

Grain Elevator _____ Track Traveling: _____ Mobile _____ Other _____

Spout/Sucker extends offshore _____Ft. Slews _____ Elevates _____ Fixed _____

Boom supporting Spout/Sucker: Length _____Ft. Type: Steel Truss _____ "I" Beam _____ Other: _____ Boom: Slews _____ Elevates _____ Fixed _____.

Upper Support Boom: Length _____Ft. Type: Steel Truss _____ "I" Beam _____. Other: _____ Boom: Slews _____ Elevates _____ Fixed _____.

If conveyor boom, indicate: Loader _____ Unloader _____. Type Boom: Steel Truss _____ Other: _____

Mounted _____Ft. above Dock on Fixed Steel Structure _____ Warehouse _____ Track Traveling _____ Mobile _____ Other: _____

Conveyor Boom Length _____Ft. extends _____Ft. offshore. Slews _____

Elevates _____ Fixed _____ Horizontally projects/retracts _____ Fixed horizontally _____. Fixed askew above _____ Below _____ Horizontal _____.

Loader/Unloader manufactured by: _____

_____

Model _____

Serial No. _____

If items are not suited for describing the device, make a sketch on the back sheet indicating particulars or furnish general arrangement plans and photos. Always indicate the number of parts of wire rope and construction supporting principal components.

Are operating controls identified? Yes _____ No _____

Remarks: _____

_____

Replacement of Wire Rope(s), for subsequent annual examination noted _____

_____

If extra copy of certificate(s) available, indicate service (boom hoist, spout, sleeve, etc.) on certificate and submit with report. Otherwise complete following data:

Wire Serves, Indicate:	Cert #	Manufacturer/ Supplier	City	State	Test Date	Tested By	City	State

WIRE ROPE DATA:

[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 some descriptive text materials in the table heading typed in vertically across the page while the remainder of the table heading was typed horizontally on the page. The "blank spaces" to write in the required information which ran top to bottom has been switched to run left to right on the page. The "descriptive text heading information" which ran left to right on the page has been switched to run top to bottom on the page.]

Wire Serves*			
Boom Hoist, Spout, Sleeve, Trimmer, etc. Indicate:	_____	_____	_____
No. of Parts	_____	_____	_____
Diameter	_____	_____	_____
No. of Strands	_____	_____	_____
Wires per Strand	_____	_____	_____
PS	_____	_____	_____
IPS	_____	_____	_____
EIPS	_____	_____	_____
Super EIPS	_____	_____	_____
Flt. Strand	_____	_____	_____
CORE			
FC	_____	_____	_____
IWRC	_____	_____	_____
Other	_____	_____	_____
LAY			
RR	_____	_____	_____
RL	_____	_____	_____
LR	_____	_____	_____
LL	_____	_____	_____
ALT	_____	_____	_____
Galv.			
YES	_____	_____	_____
NO	_____	_____	_____
Preformed			
YES	_____	_____	_____
NO	_____	_____	_____
Rotate Resisting	_____	_____	_____
YES	_____	_____	_____
NO	_____	_____	_____
Breaking Strength			
ST/LBS	_____	_____	_____

When steel connecting rods, chains, etc., are used rather than wire rope, describe: _____

_____ Dia. _____" Thickness _____X_____"

REMARKS: _____

_____

I hereby certify that the above tests and/or inspections have been conducted in accordance with the Washington State Safety Standards for Longshore, Stevedore and Related Waterfront Operations chapter 296-56 WAC.

_____, 19__

_____

Signature of Authorized Person

Division of Industrial Safety & Health
Dept. of Labor & Industries
P.O. Box 207
Olympia, WA 98504

Form #M-509——(Rev. 8-73)

[Order 74-14, Appendix G (codified as WAC 296-56-99006), filed 4/22/74.]

Chapter 296-61 WAC

SAFETY STANDARDS——METAL AND NONMETALLIC MINES, QUARRIES, PITS, AND CRUSHING OPERATIONS

WAC

296-61-010 Scope and application.
296-61-020 Definitions.
296-61-030 Safety education and first aid requirements——General, surface, and underground.
296-61-040 Personal protective equipment and clothing——General, surface and underground.
296-61-050 General requirements.
296-61-060 Illumination.
296-61-070 Guards and guarding.
296-61-080 Fire prevention and control——General.
296-61-090 Travelways and escapeways——Surface and underground.
296-61-100 Air quality, ventilation and radiation.
296-61-110 Regulations pertaining to use of diesel equipment underground.
296-61-120 Electricity——Surface and underground.

Elevates _____ Fixed _____ Horizontally projects/retracts _____ Fixed horizontally _____. Fixed askew above _____ Below _____ Horizontal _____.

Loader/Unloader manufactured by: _____

_____

Model _____

Serial No. _____

If items are not suited for describing the device, make a sketch on the back sheet indicating particulars or furnish general arrangement plans and photos. Always indicate the number of parts of wire rope and construction supporting principal components.

Are operating controls identified? Yes _____ No _____

Remarks: _____

_____

Replacement of Wire Rope(s), for subsequent annual examination noted _____

_____

If extra copy of certificate(s) available, indicate service (boom hoist, spout, sleeve, etc.) on certificate and submit with report. Otherwise complete following data:

Wire Serves, Indicate:	Cert #	Manufacturer/ Supplier	City	State	Test Date	Tested By	City	State

WIRE ROPE DATA:

[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 some descriptive text materials in the table heading typed in vertically across the page while the remainder of the table heading was typed horizontally on the page. The "blank spaces" to write in the required information which ran top to bottom has been switched to run left to right on the page. The "descriptive text heading information" which ran left to right on the page has been switched to run top to bottom on the page.]

Wire Serves*			
Boom Hoist, Spout, Sleeve, Trimmer, etc. Indicate:	_____	_____	_____
No. of Parts	_____	_____	_____
Diameter	_____	_____	_____
No. of Strands	_____	_____	_____
Wires per Strand	_____	_____	_____
PS	_____	_____	_____
IPS	_____	_____	_____
EIPS	_____	_____	_____
Super EIPS	_____	_____	_____
Flt. Strand	_____	_____	_____
CORE			
FC	_____	_____	_____
IWRC	_____	_____	_____
Other	_____	_____	_____
LAY			
RR	_____	_____	_____
RL	_____	_____	_____
LR	_____	_____	_____
LL	_____	_____	_____
ALT	_____	_____	_____
Galv.			
YES	_____	_____	_____
NO	_____	_____	_____
Preformed			
YES	_____	_____	_____
NO	_____	_____	_____
Rotate Resisting	_____	_____	_____
YES	_____	_____	_____
NO	_____	_____	_____
Breaking Strength			
ST/LBS	_____	_____	_____

When steel connecting rods, chains, etc., are used rather than wire rope, describe: _____

_____ Dia. _____" Thickness _____X_____"

REMARKS: _____

_____

I hereby certify that the above tests and/or inspections have been conducted in accordance with the Washington State Safety Standards for Longshore, Stevedore and Related Waterfront Operations chapter 296-56 WAC.

_____, 19__

_____

Signature of Authorized Person

Division of Industrial Safety & Health
Dept. of Labor & Industries
P.O. Box 207
Olympia, WA 98504

Form #M-509——(Rev. 8-73)

[Order 74-14, Appendix G (codified as WAC 296-56-99006), filed 4/22/74.]

Chapter 296-61 WAC

SAFETY STANDARDS——METAL AND NONMETALLIC MINES, QUARRIES, PITS, AND CRUSHING OPERATIONS

WAC

296-61-010 Scope and application.
296-61-020 Definitions.
296-61-030 Safety education and first aid requirements——General, surface, and underground.
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296-61-080 Fire prevention and control——General.
296-61-090 Travelways and escapeways——Surface and underground.
296-61-100 Air quality, ventilation and radiation.
296-61-110 Regulations pertaining to use of diesel equipment underground.
296-61-120 Electricity——Surface and underground.

296-61-130	Deenergizing and lock-out or tag-out procedures.
296-61-140	Vessel or confined area requirements.
296-61-150	Compressed air, boilers, hoses and fittings, surface and underground——General.
296-61-160	Materials storage and handling——General, surface and underground.
296-61-170	Crane rail stops, bumpers and fenders.
296-61-180	Crane platforms and footwalks.
296-61-190	Pit and quarry operations——Ground control——Surface.
296-61-200	Ground control——Underground.
296-61-210	Drilling.
296-61-220	Rotary jet piercing——Surface only.
296-61-230	Man hoisting——Hoists.
296-61-240	Conveyances.
296-61-250	Hoisting procedures.
296-61-260	Signaling.
296-61-270	Shafts.
296-61-280	Explosives.
296-61-290	Loading, hauling, dumping——General, surface and underground.
296-61-300	Aerial tramways.
296-61-310	Crushing and milling operations.
296-61-320	Gassy mines.

WAC 296-61-010 Scope and application. (1) These standards shall be used for above-ground and underground operations where applicable.

(2) These safety standards were promulgated by the Department of Labor and Industries, Division of Safety, in accordance with the requirements outlined in the Washington State Administrative Procedures Act (chapter 34.04 RCW) and other statutes. Notices were distributed as required and a public hearing was conducted on January 21, 1972 at Olympia, Washington. Copies of these standards have been filed in the office of the Code Reviser to become effective on April 1, 1972.

(3) When the words "shall" or "must" are used in these standards or a positive action is required by the wording of any rules, such requirement is compulsory. The words, "may" or "should" as used in these standards identify recommendations or suggestions only. Numerals appearing in brackets after a WAC rule number (example: WAC 296-61-030(2) ([57.15-1])) indicate that the cited rule has been published in the Code of Federal Regulations and contains essentially the same requirements as the rule herein promulgated.

(4) ([57.24]) (a) Realizing that conditions may exist in operations under which certain state standards will not have practical application, the Supervisor of Safety may, upon receipt of application and after adequate investigation by the Department, and subject to subparagraph (b), permit a variation from these requirements when other equal means of protection are provided. Any variation granted under the provisions of this paragraph shall be limited to the particular case or cases covered in the application for variance and may be revoked for cause. The permit for variance shall be conspicuously posted on the premises prior to becoming effective and shall remain posted during the life of such waiver. All requests for a variation, modification or waiver shall be make in writing to the Supervisor of Safety, Department of Labor and Industries at Olympia, Washington.

(b) The Washington State Department of Labor and Industries shall not approve or apply any variation, modification or waiver of any state law, rule, regulation or standard, to any mine or operation falling within the scope of these rules, which includes or incorporates all or any portion of a mandatory standard promulgated by the Secretary of the Department of Interior without first having obtained the consent and approval of such variation, modification or waiver by the Secretary of the Department of Interior or his delegate.

(5) These standards shall be augmented by the Washington State General Safety Standards, Occupational Health Standards, Precautionary Labeling of Hazardous Substances Used in Places of Employment, Electrical Workers Safety Rules, Safety Requirements for Explosive-Actuated Fastening Tools, Boilers and Unfired Pressure Vessels Law, National Electric Code, Regulations for Possession and Handling of Explosives and any other Regulations of general application which are or will be made applicable to all industries governed by the Industrial Insurance and Medical Aid Acts.

(6) At least five days prior to commencement of a new, intermittent or temporary operation, the firm responsible for employment of the workmen at the site shall notify the Supervisor of the Division of Safety of such intent. The notice shall include the firm name, mailing address, type of work to be done and the location of the workplace. (Section, Township, Range).

(7) The system used by the U.S. Bureau of Mines for identification, location, etc., of mines, quarries, pits, mills and crushers shall be used by the Division of Safety and shall be included on the report of each inspection conducted.

(8) These standards are consolidated with the intent that they will meet or exceed all mandatory requirements included in 30 CFR, Parts 55, 56, and 57.

(9) These safety standards shall apply to all industries and persons working within the following categories: mines, pits, mills, quarries, and sand, gravel and crushing operations; whether covered by Industrial Insurance (Title 51 RCW) or operated on a sole proprietorship or partnership basis.

(10) When standards of other organizations or associations are incorporated by reference, the standards shall be the most recent edition published prior to January 1, 1972. (Example: P 12, WAC 296-61-100(1)(a), "Threshold Limit Values of Airborne Contaminants", adopted by the American Conference of Governmental Industrial Hygienists, shall refer to the 1971 edition.) [Order 72-1, § 296-61-010, filed 2/25/72, effective 4/1/72.]

WAC 296-61-020 Definitions. (1) "Abandoned" means that all work has stopped on the mine premises and that an office with a responsible person in charge is no longer maintained at or in the vicinity of the mine.

(2) "Abandoned Workings" means deserted operation areas in which further work is not intended.

(3) "Active Workings" means areas at, in or around, an operation where men work or travel.

(4) "Approved" generally means acceptable to the Division of Safety except when formal written approval would be deemed necessary for use of certain equipment,

methods, or means, as determined by the Supervisor of Safety.

(5) "Auxiliary Fan" means a fan used to deliver air to a workplace located off the main air stream supply line.

(6) "Barricaded" means the installation of a suitable safeguard which will prevent the passage of persons, vehicles, flying materials or hazardous radiations.

(7) "Berm" means a pile or mound of material capable of restraining a vehicle of the type generally used in the area.

(8) "Blasting Agent" means any material consisting of a mixture of a fuel and oxidizer which:

(a) Is used or intended for use in blasting.

(b) Is not classed as an explosive by the Department of Transportation.

(c) Contains no ingredient classed as an explosive by the Department of Transportation.

(d) Cannot be detonated by a number "8" blasting cap.

(9) "Blasting Area" means the area near blasting operations in which concussion or flying material can reasonably be expected to cause injury.

(10) "Blasting Cap" means a detonator containing a charge of detonating compound, which is ignited by electric current or the spark of a fuse.

(11) "Blasting Circuit" means electric circuits used to fire electric detonators.

(12) "Blasting Switch" means a switch used to connect a power source to a blasting circuit.

(13) "Booster Fan" means a fan installed in a main air stream to maintain or increase the air flow.

(14) "Capped Fuse" means a length of safety fuse to which a detonator has been attached.

(15) "Combustible" means capable of being ignited and consumed by fire.

(16) "Company Official" means a member of the company supervisory or technical staff.

(17) "Competent Person" shall be a qualified person designated by management.

(18) "Detonating Cord" or "Detonating Fuse" means a flexible cord containing a core of high explosives.

(19) "Detonator" means a device used for detonating an explosive.

(20) "Distribution Box" means a portable apparatus with an enclosure through which an electric circuit is carried to one or more cables from a single incoming feed line, each cable circuit being connected through individual over-current protective devices.

(21) "Electric Blasting Cap" means a blasting cap designed for and capable of being ignited by means of an electric current.

(22) "Electrical Grounding" means limiting the voltage to the maximum potential for which the circuit is designed, 70-64 N.E.C., by connecting the circuit with earth.

(23) "Employer" means a person or organization which hires one or more persons to work for wages or salary.

(24) "Escapeway" means a passageway by which persons may leave if the ordinary exit is obstructed.

(25) "Explosive" means any chemical compound, mixture, or device, the primary or common purpose of which is to function by explosion. Explosives include, but are not limited to: black powder, dynamite, nitroglycerin, nitroglycerin compounds, fulminate, and ammonium nitrate when mixed with hydrocarbons.

(26) "Face" or "Bank" means that part of any operation where excavating is progressing or was last performed.

(27) "Flammable" means capable of being easily ignited and of burning rapidly.

(28) "Flammable Liquid" means liquid having a flash point below 140°F. and having a vapor pressure not exceeding 40 psi (absolute) at 100°F.

(29) "Flash Point" means the minimum temperature at which sufficient vapor is released by a liquid or solid to form a flammable vapor-air mixture at atmospheric pressure.

(30) "Highway" means any public street, public alley, or public road.

(31) "High Potential" means more than 650 volts.

(32) "Hoist" means a power-driven windlass or drum used for raising ore, rock, or other material from an operation and for lowering or raising men and material.

(33) "Igniter Cord" means a fuse, cordlike in appearance, which burns progressively along its length with an external flame at the zone of burning and is used for lighting a series of safety fuses in the desired sequence.

(34) "Incline" means an inclined plane, whether above or beneath the surface.

(35) "Inhabited Building" means a building regularly occupied in whole or in part as a habitation for human beings or any church, schoolhouse, railroad station, store, or other structure where people are accustomed to assemble, except any manufacture, transportation, storage or use of explosives.

(36) "Lay" means the distance parallel to the axis of the rope in which a strand makes one complete turn about the axis of the rope.

(37) "Low Potential" means 650 volts or less.

(38) "Main Fan" means a fan that controls the entire air flow of the mine or the air flow of one of the major air currents.

(39) "Magazine" means a storage place for explosives or detonators.

(40) "Major Electrical Installation" means an assemblage of stationary electrical equipment for the generation, transmission, distribution or conversion of electrical power.

(41) "Manlift" means a power-driven vertical belt having regularly spaced steps which can be boarded by men and used to travel from one elevation to another.

(42) "Man Trip" means a trip on which men are transported to and from a work area.

(43) "Mill" includes any ore mill, sampling works, concentrator, and any crushing, grinding, or screening plant used at, and in connection with, an excavation or mine.

(44) "Mine" means an excavation made in the earth (either on the surface or by removal of material from

beneath the surface) to extract metallic ores or other usable materials.

(45) "Mine Opening" means any opening or entrance from the surface into a mine.

(46) "Misfire" means the complete or partial failure of a blasting charge to explode as planned.

(47) "Operation" means any portion of the work relating to or incidental to mining, such as transporting, crushing, excavating, blasting, timbering, processing of materials, or maintenance work, etc.

(48) "Overburden" means material of any nature, consolidated or unconsolidated, that overlies a deposit of useful materials or ores that are to be mined.

(49) "Permissible" means that a machine, material, apparatus, or device has been investigated, tested, and approved for use by the U.S. Bureau of Mines or the Division of Safety and is continuously maintained in that condition.

(50) "Potable" means fit for drinking.

(51) "Powder Chest" (day box) means a substantial, nonconductive, portable container equipped with a lid and used for temporary storage of explosives at blasting site.

(52) "Primer" means a package or cartridge of explosives with a detonator.

(53) "Reverse–current Protection" means a method or device used on direct–current circuits or equipment to prevent the flow of current in the reverse direction.

(54) "Roll Protection" means a framework safety canopy or similar protection for the operator when equipment overturns.

(55) "Rope" means wire rope unless otherwise specified.

(56) "Safety Can" means an approved container of not more than five gallons capacity, having a spring–closing lid and spout cover.

(57) "Safety Division" refers to the Division of Safety of the Department of Labor and Industries of the State of Washington.

(58) "Safety Fuse" means a train of powder enclosed in cotton, jute yarn, and water–proofing compounds, which burns at a uniform rate and used for firing a cap containing the detonating compound which in turn sets off the explosive charge.

(59) "Safety Switch" means a sectionalizing switch that also provides short circuit protection in blasting circuits between the blasting switch and the shot area.

(60) "Scaling" means removal of insecure material from a face or highwall.

(61) "Secondary Safety Connection" means a second connection between a conveyance and rope intended to prevent the conveyance from running away or falling in the event the primary connection fails.

(62) "Secondary Underground Distribution Storage Magazine" means a place for storage of explosives or detonators on an underground working level which meets the specifications set forth in these standards.

(63) "Semiconductive Hose" means hose having an electrical resistance of not less than 5,000 ohms per foot and not more than two megohms for its total length, used in pneumatic placement of blasting agents in bore holes.

(64) "Shaft" means a vertical or inclined shaft, a slope, incline or winze.

(65) "Sprung Hole" means a blasting hole chambered or enlarged to take an increased charge of explosives.

(66) "Stemming" means the enert material and the placing of such material on top of a charge of explosives.

(67) "Stray Current" means that portion of a total electric current that flows through paths other than the intended circuit.

(68) "Substantial Construction" means construction of such strength, material, and workmanship that the object will withstand all reasonable shock, wear, usage and deterioration to which it will be subjected.

(69) "Suitable" means that which fits, and has the qualities or qualifications to meet a given purpose, occasion, condition, function, or circumstances.

(70) "Threshold Limit Values" refer to concentrations of airborne substances and/or exposures to physical agents to which it is believed that nearly all workers may be exposed for a specified length of time without adverse effect.

(71) "Travelway" means a passage, walk or way regularly used and designated for persons to go from one place to another.

(72) "Trip Light" means a light displayed on the opposite end of a train from the locomotive or engine.

(73) "Wet Drilling" means the continuous application of water through the central hole of hollow drill steel to the bottom of the drill hole.

(74) "Working Place" means any place in or about a mine where work is being performed.

(75) "Workman" means a person who is engaged in the employment of an employer. [Order 72–1, § 296–61–020, filed 2/25/72, effective 4/1/72.]

WAC 296-61-030 Safety education and first aid requirements——General, surface, and underground. (1) The applicable minimum requirements specified in the General Safety Standards relating to first aid and safety education shall be complied with.

(2) ([57.15–1]) There shall be adequate first aid supplies and materials, and adequately trained personnel so stationed that they can administer immediate care to all workmen in any mine or operation in case of injury. Water or neutralizing agents shall be available where corrosive chemicals or other harmful substances are stored, handled, or used.

(3) ([57.18–6]) All workmen shall be indoctrinated in safety rules and safe work procedures. A competent person shall give special safety training to employees who are not familiar with new work assignments.

(4) ([57.18–12]) A poster shall be fastened and maintained either on or in the cover of each first aid cabinet and at or near all telephones plainly stating the telephone numbers of available doctors, hospitals, and ambulance services within the district of the workmen.

(5) ([57.18–4]) Arrangements shall be made in advance for obtaining emergency medical assistance and transportation for injured workmen.

(6) ([57.18–20]) Working Alone (Surface). When a workman is assigned to work alone in a remote or isolated area, a system shall be instituted whereby such workman reports by use of radio or telephone to someone periodically or a designated person shall check on his safety at reasonable intervals. All persons involved in working alone shall be advised of the procedures to be followed.

(7) ([57.18–25]) Working Alone (Underground). A workman shall not be assigned, allowed or required to work alone in any area where conditions could develop which may endanger his safety, unless he can be seen, his cries for help can be heard, or if sounds of equipment being operated would indicate, if the sounds should cease for a length of time, to other workmen in the area that the person operating the equipment may be in trouble.

(8) ([57.18–27]) All workmen entering or leaving a mine shall be checked in and out. An accurate record of each entry and exit of workmen shall be kept at the mine entrance. [Order 72–1, § 296–61–030, filed 2/25/72, effective 4/1/72.]

WAC 296–61–040 Personal protective equipment and clothing——General, surface and underground. The rules for personal protective equipment and clothing shall be as specified by the Department of Labor and Industries in the General Safety Standards or Occupational Health Standards, and the following standards shall also apply.

(1) ([57.15–2]) All workmen shall wear suitable head protection when in or around a mine or plant where a hazard exists which could cause an injury to the head.

(2) ([57.15–3]) All workmen shall wear suitable protective footwear when in or around an area of a mine or plant where a hazard exists which could cause an injury to the feet.

(3) ([57.15–4]) All workmen shall wear safety glasses, goggles, or face shields or other suitable protective devices when in or around an area of a mine or plant where a hazard exists which could cause injury to unprotected face or eyes.

(4) ([57.15–5]) Safety belts and lines shall be worn by workmen when there is danger of falling; a second workman shall tend the lifeline when confined or dangerous areas are entered. (See WAC 296–61–140.)

(5) ([57.15–7]) Protective clothing or equipment shall be worn when welding, grinding, torch–cutting, snagging or chipping, handling molten metals, acids, or caustics, or when exposed to harmful rays, dusts, or flying materials of any kind.

(6) ([57.15–20]) Life jackets or vests shall be worn where there is danger from falling into water. New equipment shall have a positive buoyancy of at least fifteen and one–half pounds, shall be U.S. Coast Guard approved, and shall be replaced when the positive buoyancy diminishes to thirteen pounds or less. [Order 72–1, § 296–61–040, filed 2/25/72, effective 4/1/72.]

WAC 296–61–050 General requirements. (1) ([57-.20–1]) Intoxicating beverages and narcotics shall not be permitted or used in or around mines. Workmen under the influence of alcohol or narcotics shall not be permitted on the job. This rule shall not apply to persons taking prescription drugs and narcotics as directed by a physician, providing such use shall not endanger the workman or others.

(2) ([57.20–2]) Every place of work shall have an adequate supply of water of a quality meeting the State Board of Health standards. Drinking utensils shall be of the sanitary type. Piping and outlets conveying nonpotable water shall be identified so that they are readily distinguished from piping and outlets carrying potable water.

(3) ([57.20–5]) Carbon tetrachloride shall not be used as a cleaning solvent or as a fire extinguishing agent.

(4) ([57.20–9]) Dusts suspected of being explosive shall be tested for explosibility. If tests prove positive, appropriate control measures shall be taken.

(5) ([57.20–10]) If water or silt will create a hazard, a retaining dam of substantial construction shall be erected and shall be inspected at regular intervals.

(6) ([57.20–20]) (Surface Only.) Access to unattended mine openings shall be restricted by gates or doors, or the openings shall be fenced and posted.

(7) ([57.20–21]) Upon abandonment of any mine, the owner or operator shall effectively close or fence off all surface openings into which persons could fall or through which workmen could enter. Trespass warnings and appropriate danger notices shall be posted at or near each opening or entrance.

(8) ([57.20–31]) (Underground Only.) Before blasting, workmen shall be located in a safe area. Such areas shall be where the blast will not create hazards, such as: accumulations of water, gas, mud, or flammable atmosphere.

(9) ([57.14–25]) ([57.14–26]) ([57.14–31]) ([57.14–32]) Any person, firm, corporation or association involved in any type of operation as referred to by the title of these standards shall provide and maintain in use, belt shifters or other mechanical contrivances for the purpose of throwing on or off belts on pulley while running, where the same are practicable with regard to the nature and purpose of said belts and the dangers to workmen therefrom; also reasonable safeguards for all vats, pans, trimmers, cut–off, gang edger, and other saws, planers, cogs, gearings, belting, shafting, coupling, set screws, live rollers, conveyors, and machinery of other similar description, which it is practicable to guard and which can be effectively guarded with due regard to the ordinary use of such machinery and appliances, and the dangers to workmen therefrom, and with which the workmen are liable to come into contact while in performance of their duties; and shall correct any other unsafe methods of performing work which can be corrected with due regard to the general performance of such work; and if any machine or equipment, or any part thereof, is in a defective condition, and its operation would be extrahazardous because of such defect, or if any machine is not safeguarded as provided in this chapter, the use thereof is prohibited.

(10) ([57.14–29]) To avoid accidental activation of machinery, electrical devices or other equipment while

performing maintenance, repair, clean–up, or construction work, the main disconnect(s) (line circuit breakers), or supply valve(s) shall first be deenergized or deactivated and locked or tagged out. Equipment shall be stopped and tagged or locked out before workmen remove guards or reach into any potentially hazardous area. The only exception will be when the equipment must be in motion in order to make proper adjustments. (See WAC 296–61–130).

(11) ([57.14–30]) Workmen shall not work on or from mobile equipment in a raised position until it has been securely blocked in place. This does not preclude the use of equipment specifically designed as elevated mobile work platforms.

(12) ([57.14–33]) Pulleys of conveyors shall not be cleaned manually while the conveyor is in motion.

(13) ([57.14–34]) Belt dressing shall not be applied manually while belts are in motion unless an aerosol–type dressing is used.

(14) ([57.14–35]) Machinery shall not be lubricated while in motion where a hazard exists. Use of lubricating fittings or cups sufficiently extended to eliminate the hazard is permissible.

(15) ([57.14–45]) Welding operations shall be shielded and well ventilated in a manner which will protect workmen from harmful exposures.

(16) ([57.4–75]) Conveyors shall be equipped with slippage detection devices. Multiple conveyor systems shall be equipped with interlocking shut down system. [Order 72–1, § 296–61–050, filed 2/25/72, effective 4/1/72.]

WAC 296–61–060 Illumination. (1) ([57.17–1]) (Surface Only.) All areas shall be sufficiently illuminated in order that workmen in the area can safely perform their assigned duties. When the adequacy of illumination for the area or task performed is questionable, a determination of the amount of illumination needed shall be make by the Industrial Hygiene Section of the Division of Safety.

(2) ([57.17–10]) (Underground) Each person, when underground, shall carry an electric lamp which shall be maintained in good working condition. [Order 72–1, § 296–61–060, filed 2/25/72, effective 4/1/72.]

WAC 296–61–070 Guards and guarding. (1) General Safety Standards to prevail where applicable. Driving mechanisms, power transmission equipment or apparatus, prime movers, shear or pinch points, or other similar hazardous areas or exposure shall be properly safeguarded with standard safeguards as required by the General Safety Standards.

(2) ([57.14–1]) Gears; sprockets; chains; drive head, tail, and take–up pulleys; flywheels, couplings, shafts, saw blades; fan inlets; and similar exposed moving machine parts which may be contacted by workmen and which may cause injury to workmen shall be guarded.

(3) ([57.14–2]) All belts and rope drives exposed to contact, which are so located that should the belt or rope break and the whip–like motion of the belt or rope could strike a workman, shall be properly guarded.

(4) ([57.14–6]) Except when testing the machinery, guards shall be securely in place while machinery is being operated.

(5) ([57.14–26]) Unsafe equipment or machinery shall be removed from service immediately.

(6) ([57.14–8]) ([57.14–9]) ([57.14–14]) Grinding wheels must be provided with a hooded guard of sufficient strength to withstand the shock of a bursting wheel. This guard must be adjusted close to the wheel and extend forward over the top of the wheel to a point at least thirty degrees beyond a vertical line drawn through the center of the wheel.

(a) Arbor ends must be guarded.

(b) Speed of wheels must not exceed the speed guaranteed by the manufacturer.

(c) Where practicable, grinding wheels must be provided with safety flanges.

(d) Work to be ground shall be held firmly against the steady rest in front of the wheel.

(e) The steady rest shall be properly adjusted and as near the wheel as possible.

(f) The side of emery wheels shall not be used for grinding unless it is designed for side grinding.

(g) Face shields or goggles, in good condition, shall be worn when operating a grinding wheel.

(7) ([57.14–10]) Hand–held power tools, other than rock drills, shall be equipped with controls requiring constant hand or finger pressure to operate the tools or shall be equipped with friction or other equivalent safety devices.

(8) ([57.14–13]) Forklift trucks, front–end loaders, and bulldozers shall be provided with substantial canopies when necessary to protect the operator. [Order 72–1, § 296–61–070, filed 2/25/72, effective 4/1/72.]

WAC 296–61–080 Fire prevention and control——General. (1) ([57.4–1]) No person shall smoke or use an open flame:

(a) Where flammable solvents, liquids, fluids, or other flammable materials are stored, transported, handled or used; or

(b) Where oil or grease is stored, transported, handled, or used, if smoking or the use of an open flame may cause a fire; or

(c) Within an unsafe distance of any area where smoking or the use of any open flame may cause a fire or an explosion.

(2) ([57.5–2]) Signs warning against smoking and open flames shall be posted so they can be readily seen in areas or places where fire or explosion hazards exist.

(3) ([57.4–4]) Flammable liquids shall be stored in accordance with standards of the National Fire Protection Association or other recognized agencies approved by the U.S. Bureau of Mines. Small quantities of flammable liquids drawn from storage shall be kept in appropriately labeled safety cans.

(4) ([57.4–8]) Fuel lines shall be equipped with valves to cut off fuel at the source and shall be located and maintained to minimize fire hazards.

(5) ([57.4–9]) All heat or ignition sources, including lighting equipment, capable of producing combustion

shall be insulated or isolated from combustible materials.

(6) ([57.4-10]) Electrical conductors shall be adequately insulated:

(a) Where they pass through doors or walls,

(b) Where they present a fire hazard, or

(c) Where they may be exposed to contact.

(7) ([57.4-11]) Abandoned electrical circuits shall be deenergized and isolated so that they cannot become energized inadvertently.

(8) ([57.4-14]) Solvents with flash points lower than 100°F. (38°C.) shall not be used for cleaning.

(9) ([57.4-15]) Solvents or flammable materials shall not be used when the following conditions exist:

(a) When there is open flame or source of ignition present,

(b) When the temperature can elevate the temperature of the solvent above its flash point, or

(c) When near any source of heat which may cause the creation of a hazardous condition.

(10) ([57.4-18]) Oxygen cylinders shall not be stored near oil or grease or in rooms, or areas used or designated for the storage of oil or grease.

(11) ([57.4-19]) Gauges and regulators used with oxygen or acetylene cylinders shall be kept clean and free of oil and grease.

(12) ([57.4-20]) Battery-charging stations shall be located in well-ventilated areas, and away from sources of ignition.

(13) ([57.4-21]) Internal combustion engines, except diesels, shall have the motor stopped while fueling and extreme care shall be taken to prevent spilling fuel on hot parts. The brakes shall be set on mobile equipment prior to fueling.

(14) ([57.4-22]) Each mine shall be equipped with or be provided with fire extinguishing equipment suitable for the size of the area and types of fire which could be expected.

(15) ([57.4-23]) Firefighting equipment which is provided on the mine property shall be strategically located, readily accessible, plainly marked, properly maintained, and inspected periodically. Records shall be kept of such inspections.

(16) ([57.4-29]) When welding, cutting or heating of materials is to be done near combustible materials, proper precautions shall be taken to ensure that the combustible material is not ignited from sparks, smoldering pieces of metal or the flame. A fire extinguisher shall be at the work site.

(17) ([57.4-33]) Valves on oxygen and acetylene cylinders shall be kept closed when not in use.

(18) ([57.4-40]) Fire alarm systems shall be provided and maintained in operating condition or adequate fire alarm procedures shall be established to warn promptly all persons who may be endangered by a fire.

(19) ([57.4-46]) Containers of gasoline, diesel fuel, liquefied petroleum gases, and other flammable liquids, when not buried, shall not be stored within one hundred feet of the following:

(a) Mine openings,

(b) Buildings or snowsheds connected to mine openings,

(c) Fan installations or housings,

(d) Hoist houses.

(20) ([57.4-50]) Specific escape and evacuation plans shall be established and kept current. Escape routes shall be marked plainly.

(21) ([57.4-51]) Fire-alarm systems adequate to warn all employees (underground) shall be provided and maintained in operating condition.

(22) ([57.4-52]) Gasoline shall not be taken, stored or used underground except in permissible flame safety lamps.

(23) ([57.4-53]) The use of liquefied petroleum gases underground shall be limited to maintenance work.

(24) ([57.4-54]) Oil, grease, or diesel fuel stored underground shall be kept in suitable tightly sealed containers in fire-resistant areas, at safe distances from explosives magazines, electrical installations, and shaft stations.

(25) ([57.4-58]) Fires shall not be built underground. Burning open-flame torches and candles shall not be left unattended underground.

(26) ([57.4-65]) When welding or cutting near combustible materials underground, the surrounding area shall, if practical, be wet down thoroughly before and after work is done, and a fire patrol of the area shall be maintained afterward for at least eight hours. In addition, when welding or cutting in shafts, winzes or raises, barriers, bulkheads or other, protective measures shall be used to prevent injury to anyone working or traveling below.

(27) ([57.4-67]) A mine rescue station equipped with at least ten sets of approved and properly maintained two-hour, self-contained breathing apparatus, adequate supplies, and spare parts shall be maintained at mines employing seventy-five or more men underground, or, in lieu thereof, the mine shall be affiliated with a central mine rescue station which meets the approval of the U.S. Bureau of Mines.

(28) ([57.4-69]) Approved mine rescue apparatus shall be properly maintained for immediate use. The equipment shall be tested at least once a month and records kept of the tests.

(29) ([57.4-70]) At mines employing seventy-five or more men underground, at least two rescue crews (ten men) shall be trained at least annually in the use, care, and limitations of self-contained breathing and fire-fighting apparatus and in mine-rescue procedures. Smaller mines shall have at least one man so trained for each ten men employed underground. [Order 72-1, § 296-61-080, filed 2/25/72, effective 4/1/72.]

WAC 296-61-090 Travelways and escapeways—— Surface and underground. (1) ([57.11-1]) Safe means of access shall be provided and maintained to all working places.

(2) ([57.11-2]) Crossover, elevated walkways, elevated ramps, and stairways shall be of substantial construction, provided with handrails, and maintained in

good condition. Where necessary, toeboards shall be provided.

(3) ([57.11-3]) Ladders shall be of substantial construction and maintained in good condition.

(4) ([57.11-5]) Fixed ladders used underground shall be anchored securely and installed to provide at least three inches of toe clearance.

(5) Fixed ladders used above ground shall be anchored securely and have not less than seven inches clearance from the center of rungs to the nearest permanent object in back of the ladder.

(6) ([57.11-6]) Ladders shall project at least three and one-half feet above every platform in the ladderway and at least three and one-half feet above the collar of the shaft, winze, or raise, unless convenient and secure handholds are fixed at such places.

(7) (a) ([57.11-9]) Walkways with outboard railings shall be provided wherever persons are required to walk alongside elevated conveyor belts. Inclined walkways shall be covered with nonskid type material or provided with cleats.

(b) Whenever conveyors pass adjacent to or over working areas or passageways used by workmen, protective guards shall be installed. These guards shall be designed to catch and hold any load or materials which could create a hazard by falling or becoming dislodged.

(8) ([57.11-12]) Openings above, below, or near travelways through which men or materials may fall shall be protected by railings, barriers, or covers. If it is impractical to install such protective devices, other means or methods shall be instituted which will afford equivalent protection for the workmen.

(9) ([57.11-13]) Crossovers or underpasses with proper safeguards shall be provided over or under all conveyors which cannot otherwise be crossed safely.

(10) ([57.11-14]) Moving conveyors shall be crossed only at designated crossovers or underpasses.

(11) ([57.11-16]) Regular used walkways and travelways on which snow or ice has accumulated shall be sanded, salted, or cleared as soon as possible.

(12) ([57.11-27]) Scaffolds and working platforms shall be of substantial construction and provided with handrails and maintained in good condition. Floorboards shall be laid properly and the scaffolds and working platform shall not be overloaded. Working platforms shall be provided with toeboards when necessary.

(13) ([57.11-36]) Trap doors or adequate guarding shall be provided in ladderways at each level. Doors shall be kept operable.

(14) ([57.11-50]) Every underground mine shall have two separate properly maintained escapeways to the surface which are so positioned that damage to one shall not lessen the effectiveness of the other, or a method of refuge shall be provided when only one opening to the surface is possible.

(15) ([57.11-51]) Escape routes shall be:

(a) Inspected at regular intervals maintained in a safe travelable condition.

(b) Marked with conspicuous and easily read direction signs that clearly indicate the ways of escape.

(16) ([57.11-52]) Underground refuge areas shall be:

(a) Of fire-resistant construction, preferably in untimbered areas of the mine.

(b) Large enough to accommodate readily the normal number of men in the particular area of the mine.

(c) Constructed so they can be made gastight.

(d) Provided with compressed air lines, waterlines, suitable handtools, and stopping materials.

(17) ([57.11-53]) Mine maps showing escape routes, directions of principal airflow, locations of telephones, fire doors, and ventilation doors, shall be posted and available. Maps shall be brought up to date as necessary.

(18) ([57.11-54]) Telephone or other approved types of voice communication shall be provided between the surface and refuge chambers. Such systems shall be independent of the mine power supply.

(19) ([57.11-55]) Designated escapeways inclined more than thirty degrees from the horizontal shall be equipped with stairways, ladders, cleated walkways or emergency hoisting facilities. [Order 72-1, § 296-61-090, filed 2/25/72, effective 4/1/72.]

WAC 296-61-100 Air quality, ventilation and radiation. (1) ([57.5-1]) Except as permitted by Standard (4) (Federal 57.5-5) in this section:

(a) The exposure to airborne contaminants of a person working in a mine shall not exceed, on the basis of a time-weighted average, the threshold limit values adopted by the American Conference of Governmental Industrial Hygienists, as set forth and explained in the Conference's publication entitled "Threshold Limit Values of Airborne Contaminants." Excursions above the listed threshold limit values shall not be of a greater magnitude than is characterized as permissible by the Conference. This paragraph:

(a) Does not apply to airborne contaminants given a "C" designation by the Conference——for example, nitrogen dioxide.

(b) Workmen shall be withdrawn from areas in which there is a concentration of an airborne contaminant given a "C" designation by the Conference which exceeds the threshold limit value (ceiling "C" limit) listed for that contaminant.

(2) ([57.5-2]) A sufficient quantity of air shall be circulated through the working places of the mine to maintain a quality of air which is safe and respirable. Dust, gas, mist, and fume surveys shall be conducted as frequently as necessary to determine the adequacy of control measures.

(3) ([57.5-3]) Holes shall be collared and drilled wet, or other efficient dust-control measures shall be used when drilling nonwater-soluble material. Efficient dust-control measures shall be used when drilling water-soluble materials.

(4) ([57.5-5]) Respirators shall not be substituted for environmental control measures. However, where environmental controls have not been developed or when necessary by nature of the work involved (for example, welding, sand blasting, lead burning), a workman may work for reasonable periods of time in concentrations of airborne contaminants which exceed ceiling "C" limits or the limit of permissible excursions referred to in

Standard (1) (Federal 57.5-1) in this section, if such workman wears a respiratory protective device approved by the Bureau of Mines as protection against the particular hazards involved.

(5) UNDERGROUND. ([57.5-22]) All surface fans, casings and air ducts connecting with the mine openings and also the fan houses and other buildings in close proximity shall be made of noncombustible material throughout; or, if of combustible material, it shall be made fire-resistant.

(6) ([57.5-28]) Unventilated areas shall be sealed, or barricaded and posted against entry.

(7) RADIATION. In the standards in 57.5 which relate to radiation, a "Working level" (WL) means any combination of the short-lived radon daughters in one liter of air that will result in the ultimate emission of 1.3×10^5 MeV (million electron volts) of potential alpha energy, and exposure to these radon daughters over a period of time expressed in terms of "Working level months" (WLM). Inhalation of air containing a radon daughter concentration of 1 WL for 170 hours results in an exposure of 1 WLM.

(8) ([57.5-37]) Mine atmosphere shall be sampled to determine if hazardous concentrations of radon daughters are present. Where potentially hazardous concentrations are found, or known sources of radon exist, each active work area shall be sampled as often as necessary by a qualified person.

(9) ([57.5-38]) No workman shall be permitted to receive an exposure of more than six working level months in any consecutive three-month period and no more than twelve working level months in any consecutive twelve-month period.

(10) ([57.5-39]) If samples show an atmospheric concentration or radon daughters of more than 1.0 working level, but less than 2.0 working levels, immediate corrective action shall be taken or the workmen shall be withdrawn. When concentrations higher than 2.0 working levels are found, the workmen shall be withdrawn from the area until corrective action is taken and the radon-daughter atmospheric concentrations are reduced to 1.0 working level or less.

(11) ([57.5-40]) Where uranium is mined, if measurements in areas indicate exposure to concentrations of radon daughters in excess of 0.3 working level, complete individual exposure records shall be kept for all workmen entering these areas.

(12) ([57.5-41]) Smoking shall be prohibited where uranium is mined.

(13) ([57.5-42]) If levels of permissible exposures to concentrations of radon daughters different from those prescribed in Standard (7) Radiation, in this section, are recommended by the Environmental Protection Agency and approved by the President, no workmen shall be permitted to receive exposures in excess of those levels after the effective dates established by the Agency. [Order 72-1, § 296-61-100, filed 2/25/72, effective 4/1/72.]

WAC 296-61-110 Regulations pertaining to use of diesel equipment underground. Permission will be granted for specified diesel equipment, working in a specified location under specified conditions, as follows:

(1) Application shall be made to the Mining Section, Division of Safety, Department of Labor and Industries, for permission to use specified diesel equipment in a specified underground area and should include the following information:

(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 of the underground mine where the diesel equipment is to be used, accompanied by a drawing showing the underground area and description of the ventilation system.

(2) Before the diesel equipment is taken underground, written permission shall be obtained from the Division of Safety 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.

(3) Diesel equipment may only be used underground where the mine ventilation is controlled by mechanical means and shall not be operated if the ventilating current is less than 75 CFM per horsepower, based on the maximum brake horsepower of the engines.

(4) Air measurements shall be made at least once weekly 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[1]
Next to equipment	Carbon Monoxide	.005%	50 ppm
General atmosphere	Carbon Monoxide	.005%	50 ppm
General atmosphere	Nitrogen Dioxide	.0005%	5 ppm
General atmosphere	Aldehydes	.0002%	2 ppm

[1]Parts of vapor or gas per million parts of contaminated air by volume at 25°C and 760 mm. Hg. pressure.

[Order 72-1, § 296-61-110, filed 2/25/72, effective 4/1/72.]

WAC 296-61-120 Electricity——Surface and underground. (1) ([57.12-1]) Circuits shall be protected against excessive overloads by the use of fuses or circuit breakers of the correct type and capacity.

(2) ([57.12-2]) Electrically-operated equipment and electrical circuits shall be provided with switches and/or other controls. Such switches and/or controls shall be of approved design and construction and shall be properly installed.

(3) ([57.12-3]) Individual overload protection or short-circuit protection shall be provided for the trailing electrical cables of mobile equipment.

(4) ([57.12-7]) Trailing cable and power-cable connections to junction boxes shall not be made or broken under load.

(5) ([57.12-11]) High-potential transmission cables shall be covered, insulated, or placed according to acceptable electrical codes to prevent contact with low-potential circuits.

(6) ([57.12-14]) Shovel trailing cables shall not be moved with the shovel dipper unless cable slings or sleds are used.

(7) ([57.12-30]) When a potentially dangerous condition is found the equipment or wiring shall be immediately deenergized and the condition corrected before the equipment or wiring is reenergized.

(8) ([57.12-16]) Electrical equipment shall be deenergized before work is done on such equipment. Switches shall be locked out or other measures taken which shall prevent the equipment from being energized without the knowledge of the individuals working on it. Such locks, or preventative device, shall be removed by the persons who installed them, or other authorized personnel may remove a lock or device only when he is assured it is safe to do so and when the person who placed the device is not available.

(9) ([57.12-17]) Power circuits shall be deenergized before work is done on such circuits unless hot-line tools or other equipment approved for such use is used. Suitable warning signs shall be posted by the workmen who are to do the work. Switches shall be locked out or other measures taken which shall prevent the power circuits from being energized without the knowledge of the workmen working on them. Such locks, signs, or preventative devices shall be removed by the workman who installed them or other authorized personnel may remove a lock or device only when he is assured it is safe to do so and when the person who places the device is not available.

(10) ([57.12-18]) Principal power switches shall be labeled to show which units they control, unless identification can be made readily by location.

(11) ([57.12-20]) Dry wooden platforms, insulating mats, or other electrically nonconductive material shall be kept in place at all switchboards and power-control switches where shock hazards exist. However, metal plates on which a person normally would stand and which are kept at the same potential as the grounded, metal, noncurrent-carrying parts of the power switches to be operated, may be used.

(12) ([57.12-21]) Suitable danger signs shall be posted at all major electrical installations.

(13) ([57.12-23]) Electrical connections and resistor grids that are difficult or impractical to insulate shall be guarded, unless protection is provided by location.

(14) ([57.12-25]) All metal enclosing or encasing electrical circuits shall be grounded or provided with equivalent protection. This requirement does not apply to battery-operated equipment.

(15) ([57.12-26]) Metal fencing and metal buildings enclosing transformers and switchgear shall be grounded.

(16) ([57.12-27]) Frame grounding or equivalent protection shall be provided for mobile equipment powered through trailing cables.

(17) ([57.12-28]) Continuity and resistance of grounding systems shall be tested immediately after installation and at reasonable periodic intervals.

(18) ([57.12-33]) Hand-held electric tools shall not be operated at high potential voltages.

(19) ([57.12-36]) Fuses shall not be removed or replaced by hand in an energized circuit, and they shall not otherwise be removed or replaced in an energized circuit unless equipment and techniques especially designed to prevent electrical shock are provided and used for such purpose.

(20) ([57.12-37]) Fuse tongs or hot-line tools shall be used when fuses are removed or replaced in high-potential circuits.

(21) ([57.12-40]) Operating controls shall be installed in such a manner that they can be operated without danger of contact with energized conductors.

(22) ([57.12-41]) Switches and starting boxes shall be of safe design and capacity.

(23) ([57.12-45]) Overhead electrical transmission lines above ground shall be installed as specified by the National Electrical Safety Code, Washington State Electrical Construction Code Code or Washington State Statutes, whichever is most restrictive.

(24) ([57.12-71]) When equipment must be moved or operated near a power line (other than trolley lines) and can come within ten feet of the power line proper barricades shall be erected or the power line shall be deenergized.

(25) ([57.12-47]) Guy wires of poles supporting high-potential conductors shall be equipped with insulators installed as required by the applicable safety rules or laws.

(26) ([57.12-48]) Telegraph, telephone, or signal wires shall not be installed on the same crossarm with power conductors. When installed on poles supporting powerlines they shall be installed as specified by the National Electrical Safety Code or Washington State rules or laws, whichever affords the greatest degree of protection.

(27) ([57.12-65]) Powerlines, including trolley wires, and telephone circuits shall be protected against short circuits and lightning.

(28) ([57.12-66]) Where metallic tools or equipment can come in contact with trolley wires or bare powerlines, the lines shall be guarded or deenergized.

(29) ([57.12-67]) Transformers shall be totally enclosed, or shall be placed at least eight feet above the ground, or installed in a transformer house or surrounded by a substantial fence at least six feet high and at least three feet from any energized parts, casings, or wiring.

(30) ([57.12-68]) Transformer enclosures shall be kept locked against unauthorized entry.

(31) ([57.12-80]) Trolley wires and bare power conductors shall be guarded at man trip loading and unloading points, and at shaft stations. Where such trolley wires and bare power conductors are less than seven feet

above the rail, they shall be guarded at all points where men work or pass regularly beneath.

(32) ([57.12-82]) Powerlines shall be well separated or insulated from waterlines, telephone lines, and air lines.

(33) ([57.12-85]) Transformer stations shall be enclosed to prevent workmen from unintentionally or inadvertently contacting energized parts. [Order 72-1, § 296-61-120, filed 2/25/72, effective 4/1/72.]

WAC 296-61-130 Deenergizing and lock-out or tag-out procedures. (1) Procedures outlined in WAC 296-61-050(10) shall be followed:

(a) If pipelines or ducts are constructed without valves or closures, the lines or ducts shall be broken at a flange and a blank flange inserted to stop the accidental flow of any material.

(b) After tagging or locking out equipment, a test shall be conducted to ascertain that the equipment has been made inoperative or the flow of material has been positively stopped. Precautions shall be taken to ascertain that persons will not be subjected to hazard while conducting test if power source or flow of material is not shut off.

(2) A tag-out procedure will be acceptable when evidence indicates it is equivalent to a lock-out procedure.

(3) Tags shall contain the following information: name of person authorizing placement; reason for placing; signature of workman placing tag; and department with which such workman is associated.

(4) Locking or tagging out a machine by use of a push button or other local control device only will not be acceptable as meeting the intent of these rules.

(5) Equipment shall be stopped and tagged or locked out before workmen remove guards or reach into any potentially hazardous area. The only exception will be when the equipment must be in motion in order to make proper adjustments.

(6) Each person actively engaged in the repair, maintenance or clean-up shall lock-out or tag-out the affected equipment and shall personally remove his lock or tag upon completion of his work, except when it is positively determined that a workman has left the premises without removing his lock or tag, other workmen may remove the locks or tags in accordance with a procedure formulated by each firm and approved by the Division of Safety. [Order 72-1, § 296-61-130, filed 2/25/72, effective 4/1/72.]

WAC 296-61-140 Vessel or confined area requirements. (1) Management shall be responsible for developing a written procedure to be followed for safe entry of workmen into confined areas, tanks, vessels or sewers and for maintaining a safe condition while work is being performed therein. Such procedure shall include the following minimum requirements:

(a) Before workmen enter and at reasonable intervals as work progresses, all vessels, sewers or confined areas must be properly ventilated. Such areas shall be tested and/or evaluated by a person thoroughly trained and instructed in the use of instruments required, or qualified to make evaluations of conditions which may be encountered. Special consideration shall be given to the possibility that the area may be deficient of oxygen or may contain dangerous concentrations of gases or toxic substances.

(b) All equipment necessary to perform the work, including safety equipment, must be at the job site and shall be inspected or tested to assure that it functions properly.

(c) All electrical circuits, valves, ducts, pipes, and other equipment shall be locked out, tagged out, or blanked as required in accordance with the applicable rules in these standards.

(d) Prior to and while welding or burning is being done in areas where a fire or explosion hazard may exist, the applicable rules contained in these standards shall be complied with.

(e) The Occupational Health Standards shall prevail for evaluating conditions concerning health, fire, or explosion hazards. [Order 72-1, § 296-61-140, filed 2/25/72, effective 4/1/72.]

WAC 296-61-150 Compressed air, boilers, hoses and fittings, surface and underground——General. (1) ([57.13-1]) Boilers, high pressure cylinders and vessels shall be constructed, tested, inspected and maintained to conform to the standards established by the Boilers and Unfired Pressure Vessels Law, chapter 70.79 RCW, and adopted rules administered by Washington State Department of Labor and Industries, Division of Building and Construction Safety Inspection Services.

(2) ([57.13-19]) Repairs involving the pressure system of compressors, receivers, or compressed air-powered equipment shall not be attempted until the pressure has been bled off.

(3) ([57.13-20]) Compressed air shall not be used for cleaning purposes if it may endanger other persons in the area or for cleaning clothing while it is being worn.

(4) ([57.13-21]) High pressure steam or air hose lines of three-quarter inch inside diameter or greater shall have safety chains or devices affording equivalent protection installed in or between line sections and at connections of machines. [Order 72-1, § 296-61-150, filed 2/25/72, effective 4/1/72.]

WAC 296-61-160 Materials storage and handling——General, surface and underground. (1) ([57.16-3]) ([57.16-4]) Hazardous materials shall be labeled, handled and stored properly to prevent spillage or damage to the containers. Chemicals shall be stored in such a manner that they will not decompose, contaminate, or react with other chemicals which could create a hazard. The manufacturer's safe practice recommendations or those published by the Manufacturing Chemists Association should be followed.

(2) ([57.16-5]) ([57.4-18]) Compressed gas cylinders shall be stored away from heat sources, combustible materials or other materials, which may create hazardous conditions. Manufacturer's, supplier's or other acceptable safe practices shall be followed. Cylinders shall be secured in a manner which will prevent them from

tipping or falling. Acetylene cylinders shall be stored, transported, or used while in the upright position only. Oxygen cylinders shall not be stored near oil or grease or in rooms or areas used or designated for the storage of oil or grease.

(3) ([57.16-6]) Valves on compressed gas cylinders shall be protected by covers when being transported or stored, and by a safe location when the cylinders are in use.

(4) ([57.16-9]) Workmen shall stay clear of suspended loads.

(5) ([57.16-11]) Workmen shall not ride on loads being moved by cranes or derricks, nor shall they ride the hoisting hooks unless a special conveyance or safety device with a lifeline is used. [Order 72-1, § 296-61-160, filed 2/25/72, effective 4/1/72.]

WAC 296-61-170 Crane rail stops, bumpers and fenders. ([57.16-14]) (1) Rail stops shall be provided at both ends of the crane runway and at ends of a crane bridge. When two trolleys are operated on the same rails, bumpers shall be provided to prevent collision of the cranes or trolleys.

(2) Bumpers and rail stops shall extend at least as high as the centers of the wheels, and a warning device shall be installed to warn the operator that he is approaching the end of the runway.

(3) Rail stops shall be fastened to the girders and rails, but not to the rails alone. This does not apply to portable rail stops used temporarily as a safeguard for a specific situation.

(4) Rail stops shall be built up of steel plates and angles or be made of cast steel.

(5) When crane rails are located where workmen may be exposed to the pinch point between a crane wheel and the rail, fenders shall be installed which extend below the lowest point of the treads of the outside ridge truck wheels. They shall be of a shape and form that will tend to push or raise a man's hand, arm or leg off the rail and away from the wheel.

(6) Hoists shall be provided with a positive limit stop to prevent the hoist block from over-traveling in the upward direction.

(7) A device for locking or tagging out the disconnect switch shall be provided.

(8) Effective audible warning signals shall be provided within easy reach of the operator. [Order 72-1, § 296-61-170, filed 2/25/72, effective 4/1/72.]

WAC 296-61-180 Crane platforms and footwalks. ([57.16-15]) (1) Crane platforms shall be provided when changing and repairing truck wheels on end trucks.

(2) A platform or footwalk shall be located on crane or crane runway to give access to the crane cage, and it shall be accessible from one or more stairways or fixed ladders. This platform or footwalk shall be not less than eighteen inches in width.

(3) Where stairways are used to give access to platforms, they shall make an angle of not more than fifty degrees with the horizontal and shall be equipped with substantial railing. If ladders are used to give access to platforms, they shall extend not less than thirty-six inches above the platform. Railed stairways or ladders to be used as a means of ingress and egress to crane cages shall be located at either or both ends.

(4) A footwalk with standard railings and toeboards shall be placed along the entire length of the bridge on the motor side, and a short platform twice the length of the trolley placed at one end of the girder on the opposite side, with a vertical clearance of at least six feet, six inches, where the design of crane or building permits, but in no case shall there be less than four feet clearance. For hand-operated cranes, the footwalk shall not be required to be installed on the bridge of the crane, but there shall be a repair platform equal in strength and design to that required for motor-operated cranes, installed on the wall of the building or supported by the crane runway at a height equal to the lower edge of the bridge girder to facilitate necessary repairs. [Order 72-1, § 296-61-180, filed 2/25/72, effective 4/1/72.]

WAC 296-61-190 Pit and quarry operations——Ground control——Surface. (1) All rules contained in this standard shall prevail where applicable to this type of operation.

(2) The words "Pits" or "Quarry" when used in this section shall mean a cavity or opening formed in the earth by breaking, loosening, cutting, digging or pushing aside and removing therefrom the sand, gravel, ore, rock or other material.

(3) ([57.3-1]) Standards for the safe control of pit walls, including the overall slope of the pit wall, shall be established and followed by the operator. Such standards shall be consistent with the prudent engineering design, the nature of the ground, and the kind of mineral mined, and the ensuring of safe working conditions according to the degree of slope. Mining methods shall be selected which will ensure wall and bank stability, including benching as necessary to obtain a safe overall slope.

(4) ([57.3-2]) All material so located as to constitute a hazard shall be stripped for a safe distance but in no case less than ten feet from the top of pit or quarry walls. The faces of any open pit or quarry shall be given a slope to be consistent with the stability of the material to minimize the danger of rock or material from falling on workmen.

(5) The slope of the face shall be consistent with the stability of the rock. On walls where the material is loose or unstable, benches shall be provided to assure capture of falling material.

(6) ([57.3-3]) Width and height of benches shall be governed by the type of equipment to be used so work can be performed safely.

(7) ([57.3-4]) Safe means of scaling pit-banks shall be provided. Hazardous banks shall be scaled before other work is performed in the hazardous bank area.

(8) ([57.3-5]) Workmen shall not work near or under dangerous banks. All loose rock and overhang shall be barred down or removed by mechanical means before proceeding with work under the face. Barring down shall not be done until workmen below are notified and are at

a safe location. Other unsafe ground conditions shall be corrected or barricaded and posted.

(9) ([57.3-6]) Workmen engaged in barring down loose material shall approach the material from above and scale from a safe location and, when scaling from high and steeply inclined ledges, shall be provided with and wear safety belts or harness or equivalent protection which shall be attached to a safety line of which the opposite end shall be securely attached to a substantial anchorage. Safety lines used by scalers shall be of steel wire core type or other material specifically approved for this use by the Division of Safety.

(10) ([57.3-23]) Workmen shall be furnished light bars, blunt on one end for scaling loose rock.

(11) ([57.3-8]) The supervisor, or a competent person designated by him, shall examine working areas and faces for unsafe conditions at least at the beginning of each shift and after blasting, periods of freezing, thawing, rain or other acts of nature. Any unsafe condition found shall be corrected before any further work is performed at the immediate area or face at which the unsafe condition exists.

(12) ([57.3-9]) Workmen shall examine their working places before starting work and frequently thereafter, and any unsafe condition shall be corrected.

(13) ([57.3-12]) Workmen shall not work between equipment and the pit wall or bank where the equipment may hinder escape from falls or slides of the bank. Revolving type machines shall be located so as to allow a minimum of thirty inches clearance between the counterweight or outermost projecting part of the machine and any stationary object or the hazardous area shall be restricted to prevent workers from being caught in pinch points. [Order 72-1, § 296-61-190, filed 2/25/72, effective 4/1/72.]

WAC 296-61-200 Ground control——Underground. (1) ([57.3-20]) Whenever the ground or material is not known to be stable, supports such as rock bolts, timbers or other methods shall be installed to prevent material from moving or falling. Materials or methods used shall be consistent with the nature of the ground and the method of mining being employed.

(2) ([57.3-22]) Miners shall examine and test the back, face, and ribs of their working places at the beginning of each shift and frequently thereafter. Supervisors shall examine the ground conditions during daily visits to insure that proper testing and ground control practices are being followed. Loose ground shall be taken down or adequately supported before any other work is done. Ground conditions along the haulageways and travelways shall be examined periodically and scaled or supported as necessary. [Order 72-1, § 296-61-200, filed 2/25/72, effective 4/1/72.]

WAC 296-61-210 Drilling. (1) ([57.7-2]) Workmen shall not operate or be required to operate any equipment deemed unsafe. Any defect which would make the equipment unsafe to operate under existing conditions shall be cause to take the equipment out of service until the defects have been properly corrected.

(2) ([57.7-3]) The drilling area shall be inspected for hazards before starting the drilling operations.

(3) ([57.7-4]) Workmen shall not be on the mast while the drill bit is in operation unless they are provided with a safe platform from which to work and they are required to use safety belts and lifelines to avoid falling.

(4) ([57.7-5]) Drill crews and others shall stay clear of augers or drill stems that are in motion. Workmen shall not pass under or step over a moving stem or auger.

(5) ([57.7-8]) When drills are being moved, drill steel, tools, and other equipment shall be secured. The mast shall be placed in such a position that the drill can be moved safely.

(6) ([57.7-10]) In the event of power failure, drill controls shall be placed in the neutral position until power is restored.

(7) ([57.7-11]) The drill stem shall be resting on the bottom of the hole or on the platform with the stem secured to the mast before attempts are made to straighten a crossed cable on a reel.

(8) ([57.7-12]) Drills shall be attended at all times while drill is in operation or while it is being moved under its own power.

(9) ([57.7-13]) Drill holes large enough to constitute a hazard shall be covered or guarded.

(10) ([57.7-18]) Workmen shall not hold the drill steel while collaring holes, or rest their hands on the chuck or centralizer while drilling. [Order 72-1, § 296-61-210, filed 2/25/72, effective 4/1/72.]

WAC 296-61-220 Rotary jet piercing——Surface only. (1) ([57.8-2]) Safety chains or other suitable locking devices shall be provided across connections to and between high pressure oxygen hose lines of one inch inside diameter or larger.

(2) ([57.8-3]) Suitable protective clothing or devices shall be provided and shall be used by the workman when lighting a burner. If burners must be ignited manually, a long lance or other safe device shall be used.

(3) ([57.8-5]) Workmen shall not smoke and open flames shall not be used in the vicinity of the oxygen storage and supply lines. Signs warning against smoking and open flames shall be posted in these areas. [Order 72-1, § 296-61-220, filed 2/25/72, effective 4/1/72.]

WAC 296-61-230 Man hoisting——Hoists. The hoisting standards in this section apply to those hoists and appurtenances used for hoisting workmen. However, where workmen may be endangered by hoists and appurtenances used solely for handling ore, rock, and materials, compliance with the appropriate standards will be required.

(1) ([57.19-1]) Hoists shall have rated capacities consistent with the loads handled and the recommended safety factors of the ropes used.

(2) ([57.19-2]) Hoists shall be anchored securely.

(3) ([57.19-3]) Belt, rope, or chains shall not be used to connect driving mechanisms to man hoists.

(4) ([57.19–4]) Any hoist used to hoist workmen shall be equipped with a brake or brakes which shall be capable of holding its fully loaded cage, skip, or bucket at any point in the shaft.

(5) ([57.19–5]) The operating mechanism of the clutch of every man hoist drum shall be provided with a locking mechanism, or interlocked electrically or mechanically with the brake to prevent accidental withdrawal of the clutch.

(6) ([57.19–6]) Automatic hoists shall be provided with devices that automatically apply the brakes in the event of power failure.

(7) ([57.19–7]) Man hoists shall be provided with devices to prevent overtravel and overspeed.

(8) ([57.19–9]) An accurate and reliable indicator of the position of the cage, skip, bucket, or cars in the shaft shall be provided.

(9) ([57.19–10]) Hoist controls shall be placed or housed so that the noise from machinery or other sources will not prevent hoistmen from hearing signals.

(10) ([57.19–21]) The following static–load safety factors shall be used for selecting ropes to be used for hoisting workmen and for determining when such ropes shall be removed from the man hoists:

Length of rope in shaft (feet)	Minimum Factor of safety (new rope)	Minimum Factor of safety (removed)
500 or less	8	6.4
501 – 1,000	7	5.8
1,001 – 2,000	6	5.0
2,001 – 3,000	5	4.3
3,001 – or more	4	3.6

(11) ([57.19–24]) The rope shall be attached to the load by the thimble–end–clip method, socketing method, or other approved methods. If the socketing method is employed, zinc or its equivalent shall be used. The use of Babbit metal or lead for socketing wire ropes is prohibited. If the thimble–and–clip method is used, the following shall be observed:

(a) The rope shall be attached to the load by passing one end around an oval thimble that is attached to the load bending the end back so that it is parallel to the long or "live" end of the rope and fastening the two parts of the rope together with clips.

(b) The U–bolt of each clip shall encircle the short of "dead" end of the rope and the distance between clips shall not be less than the figures given in the accompanying table.

(c) As a minimum the following number of clips or equivalent shall be used for various diameters of six–strand, 19–wire plow steel ropes: (Follow manufacturer's recommendations for number and installation of clips for specific type of wire rope being used.)

Diameter of rope Inches	Number of Clips Clips	Center–to–Center Spacing of Clips, Inches
3/4	4	4 1/2
7/8	4	5 1/4
1	4	6
1 1/8	5	6 3/4
1 1/4	5	7 1/2
1 3/8	6	8 1/4
1 1/2	6	9
1 5/8	6	9 3/4
1 3/4	7	10 1/2
1 7/8	8	11 1/4
2	8	12
2 1/8	8	13
2 1/4	8	14

(d) For all ropes less than three–quarters inch in diameter, at least four clips or equivalent shall be used.

(e) When special conditions require the attachment of a sling to the hoisting cable to handle equipment in the shaft, the sling shall be attached by clips or equivalent in accordance with the table in paragraph (c) of this standard.

(12) ([57.19–38]) Platforms with toeboards and handrails shall be provided around elevated head sheaves.

(13) ([57.19–39]) Diameters of head sheaves and hoist drums should conform to the following specifications:

Rope Construction	Diameter of Sheave and Drum	
	Recommended	Minimum
	Times rope diameter	Times rope diameter
6 x 7 classification	72	42
6 x 19	45	30
6 x 37	27	18
6 x 25, Type B flattened strand	45	30
6 x 27, Type H, flattened strand	45	30
6 x 30, Type G, flattened strand	45	30
18 x 7 classification	51	34

(14) The main shaft and all equipment within or connected to it shall be inspected at least as often as indicated in the schedule below. A report of these inspections and all other required reports shall be entered in a "daily log book" and kept on file in the mine office for two years from the date of inspection.

(a) SHAFT INSPECTION REPORT TO BE FILED IN MINE OFFICE.

Name of Inspector_____
Date_____
Remarks_____

The items listed below shall have a visual daily inspection by persons to be designated by the management. In addition, there shall be a thorough inspection at least as often as indicated below:

Fire–fighting equipment	Monthly
Ladders and Platforms	Monthly
Manway	Monthly
Second exits	Monthly
Top sheave wheel	Weekly
Guides or track	Daily
Inspection and maintenance of safety dogs on cage or skip	Daily
Safety gates or guard rails	Daily
Safety hood on cages or skips	Daily
Shaft rope idlers or deflection sheaves	Daily
Skip or cage coupling	Daily
Timbers	Daily
Bell signal system	Shift
Chute gates	Shift
Chutes	Shift
Hoisting rope	Shift
Overwinding devices	Shift
Shaft clearance	Shift
Telephone system	Shift

(15) All chains and couplings must be annealed once every three months unless provided with safety straps or bridles. Records identifying the chains and/or couplings and indicating the dates of annealing shall be kept in the company office and shall be made available upon request. [Order 72–1, § 296–61–230, filed 2/25/72, effective 4/1/72.]

WAC 296–61–240 Conveyances. (1) ([57.19–45]) Man cages and skips used for hoisting or lowering workmen or other persons in any vertical shaft or any incline shaft with an angle of inclination of forty–five degrees or more from the horizontal, shall be covered with a metal bonnet.

(2) ([57.19–50]) Buckets used to hoist workmen during vertical shaft sinking shall have:

(a) Cross heads with safety catches. If the guides are made of steel or wood, the height of the crosshead shall be at least 1 1/2 times the width of the crosshead. If wire rope guides are used the crosshead shall be at least four feet high.

(b) Overhead protection when the shaft depth exceeds fifty feet.

(c) Sufficient depth to transport men safely while they are in a standing position. Platforms may be installed within the bucket to get this desired height.

(d) Devices which will prevent the bucket from accidentally dumping if the bucket is supported by a bail attached near or below the center of the bucket.

(3) ([57.19–51]) Buckets shall not be used to hoist men in vertical shafts except during shaft sinking operations, inspections, maintenance and repairs.

(4) ([57.19–52]) Buckets shall not be used to hoist men in incline shafts except during shaft sinking operations, inspections, maintenance and repairs.

(5) ([57.19–53]) In shaft sinking where a platform is suspended by wire ropes, such ropes shall have an approved rating for the suspended load.

(6) ([57.19–54]) Where rope guides are used in shafts they shall be of locked coil construction. [Order 72–1, § 296–61–240, filed 2/25/72, effective 4/1/72.]

WAC 296–61–250 Hoisting procedures. (1) ([57.19–55]) When a manually–operated hoist is used, a qualified hoistman shall remain within hearing of the telephone or signal device at all times while any workman is underground.

(2) ([57.19–57]) Hoistmen shall be physically fit and shall undergo yearly examinations to determine their continued fitness; certification to this effect shall be available at the mine.

(3) ([57.19–58]) Only experienced hoistmen shall operate the hoist except in cases of emergency and in the training of new hoistmen.

(4) ([57.19–59]) Whenever a regular shift of men is being hoisted or lowered, a second man familiar with and qualified to stop the hoist shall be in attendance; this provision shall not apply to shaft sinking operations, level development, or repair operations in the mine.

(5) ([57.19–65]) Conveyances shall not be lowered by the brakes alone except during emergencies.

(6) ([57.19–69]) Workmen shall not enter or leave conveyances which are in motion or after a signal to move the conveyance has been given to the hoistman.

(7) ([57.19–70]) Cage doors or gates shall be closed while workmen are being hoisted; they shall not be opened until the cage has come to a stop.

(8) ([57.19–71]) Workmen shall not ride in skips or buckets with muck, supplies, materials, or tools other than small hand tools.

(9) ([57.19–73]) Rock or supplies shall not be hoisted in the same shaft as workmen during shift changes, unless the compartments and dumping bins are partitioned to prevent spillage into the cage compartment.

(10) ([57.19–75]) Open hooks shall not be used to hoist buckets or other conveyances.

(11) ([57.19–77]) Buckets shall be stopped approximately fifteen feet from the shaft bottom to await a signal from one of the crew on the bottom for further lowering.

(12) ([57.19–79]) Where mine cars are hoisted by cage or skip, means for blocking cars shall be provided at all landings and also on the cage.

(13) ([57.19–80]) When tools, timbers, or other materials are being lowered or raised in a shaft by means of a bucket, skip, or cage, they shall be secured or so placed that they will not strike the sides of the shaft. [Order 72–1, § 296–61–250, filed 2/25/72, effective 4/1/72.]

WAC 296-61-260 Signaling. (1) ([57.19-90]) There shall be at least two effective approved methods of signaling between each of the shaft stations and the hoist room, one of which shall be a telephone or speaking tube.

(2) ([57.19-92]) A method shall be provided to signal the hoist operator from cages or other conveyances at any point in the shaft.

(3) ([57.19-94]) A legible signal code shall be posted prominently in the hoist house within easy view of the hoistmen, and at each place where signals are given or received.

(4) ([57.19-96]) Any workman responsible for receiving or giving signals for cages, skips, and man trips when workmen or material are being transported shall be familiar with the posted signaling code. [Order 72-1, § 296-61-260, filed 2/25/72, effective 4/1/72.]

WAC 296-61-270 Shafts. (1) ([57.19-100]) Shaft landings shall be equipped with substantial safety gates so constructed that materials will not go through or under them. Gates shall be closed except when loading or unloading shaft conveyances.

(2) ([57.19-101]) Positive stop blocks or a derail switch shall be installed on all tracks leading to a shaft collar or landing.

(3) ([57.19-105]) A safe means of passage around open shaft compartments shall be provided on landings with more than one entrance to the shaft.

(4) ([57.19-107]) Hoistmen shall be informed when workmen are working in a compartment affected by that hoisting operation and a sign, "Men Working in Shaft", shall be posted at the hoist.

(5) ([57.19-108]) When workmen are working in a shaft "Men Working in Shaft" signs shall be posted at all devices controlling hoisting operations which may endanger such workmen.

(6) ([57.19-110]) A substantial bulkhead or equivalent overhead protection shall be installed for protection of workmen working in a mine shaft.

(7) ([57.19-120]) A systematic procedure of inspection, testing, and maintenance of shaft and hoisting equipment shall be developed and followed. If it is found or suspected that any part is not functioning properly, the hoist shall not be used until any needed repairs or adjustments have been made.

(8) ([57.19-128]) Ropes shall not be used for hoisting when they have:

(a) More than six broken wires in any lay.

(b) Crown wires worn to less than sixty-five percent of the original diameter.

(c) A marked amount of corrosion or distortion.

(d) A combination of similar factors individually less severe than those above but which in aggregate might create an unsafe condition. [Order 72-1, § 296-61-270, filed 2/25/72, effective 4/1/72.]

WAC 296-61-280 Explosives. ([57.6]) The term "explosives" as used in this section includes blasting agents. The standards in this section in which the term "explosives" appears are applicable to blasting agents, as well as to other explosives, unless blasting agents are expressly excluded.

(1) ([57.6-1]) Detonators and explosives, including blasting agents, shall be stored in magazines as required by the State of Washington Explosives Law, chapter 70-.74 RCW and the applicable safety rules dealing with explosives, chapters 296-51 and 296-52 WAC.

(2) ([57.6-2]) Detonators shall not be stored in the same magazine or powder chest with explosives.

(3) ([57.6-5]) Areas surrounding magazines or facilities used for the storage of blasting agents shall be kept clear of all trash and other unnecessary combustible materials for a distance not less than twenty-five feet in all directions.

(4) ([57.6-6]) Smoking and open flame shall not be permitted within twenty-five feet of a place where explosives or detonators are stored.

(5) ([57.6-8]) Ammonium nitrate-fuel oil blasting agents shall be physically separated from other explosives, safety fuse, or detonating cord stored in the same magazine, and shall be stored in such a manner that oil does not contaminate the other explosives, safety fuse, or detonating cord.

(6) ([57.6-20]) ([57.6-21]) Magazines shall be:

(a) Located in accordance with the current American Tables of Distances for storage of explosives.

(b) Detached structures located away from power lines, fuse storage areas, and other possible sources of fire.

(c) Constructed substantially of noncombustible material or covered with fire-resistant material.

(d) Reasonably bullet resistant.

(e) Made of nonsparking materials on the inside, including floors. Facilities used for bulk storage of blasting agents shall not be lined with copper or zinc.

(f) Provided with adequate and effectively screened ventilation openings near the floor and ceiling.

(g) Kept locked securely when unattended.

(h) Posted with suitable danger signs so located that a bullet passing through the face of a sign will not strike the magazine.

(i) Used exclusively for storage of explosives or detonators and kept free of all extraneous materials.

(j) Kept clean and dry in the interior, and in good repair.

(k) Unheated, unless heated in a manner that does not create a fire or explosion hazard. Electrical heating devices shall not be used inside a magazine.

(l) Electrically bonded and grounded if constructed of metal.

(m) In compliance with any other applicable rules or laws concerning magazine construction and use as specified by Washington State Explosives Law, chapter 70.74 RCW and Safety Rules for Explosives, chapter 296-52 WAC.

(n) ([57.6-11]) Illuminated only by use of approved devices. If electrically illuminated, wires must be in rigid conduit and fixtures must be explosion proof type. Switches must be located outside of the magazine.

(7) ([57.6-25]) ([57.6-27]) Underground distribution storage magazines shall be:

(a) Of substantial construction and have only nonsparking material on the inside, including the floors.

(b) Separated from all active haulageways and passageways by a solid barrier, sufficient to protect such haulageway or passageway from any potential explosion that may occur when the magazine is filled to capacity.

(c) Located where the active mining area will not be exposed to a hazardous concentration of fumes or endangered by the blast if a fire or explosion should occur.

(d) Provided with suitable warning signs. Suitable warning signs shall also be posted at the entrance to the drift in which the magazine is situated.

(e) Used only for the storage of explosives or detonators and shall be kept clean and free of extraneous material. (Note WAC 296-61-280(2) prohibits storage of detonators and explosives in the same magazine.)

(f) Provided with doors, covers or lids which shall be kept locked when unattended.

(g) Separated from the active blasting area by a safe distance and out of line of blasts.

(8) ([57.6-29]) ([57.6-159]) Powder chest (day boxes) shall be:

(a) Substantially constructed, the inside surface shall be of nonsparking material.

(b) Suitably labeled and posted with warning signs.

(c) Located away from blasting area when blasting and out of line of blasts.

(d) When used on the surface of underground mining operations and for all types of surface operations, emptied of contents at end of shift and contents returned to proper magazines for storage.

(e) Provided with fittings, devices and locks as needed and kept locked when unattended.

(9) ([57.6-30]) Detonator storage magazines shall be of the same construction as explosive storage magazines and shall be separated by at least twenty-five feet from explosive storage magazines.

(10) ([57.6-40]) Explosives and detonators shall be transported in separate vehicles unless separated by four inches of hardwood or the equivalent.

(11) ([57.6-41]) When explosives and detonators are hauled by trolley locomotives, covered, electrically insulated cars shall be used.

(12) ([57.6-42]) Self-propelled vehicles used to transport explosives or detonators shall be equipped with suitable fire extinguishers.

(13) ([57.6-43]) Vehicles containing explosives or detonators shall be posted with proper warning signs.

(14) ([57.6-44]) When vehicles containing explosives or detonators are parked, the brakes shall be set, the motive power shut off, and the vehicles shall be blocked securely against rolling.

(15) ([57.6-45]) Vehicles containing explosives or detonators shall not be taken to a repair garage or shop for any purpose.

(16) ([57.6-46]) Vehicles containing explosives or detonators shall be maintained in good condition and shall be operated at a safe speed and in accordance with all safe operating practices.

(17) ([57.6-47]) ([57.6-200]) Vehicles used to transport explosives shall have substantially constructed bodies and shall have no spark producing type metal exposed in the cargo space. The cargo carrying area shall be equipped with suitable sides and tailgates. The explosives shall not be stacked higher than the side or end enclosures. If transporting blasting agents, no zinc or copper shall be exposed in the cargo space and the space freely ventilated. If an enclosed screw conveyor is used to discharge blasting agents from the vehicle, the conveyor shall be designed in a manner which will protect the blasting agents against excessive internal pressure and excessive frictional heat.

(18) ([57.6-50]) Other materials or supplies shall not be placed on or in the cargo space of a conveyance containing explosives, detonating cord or detonators, except carrying safety fuse, and properly secured, nonsparking equipment used expressly in the handling of such explosives will be permissible.

(19) ([57.6-51]) Explosives or detonators shall not be transported on locomotives.

(20) ([57.6-52]) Workmen shall not smoke while transporting or handling explosives or detonators.

(21) ([57.6-53]) Only the necessary attendants shall ride on or in vehicles containing explosives or detonators.

(22) ([57.6-54]) Explosives or detonators shall not be transported on man trips.

(23) ([57.6-56]) Substantial, nonconductive, closed containers shall be used to carry explosives to blasting sites.

(24) ([57.6-57]) Nonconductive containers with tightfitting covers shall be used to transport or carry capped fuses and electric detonators to blasting sites.

(25) ([57.6-65]) Vehicles on the surface containing detonators or explosives, other than blasting agents, shall not be left unattended except in blasting areas where loading or charging is in progress.

(26) ([57.6-75]) Men assigned to and responsible for hoisting shall be notified whenever explosives or detonators are being transported in a shaft conveyance.

(27) ([57.6-76]) Hoisting in adjacent shaft compartments shall be stopped while explosives are being loaded, transported or handled in a shaftway.

(28) ([57.6-77]) Vehicles underground shall be attended, whenever practical and possible, while loaded with explosives or detonators.

(29) ([57.6-90]) Persons who use explosives or detonators shall be licensed as required by chapter 70.74 RCW and chapter 296-52 WAC. They shall be experienced in using explosives in conjunction with type of work they are performing and shall be familiar with the hazards connected with the type of work they are doing. Trainees will be allowed to use explosives or detonators only while under the immediate supervision and presence of a licensed person in the type of work involved.

(30) ([57.6-91]) Blasting operations shall be under the direct supervision and control of authorized persons.

(31) ([57.6-92]) Damaged or deteriorated explosives or detonators shall be destroyed in a safe manner.

(32) ([57.6-94]) Holes to be blasted shall be charged as near to blasting time as practical and such holes shall be blasted as soon as possible after charging has been completed. In no case shall the time elapsing between the completion of charging to the time of blasting exceed seventy-two hours unless prior approval has been obtained from the Division of Safety.

(33) ([57.6-95]) No person shall smoke within twenty-five feet of explosives or detonators.

(34) ([57.6-96]) Explosives shall be kept separated from detonators until charging is started.

(35) ([57.6-97]) Capped primers shall be made up at the time of charging and as close to the blasting site as conditions allow.

(36) ([57.6-98]) A primer shall be prepared by completely embedding a blasting cap in the center and along the longitudinal axis of an explosive cartridge. It shall be made in such a manner so that the blasting cap cannot be pulled out of the primer cartridge.

(37) ([57.6-99]) Only wooden or other nonsparking implements shall be used to punch holes in an explosive cartridge.

(38) ([57.6-100]) Tamping poles shall be blunt and squared at one end. They shall be made of wood, nonsparking material, or of special plastic acceptable to the Bureau of Mines.

(39) ([57.6-101]) No tamping shall be done directly on a capped primer.

(40) ([57.6-102]) Unused explosives and detonators shall be moved to a safe location as soon as charging operations are completed.

(41) ([57.6-103]) Areas in which charged holes are awaiting firing shall be guarded, or barricaded and posted, or flagged against unauthorized entry.

(42) ([57.6-104]) When safety fuse has been used, workmen shall not return to misfired holes for at least thirty minutes.

(43) ([57.6-105]) When electric blasting caps have been used, workmen shall not return to misfired holes for at least fifteen minutes.

(44) ([57.6-107]) Holes shall not be drilled where there is danger of intersecting a charged or misfired hole.

(45) ([57.6-108]) Fuse and igniters shall be stored in a cool, dry place away from oils or grease.

(46) ([57.6-110]) Fuses shall be cut and capped in safe, dry locations posted with "No Smoking" signs.

(47) ([57.6-111]) Blasting caps shall be crimped to fuses only with implements designed for that specific purpose.

(48) ([57.6-112]) The burning rate of the safety fuse in use at any time shall be measured, posted in conspicuous locations, and brought to the attention of all workmen concerned with blasting. No fuse shall be used that burns faster than one foot in thirty seconds or slower than one foot in fifty-five seconds.

(49) ([57.6-113]) When firing from one to fifteen blast-holes with safety fuse ignited individually using hand-held lighter, the fuses shall be of such lengths to provide the minimum burning time specified in the following table for a particular size round:

Number of Holes in a Round	Minimum Burning Time, Minutes
1	2
2–5	2 2/3
6–10	3 1/3
11–15	5

In no case shall any forty-second-per-foot safety fuse less than thirty-six inches long or any thirty-second-per-foot safety fuse less than forty-eight inches long be used.

(50) ([57.6-114]) At least two workmen shall be present when lighting fuses, and no workman shall light more than fifteen individual fuses. If more than fifteen holes per workman are to be fired, igniter cord and connectors or electric blasting shall be used.

(51) ([57.6-116]) Fuse shall be ignited with hot-wire lighters, lead spitters, igniter cord, or other such devices designed for this purpose. Carbide lights shall not be used to light fuses.

(52) ([57.6-117]) Fuses shall not be ignited before the primer and the entire charge are securely in place.

(53) ([57.6-119]) Electric detonators of different brands shall not be used in the same round.

(54) ([57.6-120]) Except when being tested with a blasting galvanometer:

(a) Electric detonators shall be kept shunted until they are being connected to the blasting line or wired into a blasting round.

(b) Wired rounds shall be kept shunted until they are being connected to the blasting line.

(c) Blasting lines shall be kept shunted until immediately before blasting.

(55) ([57.6-122]) Permanent blasting lines shall be properly supported, insulated, and kept in good repair.

(56) ([57.6-123]) When electric detonators are used, charging shall be stopped immediately when the presence of static electricity or stray currents is detected; the condition shall be remedied before charging is resumed.

(a) When electric blasting caps are being used in blasting operations in the proximity of fixed radio transmitters, the following table of distances must be observed, unless it is determined by designated test procedures that there is not sufficient radio frequency energy present to create a hazard. The test procedure shall be to attach a No. 47 Radio Pilot Lamp in place of the cap in the blasting circuit progressively as the circuit is connected, starting with the initial hole. In the event the lamp glows, the length of the wires connecting the circuit shall be altered by adding or cutting off wire until the lamp does not glow. A radio frequency field strength meter may be used in lieu of the test lamp.

Power	Watts	Distance (Ft.)
5	25	100
25	50	150
	100	220
100	250	350
250	500	450
500	1,000	650
1,000	2,500	1,000

Power	Watts	Distance (Ft.)
2,500	5,000	1,500
5,000	10,000	2,200
10,000	25,000	3,500
25,000	50,000	5,000
50,000	100,000	7,000

(b) Where electric blasting caps are being used where there is a possibility that a mobile transmitter emitting radio frequency energy may approach the blasting area, a warning sign shall be posted requiring that all radio transmitters be turned off at least fifty feet away from the blasting area.

(57) ([57.6-124]) When electric detonators are used, charging shall be suspended in surface mining, shaft sinking and tunneling, and workmen withdrawn to a safe location upon the approach of an electrical storm.

(58) ([57.6-125]) If branch circuits are used when blasts are fired from power circuits, safety switches located at safe distances from the blast areas shall be provided in addition to the main blasting switch.

(59) ([57.6-127]) Blasting switches shall be locked in the open position, except when closed to fire the blast. Lead wires shall not be connected to the blasting switch until the shot is ready to be fired.

(60) ([57.6-128]) The key or other control to an electrical firing device shall be entrusted only to the workman designated to fire the round, or rounds.

(61) ([57.6-129]) Electric circuits from the blasting switches to the blast area shall not be grounded.

(62) ([57.6-131]) Power sources shall be suitable for the number of electric detonators to be fired and for the type of circuits used.

(63) ([57.6-133]) If any part of a blast is connected in parallel and is to be initiated from power lines or lighting circuits, the time of current flow shall be limited to a maximum of 25 milliseconds by incorporating an arching control device in the blasting circuit, or by interrupting the circuit with an explosive charge attached to one or both lead lines and initiated by a zero-delay electric blasting cap.

(64) ([57.6-134]) Tools used for opening metal or nailed wooden containers of explosives or detonators shall be of nonsparking materials.

(65) ([57.6-135]) Holes shall not be collared in bootlegs.

(66) ([57.6-136]) Black blasting powder shall not be used for blasting except when a desired result cannot be obtained with another type of explosive such as in quarrying certain types of dimension stone.

(67) ([57.6-137]) In the use of black blasting powder:

(a) Containers shall not be opened in, or within fifty feet of any magazine; within any building in which a fuel-fired or exposed-element electric heater is in operation; where electrical or incandescent-particle sparks could result in powder ignition; or within fifty feet of any open flame.

(b) Granular powder shall be transferred from containers only by pouring.

(c) Spills of granular powder shall be cleaned up promptly with nonsparking equipment, contaminated powder shall be put into a container of water and its content disposed of promptly after the granules have disintegrated, or the spill area shall be flushed with a copious amount of water to completely disintegrate the granules.

(d) Containers of powder shall be kept securely closed at all times other than when the powder is being transferred from or into a container.

(e) Containers of powder transported by vehicles shall be in a wholly enclosed cargo space.

(f) Misfires shall be disposed of by: (1) washing the stemming and powder charge from the borehole, and (2) removal and disposal of the initiator as a damaged explosive.

(g) Boreholes of shots that fire but fail to break, or fail to break promptly, shall not be recharged for at least twelve hours.

(68) ([57.6-160]) Ample warning shall be given before blasts are fired on the surface. All persons shall be cleared and removed from the blasting area unless suitable blasting shelters are provided to protect workmen who otherwise may be endangered by concussion or flyrock from blasting. Access to blast areas shall be posted with warning signs and protected by barricades or flagman.

(69) ([57.6-161]) If explosives are suspected of burning in a hole, all persons in the endangered area shall move to a safe location and no one shall return to the hole until the danger has passed, but in no case within one hour.

(70) ([57.6-162]) Lead wires and blasting lines shall not be strung across power conductors, pipelines, railroad tracks, or within twenty feet of bare powerlines. They shall be protected from sources of static or other electrical contact.

(71) ([57.6-163]) If using a detonating type cord for blasting the double-trunk-line or loop systems shall be used.

(72) ([57.6-164]) Trunk lines in multiple-row blasts shall make one or more complete loops, with crossties between loops at intervals of not over two hundred feet.

(73) ([57.6-166]) All detonating cord knots shall be tight and all connections shall be kept at right angles to the trunk lines.

(74) ([57.6-168]) Misfires shall be reported to the proper supervisor and shall be disposed of safely before any other type of work is performed in that blasting area.

(75) ([57.6-170]) Where electric blasting is to be performed, electric circuits to equipment in the immediate area to be blasted shall be deenergized before electric detonators or millisecond delays are connected to the blasting circuit; the power shall not be turned on until after the shots are fired or the blast is deactivated by removing the electric detonators or millisecond delays.

(76) ([57.6-175]) Ample warning shall be given before blasts are fired underground. All persons shall be cleared and removed from areas endangered by the blast. Clear access to exits shall be provided for workmen firing the rounds.

(77) ([57.6–177]) Misfires shall be disposed of by the following methods:

(a) Reattempting to fire the holes if the leg wires are exposed.

(b) Washing the stemming and the charge from the borehole with water.

(c) Inserting new primers after the stemming has been washed out.

(78) ([57.6–182]) Blasts in shafts or winzes shall be initiated from a safe location outside the shaft or winze.

(79) ([57.6–193]) Where pneumatic loading is employed, before any type of blasting operation using blasting agents is put into effect, an evaluation of the potential hazard of static electricity shall be made. Adequate steps, including the grounding and bonding of the conductive parts of pneumatic loading equipment, shall be taken to eliminate the hazard of static electricity before blasting agent use is commenced.

(80) ([57.6–194]) Pneumatic loading equipment shall not be grounded to waterlines, air lines, rails, or the permanent electrical grounding systems.

(81) ([57.6–195]) Hoses used in connection with pneumatic loading machines shall be of the semiconductive type, having a total resistance low enough to permit the dissipation of static electricity and high enough to limit the flow of stray electric currents to a safe level. Wire–countered hose shall not be used because of the potential hazard from stray electric currents.

(82) ([57.6–197]) In small–diameter holes, blasting agents should be loaded so as to provide a continuous column that completely fills the cross section of the borehole.

(83) ([57.6–198]) Plastic tubes shall not be used as hole liners if blasting agents are loaded pneumatically into holes containing an electric detonator.

(84) ([57.6–220]) Sensitized ammonium nitrate blasting agents shall not be mixed or compounded underground. All applicable rules for sensitizing, storage and use of sensitized ammonium nitrate administered by the Department of Labor and Industries shall be complied with. [Order 72–1, § 296–61–280, filed 2/25/72, effective 4/1/72.]

WAC 296-61-290 Loading, hauling, dumping——General, surface and underground. (1) ([57.9–2]) Defective equipment which would present a hazard shall be taken out of service immediately and shall not be put back into use until the defect has been properly corrected.

(2) ([57.9–3]) Powered mobile equipment shall be equipped with brakes and devices which will hold equipment with loads on grades on which it will be used. The brakes and parking devices shall be kept in proper operating condition at all times.

(3) ([57.9–5]) Operators shall be certain, by signal or other means, that all persons are clear before starting or moving equipment.

(4) ([57.9–9]) Operators shall sound warning before moving a train, when the train approaches a crossing, when approaching a train on adjacent tracks, and where the operator's vision is obscured.

(5) ([57.9–11]) If cab windows are installed, they shall be of safety glass or of materials affording equivalent protection and view, and shall be kept clean. Cracked or broken windows shall be replaced immediately.

(6) ([57.9–12]) Operator's cabs shall be kept free of extraneous materials and tools shall be kept off the cab floors and walking surfaces.

(7) ([57.9–20]) Positive–acting stop blocks, derail devices, track skates or other adequate means shall be installed wherever necessary to protect workmen from runaway or moving railroad equipment.

(8) ([57.9–22]) Guards, barricades or berms shall be installed on the outer banks or elevated roadways and on sides of bridges and trestles. Haul roads of adequate width with minimum grades should be established and properly maintained in surface mining operations.

(9) ([57.9–23]) Trackless haulage equipment shall be operated under power control at all times.

(10) ([57.9–24]) Mobile equipment operators shall have full control of the equipment while it is in motion.

(11) ([57.9–6]) When the entire length of a conveyor is visible from the starting switch, the operator shall visually check to make certain that all workmen are in the clear before starting the conveyor. 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 workmen that the conveyor will be started. All reasonable precautions shall be taken by the operator prior to starting a conveyor, to assure that no workman is in a hazardous location where he may be injured when the conveyor is started.

(12) ([57.9–7]) Unguarded conveyors with walkways shall be equipped with emergency stop devices or cords along their full length.

(13) ([57.9–13]) Adequate backstops or brakes shall be installed on inclined conveyor drive units to prevent conveyors from running in reverse if a hazard to workmen would be caused.

(14) ([57.9–14]) Riding on conveyor chains, belt, or bucket elevators shall be prohibited. Workmen shall not be allowed to walk on conveyors except for emergency and then only when the conveyors have been deenergized and the workman can do so safely. Riding of conveyors shall only be permitted on the manlift steps or platforms and handholds attached and other safety factors as specified under Safety Standards for Belt Manlifts.

(15) ([57.9–25]) Dippers, buckets, loading booms, or heavy suspended loads shall not be swung over the cabs of haulage vehicles until the drivers are out of the cabs and in safe locations, unless the trucks are designed specifically to protect the drivers from falling material.

(16) ([55.9–26]) Only authorized persons shall be allowed in areas where loading or dumping operations are being conducted.

(17) ([57.9–27]) If operator is on equipment, others shall notify him of their intent prior to getting on or off the equipment or entering any area where operation of the equipment may present a hazard to them.

(18) ([57.9-28]) Switch throws shall be installed so that at least thirty inches of clearance is maintained between the projection of moving equipment for at least ten feet on each side of throws.

(19) ([57.9-30]) Workmen shall not work or pass under any buckets or booms while equipment is being operated.

(20) ([57.9-31]) Equipment shall be made safe for travel prior to commencing travel between work areas.

(21) ([57.9-32]) Dippers, buckets, scraper blades, and similar movable parts shall be secured or lowered to the ground when not in use.

(22) ([57.9-33]) Workmen shall not ride in dippers, shovel buckets, forks, clamshells, or in the beds of haulage or ore haulage trucks for the purpose of transportation.

(23) ([57.9-36]) Electrically powered mobile equipment shall not be left unattended unless the master switch is in the OFF position, all operating controls are in the neutral position, and the brakes are set or other equivalent precautions are taken against rolling.

(24) ([57.9-37]) Mobile equipment shall not be left unattended unless the brakes are set. The wheels shall be turned into a bank or rib, or shall be blocked, when such equipment is parked on a grade.

(25) ([57.9-39]) Workmen shall not get on or off moving equipment, except that trainmen may get on or off slowly moving trains.

(26) ([57.9-40]) Workmen shall not ride on top of loaded haulage equipment.

(27) ([57.9-41]) Only authorized workmen shall be permitted to ride on trains or locomotives and they shall ride in a safe position.

(28) ([57.9-43]) Passengers shall not be permitted to ride with legs or arms extending outside any mobile equipment, nor shall they be permitted to ride unless a passenger seat or other protective device is provided.

(29) ([57.9-45]) Equipment to be hauled shall be loaded, protected and secured so as to prevent slipping, shifting, or spillage.

(30) ([57.9-47]) Spotted cars shall either have brakes set, wheels blocked, or shall be coupled to other immobilized cars to prevent each car from rolling.

(31) ([57.9-48]) Railroad cars with braking systems, when in use, shall be equipped with effective brake shoes.

(32) ([57.9-50]) Rail cars shall not be left on side tracks unless ample clearance is provided for traffic on adjacent tracks.

(33) ([57.9-51]) Workmen, other than railroad crewmen, shall not pass over, under, or between cars when an engine is attached to a section. Railroad crew members shall not enter such hazardous areas unless the motorman has been notified and he acknowledges.

(34) ([57.9-52]) Inability of a motorman to clearly recognize his brakeman's signals, when the train is under the direction of the brakeman, shall be construed by the motorman as a stop signal.

(35) ([57.9-54]) Berms, bumper blocks, safety hooks or similar means shall be provided to prevent over-travel and overturning at dumping locations.

(36) ([57.9-58]) To prevent accidents during the backing of trucks where vision is obstructed, a signalman shall be stationed at a point giving him a clear view of the rear of the truck and the operator of the truck at all times. During the hours of darkness or when necessary due to weather conditions, a signalman shall be furnished, and shall use, a signal light.

(37) ([57.9-59]) Public and permanent railroad crossings shall be posted with warning signs or signals, or shall be guarded when trains are passing and shall be planked or otherwise filled between the rails.

(38) ([57.9-60]) Where overhead clearance is restricted, warning devices shall be installed and the restricted area shall be conspicuously marked.

(39) ([57.9-61]) Stockpile and muckpile faces shall be trimmed to prevent hazards to workmen. Material shall be removed from stockpiles in such a manner that there will be no overhanging material.

(40) ([57.9-62]) Rocks too large to be handled safely shall be broken before loading.

(41) ([57.9-64]) Chute loading installations shall be designed and arranged so that the workmen pulling chutes will not be in a hazardous position or location.

(42) ([57.9-67]) Facilities used to transport workmen shall be of ample size to prevent workmen from being overcrowded.

(43) ([57.9-68]) Lights, flares, or other warning devices shall be posted when parked equipment creates a hazard to vehicular traffic.

(44) ([57.7-69]) Tires shall be deflated before repairs on them are started. Unmounted locking rim wheels shall be placed in a safety cage or other device shall be used which will prevent a locking rim from striking the workman if it should dislodge while the tire is being inflated.

(45) ([57.9-81]) Trucks, shuttle cars, and front-end loaders shall be equipped with emergency brakes, separate and independent of the regular braking system or there shall be a dual method of applying the brakes.

(46) ([57.9-83]) Where possible at least thirty inches continuous clearance from the farthest projection of moving railroad equipment shall be provided on at least one side of the tracks. All places shall be marked conspicuously where it is not possible to provide thirty inches clearance.

(47) ([57.9-85]) ([57.9-99]) Supplies, materials, and tools other than small handtools shall not be transported with workmen in man trip vehicles unless such vehicles are specifically designed to make such transportation safe. Man trips shall be operated independently of ore and supply trips.

(48) ([57.9-97]) Trains shall be brought to a complete stop, then moved very slowly when coupling or uncoupling cars manually.

(49) ([57.9-98]) Makeshift couplings shall not be used.

(50) ([57.9-102]) When a signalman is used during slushing operations, he shall be positioned in a safe place.

(51) ([57.9-103]) Collars of open draw holes shall be kept free of muck and material.

([57.9-106]) Ample warning shall be given to workmen who may be affected by the draw or otherwise exposed to danger from chute-pulling operations.

(53) ([57.9-107]) Workmen shall not stand on broken rock or ore overdraw points if there is danger that the chute will be pulled. Suitable platforms or safety lines shall be provided and used when work must be done in such areas.

(54) ([57.9-110]) A sufficient number of shelter holes spaced not more than one hundred fifty feet apart shall be provided to ensure the safety of workmen along haulageways where continuous clearance of at least thirty inches from the farthest projection of moving equipment on at least one side of the haulageway cannot be maintained.

(55) ([57.9-113]) Man trips shall be operated at speeds consistent with the condition of tracks and equipment used.

(56) ([57.9-114]) Where man trips are used, discharge and boarding points shall be designated. Workmen shall not board or leave moving man trip cars.

(57) ([57.9-116]) During shift changes, the movement of rock or material trains shall be limited to areas where such trains could not present a hazard to workmen coming on or going off shift.

(58) ([57.9-117]) Workmen shall not ride between cars or on top of loaded cars.

(59) ([57.9-15]) Unless the operator is otherwise protected, slushers in excess of 10 horsepower shall be provided with backlash guards. All slushers shall be equipped with rollers, and drum covers, and anchored securely before slushing operations are started. [Order 72-1, § 296-61-290, filed 2/25/72, effective 4/1/72.]

WAC 296-61-300 Aerial tramways. (1) ([57.10-3]) Any defect which would make the equipment unsafe to operate under existing conditions shall be cause to take the equipment out of service and it shall not be put back into use until it has been made safe.

(2) ([57.10-7]) Guard nets or other suitable protection shall be provided where tramways pass over roadways, walkways, or buildings.

(3) ([57.10-8]) Workmen other than maintenance men shall not ride aerial tramways unless the following features are provided:

(a) Two independent braking systems shall be installed, each capable of holding the maximum load.

(b) Direct communication between terminals shall be installed.

(c) A secondary or emergency source of power shall be available in case of primary power failure.

(d) The buckets shall be equipped with positive locks to prevent accidental tripping or dumping.

(4) ([57.10-9]) Workmen shall not ride loaded buckets.

(5) No person shall start a tramway until he is assured that all workmen are clear of the moving equipment at terminals and to the best of his ability ascertain that all workmen are clear of moving equipment between (52) terminals. [Order 72-1, § 296-61-300, filed 2/25/72, effective 4/1/72.]

WAC 296-61-310 Crushing and milling operations. (1) All rules contained in this standard shall prevail where applicable to this type of operation. The term "Crusher" as used in this standard includes both permanent and portable installations.

(2) Land shall be leveled and all material which may create a hazard shall be removed prior to setting up and operating equipment.

(3) Plant structures shall be constructed to carry the required load without material or structural failure for the prescribed life of the material used.

(4) Conveyors shall be installed on footings and solid members capable of safely supporting four times the maximum load to which they may be subjected.

(5) Chains shall not be used to permanently support conveyors.

(6) Support members of conveyors exposed to contact by mobile equipment shall be barricaded or otherwise properly safeguarded.

(7) Entrance to jaws, etc., shall be guarded by screens, rails or other suitable means which will prevent a workman from falling into the crusher.

(8) Cone type crushers shall be equipped with suitable guards over or around the feed end which will prevent rock from flying into the work area.

(9) Dust from crushing operations shall be controlled as specified in the Occupational Health Standards.

(10) Crusher operators and other employees working where hazardous or nuisance dust exists which is uncontrollable by other means shall be furnished with and shall properly wear approved respirators and goggles.

(11) Overhead conveyors shall be constructed and guarded so as to retain the spillage of materials which may create a hazard to persons below. Overhead protection shall be provided over walkways and roadways.

(12) Cone rolls shall be guarded to prevent material from flying and injuring workmen in the area.

(13) Conveyor drive, tail rolls and bend pulleys shall be maintained so that workmen are not required to scrape excess material out from between the belts while equipment is operating.

(14) Employees working around crushing operations shall wear approved head protection.

(15) When a workman is required to enter hoppers, storage bins or bunkers, he shall be provided with and shall wear a safety belt attached to a safety line which shall be attended by a second workman.

(16) Where bins, bunkers, or hoppers are loaded by the use of mobile equipment, bumper stops not less than ten inches by ten inches shall be installed and securely fastened in a manner which will prevent the truck or equipment from over-running the runway. Bull rails at least eight inches by eight inches or equivalent shall be securely fastened along the sides of the ramp or runway to prevent equipment from over-running sides of the runway.

(17) All wiring and grounding of equipment shall be installed and maintained to comply with the National Electrical Code.

(18) All counterweights shall be guarded for protection of workmen.

(19) All chains and sprockets, where exposed, shall be guarded.

(20) Oiling or greasing shall not be done on chains, sprockets or shafts while equipment is operating unless suitable safeguards are provided to eliminate all hazards.

(21) Substantial walkways and working platforms, equipped with toeboards and handrails, shall be installed where needed for maintenance purposes at all plants. Standard stairways or ladders shall be provided to reach all parts requiring oiling and maintenance.

(22) Bunker unloading devices shall be arranged to be operative from a safe location outside the walls of bunkers where overhead hazards exist or there is a danger of overturning.

(23) Mobile equipment shall be provided with overhead canopy or roll bars of sufficient strength to provide suitable protection for the operator.

(24) Mobile vehicles shall have adequate brakes which will safely stop and hold the vehicle on any incline or plane on which they may be required to work.

(25) All vehicles shall have cabs, cab shields, or devices installed which will protect the operator from falling or shifting material.

(26) Safety glass shall be installed in windshields, windows, and doors.

(27) A locking device shall be provided on every fifth wheel mechanism and tow bar arrangement which will prevent the accidental separation of towed and towing vehicles.

(28) Nonslip surfaces shall be provided on steps of all vehicles.

(29) All dump trucks shall be equipped with a supporting device to prevent accidental lowering of a raised truck bed while maintenance or inspection work is being done underneath.

(30) All control levers shall be designed to prevent accidental starting or tripping of the raising or lowering mechanism.

(31) Trip handles for tailgates on all dump equipment shall be located where the operator can activate the mechanism from a safe location.

(32) All self-propelled, bidirectional machines shall be equipped with a horn which shall be audible above the surrounding noise level. This horn shall be operated as needed prior to moving any machine and intermittently (not to exceed three-second intervals) when the machine is moving in either direction whenever the operator does not have a clear view in the direction of travel. A reverse signal alarm emitting a sound as required above shall be installed on all equipment of which the operator has an obstructed view to the rear unless a signalman is assigned to direct the operator and is positioned at all times in plain view of the operator and can observe the immediate area behind the equipment to ascertain that it is clear of all personnel and obstructions.

(33) If doors are removed from mobile equipment, seat belts or other devices shall be installed which will prevent the operator from accidentally falling, or being thrown out.

(34) Stationary dragline machines shall have all moving parts which are exposed to contact guarded with standard safeguards.

(35) Running lines, straps, etc., shall be frequently inspected for wear and other defects and shall be replaced prior to causing a hazardous condition.

(36) Any wire rope showing ten percent of its wires broken in a three foot length shall be removed from service. When cables show deterioration from rusting, wear, undue strain or other conditions to the extent of fifteen percent of their original strength, use of cable shall be discontinued. [Order 72-1, § 296-61-310, filed 2/25/72, effective 4/1/72.]

WAC 296-61-320 Gassy mines. (1) All rules contained in this standard shall prevail where applicable to gassy mine operations. When applied to gassy mines, rules contained in this section shall prevail over conflicting rules in other sections.

(2) ([57.21-1]) A mine shall be deemed gassy, and thereafter operated as a gassy mine, if:

(a) The Mining Section of the Division of Safety classifies the mine as gassy; or

(b) Flammable gas emanating from the orebody of the strata surrounding the orebody has been ignited in the mine; or

(c) A concentration of 0.25 percent or more, by air analysis, of flammable gas emanating only from the orebody; or

(d) The strata surrounding the orebody has been detected not less than twelve inches from the back, face, or ribs in any open workings; or

(e) The mine is connected to a gassy mine.

(3) ([57.21-2]) Flammable gases detected while unwatering mines and similar operations shall not be used to class a mine gassy.

(4) Fire Prevention. (a) ([57.21-10]) Workmen shall not smoke or carry smoking materials, matches, lighters or other sources of ignition underground. The operator shall institute a reasonable program to effectuate this rule.

(b) ([57.21-11]) When it becomes necessary to do welding or cutting, it shall be done in open air. Open flames or sources of ignition shall not be used where flammable gases are present or may enter the air currents.

(c) ([57.21-12]) Welding or cutting with arc of flame underground in other than fresh air or in places where flammable gases are present or may enter the air current shall be under the direct supervision of a qualified person who shall test for flammable gases before and frequently during such operations.

(d) ([57.21-13]) Welding or cutting shall not be performed in atmospheres containing more than 1.0 percent of flammable gases.

(5) Ventilation. (a) ([57.21-20]) Main fans shall be:

(i) Installed on the surface.

(ii) Powered electrically from a circuit independent of the mine power circuit. Internal combustion engines shall be used only for standby power, or where electrical power is not available.

(iii) Installed in fireproof housing provided with fireproof air ducts.

(iv) Offset not less than fifteen feet from the nearest side of the mine opening and equipped with ample means of pressure relief unless:

(A) The opening is not in direct line with forces which would come out of the mine should an explosion occur, and

(B) Another opening not less than fifteen feet nor more than one hundred feet from the fan opening is equipped with a weak-wall stopping or explosion doors in direct line with the forces which would come out of the mine should an explosion occur.

(v) Installed to permit prompt reversal of airflow.

(vi) Attended constantly or provided with automatic devices to give alarm when the fans slow down or stop. Such devices shall be placed so they will be seen or heard by responsible persons.

(b) ([57.21-23]) When single shafts are used for intake and return, the curtain wall or partition shall be constructed of reinforced concrete or equivalent and provided with pressure relief devices.

(c) ([57.21-24]) When a main fan fails or stops and ventilation is not restored in a reasonable time, action shall be taken to cut off the power to the areas affected and to withdraw all workmen from such areas.

(d) ([57.21-26]) When ventilation is not restored in a reasonable time, all workmen shall be removed from the areas affected, and after ventilation has been restored, the areas affected shall be examined by qualified persons for the presence of gas and other hazards and shall be made safe before power is restored and before workmen, other than the examiners and other authorized persons, return to the areas affected.

(e) ([57.21-27]) When the main fan or fans have been shut down with all workmen out of the mine, no person, other than those qualified to examine the mine or other authorized persons, shall go underground until the fans have been started and the mine examined for gas and other hazards and declared safe.

(f) ([57.21-28]) Booster fans shall be:

(i) Operated by permissible drive units maintained in permissible condition.

(ii) Operated only in air containing not more than one percent flammable gas.

(iii) ([57.21-29]) Inspected by a qualified person at least once each shift or provided with automatic devices to give alarm when the fans slow down or stop.

(iv) Equipped with devices that automatically cut off the power in areas affected if the fans slow down or stop when the fans are not provided with automatic alarm devices.

(v) Provided with air locks, the doors of which open automatically if the fan stops operating.

(g) ([57.21-30]) Auxiliary fans shall be:

(i) Operated by permissible drive units maintained in permissible condition.

(ii) Operated only in air containing not more than one percent flammable gas.

(h) ([57.21-32]) Workmen shall be withdrawn from areas affected by auxiliary or booster fans when such fans slow down or stop.

(i) ([57.21-33]) The volume and velocity of the current of air coursed through all active areas shall be sufficient to dilute and carry away flammable gases, smoke and fumes.

(j) ([57.21-34]) The quantity of air coursed through the last open crosscut in pairs or sets of entries or through other ventilation openings nearest the face, shall be at least six thousand cubic feet a minute.

(k) ([57.21-35]) At least once a week, a qualified person shall measure the volume of air entering the main intakes and leaving the main returns, the volume of the intake and return of each split, and the volume through the last open crosscuts or other ventilation openings nearest the active faces. Records of such measurements shall be kept in a book on the surface.

(l) ([57.21-38]) Changes in ventilation that materially affect the main air current or any split thereof and may affect the safety of persons in the mine shall be made only when the mine is idle. Only those persons engaged in making such changes shall be permitted in the mine during the change. Power shall be cut off in the areas affected by the change before work starts and not restored until the effect of the change has been ascertained and the affected areas determined to be safe by a qualified person.

(m) ([57.21-39]) If flammable gas in excess of 1.0 percent by volume is detected in the air not less than twelve inches from the back, face, and rib of an underground working place, or in the air returning from a working place or places, adjustments shall be made in the ventilation immediately so that the concentration of flammable gas in such air is reduced to 1.0 percent or less.

(n) ([57.21-40]) If 1.5 percent or higher concentration of flammable gas is detected in air returning from an underground working place or places, the workmen shall be withdrawn and the power cut off to the portion of the mine endangered by such flammable gas until the concentrations of such gas is reduced to 1.0 percent or less.

(o) ([57.21-41]) Air that has passed by an opening of any unsealed abandoned area and contains 0.25 percent or more of flammable gas shall not be used to ventilate working areas. Examinations of such air shall be conducted during the preshift examinations required by Standard (7) of this section and federal ([57.21-59]).

(p) ([57.21-42]) Air that has passed through an abandoned panel or area which is inaccessible or unsafe for inspection shall not be used to ventilate any working place in such mine. No air which has been used to ventilate an area from which the pillars have been removed shall be used to ventilate any working place in such mine, except that such air if it does not contain 0.25 volume per centum or more of methane, may be used to ventilate enough advancing working places immediately

adjacent to the line of retreat to maintain an orderly sequence of pillar recovery on a set of entries.

(q) ([57.21-43]) Abandoned areas shall be sealed or ventilated. Areas that are not sealed shall be barricaded and posted against unauthorized entry.

(r) ([57.21-44]) Seals shall be of substantial construction. Exposed surfaces shall be made of fire-resistant material or, if the commodity mined is combustible, seals shall be made of incombustible material.

(s) ([57.21-45]) One or more seals of every sealed area shall be fitted with a pipe and valve or cap to permit sampling of the atmosphere and measurement of the pressure behind such seals.

(t) ([57.21-46]) Crosscuts shall be made at intervals not in excess of one hundred feet between entries and between rooms.

(u) ([57.21-48]) Line brattice or other suitable devices shall be installed from the last open crosscut to point near the face to assure positive air flow to the face of every active underground working place, unless the Secretary or his authorized representative permits an exception to this requirement.

(v) ([57.21-50]) Damaged brattices shall be repaired promptly.

(w) ([57.21-52]) Entries or rooms shall not be started off entries beyond the last open crosscuts, except that room necks and entries not to exceed eighteen feet in depth may be turned off entries beyond the last open crosscuts if such room necks or entries are kept free of accumulations of flammable gas by use of line brattice or other adequate means.

(x) ([57.21-55]) The main ventilation shall be so arranged by means of air locks, overcasts, or undercasts that the passage of trips or workmen does not cause interruptions of air currents. Where air locks are impracticable, single doors may be used if they are attended constantly while the areas of the mine affected by the doors are being worked, unless they are operated mechanically or are self-closing.

(y) ([57.21-56]) Air locks shall be ventilated sufficiently to prevent accumulations of flammable gas inside the locks.

(6) ([57.21-57]) Doors shall be kept closed except when workmen or equipment are passing through the doorways.

(7) ([57.21-59]) Preshift examinations shall be made of all working areas by qualified persons within three hours before any workmen, other than the examiners, enter the mine.

(8) ([57.21-61]) Only qualified examiners and persons authorized to correct the dangerous conditions shall enter places or areas where danger signs are posted.

(9) ([57.21-62]) Danger signs shall not be removed until the dangerous conditions have been corrected.

(10) Equipment. (a) ([57.21-76]) Diesel-powered equipment shall not be taken into or operated in places where flammable gas exceeds 1.0 percent at any point not less than twelve inches from the back, face, and rib.

(b) ([57.21-77]) Trolley wires and trolley feeder wires shall be on intake air and shall not extend beyond the last open crosscut or other ventilation opening. Such wires shall be kept at least one hundred fifty feet from pillar workings.

(c) ([57.21-78]) Only permissible equipment maintained in permissible condition shall be used beyond the last open crosscut or in places where dangerous quantities of flammable gases are present or may enter the air current.

(d) ([57.21-79]) Only permissible distribution boxes shall be used in working places and other places where dangerous quantities of flammable gas may be present or may enter the air current.

(e) ([57.21-81]) No electric equipment shall be taken into or operated in places where flammable gas can be detected in the amount of 1.0 percent or more at any point not less than twelve inches from the back, face and rib.

(f) ([57.21-90]) Only permissible electric lamps shall be used for portable illumination underground.

(11) Explosives. The term "Explosives" as used in this standard includes blasting agents. The standards in this section in which the term "Explosives" appears are applicable to blasting agents (as well as to other explosives) unless blasting agents are expressly excluded.

(a) ([57.21-95]) Explosives not designated as permissible by the Bureau of Mines shall not be used in any underground gassy mine until the Bureau of Mines and State Inspector of Mines have given written approval for each such specific explosive to be used.

(b) ([57.21-96]) The Bureau of Mines and the State Inspector of Mines in granting approval referred to in Standard (11)(a) federal ([57.21-95]) above, shall provide the operator with a written list of conditions for using the specific explosives covered by the approval and adapted to the mining operation.

(c) ([57.21-97]) Blasts in gassy mines shall be initiated electrically, and multiple-shot blasts shall be initiated only with milli-second-delay detonators. Permissible blasting units of capacity suitable for the number of holes in a round to be blasted shall be used unless the round is fired from the surface when all workmen are out of the mine.

(d) ([57.21-98]) Boreholes shall be stemmed as prescribed for the explosives to be used.

(e) ([57.21-99]) Examinations for gas shall be made immediately before and after firing each shot or round.

(f) ([57.21-100]) Shots or rounds shall not be fired in places where flammable gas can be detected with a permissible flame safety lamp, or where 1.0 percent or more of flammable gas can be detected by any other Bureau of Mines approved device or method, at a point not less than twelve inches from the back, face, and rib. [Order 72-1, § 296-61-320, filed 2/25/72, effective 4/1/72.]

Chapter 296-62 WAC
OCCUPATIONAL HEALTH STANDARDS--SAFETY STANDARDS FOR CARCINOGENS

WAC

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***Reviser's Note:** References from these appendices are from the American Conference of Governmental Industrial Hygienists - Threshold limit values for chemical substances and physical agents in the workroom environment with intended changes for 1972.

DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

296-62-030 Revisions. [Order 70-8, § 296-62-030, filed 7/31/70, effective 9/1/70; Rule 3.010, effective 8/1/63.] Repealed by Order 73-3, filed 5/7/73.

296-62-07301 4-Nitrobiphenyl. [Order 74-35, § 296-62-07301, filed 9/20/74.] Repealed by 80-17-014 (Order 80-20), filed 11/13/80. Statutory Authority: RCW 49-.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43-.22 RCW.

296-62-07303 Alpha-Naphthylamine. [Order 74-35, § 296-62-07303, filed 9/20/74.] Repealed by 80-17-014 (Order 80-20), filed 11/13/80. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42-.30 and 43.22 RCW.

296-62-07305 4,4'-Methylene bis (2-chloroaniline). [Order 74-35, § 296-62-07305, filed 9/20/74.] Repealed by 80-17-014 (Order 80-20), filed 11/13/80. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW.

296-62-07307 Methyl chloromethyl ether. [Order 74-35, § 296-62-07307, filed 9/20/74.] Repealed by 80-17-014 (Order 80-20), filed 11/13/80. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42-.30 and 43.22 RCW.

296-62-07309 3,3'-Dichlorobenzidine (and its salts). [Order 74-35, § 296-62-07309, filed 9/20/74.] Repealed by 80-17-014 (Order 80-20), filed 11/13/80. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW.

296-62-07311 Bis-Chloromethyl ether. [Order 74-35, § 296-62-07311, filed 9/20/74.] Repealed by 80-17-014 (Order 80-20), filed 11/13/80. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42-.30 and 43.22 RCW.

296-62-07313 Beta-Naphthylamine. [Order 74-35, § 296-62-07313, filed 9/20/74.] Repealed by 80-17-014 (Order 80-20), filed 11/13/80. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42-.30 and 43.22 RCW.

296-62-07315 Benzidine. [Order 74-35, § 296-62-07315, filed 9/20/74.] Repealed by 80-17-014 (Order 80-20), filed 11/13/80. Statutory Authority: RCW 49.17-.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW.

296-62-07317 4-Aminodiphenyl. [Order 74-35, § 296-62-07317, filed 9/20/74.] Repealed by 80-17-014 (Order 80-

20), filed 11/13/80. Statutory Authority: RCW 49-.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43-.22 RCW.

296-62-07319 Ethyleneimine. [Order 76-6, § 296-62-07319, filed 3/1/76.] Repealed by 80-17-014 (Order 80-20), filed 11/13/80. Statutory Authority: RCW 49.17-.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW.

296-62-07321 Beta-Propiolactone. [Order 74-35, § 296-62-07321, filed 9/20/74.] Repealed by 80-17-014 (Order 80-20), filed 11/13/80. Statutory Authority: RCW 49-.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43-.22 RCW.

296-62-07323 2-Acetylaminofluorene. [Order 74-35, § 296-62-07323, filed 9/20/74.] Repealed by 80-17-014 (Order 80-20), filed 11/13/80. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42-.30 and 43.22 RCW.

296-62-07325 4-Dimethylaminoazobenzene. [Order 74-35, § 296-62-07325, filed 9/20/74.] Repealed by 80-17-014 (Order 80-20), filed 11/13/80. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42-.30 and 43.22 RCW.

296-62-07327 N-Nitrosodimethylamine—Carcinogen standard report form. [Order 74-35, § 296-62-07327 and Carcinogen Standard Report Form, filed 9/20/74.] Repealed by 80-17-014 (Order 80-20), filed 11/13/80. Statutory Authority: RCW 49.17.040, 49-.17.050, 49.17.240, chapters 42.30 and 43.22 RCW.

296-62-07335 Benzene. [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), § 296-62-07335, filed 8/31/78.] Repealed by 80-11-010 (Order 80-14), filed 8/8/80. Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17.240.

296-62-120 Respiratory protection. [Order 70-8, § 296-62-120 filed 7/31/70, effective 9/1/70; Rule 12.010, effective 8/1/63.] Repealed by Order 73-3, filed 5/7/73.

296-62-140 Industrial sanitation. [Order 70-8, § 296-62-140, filed 7/31/70, effective 9/1/70; Rule 14.010, effective 8/1/63.] Repealed by Order 73-3, filed 5/7/73.

296-62-150 Appendix I—Threshold limit values for 1969. [Order 70-8, § 296-62-150, filed 7/31/70, effective 9/1/70; Rules (part), effective 12/1/63.] Repealed by Order 73-3, filed 5/7/73.

296-62-155 Appendix I—Adopted values. [Order 70-8, § 296-62-155, filed 7/31/70, effective 9/1/70; Rules (part), effective 12/1/63.] Repealed by Order 73-3, filed 5/7/73.

296-62-157 Threshold limit values of physical agents for 1969. [Order 70-8, § 296-62-157, filed 7/31/70, effective 9/1/70.] Repealed by Order 73-3, filed 5/7/73.

296-62-160 Appendix II—Levels of illumination currents. [Appendix II, effective 12/1/63.] Repealed by Order 70-8, filed 7/31/70, effective 9/1/70. Also repealed by Order 73-3, filed 5/7/73.

296-62-165 Appendix III—Nonionizing radiation. [Order 70-8, § 296-62-165, filed 7/31/70, effective 9/1/70; Appendix III, effective 8/1/63.] Repealed by Order 73-3, filed 5/7/73.

296-62-170 Appendix IV—Temperature, radiant heat, humidity, or air velocity combinations. [Order 70-8, § 296-62-170, filed 7/31/70, effective 9/1/70; Appendix IV, effective 8/1/63.] Repealed by Order 73-3, filed 5/7/73.

296-62-175 References. [Order 70-8, § 296-62-175, filed 7/31/70, effective 9/1/70.] Repealed by Order 73-3, filed 5/7/73.

296-62-180 Appendix V—Use and care of respiratory protective equipment, compressed air supply for respirators. [Order 70-8, § 296-62-180, filed 7/31/70, effective 9/1/70.] Repealed by Order 73-3, filed 5/7/73.

296-62-185 References. [Order 70-8, § 296-62-185, filed 7/31/70, effective 9/1/70.] Repealed by Order 73-3, filed 5/7/73.

296-62-900 Note on application of appendices A through H. [Order 73-3, Note (codified as WAC 296-62-900), filed 5/7/73.] Repealed by 80-11-010 (Order 80-14), filed 8/8/80. Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17.240.

296-62-901 Appendix A. [Order 73-3, Appendix A (codified as WAC 296-62-901), filed 5/7/73.] Repealed by 80-11-010 (Order 80-14), filed 8/8/80. Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17.240.

296-62-902 Appendix B. [Order 73-3, Appendix B (codified as WAC 296-62-902), filed 5/7/73.] Repealed by 80-11-010 (Order 80-14), filed 8/8/80. Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17.240.

296-62-903 Appendix C—Threshold limit values for mixtures. [Order 73-3, Appendix C (codified as WAC 296-62-903), filed 5/7/73.] Repealed by 80-11-010 (Order 80-14), filed 8/8/80. Statutory Authority: RCW 49-.17.040, 49.17.050, and 49.17.240.

296-62-904 Appendix D—Permissible excursions for time-weighted average (TWA) limits. [Order 73-3, Appendix D (codified as WAC 296-62-904), filed 5/7/73.] Repealed by 80-11-010 (Order 80-14), filed 8/8/80. Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17.240.

296-62-905 Appendix E—Some nuisance particulates (see note q). [Order 73-3, Appendix E (codified as WAC 296-62-905), filed 5/7/73.] Repealed by 80-11-010 (Order 80-14), filed 8/8/80. Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17.240.

296-62-906 Appendix F. [Order 73-3, Appendix F (codified as WAC 296-62-906), filed 5/7/73.] Repealed by 80-11-010 (Order 80-14), filed 8/8/80. Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17.240.

296-62-907 Appendix G—Notice of intended changes (for 1972). [Order 73-3, Appendix G (codified as WAC 296-62-907), filed 5/7/73.] Repealed by 80-11-010 (Order 80-14), filed 8/8/80. Statutory Authority: RCW 49-.17.040, 49.17.050, and 49.17.240.

296-62-908 Appendix H—Notice of intent to change the TLV for lasers-1972. [Order 73-3, Appendix H (codified as WAC 296-62-908), filed 5/7/73.] Repealed by 80-11-010 (Order 80-14), filed 8/8/80. Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17.240.

WAC 296-62-005 Occupational health and environmental control--Foreword. (1) Foreword. (a) Modern industry is changing at an ever-increasing pace. New inventions, discoveries and developments cause changes in every facet of the industrial process. In keeping with this changing technology is the necessity to provide an adequate guide for the protection of working men and women. This chapter is for the guidance of both labor and management and to call particular attention to the way in which modernization and updating of the standards can be accomplished.

(b) This chapter is intended to cover as fully as is practical the environment in which work is performed. In addition to the suggestions made herein, the services of modern occupational medicine must also be considered. Occupational medicine with its specialized techniques for examination, diagnosis, and treatment adds another protection for the worker as he encounters newly-developed materials and methods.

(c) With the full realization that close cooperation between government and industry, labor and management, and all the health sciences, is essential, this chapter is promulgated for the health of all the workmen coming under the jurisdiction of the Department of Labor and Industries.

(d) This chapter is promulgated in accordance with the applicable requirements as outlined in the Washington State Administrative Procedures Act (chapter 34.04 RCW) and other applicable statutes. [Order 73-3, § 296-62-005, filed 5/7/73; Order 70-8, § 296-62-005, filed 7/31/70, effective 9/1/70.]

WAC 296-62-010 Purpose and scope. (1) Purpose. The purpose of this chapter is:

(a) To protect the health of workmen by prescribing minimum requirements for the prevention or control of conditions in industry hazardous to health.

(b) Assist in the provision of a healthful working environment.

(2) Scope. This chapter shall apply to all industry coming under the jurisdiction of the Department of Labor and Industries. [Order 73-3, § 296-62-010, filed 5/7/73; Order 70-8, § 296-62-010, filed 7/31/70, effective 9/1/70; Section I, effective 8/1/63.]

WAC 296-62-020 Definitions applicable to all sections of this chapter. Unless the context indicates otherwise, words used in this chapter shall have the meaning given in this section.

(1) "Adequate" or "effective" means compliance with terms and intent of these standards.

(2) "Appendix" means references or recommendations to be used as guides in applying the provisions of this chapter.

(3) "Approved" means approved by the director of the Department of Labor and Industries or his 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 provision of WAC 296-24-006 shall apply.

(4) "Authorized person" means 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.

(5) "Coal tar pitch volatiles" means the inclusion of the fused polycyclic hydrocarbons which volatilize from the distillation residues of coal, petroleum, wood, and other organic matter.

(6) "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.

(7) "Department" means the Department of Labor and Industries.

(8) "Director" means the director of the Department of Labor and Industries, or his designated representative.

(9) "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 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.

(10) "Hazard" means that condition, potential or inherent, which can cause injury, death, or occupational disease.

(11) "Occupational Disease" means such disease or infection as arises naturally and proximately out of employment.

(12) "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 his ability to solve or resolve problems relating to the subject matter, the work, or the project.

(13) "Shall" or "Must" means mandatory.

(14) "Should" or "May" means recommended.

(15) "Suitable" means that which fits, or has the qualities or qualifications to meet a given purpose, occasion, condition, function, or circumstance.

(16) "Workmen," "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 his 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 his personal labor for an employer whether by manual labor or otherwise.

(17) "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.

(18) Abbreviations used in this chapter:

(a) "ANSI" means American National Standards Institute.

(b) "ASHRE" means American Society of Heating and Refrigeration Engineers.

(c) "BUT" means British Thermal Unit.

(d) "BTUH" means British Thermal Unit per Hour.

(e) "CFM" means Cubic Feet per Minute.

(f) "CFR" means Code of Federal Register.

(g) "CGA" means Compressed Gas Association.

(h) "ID" means Inside Diameter.

(i) "MCA" means Manufacturing Chemist Association.

(j) "NEMA" means National Electrical Manufacturing Association.

(k) "NFPA" means National Fire Protection Association.

(l) "OD" means Outside Diameter.

(m) "WAC" means Washington Administrative Code.

(n) "WISHA" means Washington Industrial Safety and Health Act (Chapter 80, Laws of 1973). [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), § 296-62-020, filed 11/13/80; Order 73-3, § 296-62-020, filed 5/7/73; Order 70-8, § 296-62-020, filed 7/31/70, effective 9/1/70; Section II, effective 8/1/63.]

WAC 296-62-040 Unconstitutionality clause. In the event that any section, paragraph, sentence, clause, phrase or work of this chapter is declared unconstitutional or invalid for any reason the remainder of said standard or this chapter shall not be affected thereby. [Order 73-3, § 296-62-040, filed 5/7/73; Order 70-8, § 296-62-040, filed 7/31/70, effective 9/1/70; Rule 4.010, effective 8/1/63.]

WAC 296-62-050 Application for waiver or variances. See WAC 296-24-010 VARIANCE AND PROCEDURE. [Order 73-3, § 296-62-050, filed 5/7/73; Order 70-8, § 296-62-050, filed 7/31/70, effective 9/1/70; Rule 5.010, effective 8/1/63.]

WAC 296-62-060 Control requirements in addition to those specified. (1) In those cases where no acceptable standards have been derived for the control of hazardous conditions, every reasonable precaution shall be taken to safeguard the health of the worker whether provided herein or not.

(2) Preservation of records.

(a) Scope and application. This section applies to each employer who makes, maintains or has access to employee exposure records or employee medical records.

(b) Definitions.

(i) "Employee exposure record" – a record of monitoring or measuring which contains qualitative or quantitative information indicative of employee exposure to toxic materials or harmful physical agents. This includes both individual exposure records and general research or statistical studies based on information collected from exposure records.

(ii) "Employee medical record" – a record which contains information concerning the health status of an employee or employees exposed or potentially exposed to toxic materials or harmful physical agents. These records may include, but are not limited to:

(A) The results of medical examinations and tests;

(B) Any opinions or recommendations of a physician or other health professional concerning the health of an employee or employees; and

(C) Any employee medical complaints relating to workplace exposure. Employee medical records include both individual medical records and general research or statistical studies based on information collected from medical records.

(c) Preservation of records. Each employer who makes, maintains, or has access to employee exposure records or employee medical records shall preserve these records.

(d) Availability of records. The employer shall make available, upon request, to the Director, Department of Labor and Industries, or his designee, all employee exposure records and employee medical records for examination and copying.

(e) Effective date. This standard shall become effective thirty days after filing with the code reviser.

(3) Monitoring of employees. The department shall use industrial hygiene sampling methods and techniques including but not limited to personal monitoring devices and equipment approved by the director or his designee for the purpose of establishing compliance with chapter 296-62 WAC.

(a) The employer shall permit the director or his designee to monitor and evaluate any workplace or employee in accordance with all provisions of this subsection.

(b) The employer shall not prevent or discourage an employee from cooperating with the department by restricting or inhibiting his/her participation in the use of personal monitoring devices and equipment in accordance with all provisions of this subsection. [Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17.240. 80-11-010 (Order 80-14), § 296-62-060, filed 8/8/80; Order 73-3, § 296-62-060, filed 5/7/73; Order 70-8, § 296-62-060, filed 7/31/70, effective 9/1/70; Rule 6.010, effective 8/1/63.]

WAC 296-62-070 Chemical agents (airborne or contact). [Order 70-8, § 296-62-070, filed 7/31/70, effective 9/1/70; Section VII, effective 8/1/63.] See WAC 296-62-07001 through 296-62-07007, Order 73-3, filed 5/7/73.

WAC 296-62-07001 Definitions (airborne chemical agents). (1) "Dust" means solid particles suspended in air, generated by handling, drilling, crushing, grinding, rapid impact, detonation, or decrepitation of organic or inorganic materials such as rock, ore, metal, coal, wood, grain, etc.

(2) "Fume" means solid particles suspended in air, generated by condensation from the gaseous state, generally after volatilization from molten metals, etc., and often accompanied by a chemical reaction such as oxidation.

(3) "Gas" means a normally formless fluid which can be changed to the liquid or solid state by the effect of increased pressure or decreased temperature or both.

(4) "Mist" means liquid droplets suspended in air, generated by condensation from the gaseous to the liquid state or by breaking up a liquid into a dispersed state, such as by splashing, foaming or atomizing.

(5) "Vapor" means the gaseous form of a substance which is normally in the solid or liquid state. [Order 73-3, § 296-62-07001, filed 5/7/73.]

WAC 296-62-07003 Definitions (contact chemical agents). (1) "Corrosives" means substances which in contact with living tissue cause destruction of the tissue by chemical action.

(2) "Irritants" means substances which on immediate, prolonged, or repeated contact with normal living tissue will induce a local inflammatory reaction.

(3) "Toxicants" means substances which have the inherent capacity to produce personal injury or illness to man by absorption through any body surface. [Order 73-3, § 296-62-07003, filed 5/7/73.]

WAC 296-62-07005 Control of chemical agents. Chemical agents shall be controlled in such a manner that they will not constitute a hazard to the worker, or workers shall be protected from the hazard of contact with or exposure to chemical agents. [Order 73-3, § 296-62-07005, filed 5/7/73.]

WAC 296-62-07007 Labeling of chemical agents. Labeling of chemical agents shall conform to the Department's "Standards Relating to Precautionary Labeling of Hazardous Substances Used in Places of Employment". (See chapter 296-64 WAC). [Order 73-3, § 296-62-07007, filed 5/7/73.]

WAC 296-62-073 Carcinogens--Scope and application. All sections of this chapter which include WAC 296-62-073 in the section number apply to the manufacturing, processing, repackaging, releasing, handling or storing of carcinogens. [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), § 296-62-073, filed 11/13/80; Order 76-6, § 296-62-073, filed 3/1/76; Order 74-35, § 296-62-073, filed 9/20/74.]

WAC 296-62-07302 List of carcinogens. (1) The following substances are deemed to be carcinogens for the purposes of WAC 296-62-073 through 296-62-07314.

(2) Any reference to carcinogens in WAC 296-62-07304 through 296-62-07314 shall mean only those carcinogens listed in WAC 296-62-07302.

(a) 4-Nitrobiphenyl - Chemical Abstracts Registry Number 92933.

(b) Alpha-Naphthylamine - Chemical Abstracts Registry Number 134327.

(c) 4,4' Methylene bis - Chemical Abstract Service Registry Number 101144.

(d) Methyl chlorohethyl ether - Chemical Abstracts Service Registry Number 107302.

(e) 3,3'-Dichlorobenzidine (and its salts) - Chemical Abstracts Service Registry Number 91941.

(f) Bis-Chloromethyl ether - Chemical Abstracts Service Registry Number 542881.

(g) Beta-Naphythylamine - Chemical Abstracts Service Registry Number 91598.

(h) Benzidine - Chemical Abstracts Service Registry Number 92875.

(i) 4-Aminodiphenyl - Chemical Abstracts Service Registry Number 92671.

(j) Ethyleneimine - Chemical Abstracts Service Registry Number 151564.

(k) Beta-Propiolactone - Chemical Abstracts Service Registry Number 57578.

(l) 2-Acetylaminofluorene - Chemical Abstracts Service Registry Number 53963.

(m) 4-Dimethylaminoazobenzene - Chemical Abstract Service Registry Number 60117.

(n) N-Nitrosodimethylamine - Chemical Abstracts Service Registry Number 62759. [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), § 296-62-07302, filed 11/13/80.]

WAC 296-62-07304 Definitions. (1) The definitions set forth in this section apply throughout WAC 296-62-073 through 296-62-07314.

(2) This section shall not apply to solid or liquid mixtures containing less than 0.1 percent by weight or volume of the carcinogens listed in WAC 296-62-07302.

(a) Absolute filter - is one capable of retaining 99.97 percent of a mono disperse aerosol of 0.3 m particles.

(b) Authorized employee - an employee whose duties require him to be in the regulated area and who has been specifically assigned to those duties by the employer.

(c) Clean change room - a room where employees put on clean clothing and/or protective equipment in an environment free of carcinogens listed in WAC 296-62-07302. The clean change room shall be contiguous to and have an entry from a shower room, when the shower room facilities are otherwise required in this section.

(d) Closed system - an operation involving carcinogens listed in WAC 296-62-07302 where containment prevents the release of carcinogens into regulated areas, or the external environment.

(e) Decontamination - the inactivation of a carcinogen listed in WAC 296-62-07302 or its safe disposal.

(f) Disposal - the safe removal of a carcinogen listed in WAC 296-62-07302 from the work environment.

(g) Emergency - an unforeseen circumstance or set of circumstances resulting in the release of a carcinogen which may result in exposure to or contact with any carcinogen listed in WAC 296-62-07302.

(h) External environment - any environment external to regulated and nonregulated areas.

(i) Isolated system - a fully enclosed structure other than the vessel of containment of a listed carcinogen which is impervious to the passage of listed carcinogens and which would prevent the entry of carcinogens into regulated areas, nonregulated areas, or the external environment, should leakage or spillage from the vessel of containment occur.

(j) Laboratory-type hood - a device enclosed on three sides and the top and bottom, designed and maintained so as to draw air inward at an average linear face velocity of 150 feet per minute with a minimum of 125 feet per minute, designed, constructed and maintained such that an operation involving a listed carcinogen within the hood does not require the insertion of any portion of any employees' body other than his hands and arms.

(k) Nonregulated area - any area under the control of the employer where entry and exit is neither restricted nor controlled.

(l) Open-vessel system - an operation involving listed carcinogens in an open vessel, which is not in an isolated

system, a laboratory–type hood, nor in any other system affording equivalent protection against the entry of carcinogens into regulated areas, nonregulated areas, or the external environment.

(m) Protective clothing – clothing designed to protect an employee against contact with or exposure to listed carcinogens.

(n) Regulated area – an area where entry and exit is restricted and controlled. [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), § 296-62-07304, filed 11/13/80.]

WAC 296-62-07306 Requirements for areas containing carcinogens listed in WAC 296-62-07302. (1) A regulated area shall be established by an employer where listed carcinogens are manufactured, processed, used, re–packaged, released, handled or stored.

(2) All such areas shall be controlled in accordance with the requirements for the following category or categories describing the operation involved:

(a) Isolated systems. Employees working with carcinogens within an isolated system such as a "glove box" shall wash their hands and arms upon completion of the assigned task and before engaging in other activities not associated with the isolated system.

(b) Closed system operation. Within regulated areas where carcinogens are stored in sealed containers, or contained in a closed system including piping systems with any sample ports or openings closed while carcinogens are contained within:

(i) Access shall be restricted to authorized employees only;

(ii) Employees shall be required to wash hands, forearms, face and neck upon each exit from the regulated areas, close to the point of exit and before engaging in other activities.

(c) Open vessel system operations. Open vessel system operations as defined in WAC 296-62-07304(2)(l) are prohibited.

(d) Transfer from a closed system. Charging or discharging point operations, or otherwise opening a closed system. In operations involving "laboratory–type hoods," or in locations where a carcinogen is contained in an otherwise "closed system," but is transferred, charged, or discharged into other normally closed containers, the provisions of this section shall apply.

(i) Access shall be restricted to authorized employees only;

(ii) Each operation shall be provided with continuous local exhaust ventilation so that air movement is always from ordinary work areas to the operation. Exhaust air shall not be discharged to regulated areas, nonregulated areas or the external environment unless decontaminated. Clean makeup air shall be introduced in sufficient volume to maintain the correct operation of the local exhaust system.

(iii) employees shall be provided with, and required to wear, clean, full body protective clothing (smocks, coveralls, or long–sleeved shirt and pants), shoe covers and gloves prior to entering the regulated area.

(iv) Employees engaged in a carcinogen handling operation shall be provided with and required to wear and use a half–face, filter–type respirator for dusts, mists, and fumes, in accordance with chapter 296–24 WAC, of the General Safety and Health Standards. A respirator affording higher levels of protection may be substituted.

(v) Prior to each exit from a regulated area, employees shall be required to remove and leave protective clothing and equipment at the point of exit and at the last exit of the day, to place used clothing and equipment in impervious containers at the point of exit for purposes of decontamination or disposal. The contents of such impervious containers shall be identified, as required under WAC 296–62–07310(2),(3) and (4).

(vi) Employees shall be required to wash hands, forearms, face and neck on each exit from the regulated area, close to the point of exit, and before engaging in other activities.

(vii) Employees shall be required to shower after the last exit of the day.

(viii) Drinking fountains are prohibited in the regulated area.

(e) Maintenance and decontamination activities. In clean up of leaks or spills, maintenance or repair operations on contaminated systems or equipment, or any operations involving work in an area where direct contact with carcinogens could result, each authorized employee entering the area shall:

(i) Be provided with and required to wear, clean, impervious garments, including gloves, boots and continuous–air supplied hood in accordance with chapter 296–24 WAC, the General Safety and Health Standards;

(ii) Be decontaminated before removing the protective garments and hood;

(iii) Be required to shower upon removing the protective garments and hood.

(f) Laboratory activities. The requirements of this subdivision shall apply to research and quality control activities involving the use of carcinogens listed in WAC 296–62–07302.

(i) Mechanical pipetting aids shall be used for all pipetting procedures.

(ii) Experiments, procedures and equipment which could produce aerosols shall be confined to laboratory–type hoods or glove boxes.

(iii) Surfaces on which carcinogens are handled shall be protected from contamination.

(iv) Contaminated wastes and animal carcasses shall be collected in impervious containers which are closed and decontaminated prior to removal from the work area. Such wastes and carcasses shall be incinerated in such a manner that no carcinogenic products are released.

(v) All other forms of listed carcinogens shall be inactivated prior to disposal.

(vi) Laboratory vacuum systems shall be protected with high efficiency scrubbers or with disposable absolute filters.

(vii) Employees engaged in animal support activities shall be:

(A) Provided with, and required to wear, a complete protective clothing change, clean each day, including coveralls or pants and shirt, foot covers, head covers, gloves, and appropriate respiratory protective equipment or devices; and

(B) Prior to each exit from a regulated area, employees shall be required to remove and leave protective clothing and equipment at the point of exit and at the last exit of the day, to place used clothing and equipment in impervious containers at the point of exit for purposes of decontamination or disposal. The contents of such impervious containers shall be identified as required under WAC 296-62-07310(2),(3) and (4).

(C) Required to wash hands, forearms, face and neck upon each exit from the regulated area close to the point of exit, and before engaging in other activities; and

(D) Required to shower after the last exit of the day.

(viii) Employees, other than those engaged only in animal support activities, each day shall be:

(A) Provided with and required to wear a clean change of appropriate laboratory clothing, such as a solid front gown, surgical scrub suit, or fully buttoned laboratory coat.

(B) Prior to each exit from a regulated area, employees shall be required to remove and leave protective clothing and equipment at the point of exit and at the last exit of the day, to place used clothing and equipment in impervious containers at the point of exit for purposes of decontamination or disposal. The contents of such impervious containers shall be identified as required under WAC 296-62-07310(2),(3) and (4).

(C) Required to wash hands, forearms, face and neck upon each exit from the regulated area close to the point of exit, and before engaging in other activities.

(ix) Air pressure in laboratory areas and animal rooms where carcinogens are handled and bioassay studies are performed shall be negative in relation to the pressure in surrounding areas. Exhaust air shall not be discharged to regulated areas, nonregulated areas or the external environment unless decontaminated.

(x) There shall be no connection between regulated areas and any other areas through the ventilation system.

(xi) A current inventory of the carcinogens shall be maintained.

(xii) Ventilated apparatus such as laboratory-type hoods, shall be tested at least semi-annually or immediately after ventilation modification or maintenance operations, by personnel fully qualified to certify correct containment and operation. [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), § 296-62-07306, filed 11/13/80.]

WAC 296-62-07308 General regulated area requirements. (1) Emergencies. In an emergency, immediate measures including, but not limited to, the requirements of WAC 296-62-07308(2)(a),(b),(c),(d) and (e) shall be implemented.

(a) The potentially affected area shall be evacuated as soon as the emergency has been determined.

(b) Hazardous conditions created by the emergency shall be eliminated and the potentially affected area shall be decontaminated prior to the resumption of normal operations.

(c) Special medical surveillance by a physician shall be instituted within twenty-four hours for employees present in the potentially affected area at the time of the emergency. A report of the medical surveillance and any treatment shall be included in the incident report, in accordance with WAC 296-62-07312(2).

(d) Where an employee has a known contact with a listed carcinogen, such employee shall be required to shower as soon as possible, unless contraindicated by physical injuries.

(e) An incident report on the emergency shall be reported as provided in WAC 296-62-07312(2).

(2) Hygiene facilities and practices. (a) Storage or consumption of food, storage or use of containers of beverages, storage or application of cosmetics, smoking, storage of smoking materials, tobacco products or other products for chewing, or the chewing of such products, are prohibited in regulated areas.

(b) Where employees are required by this section to wash, washing facilities shall be provided in accordance with WAC 296-24-12009, of the General Safety and Health Standards.

(c) Where employees are required by this section to shower, shower facilities shall be provided.

(i) One shower shall be provided for each ten employees of each sex, or numerical fraction thereof, who are required to shower during the same shift.

(ii) Body soap or other appropriate cleansing agents convenient to the showers shall be provided as specified in WAC 296-24-12009, of the General Safety and Health Standards.

(iii) Showers shall be provided with hot and cold water feeding a common discharge line.

(iv) Employees who use showers shall be provided with individual clean towels.

(d) Where employees wear protective clothing and equipment, clean change rooms shall be provided and shall be equipped with storage facilities for street clothes and separate storage facilities for the protective clothing for the number of such employees required to change clothes.

(e) Where toilets are in regulated areas, such toilets shall be in a separate room.

(3) Contamination control. (a) Regulated areas, except for outdoor systems, shall be maintained under pressure negative with respect to nonregulated areas. Local exhaust ventilation may be used to satisfy this requirement. Clean makeup air in equal volume shall replace air removed.

(b) Any equipment, material, or other item taken into or removed from a regulated area shall be done so in a manner that does not cause contamination in nonregulated areas or the external environment.

(c) Decontamination procedures shall be established and implemented to remove carcinogens from the surfaces of materials, equipment and the decontamination facility.

(d) Dry sweeping and dry mopping are prohibited. [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), § 296-62-07308, filed 11/13/80.]

WAC 296-62-07310 Signs, information and training. (1) Signs. (a) Entrances to regulated areas shall be posted with signs bearing the legend:

CANCER-SUSPECT AGENT

AUTHORIZED PERSONNEL ONLY

(b) Entrances to regulated areas containing operations covered in WAC 296-62-07306(5) shall be posted with signs bearing the legend:

CANCER-SUSPECT AGENT EXPOSED IN THIS AREA

IMPERVIOUS SUIT INCLUDING GLOVES, BOOTS, AND AIR-SUPPLIED HOOD REQUIRED AT ALL TIMES

AUTHORIZED PERSONNEL ONLY

(c) Appropriate signs and instructions shall be posted at the entrance to, and exit from, regulated areas, informing employees of the procedures that must be followed in entering and leaving a regulated area.

(2) Container contents, identification. (a) Containers of carcinogens named in WAC 296-62-07302 and containers required in WAC 296-62-07306(4)(v) and 296-62-07306(6)(vii)(B) and 296-62-07306(6)(viii)(B) which are accessible only to, and handled only by authorized employees, or by other employees training in accordance with WAC 296-62-07310(5), may have contents identification limited to a generic or proprietary name, or other proprietary identification of the carcinogen and percent.

(b) Containers of carcinogens and containers required under WAC 296-62-07306(4)(v) and 296-62-07306(6)(vii)(B) and 296-62-07306(6)(viii)(B) which are accessible to, or handled by employees other than authorized employees or employees trained in accordance with WAC 296-62-07310(5) shall have contents identification which includes the full chemical name and Chemical Abstracts Service Registry number as listed in WAC 296-62-07302.

(c) Containers shall have the warning words "CANCER-SUSPECT AGENT" displayed immediately under or adjacent to the contents identification.

(d) Containers which have carcinogenic contents with corrosive or irritating properties shall have label statements warning of such hazards, noting, if appropriate, particularly sensitive or affected portions of the body.

(3) Lettering. Lettering on signs and instructions required by WAC 296-62-07310(1) shall be a minimum letter height of two inches. Labels on containers required under this section shall not be less than one-half the size of the largest lettering on the package, and not less than eight point type in any instance: Provided, that no such required lettering need be more than one inch in height.

(4) Prohibited statements. No statements shall appear on or near any required sign, label, or instruction which contradicts or detracts from the effect of any required warning, information or instruction.

(5) Training and indoctrination. (a) Each employee prior to being authorized to enter a regulated area, shall receive a training and indoctrination program including, but not necessarily limited to:

(i) The nature of the carcinogenic hazards of listed carcinogens, including local and systemic toxicity;

(ii) The specific nature of the operation involving carcinogens which could result in exposure;

(iii) The purpose for and application of the medical surveillance program, including, as appropriate, methods of self-examination;

(iv) The purpose for and application of decontamination practices and purposes;

(v) The purpose for and significance of emergency practices and procedures;

(vi) The employee's specific role in emergency procedures;

(vii) Specific information to aid the employee in recognition and evaluation of conditions and situations which may result in the release of listed carcinogens;

(viii) The purpose for an application of specific first-aid procedures and practices.

(b) A review of this section at the employee's first training and indoctrination program and annually thereafter.

(c) Specific emergency procedures shall be prescribed, and posted, and employees, shall be familiarized with their terms, and rehearsed in their application.

(d) All materials relating to the program shall be provided upon request to the director. [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), § 296-62-07310, filed 11/13/80.]

WAC 296-62-07312 Reports. (1) Operations. Not later than October 30, 1974, the information required in WAC 296-62-07312(1),(2),(3) and (4) of this section shall be reported in writing to the Industrial Hygiene Section, Division of Industrial Safety and Health. Any changes in such information shall be similarly reported in writing within 15 calendar days of such change.

(a) A brief description and inplant location of the area(s) regulated and the address of each regulated area;

(b) The name(s) and other identifying information as to the presence of listed carcinogens in each regulated area;

(c) The number of employees in each regulated area, during normal operations including maintenance activities; and

(d) The manner in which a carcinogen is present in each regulated area; e.g., whether it is manufactured, processed, used, repackaged, released, stored, or otherwise handled.

(2) Incidents. Incidents which result in the release of a listed carcinogen into any area where employees may be potentially exposed shall be reported in accordance with WAC 296-62-07312.

(a) A report of the occurrence of the incident and the facts obtainable at that time including a report on any

medical treatment of affected employees shall be made within 24 hours to the Industrial Hygiene Section, Division of Industrial Safety and Health.

(b) A written report shall be filed with the Industrial Hygiene Section, Division of Industrial Safety and Health, within 15 calendar days thereafter and shall include:

(i) A specification of the amount of material released, the amount of time involved, and an explanation of the procedure used in determining this figure;

(ii) A description of the area involved, and the extent of known and possible employee exposure and area contamination;

(iii) A report of any medical treatment of affected employees, and any medical surveillance program implemented; and

(iv) An analysis of the circumstances of the incident, and measures taken or to be taken, with specific completion dates, to avoid further similar releases. [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), § 296-62-07312, filed 11/13/80.]

WAC 296-62-07314 Medical surveillance. (1) At no cost to the employee, a program of medical surveillance shall be established and implemented for employees considered for assignment to enter regulated areas, and for authorized employees.

(2) Examinations. (a) Before an employee is assigned to enter a regulated area, a preassignment physical examination by a physician shall be provided. The examination shall include the personal history of the employee, family and occupation background, including genetic and environmental factors.

(b) Authorized employees shall be provided periodic physical examination, not less often than annually, following the preassignment examination.

(c) In all physical examinations, the examining physician shall be requested to consider whether there exist conditions of increased risk, including reduced immunological competence, those undergoing treatment with steroids or cytotoxic agents, pregnancy and cigarette smoking.

(3) Records. (a) Employers of employees examined pursuant to this subdivision shall cause to be maintained complete and accurate records of all such medical examinations. Records shall be maintained for the duration of the employee's employment. Upon termination of the employee's employment, including retirement or death, or in the event that the employer ceases business without a successor, records, or notarized true copies thereof, shall be forwarded by registered mail to the director.

(b) Records required by this section shall be provided upon request to the director; and upon request of an employee or former employee, to a physician designated by the employee or to a new employer.

(c) Any employer who requests a physical examination of one of his employees or prospective employees as required by this section shall obtain from the physician a statement of the employee's suitability for employment in the specific exposure. [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), § 296-62-07314, filed 11/13/80.]

WAC 296-62-07316 Premixed solutions. (1) Where 4,4'—Methylene bis (2—chloroaniline) is present only in a single solution at a temperature not exceeding 220°F. the establishment of a regulated area is not required; however,

(a) Only authorized employees shall be permitted to handle such materials.

(b) Each day employees shall be provided with and required to wear a clean change of protective clothing (smocks, coveralls, or long-sleeved shirts and pants), gloves and other protective garments and equipment necessary to prevent contact with the solution in the process used.

(c) Employees shall be required to remove and leave protective clothing and equipment when leaving the work area at the end of the work day, or at any time solution is spilled on such clothing or equipment. Used clothing and equipment shall be placed in impervious containers for purposes of decontamination or disposal. The contents of such impervious containers shall be identified, as required under WAC 296-62-07310(2), (3) and (4).

(d) Employees shall be required to wash hands and face after removing such clothing and equipment and before engaging in other activities.

(e) Employees assigned to work covered by this section shall be deemed to be working in regulated areas for the purposes of WAC 296-62-07308(1),(2)(a) and (b), and (3)(c) and (d), WAC 296-62-07310, 296-62-07312 and 296-62-07314.

(f) Work areas where solution may be spilled shall be:

(i) Covered daily or after any spill with a clean covering; or

(ii) Clean thoroughly, daily and after any spill. [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), § 296-62-07316, filed 11/13/80.]

WAC 296-62-07329 Vinyl chloride. (1) Scope and Application.

(a) This section includes requirements for the control of employee exposure to vinyl chloride (chloroethene), Chemical Abstracts Service Registry No. 75014.

(b) This section applies to the manufacture, reaction, packaging, repackaging, storage, handling or use of vinyl chloride or polyvinyl chloride, but does not apply to the handling or use of fabricated products made of polyvinyl chloride.

(c) This section applies to the transportation of vinyl chloride or polyvinyl chloride except to the extent that the Department of Transportation may regulate the hazards covered by this section.

(2) Definitions.

(a) "Action level" means a concentration of vinyl chloride of 0.5 ppm averaged over an 8-hour work day.

(b) "Authorized person" means any person specifically authorized by the employer whose duties require him to enter a regulated area or any person entering such an area as a designated representative of employees for the purpose of exercising an opportunity to observe monitoring and measuring procedures.

(c) "Director" means Chief, Industrial Hygiene Section, Department of Labor and Industries.

(d) "Emergency" means any occurrence such as, but not limited to, equipment failure, or operation of a relief device which is likely to, or does, result in massive release of vinyl chloride.

(e) "Fabricated product" means a product made wholly or partly from polyvinyl chloride, and which does not require further processing at temperatures, and for times, sufficient to cause mass melting of the polyvinyl chloride resulting in the release of vinyl chloride.

(f) "Hazardous operation" means any operation, procedure, or activity where a release of either vinyl chloride liquid or gas might be expected as a consequence of the operation or because of an accident in the operation, which would result in an employee exposure in excess of the permissible exposure limit.

(g) "Polyvinyl chloride" means polyvinyl chloride homopolymer or copolymer before such is converted to a fabricated product.

(h) "Vinyl chloride" means vinyl chloride monomer.

(3) Permissible exposure limit.

(a) No employee may be exposed to vinyl chloride at concentrations greater than 1 ppm averaged over any 8-hour period, and

(b) No employee may be exposed to vinyl chloride at concentrations greater than 5 ppm averaged over any period not exceeding 15 minutes.

(c) No employee may be exposed to vinyl chloride by direct contact with liquid vinyl chloride.

(4) Monitoring

(a) A program of initial monitoring and measurement shall be undertaken in each establishment to determine if there is any employee exposed, without regard to the use of respirators, in excess of the action level.

(b) Where a determination conducted under paragraph (4)(a) of this section shows any employee exposures without regard to the use of respirators, in excess of the action level, a program for determining exposures for each such employee shall be established. Such a program:

(i) Shall be repeated at least monthly where any employee is exposed, without regard to the use of respirators, in excess of the permissible exposure limit.

(ii) Shall be repeated not less than quarterly where any employee is exposed, without regard to the use of respirators, in excess of the action level.

(iii) May be discontinued for any employee only when at least two consecutive monitoring determinations, made not less than 5 working days apart, show exposures for that employee at or below the action level.

(c) Whenever there has been a production, process or control change which may result in an increase in the release of vinyl chloride, or the employer has any other reason to suspect that any employee may be exposed in excess of the action level, a determination of employee exposure under subsection (4)(a) of this section shall be performed

(d) The method of monitoring and measurement shall have an accuracy (with a confidence level of 95 percent) of not less than plus or minus 50 percent from 0.25 through 0.5 ppm, plus or minus 35 percent from over 0.5 ppm through 1.0 ppm, plus or minus 25 percent over 1.0 ppm, (methods meeting these accuracy requirements are available from the director).

(e) Employees or their designated representatives shall be afforded reasonable opportunity to observe the monitoring and measuring required by this subdivision.

(5) Regulated Area.

(a) A regulated area shall be established where:

(i) Vinyl chloride or polyvinyl chloride is manufactured, reacted, repackaged, stored, handled or used; and

(ii) Vinyl chloride concentrations are in excess of the permissible exposure limit.

(b) Access to regulated areas shall be limited to authorized persons. A daily roster shall be made of authorized persons who enter.

(6) Methods of Compliance. Employee exposures to vinyl chloride shall be controlled to at or below the permissible exposure limit provided in subsection (3) of this section by engineering, work practice, and personal protective controls as follows:

(a) Feasible engineering and work practice controls shall immediately be used to reduce exposures to at or below the permissible exposure limit.

(b) Wherever feasible engineering and work practice controls which can be instituted immediately are not sufficient to reduce exposures to at or below the permissible exposure limit, they shall nonetheless be used to reduce exposures to the lowest practicable level, and shall be supplemented by respiratory protection in accordance with subsection (6) of this section. A program shall be established and implemented to reduce exposures to at or below the permissible exposure limit, or to the greatest extent feasible, solely by means of engineering and work practice controls, as soon as feasible.

(c) Written plans for such a program shall be developed and furnished upon request for examination and copying to the director. Such plans shall be updated at least every six months.

(7) Respiratory Protection. Where respiratory protection is required under this section:

(a) The employer shall provide a respirator which meets the requirements of this subdivision and shall assure that the employee uses such respirator, except that until December 31, 1975, wearing of respirators shall be at the discretion of each employee for exposures not in excess of 25 ppm, measured over any 15-minute period. Until December 31, 1975, each employee who chooses not to wear an appropriate respirator shall be informed at least quarterly of the hazards of vinyl chloride and the purpose, proper use, and limitations of respiratory devices.

(b) Respirators shall be selected from among those jointly approved by the Mining Enforcement and Safety Administration, Department of the Interior, and the

National Institute for Occupational Safety and Health under the provisions of 30 CFR Part 11.

(c) A respiratory protection program meeting the requirements of chapter 296-24 WAC shall be established and maintained.

(d) Selection of respirators for vinyl chloride shall be as follows:

Atmospheric concentration of Vinyl Chloride	Required Apparatus
(i) Unknown, or above 3,600 ppm	Open-circuit, self-contained breathing apparatus, pressure demand type, with full facepiece.
(ii) Not over 3,600 ppm	(A) Combination type C supplied air respirator, pressure demand type, with full or half facepiece, and auxiliary self-contained air supply; or (B) Combination type C, supplied air respirator continuous flow type, with full or half facepiece, and auxiliary self-contained air supply.
(iii) Not over 1,000 ppm	Type C, supplied air respirator, continuous flow type, with full or half facepiece, helmet or hood.
(iv) Not over 100 ppm	(A) Combination type C supplied air respirator demand type, with full facepiece, and auxiliary self-contained air supply; or (B) Open-circuit self-contained breathing apparatus with full facepiece, in demand mode; or (C) Type C supplied air respirator, demand type, with full facepiece.
(v) Not over 25 ppm	(A) A powered air-purifying respirator with hood, helmet, full or half facepiece, and a canister which provides a service life of at least 4 hours for concentrations of vinyl chloride up to 25 ppm, or (B) Gas mask, front or back-mounted canister which provides a service life of at least 4=p hours for concentrations of vinyl chloride up to 25 ppm.
(vi) Not over 10 ppm	(A) Combination type C supplied-air respirator, demand type, with half facepiece, and auxiliary self-contained air supply; or (B) Type C supplied-air respirator, demand type, with half facepiece; or (C) Any chemical cartridge respirator with an organic vapor cartridge which provides a service life of at least 1 hour for concentrations of vinyl chloride up to 10 ppm.

(e)(i) Entry into unknown concentrations or concentrations greater than 36,000 ppm (lower explosive limit) may be made only for purposes of life rescue; and

(ii) Entry into concentrations of less than 36,000 ppm, but greater than 3,600 ppm may be made only for purposes of life rescue, firefighting, or securing equipment so as to prevent a greater hazard from release of vinyl chloride.

(f) Where air-purifying respirators are used:

(i) Air-purifying cannisters or cartridges shall be replaced prior to the expiration of their service life or the end of the shift in which they are first used, whichever occurs first, and

(ii) A continuous monitoring and alarm system shall be provided where concentrations of vinyl chloride could reasonably exceed the allowable concentrations for the devices in use. Such system shall be used to alert employees when vinyl chloride concentrations exceed the allowable concentrations for the devices in use.

(g) Apparatus prescribed for higher concentrations may be used for any lower concentration.

(8) Hazardous Operations. (a) Employees engaged in hazardous operations, including entry of vessels to clean polyvinyl chloride residue from vessel walls, shall be provided and required to wear and use;

(i) Respiratory protection in accordance with subsections (3) and (6) of this section; and

(ii) Protective garments to prevent skin contact with liquid vinyl chloride or with polyvinyl chloride residue from vessel walls. The protective garments shall be selected for the operation and its possible exposure conditions.

(b) Protective garments shall be provided clean and dry for each use.

(i) Emergency situations. A written operational plan for emergency situations shall be developed for each facility storing, handling, or otherwise using vinyl chloride as a liquid or compressed gas. Appropriate portions of the plan shall be implemented in the event of an emergency. The plan shall specifically provide that:

(A) Employees engaged in hazardous operations or correcting situations of existing hazardous releases shall be equipped as required in subsection (8) of this section;

(B) Other employees not so equipped shall evacuate the area and not return until conditions are controlled by the methods required in subsection (6) of this section and the emergency is abated.

(9) Training. Each employee engaged in vinyl chloride or polyvinyl chloride operations shall be provided training in a program relating to the hazards of vinyl chloride and precautions for its safe use.

(a) The program shall include:

(i) The nature of the health hazard from chronic exposure to vinyl chloride including specifically the carcinogenic hazard;

(ii) The specific nature of operations which could result in exposure to vinyl chloride in excess of the permissible limit and necessary protective steps;

(iii) The purpose for, proper use, and limitations of respiratory protective devices;

(iv) The fire hazard and acute toxicity of vinyl chloride, and the necessary protective steps;

(v) The purpose for and a description of the monitoring program;

(vi) The purpose for and a description of, the medical surveillance program;

(vii) Emergency procedures:

(A) Specific information to aid the employee in recognition of conditions which may result in the release of vinyl chloride; and

(B) A review of this standard at the employee's first training and indoctrination program, and annually thereafter.

(b) All materials relating to the program shall be provided upon request to the director.

(10) Medical Surveillance. A program of medical surveillance shall be instituted for each employee exposed, without regard to the use of respirators, to vinyl chloride in excess of the action level. The program shall provide each such employee with an opportunity for examinations and tests in accordance with this subsection. All medical examinations and procedures shall be performed by or under the supervision of a licensed physician and shall be provided without cost to the employee.

(a) At the time of initial assignment, or upon institution of medical surveillance;

(i) A general physical examination shall be performed with specific attention to detecting enlargement of liver, spleen or kidneys, or dysfunction in these organs, and for abnormalities in skin, connective tissues and the pulmonary system (See Appendix A).

(ii) A medical history shall be taken, including the following topics:

(A) Alcohol intake,

(B) Past history of hepatitis,

(C) Work history and past exposure to potential hepatotoxic agents, including drugs and chemicals,

(D) Past history of blood transfusions, and

(E) Past history of hospitalizations.

(iii) A serum specimen shall be obtained and determinations made of:

(A) Total bilirubin,

(B) Alkaline phosphatase,

(C) Serum glutamic oxalacetic transaminase (SGOT),

(D) Serum glutamic pyruvic transaminase (SGPT), and

(E) Gamma glustamyl transpeptidase.

(b) Examinations provided in accordance with this subdivision shall be performed at least:

(i) Every 6 months for each employee who has been employed in vinyl chloride or polyvinyl chloride manufacturing for 10 years or longer; and

(ii) Annually for all other employees.

(c) Each employee exposed to an emergency shall be afforded appropriate medical surveillance.

(d) A statement of each employee's suitability for continued exposure to vinyl chloride including use of protective equipment and respirators, shall be obtained from the examining physician promptly after any examination. A copy of the physician's statement shall be provided each employee.

(e) If any employee's health would be materially impaired by continued exposure, such employee shall be withdrawn from possible contact with vinyl chloride.

(f) Laboratory analyses for all biological specimens included in medical examinations shall be performed in laboratories licensed under 42 CFR Part 74.

(g) If the examining physician determines that alternative medical examinations to those required by subsection (10)(a) of this section will provide at least equal assurance of detecting medical conditions pertinent to the exposure to vinyl chloride, the employer may accept such alternative examinations as meeting the requirements of subsection (10)(a) of this section, if the employer obtains a statement from the examining physician setting forth the alternative examinations and the rationale for substitution. This statement shall be available upon request for examination and copying to authorized representatives of the director.

(11) Signs and Labels.

(a) Entrances to regulated areas shall be posted with legible signs bearing the legend:

CANCER-SUSPECT AGENT AREA
AUTHORIZED PERSONNEL ONLY

(b) Areas containing hazardous operations or where an emergency currently exists shall be posted with legible signs bearing the legend:

CANCER–SUSPECT AGENT IN THIS AREA
PROTECTIVE EQUIPMENT REQUIRED
AUTHORIZED PERSONNEL ONLY

(c) Containers of polyvinyl chloride resin waste from reactors or other waste contaminated with vinyl chloride shall be legibly labeled:

CONTAMINATED WITH VINYL CHLORIDE
CANCER–SUSPECT AGENT

(d) Containers of polyvinyl chloride shall be legibly labeled:

POLYVINYL CHLORIDE (OR TRADE NAME)
CONTAINS VINYL
CHLORIDE VINYL CHLORIDE IS A CANCER–
SUSPECT AGENT

(e) Containers of vinyl chloride shall be legibly labeled either:

VINYL CHLORIDE EXTREMELY FLAMMABLE
GAS UNDER PRESSURE CANCER–SUSPECT
AGENT (or)

(f) In accordance with 49 CFR Part 173, Subpart H, with the additional legends:

CANCER–SUSPECT AGENT

applied near the label or placard.

(g) No statement shall appear on or near any required sign, label or instruction which contradicts or detracts from the effect of any required warning, information or instruction.

(12) Records. (a) All records maintained in accordance with this section shall include the name and social security number of each employee where relevant.

(b) Records of required monitoring and measuring, medical records and authorized personnel rosters, shall be made and shall be available upon request for examination and copying to the director.

(i) Monitoring and measuring records shall:

(A) State the date of such monitoring and measuring and the concentrations determined and identify the instruments and methods used;

(B) Include any additional information necessary to determine individual employee exposures where such exposures are determined by means other than individual monitoring of employees; and

(C) Be maintained for not less than 30 years.

(ii) Authorized personnel rosters shall be maintained for not less than 30 years.

(iii) Medical records shall be maintained for the duration of the employment of each employee plus 20 years, or 30 years, whichever is longer.

(c) In the event that the employer ceases to do business and there is no successor to receive and retain his records for the prescribed period, these records shall be transmitted by registered mail to the director, and each employee individually notified in writing of this transfer.

(d) Employees or their designated representatives shall be provided access to examine and copy records of required monitoring and measuring.

(e) Former employees shall be provided access to examine and copy required monitoring and measuring records reflecting their own exposures.

(f) Upon written request of any employee, a copy of the medical record of that employee shall be furnished to any physician designated by the employee.

(13) Reports. (a) Not later than 1 month after the establishment of a regulated area, the following information shall be reported to the director. Any changes to such information shall be reported within 15 days.

(i) The address and location of each establishment which has one or more regulated areas; and

(ii) The number of employees in each regulated area during normal operations, including maintenance.

(b) Emergencies and the facts obtainable at that time, shall be reported within 24 hours to the director. Upon request of the director, the employer shall submit additional information in writing relevant to the nature and extent of employee exposures and measures taken to prevent future emergencies of similar nature.

(c) Within 10 working days following any monitoring and measuring which discloses that any employee has been exposed, without regard to the use of respirators, in excess of the permissible exposure limit, each such employee shall be notified in writing of the results of the exposure measurement and the steps being taken to reduce the exposure to within the permissible exposure limit.

(i) Effective January 1, 1975, the provisions set forth in WAC 296–62–07329 shall apply.

APPENDIX A SUPPLEMENTARY MEDICAL INFORMATION

When required tests under paragraph (10)(a) of this section show abnormalities, the tests should be repeated as soon as practicable, preferably within 3 to 4 weeks. If tests remain abnormal, consideration should be given to withdrawal of the employee from contact with vinyl chloride, while a more comprehensive examination is made.

Additional tests which may be useful:

(A) For kidney dysfunction: urine examination for albumin, red blood cells, and exfoliative abnormal cells.

(B) Pulmonary system: forced vital capacity, forced expiratory volume at 1 second, and chest roentgenogram (posterior–anterior, 14 x 17 inches).

(C) Additional serum tests: lactic acid dehydrogenase, lactic acid dehydrogenase isoenzyme, protein determination, and protein electrophoresis.

(D) For a more comprehensive examination on repeated abnormal serum tests: hepatitis B antigen, and liver scanning. [Order 75–41, § 296–62–07329, filed 12/19/75.]

WAC 296-62-07341 Acrylonitrile. (1) Scope and application.

(a) This section applies to all occupational exposure to acrylonitrile (AN), Chemical Abstracts Service Registry

No. 000107131, except as provided in subsection (1)(b) and (c) of this section.

(b) This section does not apply to exposures which result solely from the processing, use, and handling of the following materials:

(i) ABS resins, SAN resins, nitrile barrier resins, solid nitrile elastomers, and acrylic and modacrylic fibers, when these listed materials are in the form of finished polymers, and products fabricated from such finished polymers;

(ii) Materials made from and/or containing AN for which objective data is reasonably relied upon to demonstrate that the material is not capable of releasing AN in airborne concentrations in excess of 1 ppm as an eight-hour time-weighted average, under the expected conditions of processing, use, and handling which will cause the greatest possible release; and

(iii) Solid materials made from and/or containing AN which will not be heated above 170° F during handling, use, or processing.

(c) An employer relying upon exemption under (1)(b)(ii) shall maintain records of the objective data supporting that exemption, and of the basis of the employer's reliance on the data as provided in subsection (17) of this section.

(2) Definitions, as applicable to this section:

(a) "Acrylonitrile" or "AN" - acrylonitrile monomer, chemical formula CH2=CHCN.

(b) "Action level" - a concentration of AN of 1 ppm as an eight-hour time-weighted average.

(c) "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 procedures under subsection (18) of this section.

(d) "Director" - the Director of Labor and Industries, or his authorized representative.

(e) "Emergency" - any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment, which is likely to, or does, result in unexpected exposure to AN in excess of the ceiling limit.

(f) "Polyacrylonitrile" or "PAN" - polyacrylonitrile homopolymers or copolymers, except for materials as exempted under subsection (1)(b) of this section.

(3) Permissible exposure limits. (a) Inhalation. (i) Time-weighted average limit (TWA). The employer shall assure that no employee is exposed to an airborne concentration of acrylonitrile in excess of two parts acrylonitrile per million parts of air (2 ppm), as an eight-hour time-weighted average.

(ii) Ceiling limit. The employer shall assure that no employee is exposed to an airborne concentration of acrylonitrile in excess of (10) ppm as averaged over any fifteen-minute period during the working day.

(b) Dermal and eye exposure. The employer shall assure that no employee is exposed to skin contact or eye contact with liquid AN or PAN.

(4) Notification of use and emergencies. (a) Use. Within ten days of the effective date of this standard, or within fifteen days following the introduction of AN into the workplace, every employer shall report, unless he has done so pursuant to the emergency temporary standard, the following information to the director for each such workplace:

(i) The address and location of each workplace in which AN is present;

(ii) A brief description of each process of operation which may result in employee exposure to AN;

(iii) The number of employees engaged in each process or operation who may be exposed to AN and an estimate of the frequency and degree of exposure that occurs; and

(iv) A brief description of the employer's safety and health program as it relates to limitation of employee exposure to AN. Whenever there has been a significant change in the information required by this subsection, the employer shall promptly amend such information previously provided to the director.

(b) Emergencies and remedial action. Emergencies, and the facts obtainable at that time, shall be reported within 24 hours of the initial occurrence to the director. Upon request of the director, the employer shall submit additional information in writing relevant to the nature and extent of employee exposures and measures taken to prevent future emergencies of a similar nature.

(5) Exposure monitoring. (a) General. (i) Determinations of airborne exposure levels shall be made from air samples that are representative of each employee's exposure to AN over an eight-hour period.

(ii) For the purposes of this section, employee exposure is that which would occur if the employee were not using a respirator.

(b) Initial monitoring. Each employer who has a place of employment in which AN is present shall monitor each such workplace and work operation to accurately determine the airborne concentrations of AN to which employees may be exposed. Such monitoring may be done on a representative basis, provided that the employer can demonstrate that the determinations are representative of employee exposures.

(c) Frequency. (i) If the monitoring required by this section reveals employee exposure to be below the action level, the employer may discontinue monitoring for that employee.

(ii) If the monitoring required by this section reveals employee exposure to be at or above the action level but below the permissible exposure limits, the employer shall repeat such monitoring for each such employee at least quarterly.

(iii) If the monitoring required by this section reveals employee exposure to be in excess of the permissible exposure limits, the employer shall repeat these determinations for each such employee at least monthly. The employer shall continue these monthly measurements until at least two consecutive measurements, taken at least seven days apart, are below the permissible exposure limits, and thereafter the employer shall monitor at least quarterly.

(d) Additional monitoring. Whenever there has been a production, process, control or personnel change which may result in new or additional exposure to AN, or whenever the employer has any other reason to suspect a change which may result in new or additional exposures to AN, additional monitoring which complies with this subsection shall be conducted.

(e) Employee notification. (i) Within five working days after the receipt of monitoring results, the employer shall notify each employee in writing of the results which represent that employee's exposure.

(ii) Whenever the results indicate that the representative employee exposure exceeds the permissible exposure limits, the employer shall include in the written notice a statement that the permissible exposure limits were exceeded and a description of the corrective action being taken to reduce exposure to or below the permissible exposure limits.

(f) Accuracy of measurement. The method of measurement of employee exposures shall be accurate, to a confidence level of 95 percent, to within plus or minus 25 percent for concentrations of AN at or above the permissible exposure limits, and plus or minus 35 percent for concentrations of AN between the action level and the permissible exposure limits.

(g) Weekly survey of operations involving liquid AN. In addition to monitoring of employee exposures to AN as otherwise required by this subsection, the employer shall survey areas of operations involving liquid AN at least weekly to detect points where AN liquid or vapor are being released into the workplace. The survey shall employ an infra-red gas analyzer calibrated for AN, a multipoint gas chromatographic monitor, or comparable system for detection of AN. A listing of levels detected and areas of AN release, as determined from the survey, shall be posted prominently in the workplace, and shall remain posted until the next survey is completed.

(6) Regulated areas. (a) The employer shall establish regulated areas where AN concentrations are in excess of the permissible exposure limits.

(b) Regulated areas shall be demarcated and segregated from the rest of the workplace, in any manner that minimizes the number of persons who will be exposed to AN.

(c) Access to regulated areas shall be limited to authorized persons or to persons otherwise authorized by the act or regulations issued pursuant thereto.

(d) 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 subsections (13)(a)-(13)(c) of this section.

(7) Methods of compliance. (a) Engineering and work practice controls. (i) The employer shall institute engineering or work practice controls to reduce and maintain employee exposures to AN, to or below the permissible exposure limits, except to the extent that the employer establishes that such controls are not feasible.

(ii) Wherever the engineering and work practice controls which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limits, the employer shall nonetheless use them to reduce exposures to the lowest levels achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of subsection (8) of this section.

(b) Compliance program. (i) The employer shall establish and implement a written program to reduce employee exposures to or below the permissible exposure limits solely by means of engineering and work practice controls, as required by subsection (7)(a) of this section.

(ii) Written plans for these compliance programs shall include at least the following:

(A) A description of each operation or process resulting in employee exposure to AN above the permissible exposure limits;

(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 limits;

(D) A detailed schedule for the implementation of engineering or work practice controls; and

(E) Other relevant information.

(iii) Written plans for such a program shall be submitted upon request to the director, and shall be available at the worksite for examination and copying by the director, or any affected employee or representative.

(iv) The plans required by this subsection shall be revised and updated at least every six months to reflect the current status of the program.

(8) Respiratory protection. (a) General. The employer shall assure that respirators are used where required pursuant to this section to reduce employee exposure to within the permissible exposure limits and in emergencies. Compliance with the permissible exposure limits 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 activities in which the employer establishes that engineering and work practice controls are 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 limits; or

(iv) In emergencies.

(b) Respirator selection. (i) Where respiratory protection is required under this section, the employer shall select and provide at no cost to the employee, the appropriate type of respirator from Table I and shall assure that the employee wears the respirator provided.

TABLE I

RESPIRATORY PROTECTION FOR ACRYLONITRILE (AN)

Concentration of AN or Condition of Use	Respirator Type
(a) Less than or equal to 10 x permissible exposure limits.	(1) Any chemical cartridge respirator with organic vapor cartridge(s) and half-mask; or (2) Any supplied air respirator with half-mask.
(b) Less than or equal to 50 x permissible exposure limits.	(1) Any organic vapor gas mask; or (2) Any supplied air respirator with full facepiece; or (3) Any self-contained breathing apparatus with full facepiece.
(c) Less than or equal to 2,000 x permissible exposure limits.	(1) Supplied air respirator in positive pressure mode with full facepiece, helmet, hood, or suit.
(d) Less than or equal to 10,000 x permissible exposure limits.	(1) Supplied air respirator and auxiliary self-contained full facepiece in positive pressure mode; or (2) Open circuit self-contained breathing apparatus with full facepiece in positive pressure mode.
(e) Emergency entry into unknown concentration of fire-fighting.	(1) Any self-contained breathing apparatus with full facepiece in positive pressure mode.
(f) Escape.	(1) Any organic vapor gas mask; or (2) Any self-contained breathing apparatus with full facepiece.

(ii) The employer shall select respirators from those approved for use with AN by the National Institute for Occupational Safety and Health under the provisions of WAC 296-24-081.

(c) Respirator program. (i) The employer shall institute a respiratory protection program in accordance with WAC 296-24-081.

(ii) Where air-purifying respirators (chemical cartridge or canister-type gas mask) are used, the air-purifying canister or cartridge(s) shall be replaced prior to the expiration of their service life or at the beginning of each shift, whichever occurs first. A label shall be attached to the cartridge or canister to indicate the date and time at which it is first installed on the respirator.

(iii) The employer shall allow each employee who uses a filter respirator (cartridge or canister) to change the filter elements whenever an increase in breathing resistance is detected and shall maintain an adequate supply of the filter elements necessary for this purpose.

(iv) Employees who wear respirators shall be allowed to wash their faces and respirator facepieces to prevent potential skin irritation associated with respirator use.

(9) Emergency situations. (a) Written plans. (i) A written plan for emergency situations shall be developed for each workplace where AN is present. Appropriate portions of the plan shall be implemented in the event of an emergency.

(ii) The plan shall specifically provide that employees engaged in correcting emergency conditions shall be equipped as required in subsection (8) of this section until the emergency is abated.

(b) Alerting employees. (i) Alarms. Where there is the possibility of employee exposure to AN in excess of the ceiling limit due to the occurrence of an emergency, a general alarm shall be installed and maintained to promptly alert employees of such occurrences.

(ii) Evacuation. Employees not engaged in correcting the emergency shall be restricted from the area and shall not be permitted to return until the emergency is abated.

(10) Protective clothing and equipment. (a) Provision and use. Where eye or skin contact with liquid AN or PAN may occur, the employer shall provide at no cost to the employee, and assure that employees wear, appropriate protective clothing or other equipment in accordance with WAC 296-24-07501 and 296-24-07801 to protect any area of the body which may come in contact with liquid AN or PAN.

(b) Cleaning and replacement. (i) The employer shall clean, launder, maintain, or replace protective clothing and equipment required by this subsection, as needed to maintain their effectiveness. In addition, the employer shall provide clean protective clothing and equipment at least weekly to each affected employee.

(ii) The employer shall assure that the employee removes all protective clothing and equipment at the completion of a work shift and that an employee whose protective clothing becomes wet with liquid AN or PAN removes that clothing promptly to avoid skin contact with the liquid AN or PAN. Protective clothing shall be removed only in change rooms as required by subsection (14)(a) of this section.

(iii) The employer shall assure that AN- or PAN-contaminated protective clothing and equipment is placed and stored in closable containers which prevent dispersion of the AN or PAN outside the container.

(iv) The employer shall assure that no employee removes AN- or PAN-contaminated protective equipment or clothing from the change room, except for those employees authorized to do so for the purpose of laundering, maintenance, or disposal.

(v) The employer shall inform any person who launders or cleans AN-or PAN-contaminated protective clothing or equipment of the potentially harmful effects of exposure to AN.

(vi) The employer shall assure that containers of contaminated protective clothing and equipment which are to be removed from the workplace for any reason are labeled in accordance with subsection (16)(c)(ii) of this section, and that such labels remain affixed when such containers leave the employer's workplace.

(11) Housekeeping. (a) Surfaces. (i) All surfaces shall be maintained free of accumulations of liquid AN and of PAN.

(ii) Dry sweeping and the use of compressed air for the cleaning of floors and other surfaces where liquid AN and PAN are found is prohibited.

(iii) Where vacuuming methods are selected, either portable units or a permanent system may be used.

(A) If a portable unit is selected, the exhaust shall be attached to the general workplace exhaust ventilation system or collected within the vacuum unit, equipped with high efficiency filters or other appropriate means of contaminant removal, so that AN is not reintroduced into the workplace air; and

(B) Portable vacuum units used to collect AN may not be used for other cleaning purposes and shall be labeled as prescribed by subsection (16)(c)(ii) of this section.

(iv) Cleaning of floors and other contaminated surfaces may not be performed by washing down with a hose, unless a fine spray has first been laid down.

(b) Liquids. Where AN is present in a liquid form, or as a resultant vapor, all containers or vessels containing AN shall be enclosed to the maximum extent feasible and tightly covered when not in use, with adequate provision made to avoid any resulting potential explosion hazard.

(12) Waste disposal. AN and PAN waste, scrap, debris, bags, containers or equipment, shall be disposed of in sealed bags or other closed containers which prevent dispersion of AN outside the container, and labeled as prescribed in subsection (16)(c)(ii) of this section.

(13) Hygiene facilities and practices. Where employees are exposed to airborne concentrations of AN above the permissible exposure limits, or where employees are required to wear protective clothing or equipment pursuant to subsection (11) of this section, or where otherwise found to be appropriate, the facilities required by WAC 296-24-12009 shall be provided by the employer for the use of those employees, and the employer shall assure that the employees use the facilities provided. In addition, the following facilities or requirements are mandated.

(a) Change rooms. The employer shall provide clean change rooms in accordance with WAC 296-24-12011.

(b) Showers. (i) The employer shall provide shower facilities in accordance with WAC 296-24-12009(3).

(ii) In addition, the employer shall also assure that employees exposed to liquid AN and PAN shower at the end of the work shift.

(c) Lunchrooms. (i) Whenever food or beverages are consumed in the workplace, the employer shall provide lunchroom facilities which have a temperature controlled, positive pressure, filtered air supply, and which are readily accessible to employees exposed to AN above the permissible exposure limits.

(ii) In addition, the employer shall also assure that employees exposed to AN above the permissible exposure limits wash their hands and face prior to eating.

(14) Medical surveillance. (a) General. (i) The employer shall institute a program of medical surveillance for each employee who is or will be exposed to AN above the action level. The employer shall provide each such employee with an opportunity for medical examinations and tests in accordance with this subsection.

(ii) The employer shall assure 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.

(b) Initial examinations. At the time of initial assignment, or upon institution of the medical surveillance program, the employer shall provide each affected employee an opportunity for a medical examination, including at least the following elements:

(i) A work history and medical history with special attention to skin, respiratory, and gastrointestinal systems, and those non-specific symptoms, such as headache, nausea, vomiting, dizziness, weakness, or other central nervous system dysfunctions that may be associated with acute or chronic exposure to AN.

(ii) A physical examination giving particular attention to central nervous system, gastrointestinal system, respiratory system, skin and thyroid.

(iii) A 14" x 17" posteroanterior chest x-ray.

(iv) Further tests of the intestinal tract, including fecal occult blood and proctosigmoidoscopy, on all workers 40 years of age or older, and to any other affected employees for whom, in the opinion of the physician, such testing would be appropriate.

(c) Periodic examinations. (i) The employer shall provide examinations specified in this subsection at least annually for all employees specified in subsection (14)(a) of this section.

(ii) If an employee has not had the examinations prescribed in subsection (14)(b) of this section within six months of termination of employment, the employer shall make such examination available to the employee upon such termination.

(d) Additional examinations. If the employee for any reason develops signs or symptoms commonly associated with exposure to AN, the employer shall provide appropriate examination and emergency medical treatment.

(e) Information provided to the physician. The employer shall provide the following information to the examining physician:

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

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

(iii) The employee's representative exposure level;

(iv) The employee's anticipated or estimated exposure level (for preplacement examinations or in cases of exposure due to an emergency);

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

(vi) Information from previous medical examinations of the affected employee, which is not otherwise available to the examining physician.

(f) Physician's written opinion. (i) The employer shall obtain a written opinion from the examining physician which shall include:

(A) The results of the medical tests performed;

(B) The physician's opinion as to whether the employee has any detected medical condition which would place the employee at an increased risk of material impairment of the employee's health from exposure to AN;

(C) Any recommended limitations upon the employee's exposure to AN or upon the use of protective clothing and equipment such as 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 which require further examination or treatment.

(ii) The employer shall instruct the physician not to reveal in the written opinion specific findings or diagnoses unrelated to occupational exposure to AN.

(iii) The employer shall provide a copy of the written opinion to the affected employee.

(15) Employee information and training. (a) Training program. (i) The employer shall institute a training program for all employees where there is occupational exposure to AN and shall assure their participation in the training program.

(ii) The training program shall be provided at the time of initial assignment, or upon institution of the training program, and at least annually thereafter, and the employer shall assure that each employee is informed of the following:

(A) The information contained in Appendices A, B and C*[1];

(B) The quantity, location, manner of use, release or storage of AN and the specific nature of operations which could result in exposure to AN, as well as any necessary protective steps;

(C) The purpose, proper use, and limitations of respirators;

(D) The purpose and a description of the medical surveillance program required by subsection (14) of this section;

(E) The emergency procedures developed, as required by subsection (9) of this section; and

(F) The engineering and work practice controls, their function and the employee's relationship thereto; and

(G) A review of this standard.

(b) Access to training materials. (i) The employer shall make a copy of this standard and its appendices readily available to all affected employees.

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

(16) Signs and labels. (a) General. (i) 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 subsection.

(ii) The employer shall assure that no statement appears on or near any sign or label, required by this subsection, which contradicts or detracts from such effects of the required sign or label.

(b) Signs. (i) The employer shall post signs to clearly indicate all workplaces where AN concentrations exceed the permissible exposure limits. The signs shall bear the following legend:

DANGER
ACRYLONITRILE (AN)
CANCER HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS REQUIRED

(ii) The employer shall assure that signs required by this subsection are illuminated and cleaned as necessary so that the legend is readily visible.

(c) Labels. (i) The employer shall assure that precautionary labels are affixed to all containers of AN, and to containers of PAN and products fabricated from PAN, except for those materials for which objective data is provided as to the conditions specified in subsection (1)(b) of this section. The employer shall assure that the labels remain affixed when the AN or PAN are sold, distributed or otherwise leave the employer's workplace.

(ii) The employer shall assure that the precautionary labels required by this subsection are readily visible and legible. The labels shall bear the following legend:

DANGER
CONTAINS ACRYLONITRILE (AN)
CANCER HAZARD

(17) Recordkeeping. (a) Objective data for exempted operations. (i) Where the processing, use, and handling of products fabricated from PAN are exempted pursuant to subsection (1)(b) of this section, the employer shall establish and maintain an accurate record of objective data reasonably relied upon in support of the exemption.

(ii) This record shall include the following information:

(A) The relevant condition in subsection (1)(b) upon which exemption is based;

(B) The source of the objective data;

(C) The results of testing and analysis of the material being processed;

(D) A description of the operation exempted; and

(E) Other data relevant to the operations, materials, and processing covered by the exemption.

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

(b) Exposure monitoring. (i) The employer shall establish and maintain an accurate record of all monitoring required by subsection (5) of this section.

(ii) This record shall include:

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

(B) A description of the sampling and analytical methods used;

(C) Type of respiratory protective devices worn, if any; and

(D) Name, social security number and job classification of the employee monitored and of all other employees whose exposure the measurement is intended to represent.

(iii) The employer shall maintain this record for at least 40 years or the duration of employment plus 20 years, whichever is longer.

(c) Medical surveillance. (i) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance as required by subsection (14) of this section.

(ii) This record shall include:

(A) A copy of the physicians' written opinions;

(B) Any employee medical complaints related to exposure to AN;

(C) A copy of the information provided to the physician as required by subsection (14)(f) of this section; and

(D) A copy of the employee's work history.

(iii) The employer shall assure that this record be maintained for at least forty years or for the duration of employment plus twenty years, whichever is longer.

(d) Availability. (i) The employer shall assure that all records required to be maintained by this section be made available upon request to the director for examination and copying.

(ii) The employer shall assure that employee exposure measurement records, as required by this section, be made available, upon request, for examination and copying to the affected employee, former employee, or designated representative.

(iii) The employer shall assure that employee medical records required to be maintained by this section, be made available, upon request, for examination and copying, to the affected employee or former employee, or to a physician designated by the affected employee, former employee, or designated representative.

(e) 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 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 pursuant to this section, the employer shall transmit these records to the director.

(18) 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 AN conducted pursuant to subsection (5) of this section.

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

(ii) Without interfering with the monitoring, observers shall be entitled:

(A) To receive an explanation of the measurement procedures;

(B) To observe all steps related to the measurement of airborne concentrations of AN performed at the place of exposure; and

(C) To record the results obtained.

(19) Effective date. This standard will become effective 30 days after it is filed with the Code Reviser.

*(1) Appendices printed in addition to this section, and information contained therein is not intended, by itself, to create any additional obligations not otherwise imposed or to detract from any existing obligations. Appendices are available from:

The Technical Services Section
Division of Industrial Safety and Health
P.O. Box 207
Olympia, WA 98504 (206) 753-6381

[Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17.240. 80-11-010 (Order 80-14), § 296-62-07341, filed 8/8/80. Statutory Authority: RCW 49.17.040, 49-.17.050, 49.17.240, chapters 42.30, and 43.22 RCW. 78-07-052 (Order 78-10), § 296-62-07341, filed 6/28/78.]

WAC 296-62-07345 1,2-Dibromo-3-chloropropane. (1) Scope and Application. This section applies to all occupational exposures to 1,2-dibromo-3-chloropropane (DBCP), Chemical Abstracts Service Registry Number 96-12-8, except that this section does not apply to exposure to DBCP which results solely from the application and use of DBCP as a pesticide.

(2) Definitions applicable to this section:

(a) "Authorized person" - any person specifically authorized by the employer and whose duties require the person to be present in areas where DBCP is present; and any person entering this area as a designated representative of employees exercising an opportunity to observe employee exposure monitoring.

(b) "DBCP" - 1,2-dibromo-3-chloropropane.

(c) "Director" - the Director of Labor and Industries, or his authorized representative.

(3) Permissible Exposure Limits. (a) Inhalation. (i) Time-weighted average limit (TWA). The employer shall assure that no employee is exposed to an airborne concentration in excess of 1 part DBCP per billion part of air (ppb) as an eight-hour time-weighted average.

(ii) Ceiling limit. The employer shall assure that no employee is exposed to an airborne concentration in excess of 50 parts DBCP per billion parts of air (ppb) as averaged over any 15 minutes during the working day.

(b) Dermal and eye exposure. The employer shall assure that no employee is exposed to eye or skin contact with DBCP.

(4) Notification of Use. Within ten days of the effective date of this section or within ten days following the introduction of DBCP into the workplace, every employer who has a workplace where DBCP is present shall report the following information to the director for each such workplace:

(a) The address and location of each workplace in which DBCP is present;

(b) A brief description of each process or operation which may result in employee exposure to DBCP;

(c) The number of employees engaged in each process or operation who may be exposed to DBCP and an estimate of the frequency and degree of exposure that occurs;

(d) A brief description of the employer's safety and health program as it relates to limitation of employee exposure to DBCP.

(5) Exposure Monitoring. (a) General. Determinations of airborne exposure levels shall be made from air samples that are representative of each employee's exposure to DBCP over an eight-hour period. (For the purposes of this section, employee exposure is that exposure which would occur if the employee were not using a respirator.)

(b) Initial. Each employer who has a place of employment in which DBCP is present shall monitor, within thirty days of the effective date of this section, each workplace and work operation to accurately determine the airborne concentrations of DBCP to which employees may be exposed.

(c) Frequency. (i) If the monitoring required by this section reveals employee exposures to be below the permissible exposure limits, the employer shall repeat these determinations at least quarterly.

(ii) If the monitoring required by this section reveals employee exposure to be in excess of the permissible exposure limits, the employer shall repeat these determinations for each such employee at least monthly. The employer shall continue these monthly determinations until at least two consecutive measurements, taken at least seven days apart, are below the permissible exposure limit, thereafter the employer shall monitor at least quarterly.

(d) Additional. Whenever there has been a production process, control or personnel change which may result in any new or additional exposure to DBCP, or whenever the employer has any other reason to suspect a change which may result in new or additional exposure to DBCP, additional monitoring which complies with subsection (5) shall be conducted.

(e) Employee notification. (i) Within five working days after the receipt of monitoring results, the employer shall notify each employee in writing of results which represent the employee's exposure.

(ii) Whenever the results indicate that employee exposure exceeds the permissible exposure limit, the employer shall include in the written notice a statement that the permissible exposure limit was exceeded and a description of the corrective action being taken to reduce exposure to or below the permissible exposure limits.

(f) Accuracy of measurement. The method of measurement shall be accurate, to a confidence level of 95 percent, to within plus or minus 25 percent for concentrations of DBCP at or above the permissible exposure limits.

(6) Methods of Compliance. The employer shall control employee exposures to airborne concentrations of DBCP to within the permissible exposure limit, and shall protect against employee exposure to eye or skin contact with DBCP by engineering controls, work practices and personal protective equipment.

(a) Engineering controls. The employer shall develop and implement, as soon as possible, feasible engineering controls to reduce the airborne concentrations of DBCP to within the permissible exposure limits.

(b) Work practices. The employer shall examine each work area in which DBCP is present and shall institute, as soon as possible, work practices to reduce employee exposure to DBCP. The work practices shall be described in writing and shall include, among other things, the following mandatory work practices:

(i) Limiting access to work areas where DBCP is present to authorized personnel only;

(ii) Prohibiting smoking and the consumption of food and beverages in work areas where DBCP is present; and

(iii) Establishing good maintenance and housekeeping practices including the prompt cleanup of spills, repair of leaks, and the practices required in subsection (9) of this section.

(c) Respiratory protection. Where engineering and work practice controls are not sufficient to reduce employee exposures to airborne concentrations of DBCP to within the permissible exposure limits, the employer shall provide at no cost to the employee, and assure that employees wear respirators in accordance with subsection (7) of this section.

(d) Engineering and work practice control plan. (i) Within ninety days of the effective date of this section, the employer shall develop a written plan describing proposed means to reduce employee exposures to DBCP to the lowest feasible level solely by means of engineering and work practice controls.

(ii) Written plans required under subsection (6)(d) 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 designated representative of employees.

(7) Respirators. (a) Required use. The employer shall assure that respirators are used where required under this section to reduce employee exposure to within the permissible exposure limits, and in emergencies.

(b) Respirator selection. (i) Where respirators are used to reduce employee exposures to within the permissible exposure limit and in emergencies, the employer shall select and provide, at no cost to the employee, the appropriate respirator from Table I and shall assure that the employee wears the respirator provided.

(ii) The employer shall select respirators from among those approved by the National Institute for Occupational Safety and Health (NIOSH) under the provisions of WAC 296-24-081.

TABLE I

RESPIRATORY PROTECTION FOR DBCP

RESPIRATORY PROTECTION

Concentration not greater than:

100 ppb:

Any chemical cartridge respirator with pesticide cartridge(s).

Any supplied–air respirator.

Any self–contained cartridge breathing apparatus.

500 ppb:

A chemical cartridge respirator with full facepiece and pesticide cartridge(s).

A gas mask with full facepiece and pesticide canister.

Any supplied–air respirator with full facepiece, helmet or hood.

Any self–contained breathing apparatus with full facepiece.

5,000 ppb:

A Type C supplied–air respirator operated in pressure–demand or other positive pressure or continuous flow mode.

20,000 ppb:

A Type C supplied–air respirator with full facepiece operated in pressure–demand or other positive pressure mode, or with full facepiece, hood or helmet operated in continuous flow mode.

Greater than 20,000 ppb or entry and escape from unknown concentrations:

A combination respirator which includes a Type C supplied–air respirator with full facepiece operated in pressure–demand or other positive pressure or continuous flow mode and an auxiliary self–contained breathing apparatus operated in pressure–demand or positive pressure mode.

A self–contained breathing apparatus with full facepiece operated in pressure–demand or other positive pressure mode.

Firefighting:

A self–contained breathing apparatus with full facepiece operated in pressure–demand or other positive pressure mode.

(c) Respirator program. (i) The employer shall institute a respiratory protection program in accordance with WAC 296–24–081.

(ii) Where air–purifying respirators (chemical cartridge or gas mask) are used, the air–purifying canister or cartridge(s) shall be replaced prior to the expiration of their service life or the beginning of each shift, whichever occurs first.

(iii) Employees who wear respirators shall be allowed to wash their face and respirator facepiece to prevent potential skin irritation associated with respirator use.

(8) Protective Clothing and Equipment. (a) Provision and use. Where eye or skin contact with liquid or solid DBCP may occur, employers shall provide at no cost to the employee, and assure that employees wear impermeable protective clothing and equipment in accordance with WAC 296–24–07501 and 296–24–07801 to protect the area of the body which may come in contact with DBCP.

(b) Cleaning and replacement. (i) The employer shall clean, launder, maintain, or replace protective clothing and equipment required by this subsection to maintain their effectiveness. In addition, the employer shall provide clean protective clothing and equipment at least daily to each affected employee.

(ii) The employer shall assure that the employee removes all protective clothing and equipment at the completion of a workshift.

(iii) The employer shall assure that DBCP–contaminated protective work clothing and equipment is placed and stored in closed containers which prevent dispersion of DBCP outside the container.

(iv) The employer shall inform any person who launders or cleans DBCP–contaminated protective clothing or equipment of the potentially harmful effects of exposure to DBCP.

(v) The employer shall assure that the containers of contaminated protective clothing and equipment which are to be removed from the workplace for any reason are labeled in accordance with subsection (13)(c) of this section.

(vi) The employer shall prohibit the removal of DBCP from protective clothing and equipment by blowing or shaking.

(9) Housekeeping. (a) Surfaces. (i) All surfaces shall be maintained free of accumulations of DBCP.

(ii) Dry sweeping and the use of air for the cleaning of floors and other surfaces where DBCP dust or liquids are found is prohibited.

(iii) Where vacuuming methods are selected, either portable units or a permanent system may be used.

(A) If a portable unit is selected, the exhaust shall be attached to the general workplace exhaust ventilation system or collected within the vacuum unit, equipped with high efficiency filters or other appropriate means of contaminant removal, so that DBCP is not reintroduced into the workplace air; and

(B) Portable vacuum units used to collect DBCP may not be used for other cleaning purposes and shall be labeled as prescribed by subsection (13)(c) of this section.

(iv) Cleaning of floors and other contaminated surfaces may not be performed by washing down with a hose, unless a fine spray has first been laid down.

(b) Liquids. Where DBCP is present in a liquid form, or as a resultant vapor, all containers or vessels containing DBCP shall be enclosed to the maximum extent feasible and tightly covered when not in use.

(c) Waste disposal. DBCP waste, scrap, debris, bags, containers or equipment, shall be disposed in sealed bags

or other closed containers which prevent dispersion of DBCP outside the container.

(10) Hygiene Facilities and Practices. Hygiene facilities shall be provided and practices implemented in accordance with the requirements of WAC 296-24-12009.

(11) Medical Surveillance. (a) General. The employer shall institute a program of medical surveillance for each employee who is or will be exposed, without regard to the use of respirators, to DBCP. The employer shall provide each such employee with an opportunity for medical examinations and tests in accordance with this subsection. All medical examinations and procedures shall be performed by or under the supervision of a licensed physician, and shall be provided without cost to the employee.

(b) Frequency and content. Within 30 days of the effective date of this section or time of initial assignment, and whenever exposure to DBCP, the employer shall provide a medical examination including at least the following:

(i) A complete medical and occupational history with emphasis on reproductive history.

(ii) A complete physical examination with emphasis on the genito-urinary tract, testicle size, and body habitus including the following tests:

(A) Sperm count;

(B) Complete urinalysis (U/A);

(C) Complete blood count; and

(D) Thyroid profile.

(iii) A serum specimen shall be obtained and the following determinations made:

(A) Serum multiphasic analysis (SMA 12);

(B) Serum testosterone;

(C) Serum follicle stimulating hormone (FSH);

(D) Serum luteinizing hormone (LH).

(c) Information provided to the physician. The employer shall provide the following information to the examining physician:

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

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

(iii) The level of DBCP to which the employee is exposed; and

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

(d) Physician's written opinion. (i) The employer shall obtain a written opinion from the examining physician which shall include:

(A) The results of the medical tests performed;

(B) The physician's opinion as to whether the employee has any detected medical condition which would place the employee at an increased risk of material impairment of health from exposure to DBCP;

(C) Any recommended limitations upon the employee's exposure to DBCP or upon the use of protective clothing and equipment such as respirators; and

(D) A statement that the employee was informed by the physician of the results of the medical examination, and any medical conditions which require further examination or treatment.

(ii) The employer shall instruct the physician not to reveal in the written opinion specific findings or diagnoses unrelated to occupational exposure to DBCP.

(iii) The employer shall provide a copy of the written opinion to the affected employee.

(12) Employee Information and Training. (a) Training program. (i) Within thirty days of the effective date of this standard, the employer shall institute a training program for all employees who may be exposed to DBCP and shall assure their participation in such training program.

(ii) The employer shall assure that each employee is informed of the following:

(A) The information contained in Appendices A, B and C*(1);

(B) The quantity, location, manner of use, release or storage of DBCP and the specific nature of operations which could result in exposure to DBCP as well as any necessary protective steps;

(C) The purpose, proper use, and limitations of respirators;

(D) The purpose and description of the medical surveillance program required by subsection (11) of this section; and

(E) A review of this standard.

(b) Access to training materials. (i) The employer shall make a copy of this standard and its appendices readily available to all affected employees.

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

(13) Signs and Labels. (a) General. (i) 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 subsection.

(ii) The employer shall assure that no statement appears on or near any sign or label required by this subsection which contradicts or detracts from the required sign or label.

(b) Signs. (i) The employer shall post signs to clearly indicate all work areas where DBCP may be present. These signs shall bear the legend:

DANGER

1,2-Dibromo-3-chloropropane

(Insert appropriate trade or common names)

CANCER HAZARD

AUTHORIZED PERSONNEL ONLY

(ii) Where airborne concentrations of DBCP exceed the permissible exposure limits, the signs shall bear the additional legend:

RESPIRATOR REQUIRED

(c) Labels. (i) The employer shall assure that precautionary labels are affixed to all containers of DBCP and of products containing DBCP, and that the labels remain affixed when the DBCP or products containing

DBCP are sold, distributed, or otherwise leave the employer's workplace. Where DBCP or products containing DBCP are sold, distributed or otherwise leave the employer's workplace bearing appropriate labels required by EPA under the regulations in 40 CFR Part 162, the labels required by this subsection need not be affixed.

(ii) The employer shall assure that the precautionary labels required by this subsection are readily visible and legible. The labels shall bear the following legend:

DANGER

1,2–Dibromo–3–chloropropane

CANCER HAZARD

(14) Recordkeeping. (a) Exposure monitoring. (i) The employer shall establish and maintain an accurate record of all monitoring required by subsection (5) of this section.

(ii) This record shall include:

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

(B) A description of the sampling and analytical methods used;

(C) Type of respiratory worn, if any; and

(D) Name, social security number, and job classification of the employee monitored and of all other employees whose exposure the measurement is intended to represent.

(iii) The employer shall maintain this record for the effective period of this standard.

(b) Medical surveillance. (i) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance required by subsection (11) of this section.

(ii) This record shall include:

(A) A copy of the physician's written opinion.

(B) Any employee medical complaints related to exposure to DBCP;

(C) A copy of the information provided the physician as required by subsection (11)(c) of this section; and

(D) A copy of the employee's work history.

(iii) The employer shall assure that this record be maintained for the effective period of this standard.

(c) Availability. (i) The employer shall assure that all records required to be maintained by this section be made available upon request to the director for examination and copying.

(ii) The employer shall assure that employee exposure monitoring records required by this section be made available upon request, for examination and copying to the affected employee or former employee, and their designated representatives.

(iii) The employer shall assure that employee medical records required to be maintained by this section be made available, upon request, for examination and copying to the affected employee or former employee, or to a physician designated by the affected employee or former employee or designated representative.

(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 DBCP conducted under subsection (5) of this section.

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

(ii) Without interfering with the monitoring or measurement, observers shall be entitled to:

(A) Receive an explanation of the measurement procedures;

(B) Observe all steps related to the measurement of airborne concentrations of DBCP performed at the place of exposure; and

(C) Record the results obtained.

(16) Effective Date. This standard will become effective 30 days after it is filed with the Code Reviser.

*(1) Appendices printed in addition to this section, and information contained therein is not intended, by itself, to create any additional obligations not otherwise imposed or to detract from any existing obligations. Appendices are available from:

The Technical Services Section
Division of Industrial Safety and Health
P.O. Box 207
Olympia, WA 98504 (206) 753-6381

[Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17.240. 80–11–010 (Order 80–14), § 296–62–07345, filed 8/8/80. Statutory Authority: RCW 49.17.040, 49-.17.050, and 49.17.240, chapters 42.30, and 43.22 RCW. 78–07–052 (Order 78–10), § 296–62–07345, filed 6/28/78.]

WAC 296–62–07347 Inorganic arsenic. (1) Scope and Application. This section applies to all occupational exposures to inorganic arsenic except that this section does not apply to employee exposures in agriculture or resulting from pesticide application, the treatment of wood with preservatives or the utilization of arsenically preserved wood.

(2) Definitions. (a) "Action level" – a concentration of inorganic arsenic of 5 micrograms per cubic meter of air (5 $\mu g/m^3$) averaged over any eight–hour period.

(b) "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 right to observe monitoring and measuring procedures under subsection (5) of this section.

(c) "Director" – the Director of the Department of Labor and Industries, or his designated representative.

(d) "Inorganic arsenic" – copper aceto–arsenite and all inorganic compounds containing arsenic except arsine, measured as arsenic (As).

(3) Permissible Exposure Limit. The employer shall assure that no employee is exposed to inorganic arsenic at concentrations greater than 10 micrograms per cubic meter of air (10 $\mu g/m^3$), averaged over any eight-hour period.

(4) Notification of Use. (a) By October 1, 1978, or within sixty days after the introduction of inorganic arsenic into the workplace, every employer who is required to establish a regulated area in his workplaces shall report in writing to the Department of Labor and Industries for each such workplace:

(i) The address of each such workplace;

(ii) The approximate number of employees who will be working in regulated areas; and

(iii) A brief summary of the operations creating the exposure and the actions which the employer intends to take to reduce exposures.

(b) Whenever there has been a significant change in the information required by subsection (4)(a) of this section, the employer shall report the changes in writing within sixty days to the Department of Labor and Industries.

(5) Exposure Monitoring. (a) General. (i) Determinations of airborne exposure levels shall be made from air samples that are representative of each employee's exposure to inorganic arsenic over an eight-hour period.

(ii) For the purposes of this section, employee exposure is that exposure which would occur if the employee were not using a respirator.

(iii) The employer shall collect full shift (for at least seven continuous hours) personal samples including at least one sample for each shift for each job classification in each work area.

(b) Initial Monitoring. Each employer who has a workplace or work operation covered by this standard shall monitor each such workplace and work operation to accurately determine the airborne concentration of inorganic arsenic to which employees may be exposed.

(c) Frequency. (i) If the initial monitoring reveals employee exposure to be below the action level the measurements need not be repeated except as otherwise provided in subsection (5)(d) of this section.

(ii) If the initial monitoring, required by this section, or subsequent monitoring reveals employee exposure to be above the permissible exposure limit, the employer shall repeat monitoring at least quarterly.

(iii) If the initial monitoring, required by this section, or subsequent monitoring reveals employee exposure to be above the action level and below the permissible exposure limit the employee shall repeat monitoring at least every six months.

(iv) The employer shall continue monitoring at the required frequency until at least two consecutive measurements, taken at least seven days apart, are below the action level at which time the employer may discontinue monitoring for that employee until such time as any of the events in subsection (5)(d) of this section occur.

(d) Additional monitoring. Whenever there has been a production, process, control or personal change which may result in new or additional exposure to inorganic arsenic, or whenever the employer has any other reason to suspect a change which may result in new or additional exposures to inorganic arsenic, additional monitoring which complies with subsection (5) of this section shall be conducted.

(e) Employee notification. (i) Within five working days after the receipt of monitoring results, the employer shall notify each employee in writing of the results which represent that employee's exposures.

(ii) Whenever the results indicate that the representative employee exposure exceeds the permissible exposure limit, 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 to or below the permissible exposure limit.

(f) Accuracy of measurement. (i) The employer shall use a method of monitoring and measurement which has an accuracy (with a confidence level of 95 percent) of not less than plus or minus 25 percent for concentrations of inorganic arsenic greater than or equal to 10 $\mu g/m^3$.

(ii) The employer shall use a method of monitoring and measurement which has an accuracy (with confidence level of 95 percent) of not less than plus or minus 35 percent for concentrations of inorganic arsenic greater than 5 $\mu g/m^3$ but less than 10 $\mu g/m^3$.

(6) Regulated Area. (a) Establishment. The employer shall establish regulated areas where worker exposures to inorganic arsenic, without regard to the use of respirators, are in excess of the permissible limit.

(b) Demarcation. Regulated areas shall be demarcated and segregated from the rest of the workplace in any manner that minimizes the number of persons who will be exposed to inorganic arsenic.

(c) Access. Access to regulated areas shall be limited to authorized persons or to persons otherwise authorized by the Act or regulations issued pursuant thereto to enter such areas.

(d) Provision of respirators. All persons entering a regulated area shall be supplied with a respirator, selected in accordance with subsection (8)(b) of this section.

(e) Prohibited activities. The employer shall assure that in regulated areas, food or beverages are not consumed, smoking products, chewing tobacco and gum are not used and cosmetics are not applied, except that these activities may be conducted in the lunchrooms, change rooms and showers required under subsection (12) of this section. Drinking water may be consumed in the regulated area.

(7) Methods of Compliance. (a) Controls. (i) The employer shall institute at the earliest possible time but not later than December 31, 1979, engineering and work practice controls 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.

(ii) Where engineering and work practice controls are not sufficient to reduce exposures to or below the permissible exposure limit, they shall nonetheless be used to reduce exposures to the lowest levels achievable by these

controls and shall be supplemented by the use of respirators in accordance with subsection (8) of this section and other necessary personal protective equipment. Employee rotation is not required as a control strategy before respiratory protection is instituted.

(b) Compliance program. (i) The employer shall establish and implement a written program to reduce exposures to or below the permissible exposure limit by means of engineering and work practice controls.

(ii) Written plans for these compliance programs shall include at least the following:

(A) A description of each operation in which inorganic arsenic is emitted; e.g., machinery used, material processed, controls in place, crew size, operating procedures and maintenance practices;

(B) Engineering plans and studies used to determine methods selected for controlling exposure to inorganic arsenic;

(C) A report of the technology considered in meeting the permissible exposure limit;

(D) Monitoring data;

(E) A detailed schedule for implementation of the engineering controls and work practices that cannot be implemented immediately and for the adaption and implementation of any additional engineering and work practices necessary to meet the permissible exposure limit;

(F) Whenever the employer will not achieve the permissible exposure limit with engineering controls and work practices by December 31, 1979, the employer shall include in the compliance plan an analysis of the effectiveness of the various controls, shall install engineering controls and institute work practices on the quickest schedule feasible, and shall include in the compliance plan and implement a program to minimize the discomfort and maximize the effectiveness of respirator use; and

(G) Other relevant information.

(iii) Written plans for such a program shall be submitted upon request to the Director, and shall be available at the worksite for examination and copying by the Director, any affected employee or authorized employee representatives.

(iv) The plans required by this subsection shall be revised and updated at least every six months to reflect the current status of the program.

(8) Respiratory Protection. (a) General. The employer shall assure that respirators are used where required under this section to reduce employee exposures to below the permissible exposure limit and in emergencies. Respirators shall be used in the following circumstances:

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

(ii) In work operations such as maintenance and repair activities in which the employer establishes that engineering and work practice controls are not feasible;

(iii) In work situations in which engineering controls and supplemental work practice controls are not yet sufficient to reduce exposures to or below the permissible exposure limit; or

(iv) In emergencies.

(b) Respirator selection. (i) Where respirators are required under this section the employer shall select, provide at no cost to the employee and assure the use of the appropriate respirator or combination of respirators from Table I for inorganic arsenic compounds without significant vapor pressure, or Table II for inorganic arsenic compounds which have significant vapor pressure.

(ii) Where employee exposures exceed the permissible exposure limit for inorganic arsenic and also exceed the relevant limit for particular gasses such as sulfur dioxide, any air purifying respirator supplied to the employee as permitted by this standard must have a combination high efficiency filter with an appropriate gas sorbent. (See footnote in Table I)

TABLE I

RESPIRATORY PROTECTION FOR INORGANIC ARSENIC PARTICULATE EXCEPT FOR THOSE WITH SIGNIFICANT VAPOR PRESSURE

Concentration of Inorganic Arsenic (as As) or Condition of Use.	Required Respirator
(i) Unknown or greater or lesser than 20,000 $\mu g/m^3$ (20 mg/m^3) or firefighting.	(A) Any full facepiece self-contained breathing apparatus operated in positive pressure mode.
(ii) Not greater than 20,000 $\mu g/m^3$ (20 mg/m^3)	(A) Supplied air respirator with full facepiece, hood, or helmet or suit and operated in positive pressure mode.
(iii) Not greater than 10,000 $\mu g/m^3$ (10 mg/m^3)	(A) Powered air-purifying respirators in all inlet face coverings with high-efficiency filters.[1] (B) Half-mask supplied air respirators operated in positive pressure mode.
(iv) Not greater than 500 $\mu g/m^3$	(A) Full facepiece air-purifying respirator equipped with high-efficiency filter.[1] (B) Any full facepiece supplied air respirator. (C) Any full facepiece self-contained breathing apparatus.
(v) Not greater than 100 $\mu g/m^3$	(A) Half-mask air-purifying respirator equipped with high-efficiency filter.[1] (B) Any half-mask supplied air respirator.

[1]High-efficiency filter-99.97 pct efficiency against 0.3 micrometer monodisperse diethyl-hexyl phthalate (DOP) particles.

TABLE II

RESPIRATORY PROTECTION FOR INORGANIC ARSENICALS (SUCH AS ARSENIC TRICHLORIDE[2] AND ARSENIC PHOSPHIDE) WITH SIGNIFICANT VAPOR PRESSURE

Concentration of Inorganic Arsenic (as As) or Condition of Use	Required Respirator
(i) Unknown or greater or lesser than 20,000 $\mu g/m^3$ (20 mg/m^3) or firefighting.	(A) Any full facepiece contained breathing apparatus operated in positive pressure mode.
(ii) Not greater than 20,000 $\mu g/m^3$ (20 mg/m^3)	(A) Supplied air respirator with full facepiece hood, or helmet or suit and operated in positive pressure mode.
(iii) Not greater than 10,000 $\mu g/m^3$ (10 mg/m^3)	(A) Half-mask[2] supplied air respirator operated in positive pressure mode.
(iv) Not greater than 500 $\mu g/m^3$	(A) Front or back mounted gas mask equipped with high-efficiency filter[1] and acid gas canister. (B) Any full facepiece supplied air respirator. (C) Any full facepiece self-contained breathing apparatus.
(v) Not greater than 100 $\mu g/m^3$	(A) Half-mask[2] air-purifying respirator equipped with high-efficiency filter[1] and acid gas cartridge. (B) Any half-mask supplied air respirator.

[1]High efficiency filter-99.97 pct efficiency against 0.3 micrometer monodisperse diethyl-hexyl phthalate (DOP) particles.

[2]Half-mask respirators shall not be used for protection against arsenic trichloride, as it is rapidly absorbed through the skin.

(iii) 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.

(c) Respirator usage. (i) The employer shall assure that the respirator issued to the employee exhibits minimum facepiece leakage and that the respirator is fitted properly.

(ii) The employer shall perform qualitative fit tests at the time of initial fitting and at least semi-annually thereafter for each employee wearing respirators, where quantitative fit tests are not required.

(iii) Employers with more than twenty employees wearing respirators shall perform a quantitative face fit test at the time of initial fitting and at least semi-annually thereafter for each employee wearing negative pressure respirators. The test shall be used to select facepieces that provide the required protection as prescribed in Table I or II.

(iv) If an employee has demonstrated difficulty in breathing during the fitting test or during use, he or she shall be examined by a physician trained in pulmonary medicine to determine whether the employee can wear a respirator while performing the required duty.

(d) Respirator program. (i) The employer shall institute a respiratory protection program in accordance with WAC 296-24-08103, 296-24-08107, 296-24-08109 and 296-24-08111.

(ii) 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.

(iii) Employees who wear respirators shall be permitted to leave work areas to wash their face and respirator facepiece to prevent skin irritation associated with respirator use.

(e) Commencement of respirator use. (i) The employer's obligation to provide respirators commences on August 1, 1978, for employees exposed over 500 $\mu g/m^3$ of inorganic arsenic, as soon as possible but not later than October 1, 1978, for employees exposed to over 50 $\mu g/m^3$ of inorganic arsenic, and as soon as possible but not later than December 1, 1978, for employees exposed between 10 and 50 $\mu g/m^3$ of inorganic arsenic.

(ii) Employees with exposures below 50 $\mu g/m^3$ of inorganic arsenic may choose not to wear respirators until December 31, 1979.

(iii) After December 1, 1978, any employee required to wear air purifying respirators may choose, and if so chosen the employer must provide, if it will give proper protection, a powered air purifying respirator and in addition if necessary a combination dust and acid gas respirator for times where exposures to gases are over the relevant exposure limits.

(9) RESERVED.

(10) Protective Work Clothing and Equipment. (a) Provision and use. Where the possibility of skin or eye irritation from inorganic arsenic exists, and for all workers working in regulated areas, the employer shall provide at no cost to the employee and assure that employees use appropriate and clean protective work clothing and equipment such as, but not limited to:

(i) Coveralls or similar full-body work clothing;

(ii) Gloves, and shoes or coverlets;

(iii) Face shields or vented goggles when necessary to prevent eye irritation, which comply with the requirements of WAC 296-24-07801(1) - (6).

(iv) Impervious clothing for employees subject to exposure to arsenic trichloride.

(b) Cleaning and replacement. (i) The employer shall provide the protective clothing required in subsection (10)(a) of this section in a freshly laundered and dry condition at least weekly, and daily if the employee works in areas where exposures are over 100 $\mu g/m^3$ of inorganic arsenic or in areas where more frequent washing is needed to prevent skin irritation.

(ii) The employer shall clean, launder, or dispose of protective clothing required by subsection (10)(a) of this section.

(iii) The employer shall repair or replace the protective clothing and equipment as needed to maintain their effectiveness.

(iv) The employer shall assure that all protective clothing is removed at the completion of a work shift only in change rooms prescribed in subsection (13)(a) of this section.

(v) 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-room which prevents dispersion of inorganic arsenic outside the container.

(vi) The employer shall inform in writing any person who cleans or launders clothing required by this section, of the potentially harmful affects including the carcinogenic effects of exposure to inorganic arsenic.

(vii) The employer shall assure that the containers of contaminated protective clothing and equipment in the workplace or which are to be removed from the workplace are labeled as follows:

CAUTION: Clothing contaminated with inorganic arsenic; do not remove dust by blowing or shaking. Dispose of inorganic arsenic contaminated wash water in accordance with applicable local, state, or Federal regulations.

(viii) The employer shall prohibit the removal of inorganic arsenic from protective clothing or equipment by blowing or shaking.

(11) Housekeeping. (a) Surfaces. All surfaces shall be maintained as free as practicable of accumulations of inorganic arsenic.

(b) Cleaning floors. Floors and other accessible surfaces contaminated with inorganic arsenic may not be cleaned by the use of compressed air, and shoveling and brushing may be used only where vacuuming or other relevant methods have been tried and found not to be effective.

(c) Vacuuming. Where vacuuming methods are selected, the vacuums shall be used and emptied in a manner to minimize the reentry of inorganic arsenic into the workplace.

(d) Housekeeping plan. A written housekeeping and maintenance plan shall be kept which shall list appropriate frequencies for carrying out housekeeping operations, and for cleaning and maintaining dust collection equipment. The plan shall be available for inspection by the Director.

(e) Maintenance of equipment. Periodic cleaning of dust collection and ventilation equipment and checks of their effectiveness shall be carried out to maintain the effectiveness of the system and a notation kept of the last check of effectiveness and cleaning or maintenance.

(12) RESERVED.

(13) Hygiene Facilities and Practices. (a) Change rooms. The employer shall provide for employees working in regulated areas or subject to the possibility of skin or eye irritation from inorganic arsenic, clean change rooms equipped with storage facilities for street clothes and separate storage facilities for protective clothing and equipment in accordance with WAC 296-24-12011.

(b) Showers. (i) The employer shall assure that employees working in regulated areas or subject to the possibility of skin or eye irritation from inorganic arsenic shower at the end of the work shift.

(ii) The employer shall provide shower facilities in accordance with WAC 296-24-12009(3).

(c) Lunchrooms. (i) The employer shall provide for employees working in regulated areas, lunchroom facilities which have a temperature controlled, positive pressure, filtered air supply, and which are readily accessible to employees working in regulated areas.

(ii) The employer shall assure that employees working in the regulated area or subject to the possibility of skin or eye irritation from exposure to inorganic arsenic wash their hands and face prior to eating.

(d) Lavatories. The employer shall provide lavatory facilities which comply with WAC 296-24-12009(1) and (2).

(e) Vacuuming clothes. The employer shall provide facilities for employees working in areas where exposure, without regard to the use of respirators, exceeds 100 $\mu g/m^3$ to vacuum their protective clothing and clean or change shoes worn in such areas before entering change rooms, lunchrooms or shower rooms required by subsection (10) of this section and shall assure that such employees use such facilities.

(f) Avoidance of skin irritation. The employer shall assure that no employee is exposed to skin or eye contact with arsenic trichloride, or to skin or eye contact with liquid or particulate inorganic arsenic which is likely to cause skin or eye irritation.

(14) Medical Surveillance. (a) General. (i) Employees covered. The employer shall institute a medical surveillance program for the following employees:

(A) All employees who are or will be exposed above the action level, without regard to the use of respirators, at least thirty days per year; and

(B) All employees who have been exposed above the action level, without regard to respirator use, for thirty days or more per year for a total of ten years or more of combined employment with the employer or predecessor employers prior to or after the effective date of this standard. The determination of exposures prior to the effective date of this standard shall be based upon prior exposure records, comparison with the first measurements taken after the effective date of this standard, or comparison with records of exposures in areas with similar processes, extent of engineering controls utilized and materials used by that employer.

(ii) Examination by physician. The employer shall assure 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, without loss of pay and at a reasonable time and place.

(b) Initial examinations. By December 1, 1978, for employees initially covered by the medical provisions of this section, or thereafter at the time of initial assignment to an area where the employee is likely to be exposed over the action level at least thirty days per year, the employer shall provide each affected employee an opportunity for a medical examination, including at least the following elements:

(i) A work history and a medical history which shall include a smoking history and the presence and degree of respiratory symptoms such as breathlessness, cough, sputum production and wheezing.

(ii) A medical examination which shall include at least the following:

(A) A 14" by 17" posterior–anterior chest X–ray and International Labor Office UICC/Cincinnati (ILO U/C) rating;

(B) A nasal and skin examination;

(C) A sputum cytology examination; and

(D) Other examinations which the physician believes appropriate because of the employees exposure to inorganic arsenic or because of required respirator use.

(c) Periodic examinations. (i) The employer shall provide the examinations specified in subsections (14)(b)(i) and (14)(b)(ii)(A), (B) and (D) of this section at least annually for covered employees who are under forty–five years of age with fewer than ten years of exposure over the action level without regard to respirator use.

(ii) The employer shall provide the examinations specified in subsections (14)(b)(i) and (ii) of this section at least semi–annually for other covered employees.

(iii) Whenever a covered employee has not taken the examinations specified in subsection (14)(b)(i) and (ii) of this section within six months preceding the termination of employment, the employer shall provide such examinations to the employee upon termination of employment.

(d) Additional examinations. If the employee for any reason develops signs or symptoms commonly associated with exposure to inorganic arsenic the employer shall provide an appropriate examination and emergency medical treatment.

(e) Information provided to the physician. The employer shall provide the following information to the examining physician:

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

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

(iii) The employee's representative 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.

(f) Physician's written opinion. (i) The employer shall obtain a written opinion from the examining physician which shall include:

(A) The results of the medical examination and tests performed;

(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 inorganic arsenic;

(C) Any recommended limitations upon the employee's exposure to inorganic arsenic or upon the use of protective clothing or equipment such as 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 which require further explanation or treatment.

(ii) The employer shall instruct the physician not to reveal in the written opinion specific findings or diagnoses unrelated to occupational exposure.

(iii) The employer shall provide a copy of the written opinion to the affected employee.

(15) Employee information and training. (a) Training program. (i) The employer shall institute a training program for all employees who are subject to exposure to inorganic arsenic above the action level without regard to respirator use, or for whom there is the possibility of skin or eye irritation from inorganic arsenic. The employer shall assure that those employees participate in the training program.

(ii) The training program shall be provided by October 1, 1978 for employees covered by this provision, at the time of initial assignment for those subsequently covered by this provision, and shall be repeated at least quarterly for employees who have optional use of respirators and at least annually for other covered employees thereafter, and the employer shall assure that each employee is informed of the following:

(A) The information contained in Appendix A;

(B) The quantity, location, manner of use, storage, sources of exposure, and the specific nature of operations which could result in exposure to inorganic arsenic as well as any necessary protective steps;

(C) The purpose, proper use, and limitation of respirators;

(D) The purpose and a description of medical surveillance program as required by subsection (14) of this section;

(E) The engineering controls and work practices associated with the employee's job assignment; and

(F) A review of this standard.

(b) Access to training materials. (i) The employer shall make readily available to all affected employees a copy of this standard and its appendices.

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

(16) Signs and Labels. (a) General. (i) 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 subsection.

(ii) The employer shall assure that no statement appears on or near any sign or label required by this subsection which contradicts or detracts from the meaning of the required sign or label.

(b) Signs. (i) The employer shall post signs demarcating regulated areas bearing the legend:

DANGER

INORGANIC ARSENIC

CANCER HAZARD

AUTHORIZED PERSONNEL ONLY

NO SMOKING OR EATING

RESPIRATOR REQUIRED

(ii) The employer shall assure that signs required by this subsection are illuminated and cleaned as necessary so that the legend is readily visible.

(c) Labels. The employer shall apply precautionary labels to all shipping and storage containers of inorganic arsenic, and to all products containing inorganic arsenic except when the inorganic arsenic in the product is bound in such a manner so as to make unlikely the possibility of airborne exposure to inorganic arsenic. (Possible examples of products not requiring labels are semiconductors, light emitting diodes and glass.) The label shall bear the following legend:

DANGER

CONTAINS INORGANIC ARSENIC

CANCER HAZARD

HARMFUL IF INHALED OR SWALLOWED

USE ONLY WITH ADEQUATE VENTILATION

OR RESPIRATORY PROTECTION

(17) Recordkeeping. (a) Exposure monitoring. (i) The employer shall establish and maintain an accurate record of all monitoring required by subsection (5) of this section.

(ii) This record shall include:

(A) The date(s), number, duration location, and results of each of the samples taken, including a description of the sampling procedure used to determine representative employee exposure where applicable;

(B) A description of the sampling and analytical methods used and evidence of their accuracy;

(C) The type of respiratory protective devices worn, if any;

(D) Name, social security number, and job classification of the employees monitored and of all other employees whose exposure the measurement is intended to represent; and

(E) The environmental variables that could affect the measurement of the employee's exposure.

(iii) The employer shall maintain these monitoring records for at least forty years or for the duration of employment plus twenty years, whichever is longer.

(b) Medical surveillance. (i) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance as required by subsection (14) of this section.

(ii) This record shall include:

(A) The name, social security number, and description of duties of the employee;

(B) A copy of the physician's written opinions;

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

(D) Any employee medical complaints related to exposure to inorganic arsenic.

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

(A) A copy of the medical examination results including medical and work history required under subsection (14) of this section;

(B) 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;

(C) The initial X–ray;

(D) The X–rays for the most recent five years;

(E) Any X–rays with a demonstrated abnormality and all subsequent X–rays;

(F) The initial cytologic examination slide and written description;

(G) The cytologic examination slide and written description for the most recent five years; and

(H) Any cytologic examination slides with demonstrated atypia, if such atypia persists for three years, and all subsequent slides and written descriptions.

(iv) The employer shall maintain or assure that the physician maintains those medical records for at least forty years, or for the duration of employment, plus twenty years, whichever is longer.

(c) Availability. (i) The employer shall make available upon request all records required to be maintained by subsection (17) of this section to the Director for examination and copying.

(ii) The employer shall make available upon request records of employee exposure monitoring required by subsection (17)(a) of this section for inspection and copying to affected employees, former employees and their designated representatives.

(iii) The employer shall make available upon request an employee's medical records and exposure records representative of that employee's exposure required to be maintained by subsection (17) of this section to the affected employee or former employee or to a physician designated by the affected employee or former employee.

(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 this section.

(ii) Whenever the employer ceases to do business and there is no successor employer to receive and retain the records required to be maintained by this section 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.

(18) 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 inorganic arsenic conducted pursuant to subsection (5) of this section.

(b) Observation procedures. (i) Whenever observation of the monitoring of employee exposure to inorganic arsenic 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 such equipment, and shall require the observer to comply with all other applicable safety and health procedures.

(ii) Without interfering with the monitoring, observers shall be entitled to;

(A) Receive an explanation of the measurement procedures;

(B) Observe all steps related to the monitoring of inorganic arsenic performed at the place of exposure; and

(C) Record the results obtained or receive copies of the results when returned by the laboratory.

(19) Effective Date. This standard shall become effective thirty days after filing with the Code Reviser.

(20) Appendices. The information contained in the appendices to this section is not intended by itself, to create any additional obligations not otherwise imposed by this standard nor detract from any existing obligation.

(21) Startup Dates. (a) General. The startup dates of requirements of this standard shall be the effective date of this standard unless another startup date is provided for, either in other subsections of this section or in this subsection.

(b) Monitoring. Initial monitoring shall be commenced by August 1, 1978, and shall be completed by September 15, 1978.

(c) Regulated areas. Regulated areas required to be established as a result of initial monitoring shall be set up as soon as possible after the results of that monitoring is known and no later than October 1, 1978.

(d) Compliance program. The written program required by subsection (7)(b) as a result of initial monitoring shall be made available for inspection and copying as soon as possible and no later than December 1, 1978.

(e) Hygiene and lunchroom facilities. Construction plans for change-rooms, showers, lavatories, and lunchroom facilities shall be completed no later than December 1, 1978, and these facilities shall be constructed and in use no later than July 1, 1979. However, if as part of the compliance plan it is predicted by an independent engineering firm that engineering controls and work practices will reduce exposures below the permissible exposure limit by December 31, 1979, for affected employees, then such facilities need not be completed until one year after the engineering controls are completed or December 31, 1980, whichever is earlier, if such controls have not in fact succeeded in reducing exposure to below the permissible exposure limit.

(f) Summary of startup dates set forth elsewhere in this standard.

STARTUP DATES

August 1, 1978 – Respirator use over 500 $\mu g/m^3$.

AS SOON AS POSSIBLE BUT NO LATER THAN

September 15, 1978 – Completion of initial monitoring.

October 1, 1978 – Complete establishment of regulated areas. Respirator use for employees exposed above 50 $\mu g/m^3$. Completion of initial training. Notification of use.

December 1, 1978 – Respirator use over 10 $\mu g/m^3$. Completion of initial medical. Completion of compliance plan. Optional use of powered air-purifying respirators.

July 1, 1979 – Completion of lunch rooms and hygiene facilities.

December 31, 1979 – Completion of engineering controls.

All other requirements of the standard have as their startup date August 1, 1978.

[Statutory Authority: RCW 49.17.040, 49.17.150 and 49.17.240. 79-08-115 (Order 79-9), § 296-62-07347, filed 7/31/79; 79-02-037 (Order 79-1), § 296-62-07347, filed 1/23/79.]

WAC 296-62-07349 Lead. (1) Scope and application.

(a) This section applies to all occupational exposure to lead, except as provided in subdivision (1)(b).

(b) This section does not apply to the construction industry or to agricultural operations covered by chapter 296-306 WAC.

(2) Definitions as applicable to this part.

(a) "Action level" – employee exposure, without regard to the use of respirators, to an airborne concentration of lead of thirty micrograms per cubic meter of air (30 $\mu g/m^3$) averaged over an eight-hour period.

(b) "Director" – the director of the department of labor and industries.

(c) "Lead" – metallic lead, all inorganic lead compounds, and organic lead soaps. Excluded from this definition are all other organic lead compounds.

(3) Permissible exposure limit (PEL).

(a) The employer shall assure that no employee is exposed to lead at concentrations greater than fifty micrograms per cubic meter of air (50 $\mu g/m^3$) averaged over an eight-hour period.

(b) If an employee is exposed to lead for more than eight hours in any work day, the permissible exposure limit, as a time weighted average (TWA) for that day, shall be reduced according to the following formula:

Maximum permissible limit (in $\mu g/m^3$) = 400 ÷ hours worked in the day.

(c) When respirators are used to supplement engineering and work practice controls to comply with the PEL and all the requirements of subsection (6) have been met, employee exposure, for the purpose of determining whether the employer has complied with the PEL, 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.

(4) Exposure monitoring.

(a) General.

(i) For the purposes of subsection (4), employee exposure is that exposure which would occur if the employee were not using a respirator.

(ii) With the exception of monitoring under subdivision (4)(c), the employer shall collect full shift (for at least seven continuous hours) personal samples including at least one sample for each shift for each job classification in each work area.

(iii) Full shift personal samples shall be representative of the monitored employee's regular, daily exposure to lead.

(b) Initial determination. Each employer who has a workplace or work operation covered by this standard shall determine if any employee may be exposed to lead at or above the action level.

(c) Basis of initial determination.

(i) The employer shall monitor employee exposures and shall base initial determinations on the employee exposure monitoring results and any of the following, relevant considerations:

(A) Any information, observations, or calculations which would indicate employee exposure to lead;

(B) Any previous measurements of airborne lead; and

(C) Any employee complaints of symptoms which may be attributable to exposure to lead.

(ii) Monitoring for the initial determination 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.

(iii) Measurements of airborne lead made in the preceding twelve months may be used to satisfy the requirement to monitor under item (4)(c)(i) if the sampling and analytical methods used meet the accuracy and confidence levels of subdivision (4)(i) of this section.

(d) Positive initial determination and initial monitoring.

(i) Where a determination conducted under subdivision (4)(b) and (4)(c) 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.

(ii) Measurements of airborne lead made in the preceding twelve months may be used to satisfy this requirement if the sampling and analytical methods used meet the accuracy and confidence levels of subdivision (4)(i) of this section.

(e) Negative initial determination. Where a determination, conducted under subdivisions (4)(b) and (4)(c) 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 subdivision (4)(c) 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.

(f) Frequency.

(i) If the initial monitoring reveals employee exposure to be below the action level the measurements need not be repeated except as otherwise provided in subdivision (4)(g) of this section.

(ii) If the initial determination or subsequent monitoring reveals employee exposure to be at or above the action level but below the permissible exposure limit the employer shall repeat monitoring in accordance with this subsection at least every six months. The employer shall continue monitoring at the required frequency until at least two consecutive measurements, taken at least seven days apart, are below the action level at which time the employer may discontinue monitoring for that employee except as otherwise provided in subdivision (4)(g) of this section.

(iii) If the initial monitoring reveals that employee exposure is above the permissible exposure limit the employer shall repeat monitoring quarterly. The employer shall continue monitoring at the required frequency until at least two consecutive measurements, taken at least seven days apart, are 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 item (4)(f)(ii), except as otherwise provided in subdivision (4)(g) of this section.

(g) Additional monitoring. Whenever there has been a production, process, control or personnel change which may result in new or additional exposure to lead, or whenever the employer has any other reason to suspect a change which may result in new or additional exposures to lead, additional monitoring in accordance with this subsection shall be conducted.

(h) Employee notification.

(i) Within five working days after the receipt of monitoring results, the employer shall notify each employee in writing of the results which represent that employee's exposure.

(ii) Whenever the results indicate that the representative employee exposure, without regard to respirators, exceeds the permissible exposure limit, 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 or to be taken to reduce exposure to or below the permissible exposure limit.

(i) Accuracy of measurement. The employer shall use a method of monitoring and analysis which has an accuracy (to a confidence level of ninety-five percent) of not less than plus or minus twenty percent for airborne concentrations of lead equal to or greater than 30 $\mu g/m^3$.

(5) Method of compliance.

(a) 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 in accordance with the implementation schedule in Table I. Failure to achieve exposure levels without regard to respirators is sufficient to establish a violation of this provision.

TABLE I

IMPLEMENTATION SCHEDULE

Industry[1]	Compliance Dates[2] 200 $\mu g/m^3$	100 $\mu g/m^3$	50 $\mu g/m^3$
Primary lead production	([3])	3	10
Secondary lead production	([3])	3	5
Lead-acid battery manufacturing	([3])	2	5
Nonferrous foundries	([3])	1	5
Lead pigment manufacturing	([3])	3	5
All other industries	([3])	Not Applicable	1

[1]Includes ancillary activities located on the same worksite.

[2]Expressed as the number of years from the effective date by which compliance with the given airborne exposure level, as an eight-hour TWA, must be achieved.

[3]On effective date. This continues an obligation from WAC 296-62-07515 Table 1 which had been in effect since 1973.

(b) Respiratory protection. Where engineering and work practice controls do not reduce employee exposure to or below the 50 $\mu g/m^3$ permissible exposure limit, the employer shall supplement these controls with respirators in accordance with subsection (6).

(c) Compliance program.

(i) Each employer shall establish and implement a written compliance program to reduce exposures to or below the permissible exposure limit, and interim levels if applicable, solely by means of engineering and work practice controls in accordance with the implementation schedule in subdivision (5)(a).

(ii) Written plans for these compliance programs shall include at least the following:

(A) A description of each operation in which lead is emitted; e.g., machinery used, material processed, controls in place, crew size, employee job responsibilities, operating procedures and maintenance practices;

(B) A description of the specific means that will be employed to achieve compliance, including engineering plans and studies used to determine methods selected for controlling exposure to lead;

(C) A report of the technology considered in meeting the permissible exposure limit;

(D) Air monitoring data which documents the source of lead emissions;

(E) A detailed schedule for implementation of the program, including documentation such as copies of purchase orders for equipment, construction contracts, etc.;

(F) A work practice program which includes items required under subsections (7), (8) and (9) of this regulation;

(G) An administrative control schedule required by subdivision (5)(f), if applicable; and

(H) Other relevant information.

(iii) Written programs shall be submitted upon request to the director, and shall be available at the worksite for examination and copying by the director, any affected employee or authorized employee representatives.

(iv) Written programs shall be revised and updated at least every six months to reflect the current status of the program.

(d) Bypass of interim level. Where an employer's compliance plan provides for a reduction of employee exposures to or below the PEL solely by means of engineering and work practice controls in accordance with the implementation schedule in Table I, and the employer has determined that compliance with the 100 $\mu g/m^3$ interim level would divert resources to the extent that it clearly precludes compliance, otherwise attainable, with the PEL by the required time, the employer may proceed with the plan to comply with the PEL in lieu of compliance with the interim level if:

(i) The compliance plan clearly documents the basis of the determination;

(ii) The employer takes all feasible steps to provide maximum protection for employees until the PEL is met; and

(iii) The employer notifies the director in writing within ten working days of the completion or revision of the compliance plan reflecting the determination.

(e) Mechanical ventilation.

(i) When ventilation is used to control exposure, measurements which demonstrate the effectiveness of the system in controlling exposure, such as capture velocity, duct velocity, or static pressure shall be made at least every three months. Measurements of the system's effectiveness in controlling exposure shall be made within five days of any change in production, process, or control which might result in a change in employee exposure to lead.

(ii) Recirculation of air. If air from exhaust ventilation is recirculated into the workplace, the employer shall assure that (A) the system has a high efficiency filter with reliable back-up filter; and (B) controls to monitor the concentration of lead in the return air and to bypass the recirculation system automatically if it fails are installed, operating, and maintained.

(f) 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:

(i) Name or identification number of each affected employee;

(ii) Duration and exposure levels at each job or work station where each affected employee is located; and

(iii) Any other information which may be useful in assessing the reliability of administrative controls to reduce exposure to lead.

(6) Respiratory protection.

(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. Respirators shall be used in the following circumstances:

(i) During the time period necessary to install or implement engineering or work practice controls, except that after the dates for compliance with the interim levels in Table I, no employer shall require an employee to wear a negative pressure respirator longer than 4.4 hours per day;

(ii) In work situations in which engineering and work practice controls are not sufficient to reduce exposures to or below the permissible exposure limit; and

(iii) Whenever an employee requests a respirator.

(b) Respirator selection.

(i) Where respirators are required under this section the employer shall select the appropriate respirator or combination of respirators from Table II.

TABLE II

RESPIRATORY PROTECTION FOR LEAD AEROSOLS

Airborne Concentration of Lead or Condition of Use	Required Respirator[1]
Not in excess of 0.5 mg/m^3 (10X PEL).	Half–mask, air–purifying respirator equipped with high efficiency filters.[2,3]
Not in excess of 2.5 mg/m^3 (50X PEL).	Full facepiece, air–purifying respirator with high efficiency filters.[3]
Not in excess of 50 mg/m^3 (1000X PEL).	(1) Any powered, air–purifying respirator with high efficiency filters[3]; or (2) Half–mask supplied air respirator operated in positive–pressure mode.[2]
Not in excess of 100 mg/m^3 (2000X PEL).	Supplied–air respirators with full facepiece, hood, helmet, or suit, operated in positive pressure mode.
Greater than 100 mg/m^3, unknown concentration or fire fighting.	Full facepiece, self–contained breathing apparatus operated in positive–pressure mode.

[1] Respirators specified for high concentrations can be used at lower concentrations of lead.

[2] Full facepiece is required if the lead aerosols cause eye or skin irritation at the use concentrations.

[3] A high efficiency particulate filter means 99.97 percent efficient against 0.3 micron size particles.

(ii) The employer shall provide a powered, air–purifying respirator in lieu of the respirator specified, in Table II whenever:

(A) An employee chooses to use this type of respirator; and

(B) This respirator will provide adequate protection to the employee.

(iii) 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.

(c) Respirator usage.

(i) The employer shall assure that the respirator issued to the employee exhibits minimum facepiece leakage and that the respirator is fitted properly.

(ii) Employers shall perform quantitative face fit tests at the time of initial fitting and at least semiannually thereafter for each employee wearing negative pressure respirators. The test shall be used to select facepieces that provide the required protection as prescribed in Table II.

(iii) 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 subitem (10)(c)(i)(C) of this section to determine whether the employee can wear a respirator while performing the required duty.

(d) Respirator program.

(i) The employer shall institute a respiratory protection program in accordance with WAC 296–24–08103, 296–24–08107, 296–24–08109 and 296–24–08111.

(ii) 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.

(iii) 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.

(7) Protective work clothing and equipment.

(a) Provision and use. If an employee is exposed to lead above the PEL, without regard to the use of respirators or where the possibility of skin or eye irritation exists, the employer shall provide at no cost to the employee and assure that the employee uses appropriate protective work clothing and equipment such as, but not limited to:

(i) Coveralls or similar full–body work clothing;

(ii) Gloves, hats, and shoes or disposable shoe coverlets; and

(iii) Face shields, vented goggles, or other appropriate protective equipment which complies with WAC 296–24–078.

(b) Cleaning and replacement.

(i) The employer shall provide the protective clothing required in subdivision (7)(a) 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 $\mu g/m^3$ of lead as an eight-hour TWA.

(ii) The employer shall provide for the cleaning, laundering, or disposal of protective clothing and equipment required by subdivision (7)(a) of this section.

(iii) The employer shall repair or replace required protective clothing and equipment as needed to maintain their effectiveness.

(iv) The employer shall assure that all protective clothing is removed at the completion of a work shift only in change rooms provided for that purpose as prescribed in subdivision (9)(b) of this section.

(v) 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-room which prevents dispersion of lead outside the container.

(vi) 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.

(vii) The employer shall assure that the containers of contaminated protective clothing and equipment required by subdivision (7)(b)(v) are labeled 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.

(viii) 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.

(8) Housekeeping.

(a) Surfaces. All surfaces shall be maintained as free as practicable of accumulations of lead.

(b) Cleaning floors.

(i) Floors and other surfaces where lead accumulates may not be cleaned by the use of compressed air.

(ii) 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.

(c) Vacuuming, Where vacuuming methods are selected, the vacuums shall be used and emptied in a manner which minimizes the reentry of lead into the workplace.

(9) Hygiene facilities and practices.

(a) 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, except in change rooms, lunchrooms, and showers required under subdivision (9)(b) through (9)(d) of this section.

(b) Change rooms.

(i) The employer shall provide clean change rooms for employees who work in areas where their airborne exposure to lead is above the PEL, without regard to the use of respirators.

(ii) The employer shall assure that change rooms are equipped with separate storage facilities for protective work clothing and equipment and for street clothes which prevent cross-contamination.

(c) Showers.

(i) The employer shall assure that employees who work in areas where their airborne exposure to lead is above the PEL, without regard to the use of respirators, shower at the end of the work shift.

(ii) The employer shall provide shower facilities in accordance with WAC 296-24-12009.

(iii) The employer shall assure that employees who are required to shower pursuant to item (9)(c)(i) do not leave the workplace wearing any clothing or equipment worn during the work shift.

(d) Lunchrooms.

(i) The employer shall provide lunchroom facilities for employees who work in areas where their airborne exposure to lead is above the PEL, without regard to the use of respirators.

(ii) The employer shall assure that lunchroom facilities have a temperature controlled, positive pressure, filtered air supply, and are readily accessible to employees.

(iii) The employer shall assure that employees who work in areas where their 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.

(iv) The employer shall assure that employees do not enter lunchroom facilities with protective work clothing or equipment unless surface lead dust has been removed by vacuuming, downdraft booth, or other cleaning method.

(e) Lavatories. The employer shall provide an adequate number of lavatory facilities which comply with WAC 296-24-12009(1) and (2).

(10) Medical surveillance.

(a) General.

(i) The employer shall institute a medical surveillance program for all employees who are or may be exposed above the action level for more than thirty days per year.

(ii) The employer shall assure that all medical examinations and procedures are performed by or under the supervision of a licensed physician.

(iii) The employer shall provide the required medical surveillance including multiple physician review under item (10)(c)(iii) without cost to employees and at a reasonable time and place.

(b) Biological monitoring.

(i) 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 under item (10)(a)(i) of this section on the following schedule:

(A) At least every six months to each employee covered under item (10)(a)(i) of this section;

(B) At least every two months for each employee whose last blood sampling and analysis indicated a blood lead level at or above 40 $\mu g/100$ g of whole blood. This frequency shall continue until two consecutive blood

samples and analyses indicate a blood lead level below 40 μg/100 g of whole blood; and

(C) At least monthly during the removal period of each employee removed from exposure to lead due to an elevated blood lead level.

(ii) 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 item (11)(a)(i), 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.

(iii) Accuracy of blood lead level sampling and analysis. Blood lead level sampling and analysis provided pursuant the this section shall have an accuracy (to a confidence level of ninety-five percent) within plus or minus fifteen percent or 6 μg/100 ml, whichever is greater, and shall be conducted by a laboratory licensed by the Center for Disease Control (CDC), United States Department of Health, Education and Welfare or which has received a satisfactory grade in blood lead proficiency testing from CDC in the prior twelve months.

(iv) Employee notification. Within five working days after the receipt of biological monitoring results, the employer shall notify in writing each employee whose blood lead level exceeds 40 μg/100 g: (A) of that employee's blood lead level and (B) 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 item (11)(a)(i) of this section.

(c) Medical examinations and consultations.

(i) Frequency. The employer shall make available medical examinations and consultations to each employee covered under item (10)(a)(i) of this section on the following schedule:

(A) At least annually for each employee for whom a blood sampling test conducted at any time during the preceding twelve months indicated a blood lead level at or above 40 μg/100 g;

(B) Prior to assignment for each employee being assigned for the first time to an area in which airborne concentrations of lead are at or above the action level;

(C) 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, or that the employee has demonstrated difficulty in breathing during a respirator fitting test or during use; and

(D) 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.

(ii) Content. Medical examinations made available pursuant to subitems (10)(c)(i)(A) through (B) of this section shall include the following elements:

(A) A detailed work history and a medical history, with particular attention to past lead exposure (occupational and nonoccupational), personal habits (smoking, hygiene), and past gastrointestinal, hematologic, renal, cardiovascular, reproductive and neurological problems;

(B) 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;

(C) A blood pressure measurement;

(D) A blood sample and analysis which determines:

(aa) Blood lead level;

(bb) Hemoglobin and hematocrit determinations, red cell indices, and examination of peripheral smear morphology;

(cc) Zinc protoporphyrin;

(dd) Blood urea nitrogen; and

(ee) Serum creatinine;

(E) A routine urinalysis with microscopic examination; and

(F) Any laboratory or other test which the examining physician deems necessary by sound medical practice.

The content of medical examinations made available pursuant to subitems (10)(c)(i)(C) through (D) of this section shall be determined by an examining physician and, if requested by an employee, shall include pregnancy testing or laboratory evaluation of male fertility.

(iii) 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, the employee may designate a second physician:

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

(bb) 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 fifteen days after receipt of the foregoing notification, or receipt of the initial physician's written opinion, whichever is later:

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

(bb) 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:

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

(bb) 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.

(iv) Information provided to examining and consulting physicians.

(A) The employer shall provide an initial physician conducting a medical examination or consultation under this section with the following information:

(aa) A copy of this regulation for lead including all appendices;

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

(cc) The employee's exposure level or anticipated exposure level to lead and to any other toxic substance (if applicable);

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

(ee) Prior blood lead determinations; and

(ff) All prior written medical opinions concerning the employee in the employer's possession or control.

(B) The employer shall provide the foregoing information to a second or third physician conducting a medical examination or consultation under this section upon request either by the second or third physician, or by the employee.

(v) Written medical opinions.

(A) The employer shall obtain and furnish the employee with a copy of a written medical opinion from each examining or consulting physician which contains the following information:

(aa) 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;

(bb) Any recommended special protective measures to be provided to the employee, or limitations to be placed upon the employee's exposure to lead;

(cc) 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

(dd) The results of the blood lead determinations.

(B) The employer shall instruct each examining and consulting physician to:

(aa) Not reveal either in the written opinion, 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

(bb) Advise the employee of any medical condition, occupational or nonoccupational, which dictates further medical examination or treatment.

(vi) Alternate physician determination mechanisms. The employer and an employee or authorized employee representative may agree upon the use of any expeditious alternate physician determination mechanism in lieu of the multiple physician review mechanism provided by this subsection so long as the alternate mechanism otherwise satisfies the requirements contained in this subsection.

(d) Chelation.

(i) 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.

(ii) If therapeutic or diagnostic chelation is to be performed by any person in item (10)(d)(i), 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.

(11) Medical removal protection.

(a) Temporary medical removal and return of an employee.

(i) Temporary removal due to elevated blood lead levels.

(A) First year of the standard. During the first year following the effective date of the standard, the employer shall remove an employee from work having a daily eight hour TWA exposure to lead at or above 100 $\mu g/m^3$ on each occasion that a periodic and a follow-up blood sampling test conducted pursuant to this section indicate that the employee's blood lead level is at or above 80 $\mu g/100$ g of whole blood;

(B) Second year of the standard. During the second year following the effective date of the standard, the employer shall remove an employee from work having a daily eight hour TWA exposure to lead at or above 50 $\mu g/m^3$ on each occasion that a periodic and a follow-up blood sampling test conducted pursuant to this section indicate that the employee's blood lead level is at or above 70 $\mu g/100$ g of whole blood;

(C) Third year of the standard, and thereafter. Beginning with the third year following the effective date of the standard, 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 this section indicate that the employee's blood lead level is at or above 60 $\mu g/100$ g of whole blood; and

(D) Fifth year of the standard, and thereafter. Beginning with the fifth year following the effective date of the standard, the employer shall remove an employee from work having an exposure to lead at or above the action level on each occasion that the average of the last three blood sampling tests conducted pursuant to this section (or the average of all blood sampling tests conducted over the previous six months, whichever is longer) indicates that the employee's blood lead level is at or above 50 $\mu g/100$ g of whole blood; provided, however, that an employee need not be removed if the last blood sampling test indicates a blood lead level at or below 40 $\mu g/100$ g of whole blood.

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

(A) 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.

(B) For the purposes of this section, the phrase "final medical determination" shall mean the outcome of the multiple physician review mechanism or alternate medical determination mechanism used pursuant to the medical surveillance provisions of this section.

(C) 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.

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

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

(aa) For an employee removed due to a blood lead level at or above 80 μg/100 g, when two consecutive blood sampling tests indicate that the employee's blood lead level is at or below 60 μg/100 g of whole blood;

(bb) For an employee removed due to a blood lead level at or above 70 μg/100 g, when two consecutive blood sampling tests indicate that the employee's blood lead level is at or below 50 μg/100 g of whole blood;

(cc) For an employee removed due to a blood lead level at or above 60 μg/100 g, or due to an average blood lead level at or above 50 μg/100 g, when two consecutive blood sampling tests indicate that the employee's blood lead level is at or below 40 μg/100 g of whole blood;

(dd) 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.

(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.

(iv) 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.

(v) 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 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 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.

(B) Return. The employer may return the employee to his or her 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. If:

(aa) 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

(bb) 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.

(b) Medical removal protection benefits.

(i) Provision of medical removal protection benefits. The employer shall provide to an employee up to eighteen months of medical removal protection benefits on each occasion that an employee is removed from exposure to lead or otherwise limited pursuant to this section.

(ii) 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 lead or otherwise limited.

(iii) Follow–up medical surveillance during the period of employee removal or limitation. During the period of time that an employee is removed from normal exposure to lead 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.

(iv) 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.

(v) 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.

(vi) Employees whose blood lead levels do not adequately decline within eighteen months of removal. The employer shall take the following measures with respect to any employee removed from exposure to lead due to an elevated blood lead level whose blood lead level has not declined within the past eighteen months of removal so that the employee has been returned to his or her former job status:

(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.

(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 unacceptable blood lead level, 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 blood lead level removal criteria provided by this section.

(vii) 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 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 item (11)(b)(i) of this section.

(12) Employee information and training.

(a) Training program.

(i) Each employer who has a workplace in which there is a potential exposure to airborne lead at any level shall inform employees of the content of Appendices A and B of this regulation.

(ii) The employer shall institute a training program for and assure the participation of all employees who are subject to exposure to lead at or above the action level or for whom the possibility of skin or eye irritation exists.

(iii) The employer shall provide initial training by one hundred eighty days from the effective date for those employees covered by item (12)(a)(ii) on the standard's effective date and prior to the time of initial job assignment for those employees subsequently covered by this subsection.

(iv) The training program shall be repeated at least annually for each employee.

(v) The employer shall assure that each employee is informed of 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);

(E) The engineering controls and work practices associated with the employee's job assignment;

(F) The contents of any compliance plan in effect; and

(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.

(b) Access to information and training materials.

(i) The employer shall make readily available to all affected employees a copy of this standard and its appendices.

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

(iii) In addition to the information required by item (12)(a)(v), the employer shall include as part of the training program, and shall distribute to employees, any materials pertaining to the Occupational Safety and Health Act, the regulations issued pursuant to the act, and this lead standard, which are made available to the employer by the director.

(13) Signs.

(a) General.

(i) The employer may use signs required by other statutes, regulations or ordinances in addition to, or in combination with, signs required by this subsection.

(ii) The employer shall assure that no statement appears on or near any sign required by this subsection which contradicts or detracts from the meaning of the required sign.

(b) Signs.

(i) The employer shall post the following warning signs in each work area where the PEL is exceeded:

WARNING
LEAD WORK AREA
POISON
NO SMOKING OR EATING

(ii) The employer shall assure that signs required by this subsection are illuminated and cleaned as necessary so that the legend is readily visible.

(14) Recordkeeping.

(a) Exposure monitoring.

(i) The employer shall establish and maintain an accurate record of all monitoring required in subsection (4) of this section.

(ii) This record shall include:

(A) The date(s), number, duration, location and results of each of the samples taken, including a description of the sampling procedure used to determine representative employee exposure where applicable;

(B) A description of the sampling and analytical methods used and evidence of their accuracy;

(C) The type of respiratory protective devices worn, if any;

(D) 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

(E) the environmental variables that could affect the measurement of employee exposure.

(iii) The employer shall maintain these monitoring records for at least forty years or for the duration of employment plus twenty years, whichever is longer.

(b) Medical surveillance.

(i) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance as required by subsection (10) of this section.

(ii) This record shall include:

(A) The name, social security number, and description of the duties of the employee;

(B) A copy of the physician's written opinions;

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

(D) Any employee medical complaints related to exposure to lead.

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

(A) A copy of the medical examination results including medical and work history required under subsection (10) of this section;

(B) 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; and

(C) A copy of the results of biological monitoring.

(iv) The employer shall maintain or assure that the physician maintains those medical records for at least forty years, or for the duration of employment plus twenty years, whichever is longer.

(c) Medical removals.

(i) The employer shall establish and maintain an accurate record for each employee removed from current exposure to lead pursuant to subsection (11) of this section.

(ii) Each record shall include:

(A) The name and social security number of the employee;

(B) The date on 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 his or her former job status;

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

(D) A statement with respect to each removal indicating whether or not the reason for the removal was an elevated blood lead level.

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

(d) Availability.

(i) The employer shall make available upon request all records required to be maintained by subsection (14) of this section to the director for examination and copying.

(ii) Upon request, the employer shall make environmental monitoring, biological monitoring, and medical removal records available to affected employees, former employees or their authorized employee representatives for inspection and copying.

(iii) Upon request, the employer shall make an employee's medical records required to be maintained by this section available to the affected employee or former employee or to a physician or other individual designated by such affected employee or former employees for examination and copying.

(e) 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 (14) of this section.

(ii) Whenever the employer ceases to do business and there is no successor employer to receive and retain the records required to be maintained by this section 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 requested within the period.

(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 lead conducted pursuant to subsection (4) of this section.

(b) Observation procedures.

(i) 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 such equipment, and shall require the observer to comply with all other applicable safety and health procedures.

(ii) Without interfering with the monitoring, observers shall be entitled to:

(A) Receive an explanation of the measurement procedures;

(B) Observe all steps related to the monitoring of lead performed at the place of exposure; and

(C) Record the results obtained or receive copies of the results when returned by the laboratory.

(16) Effective date. This standard shall become effective thirty days after filing with the code reviser.

(17) Appendices. The information contained in the appendices to this section is not intended by itself, to create any additional obligations not otherwise imposed by this standard nor detract from any existing obligation. Appendices are available from:

The Technical Services Section
Division of Industrial Safety and Health
P.O. Box 207
Olympia, WA 98504 (206)753-6381

(18) Startup dates. All obligations of this standard commence on the effective date except as follows:

(a) The initial determination under subdivision (4)(b) shall be made as soon as possible but no later than thirty days from the effective date.

(b) Initial monitoring under subdivision (4)(d) shall be completed as soon as possible but no later than ninety days from the effective date.

(c) Initial biological monitoring and medical examinations under subsection (10) shall be completed as soon as possible but no later than one hundred eighty days from the effective date. Priority for biological monitoring and medical examinations shall be given to employees whom the employer believes to be at greatest risk from continued exposure.

(d) Initial training and education shall be completed as soon as possible but no later than one hundred eighty days from the effective date.

(e) Hygiene and lunchroom facilities under subsection (9) shall be in operation as soon as possible but no later than one year from the effective year.

(f) Respiratory protection required by subsection (6) shall be provided as soon as possible but no later than the following schedule:

(i) Employees whose eight-hour TWA exposure exceeds 200 $\mu g/m^3$ – on the effective date.

(ii) Employees whose eight-hour TWA exposure exceeds the PEL but is less than 200 $\mu g/m^3$ – one hundred fifty days from the effective date.

(iii) Powered, air-purifying respirators provided under (6)(b)(ii) – two hundred ten days from the effective date.

(iv) Quantitative fit testing required under item (6)(c)(ii) – one year from effective date. Qualitative fit testing is required in the interim.

(g) Written compliance plans required by subdivision (5)(c) shall be completed and available for inspection and copying as soon as possible but no later than the following schedule:

(i) Employers for whom compliance with the PEL or interim level is required within one year from the effective date – six months from the effective date.

(ii) Employers in secondary smelting and refining, lead storage battery manufacturing, lead pigment manufacturing and nonferrous foundry industries – one year from the effective date.

(iii) Employers in primary smelting and refining industry – one year from the effective date from the interim level; five years from the effective date for PEL.

(iv) Plans for construction of hygiene facilities, if required – six months from the effective date.

(h) The permissible exposure limit in subsection (3) shall become effective one hundred fifty days from the effective date. [Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17.240. 80-11-009 (Order 80-16), § 296-62-07349, filed 8/8/80.]

WAC 296-62-075 Air contaminants. [Order 73-3, § 296-62-075, filed 5/7/73.] See WAC 296-62-07501 through 296-62-07517.

WAC 296-62-07501 Airborne contaminants. (1) Permissible exposure limits (PELs) refer to airborne concentrations of substances without regard to the use of respiratory protection and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effect. Because of wide variation in individual susceptibility, however, a small percentage of workers may experience discomfort from some substances at concentrations at or below the permissible limit, a smaller percentage may be affected more seriously by aggravation of a pre-existing condition or by development of an occupational illness.

(2) Permissible exposure limits refer to time-weighted concentrations for an 8-hour workday within a 40-hour workweek.

The time-weighted average exposure for an 8-hour work shift shall be computed as follows:

$$E = \frac{C_a T_a + \quad C_b T_b + \ldots + C_n T_n}{8}$$

where:

E is the equivalent exposure for the working shift.

C is the concentration during any period of time T where the concentration remains constant.

T is the duration in hours of the exposure at the concentration C.

The value of E shall not exceed the eight-hour time-weighted average limit in Table 1, 2 or 3 for the material involved.

(3) Methods of compliance:

(a) To achieve compliance with these standards, the employer shall determine and implement feasible administrative or engineering controls.

(b) When administrative or engineering controls are not feasible to achieve full compliance, they shall nonetheless be used to reduce exposures to the lowest levels achievable by these controls.

(c) Whenever full compliance cannot be achieved by the use of feasible administrative or engineering controls, approved respiratory protection shall be provided at no cost to the employee and shall be used in accordance with WAC 296-24-081 through 296-24-08113.

(d) Any control equipment or technical measure utilized for the purpose of complying with WAC 296-62-07501(3) must be approved for each particular use by a competent industrial hygienist or other technically qualified person.

(e) Upon request, the employer shall prepare and submit a written compliance plan to the director. This plan must include a description of the manner in which

compliance will be achieved with respect to cited violations of WAC 296-62-07501(3), and shall include proposed abatement methods, anticipated completion dates, and provision for progress reports to be sent to the department.

(4) An employee's exposure to any substance in Table 1 and 3, the name of which is not preceded by a "C," shall not exceed the excursion level limit which is computed by multiplying the appropriate factor below times eight-hour time-weighted average for the substance in the applicable table.

PEL > 0-1	(ppm or mg/M^3),	Excursion Factor = 3
PEL > 1-10	(ppm or mg/M^3),	Excursion Factor = 2
PEL > 10-100	(ppm or mg/M^3),	Excursion Factor = 1.5
PEL > 100-1000	(ppm or mg/M^3),	Excursion Factor = 1.25
PEL > 1000	(ppm or mg/M^3),	Excursion Factor = 1

(5) Permissible limits are based on the best available information from industrial experience, from experimental human and animal studies, and, when possible, from a combination of the three. The basis on which the values are established may differ from substance to substance; protection against impairment of health may be a guiding factor for some, whereas reasonable freedom from irritation, narcosis, nuisance or other forms of stress may form the basis for others.

(6) The limits based on physical irritation shall be considered no less binding than those based on physical impairment. There is increasing evidence that physical irritation may initiate, promote or accelerate physical impairment through interaction with other chemical or biologic agents.

(7) In spite of the fact that serious injury is not believed likely as a result of exposure to the permissible limit concentrations, the best practice is to maintain concentrations of all atmospheric contaminants as low as is practical.

(8) These limits are intended for use in the practice of industrial hygiene and should be interpreted and applied only by a technically qualified person. [Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17.240. 80-11-010 (Order 80-14), § 296-62-07501, filed 8/8/80; Order 73-3, § 296-62-07501, filed 5/7/73.]

WAC 296-62-07503 Ceiling vs time-weighted average limits. (1) Although the time-weighted average concentration provides the most satisfactory, practical way of monitoring airborne agents for compliance with the limits, there are certain substances for which it is inappropriate. In the latter group are substances which are predominantly fast acting and whose permissible limit is based on this particular response. Substances with this type of response are controlled by a ceiling "C" limit that shall not be exceeded. It is implicit in these definitions that the manner of sampling to determine compliance with the limits for each group must differ; a single brief sample, that is applicable to a "C" limit, is not appropriate to the time-weighted limit; here, a sufficient number of samples are needed to determine a time-weighted average concentration throughout a complete cycle of operations or throughout the work shift.

(2) Whereas the ceiling limit places a definite boundary which concentrations shall not be permitted to exceed, the time-weighted average limit requires an explicit limit to the excursions that are permissible above the listed values. The magnitude of these excursions are limited by an appropriate factor shown in WAC 296-62-07501(4). [Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17.240. 80-11-010 (Order 80-14), § 296-62-07503, filed 8/8/80; Order 73-3, § 296-62-07503, filed 5/7/73.]

WAC 296-62-07505 "Skin" notation. Listed substances followed by the designation "Skin" refer to the potential contribution to the overall exposure by the cutaneous route including mucous membranes and eye, either by airborne, or more particularly, by direct contact with the substance. Vehicles can alter skin absorption. Measures for the prevention of cutaneous absorption so that the permissible limit is not invalidated shall be taken. [Statutory Authority: RCW 49.17.040, 49.17-.050, and 49.17.240. 80-11-010 (Order 80-14), § 296-62-07505, filed 8/8/80; Order 73-3, § 296-62-07505, filed 5/7/73.]

WAC 296-62-07507 Mixtures. Special consideration shall be given to assessing the health hazards associated with exposure to mixtures of two or more substances which have similar health effects. In case of a mixture of air-contaminants compute the equivalent exposure as follows:

$$E_m = \frac{C_1}{L_1} + \frac{C_2}{L_2} + \ldots + \frac{C_n}{L_n}$$

Where:

E_m is the equivalent exposure for the mixture.

C is the concentration of a particular contaminant.

L is the exposure limit for that contaminant, from table 1, 2, or 3.

The value of E_m shall not exceed unity (1). [Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17-.240. 80-11-010 (Order 80-14), § 296-62-07507, filed 8/8/80; Order 73-3, § 296-62-07507, filed 5/7/73.]

WAC 296-62-07509 Nuisance dusts. (1) In contrast to fibrogenic dusts which cause scar tissue to be formed in lungs when inhaled in excessive amounts, so-called "nuisance" dusts have a long history of little adverse effect on lungs and do not produce significant organic disease or toxic effect when exposures are kept under reasonable control. The nuisance dusts have also been called (biologically) "inert" dusts, but the latter term is inappropriate to the extent that there is no dust which does not evoke some cellular response in the lung when inhaled in sufficient amount. However, the lung-tissue reaction caused by inhalation of nuisance dusts has the following characteristics:

(a) The architecture of the air spaces remains intact,

(b) Collagen (scar tissue) is not formed to a significant extent,

(c) The tissue reaction is potentially reversible.

(2) Excessive concentrations of nuisance dusts in the workroom air may seriously reduce visibility, may cause unpleasant deposits in the eyes, ears and nasal passages, or cause injury to the skin or mucous membranes by chemical or mechanical action per se or by the rigorous skin cleansing procedures necessary for their removal.

(3) A permissible limit of 10 milligrams per cubic meter, of total dust $< 1\%$ SiO_2, is mandatory for substances in these categories and for which no specific permissible limits have been assigned. This limit, for a normal workday, does not apply to brief exposures at higher concentrations. Neither does it apply to those substances which may cause physiologic impairment at lower concentrations but for which a threshold limit has not yet been adopted. [Statutory Authority: RCW 49-.17.040, 49.17.050, and 49.17.240. 80-11-010 (Order 80-14), § 296-62-07509, filed 8/8/80; Order 73-3, § 296-62-07509, filed 5/7/73.]

WAC 296-62-07510 Total Particulate. Total particulate exposure shall not exceed a permissible limit of 10 milligrams per cubic meter (mg/M^3) of air. The use of this eight-hour time-weighted-average exposure limit does not preclude the application of other applicable limits in WAC 296-62-075 through 296-62-07515. Nor does it preclude the use of WAC 296-62-060 when substances not specifically listed in Table 1, 2 and 3 are found to require a lower limit. This section does, however, limit the combined total concentration of all particulate contaminants whether or not specifically listed in Tables 1, 2 and 3. [Statutory Authority: RCW 49.17-.040, 49.17.050, and 49.17.240. 80-11-010 (Order 80-14), § 296-62-07510, filed 8/8/80.]

WAC 296-62-07511 Simple asphyxiants. "Inert" Gases or Vapors. A number of gases and vapors when present in high concentrations in air act primarily as simple asphyxiants without other significant physiologic effects. A PEL may not be established for each simple asphyxiant because the limiting factor is the available oxygen. The minimal oxygen content shall be 18 percent by volume under normal atmospheric pressure (equivalent to a partial pressure, pO_2 of 135 mm Hg). Atmospheres deficient in O_2 do not provide adequate warning and most simple asphyxiants are odorless. Several simple asphyxiants present an explosion hazard. Account shall be taken of this factor in limiting the concentration of the asphyxiant. [Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17.240. 80-11-010 (Order 80-14), § 296-62-07511, filed 8/8/80; Order 73-3, § 296-62-07511, filed 5/7/73.]

WAC 296-62-07513 Physical factors. It is recognized that such physical factors as heat, ultraviolet and ionizing radiation, humidity, abnormal pressure and the like may place added stress on the body so that the effects from exposure at a permissible limit may be altered. Most of these stresses act adversely to increase the toxic response of a substance. Although most permissible limits have built-in safety factors to guard against adverse effects to moderate deviations from normal environments, the safety factors of most substances are not of such a magnitude as to take care of gross deviations. [Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17.240. 80-11-010 (Order 80-14), § 296-62-07513, filed 8/8/80; Order 73-3, § 296-62-07513, filed 5/7/73.]

WAC 296-62-07515 Control of chemical agents. Chemical agents shall be controlled in such a manner that the workers exposure shall not exceed the applicable limits in WAC 296-62-075 through 296-62-07515.

TABLE 1

PERMISSIBLE EXPOSURE LIMITS (PEL)

	Substance	ppm (See note a)	mg/M^3 (See note b)
	Abate	—	10
	Acetaldehyde	200	360
	Acetic acid	10	25
	Acetic anhydride	5	20
	Acetone	1,000	2,400
	Acetonitrile	40	70
	Acetylene	Simple	Asphyxiant
	Acetylene dichloride, see 1,2–Dichloroethylene		
	Acetylene tetrabromide	1	14
	Acrolein	0.1	0.25
	Acrylamide—Skin	—	0.3
	Aldrin—Skin	—	0.25
	Allyl alcohol—Skin	2	3
	Allyl chloride	1	5
C	Allyl glycidyl ether (AGE)	10	45
	Allyl propyl disulfide	2	12
	Alundum (Al_2O_3)	—	10
	2–Aminoethanol, see Ethanolamine	—	—
	2–Aminopyridine	0.5	2
	Ammonia	50	35
	Ammonium chloride, fume	—	10
	Ammonium sulfamate (Ammate)	—	10
	n–Amyl acetate	100	525
	sec–Amyl acetate	125	650
	Aniline—Skin	5	19
	Anisidine (o, p–isomers)—Skin	—	0.5
	Antimony & Compounds (as Sb)	—	0.5
	ANTU (alpha Naphthyl thiourea)	—	0.3
	Argon	Simple	Asphyxiant
	Arsenic & Compounds (as As) which are exempt from WAC 296–62–07347	—	0.5
	Arsine	0.05	0.2
	Asphalt (petroleum) fumes	—	5
	Azinphos methyl—Skin	—	0.2
	Barium (soluble compounds)	—	0.5
	p–Benzoquione, see Quinone		
	Benzoyl peroxide	—	5
	Benzyl chloride	1	5
	Biphenyl, see Diphenyl		
	Boron oxide	—	10
	Boron tribromide	1	10
C	Boron trifluoride	1	3
	Bromine	0.1	0.7
	Bromine pentafluoride	0.1	0.7
	Bromoform—Skin	0.5	5.0
	Butadiene (1,3–butadiene)	1,000	2,200
	Butanethiol, see Butyl mercaptan		
	2–Butanone	200	590
	2–Butoxy ethanol (Butyl Cellosolve)—Skin	50	240
	Butyl acetate (n–butyl acetate)	150	710
	sec–Butyl acetate	200	950
	tert–Butyl acetate	200	950
	Butyl alcohol	100	300
	sec–Butyl alcohol	150	450
	tert–Butyl alcohol	100	300
C	Butylamine—Skin	5	15
C	tert–Butyl chromate (as CrO_3)—Skin	—	0.1
	n–Butyl glycidyl ether (BGE)	50	270
	Butyl mercaptan	0.5	1.5
	p–tert–Butyl–toluene	10	60
C	Cadmium oxide fume (as Cd)	—	0.1
	Calcium carbonate	—	10
	Calcium arsenate See WAC 296–62–07347		
	Calcium oxide	—	5
	Camphor (synthetic)	2	12
	Carbaryl (Sevin[R])	—	5
	Carbon black	—	3.5
	Carbon dioxide	5,000	9,000
	Carbon monoxide	50	55
	Cellulose (paper fiber)	—	10
	Chlordane—Skin	—	0.5
	Chlorinated camphene–Skin	—	0.5
	Chlorinated diphenyl oxide	—	0.5
C	Chlorine	1	3
	Chlorine dioxide	0.1	0.3
C	Chlorine tri–fluoride	0.1	0.4
C	Chloroacet–aldehyde	1	3
	α–Chloroaceto–phenone (Phenacylchloride)	0.05	0.03
	Chlorobenzene (Monochlorobenzene)	75	350
	o–Chlorobenzylidene malononitrile (OCBM)–Skin	0:05	0.4
	Chlorobromomethane	200	1,050
	2–Chloro–1,3–butadiene, see Chloroprene		
	Chlorodiphenyl (42% Chlorine)—Skin	—	1
	Chlorodiphenyl (54% Chlorine)—Skin	—	0.5
	1–Chloro,2,3–epoxy propane, see Epichlorhydrin		
	2–Chloroethanol, see Ethylene chlorohydrin		
	Chloroform (Trichloromethane)	50	240
	1–Chloro–1–nitropropane	20	100
	Chloropicrin	0.1	0.7
	Chloroprene (2–chloro–1,3–butadiene)—Skin	25	90
	Chromium, sol. chromic, chromous salts as Cr.	—	0.5
	Chromium Metal & insol. salts		1
	Coal tar pitch volatiles (benzene soluble fraction anthracene, BaP, phenanthrene, acridine, chrysene, pyrene)		0.2
	Colbalt, metal fume & dust	—	0.1
	Copper fume	—	0.1
	Dusts and Mists	—	1.0
	Corundum (Al_2O_3)	—	10
	Cotton Dust (raw)	—	1
	Crag[R] herbicide	—	10
	Cresol (all isomers)—Skin	5	22
	Crotonaldehyde	2	6
	Cumene—Skin	50	245
	Cyanide (as CN)—Skin	—	5
	Cyanogen	10	—
	Cyclohexane	300	1,050
	Cyclohexanol	50	200
	Cyclohexanone	50	200
	Cyclohexene	300	1,015

TABLE 1

PERMISSIBLE EXPOSURE LIMITS (PEL)

TABLE 1

PERMISSIBLE EXPOSURE LIMITS (PEL)

	Substance	ppm (See note a)	mg/M^3 (See note b)
	Cyclopentadiene	75	200
	2,4–D	—	10
	DDT	—	1
	DDVP, see Dichlorvos	—	—
	Decaborane—Skin	0.05	0.3
	Demeton[R]—Skin	—	0.1
	Diacetone alcohol (4–hydroxy–4–methyl–2–pentanone)	50	240
	1,2–Diaminoethane, see Ethylenediamine	—	—
	Diazinon–skin	—	0.1
	Diazomethane	0.2	0.4
	Diborane	0.1	0.1
	Dibrom[R]	—	3
	2–N Dibutylamino–ethanol–Skin	2	14
	Dibutyl phosphate	1	5
	Dibutylphthalate	—	5
C	Dichloroacetylene	0.1	0.4
C	o–Dichlorobenzene	50	300
	p–Dichlorobenzene	75	450
	Dichlorodifluoromethane	1,000	4,950
	1,3–Dichloro–5,5–dimethyl hydantoin	—	0.2
	1,1–Dichloroethane	100	400
	1,2–Dichloro–ethylene	200	790
C	Dichloroethyl ether—Skin	15	90
	Dichloromethane, see Methylene–chloride	—	—
	Dichloromonofluoro–methane	1,000	4,200
C	1,1–Dichloro–1–nitroethane	10	60
	1,2–Dichloropropane, see Propylene–dichloride		
	Dichlorotetra–fluoroethane	1,000	7,000
	Dichlorvos (DDVP)–Skin	—	1
	Dieldrin—Skin	—	0.25
	Diethylamine	25	75
	Diethylamino ethanol—Skin	10	50
C	Diethylene triamine—Skin	1	4
	Diethylether, see Ethyl ether		
	Difluorodibromomethane	100	860
C	Diglycidyl ether (DGE)	0.5	2.8
	Dihydroxybenzene, see Hydroquinone		
	Diisobutyl ketone	50	290
	Diisopropylamine—Skin	5	20
	Dimethoxymethane, see Methylal		
	Dimethyl acetamide—Skin	10	35
	Dimethylamine	10	18
	Dimethylaminobenzene, see Xylidene		
	Dimethylaniline (N–Dimethylaniline)—Skin	5	25
	Dimethylbenzene, see Xylene		
	Dimethyl,1,2–dibromo–2,2–dichloroethyl phosphate, see DiBrom		
	Dimethylformamide—Skin	10	30
	2,6–Dimethylheptanone, see Diisobutyl ketone		
	1,1–Dimethylhydrazine—Skin	0.5	1
	Dimethylphthalate	—	5
	Dimethylsulfate—Skin	1	5
	Dinitrobenzene (all isomers)—Skin	—	1
	Dinitro–o–cresol—Skin	—	0.2

TABLE 1

PERMISSIBLE EXPOSURE LIMITS (PEL)

	Substance	ppm (See note a)	mg/M^3 (See note b)
	Dinitrotoluene—Skin	—	1.5
	Dioxane (Diethylene dioxide)—Skin	100	360
	Diphenyl	0.2	1
	Diphenyl amine	—	10
	Diphenylmethane diisocyanate (see Methylene bisphenyl isocyanate (MDI))		
	Dipropylene glycol methyl ether—Skin	100	600
	Di–sec,octyl phthalate (Di–2–ethylhexyl–phthalate)	—	5
	Emery	—	10
	Endosulfan (Thiodan[R])–skin	—	0.1
	Endrin—Skin	—	0.1
	Epichlorhydrin—Skin	5	19
	EPN—Skin	—	0.5
	1,2–Epoxypropane, see Propylene–oxide		
	2,3–Epoxy–1–propanol, see Glycidol		
	Ethane	Simple	Asphyxiant
	Ethanethiol, see Ethylmercaptan		
	Ethanolamine	3	6
	2–Ethoxyethanol—Skin	200	740
	2–Ethoxyethylacetate (Cellosolve acetate)—Skin	100	540
	Ethyl acetate	400	1,400
	Ethyl acrylate—Skin	25	100
	Ethyl alcohol (ethanol)	1,000	1,900
	Ethylamine	10	18
	Ethyl sec–amyl ketone (5–methyl–3–heptanone)	25	130
	Ethyl benzene	100	435
	Ethyl bromide	200	890
	Ethyl butyl ketone (3–Heptanone)	50	230
	Ethyl chloride	1,000	2,600
	Ethyl ether	400	1,200
	Ethyl formate	100	300
	Ethyl mercaptan	0.5	1
	Ethyl silicate	100	850
	Ethylene	Simple	Asphyxiant
	Ethylene chlorohydrin—Skin	5	16
	Ethylenediamine	10	25
C	Ethylene glycol dinitrate and/or Nitroglycerin—Skin	0.2 (See note d)	—
	Ethylene glycol monomethyl ether acetate (Methyl cellosolve acetate)—Skin	25	120
	Ethylene imine—Skin	0.5	1
	Ethylene oxide	50	90
	Ethylidine chloride, see 1,1–Dichloroethane		
	n–Ethylmorpholine—Skin	20	94
	Ferbam	—	15
	Ferrovanadium dust	—	1
	Fluoride as dust	—	2.5
	Fluorine	0.1	0.2
	Fluorotrichloromethane	1,000	5,600
C	Formaldehyde	2	3
	Formic acid	5	9
	Furfuryl–Skin	5	20
	Furfuryl alcohol	50	200

TABLE 1

PERMISSIBLE EXPOSURE LIMITS (PEL)

	Substance	ppm (See note a)	mg/M^3 (See note b)
	Glass, fibrous or dust (See note e)	—	10
	Glycerin mist	—	10
	Glycidol (2,3-Epoxy-1-propanol)	50	150
	Glycol monoethyl ether, see 2-Ethoxyethanol		
	Graphite, (Synthetic)	—	10
	Guthion[R], see Azinphosmethyl		
	Gypsum	—	10
	Hafnium	—	0.5
	Helium	Simple	Asphyxiant
	Heptachlor—Skin	—	0.5
	Heptane (n-heptane)	500	2,000
	Hexachloroethane—Skin	1	10
	Hexachloronaphthalene—Skin	—	0.2
	Hexane (n-hexane)	500	1,800
	2-Hexanone	100	410
	Hexone (Methyl isobutyl ketone)	100	410
	156 sec-Hexyl acetate	50	300
	Hydrazine—Skin	1	1.3
	Hydrogen	Simple	Asphyxiant
	Hydrogen bromide	3	10
C	Hydrogen chloride	5	7
	Hydrogen cyanide—Skin	10	11
	Hydrogen fluoride	3	2
	Hydrogen peroxide	1	1.4
	Hydrogen selenide	0.05	0.2
	Hydroquinone	—	2
	Indene	10	45
	Indium and compounds, as In	—	0.1
C	Iodine	0.1	1
	Iron oxide fume	—	10
	Iron pentacarbonyl	0.01	0.08
	Iron salts, soluble, as Fe	—	1
	Isoamyl acetate	100	525
	Isoamyl alcohol	100	360
	Isobutyl acetate	150	700
	Isobutyl alcohol	100	300
	Isophorone	10	55
	Isopropyl acetate	250	950
	Isopropyl alcohol	400	980
	Isopropylamine	5	12
	Isopropylether	250	1,050
	Isopropyl glycidyl ether (IGE)	50	240
	Kaolin	—	10
	Ketene	0.5	0.9
	Lead and its inorganic compounds which are exempt from WAC 296-62-07349	—	0.2
	Lead arsenate -See WAC 296-62-07347	—	0.15
	Limestone	—	10
	Lindane	—	0.5
	Lithium hydride	—	0.025
	L.P.G. (Liquified petroleum gas)	1,000	1,800
	Magnesite	—	10
	Magnesium oxide fume	—	10
	Malathion—Skin	—	10
	Maleic anhydride	0.25	1
C	Manganese and compounds, as Mn	—	5
	Marble	—	10
	Mesityl oxide	25	100

TABLE 1

PERMISSIBLE EXPOSURE LIMITS (PEL)

	Substance	ppm (See note a)	mg/M^3 (See note b)
	Methane	Simple	Asphyxiant
	Methanethiol, see Methyl mercaptan		
	Methoxychlor	—	10
	2-Methoxyethanol-skin (Methyl cellosolve)	25	80
	Methyl acetate	200	610
	Methyl acetylene (propyne)	1,000	1,650
	Methyl acetylene-propadiene mixture (MAPP)	1,000	1,800
	Methyl acrylate—Skin	10	35
	Methylal (dimethoxy-methane)	1,000	3,100
	Methyl alcohol (methanol)	200	260
	Methylamine	10	12
	Methyl amyl alcohol, see Methyl isobutyl carbinol		
	Methyl 2-cyano-acrylate	2	8
	Methyl isoamyl ketone	100	475
	Methyl (n-amyl) ketone (2-Heptanone)	100	465
	Methyl bromide—Skin	15	60
	Methyl butyl ketone, see 2-Hexanone		
	Methyl cellosolve-skin, see 2-Methoxyethanol	—	—
	Methyl cellosolve acetate-Skin, see Ethylene glycol monomethyl ether acetate	—	—
	Methyl chloride	100	210
	Methyl chloroform	350	1,900
	Methylcyclohexane	500	2,000
	Methylcyclohexanol	100	470
	o-Methylcyclo-hexanone—Skin	100	460
	Methylcyclopentadienyl manganese tricarbonyl (as Mn)—skin	0.1	0.2
	Methyl demeton-skin	—	0.5
	Methyl ethyl ketone (MEK), see 2-Butanone		
	Methyl formate	100	250
	Methyl iodide—Skin	5	28
	Methyl isobutyl carbinol—Skin	25	100
	Methyl isobutyl ketone, see Hexone		
	Methyl isocyanate—Skin	0.02	0.05
	Methyl mercaptan	0.5	1
	Methyl methacrylate	100	410
	Methyl parathion-skin	—	0.2
	Methyl propyl ketone, see 2-Pentanone		
C	Methyl silicate	5	30
C	α-Methyl styrene	100	480
C	Methylene bisphenyl isocyanate (MDI)	0.02	0.2
	Molybdenum (soluble compounds)	—	5
	(insoluble compounds)	—	10
	Monomethyl aniline—Skin	2	9
C	Monomethyl hydrazine—Skin	0.2	0.35
	Morpholine—Skin	20	70
	Naphtha (coal tar)	100	400
	Naphthalene	10	50
	Neon	Simple	Asphyxiant
	Nickel carbonyl	0.001	0.007 (See note a)

TABLE 1

PERMISSIBLE EXPOSURE LIMITS (PEL)

	Substance	ppm (See note a)	mg/M^3 (See note b)
	Nickel, metal and soluble compounds, as Ni	—	1
	Nicotine—Skin	—	0.5
	Nitric acid	2	5
	Nitric oxide	25	30
	p–Nitroaniline—Skin	1	6
	Nitrobenzene—Skin	1	5
	p–Nitrochlorobenzene—Skin	—	1
	Nitroethane	100	310
	Nitrogen	Simple	Asphyxiant
C	Nitrogen dioxide	5	9
	Nitrogen trifluoride	10	29
C	Nitroglycerin—Skin	0.2	2
	Nitromethane	100	250
	1–Nitropropane	25	90
	2–Nitropropane	25	90
	Nitrotoluene—Skin	5	30
	Nitrotrichloromethane, see Chloropicrin		
	Nitrous Oxide	Simple	Asphyxiant
	Octachloronaphthalene—Skin	—	0.1
	Octane	400	1,900
	Oil mist, particulate	—	5 (See note f)
	Osmium tetroxide	—	0.002
	Oxalic acid	—	1
	Oxygen difluoride	0.05	0.1
	Ozone	0.1	0.2
	Paraquat—Skin	—	0.5
	Parathion—Skin	—	0.1
	Pentaborane	0.005	0.01
	Pentachloronaphthalene—Skin	—	0.5
	Pentachlorophenol—Skin	—	0.5
	Pentaerythritol	—	10
	Pentane	500	1,500
	2–Pentanone	200	700
	Perchloromethyl mercaptan	0.1	0.8
	Perchloryl fluoride	3	14
	Phenol—Skin	5	19
	p–Phenylene diamine—Skin	—	0.1
	Phenyl ether (vapor)	1	7
	Phenyl ether–Diphenyl mixture (vapor)	1	7
	Phenylethylene, see Styrene		
	Phenyl glycidyl ether (PGE)	10	60
	Phenylhydrazine—Skin	5	22
	Phenothiazine–skin	—	5
	Phosdrin (Mevinphos[R])—Skin	—	0.1
	Phosgene (carbonyl chloride)	0.1	0.4
	Phosphine	0.3	0.4
	Phosphoric acid	—	1
	Phosphorus (yellow)	—	0.1
	Phosphorus pentachloride	—	1
	Phosphorus pentasulfide	—	1
	Phosphorus trichloride	0.5	3
	Phthalic anhydride	2	12
	Picric acid—Skin	—	0.1
	Pival[R] (2–Pivalyl–1,3–indandione)	—	0.1
	Plaster of Paris	—	10
	Platinum (Soluble Salts) as Pt	—	0.002
	Polychlorobiphenyls, see Chlorodiphenyls		
	Propane	Simple	Asphyxiant
	Propargyl alcohol—Skin	1	—
	n–Propyl acetate	200	840

TABLE 1

PERMISSIBLE EXPOSURE LIMITS (PEL)

	Substance	ppm (See note a)	mg/M^3 (See note b)
	Propyl alcohol	200	500
	n–Propyl nitrate	25	110
	Propylene dichloride (1,2–Dichloropropane)	75	350
	Propylene glycol monomethyl ether	100	360
	Propylene imine—Skin	2	5
	Propylene oxide	100	240
	Propyne, see Methylacetylene		
	Pyrethrum	—	5
	Pyridine	5	15
	Quinone	0.1	0.4
	RDX—Skin	—	1.5
	Rhodium, Metal fume and dusts, as Rh	—	0.1
	Soluble salts	—	0.001
	Ronnel	—	10
	Rosin Core Solder, pyrolysis products (as formaldehyde)	—	0.1
	Rotenone (commercial)	—	5
	Rouge	—	10
	Selenium compounds (as Se)	—	0.2
	Selenium hexafluoride	0.05	0.4
	Silicon Carbide	—	10
	Silver, metal and soluble compounds	—	0.01
	Sodium fluoroacetate (1080)—Skin	—	0.05
	Sodium hydroxide	—	2
	Starch	—	10
	Stibine	0.1	0.5
	Stoddard solvent	200	1,150
	Strychnine	—	0.15
	Sucrose	—	10
	Sulfur dioxide	5	13
	Sulfur hexafluoride	1,000	6,000
	Sulfuric acid	—	1
	Sulfur monochloride	1	6
	Sulfur pentafluoride	0.025	0.25
	Sulfuryl fluoride	5	20
	Systox, see Demeton[R]	—	—
	2,4,5 T	—	10
	Tantalum	—	5
	TEDP—Skin	—	0.2
	Tellurium	—	0.1
	Tellurium hexafluoride	0.02	0.2
	TEPP—Skin	—	0.05
C	Terphenyls	1	9
	1,1,1,2–Tetrachloro–2,2–difluoroethane	500	4,170
	1,1,2,2–Tetrachloro–1,2–difluoroethane	500	4,170
	1,1,2,2–Tetrachloroethane—Skin	5	35
	Tetrachloromethane, see Carbon tetrachloride		
	Tetrachloronaphthalene—Skin	—	2
	Tetraethyl lead (as Pb)—Skin	—	0.100 (See note h)
	Tetrahydrofuran	200	590
	Tetramethyl lead (as Pb)—Skin	—	0.150 (See note h)
	Tetramethyl succinonitrile—Skin	0.5	3
	Tetranitromethane	1	8

TABLE 1

PERMISSIBLE EXPOSURE LIMITS (PEL)

	Substance	ppm (See note a)	mg/M^3 (See note b)
	Tetryl (2,4,6–trinitrophenyl–methylnitramine)—Skin	—	1.5
	Thallium (soluble compounds)—Skin (as Tl)	—	0.1
	Thiram[R]	—	5
	Tin (inorganic compounds, except SnH_4 and SnO_2) as Sn	—	2
	Tin (organic compounds)–skin (as Sn)	—	0.1
	Tin oxide	—	10
	Titanium dioxide	—	10
C	Toluene–2,4–diisocyanate	0.02	0.14
	o–Toluidine—Skin	5	22
	Toxaphene, see Chlorinated camphene		
	Tributyl phosphate	—	5
	1,1,1–Trichloroethane, see Methyl chloroform		
	1,1,2–Trichloroethane—Skin	10	45
	Trichloromethane, see Chloroform		
	Trichloronaphthalene—Skin	—	5
	1,2,3–Trichloropropane	50	300
	1,1,2–Trichloro 1,2,2–trifluoroethane	1,000	7,600
	Triethylamine	25	100
	Trifluoromono–bromomethane	1,000	6,100
	Trimethyl benzene	25	120
	2,4,6–Trinitrophenol, see Picric acid		
	2,4,6–Trinitrophenyl–methylnitramine, see Tetryl		
	Trinitrotoluene—Skin	—	1.5
	Triorthocresyl phosphate	—	0.1
	Triphenyl phosphate	—	3
	Tungsten & Compounds, as W		
	Soluble	—	1
	Insoluble	—	5
	Turpentine	100	560
	Uranium (natural) sol. & insol. compounds as U	—	0.2
	Vanadium (V_2O_5), as V		
	Dust	—	0.5
	Vinyl acetate	10	30
	Vinyl bromide	250	1,100
	Vinyl toluene	100	480
	Warfarin	—	0.1
	Xylene (xylol)	100	435
	Xylidine—Skin	5	25
	Yttrium	—	1
	Zinc chloride fume	—	1
	Zinc oxide fume	—	5
	Zirconium compounds (as Zr)	—	5

a) Parts of vapor or gas per million parts of contaminated air by volume at 25°C and 760 mm. Hg. pressure.

b) Approximate milligrams of substance per cubic meter of air.

d) An atmospheric concentration of not more than 0.02 ppm, or personal protection may be necessary to avoid headache.

e) <5–7 μm in diameter.

f) As sampled by method that does not collect vapor.

g) According to analytically determined composition.

h) For control of general room air, biologic monitoring is essential for personnel control.

+ TABLE 2

(See note [a])

Material	8–hour time weighted average	Acceptable ceiling concentration	Acceptable maximum peak above the acceptable ceiling concentration for an 8 hour shift.	
			Concentration	Maximum duration
Benzene (Z37.4–1969)	10 ppm	25 ppm	50 ppm	10 minutes.
Beryllium and beryllium compounds (Z37.29–1970)	2 μg/M^3	5 μg/M^3	25 μg/M^3	30 minutes.
Cadmium dust (Z37.5–1970)	0.2 mg/M^3	0.6 mg/M^3		
Carbon disulfide (Z37.3–1968)	20 ppm	30 ppm	100 ppm	30 minutes.
Carbon Tetrachloride (Z37.17–1967)	10 ppm	25 ppm	200 ppm	5 minutes in any 4 hours.
Ethylene dibromide (Z37.31–1970)	20 ppm	30 ppm	50 ppm	5 minutes.
Ethylene dichloride (Z37.21–1969)	50 ppm	100 ppm	200 ppm	5 minutes in any 3 hours.
Methylene Chloride (Z37.3–1969)	500 ppm	1,000 ppm	2,000 ppm	5 minutes in any 2 hours.
Organo (alkyl) mercury (Z37.30–1969)	0.01 mg/M^3	0.04 mg/M^3		
Styrene (Z37.15–1969)	100 ppm	200 ppm	600 ppm	5 minutes in any 3 hours.
Trichloroethylene (Z37.19–1967)	100 ppm	200 ppm	300 ppm	5 minutes in any 2 hours.
Tetrachloroethylene (Z37.22–1967)	100 ppm	200 ppm	300 ppm	5 minutes in any 3 hours.
Toluene (Z37.12–1967)	200 ppm	300 ppm	500 ppm	10 minutes.
Hydrogen sulfide (Z37.2–1966)	10 ppm	20 ppm	50 ppm	10 minutes once only if no measurable exposure occurs.
Mercury (Z37.8–1971)	0.05 mg/M^3	0.1 mg/M^3		
Chromic acid and chromates (Z37.7–1973)	0.1 mg/M^3	0.3 mg/M^3		

NOTE: [a] **Acceptable ceiling concentrations.** An employee's exposure to a material listed in table 2 shall not exceed at any time during an 8–hour shift the acceptable ceiling concentration limit given for the material in the table, except for a time period, and up to a concentration not exceeding the maximum duration and concentration allowed in the column under "acceptable maximum peak above the acceptable ceiling concentration for an 8–hour shift".

Example. During an 8–hour work shift, an employee may be exposed to a concentration of Benzene above 25 ppm (but never above 50 ppm) only for a maximum period of 10 minutes. Such exposure must be compensated by exposures to concentrations less than 10 ppm so that the cumulative exposure for the entire 8–hour work shift does not exceed a weighted average of 10 ppm.

+TABLE 3

PARTICULATES

Substance	Mppcf (See note e)	mg/M^3
Silica:		
Crystalline: (See note f)		
Quartz (respirable)		10mg/M^{3}m
		%SiO_2+2
Quartz (total dust)		30mg/M^3
		%SiO_2+3
Cristobalite: Use 1/2 the value calculated from the mass formulae for quartz.		
Tridymite: Use 1/2 the value calculated from the formulae for quartz.		
Amorphous, including natural diatomaceous earth	20	80mg/M^3
		%SiO_2
Silicates (less than 1% crystalline silica):		
Mica	20	
Soapstone	20	
Talc	20	
Portland cement	50	
Graphite (natural)	15	
Coal dust (respirable fraction less than 5% SiO_2)		2.4mg/M^3
		or
For more than 5% SiO_2		10mg/M^3
		%SiO_2+2
Inert or Nuisance Dust:		
Respirable fraction		5mg/M^3
Total dust		10mg/M^3
Total Particulates (less than 1% SiO_2)		10mg/M^3
Respirable fraction		5mg/M^3

NOTE: Conversion factors—
mppcf X 35.3 = million particles per cubic meter
= particles per c.c.

e Millions of particles per cubic foot of air, based on impinger samples counted by light-field techniques.

f The percentage of crystalline silica in the formula is the amount determined from airborne samples, except in those instances in which other methods have been shown to be applicable.

m Both concentration and percent quartz for the application of this limit are to be determined from the fraction passing a size-selector with the following characteristics:

Aerodynamic diameter (unit density sphere)	Percent passing selector
2	90
2.5	75
3.5	50
5.0	25
10	0

The measurements under this note refer to the use of an AEC instrument. If the respirable fraction of coal dust is determined with a MRE the figure corresponding to that of a 2.4 mg/M^3 in the table for coal dust is 4.5 mg/M^3.

[Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17.240. 80-11-010 (Order 80-14), § 296-62-07515, filed 8/8/80. Statutory Authority: RCW 49.17.040, 49-.17.150 and 49.17.240. 79-08-115 (Order 79-9), § 296-62-07515, filed 7/31/79; Order 73-3, § 296-62-07515, filed 5/7/73.]

WAC 296-62-07517 Asbestos. (1) Definitions. For the purpose of this section, (a) "Asbestos" means chrysotile, amosite, crocidolite, tremolite, anthophyllite, and actinolite.

(b) "Asbestos fibers" means asbestos fibers longer than 5 micrometers.

(2) Permissible exposure to airborne concentrations of asbestos fibers. (a) The 8-hour time-weighted average airborne concentrations of asbestos fibers to which any employee may be exposed shall not exceed two fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in (5) of this section.

(b) Ceiling concentration. No employee shall be exposed at any time to airborne concentrations of asbestos fibers in excess of 10 fibers, longer than 5 micrometers, per cubic centimeter of air, as determined by the method prescribed in (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 (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 asbestos fibers in excess of the exposure limits prescribed in (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 (3)(a)(ii) of this section.

(b) Work practices. (i) Wet methods. Insofar as practicable, asbestos 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 (2) of this section, unless the usefulness of the product would be diminished thereby.

(ii) 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, or enclosed, or ventilated so as to prevent effectively the release of airborne asbestos fibers in excess of the limits prescribed in (2) of this section.

(iii) Spraying, demolition, or removal. Employees engaged in the spraying of asbestos, the removal, or demolition of pipes, structures, or equipment covered or insulated with asbestos, and in the removal or demolition

of asbestos insulation or coverings shall be provided with respiratory equipment in accordance with (4)(b)(iii) of this section and with special clothing in accordance with (4)(c) of this section.

(4) Personal protective equipment. (a) Compliance with the exposure limits prescribed by (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 (3) of this section.

(ii) In work situations in which the methods prescribed in (3) of this section are either technically not feasible or feasible to an extent insufficient to reduce the airborne concentrations of asbestos fibers below the limits prescribed by (2) of this section; or

(iii) In emergencies.

(iv) Where both respirators and personnel rotation are allowed by (4)(a)(i), (ii), or (iii) of this section, and both are practicable, personnel rotation shall be preferred and used.

(b) Where a respirator is permitted by (4)(a)(i), (ii), or (iii) of this section, it shall comply with the applicable provisions of chapter 296–24 WAC.

(i) Air purifying respirators. A reusable or single use air purifying respirator, or a respirator described in (4)(b)(ii) or (iii) of this section shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in (2) of this section, when the ceiling or the 8–hour time–weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed no more than 10 times those limits.

(ii) Powered air purifying respirators. A full facepiece powered air purifying respirator, or a powered air purifying respirator, or a respirator described in (4)(b)(iii) of this section, shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in (2) of this section, when the ceiling or the 8–hour time–weighted average concentrations of asbestos fibers are reasonably expected to exceed 10 times, but not 100 times, those limits.

(iii) Type "C" supplied–air respirators, continuous flow or pressure–demand class. A type "C" continuous flow or pressure–demand, supplied–air respirator shall be used to reduce the concentrations of airborne asbestos fibers in the respirator below the exposure limits prescribed in (2) of this section, when the ceiling or the 8–hour time–weighted average airborne concentrations of asbestos fibers are reasonably expected to exceed 100 times those limits.

(iv) Establishment of a respirator program. (A) The employer shall establish a respirator program in accordance with the requirements of chapter 296–24 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 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 is able to perform with the same employer, in the same geographical area and with the same seniority, status, and rate of pay he had just prior to such transfer, if such a different position is available.

(c) Special clothing: The employer shall provide, 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 airborne concentrations of asbestos fibers, which exceed the ceiling level prescribed in (2)(b) of this section.

(d) Change rooms: (i) At any fixed place of employment exposed to airborne concentrations of asbestos fibers in excess of the exposure limits prescribed in (2) of this section, the employer shall provide change rooms for employees working regularly at the place.

(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 work clothes.

(iii) Laundering: (A) Laundering of asbestos contaminated clothing shall be done so as to prevent the release of airborne asbestos fibers in excess of the exposure limits prescribed in (2) of this section.

(B) Any employer who gives asbestos–contaminated clothing to another person for laundering shall inform such person of the requirement in (4)(d) of this section to effectively prevent the release of airborne asbestos fibers in excess of the exposure limits prescribed in (2) of this section.

(C) Contaminated clothing shall be transported in sealed impermeable bags, or other closed, impermeable containers, and labeled in accordance with (7)(b) of this section.

(5) Method of measurement. All determinations of airborne concentrations of asbestos fibers shall be made by the membrane filter method at 400–450 X (magnification) (4 millimeter objective) with phase contrast illumination.

(6) Monitoring. (a) Initial determinations. Every employer shall cause every place of employment where asbestos fibers are released to be monitored in such a way as to determine whether every employee's exposure to asbestos fibers is below the limits prescribed in (2) of this section. If the limits are exceeded, the employer shall immediately undertake a compliance program in accordance with (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 8–hour time–weighted average airborne concentrations and of the ceiling concentrations of asbestos fibers.

(ii) Sampling frequency and patterns. After the initial determinations required by (6)(a) of this section, 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 6 months for employees whose exposure to asbestos may reasonably be foreseen to exceed the limits prescribed by (2) of this section.

(c) Environmental monitoring. (i) Samples shall be collected from areas of a work environment which are representative of the airborne concentrations of asbestos 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 8–hour time–weighted average airborne concentrations and of the ceiling concentrations of asbestos fibers.

(ii) Sampling frequency and patterns. After the initial determinations required by (6)(a) 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 6 months for employees whose exposures to asbestos may reasonably be foreseen to exceed the exposure limits prescribed in (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 paragraph 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 asbestos fibers are reasonably expected to be released or where airborne concentrations of asbestos fibers may be in excess of the exposure limits prescribed in (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 asbestos fibers.

(ii) Sign specifications. The warning signs required by (7)(a)(i) of this section 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
Asbestos	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 Asbestos Dust 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 asbestos fibers, or to their containers, except that no label is required where asbestos 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 concentrations of asbestos fibers will be released.

(ii) Label specifications. The caution labels required by (7)(b)(i) of this section shall be printed in letters of sufficient size and contrast as to be readily visible and legible. The label shall state:

CAUTION

Contains Asbestos Fibers

Avoid Creating Dust

Breathing Asbestos Dust May Cause

Serious Bodily Harm

(8) Housekeeping. (a) Cleaning. All external surfaces in any place of employment shall be maintained free of accumulations of asbestos fibers.

(b) Waste disposal. Asbestos waste, scrap, debris, bags, containers, equipment, and asbestos–contaminated clothing, consigned for disposal, shall be collected and disposed of in sealed impermeable bags, or other closed, impermeable containers.

(c) Deterioration. Friable asbestos or friable asbestos containing material which has become damaged or deteriorated shall be contained, treated, or replaced.

(9) Recordkeeping. (a) Exposure records. Every employer shall maintain records of any personal or environmental monitoring required by (6) of this section. Records shall be maintained for a period of at least 20 years and shall be made available upon request to the Director of the Department of Labor and Industries.

(b) Employee access. Every employee and former employee shall have reasonable access to any record required to be maintained by (9)(a) of this section, which indicates the employee's own exposure to asbestos fibers.

(c) Employee notification. Any employee found to have been exposed at any time to airborne concentrations of asbestos fibers in excess of the limits prescribed in (2) of this section shall be notified in writing of the exposure as soon as practicable but not later than 5 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 cost, medical examinations relative to exposure to asbestos required by this section.

(b) Preplacement. The employer shall provide or make available to each of his employees, within 30 calendar days following his first employment in an occupation exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination, which shall include, as a minimum, a chest roentgenogram (posterior–anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary

function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 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 employees engaged in occupations exposed to airborne concentrations of asbestos fibers. Such annual examination shall include, as a minimum, a chest roentgenogram (posterior–anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second ($FEV_{1.0}$).

(d) Termination of employment. The employer shall provide, or make available, within 30 calendar days before or after the termination of employment of any employee engaged in an occupation exposed to airborne concentrations of asbestos fibers, a comprehensive medical examination which shall include, as a minimum, a chest roentgenogram (posterior–anterior 14 x 17 inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 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 1–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 20 years.

(ii) Access. The contents of the records of the medical examinations required by this paragraph shall be made available, for inspection and copying, to the director of the Department of Labor and Industries, the Assistant Secretary of Labor for Occupational Safety and Health, the director of NIOSH, to authorized physicians and medical consultants of either of them, and, upon the request of an employee or former employee, to his physician. 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 asbestos fibers. [Statutory Authority: RCW 49-.17.040, 49.17.050, and 49.17.240. 80–11–010 (Order 80–14), § 296–62–07517, filed 8/8/80; Order 77–12, § 296–62–07517, filed 7/11/77; Order 73–3, § 296–62–07517, filed 5/7/73.]

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 296–62–090 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.] See WAC 296–61–09001 through 296–62–09013.

WAC 296–62–09001 Definitions. (1) "Physical agents" shall mean, but are not limited to: illumination, 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 10^{-7} cm. to 10^{3} cm. including ultraviolet, visible, infrared and microwave radiation. The electromagnetic spectrum is shown graphically in Figure 1 below.

ELECTROMAGNETIC SPECTRUM

WAVE LENGTH–CENTIMETERS

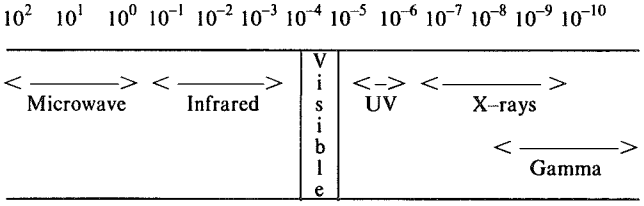


Figure 1

(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. [Order 73–3, § 296–62–09001, filed 5/7/73.]

WAC 296–62–09003 Lighting and illumination. (1) General Level. A level of illumination shall be maintained for the various types of jobs in all shops as indicated below. Where there is no level indicated for the specific operation or industry, use that level which is most similar to the job in question.

	Minimum Footcandles Measured 30 Inches Above Floor **
Assembly:	
Rough	10
Medium	20
Fine	B*
Extra fine	A*
Automobile Manufacturing:	
Assembly line	B*
Frame Assembly	20
Body Manufacturing—	
Parts	20
Assembly	20
Finishing and Inspecting	A*
Bakeries	20
Book Binding:	
Folding, Assembling, Pasting, etc.	10
Cutting, Punching and Stitching	20
Embossing	20
Breweries:	
Brew House	5
Boiling, Keg Washing & Filing	10
Bottling	20
Candy Making:	
Box Department	20
Chocolate Department—Husking, Winnowing, Fat Extraction, Crushing, and Refining, Feeding	10
Bean Cleaning and Sorting, Dipping, Packing, Wrapping	20
Milling	30
Cream Making—	
Mixing, Cooking and Molding	20
Gum Drops and Jellied Forms	20
Hand Decorating	50
Hard Candy—	
Mixing, Cooking, Molding	20
Die Cutting and Sorting	30
Kiss Making and Wrapping	30
Canning and Preserving	20
Chemical Works:	
Hand Furnaces, Boiling Tanks, Stationary Driers, Stationary and Gravity Crystallizers	5
Mechanical Furnaces, Generators and Stills, Mechanical Driers, Evaporators, Filtration, Mechanical Crystallizers, Bleaching	10
Tanks for Cooking, Extractors, Percolators, Nitrators, Electrolytic Cells	15
Clay Products and Cements:	
Grinding, Filter Presses, Kiln Rooms	5
Molding, Pressing, Cleaning and Trimming	10
Enameling	15
Color and Glazing	20
Cleaning and Pressing Industry:	
Checking and Sorting	20
Dry and Wet Cleaning and Steaming	10
Inspection and Spotting	A*
Pressing—	
Machine	20
Hand	50
Receiving and Shipping	10
Repair and Alteration	50
Cloth Products:	
Cutting, Inspecting, Sewing—	
Light Goods	20
Dark Goods	A*
Pressing, Cloth Treating (Oil Cloth, etc.)—	
Light Goods	10
Dark Goods	20
Coal Tipples and Cleaning Plants:	
Breaking, Screening and Cleaning	10
Picking	A*
Construction—Indoor:	
General	10
Elevators—Freight and Passenger	10
Engraving	A*
Forge Shops and Welding	10
Garages—Automobiles:	
Storage—Live	10
Storage—Dead	2
Repair Department and Washing	30
Glass Works:	
Mix and Furnace Rooms, Pressing and Lehr, Glass Blowing Machines	10
Grinding, Cutting Glass to Size, Silvering	20
Fine Grinding, Polishing, Beveling, Etching, and Decorating	50 C*
Inspection	B* C*

	Minimum Footcandles Measured 30 Inches Above Floor **
Glove Manufacturing:	
Pressing, Knitting, Sorting—	
Light Goods	10
Dark Goods	20
Cutting, Stitching, Trimming, Inspection—	
Light Goods	20
Dark Goods	A*
Hangars—Airplane:	
Storage—Live	10
Repair Department	50
Hat Manufacturing:	
Dyeing, Stiffening, Braiding, Cleaning, and Refining—	
Light	20
Dark	30
Forming, Sizing, Pouncing, Flanging, Finishing and Ironing—	
Light	20
Dark	30
Sewing—	
Light	20
Dark	A*
Ice Making—Engine and Compressor Room	10
Inspection:	
Rough	20
Medium	30
Fine	B*
Extra Fine	A*
Jewelry and Watch Manufacturing	A*
Laundries	20
Leather Manufacturing	
Vats	5
Cleaning, Tanning and Stretching	10
Cutting, Fleshing and Stuffing	20
Finishing and Scarfing	30
Leather Working:	
Pressing, Winding and Glazing—	
Light	20
Dark	A*
Locker Rooms	10
Machine Shops:	
Rough Bench and Machine Work	20
Medium Bench and Machine Work, Ordinary Automatic Machines, Rough Grinding, Medium Buffing and Polishing	30
Fine Bench and Machine Work, Fine Automatic Machines, Medium Grinding, Fine Buffing and Polishing	B*
Extra Fine Bench and Machine Work—	
Fine Work	A*
Meat Packing:	
Slaughtering	10
Cleaning, Cutting, Cooking, Grinding, Canning, Packing	20
Milling—Grain Foods:	
Cleaning, Grinding and Rolling	10
Baking or Roasting	20
Flour Grading	30
Offices:	
Bookkeeping, Typing and Accounting	50
Business Machines—Power Driven (Transcribing and Tabulating) Calculators, Key Punch, Bookkeeping	B*
Conference Room—	
General Meetings	25
Office Activities—See Desk Work	
Corridors and Stairways	5
Desk Work—	
Intermittent Reading and Writing	25
Prolonged Close Work, Computing, Studying, Designing, etc.	50
Reading Blueprints and Plans	30
Drafting—	
Prolonged Close Work—Art Drafting and Designing in Detail	50
Rough Drawing and Sketching	30
Filing and Index References	25
Lobby	10
Mail Sorting	25
Reception Rooms	10
Stenographic Work	50
Vault	10
Packing and Boxing	10
Paint Mixing	10

	Minimum Footcandles Measured 30 Inches Above Floor **
Paint Shops:	
Dipping, Simple Spraying, Firing	10
Rubbing, Ordinary Hand Painting and Finishing, Art, Stencil and Special Spraying	20
Fine Hand Painting and Finishing	B*
Extra Fine Hand Painting and Finishing (Automobile Bodies, Piano Cases, etc.)	A*
Paper Box Manufacturing:	
Light	10
Dark	20
Storage	5
Paper Manufacturing:	
Beaters, Grinding, Calendering	10
Finishing, Cutting, Trimming, Paper Making Machines	20
Plating	10
Polishing and Burnishing	20
Power Plants, Engine Room, Boilers:	
Boilers, Coal and Ash Handing, Storage Battery Rooms	5
Auxiliary Equipment, Oil Switches and Transformers	10
Engines, Generators, Blowers, Compressors	20
Switchboards	30
Printing Industries:	
Type Foundries—	
Matrix Making, Dressing Type	A*
Font Assembly—Sorting	B*
Hand Casting	30
Machine Casting	20
Printing Plants:	
Presses	30
Imposing Stones	A* C*
Proof Reading	A*
Electrotyping:	
Molding, Finishing, Leveling Molds, Routing, Trimming	B*
Blocking, Tinning	30
Electroplating, Washing, Backing	20
Photo Engraving:	
Etching, Staging	20
Blocking	30
Routing, Finishing, Proofing	B*
Tint Laying	A*
Receiving and Shipping	10

	Minimum Footcandles Measured 30 Inches Above Floor **
Rubber Tire and Tube Manufacturing:	
Stock Preparation—	
Plasticating	20
Milling	20
Calendering	30
Branbury	20
Fabric Preparation—	
Stock Cutting	30
Bead Building	30
Tube Tubing Machines	20
Tread Tubing Machines	20
Tire Building—	
Solid Tire	20
Pneumatic Tire	50
Curing Department—	
Tube Curing	B*
Casing Curing	B*
Final Inspection—	
Tube	B*
Casing	A*
Wrapping	20
Warehouse	5
Mechanical Rubber Goods:	
Stock Preparation—	
Plasticating	20
Milling	20
Calendering	30
Branbury	20
Fabric Preparation—	
Stock Cutting	30
Hose Looms	30
Molded Products	B*
Extruded Products	30
Curing	B*
Inspection	A*
Boxing	20
Warehouse	5
Sheet Metal Works:	
Miscellaneous Machines, Ordinary Bench Work	20
Punches, Presses, Shears, Stamps, Spinning, Medium Bench Work	20 C*
Tin Plate Inspection	B* C*
Shoe Manufacturing (Leather):	
Cutting and Stitching—	
Cutting Tables	20
Marking, Buttonholing, Skiving, Sorting, Vamping and Counting—	
Light Materials	20
Dark Materials	50

	Minimum Footcandles Measured 30 Inches Above Floor **
Stitching—	
Light Materials	50
Dark Materials	B*
Making and Finishing—	
Stitchers, Mailers, Sole Layers, Welt Beaters and Scarfers, Trimmers, Welters, Lasters, Edge Setters, Sluggers, Randers, Wheelers, Treers, Cleaning, Spraying, Buffing, Polishing, Embossing—	
Light Materials	30
Dark Materials	50
Storage, Packing and Shipping	10
Shoe Manufacturing (Rubber):	
Washing, Coating, Mill Run Compounding	10
Varnishing, Vulcanizing, Calendering, Upper and Sole Cutting	30
Sole Rolling, Lining, Making and Finishing Processes	50
Soap Manufacturing:	
Kettle Houses, Cutting, Soap Chip and Powder	10
Stamping, Wrapping and Packing, Filling and Packing Soap Powder	20
Stairways, Passageways	5
Stone Crushing and Screening:	
Belt Conveyor Tubes, Main Line Shafting Spaces, Chute Rooms, Inside of Bins	5
Primary Breaker Room, Auxiliary Breakers under Bins	5
Screens	10
Storage Battery Manufacturing:	
Molding of Grids	10
Store and Stock Rooms:	
Rough Bulky Material	5
Medium or Fine Material Requiring Care	10
Structural Steel Fabrication	10
Sugar Grading	30
Testing:	
Rough	20
Fine	30
Extra Fine Instruments, Scales, etc.	A*
Textile Mills (Cotton):	
Opening, Mixing, Picking, Carding, and Drawing	10
Slubbing, Roving, Spinning	20
Spooling, Warping on Comb	20
Beaming and Slashing on Comb—	
Grey Goods	20
Denims	B*
Inspection—	
Grey Goods (Hand Turning)	50
Denims (Rapidly Moving)	A*
Automatic Tying-in, Weaving	B*
Drawing-in by Hand	A*
Weaving	25
Silk and Rayon Manufacturing:	
Soaking, Fugitive Tinting, and Conditioning or Setting of Twist	10
Winding, Twisting, Rewinding, and Conning, Quilling, Slashing	30
Warping (Silk or Cotton System) on Creel on Running Ends, on Reel, on Beam, on Warp at Beaming	50
Drawing-in—	
On Heddles	A*
On Reed	A*
Weaving—	
On Heddles and Reeds	10
On Warp Back of Harness	20
On Woven Cloth	30
Woolen:	
Carding, Picking, Washing, Combing	15
Twisting, Dyeing	15
Drawing-in, Warping	A*
Weaving—	
Light Goods	25
Dark Goods	50
Knitting Machines	20
Tobacco Products:	
Drying, Stripping, General	10
Grading and Sorting	A*
Toilets and Washrooms	10
Upholstering—Automobile, Coach Furniture	20
Warehouse	5
Welding	30

	Minimum Footcandles Measured 30 Inches Above Floor **
Woodworking:	
Rough Sawing and Bench Work	15
Sizing, Planing, Rough Sanding, Medium Machine and Bench Work, Gluing, Veneering, Cooperage	20
Fine Bench and Machine Work, Fine Sanding and Finishing	50

**Figures represent average level for area with lowest level in area to be 50 percent of the listed value. The levels are exclusive of the levels established for more difficult seeing tasks which follow in Groups A, B and C and which are light–levels on the task measurements.

*Lighting for the more difficult seeing tasks, as indicated by A, B, and C in the foregoing table, are given in the following:

Group A. These seeing tasks involve (a) the discrimination of extremely fine detail under conditions of (b) extremely poor contrast, (c) for long periods of time. To meet these requirements, illumination levels above 100 footcandles are recommended.

To provide illumination of this order, a combination of at least 20 footcandles of general lighting plus specialized supplementary lighting is necessary. The design and installation of the combination systems must not only provide a sufficient amount of light but also must provide the proper direction of light, diffusion, eye protection, and in so far as possible must eliminate direct and reflected glare as well as objectionable shadows.

Group B. This group of visual tasks involves (a) the discrimination of fine detail under conditions of (b) a fair degree of contrast, (c) for long periods of time. Illumination levels from 50 to 100 footcandles are required.

To provide illumination of this order a combination of at least 20 footcandles of general lighting plus specialized supplementary lighting is necessary. The design and installation of the combination systems must not only provide a sufficient amount of light but also must provide the proper direction of light diffusion, eye protection, and in so far as possible must eliminate direct and reflected glare as well as objectionable shadows.

Group C. The seeing tasks of this group require the discrimination of fine detail by utilizing (a) the reflected image of a luminous area or (b) the transmitted light from a luminous area.

The essential requirements are (1) that the luminous area shall be large enough to cover the surface which is being inspected and (2) that the brightness be within the limits necessary to obtain comfortable contrast conditions. This involves the use of sources of large area and relatively low brightness in which the source brightness is the principal factor rather than the footcandles produced at a given point.

(3) Diffusion and Distribution of Artificial and Natural Light. Artificial light sources shall be installed in regard to mounting height, spacing and reflectors or other suitable accessories, as to secure a reasonable uniform distribution of illumination and to avoid glare and sharply defined shadows from overhanging structural parts or persons in normal working positions. Suitable awnings, window shades, diffusive or refractive window glass shall be used where necessary to improve the diffusion and distribution of natural light. [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 corresponding 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	970×10^6	670
0.0001	720×10^6	500
0.005	820×10^6	570
0.02	400×10^6	280
0.1	120×10^6	80
0.5	43×10^6	30
1.0	26×10^6	18
2.5	29×10^6	20
5.0	26×10^6	18
7.5	24×10^6	17
10	24×10^6	17
10 to 30	14×10^6	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.

(2) Atomic Energy Commission Licensees—AEC Contractors Operating AEC 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 Atomic Energy 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) AEC contractors operating AEC 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 Atomic Energy Commission for the operation of AEC 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:

EXPOSURE IN RESTRICTED AREAS	Rems per Calendar Quarter
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 Part 1 of Table I of this Standard. The limits given in Part 1 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 Part II of Table I of this Standard. 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.

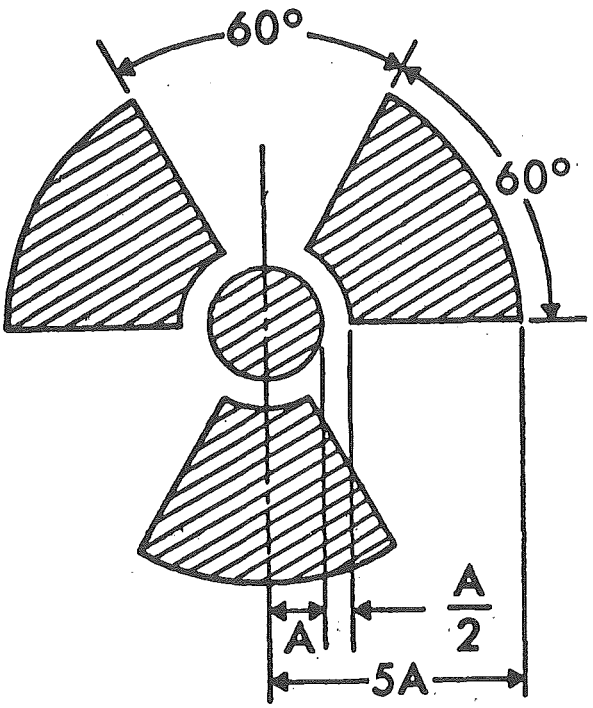


FIGURE G–10

(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 Part 1 of Table 1 of this Standard.

(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 Part I of Table I of this Standard.

(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 Table II of this Standard 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 Table II of this Standard 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 Table II of this Standard 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 Part I of Table I of this Standard.

(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 Atomic Energy 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 by transfer to an authorized recipient, or in a manner approved by the Atomic Energy Commission or Industrial Health Section, Department of Labor and Industries.

(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 Atomic Energy 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 Part II of Table I of this Standard.

(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 Atomic Energy 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 Atomic Energy 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 Table I of this Standard.

(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 following this section.

TABLE I

CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See notes at end of table]

Element (atomic number)	Isotope[1]		Part I Column 1 Air (μCi/ml)	Part I Column 2 Water (μCi/ml)	Part II Column 1 Air (μCi/ml)	Part II Column 2 Water (μCi/ml)
Actinium (89)	Ac-227	S	$2X10^{-12}$	$6X10^{-5}$	$8X10^{-14}$	$2X10^{-6}$
		I	$3X10^{-11}$	$9X10^{-3}$	$9X10^{-13}$	$3X10^{-4}$
	Ac-228	S	$8X10^{-8}$	$3X10^{-3}$	$3X10^{-9}$	$9X10^{-5}$
		I	$2X10^{-8}$	$3X10^{-3}$	$6X10^{-10}$	$9X10^{-5}$
Americium (95)	Am-241	S	$6X10^{-12}$	$1X10^{-4}$	$2X10^{-13}$	$4X10^{-6}$
		I	$1X10^{-10}$	$8X10^{-4}$	$4X10^{-12}$	$3X10^{-5}$
	Am-242m	S	$6X10^{-12}$	$1X10^{-4}$	$2X10^{-13}$	$4X10^{-6}$
		I	$3X10^{-10}$	$3X10^{-3}$	$9X10^{-12}$	$9X10^{-5}$
	Am-242	S	$4X10^{-8}$	$4X10^{-3}$	$1X10^{-9}$	$1X10^{-4}$
		I	$5X10^{-8}$	$4X10^{-3}$	$2X10^{-9}$	$1X10^{-4}$
	Am-243	S	$6X10^{-12}$	$1X10^{-4}$	$2X10^{-13}$	$4X10^{-6}$
		I	$1X10^{-10}$	$8X10^{-4}$	$4X10^{-12}$	$3X10^{-5}$
	Am-244	S	$4X10^{-6}$	$1X10^{-1}$	$1X10^{-7}$	$5X10^{-3}$
		I	$2X10^{-5}$	$1X10^{-1}$	$8X10^{-7}$	$5X10^{-3}$
Antimony (51)	Sb-122	S	$2X10^{-7}$	$8X10^{-4}$	$6X10^{-9}$	$3X10^{-5}$
		I	$1X10^{-7}$	$8X10^{-4}$	$5X10^{-9}$	$3X10^{-5}$
	Sb-124	S	$2X10^{-7}$	$7X10^{-4}$	$5X10^{-9}$	$2X10^{-5}$
		I	$2X10^{-8}$	$7X10^{-4}$	$7X10^{-10}$	$2X10^{-5}$
	Sb-125	S	$5X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
		I	$3X10^{-8}$	$3X10^{-3}$	$9X10^{-10}$	$1X10^{-4}$
Argon (18)	Ar-37	Sub[2]	$6X10^{-3}$	———	$1X10^{-4}$	———
	Ar-41	Sub	$2X10^{-6}$	———	$4X10^{-8}$	———

TABLE I

CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See notes at end of table]

Element (atomic number)	Isotope[1]		Part I Column 1 Air (μCi/ml)	Part I Column 2 Water (μCi/ml)	Part II Column 1 Air (μCi/ml)	Part II Column 2 Water (μCi/ml)
Arsenic (33)	As-73	S	$2X10^{-6}$	$1X10^{-2}$	$7X10^{-8}$	$5X10^{-4}$
		I	$4X10^{-7}$	$1X10^{-2}$	$1X10^{-8}$	$5X10^{-4}$
	As-74	S	$3X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$5X10^{-5}$
		I	$1X10^{-7}$	$2X10^{-3}$	$4X10^{-9}$	$5X10^{-5}$
	As-76	S	$1X10^{-7}$	$6X10^{-4}$	$4X10^{-9}$	$2X10^{-5}$
		I	$1X10^{-7}$	$6X10^{-4}$	$3X10^{-9}$	$2X10^{-5}$
	As-77	S	$5X10^{-7}$	$2X10^{-3}$	$2X10^{-8}$	$8X10^{-5}$
		I	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$8x10^{-5}$
Astatine (85)	At-211	S	$7X10^{-9}$	$5X10^{-5}$	$2X10^{-10}$	$2X10^{-6}$
		I	$3X10^{-8}$	$2X10^{-3}$	$1X10^{-9}$	$7X10^{-5}$
Barium (56)	Ba-131	S	$1X10^{-6}$	$5X10^{-3}$	$4X10^{-8}$	$2X10^{-4}$
		I	$4X10^{-7}$	$5X10^{-3}$	$1X10^{-8}$	$2X10^{-4}$
	Ba-140	S	$1X10^{-7}$	$8X10^{-4}$	$4X10^{-9}$	$3X10^{-5}$
		I	$4X10^{-8}$	$7X10^{-4}$	$1X10^{-9}$	$2X10^{-5}$
Berkelium (97)	Bk-249	S	$9X10^{-10}$	$2X10^{-2}$	$3X10^{-11}$	$6X10^{-4}$
		I	$1X10^{-7}$	$2X10^{-2}$	$4X10^{-9}$	$6X10^{-4}$
	Bk-250	S	$1X10^{-7}$	$6X10^{-3}$	$5X10^{-9}$	$2X10^{-4}$
		I	$1X10^{-6}$	$6X10^{-3}$	$4X10^{-8}$	$2X10^{-4}$
Beryllium (4)	Be-7	S	$6X10^{-6}$	$5X10^{-2}$	$2X10^{-7}$	$2X10^{-3}$
		I	$1X10^{-6}$	$5X10^{-2}$	$4X10^{-8}$	$2X10^{-3}$
Bismuth (83)	Bi-206	S	$2X10^{-7}$	$1X10^{-3}$	$6X10^{-9}$	$4X10^{-5}$
		I	$1X10^{-7}$	$1X10^{-3}$	$5X10^{-9}$	$4X10^{-5}$
	Bi-207	S	$2X10^{-7}$	$2X10^{-3}$	$6X10^{-9}$	$6X10^{-5}$
		I	$1X10^{-8}$	$2X10^{-3}$	$5X10^{-10}$	$6X10^{-5}$
	Bi-210	S	$6X10^{-9}$	$1X10^{-3}$	$2X10^{-10}$	$4X10^{-5}$
		I	$6X10^{-9}$	$1X10^{-3}$	$2X10^{-10}$	$4X10^{-5}$
	Bi-212	S	$1X10^{-7}$	$1X10^{-2}$	$3X10^{-9}$	$4X10^{-4}$
		I	$2X10^{-7}$	$1X10^{-2}$	$7X10^{-9}$	$4X10^{-4}$
Bromine (35)	Br-82	S	$1X10^{-6}$	$8X10^{-3}$	$4X10^{-8}$	$3X10^{-4}$
		I	$2X10^{-7}$	$1X10^{-3}$	$6X10^{-9}$	$4X10^{-5}$
Cadmium (48)	Cd-109	S	$5X10^{-8}$	$5X10^{-3}$	$2X10^{-9}$	$2X10^{-4}$
		I	$7X10^{-8}$	$5X10^{-3}$	$3X10^{-9}$	$2X10^{-4}$
	Cd-115m	S	$4X10^{-8}$	$7X10^{-4}$	$1X10^{-9}$	$3X10^{-5}$
		I	$4X10^{-8}$	$7X10^{-4}$	$1X10^{-9}$	$3X10^{-5}$
	Cd-115	S	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$3X10^{-5}$
		I	$2X10^{-7}$	$1X10^{-3}$	$6X10^{-9}$	$4X10^{-5}$
Calcium (20)	Ca-45	S	$3X10^{-8}$	$3X10^{-4}$	$1X10^{-9}$	$9X10^{-6}$
		I	$1X10^{-7}$	$5X10^{-3}$	$4X10^{-9}$	$2X10^{-4}$
	Ca-47	S	$2X10^{-7}$	$1X10^{-3}$	$6X10^{-9}$	$5X10^{-5}$
		I	$2X10^{-7}$	$1X10^{-3}$	$6X10^{-9}$	$3X10^{-5}$
Californium (98)	Cf-249	S	$2X10^{-12}$	$1X10^{-4}$	$5X10^{-14}$	$4X10^{-6}$
		I	$1X10^{-10}$	$7X10^{-4}$	$3X10^{-12}$	$2X10^{-5}$
	Cf-250	S	$5X10^{-12}$	$4X10^{-4}$	$2X10^{-13}$	$1X10^{-5}$
		I	$1X10^{-10}$	$7X10^{-4}$	$3X10^{-12}$	$3X10^{-5}$
	Cf-251	S	$2X10^{-12}$	$1X10^{-4}$	$6X10^{-14}$	$4X10^{-6}$
		I	$1X10^{-10}$	$8X10^{-4}$	$3X10^{-12}$	$3X10^{-5}$
	Cf-252	S	$6X10^{-12}$	$2X10^{-4}$	$2X10^{-13}$	$7X10^{-6}$
		I	$3X10^{-11}$	$2X10^{-4}$	$1X10^{-12}$	$7X10^{-6}$
	Cf-253	S	$8X10^{-10}$	$4X10^{-3}$	$3X10^{-11}$	$1X10^{-4}$
		I	$8X10^{-10}$	$4X10^{-3}$	$3X10^{-11}$	$1X10^{-4}$
	Cf-254	S	$5X10^{-12}$	$4X10^{-6}$	$2X10^{-13}$	$1X10^{-7}$
		I	$5X10^{-12}$	$4X10^{-6}$	$2X10^{-13}$	$1X10^{-7}$
Carbon (6)	C-14	S	$4X10^{-6}$	$2X10^{-2}$	$1X10^{-7}$	$8X10^{-4}$
	(CO_2)	Sub[2]	$5X10^{-5}$	———	$1X10^{-6}$	———
Cerium (58)	Ce-141	S	$4X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$9X10^{-5}$
		I	$2X10^{-7}$	$3X10^{-3}$	$5X10^{-9}$	$9X10^{-5}$
	Ce-143	S	$3X10^{-7}$	$1X10^{-3}$	$9X10^{-9}$	$4X10^{-5}$
		I	$2X10^{-7}$	$1X10^{-3}$	$7X10^{-9}$	$4X10^{-5}$
	Ce-144	S	$1X10^{-8}$	$3X10^{-4}$	$3X10^{-10}$	$1X10^{-5}$
		I	$6X10^{-9}$	$3X10^{-4}$	$2X10^{-10}$	$1X10^{-5}$
Cesium (55)	Cs-131	S	$1X10^{-5}$	$7X10^{-2}$	$4X10^{-7}$	$2X10^{-3}$
		I	$3X10^{-6}$	$3X10^{-2}$	$1X10^{-7}$	$9X10^{-4}$
	Cs-134m	S	$4X10^{-5}$	$2X10^{-1}$	$1X10^{-6}$	$6X10^{-3}$
		I	$6X10^{-6}$	$3X10^{-2}$	$2X10^{-7}$	$1X10^{-3}$
	Cs-134	S	$4X10^{-8}$	$3X10^{-4}$	$1X10^{-9}$	$9X10^{-6}$
		I	$1X10^{-8}$	$1X10^{-3}$	$4X10^{-10}$	$4X10^{-5}$
	Cs-135	S	$5X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
		I	$9X10^{-8}$	$7X10^{-3}$	$3X10^{-9}$	$2X10^{-4}$
	Cs-136	S	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$9X10^{-5}$
		I	$2X10^{-7}$	$2X10^{-3}$	$6X10^{-9}$	$6X10^{-5}$
	Cs-137	S	$6X10^{-8}$	$4X10^{-4}$	$2X10^{-9}$	$2X10^{-5}$
		I	$1X10^{-8}$	$1X10^{-3}$	$5X10^{-10}$	$4X10^{-5}$
Chlorine (17)	Cl-36	S	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$8X10^{-5}$
		I	$2X10^{-8}$	$2X10^{-3}$	$8X10^{-10}$	$6X10^{-5}$
	Cl-38	S	$3X10^{-6}$	$1X10^{-2}$	$9X10^{-8}$	$4X10^{-4}$
		I	$2X10^{-6}$	$1X10^{-2}$	$7X10^{-8}$	$4X10^{-4}$
Chromium (24)	Cr-51	S	$1X10^{-5}$	$5X10^{-2}$	$4X10^{-7}$	$2X10^{-3}$
		I	$2X10^{-6}$	$5X10^{-2}$	$8X10^{-8}$	$2X10^{-3}$
Cobalt (27)	Co-57	S	$3X10^{-6}$	$2X10^{-2}$	$1X10^{-7}$	$5X10^{-4}$
		I	$2X10^{-7}$	$1X10^{-2}$	$6X10^{-9}$	$4X10^{-4}$
	Co-58m	S	$2X10^{-5}$	$8X10^{-2}$	$6X10^{-7}$	$3X10^{-3}$
		I	$9X10^{-6}$	$6X10^{-2}$	$3X10^{-7}$	$2X10^{-3}$
	Co-58	S	$8X10^{-7}$	$4X10^{-3}$	$3X10^{-8}$	$1X10^{-4}$
		I	$5X10^{-8}$	$3X10^{-3}$	$2X10^{-9}$	$9X10^{-5}$
	Co-60	S	$3X10^{-7}$	$1X10^{-3}$	$1X10^{-8}$	$5X10^{-5}$
		I	$9X10^{-9}$	$1X10^{-3}$	$3X10^{-10}$	$3X10^{-5}$
Copper (29)	Cu-64	S	$2X10^{-6}$	$1X10^{-2}$	$7X10^{-8}$	$3X10^{-4}$
		I	$1X10^{-6}$	$6X10^{-3}$	$4X10^{-8}$	$2X10^{-4}$
Curium (96)	Cm-242	S	$1X10^{-10}$	$7X10^{-4}$	$4X10^{-12}$	$2X10^{-5}$
		I	$2X10^{-10}$	$7X10^{-4}$	$6X10^{-12}$	$2X10^{-5}$
	Cm-243	S	$6X10^{-12}$	$1X10^{-4}$	$2X10^{-13}$	$5X10^{-6}$
		I	$1X10^{-10}$	$7X10^{-4}$	$3X10^{-12}$	$2X10^{-5}$
	Cm-244	S	$9X10^{-12}$	$2X10^{-4}$	$3X10^{-13}$	$7X10^{-6}$
		I	$1X10^{-10}$	$8X10^{-4}$	$3X10^{-12}$	$3X10^{-5}$
	Cm-245	S	$5X10^{-12}$	$1X10^{-4}$	$2X10^{-13}$	$4X10^{-6}$
		I	$1X10^{-10}$	$8X10^{-4}$	$4X10^{-12}$	$3X10^{-5}$
	Cm-246	S	$5X10^{-12}$	$1X10^{-4}$	$2X10^{-13}$	$4X10^{-6}$
		I	$1X10^{-10}$	$8X10^{-4}$	$4X10^{-12}$	$3X10^{-5}$
	Cm-247	S	$5X10^{-12}$	$1X10^{-4}$	$2X10^{-13}$	$4X10^{-6}$
		I	$1X10^{-10}$	$6X10^{-4}$	$4X10^{-12}$	$2X10^{-5}$
	Cm-248	S	$6X10^{-13}$	$1X10^{-5}$	$2X10^{-14}$	$4X10^{-7}$
		I	$1X10^{-11}$	$4X10^{-5}$	$4X10^{-13}$	$1X10^{-6}$
	Cm-249	S	$1X10^{-5}$	$6X10^{-2}$	$4X10^{-7}$	$2X10^{-3}$
		I	$1X10^{-5}$	$6X10^{-2}$	$4X10^{-7}$	$2X10^{-3}$
Dysprosium (66)	Dy-165	S	$3X10^{-6}$	$1X10^{-2}$	$9X10^{-8}$	$4X10^{-4}$
		I	$2X10^{-6}$	$1X10^{-2}$	$7X10^{-8}$	$4X10^{-4}$
	Dy-166	S	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$4X10^{-5}$
		I	$2X10^{-7}$	$1X10^{-3}$	$7X10^{-9}$	$4X10^{-5}$
Einsteinium (99)	Es-253	S	$8X10^{-10}$	$7X10^{-4}$	$3X10^{-11}$	$2X10^{-5}$
		I	$6X10^{-10}$	$7X10^{-4}$	$2X10^{-11}$	$2X10^{-5}$
	Es-254m	S	$5X10^{-9}$	$5X10^{-4}$	$2X10^{-10}$	$2X10^{-5}$
		I	$6X10^{-9}$	$5X10^{-4}$	$2X10^{-10}$	$2X10^{-5}$
	Es-254	S	$2X10^{-11}$	$4X10^{-4}$	$6X10^{-13}$	$1X10^{-5}$
		I	$1X10^{-10}$	$4X10^{-4}$	$4X10^{-12}$	$1X10^{-5}$
	Es-255	S	$5X10^{-10}$	$8X10^{-4}$	$2X10^{-11}$	$3X10^{-5}$
		I	$4X10^{-10}$	$8X10^{-4}$	$1X10^{-11}$	$3X10^{-5}$
Erbium (68)	Er-169	S	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$9X10^{-5}$
		I	$4X10^{-7}$	$3X10^{-3}$	$1X10^{-8}$	$9X10^{-5}$
	Er-171	S	$7X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
		I	$6x10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
Europium (63) (T_r=9.2 hrs)	Eu-152	S	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
		I	$3X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
(T_r=13 yrs)	Eu-152	S	$1X10^{-8}$	$2X10^{-3}$	$4X10^{-10}$	$8X10^{-5}$
		I	$2X10^{-8}$	$2X10^{-3}$	$6X10^{-10}$	$8X10^{-5}$
	Eu-154	S	$4X10^{-9}$	$6X10^{-4}$	$1X10^{-10}$	$2X10^{-5}$
		I	$7X10^{-9}$	$6X10^{-4}$	$2X10^{-10}$	$2X10^{-5}$
	Eu-155	S	$9X10^{-8}$	$6X10^{-3}$	$3X10^{-9}$	$2X10^{-4}$
		I	$7X10^{-8}$	$6X10^{-3}$	$3X10^{-9}$	$2X10^{-4}$

TABLE I

CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See notes at end of table]

TABLE I

CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See notes at end of table]

Element (atomic number)	Isotope[1]		Part I Column 1 Air (μCi/ml)	Part I Column 2 Water (μCi/ml)	Part II Column 1 Air (μCi/ml)	Part II Column 2 Water (μCi/ml)
Fermium (100)	Fm-254	S	$6X10^{-8}$	$4X10^{-3}$	$2X10^{-9}$	$1X10^{-4}$
		I	$7X10^{-8}$	$4X10^{-3}$	$2X10^{-9}$	$1X10^{-4}$
	Fm-255	S	$2X10^{-8}$	$1X10^{-3}$	$6X10^{-10}$	$3X10^{-5}$
		I	$1X10^{-8}$	$1X10^{-3}$	$4X10^{-10}$	$3X10^{-5}$
	Fm-256	S	$3X10^{-9}$	$3X10^{-5}$	$1X10^{-10}$	$9X10^{-7}$
		I	$2X10^{-9}$	$3X10^{-5}$	$6X10^{-11}$	$9X10^{-7}$
Fluorine (9)	F-18	S	$5X10^{-6}$	$2X10^{-2}$	$2X10^{-7}$	$8X10^{-4}$
		I	$3X10^{-6}$	$1X10^{-2}$	$9X10^{-8}$	$5X10^{-4}$
Gadolinium (64)	Gd-153	S	$2X10^{-7}$	$6X10^{-3}$	$8X10^{-9}$	$2X10^{-4}$
		I	$9X10^{-8}$	$6X10^{-3}$	$3X10^{-9}$	$2X10^{-4}$
	Gd-159	S	$5X10^{-7}$	$2X10^{-3}$	$2X10^{-8}$	$8X10^{-5}$
		I	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$8X10^{-5}$
Gallium (31)	Ga-72	S	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$4X10^{-5}$
		I	$2X10^{-7}$	$1X10^{-3}$	$6X10^{-9}$	$4X10^{-5}$
Germanium (32)	Ge-71	S	$1X10^{-5}$	$5X10^{-2}$	$4X10^{-7}$	$2X10^{-3}$
		I	$6X10^{-6}$	$5X10^{-2}$	$2X10^{-7}$	$2X10^{-3}$
Gold (79)	Au-196	S	$1X10^{-6}$	$5X10^{-3}$	$4X10^{-8}$	$2X10^{-4}$
		I	$6X10^{-7}$	$4X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
	Au-198	S	$3X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$5X10^{-5}$
		I	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$5X10^{-5}$
	Au-199	S	$1X10^{-6}$	$5X10^{-3}$	$4X10^{-8}$	$2X10^{-4}$
		I	$8X10^{-7}$	$4X10^{-3}$	$3X10^{-8}$	$2X10^{-4}$
Hafnium (72)	Hf-181	S	$4X10^{-8}$	$2X10^{-3}$	$1X10^{-9}$	$7X10^{-5}$
		I	$7X10^{-8}$	$2X10^{-3}$	$3X10^{-9}$	$7X10^{-5}$
Holmium (67)	Ho-166	S	$2X10^{-7}$	$9X10^{-4}$	$7X10^{-9}$	$3X10^{-5}$
		I	$2X10^{-7}$	$9X10^{-4}$	$6X10^{-9}$	$3X10^{-5}$
Hydrogen (1)	H-3	S	$5X10^{-6}$	$1X10^{-1}$	$2X10^{-7}$	$3X10^{-3}$
		I	$5X10^{-6}$	$1X10^{-1}$	$2X10^{-7}$	$3X10^{-3}$
		Sub[2]	$2X10^{-3}$	———	$4X10^{-5}$	———
Indium (49)	In-113m	S	$8X10^{-6}$	$4X10^{-2}$	$3X10^{-7}$	$1X10^{-3}$
		I	$7X10^{-6}$	$4X10^{-2}$	$2X10^{-7}$	$1X10^{-3}$
	In-114m	S	$1X10^{-7}$	$5X10^{-4}$	$4X10^{-9}$	$2X10^{-5}$
		I	$2X10^{-8}$	$5X10^{-4}$	$7X10^{-10}$	$2X10^{-5}$
	In-115m	S	$2X10^{-6}$	$1X10^{-2}$	$8X10^{-8}$	$4X10^{-4}$
		I	$2X10^{-6}$	$1X10^{-2}$	$6X10^{-8}$	$4X10^{-4}$
	In-115	S	$2X10^{-7}$	$3X10^{-3}$	$9X10^{-9}$	$9X10^{-5}$
		I	$3X10^{-8}$	$3X10^{-3}$	$1X10^{-9}$	$9X10^{-5}$
Iodine (53)	I-125	S	$5X10^{-9}$	$4X10^{-5}$	$8X10^{-11}$	$2X10^{-7}$
		I	$2X10^{-7}$	$6X10^{-3}$	$6X10^{-9}$	$2X10^{-4}$
	I-126	S	$8X10^{-9}$	$5X10^{-5}$	$9X10^{-11}$	$3X10^{-7}$
		I	$3X10^{-7}$	$3X10^{-3}$	$1X10^{-8}$	$9X10^{-5}$
	I-129	S	$2X10^{-9}$	$1X10^{-5}$	$2X10^{-11}$	$6X10^{-8}$
		I	$7X10^{-8}$	$6X10^{-3}$	$2X10^{-9}$	$2X10^{-4}$
	I-131	S	$9X10^{-9}$	$6X10^{-5}$	$1X10^{-10}$	$3X10^{-7}$
		I	$3X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
	I-132	S	$2X10^{-7}$	$2X10^{-3}$	$3X10^{-9}$	$8X10^{-6}$
		I	$9X10^{-7}$	$5X10^{-3}$	$3X10^{-8}$	$2X10^{-4}$
	I-133	S	$3X10^{-8}$	$2X10^{-4}$	$4X10^{-10}$	$1X10^{-6}$
		I	$2X10^{-7}$	$1X10^{-3}$	$7X10^{-9}$	$4X10^{-5}$
	I-134	S	$5X10^{-7}$	$4X10^{-3}$	$6X10^{-9}$	$2X10^{-5}$
		I	$3X10^{-6}$	$2X10^{-2}$	$1X10^{-7}$	$6X10^{-4}$
	I-135	S	$1X10^{-7}$	$7X10^{-4}$	$1X10^{-9}$	$4X10^{-6}$
		I	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$7X10^{-5}$
Iridium (77)	Ir-190	S	$1X10^{-6}$	$6X10^{-3}$	$4X10^{-8}$	$2X10^{-4}$
		I	$4X10^{-7}$	$5X10^{-3}$	$1X10^{-8}$	$2X10^{-4}$
	Ir-192	S	$1X10^{-7}$	$1X10^{-3}$	$4X10^{-9}$	$4X10^{-5}$
		I	$3X10^{-8}$	$1X10^{-3}$	$9X10^{-10}$	$4X10^{-5}$
	Ir-194	S	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$3X10^{-5}$
		I	$2X10^{-7}$	$9X10^{-4}$	$5X10^{-9}$	$3X10^{-5}$
Iron (26)	Fe-55	S	$9X10^{-7}$	$2X10^{-2}$	$3X10^{-8}$	$8X10^{-4}$
		I	$1X10^{-6}$	$7X10^{-2}$	$3X10^{-8}$	$2X10^{-3}$
	Fe-59	S	$1X10^{-7}$	$2X10^{-3}$	$5X10^{-9}$	$6X10^{-5}$
		I	$5X10^{-8}$	$2X10^{-3}$	$2X10^{-9}$	$5X10^{-5}$

TABLE I

CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See notes at end of table]

Element (atomic number)	Isotope[1]		Part I Column 1 Air (μCi/ml)	Part I Column 2 Water (μCi/ml)	Part II Column 1 Air (μCi/ml)	Part II Column 2 Water (μCi/ml)
Krypton (36)	Kr-85m	Sub[2]	$6X10^{-6}$	———	$1X10^{-7}$	———
	Kr-85	Sub	$1X10^{-5}$	———	$3X10^{-7}$	———
	Kr-87	Sub	$1X10^{-6}$	———	$2X10^{-8}$	———
	Kr-88	Sub	$1X10^{-6}$	———	$2X10^{-8}$	———
Lanthanum (57)	La-140	S	$2X10^{-7}$	$7X10^{-4}$	$5X10^{-9}$	$2X10^{-5}$
		I	$1X10^{-7}$	$7X10^{-4}$	$4X10^{-9}$	$2X10^{-5}$
Lead (82)	Pb-203	S	$3X10^{-6}$	$1X10^{-2}$	$9X10^{-8}$	$4X10^{-4}$
		I	$2X10^{-6}$	$1X10^{-2}$	$6X10^{-8}$	$4X10^{-4}$
	Pb-210	S	$1X10^{-10}$	$4X10^{-6}$	$4X10^{-12}$	$1X10^{-7}$
		I	$2X10^{-10}$	$5X10^{-3}$	$8X10^{-12}$	$2X10^{-4}$
	Pb-212	S	$2X10^{-8}$	$6X10^{-4}$	$6X10^{-10}$	$2X10^{-5}$
		I	$2X10^{-8}$	$5X10^{-4}$	$7X10^{-10}$	$2X10^{-5}$
Lutetium (71)	Lu-177	S	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
		I	$5X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
Manganese (25)	Mn-52	S	$2X10^{-7}$	$1X10^{-3}$	$7X10^{-9}$	$3X10^{-5}$
		I	$1X10^{-7}$	$9X10^{-4}$	$5X10^{-9}$	$3X10^{-5}$
	Mn-54	S	$4X10^{-7}$	$4X10^{-3}$	$1X10^{-8}$	$1X10^{-4}$
		I	$4X10^{-8}$	$3X10^{-3}$	$1X10^{-9}$	$1X10^{-4}$
	Mn-56	S	$8X10^{-7}$	$4X10^{-3}$	$3X10^{-8}$	$1X10^{-4}$
		I	$5X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
Mercury (80)	Hg-197m	S	$7X10^{-7}$	$6X10^{-3}$	$3X10^{-8}$	$2X10^{-4}$
		I	$8X10^{-7}$	$5X10^{-3}$	$3X10^{-8}$	$2X10^{-4}$
	Hg-197	S	$1X10^{-6}$	$9X10^{-3}$	$4X10^{-8}$	$3X10^{-4}$
		I	$3X10^{-6}$	$1X10^{-2}$	$9X10^{-8}$	$5X10^{-4}$
	Hg-203	S	$7X10^{-8}$	$5X10^{-4}$	$2X10^{-9}$	$2X10^{-5}$
		I	$1X10^{-7}$	$3X10^{-3}$	$4X10^{-9}$	$1X10^{-4}$
Molybdenum (42)	Mo-99	S	$7X10^{-7}$	$5X10^{-3}$	$3X10^{-8}$	$2X10^{-4}$
		I	$2X10^{-7}$	$1X10^{-3}$	$7X10^{-9}$	$4X10^{-5}$
Neodymium (60)	Nd-144	S	$8X10^{-11}$	$2X10^{-3}$	$3X10^{-12}$	$7X10^{-5}$
		I	$3X10^{-10}$	$2X10^{-3}$	$1X10^{-11}$	$8X10^{-5}$
	Nd-147	S	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
		I	$2X10^{-7}$	$2X10^{-3}$	$8X10^{-9}$	$6X10^{-5}$
	Nd-149	S	$2X10^{-6}$	$8X10^{-3}$	$6X10^{-8}$	$3X10^{-4}$
		I	$1X10^{-6}$	$8X10^{-3}$	$5X10^{-8}$	$3X10^{-4}$
Neptunium (93)	Np-237	S	$4X10^{-12}$	$9X10^{-5}$	$1X10^{-13}$	$3X10^{-5}$
		I	$1X10^{-10}$	$9X10^{-4}$	$4X10^{-12}$	$3X10^{-5}$
	Np-239	S	$8X10^{-7}$	$4X10^{-3}$	$3X10^{-8}$	$1X10^{-4}$
		I	$7X10^{-7}$	$4X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
Nickel (28)	Ni-59	S	$5X10^{-7}$	$6X10^{-3}$	$2X10^{-8}$	$2X10^{-4}$
		I	$8X10^{-7}$	$6X10^{-2}$	$3X10^{-8}$	$2X10^{-3}$
	Ni-63	S	$6X10^{-8}$	$8X10^{-4}$	$2X10^{-9}$	$3X10^{-5}$
		I	$3X10^{-7}$	$2X10^{-2}$	$1X10^{-8}$	$7X10^{-4}$
	Ni-65	S	$9X10^{-7}$	$4X10^{-3}$	$3X10^{-8}$	$1X10^{-4}$
		I	$5X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
Niobium (41)	Nb-93m	S	$1X10^{-7}$	$1X10^{-2}$	$4X10^{-9}$	$4X10^{-4}$
		I	$2X10^{-7}$	$1X10^{-2}$	$5X10^{-9}$	$4X10^{-4}$
	Nb-95	S	$5X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
		I	$1X10^{-7}$	$3X10^{-3}$	$3X10^{-9}$	$1X10^{-4}$
	Nb-97	S	$6X10^{-6}$	$3X10^{-2}$	$2X10^{-7}$	$9X10^{-4}$
		I	$5X10^{-6}$	$3X10^{-2}$	$2X10^{-7}$	$9X10^{-4}$
Osmium (76)	Os-185	S	$5X10^{-7}$	$2X10^{-3}$	$2X10^{-8}$	$7X10^{-5}$
		I	$5X10^{-8}$	$2X10^{-3}$	$2X10^{-9}$	$7X10^{-5}$
	Os-191m	S	$2X10^{-5}$	$7X10^{-2}$	$6X10^{-7}$	$3X10^{-3}$
		I	$9X10^{-6}$	$7X10^{-2}$	$3X10^{-7}$	$2X10^{-3}$
	Os-191	S	$1X10^{-6}$	$5X10^{-3}$	$4X10^{-8}$	$2X10^{-4}$
		I	$4X10^{-7}$	$5X10^{-3}$	$1X10^{-8}$	$2X10^{-4}$
	Os-193	S	$4X10^{-7}$	$2X10^{-3}$	$1X10^{8}$	$6X10^{-5}$
		I	$3X10^{-7}$	$2X10^{-3}$	$9X10^{-9}$	$5X10^{-5}$
Palladium (46)	Pd-103	S	$1X10^{-6}$	$1X10^{-2}$	$5X10^{-8}$	$3X10^{-4}$
		I	$7X10^{-7}$	$8X10^{-3}$	$3X10^{-8}$	$3X10^{-4}$
	Pd-109	S	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$9X10^{-5}$
		I	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$7X10^{-5}$
Phosphorus (15)	P-32	S	$7X10^{-8}$	$5X10^{-4}$	$2X10^{-9}$	$2X10^{-5}$
		I	$8X10^{-8}$	$7X10^{-4}$	$3X10^{-9}$	$2X10^{-5}$

TABLE I

CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See notes at end of table]

Element (atomic number)	Isotope[1]		Part I Column 1 Air (μCi/ml)	Part I Column 2 Water (μCi/ml)	Part II Column 1 Air (μCi/ml)	Part II Column 2 Water (μCi/ml)
Platinum (78)	Pt-191	S	$8X10^{-7}$	$4X10^{-3}$	$3X10^{-8}$	$1X10^{-4}$
		I	$6X10^{-7}$	$3X10^{-3}$	$2X10^{8}$	$1X10^{-4}$
	Pt-193m	S	$7X10^{-6}$	$3X10^{-2}$	$2X10^{-7}$	$1X10^{-3}$
		I	$5X10^{-6}$	$3X10^{-2}$	$2X10^{-7}$	$1X10^{-3}$
		I	$3X10^{-7}$	$5X10^{-2}$	$1X10^{-8}$	$2X10^{-3}$
	Pt-197m	S	$6X10^{-6}$	$3X10^{-2}$	$2X10^{-7}$	$1X10^{-3}$
		I	$5X10^{-6}$	$3X10^{-2}$	$2X10^{-7}$	$9X10^{-4}$
	Pt-197	S	$8X10^{-7}$	$4X10^{-3}$	$3X10^{-8}$	$1X10^{-4}$
		I	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
Plutonium (94)	Pu-238	S	$2X10^{-12}$	$1X10^{-4}$	$7X10^{-14}$	$5X10^{-6}$
		I	$3X10^{-11}$	$8X10^{-4}$	$1X10^{-12}$	$3X10^{-5}$
	Pu-239	S	$2X10^{-12}$	$1X10^{-4}$	$6X10^{-14}$	$5X10^{-6}$
		I	$4X10^{-11}$	$8X10^{-4}$	$1X10^{-12}$	$3X10^{-5}$
	Pu-240	S	$2X10^{-12}$	$1X10^{-4}$	$6X10^{-14}$	$5X10^{-6}$
		I	$4X10^{-11}$	$8X10^{-4}$	$1X10^{-12}$	$3X10^{-5}$
	Pu-241	S	$9X10^{-11}$	$7X10^{-3}$	$3X10^{-12}$	$2X10^{-4}$
		I	$4X10^{-8}$	$4X10^{-2}$	$1X10^{-9}$	$1X10^{-3}$
	Pu-242	S	$2X10^{-12}$	$1X10^{-4}$	$6X10^{-14}$	$5X10^{-6}$
		I	$4X10^{-11}$	$9X10^{-4}$	$1X10^{-12}$	$3X10^{-5}$
	Pu-243	S	$2X10^{-6}$	$1X10^{-2}$	$6X10^{-8}$	$3X10^{-4}$
		I	$2X10^{-6}$	$1X10^{-2}$	$8X10^{-8}$	$3X10^{-4}$
	Pu-244	S	$2X10^{-12}$	$1X10^{-4}$	$6X10^{-14}$	$4X10^{-6}$
		I	$3X10^{-11}$	$3X10^{-4}$	$1X10^{-12}$	$1X10^{-5}$
Polonium (84)	Po-210	S	$5X10^{-10}$	$2X10^{-5}$	$2X10^{-11}$	$7X10^{-7}$
		I	$2X10^{-10}$	$8X10^{-4}$	$7X10^{-12}$	$3X10^{-5}$
Potassium (19)	K-42	S	$2X10^{-6}$	$9X10^{-3}$	$7X10^{-8}$	$3X10^{-4}$
		I	$1X10^{-7}$	$6X10^{-4}$	$4X10^{-9}$	$2X10^{-5}$
Praseodymium(59)	Pr-142	S	$2X10^{-7}$	$9X10^{-4}$	$7X10^{-9}$	$3X10^{-5}$
		I	$2X10^{-7}$	$9X10^{-4}$	$5X10^{-9}$	$3X10^{-5}$
	Pr-143	S	$3X10^{-7}$	$1X10^{-3}$	$1X10^{-8}$	$5X10^{-5}$
		I	$2X10^{-7}$	$1X10^{-3}$	$6X10^{-9}$	$5X10^{-5}$
Promethium (61)	Pm-147	S	$6X10^{-8}$	$6X10^{-3}$	$2X10^{-9}$	$2X10^{-4}$
		I	$1X10^{-7}$	$6X10^{-3}$	$3X10^{-9}$	$2X10^{-4}$
	Pm-149	S	$3X10^{-7}$	$1X10^{-3}$	$1X10^{-8}$	$4X10^{-5}$
		I	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$4X10^{-5}$
Protactinium(91)	Pa-230	S	$2X10^{-9}$	$7X10^{-3}$	$6X10^{-11}$	$2X10^{-4}$
		I	$8X10^{-10}$	$7X10^{-3}$	$3X10^{-11}$	$2X10^{-4}$
	Pa-231	S	$1X10^{-12}$	$3X10^{-5}$	$4X10^{-14}$	$9X10^{-7}$
		I	$1X10^{-10}$	$8X10^{-4}$	$4X10^{-12}$	$2X10^{-5}$
	Pa-233	S	$6X10^{-7}$	$4X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
		I	$2X10^{-7}$	$3X10^{-3}$	$6X10^{-9}$	$1X10^{-4}$
Radium (88)	Ra-223	S	$2X10^{-9}$	$2X10^{-5}$	$6X10^{-11}$	$7X10^{-7}$
		I	$2X10^{-10}$	$1X10^{-4}$	$8X10^{-12}$	$4X10^{-6}$
	Ra-224	S	$5X10^{-9}$	$7X10^{-5}$	$2X10^{-10}$	$2X10^{-6}$
		I	$7X10^{-10}$	$2X10^{-4}$	$2X10^{-11}$	$5X10^{-6}$
	Ra-226	S	$3X10^{-11}$	$4X10^{-7}$	$3X10^{-12}$	$3X10^{-8}$
		I	$5X10^{-11}$	$9X10^{-4}$	$2X10^{-12}$	$3X10^{-5}$
	Ra-228	S	$7X10^{-11}$	$8X10^{-7}$	$2X10^{-12}$	$3X10^{-8}$
		I	$4X10^{-11}$	$7X10^{-4}$	$1X10^{-12}$	$3X10^{-5}$
Radon (86)	Rn-220	S	$3X10^{-7}$	———	$1X10^{-8}$	———
		I	———	———	———	———
	Rn-222	S	$1X10^{-7}$	———	$3X10^{-9}$	———
Rhenium (75)	Re-183	S	$3X10^{-6}$	$2X10^{-2}$	$9X10^{-8}$	$6X10^{-4}$
		I	$2X10^{-7}$	$8X10^{-3}$	$5X10^{-9}$	$3X10^{-4}$
	Re-186	S	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$9X10^{-5}$
		I	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$5X10^{-5}$
	Re-187	S	$9X10^{-6}$	$7X10^{-2}$	$3X10^{-7}$	$3X10^{-3}$
		I	$5X10^{-7}$	$4X10^{-2}$	$2X10^{-8}$	$2X10^{-3}$
	Re-188	S	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
		I	$2X10^{-7}$	$9X10^{-4}$	$6X10^{-9}$	$3X10^{-5}$

TABLE I

CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See notes at end of table]

Element (atomic number)	Isotope[1]		Part I Column 1 Air (μCi/ml)	Part I Column 2 Water (μCi/ml)	Part II Column 1 Air (μCi/ml)	Part II Column 2 Water (μCi/ml)
Rhodium (45)	Rh-103m	S	$8X10^{-5}$	$4X10^{-1}$	$3X10^{-6}$	$1X10^{-2}$
		I	$6X10^{-5}$	$3X10^{-1}$	$2X10^{-6}$	$1X10^{-2}$
	Rh-105	S	$8X10^{-7}$	$4X10^{-3}$	$3X10^{-8}$	$1X10^{-4}$
		I	$5X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
Rubidium (37)	Rb-86	S	$3X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$7X10^{-5}$
		I	$7X10^{-8}$	$7X10^{-4}$	$2X10^{-9}$	$2X10^{-5}$
	Rb-87	S	$5X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
		I	$7X10^{-8}$	$5X10^{-3}$	$2X10^{-9}$	$2X10^{-4}$
Ruthenium (44)	Ru-97	S	$2X10^{-6}$	$1X10^{-2}$	$8X10^{-8}$	$4X10^{-4}$
		I	$2X10^{-6}$	$1X10^{-2}$	$6X10^{-8}$	$3X10^{-4}$
	Ru-103	S	$5X10^{-7}$	$2X10^{-3}$	$2X10^{-8}$	$8X10^{-5}$
		I	$8X10^{-8}$	$2X10^{-3}$	$3X10^{-9}$	$8X10^{-5}$
	Ru-105	S	$7X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
		I	$5X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
	Ru-106	S	$8X10^{-8}$	$4X10^{-4}$	$3X10^{-9}$	$1X10^{-5}$
		I	$6X10^{-9}$	$3X10^{-4}$	$2X10^{-10}$	$1X10^{-5}$
Samarium (62)	Sm-147	S	$7X10^{-11}$	$2X10^{-3}$	$2X10^{-12}$	$6X10^{-5}$
		I	$3X10^{-10}$	$2X10^{-3}$	$9X10^{-12}$	$7X10^{-5}$
	Sm-151	S	$6X10^{-8}$	$1X10^{-2}$	$2X10^{-9}$	$4X10^{-4}$
		I	$1X10^{-7}$	$1X10^{-2}$	$5X10^{-9}$	$4X10^{-4}$
	Sm-153	S	$5X10^{-7}$	$2X10^{-3}$	$2X10^{-8}$	$8X10^{-5}$
		I	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$8X10^{-5}$
Scandium (21)	Sc-46	S	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$4X10^{-5}$
		I	$2X10^{-8}$	$1X10^{-3}$	$8X10^{-10}$	$4X10^{-5}$
	Sc-47	S	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$9X10^{-5}$
		I	$5X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$9X10^{-5}$
	Sc-48	S	$2X10^{-7}$	$8X10^{-4}$	$6X10^{-9}$	$3X10^{-5}$
		I	$1X10^{-7}$	$8X10^{-4}$	$5X10^{-9}$	$3X10^{-5}$
Selenium (34)	Se-75	S	$1X10^{-6}$	$9X10^{-3}$	$4X10^{-8}$	$3X10^{-4}$
		I	$1X10^{-7}$	$8X10^{-3}$	$4X10^{-9}$	$3X10^{-4}$
Silicon (14)	Si-31	S	$6X10^{-6}$	$3X10^{-2}$	$2X10^{-7}$	$9X10^{-4}$
		I	$1X10^{-6}$	$6X10^{-3}$	$3X10^{-8}$	$2X10^{-4}$
Silver (47)	Ag-105	S	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
		I	$8X10^{-8}$	$3X10^{-3}$	$3X10^{-9}$	$1X10^{-4}$
	Ag-110m	S	$2X10^{-7}$	$9X10^{-4}$	$7X10^{-9}$	$3X10^{-5}$
		I	$1X10^{-8}$	$9X10^{-4}$	$3X10^{-10}$	$3X10^{-5}$
	Ag-111	S	$3X10^{-7}$	$1X10^{-3}$	$1X10^{-8}$	$4X10^{-5}$
		I	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$4X10^{-5}$
Sodium (11)	Na-22	S	$2X10^{-7}$	$1X10^{-3}$	$6X10^{-9}$	$4X10^{-5}$
		I	$9X10^{-9}$	$9X10^{-4}$	$3X10^{-10}$	$3X10^{-5}$
	Na-24	S	$1X10^{-6}$	$6X10^{-3}$	$4X10^{-8}$	$2X10^{-4}$
		I	$1X10^{-7}$	$8X10^{-4}$	$5X10^{-9}$	$3X10^{-5}$
Strontium (38)	Sr-85m	S	$4X10^{-5}$	$2X10^{-1}$	$1X10^{-6}$	$7X10^{-3}$
		I	$3X10^{-5}$	$2X10^{-1}$	$1X10^{-6}$	$7X10^{-3}$
	Sr-85	S	$2X10^{-7}$	$3X10^{-3}$	$8X10^{-9}$	$1X10^{-4}$
		I	$1X10^{-7}$	$5X10^{-3}$	$4X10^{-9}$	$2X10^{-4}$
	Sr-89	S	$3X10^{-8}$	$3X10^{-4}$	$3X10^{-10}$	$3X10^{-6}$
		I	$4X10^{-8}$	$8X10^{-4}$	$1X10^{-9}$	$3X10^{-5}$
	Sr-90	S	$1X10^{-9}$	$1X10^{-5}$	$3X10^{-11}$	$3X10^{-7}$
		I	$5X10^{-9}$	$1X10^{-3}$	$2X10^{-10}$	$4X10^{-5}$
	Sr-91	S	$4X10^{-7}$	$2X10^{-3}$	$2X10^{-8}$	$7X10^{-5}$
		I	$3X10^{-7}$	$1X10^{-3}$	$9X10^{-9}$	$5X10^{-5}$
	Sr-92	S	$4X10^{-7}$	$2X10^{-3}$	$2X10^{-8}$	$7X10^{-5}$
		I	$3X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
Sulfur (16)	S-35	S	$3X10^{-7}$	$2X10^{-3}$	$9X10^{-9}$	$6X10^{-5}$
		I	$3X10^{-7}$	$8X10^{-3}$	$9X10^{-9}$	$3X10^{-4}$
Tantalum (73)	Ta-182	S	$4X10^{-8}$	$1X10^{-3}$	$1X10^{-9}$	$4X10^{-5}$
		I	$2X10^{-8}$	$1X10^{-3}$	$7X10^{-10}$	$4X10^{-5}$

TABLE I

CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See notes at end of table]

Element (atomic number)	Isotope[1]		Part I Column 1 Air (μCi/ml)	Part I Column 2 Water (μCi/ml)	Part II Column 1 Air (μCi/ml)	Part II Column 2 Water (μCi/ml)
Technetium (43)	Tc-96m	S	$8X10^{-5}$	$4X10^{-1}$	$3X10^{-6}$	$1X10^{-2}$
		I	$3X10^{-5}$	$3X10^{-1}$	$1X10^{-6}$	$1X10^{-2}$
	Tc-96	S	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
		I	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$5X10^{-5}$
	Tc-97m	S	$2X10^{-6}$	$1X10^{-2}$	$8X10^{-8}$	$4X10^{-4}$
		I	$2X10^{-7}$	$5X10^{-3}$	$5X10^{-9}$	$2X10^{-4}$
	Tc-97	S	$1X10^{-5}$	$5X10^{-2}$	$4X10^{-7}$	$2X10^{-3}$
		I	$3X10^{-7}$	$2X10^{-2}$	$1X10^{-8}$	$8X10^{-4}$
	Tc-99m	S	$4X10^{-5}$	$2X10^{-1}$	$1X10^{-6}$	$6X10^{-3}$
		I	$1X10^{-5}$	$8X10^{-2}$	$5X10^{-7}$	$3X10^{-3}$
	Tc-99	S	$2X10^{-6}$	$1X10^{-2}$	$7X10^{-8}$	$3X10^{-4}$
		I	$6X10^{-8}$	$5X10^{-3}$	$2X10^{-9}$	$2X10^{-4}$
Tellurium (52)	Te-125m	S	$4X10^{-7}$	$5X10^{-3}$	$1X10^{-8}$	$2X10^{-4}$
		I	$1X10^{-7}$	$3X10^{-3}$	$4X10^{-9}$	$1X10^{-4}$
	Te-127m	S	$1X10^{-7}$	$2X10^{-3}$	$5X10^{-9}$	$6X10^{-5}$
		I	$4X10^{-8}$	$2X10^{-3}$	$1X10^{-9}$	$5X10^{-5}$
	Te-127	S	$2X10^{-6}$	$8X10^{-3}$	$6X10^{-8}$	$3X10^{-4}$
		I	$9X10^{-7}$	$5X10^{-3}$	$3X10^{-8}$	$2X10^{-4}$
	Te-129m	S	$8X10^{-8}$	$1X10^{-3}$	$3X10^{-9}$	$3X10^{-5}$
		I	$3X10^{-8}$	$6X10^{-4}$	$1X10^{-9}$	$2X10^{-5}$
	Te-129	S	$5X10^{-6}$	$2X10^{-2}$	$2X10^{-7}$	$8X10^{-4}$
		I	$4X10^{-6}$	$2X10^{-2}$	$1X10^{-7}$	$8X10^{-4}$
	Te-131m	S	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
		I	$2X10^{-7}$	$1X10^{-3}$	$6X10^{-9}$	$4X10^{-5}$
	Te-132	S	$2X10^{-7}$	$9X10^{-4}$	$7X10^{-9}$	$3X10^{-5}$
		I	$1X10^{-7}$	$6X10^{-4}$	$4X10^{-9}$	$2X10^{-5}$
Terbium (65)	Tb-160	S	$1X10^{-7}$	$1X10^{-3}$	$3X10^{-9}$	$4X10^{-5}$
		I	$3X10^{-8}$	$1X10^{-3}$	$1X10^{-9}$	$4X10^{-5}$
Thallium (81)	Tl-200	S	$3X10^{-6}$	$1X10^{-2}$	$9X10^{-8}$	$4X10^{-4}$
		I	$1X10^{-6}$	$7X10^{-3}$	$4X10^{-8}$	$2X10^{-4}$
	Tl-201	S	$2X10^{-6}$	$9X10^{-3}$	$7X10^{-8}$	$3X10^{-4}$
		I	$9X10^{-7}$	$5X10^{-3}$	$3X10^{-8}$	$2X10^{-4}$
	Tl-202	S	$8X10^{-7}$	$4X10^{-3}$	$3X10^{-8}$	$1X10^{-4}$
		I	$2X10^{-7}$	$2X10^{-3}$	$8X10^{-9}$	$7X10^{-5}$
	Tl-204	S	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
		I	$3X10^{-8}$	$2X10^{-3}$	$9X10^{-10}$	$6X10^{-5}$
	Th-228	S	$9X10^{-12}$	$2X10^{-4}$	$3X10^{-13}$	$7X10^{-6}$
		I	$6X10^{-12}$	$4X10^{-4}$	$2X10^{-13}$	$1X10^{-5}$
	Th-230	S	$2X10^{-12}$	$5X10^{-5}$	$8X10^{-14}$	$2X10^{-6}$
		I	$1X10^{-11}$	$9X10^{-4}$	$3X10^{-13}$	$3X10^{-5}$
	Th-232	S	$3X10^{-11}$	$5X10^{-5}$	$1X10^{-12}$	$2X10^{-6}$
		I	$3X10^{-11}$	$1X10^{-3}$	$1X10^{-12}$	$4X10^{-5}$
	Th-natural	S	$6X10^{-11}$	$6X10^{-5}$	$2X10^{-12}$	$2X10^{-6}$
		I	$6X10^{-11}$	$6X10^{-4}$	$2X10^{-12}$	$2X10^{-5}$
	Th-234	S	$6X10^{-8}$	$5X10^{-4}$	$2X10^{-9}$	$2X10^{-5}$
		I	$3X10^{-8}$	$5X10^{-4}$	$1X10^{-9}$	$2X10^{-5}$
Thulium (69)	Tm-170	S	$4X10^{-8}$	$1X10^{-3}$	$1X10^{-9}$	$5X10^{-5}$
		I	$3X10^{-8}$	$1X10^{-3}$	$1X10^{-9}$	$5X10^{-5}$
	Tm-171	S	$1X10^{-7}$	$1X10^{-2}$	$4X10^{-9}$	$5X10^{-4}$
		I	$2X10^{-7}$	$1X10^{-2}$	$8X10^{-9}$	$5X10^{-4}$
Tin (50)	Sn-113	S	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$9X10^{-5}$
		I	$5X10^{-8}$	$2X10^{-3}$	$2X10^{-9}$	$8X10^{-5}$
	Sn-125	S	$1X10^{-7}$	$5X10^{-4}$	$4X10^{-9}$	$2X10^{5}$
		I	$8X10^{-8}$	$5X10^{-4}$	$3X10^{-9}$	$2X10^{-5}$
Tungsten (74)	W-181	S	$2X10^{-6}$	$1X10^{-2}$	$8X10^{-8}$	$4X10^{-4}$
		I	$1X10^{-7}$	$1X10^{-2}$	$4X10^{-9}$	$3X10^{-4}$
	W-185	S	$8X10^{-7}$	$4X10^{-3}$	$3X10^{-8}$	$1X10^{-4}$
		I	$1X10^{-7}$	$3X10^{-3}$	$4X10^{-9}$	$1X10^{-4}$
	W-187	S	$4X10^{-7}$	$2X10^{-3}$	$2X10^{-8}$	$7X10^{-5}$
		I	$3X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
Uranium (92)	U-230	S	$3X10^{-10}$	$1X10^{-4}$	$1X10^{-11}$	$5X10^{-6}$
		I	$1X10^{-10}$	$1X10^{-4}$	$4X10^{-12}$	$5X10^{-6}$
	U-232	S	$1X10^{-10}$	$8X10^{-4}$	$3X10^{-12}$	$3X10^{-5}$
		I	$3X10^{-11}$	$8X10^{-4}$	$9X10^{-13}$	$3X10^{-5}$
	U-233	S	$5X10^{-10}$	$9X10^{-4}$	$2X10^{-11}$	$3X10^{-5}$
		I	$1X10^{-10}$	$9X10^{-4}$	$4X10^{-12}$	$3X10^{-5}$
	U-234	S	$6X10^{-10}$	$9X10^{-4}$	$2X10^{-11}$	$3X10^{-5}$
		I	$1X10^{-10}$	$9X10^{-4}$	$4X10^{-12}$	$3X10^{-5}$
	U-235	S	$5X10^{-10}$	$8X10^{-4}$	$2X10^{-11}$	$3X10^{-5}$
		I	$1X10^{-10}$	$8X10^{-4}$	$4X10^{-12}$	$3X10^{-5}$
	U-236	S	$6X10^{-10}$	$1X10^{-3}$	$2X10^{-11}$	$3X10^{-5}$
		I	$1X10^{-10}$	$1X10^{-3}$	$4X10^{-12}$	$3X10^{-5}$
	U-238	S	$7X10^{-11}$	$1X10^{-3}$	$3X10^{-12}$	$4X10^{-5}$
		I	$1X10^{-10}$	$1X10^{-3}$	$5X10^{-12}$	$4X10^{-5}$
	U-240	S	$2X10^{-7}$	$1X10^{-3}$	$8X10^{-9}$	$3X10^{-5}$
		I	$2X10^{-7}$	$1X10^{-3}$	$6X10^{-9}$	$3X10^{-5}$
	U-natural	S	$1X10^{-10}$	$1X10^{-3}$	$5X10^{-12}$	$3X10^{-5}$
		I	$1X10^{-10}$	$1X10^{-3}$	$5X10^{-12}$	$3X10^{-5}$
Vanadium (23)	V-48	S	$2X10^{-7}$	$9X10^{-4}$	$6X10^{-9}$	$3X10^{-5}$
		I	$6X10^{-8}$	$8X10^{-4}$	$2X10^{-9}$	$3X10^{-5}$
Xenon (54)	Xe-131m	Sub[2]	$2X10^{-5}$	———	$4X10^{-7}$	———
	Xe-133m	Sub	$1X10^{-5}$	———	$3X10^{-7}$	———
	Xe-133	Sub	$1X10^{-5}$	———	$3X10^{-7}$	———
	Xe-135	Sub	$4X10^{-6}$	———	$1X10^{-7}$	———
Ytterbium (70)	Yb-175	S	$7X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
		I	$6X10^{-7}$	$3X10^{-3}$	$2X10^{-8}$	$1X10^{-4}$
Yttrium (39)	Y-90	S	$1X10^{-7}$	$6X10^{-4}$	$4X10^{-9}$	$2X10^{-5}$
		I	$1X10^{-7}$	$6X10^{-4}$	$3X10^{-9}$	$2X10^{-5}$
	Y-91m	S	$2X10^{-5}$	$1X10^{-1}$	$8X10^{-7}$	$3X10^{-3}$
		I	$2X10^{-5}$	$1X10^{-1}$	$6X10^{-7}$	$3X10^{-3}$
	Y-91	S	$4X10^{-8}$	$8X10^{-4}$	$1X10^{-9}$	$3X10^{-5}$
		I	$3X10^{-8}$	$8X10^{-4}$	$1X10^{-9}$	$3X10^{-5}$
	Y-92	S	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
		I	$3X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
	Y-93	S	$2X10^{-7}$	$8X10^{-4}$	$6X10^{-9}$	$3X10^{-5}$
		I	$1X10^{-7}$	$8X10^{-4}$	$5X10^{-9}$	$3X10^{-5}$
Zinc (30)	Zn-65	S	$1X10^{-7}$	$3X10^{-3}$	$4X10^{-9}$	$1X10^{-4}$
		I	$6X10^{-8}$	$5X10^{-3}$	$2X10^{-9}$	$2X10^{-4}$
	Zn-69m	S	$4X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$7X10^{-5}$
		I	$3X10^{-7}$	$2X10^{-3}$	$1X10^{-8}$	$6X10^{-5}$
	Zn-69	S	$7X10^{-6}$	$5X10^{-2}$	$2X10^{-7}$	$2X10^{-3}$
		I	$9X10^{-6}$	$5X10^{-2}$	$3X10^{-7}$	$2X10^{-3}$
Zirconium (40)	Zr-93	S	$1X10^{-7}$	$2X10^{-2}$	$4X10^{-9}$	$8X10^{-4}$
		I	$3X10^{-7}$	$2X10^{-2}$	$1X10^{-8}$	$8X10^{-4}$
	Zr-95	S	$1X10^{-7}$	$2X10^{-3}$	$4X10^{-9}$	$6X10^{-5}$
		I	$3X10^{-8}$	$2X10^{-3}$	$1X10^{-9}$	$6X10^{-5}$
	Zr-97	S	$1X10^{-7}$	$5X10^{-4}$	$4X10^{-9}$	$2X10^{-5}$
		I	$9X10^{-8}$	$5X10^{-4}$	$3X10^{-9}$	$2X10^{-5}$
Any single radionuclide not listed above with decay mode other than alpha emission or spontaneous fission and with radioactive half-life less than 2 hours.		Sub[2]	$1X10^{-6}$	———	$3X10^{-8}$	———
Any single radionuclide not listed above with decay mode other than alpha emission or spontaneous fission and with radioactive half-life greater than 2 hours.			$3X10^{-9}$	$9X10^{-5}$	$1X10^{-10}$	$3X10^{-6}$
Any single radionuclide not listed above, which decays by alpha emission or spontaneous fission.			$6X10^{-13}$	$4X10^{-7}$	$2X10^{-14}$	$3X10^{-8}$

TABLE I

CONCENTRATIONS IN AIR AND WATER ABOVE NATURAL BACKGROUND

[See notes at end of table]

[1]Soluble(S); Insoluble(I).
[2]"Sub" means that values given are for submersion in a semi-spherical infinite cloud of airborne material.

NOTE: In any case where there is a mixture in air or water of more than one radionuclide, the limiting values for purposes of this Appendix should be determined as follows:

1. If the identity and concentration of each radionuclide in the mixture are known, the limiting values should be derived as follows: Determine, for each radionuclide in the mixture, the ratio between the quantity present in the mixture and the limit otherwise established in Appendix "A" for the specific radionuclide when not in a mixture. The sum of such ratios for all the radionuclides in the mixture may not exceed "1" (i.e., "unity").

Example: If radionuclides a, b, and c are present in concentrations C_a, C_b, and C_c, and if the applicable MPC's are MPC_a, MPC_b, and MPC_c respectively, then the concentrations shall be limited so that the following relationship exists:

$$\frac{C_a}{MPC_a} + \frac{C_b}{MPC_b} + \frac{C_c}{MPC_c} \leq 1$$

2. If either the identity or the concentration of any radionuclide in the mixture is not known, the limiting values for purposes of Appendix "A" shall be:

a. For purposes of Table I, Col. 1 ..... $6X10^{-13}$
b. For purposes of Table I, Col. 2 ..... $4X10^{-7}$
c. For purposes of Table II, Col. 1 ..... $2X10^{-14}$
d. For purposes of Table II, Col. 2 ..... $3X10^{-8}$

3. If any of the conditions specified below are met, the corresponding values specified below may be used in lieu of those specified in paragraph 2 above.

a. If the identity of each radionuclide in the mixture is known but the concentration of one or more of the radionuclides in the mixture is not known, the concentration limit for the mixture is the limit specified in Appendix "A" for the radionuclide in the mixture having the lowest concentration limit; orp b. If the identity of each radionuclide in the mixture is not known, but it is known that certain radio nuclides specified in Appendix "A" are not present in the mixture, the concentration limit for the mixture is the lowest concentration limit specified in Appendix "A" for any radionuclide which is not known to be absent from the mixture; or

c. Element (atomic number) and isotope	Part I Column 1 Air (μCi/ml)	Part I Column 2 water (μCi/ml)	Part II Column 1 Air (μCi/ml)	Part II Column 2 water (μCi/ml)
If it is known that Sr–90, I–125, I–126, I–129, I–131, (I–133 Table II only), Pb–210, Po–210, At–211, Ra–223, Ra–224, Ra–226, Ac–227, Ra–228, Th–230, Pa–231, Th–232, Th–nat, Cm–248, Cf–254, and Fm–256 are not present	——	$9X10^{-5}$	——	$3X10^{-6}$
If it is known that Sr–90, I–125, I–126, I–129, (I–131, I–133, Table II only), Pb–210, Po–210, Ra–223, Ra–226, Ra–228, Pa–231, Th–nat, Cm–248, Cf–254, and Fm–256 are not present	——	$6X10^{-5}$	——	$2X10^{-6}$
If it is known that Sr–90, I–129, (I–125, I–126, I–131, Table II only), Pb–210, Ra–226, Ra–228, Cm–248, and Cf–254 are not present	——	$2X10^{-5}$	——	$6X10^{-7}$
If it is known that (I–129, Table II only), Ra–226, and Ra–228 are not present	——	$3X10^{-6}$	——	$1X10^{-7}$
If it is known that alpha–emitters and Sr–90, I–129, Pb–210, Ac–227, Ra–228, Pa–230, Pu–241, and Bk–249 are not present	$3X10^{-9}$	——	$1X10^{-10}$	——
If it is known that alpha–emitters and Pb–210, Ac–227, Ra–228, And Pu–241 are not present	$3X10^{-10}$	——	$1X10^{-11}$	——
If it is known that alpha–emitters and Ac–227 are not present	$3X10^{-11}$	——	$1X10^{-12}$	——
If it is known that Ac–227, Th–230, Pa–231, Pu–238, Pu–239, Pu–240, Pu–242, Pu–244 Cm–248, Cf–249 and Cf–251 are not present	$3X10^{-12}$	——	$1X10^{-13}$	——

4. If the mixture of radionuclides consists of uranium and its daughter products in ore dust prior to chemical processing of the uranium ore, the values specified below may be used in lieu of those determined in accordance with paragraph 1 above or those specified in paragraphs 2 and 3 above.

a. For purposes of Table I, Column 1, 1×10^{-10} μCi/ml gross alpha activity; or 5×10^{-11} μCi/ml natural uranium; or 75 micrograms per cubic meter of air natural uranium.

b. For purposes of Table II, Column 1, 3×10^{-12} μCi/ml gross alpha activity; 2×10^{-12} μCi/ml natural uranium; or 3 micrograms per cubic meter of air natural uranium.

5. For purposes of this note, a radionuclide may be considered as not present in a mixture if (a) the ratio of the concentration of that radionuclide in the mixture (C_a) to the concentration limit for that radionuclide specified in Table II of Appendix "A" (MPC_a) does not exceed 1/10, (i.e., $C_a/MPC_a \leq 1/10$ and (b) the sum of such ratios for all radionuclides considered as not present in the mixture does not exceed 1/4, (i.e., $C_a/MPC_a + C_b/MPC_b + \ldots\ldots \leq 1/4$). [Order 75–15, § 296–62–09004, filed 4/18/75.]

WAC 296-62-09005 Nonionizing radiation. Workmen shall be protected from exposure to hazardous levels of nonionizing radiations.

(1) Introduction. Biological responses in the various sections of the electro–magnetic spectrum are different. In certain instances there are also different responses within any segment of the spectrum, such as the infrared. Experience and experimentation have been sufficient to permit the establishment of certain standards which can be used to promote a healthful working environment.

(2) Microwaves. (a) Definitions. (i) "Partial Body Irradiation" shall mean the case in which part of the body is exposed to the incident electromagnetic energy.

(ii) "Radiation Protection Standard" means radiation level which shall not be exceeded.

(iii) "Symbol" means the overall design, shape, and coloring of the microwave radiation sign shown in figure 2.

(iv) "Whole body irradiation" shall mean the case in which the entire body is exposed to the incident electromagnetic energy or in which the cross section of the body is smaller than the cross section of the incident radiation beam.

(b) Radiation protection standard.

(i) For normal environmental conditions and for incident electromagnetic energy of frequencies from 10 megahertz to 100 gigahertz, the radiation protection standard is 10 $mW/cm.^2$ (milliwatt per square centimeter) as averaged over any possible 0.1–hour period. This means the following:

Power density: $10mW/cm^2$ for periods of 0.1–hour or more.

Energy density: $1mW–hr/cm^2$ (milliwatt hour per square centimeter) during any 0.1–hour period.

This standard applies whether the radiation is continuous or intermittent.

(ii) These formulated standards pertain to both whole body irradiation and partial body irradiation. Partial body irradiation must be included since it has been shown that some parts of the human body (e.g., eyes, testicles) may be harmed if exposed to incident radiation levels significantly in excess of these levels.

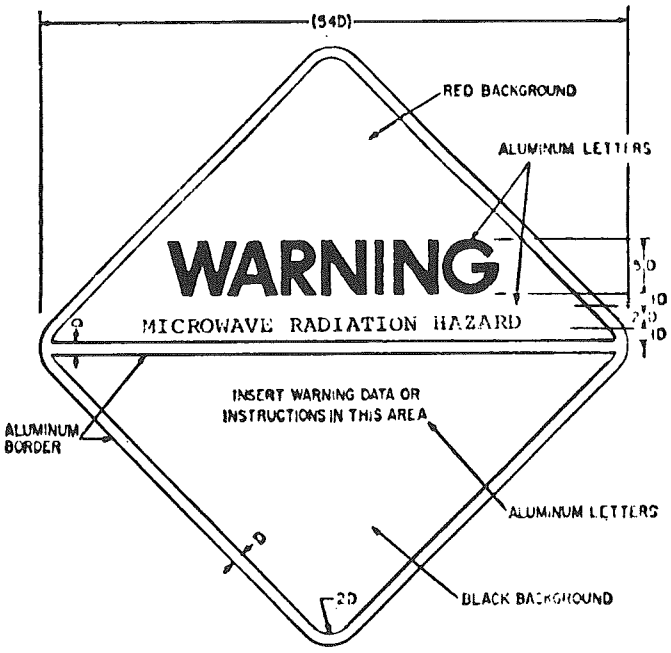
(c) Warning symbol.

(i) The warning symbol for microwave radiation hazards shall consist of a red isosceles triangle above an inverted black isosceles triangle, separated and outlined by an aluminum color border. The words "Warning—Microwave Radiation Hazard" shall appear in the upper triangle. See Figure 2.

(ii) 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.

(iii) 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.

NOTE: Subsection (2) of this section does not apply to the deliberate exposure of patients by, or under the direction of, practitioners of the healing arts.



1. Place handling and mounting instructions on reverse side.
2. D = Scaling Unit.
3. 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

4. Symbol is square, triangles are right–angle isosceles.

FIG. 2
Microwave Radiation Hazard Warning Symbol

(3) Permissible exposure limits.

(a) These exposure limit values refer to levels of physical agents and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effect. They are based on the best available information from experimental studies. Because of wide variations in individual susceptibility, exposure of an occasional individual, at, or even below, the permissible limit may not prevent annoyance, aggravation of a preexisting condition, or physiological damage.

(b) Permissible exposure limits refer to levels of exposure for an 8–hour workday within a 40–hour week. Exceptions are those limits which are given a ceiling value "C".

(c) These limits should be interpreted and applied only by a technically qualified person.

(d) Ceiling value. There are some physical agents which produce physiological response from short intense exposure and whose permissible limit is more appropriately based on this particular response. Physical agents with this type of response are best controlled by a ceiling "C" limit which is a maximum level of exposure which shall not be exceeded.

(4) 6943Å Lasers. Eye protection.

(a) The permissible exposure limits for exposure of the eye refer to levels of laser energy at the cornea under conditions to which nearly all workers may be exposed without adverse effects. These permissible exposure limits shall be used in the control of exposures to the eye from Q–Switched, and Non–Q–Switched laser energy at 6943Å.

(b) The values apply to direct illumination or specular reflected laser energy (6943Å) at the cornea and do not apply to laser energy at any other wave length or operational mode.

Mode	Energy Density Joules/sq. centimeter
Q–Switched (1 nanosecond – 1 microsecond)	1×10^{-7}*
Non–Q–Switched (1 microsecond – 0.1 sec. pulse)	1×10^{-6}*

*Ceiling Value

(5) Continuous wave lasers. Eye protection.

(a) The permissible exposure limits for exposure of the eye refer to levels of laser energy at the cornea under conditions to which nearly all workers may be exposed without adverse effects. These permissible exposure limits shall be used in the control of exposures to the eye from continuous wave laser energy in the 4000Å to 7500Å region of the spectra.

(b) The values apply to direct illumination or specular reflected continuous wave laser energy (4000Å to 7500Å) at the cornea and do not apply to laser energy at any other wave length or operational mode.

Mode	Power Density Watt/sq. centimeter
Continuous Wave (>0.1 sec.)	1×10^{-5}*

*Ceiling Value

(6) Lasers. Skin protection.

(a) The permissible exposure limits for exposure of the skin to levels of laser energy in the visible, near infrared, and infrared portions of the spectra are under conditions which it is believed nearly all workers may be exposed without adverse effects.

(b) These values shall be used in the control of exposure to pulsed and continuous wave laser energy.

(c) The notation "SKIN PROTECTION" refers to the potential risk of exposure of the skin to laser energy. These limits are not directly related to, or part of, the permissible exposure limit for eye protection and are intended to suggest that appropriate control measures may be necessary to prevent damage to the skin.

(d) The values apply to the maximum intensity of laser energy incident on the skin (excluding eyes) in the visible, near infrared and infrared wave lengths.

Mode	
Pulsed	0.1 Joules/sq. centimeter* (Energy Density)
Continuous Wave	1.0 Watts/sq. centimeter* (Power Density)

*Ceiling Value

(7) 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 milliwatt/sq. centimeter for periods greater than 10^3 seconds (approximately 16 minutes) and for exposure times less than 103 seconds shall not exceed one Joules/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.

$$E_{eff} = \Sigma \text{ (E–Lambda) (S–Lambda) (Delta–Lambda)}$$

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 (superscript 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 $\mu W/cm^2$.

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 ($\mu W/cm^2$)
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 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

Shade No.	Maximum Ultraviolet Transmission 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: 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.]

WAC 296-62-09007 Pressure. (1) Workmen 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 Regulations for Scuba Diving". 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. [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 296-62-09011 Occupational noise exposure. (1) Workers shall be protected against the effects of exposure to noise which exceeds the permissible noise exposure shown in Table 7 of this section.

(2) Permissible exposure limits. These permissible exposure limits refer to sound pressure levels that represent conditions under which it is believed that nearly all workers may be repeatedly exposed without adverse effect on their ability to hear and understand normal speech. The medical profession has defined hearing impairment as an average hearing threshold level in excess of 25 decibels (ANSI S3.6-1969) at 500, 1000, and 2000 Hz, and the limits which are given have been established to prevent a hearing loss in excess of this value. These values shall be used as a standard in the control of noise exposure.

TABLE 7
Permissible Noise Exposures

Duration per day Hours	Sound Level dBA
16	85
8	90
6	92
4	95
3	97
2	100
1-1/2	102
1	105
3/4	107
1/2	110
1/4	115*

*Ceiling Value: No exposure in excess of 115 dBA.

(3) Continuous or intermittent. The sound level shall be measured with a sound level meter, conforming as a minimum to the requirements of the American National Standards Institute ANSI A1.4 1971, Type 2, and set to an A-weighted slow meter response or with an audiodosimeter of equivalent accuracy and precision. The unit of measurement shall be decibels Re 20 micropascals A-weighted. Duration of exposure shall not *exceed that shown in Table 7.*

These values apply to total time of exposure per working day regardless of whether this is one continuous exposure or a number of short-term exposures but does not apply to impact or impulsive type of noises.

(4) Intermittent exposure. When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect shall be considered, rather than the individual effect of each. If the sum of the following fractions:

$$\frac{C_1}{T_1} + \frac{C_2}{T_2} + \ldots + \frac{C_n}{T_n}$$

exceeds unity, then, the mixed exposure shall be considered to exceed the permissible exposure limits, C_1 indicates the total time of exposure at a specified noise level, and T_1 indicates the total time of exposure permitted at that level. Noise exposures shall be established according to the criteria of Table 7.

(5) Impulsive or impact noise. Impulsive or impact noise shall be those variations in noise levels which involve maxima at intervals greater than one second. Where the intervals are less than (1) second, it shall be considered continuous. All impact and impulsive noise measurements should be made on the C-weighting network of a sound level meter in conjunction with an impact noise analyzer or oscilloscope. Exposure to impulsive or impact noise should not exceed 140 decibels peak sound pressure level (ceiling value).

(6) Methods of compliance. (a) When employees are subjected to sound levels exceeding those listed in Table 7, feasible administrative or engineering controls shall be utilized.

(b) Upon request, the employer shall prepare and submit a written compliance plan to the director. This plan must include a description of the manner in which compliance will be achieved with respect to cited violations of WAC 296-62-09011(6)(a) and shall include proposed abatement methods, anticipated completion dates, and provision for progress reports to the department.

(c) Personal hearing protective equipment shall be provided at no cost to the employee and shall be used whenever the sound levels prescribed in subsections (3), (4), or (5) of this section are exceeded.

(i) The employer shall assure that personal protective equipment is worn by each affected employee.

(ii) Insert-type protectors, other than self-fitted malleable plugs, shall be individually fitted by a trained person.

(iii) Employees shall be instructed in the care and use of personal protective equipment.

(7) In all cases where the sound levels exceed the values shown in Table 7 of this section, it is recommended that workmen whose duties may subject them to these potentially harmful noise levels be provided with an audiometric examination at the time of employment and at reasonable intervals thereafter not exceeding an 18-month period.

(8) Workmen employed in areas where the sound level is above the level deemed to be safe should cooperate in an audiometric testing program. Workmen shall be informed of the test results by an authorized person. [Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17.240. 80-11-010 (Order 80-14), § 296-62-09011, filed 8/8/80; Order 73-3, § 296-62-09011, 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.]

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 18% oxygen by volume or has a partial pressure of oxygen of 135 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. Workmen entering any area where a lack

of sufficient oxygen is probable shall be supplied with and shall use approved equipment (for specific requirements see applicable provisions of chapter 296-24 WAC) capable of providing safe respirable air, or prior to entry and at all times when workmen 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. [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.] See WAC 296-62-11001 through 296-62-11013.

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 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: 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 Concensus 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.]

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 re-enter 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 workmen will not be subjected to excessive air velocities. [Order 73-3, § 296-62-11011, filed 5/7/73.]

WAC 296-62-11013 Compatibility of systems. Makeup 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 respirator, 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 American National Standard Electrical Code, C1-1968 (NFPA 70-1968). 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 chapter 296-24 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 chapter 296-24

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: RCW 49.17-.040, 49.17.050, and 49.17.240. 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

$$\frac{4.5}{4} \times 610 = 686 \text{ (rounded to 690).}$$

(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.

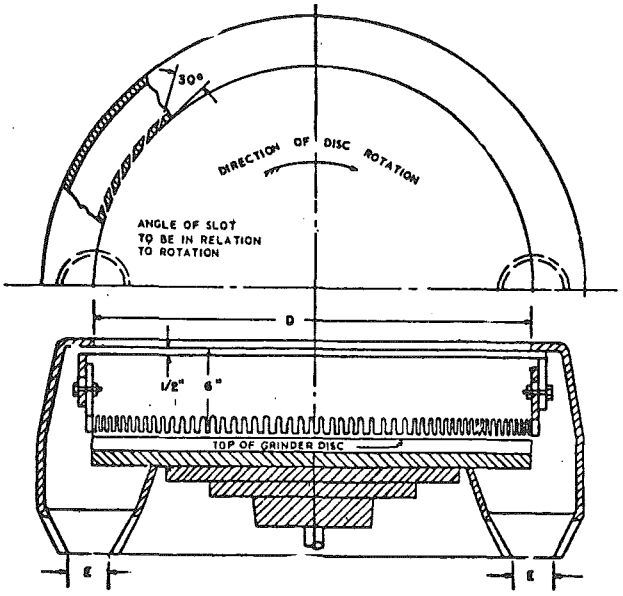


Fig. 3

Vertical Spindle Disc Grinder Exhaust Hood and Branch Pipe Connections

Dia D. Inches		Exhaust E		Volume Exhausted at 4,500 ft/min	Note
Min.	Max	No. Pipes	Dia	ft^3/min	
	20	1	4 1/2	500	When one-half or more
Over 20	30	2	4	780	of the disc can be
Over 30	72	2	6	1,770	hooded, use exhaust
Over 53	72	2	8	3,140	ducts as shown at the left.
	20	2	4	780	When no hood can be
Over 20	30	2	5 1/2	1,480	used over disc, use
Over 30	53	4	6	3,530	exhaust ducts as
Over 53	72	5	7	6,010	shown at left.

Entry loss = 1.0 slot velocity pressure +0.5 branch velocity pressure
Minimum slot velocity = 2,000 ft/min – 1/2-inch slot width

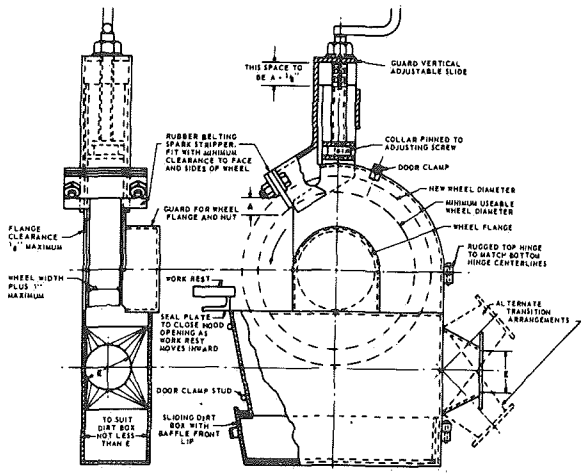


Fig. 4

Standard Grinder Hood

Wheel Dimension			Exhaust Outlet Inches	Volume of Air at 4,500 ft/min
Diameter, Inches		Width, Inches		
Min = d	Max = D	Max	E	
	9	1 1/2	3	220
Over 9	16	2	4	390
Over 16	19	3	4 1/2	500
Over 19	24	4	5	610
Over 24	30	5	6	880
Over 30	36	6	7	1,200

Entry loss = 0.45 velocity pressure for tapered takeoff
0.65 vellocity pressure for straight takeoff

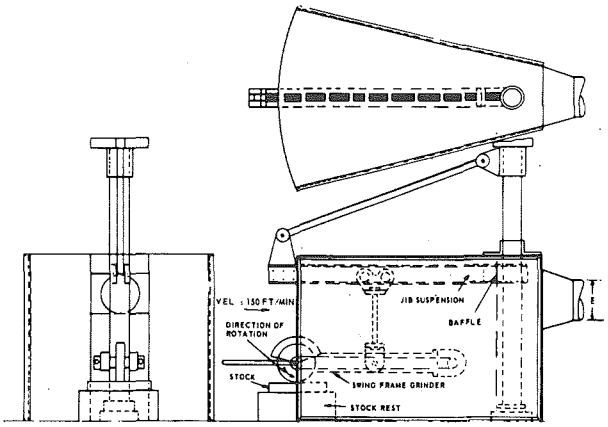


Fig. 5

A method of Applying an Exhaust Enclosure to Swing–Frame Grinders

NOTE: Baffle to reduce front opening as much as possible

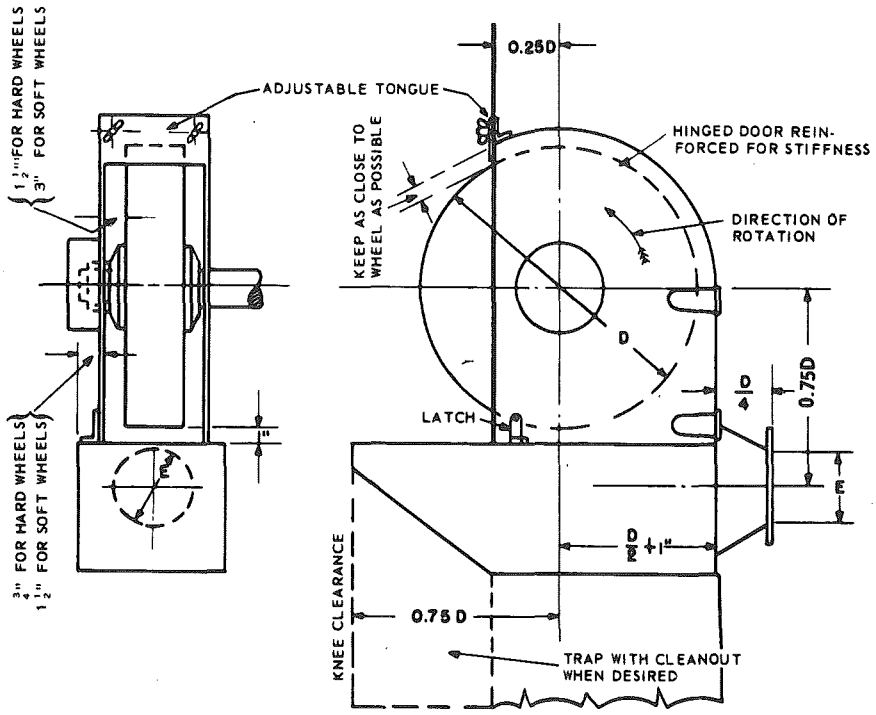


Fig. 6

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 vellocity pressure for straight takeoff

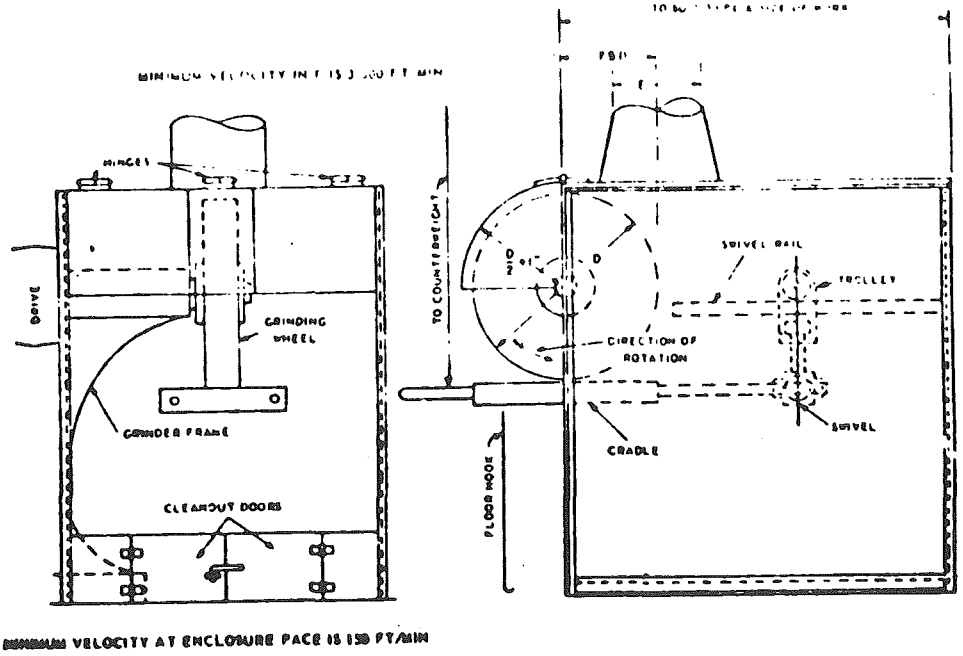


Fig. 7

Cradle Polishing or Grinding Enclosure

Entry loss = 0.45 velocity pressure for tapered takeoff

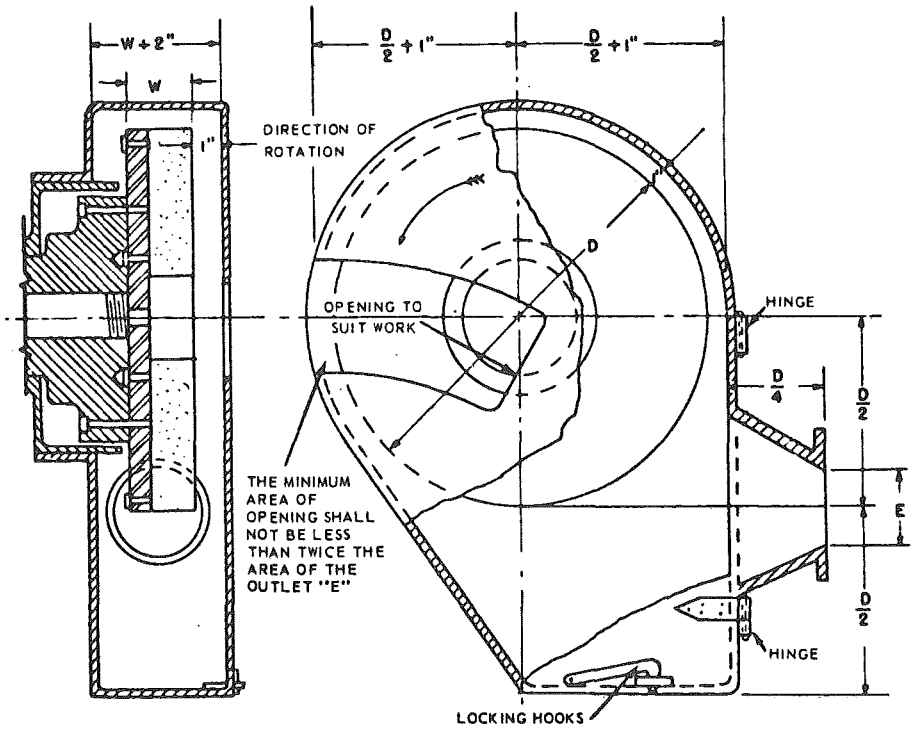


Fig. 8

Horizontal Single–Spindle Disc Grinder
Exhaust Hood and Branch Pipe Connection

Dia. D. Inches		Exhaust E	Volume Exhausted at 4,500 ft/min
Min	Max	Dia. Inches	ft^3/min
	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

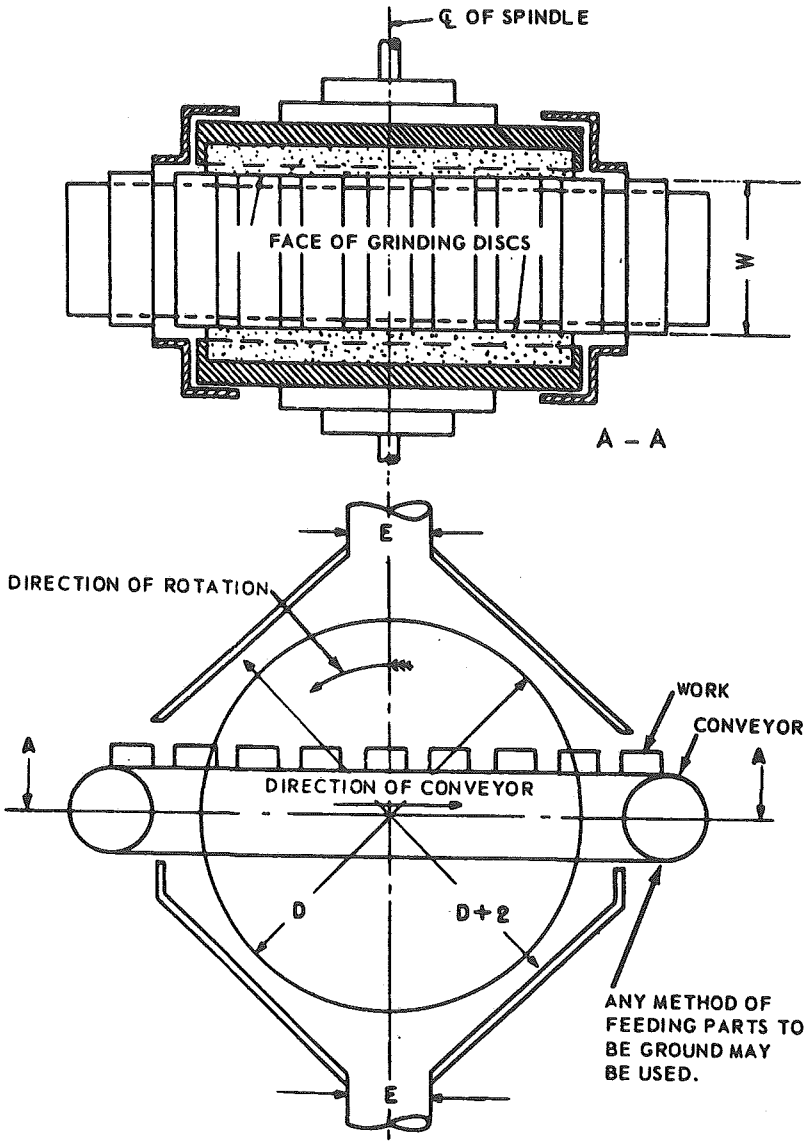


Fig. 9

Horizontal Double–Spindle Disc Grinder
Exhaust Hood and Branch Pipe Connection

Disc Dia. Inches		Exhaust E		Volume Exhausted at 4,500 ft/min	Note
Min.	Max	No. Pipes	Dia	ft^3/min	
	19	1	5	610	When width "W" permits,
Over 19	25	1	6	880	exhaust ducts should
Over 25	30	1	7	1,200	be as near heaviest
Over 30	53	2	6	1,770	grinding as possible.
Over 53	72	4	8	6,280	

Entry loss = 0.45 velocity pressure for tapered takeoff

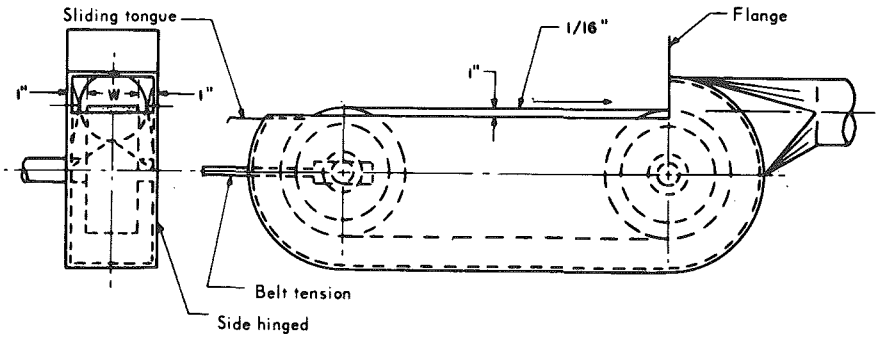


Fig. 10
A Typical Hood for a Belt Operation

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 conditions for object completely inside booth	Crossdraft f.p.m.	Airflow Velocities, f.p.m. Design	Range
Electostatic 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 =

$$\frac{4\,(100-1.4)\,30.4}{1.4} = 8{,}564 \text{ cubic feet.}$$

(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	Cubic feet of vapor per gallon of liquid at 70°F.	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

TABLE 15
LOWER EXPLOSIVE LIMIT OF SOME COMMONLY USED SOLVENTS

Solvent	Cubic feet of vapor per gallon of liquid at 70°F.	Lower explosive limit in percent by volume of air at 70°F.
	Column 1	Column 2
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 296–24 WAC or specified in ANSI Z88.2–1969 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 form 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 makeup 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. [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/m^3), 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/m^3) 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/m^3, 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:

$$\frac{c_1}{PEL} + \frac{c_2}{PEL} + \frac{c_3}{PEL} + \ldots + \frac{c_N}{PEL} > 1$$

where:

c = Concentration measured at the operation in ppm.

TABLE 16
DETERMINATION OF HAZARD POTENTIAL

Hazard potential	Toxicity Group		
	Gas or vapor (ppm)	Mist (mg/m^3)	Flash point (in degrees F.)
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 EVOLUTION[1]

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 Subparagraph (2) and Tables 16 and 17)	Enclosing hood (See Subparagraph (4)(ii))		Lateral exhaust[1] (See Subparagraph (4)(iii))	Canopy hood[2] (See Subparagraph (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 conveyorized 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 18 percent, 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 296–24 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 296–24 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 18 percent.

(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: RCW 49.17.040, 49.17.050, and 49.17.240. 80-11-010 (Order 80-14), § 296-62-11021, filed 8/8/80; Order 73-3, § 296-62-11021, filed 5/7/73.]

WAC 296-62-130 Emergency washing facilities. (1) Definitions. Emergency washing facilities shall mean deluge showers, eye wash fountains or available water supply suitable for drenching or cleansing purposes. Every washing facility using nonpotable water shall have signs stating water is nonpotable.

(2) Facilities Required. Emergency washing facilities shall be readily available in the immediate work area for workmen who may be exposed to the hazards of harmful concentrations of contact chemical agents. Such facilities shall be periodically inspected to ensure that they function correctly and that the quality and quantity of water is satisfactory for emergency washing purposes. [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.]

WAC 296-62-145 Confined spaces. [Order 73-3, § 296-62-145 reference section, filed 5/7/73.] See WAC 296-62-14501 through 296-62-14529.

WAC 296-62-14501 Definitions. (1) "Confined space" means any space having a limited means of egress which is subject to the accumulation of toxic or flammable contaminants or an oxygen deficient atmosphere. Confined spaces include but are not limited to storage tanks, process vessels, bins, boilers, ventilation or exhaust ducts, sewers, underground utility vaults, tunnels, pipelines and open top spaces more than 4 feet in depth, such as pits, tubes, vaults and vessels.

(2) Toxic atmospheres are atmospheres having concentrations of airborne chemicals in excess of permissible exposure limits as defined in WAC 296-62-075 through 296-62-07517.

(3) Chemical contact agents are defined in WAC 296-62-07003.

(4) Oxygen deficient atmospheres are deemed to exist if the atmosphere at sea level has less than 18% oxygen by volume or has a partial pressure of 135 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.

(5) Flammable atmospheres are atmospheres in excess of 20% of the lower explosive limit. These are usually toxic as well as flammable. [Statutory Authority: 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 Personnel requirements for entry into confined spaces. Workmen required to enter confined spaces shall be protected from the hazards which may result from the entry.

(1) Management shall be responsible for procedures, training, and planning for entry into confined spaces which present a problem due to toxicity, flammability, oxygen deficiency or excess, mechanical, electrical, corrosive or temperature hazard.

(2) Management shall develop, distribute and enforce a written procedure which shall include planning, general precautions, procedures, evaluation of hazards, ventilation requirements, personal protection, isolation and responsibilities.

(3) For each project or job, individuals who are competent in the evaluation of hazards, precautions, first aid and artificial respiration shall specifically be assigned. All personnel shall be trained in the use of personal protective equipment required for the job assignment.

(4) Management shall instruct all involved employees in the safe procedures to be followed. [Order 73-3, § 296-62-14503, filed 5/7/73.]

WAC 296-62-14505 General precautions. (1) Toxic or flammable atmospheres. Employees shall not be permitted to enter atmospheres in a confined space which has contained toxic, flammable or corrosive materials or which may have had such materials accidentally introduced or generated until such space has been evaluated and/or tested by a competent person who shall declare the space safe for entry.

(2) Exposure to temperature extremes and noise shall be controlled as defined in WAC 296-62-09011 and 296-62-09013.

(3) Exposure to ionizing radiation shall be controlled as defined in Rules and Regulations for Radiation Protection, chapter 402-12 WAC as administered by the state of Washington, Department of Social and Health Services, Health Services Division. [Order 73-3, § 296-62-14505, filed 5/7/73.]

WAC 296-62-14507 Toxic atmospheres. (1) Atmospheres where contamination is below permissible exposure limits as defined in WAC 296-62-075 through 296-62-07517 may be entered without respiratory protection.

(2) Atmospheres where contamination is above the permissible exposure limits but below values immediately hazardous to life or health may be entered when respiratory protective equipment as defined in the applicable provisions of chapter 296-24 WAC is properly worn.

(3) Atmospheres immediately hazardous to life may be entered only in the event of emergency and then only when employees are protected by equipment approved for such exposures.

(4) Atmospheres where the toxicity is not known shall require full protection.

(5) Entry into spaces which contain or could contain corrosive chemicals or chemicals which are toxic through skin absorption shall require equipment to prevent skin and/or eye contact. [Statutory Authority: RCW 49.17-.040, 49.17.050, and 49.17.240. 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 Flammable atmospheres. Atmospheres which contain or could contain flammable gases or vapors shall not be entered if the concentration of gases or vapors in any part of the area is more than 20% of the lower explosive limit except in the event of emergency and then only when employees are protected by equipment approved for such exposures. [Order 73-3, § 296-62-14509, filed 5/7/73.]

WAC 296-62-14511 Oxygen deficiency or excess. (1) All employees required to enter into confined spaces shall be instructed as to the nature of the hazards involved, the necessary precautions to be taken and in the use of protective and emergency equipment required. The employer shall comply with any specific regulations that apply to work in dangerous or potentially dangerous areas.

(2) Atmospheres having an oxygen content less than 18% oxygen at sea level (this may deviate at higher elevations) shall not be entered without approved respiratory protective equipment which will provide an adequate supply of breathing air.

(3) In the event that the air may be diluted by an unknown gas, the atmosphere shall be considered highly toxic and/or flammable. [Order 73-3, § 296-62-14511, filed 5/7/73.]

WAC 296-62-14513 Mechanical hazards. (1) Confined areas containing parts which may move or which contain agitators, fans or other power driven moving parts of potential hazard to employees shall not be entered until it is assured that such parts cannot move to injure the employee.

(a) Open and lock circuit breakers or switches, or remove fuses or disconnect wiring and tag the location.

(b) Disconnect and tag belt or mechanical linkage.

(c) Physically block part against movement and tag switches, clutches or other means of control.

(d) Tagging of controls without other means of control shall be considered satisfactory only if the control is barricaded and/or is under constant observation during occupancy of the space. [Order 73-3, § 296-62-14513, filed 5/7/73.]

WAC 296-62-14515 Electrical hazards. (1) Electrical circuits in the confined area which may present a hazard shall be disconnected, locked out and tagged in accordance with WAC 296-62-14513(1)(a). All temporary lights shall be protected against damage and cords shall be heavy duty and kept clear of working spaces and walkways. Only low voltage, battery operated, or ground fault protected equipment shall be used on water-slides of boilers or when electrically conductive liquids are involved.

(2) Electric lighting or circuits used where potentially hazardous concentrations of flammable vapors, gases or dusts are present or may develop shall conform to the National Electric Code.

(3) Portable electric tools shall be grounded or isolation transformers, ground fault interrupters or double insulated tools shall be required. [Order 73-3, § 296-62-14515, filed 5/7/73.]

WAC 296-62-14517 Procedures for entry into toxic or flammable atmospheres. Every reasonable effort shall be made to reduce the hazard to safe levels prior to permitting entry into the enclosed space.

(1) Preliminary Preparations. (a) Determine type and extent of contamination including gases, liquids, sludge, residue or absorbed and/or absorbed material.

(b) Survey area to determine the effect of escape of gases or vapors in surrounding areas.

(c) Post or barricade area to prevent unauthorized entry.

(d) Ensure control of all sources of ignition when a potential fire hazard exists.

(e) Collect and inspect the condition of all equipment needed including pumps, ventilating equipment, personal protective equipment, atmospheric testing equipment and mechanical equipment. Ensure that all equipment is in good condition and is compatible with the work involved.

(f) Ensure that all required personnel are available and familiar with the hazards. [Order 73-3, § 296-62-14517, filed 5/7/73.]

WAC 296-62-14519 Removal of flammable or toxic material. (1) Remove all possible liquid product, sludge or residue if present by draining, pumping or washing as applicable. Dispose of solid, liquid or gaseous materials in a manner which will not cause air or water pollution, a fire hazard or endanger workmen or equipment.

(2) Vent any pressure as required.

(3) Isolate tank or confined space from all potential sources of hazardous materials by one of the following:

(a) Remove a valve, spool piece, or expansion joint and cap open ends. Tag line.

(b) Insert a blank in the line and tag it. [Order 73-3, § 296-62-14519, filed 5/7/73.]

WAC 296-62-14521 Vapor freeing. (1) Vapor Freeing is usually done by ventilation. The effectiveness of ventilation is dependent upon the number of air changes and the efficiency of mixing of the air with the gas in the tank. Ventilation by supply air provides more efficient mixing than exhaust air but cannot be used if it creates a hazard near the discharge point. Exhaust air ducts must be placed at locations remote from air inlets and may require moving to various locations.

(2) Prior to entry, a minimum of five air changes is recommended where oxygen deficiency may exist and ten air changes is recommended where a toxic and/or flammable material is involved.

(3) Concentrations of vapors or gases in the flammable or above the flammable range may require replacement by an inerting gas such as nitrogen or carbon dioxide to prevent explosions.

(a) When inert gases are used, they must subsequently be replaced by air prior to entry except when the inerting provides safer working conditions.

(4) All fans and other equipment used for removing flammable gases or vapors shall conform to NFPA requirements and shall not create an ignition hazard.

(5) Oxygen shall never be used for ventilation. [Order 73-3, § 296-62-14521, filed 5/7/73.]

WAC 296-62-14523 Evaluation of potentially hazardous atmospheres. Evaluation of the atmospheres shall be made by competent personnel.

(1) Atmospheric tests shall be made using accepted procedures and/or instruments to determine the kind and extent of any hazards present. However, atmospheric tests should be supplemented by other types of evaluation.

(2) Evaluation shall consider such factors as degree of toxicity, flammability, oxygen deficiency, noise, temperature, vapor pressures, sorption on surface, sludges, residue and ventilation rates.

(3) Evaluation shall be made immediately prior to entry and during occupation at intervals dependent on the possibility of changing conditions.

(4) Testing or other evaluation shall be made in all locations where employees may be exposed.

(5) If there is any doubt as to the validity of evaluation, the hazard shall be assumed to be high, and personal protective equipment or measures used accordingly. [Order 73-3, § 296-62-14523, filed 5/7/73.]

WAC 296-62-14525 Entry into confined space. After initial cleaning, vapor freeing, and evaluation of the atmosphere, the confined space may be entered to complete cleaning, repair or other work.

(1) Respiratory protective equipment shall be used when indicated.

(2) An observer capable of maintaining communication at all times shall be located outside the tank. He shall have respiratory protection available when indicated.

(3) If the possibility of a highly toxic or flammable atmosphere, or oxygen deficiency exists or can develop, workers shall wear safety harness with lifeline attached and a means of rescue shall be provided.

(4) Fire extinguishing equipment shall be immediately available when indicated.

(5) Ventilation shall be maintained at all times when employees are in confined spaces except when the atmosphere has been purposely inerted to provide safer working conditions. All work shall stop and the area shall be evacuated if ventilation fails.

(6) All tools and equipment shall be available as required.

(7) Emergency lighting shall be available as required.

(8) The area shall be evacuated if any indication of ill effects such as dizziness, irritation or excessive odors are noted. [Order 73-3, § 296-62-14525, filed 5/7/73.]

WAC 296-62-14527 Hot work. (1) Any hot work involving sources of ignition and including welding and burning shall require positive assurance that fire hazards and flammable atmospheres have been controlled. Combustible material shall be protected.

(2) Usually the atmosphere should be tested by a combustible gas indicator and/or other device as indicated. Tests should be made frequently enough to assure that safe conditions prevail.

(3) Hot work permits are required prior to entry.

(4) Where hot work involves the generation of toxic gases, vapors, or fumes, local exhaust and/or respiratory protection shall be required.

(5) Compressed gas cylinders should not generally be allowed in confined spaces. Compressed gas lines shall be protected from rupture or damage.

(6) Compressed gas cylinders or electric generators should be attended at all times. Sources of compressed gases or arc welding power shall be turned off immediately when an emergency arises or when work is interrupted or completed. [Order 73-3, § 296-62-14527, filed 5/7/73.]

WAC 296-62-14529 Use of toxic and/or flammable materials in confined spaces. Work in confined spaces frequently requires the use of toxic or flammable materials. These include but are not confined to coatings, linings, paints, cements, and solvents.

(1) Quantities of toxic or flammable materials brought into or used in confined spaces shall be limited to the smallest amount consistent with efficient use.

(2) Containers shall be designed to minimize evaporation and spillage. Safety cans or small squeeze bottles are preferable when applicable.

(3) Continuous ventilation shall be provided in sufficient quantity and design to control fire and health hazards.

(4) Atmospheres shall be tested and/or evaluated to provide positive assurance that hazards do not exist. In no instance shall flammable vapor concentrations exceed 20% of the lower explosive limit. Evaluation shall be repeated at intervals to ensure no hazardous build up of concentrations.

(5) Spraying of toxic or flammable substances such as paint is not recommended.

(6) Respiratory protective equipment shall be used as defined in WAC 296-62-14507.

(7) Sources of ignition shall be eliminated when flammable liquids are used.

(8) Materials, equipment and training shall be provided to clean up spills.

(9) All applicable instructions or recommendations from the manufacturer shall be enforced. [Order 73-3, § 296-62-14529, filed 5/7/73.]

WAC 296-62-14531 Exposure to cotton dust in cotton gins. (1) Scope and Application. This section applies to the control of employee exposure to cotton dust in cotton gins.

(2) Definitions. For the purposes of this section:

(a) "Blow down" – the cleaning of equipment and surface with compressed air.

(b) "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.

(c) "Director" – The Director of the Department of Labor and Industries, or his designated representative.

(3) Work Practices. Each employer shall immediately establish and implement a written program of work practices, which shall minimize cotton dust exposure for each specific job. Where applicable, the following work practices shall be included in the written work practices program:

(a) General. (i) All surfaces shall be maintained as free as practicable of accumulations of cotton dust.

(ii) The employer shall inspect, clean, maintain and repair, all engineering control equipment, production equipment and ventilation systems including power sources, ducts, and filtration units of the equipment, and at a minimum, tape or cover leaks in valves, flashing, elbows, and bands on air lines.

(iii) 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 most effectively reduces exposure to the lowest level feasible.

(b) Specific. (i) Floors and other accessible surfaces contaminated with cotton dust may not be cleaned by the use of compressed air.

(ii) Cleaning of clothing with compressed air is prohibited.

(iii) Floor sweeping shall be performed by a vacuum or with methods designed to minimize dispersal of dust.

(iv) Compressed air "blow-down" cleaning shall be prohibited, except where alternative means are not feasible. Where compressed air "blow-down" is done, respirators shall be worn by the employees performing the "blow-down," and employees in the area whose presence is not required to perform the "blow-down" shall be required to leave the area during this cleaning operation.

(c) Work practice plan. A written work place plan shall be kept which shall list appropriate schedules for carrying out housekeeping operations, and for cleaning and maintaining dust collection equipment. The plan shall be made available for inspection by the Director.

(4) 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.

(b) Use of respirators. Respirators shall be used in the following circumstances:

(i) By workers identified by medical surveillance under subitem (5)(f)(i)(D) of this subsection; or

(ii) During operations such as maintenance and repair activities in which work practice controls are not feasible; or

(iii) In operations specified under subitem (3)(b)(iv) of this subsection.

(c) Availability upon request. Respirators shall be made available upon request, to any employee exposed to cotton dust.

(d) Respirator selection. (i) Where respirators are required under this section, the employer shall select, provide and assure the use of any respirator tested and approved for protection against dust by the National Institute Of Occupational Safety and Health (NIOSH) under the provisions of 30 CFR Part 11.

(ii) Where respirators are required by this subsection, the employer shall provide either any NIOSH approved respirator or at the option of each affected worker, a NIOSH approved powered air purifying respirator with a high efficiency filter.

(e) Respirator program. The employer shall institute a respirator program in accordance with WAC 296-24-08103, 296-24-08107, 296-24-08109 and 296-24-08111.

(f) Respirator usage. (i) The employer shall assure that the respirator used by each employee exhibits minimum facepiece 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, and 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 facepieces to prevent skin irritation associated with respirator use.

(5) Medical Surveillance. (a) General. (i) Each employer who has an operating gin in which cotton dust is present 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 complete a NIOSH approved training course in spirometry.

(b) Initial examinations. For each ginning season, at the time of initial assignment, the employer shall provide each employee who is or may be exposed to cotton dust, with an opportunity for medical surveillance that shall include:

(i) A medical history;

(ii) The standardized questionnaire in Appendix B; and

(iii) A pulmonary function measurement, including a determination of forced vital capacity (FVC) and forced

expiratory volume in 1 second (FEV_1), and the percentage that the measured values of FEV and FVC differ from the predicted values, using the standard tables in Appendix C. The predicted FEV, and FVC for blacks shall be multiplied by 0.85 to adjust for racial differences.

(iv) Based upon the questionnaire results, each employee shall be graded according to Schilling's byssinosis classification system.

(c) Mid–season retest. The determinations required under subsection (5)(b) of this section shall be made again for each employee after at least 14 days of employment and before the termination of employment for the season. The determinations shall be made following at least 24 hours or one working day after previous exposure to cotton dust. The pulmonary function tests shall be repeated during the shift, no sooner than four and no more than 10 hours after the beginning of the work shift; and, in any event, no more than one hour after cessation of exposure.

(d) Periodic examinations. (i) The employer shall provide the medical surveillance under this subsection (5) annually.

(ii) 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.

(iii) An employee whose FEV_1 is less than 60 percent of the predicted value shall be referred to a physician for a detailed pulmonary examination.

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

(iv) Information from previous medical examinations of the affected employee which is not readily available to the examining physician.

(f) Physician's written opinion. (i) The employer shall obtain and furnish the employee with a copy of the written opinion from the examining physician containing the following:

(A) The results of the medical examination and tests, including any determinations made under subitem (5)(d)(ii) of this section.

(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;

(D) The physician's recommendations for the employee's use of a respirator where dust effects could be suppressed by respirator use;

(E) 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 diagnosis unrelated to occupational exposure.

(g) Spanish speaking employees. An employer whose workforce consists of a significant percentage of Spanish speaking workers who cannot communicate effectively in English, shall provide bilingual administration of the medical surveillance requirements, including use of the Spanish questionnaire provided in Appendix B.

(h) Nonduplication of medical surveillance. (i) During any one ginning season, an employer is not required to provide medical surveillance as described in subsection (5) of this section for any employee who can demonstrate that both the background medical surveillance and the mid–season retest required by subsection (5) of this section were administered during that ginning season while in the employment of another gin employer.

(ii) If an employee can demonstrate that the background medical surveillance has been administered but not the mid–season retest, the employer shall provide the mid–season medical retest of subdivision (5)(c) of this section, and comply with provisions of subdivision (5)(d)–(5)(f) of this section. Where the employer is administering only the mid–season retest, the employer shall provide the mid–season retest after at least 14 days of employment in his gin and before termination of employment for the season.

(iii) For purposes of this section, where the employer does not administer any medical surveillance, the employer shall be satisfied that an employee has undergone the medical surveillance required under subdivisions (5)(a) to (5)(c) of this section upon receipt of written notification from the employer who administered the test, or upon receipt by the physician supervising the program, of a copy of the results of medical surveillance.

(6) Employee Education and Training. (a) Training program. (i) Each employer who operates an active gin shall institute a training program for all his employees, prior to initial assignment, and shall assure that each employee is informed of the following:

(A) The specific nature of the operations which could result in exposure to cotton dust;

(B) The measures, including work practices, required by subsection (3) of this section, necessary to protect the employee from excess exposures;

(C) The purpose, proper use and limitations of respirators required by subsection (4) of this section;

(D) The purpose for and a description of the medical surveillance program required by subsection (5) of this section; and other information which will aid exposed employees in understanding the hazards of cotton dust exposure; and

(E) The contents of this standard and its appendices.

(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.

(iii) An employer whose workforce consists of a significant percentage of Spanish speaking employees who cannot communicate effectively in English shall provide bilingual administration of the provisions of this section.

(iv) In addition to the information required by subdivision (6)(a), the employer shall include as part of his training program and distribute to employees any materials pertaining to the Washington Industrial Safety and Health Act, the regulations issued pursuant to that Act, and to this cotton dust standard which are made available by the Director.

(7) Signs. (a) The employer shall post the following warning sign in each work area where there is potential exposure to cotton dust:

WARNING:

COTTON DUST WORK AREA
MAY CAUSE ACUTE OR DELAYED
LUNG INJURY (BYSSINOSIS).

(b) An employer whose workforce consists of a significant percentage of Spanish-speaking employees who cannot communicate effectively in English shall provide bilingual versions of the sign required by subdivision (7)(a) of this section.

(8) Recordkeeping. (a) Medical surveillance. (i) The employer shall establish and maintain an accurate medical record for each employee subject to medical surveillance required by subsection (5) of this section.

(ii) The record shall include:

(A) The name, social security number and description of the duties of the employee;

(B) A copy of the medical surveillance results including the medical history, questionnaire responses, 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) The type of protective devices worn, and length of time worn;

(F) 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 that he references the standard in the medical surveillance records of each employee.

(iii) The employer shall maintain this record for at least 10 years.

(b) Availability. (i) The employer shall make available upon request all records required to be maintained by subsection (8) of this section to the Director for examination and copying.

(ii) The employer shall make available an employee's medical records required by this section, for examination and copying, to the affected employee or former employee or to a physician or other individual designated by such affected employee or former employee.

(c) 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 (8) 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.

(9) Effective Date. This emergency rule shall become effective immediately upon filing with the Code Reviser.

(10) Appendices. Appendices to this section are found in the Federal Register, Vol. 43, No. 122, dated 6-23-78, and the corrections in Vol. 43, No. 153, dated 8-8-78; the contents of these appendices are mandatory. Appendices are available from:

The Technical Services Section
Division of Industrial Safety and Health
P.O. Box 207
Olympia, WA 98504 (206) 753-6381

[Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17.240. 80-11-010 (Order 80-14), § 296-62-14531, filed 8/8/80. Statutory Authority: RCW 49.17.040, 49-.17.150 and 49.17.240. 79-02-037 (Order 79-1), § 296-62-14531, filed 1/23/79.]

WAC 296-62-14533 Cotton dust. (1) Scope and application. (a) This section applies to the control of employee exposure to cotton dust in all workplaces, except as provided in subsection (1)(b) of this section.

(b) This section does not apply to:

(i) The harvesting of cotton;

(ii) The ginning of cotton (exposure to cotton dust in cotton ginning is covered by WAC 296-62-14531);

(iii) Maritime operations are covered by chapters 296-56 and 296-304 WAC;

(iv) The handling or processing of woven or knitted materials; and

(v) The handling or processing of washed cotton.

(c) This section provides mandatory requirements for the control of employee exposure to cotton dust. The mandatory nature of these requirements is not intended, however, to discourage or inhibit the development of different, equally effective means of providing the required protection. The variance and procedure section, WAC 296-24-010, provides a mechanism for employers to obtain variances from the provisions of this section where the employer has developed alternative procedures which are "as safe and healthful as" those required by this section. As implemented by the procedural regulations in WAC 296-24-010, the variance provisions permit the flexibility which contributes to efficient compliance with the standard. To aid in the expeditious processing of variance applications, the procedures allow, where appropriate, for the grant of interim orders

pending a decision on the merits of the variance as well as for the consideration of variances applicable to groups of employers. We encourage interested employers to utilize the variance provisions where equally safe and healthful protective means are available.

(2) Definitions applicable to this section:

(a) "Blow down" – the cleaning of equipment and surfaces with compressed air.

(b) "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 new or waste cotton fibers or cotton fiber byproducts from textile mills are considered cotton dust.

(c) "Director" – the director of labor and industries or his authorized representative.

(d) "Lint–free respirable cotton dust" – particles of cotton dust of approximately 15 microns or less aerodynamic equivalent diameter.

(e) "Vertical elutriator cotton dust sampler" – 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.

(f) "Yarn manufacturing" – all textile mill operations from opening to, but not including, slashing and weaving.

(g) "Washed cotton" – cotton which has been thoroughly washed in hot water and is known in the cotton textile trade as purified or dyed. Washed cotton does not include steamed, autoclaved cotton or cotton washed solely in solvents.

(3) Permissible exposure limits. (a) The employer shall assure that no employee who is exposed to cotton dust in yarn manufacturing is exposed to airborne concentrations of lint–free respirable cotton dust greater than 200 $\mu g/m^3$ mean concentration, averaged over an eight–hour period, as measured by a vertical elutriator or a method of equivalent accuracy and precision.

(b) The employer shall assure than 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 $\mu g/m^3$ mean concentration, averaged over an eight–hour period, as measured by a vertical elutriator or a method of equivalent accuracy and precision.

(c) The employer shall assure that no employee who is exposed to cotton dust (except for exposures in yarn manufacturing and slashing and weaving covered by subsection (3)(a) and (b) of this section is exposed to airborne concentrations of lint–free respirable cotton dust greater than 500 $\mu g/m^3$ mean concentration, averaged over an eight–hour period, as measured by a vertical elutriator or a method of equivalent accuracy and precision.

(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 a method of equivalent accuracy and precision.

(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) Collect respirable particulates in the same range as the vertical elutriator (approximately 15 microns);

(B) Replicate exposure data in side–by–side field comparisons; and

(C) Are equivalent within an accuracy and precision range of plus or minus twenty–five percent for ninety–five percent of the samples over the range of 0.5 to 2 times the permissible exposure limit.

(b) Initial monitoring. Each employer who has a place of employment in which cotton dust is present, 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) The employer shall repeat the measurements required by subsection (4)(b) of this section at least every six months.

(ii) 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 required by subsection (4)(b) of this section for those employees affected by the change or increase.

(d) Employee notification. (i) Within five 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 establishes 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) Each 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 subsection (5)(a) of this section.

(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 no later than March 27, 1984.

(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 least every six months. Measurements of the system's effectiveness to control exposures shall also be made within five days of any change in production, process or control which may result in any increase in airborne concentrations of cotton dust.

(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 limit;

(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.	1. Any dust respirator, including single use.
(b) 10 x the applicable permissible exposure limit.	1. Any dust respirator, except single use or quarter mask; or 2. Any supplied air respirator; or 3. Any self–contained breathing apparatus.
(c) 100 x the applicable permissible exposure limit.	1. High efficiency particulate filter respirator with a full facepiece; or 2. Any supplied air respirator with full facepiece, helmet or hood; or 3. Any self–contained breathing apparatus with full facepiece.
(d) Greater than 100 x the applicable permissible exposure limit.	1. A powered air–purifying respirator with high efficiency particulate filter; or 2. A self–contained breathing apparatus with a full facepiece operated in pressure demand or other positive pressure mode; or 3. A type "C" supplied air respirator operated in pressure demand or other positive pressure mode; or 4. A combination respirator which includes a type "C" supplied–air respirator with a full facepiece operated in pressure or continuous–flow mode and an auxiliary self–contained breathing apparatus operated in pressure demand or other 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 5 x the applicable permissible exposure limit, the employer shall provide and permit the employee to use, at the employee's option, single use dust respirator in preference to any respirator specified in paragraph (a) of Table I.

(iv) 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.

(v) Whenever a physician determines that an employee is unable to wear any form of respirator, including a power 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 due to an inability to wear a respirator suffers no loss of earnings or other employment rights or benefits as a result of the transfer.

(vi) Until September 27, 1980, the employer shall provide any dust respirator, including single use, to all employees exposed to cotton dust, unless the employer has conducted the monitoring required by subsection (4)(b) of this section or otherwise has monitored employee exposure. As soon as monitoring has been conducted, the employer shall select the appropriate respirator from Table I.

(c) Respirator program. The employer shall institute a respirator program in accordance with WAC 296-24-08103, 296-24-08107, 296-24-08109 and 296-24-08111.

(d) Respirator usage. (i) The employer shall assure that the respirator used by each employee exhibits minimum facepiece 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 facepieces 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 for each specific job. Where applicable, the following work practices shall be included in the work practices program:

(a) Compressed air "blow down" cleaning shall be prohibited, where alternative means are feasible. Where compressed air "blow down" is done, respirators shall be worn by the employees performing the "blow down", and employees in the area whose presence is not required to perform the "blow down" shall be required to leave the area 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) Cotton and cotton waste shall be stacked, sorted, baled, dumped, removed or otherwise handled by mechanical means, except where the employer can how 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.

(e) The employer shall inspect, clean, maintain, and repair, all engineering control equipment and ventilation systems including power sources, ducts, and filtration units of the equipment.

(8) Medical surveillance. (a) General. (i) Each employer who has a place of employment in which cotton dust is present 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 complete a NIOSH approved training course in spirometry.

(b) Initial examinations. The employer shall provide each employee who is or may be exposed to cotton dust with an opportunity for medical surveillance. 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 (FEV_1), and the percentage that the measured values of FEV and FVC differ from the predicted values, using the standard tables in WAC 296-62-14539. The predicted FEV_1 and FVC for blacks shall be multiplied by 0.85 to adjust for racial differences.

These determinations shall be made for each employee before the employee enters the workplace on the first day of the work week, following at least thirty-five hours after previous exposure to cotton dust. The tests shall be repeated during the shift, no sooner than four 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.

(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 annual medical surveillance for all employees exposed to cotton dust which shall include at least an update of the medical history and standardized questionnaire (the abbreviated questionnaire, App. B-III) and the pulmonary function measurements in subsection (8)(b) of this section.

(ii) Medical surveillance as required in subsection (8)(c)(i) of this section shall be provided every six months for all employees in the following categories:

(A) An FEV_1 of greater than eighty percent of the predicted value, but with an FEV_1 decrement of five percent or 200 ml. on a first working day;

(B) An FEV_1 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 has occurred.

(iii) An employee whose FEV_1 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;

(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 in all workplaces where cotton dust is present, and shall assure that each employee in these workplaces is informed of the following:

(A) The specific nature of the operations which could result in exposure to cotton dust at or above the permissible exposure limit;

(B) 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;

(C) The purpose, proper use and limitations of respirators required by subsection (6) of this section;

(D) 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

(E) The contents of this standard and its appendices.

(ii) The training program shall be provided prior to initial assignment and shall be repeated at least annually.

(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.

(iii) In addition to the information required by subsection (9)(a) of this section, the employer shall include as part of the training program, and shall distribute to employees, any materials, pertaining to the Washington Industrial Safety and Health Act, the regulations issued pursuant to that act, and this cotton dust standard, which are made available to the employer by the director.

(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 responses, 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) The employer shall make employee exposure measurement records required by this section available to affected employees or their designated representatives for examination and copying.

(iii) The employer shall make all records indicating a former employee's own exposure to cotton dust available to the former employee or his designated representative for examination and copying.

(iv) The employer shall make an employee's medical records required to be maintained by this section, available to the affected employee or former employee or to a physician or other individual designated by such affected employee or former employees, for examination and copying.

(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.

(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; engineering and work practice controls. Engineering and work practice controls required by subsection (5) of this section shall be implemented no later than March 27, 1984.

(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. Until September 27, 1980, the provisions of subsection (6)(b)(vi) of this section apply.

(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 initial medical surveillance required by subsection (8) of this section shall be completed no later than March 27, 1981.

(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) Appendices. (a) Appendix B, 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, 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. [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 μg/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 296-62-200 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 occurence 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 unvolatilized 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/m^3), 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/m^3. [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 engineering controls, work practices and respiratory protection as follows:

(1) Priority of Compliance Methods. (a) Existing coke oven batteries. (i) The employer shall institute the engineering 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 engineering and work practice controls, the requirement, effective August 27, 1971, to implement feasible administrative or engineering controls to reduce exposures to coal tar pitch volatiles, shall be considered. Wherever the engineering 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 engineering and work practice controls required under subsection (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 research, develop and implement any other engineering and work practice controls necessary to reduce exposure to or below the permissible exposure limit, whenever the engineering 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. The employer shall institute the best available engineering 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 engineering 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. The employer shall institute engineering 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 engineering and work practice controls, the requirement, effective August 27, 1971, to implement feasible administrative or engineering controls to reduce exposures to coal tar pitch volatiles, shall be considered. Wherever the engineering 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) Engineering Controls. (a) Charging. The employer shall equip and operate existing coke oven batteries with all of the following engineering 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 subsection (2)(a) of this section, except subsections (2)(a)(ii), (iv), (v), (vi) and (viii) of this section 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 engineering 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 engineering 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:

(aa) The aspiration system turned on;

(bb) Coal charged through the outermost hoppers, either individually or together, depending on the capacity of the aspiration system to collect the gases involved;

(cc) The charging holes used under subsection (3)(a)(ii), (3)(b) of this section relidded or otherwise sealed off to prevent leakage of coke oven emissions;

(dd) If four hoppers are used, the third hopper discharged and relidded or otherwise sealed off to prevent leakage of coke oven emissions;

(ee) 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;

(ff) 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

(gg) The aspiration system turned off only after the charging holes have been closed.

(iii) 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) Dampering 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 goosenecks, 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 engineering 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 descripition of each coke oven operation by battery, including work force and operating crew, coking time, operating procedures and maintenance practices;

(ii) Engineering 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 engineering 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)-(4) of this section, or after January 20, 1980, whichever is sooner, the permissible exposure limit is still exceeded, the employer shall develop a detailed written program and schedule for the development and

implementation of any additional engineering 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 subsection (6) of this section 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. [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 repirators 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 Hg/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.

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 Hg/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 Hg/m^3, 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 296-24-08101 through 296-24-08113.

(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. The employer shall perform quantitative fit tests annually for each employee who uses a nonpowered, particulate filter respirator.

(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. [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 whch 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;

(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) The employer shall make available upon request records of employee exposure measurements required by subsection (1) of this section for inspection and copying to affected employees, former employees, and their designated representatives.

(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. [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.

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, protective 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 equipment 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.

APPENDIX B

INDUSTRIAL HYGIENE AND MEDICAL SURVEILLANCE GUIDELINES

I. INDUSTRIAL HYGIENE GUIDELINES

(1) Sampling. (Benzene-Soluable 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 soluable 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 ofthe 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 cytologys 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.]

Chapter 296-64 WAC
SAFETY STANDARDS——OCCUPATIONAL DISEASES

WAC

STANDARDS RELATING TO PRECAUTIONARY LABELING OF HAZARDOUS SUBSTANCES USED IN PLACES OF EMPLOYMENT

296-64-400 Purpose and scope.
296-64-405 Definitions.
296-64-410 General requirements.
296-64-415 General labeling requirements and attached appendices.
296-64-420 Container handling and storage.
296-64-425 Exemptions.

DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

296-64-001 Preface. [Preface, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-002 Introduction. [Introduction, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-005 Foreword. [Foreword, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-010 Safety standards relating to dusts, fumes, vapors and gases in industry——Application. [Standard 1, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-020 Definitions. [Standard 2, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-030 Control of atmospheric contaminants. [Standard 3, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-031 Threshold limit values. [Appendix 1, filed 3/23/60.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-040 Specifications of air requirements per worker in industrial plants. [Standard 4, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-050 Local exhaust ventilation. [Standard 5, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

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296-64-070 Substitution of nonhazardous equipment, material or process. [Standard 7, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-080 Dust allaying media. [Standard 8, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-090 Isolation of hazardous operations. [Standard 9, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

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296-64-110 Rubber boots. [Standard 11, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-120 Applying paint by the spray method in fixed finishing shops. [Spray paint in fixed finishing shops rules, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-130 Galvanizing. [Galvanizing rules, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-140 Workmen exposed to silicosis. [Exposure to silicosis rules, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-150 Plywood manufacturing——Men handling glue (core) sections. [Plywood-glue (core) section rules, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-160 Auto repair and internal combustion engine adjusting plants. [Auto repair and internal combustion engine adjusting plant rules, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-170 Applying paint by the method of the spray, other than in fixed finishing shops. [Spray paint rules (other than in fixed finishing shops), effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-180 Wool weaving. [Wool weaving rules, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-190 Sea foods——Fresh and canning industry employees. [Sea food rules, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-200 Paint and kalsomine manufacturing and handling. [Paint and kalsomine manufacturing and handling rules, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-210 Handling and emptying of sacks or barrels containing dry kalsomine, cement, sand-blasting sand and other like material except in manufacturing plants. [Paint and kalsomine sack and barrel rules, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-220 Shingle manufacturing. [Shingle manufacturing rules, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-230 Compressed air chambers, hard rock workers——Soft earth tunnels and open cuts. [Compressed air, hard rock, soft earth tunnels, and open cut rules, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-240 Electric and gas torch workers. [Electric and gas torch rules, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-250 Battery manufacturing and rebuilding. [Battery manufacturing and rebuilding rules, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-260 Power propelled trucks operated within buildings. [Power propelled truck rules, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

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296-64-260 Power propelled trucks operated within buildings. [Power propelled truck rules, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-270 Polishing, grinding and buffing machine operators. [Polishing, grinding, and buffing rules, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-280 Plating and removal of plating, including acid dips. [Plating and stripping rules, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-290 Dry cleaning by use of any solvent, producing fumes, gases or vapors injurious to health, including, but not limiting the same to, carbon tetrachloride, trichloroethylene, perchloroethylene and their sequel. [Dry cleaning rules, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

296-64-300 Lumber and timber treated with arsenic compounds and the handling thereof. [Arsenic treated lumber rules, effective 10/1/38.] Repealed by Order 70-8 (part), filed 7/31/70, effective 9/1/70.

STANDARDS RELATING TO PRECAUTIONARY LABELING OF HAZARDOUS SUBSTANCES USED IN PLACES OF EMPLOYMENT

WAC 296-64-400 Purpose and scope. (1) The purposes of these standards are to provide reasonable requirements for the protection of the health and safety of employed persons, to provide the labeling requirements similar to or uniform with those of other states at industrial level. These purposes are accomplished herein by:

(a) proper identification of containers of hazardous substances

(b) adequate warning of the hazards of these substances

(c) sufficient information of precautions to be exercised

(2) The scope of these standards is to provide warning label requirements for containers holding substances capable, under the definitions set forth herein, of producing a health, fire or explosion hazard when such substances are used in any place of employment governed under the Washington industrial insurance and medical aid act. These standards shall be supplementary to any applicable regulations as promulgated by any other Washington state or federal agency. [Standard I, effective 12/1/62.]

WAC 296-64-405 Definitions. (1) "Approved" – shall mean approved by the director of the department of labor and industries or his authorized representative.

(2) "Department" – shall mean the Washington state department of labor and industries.

(3) "Division" – shall mean the division of safety of the department.

(4) "Section" – shall mean the industrial hygiene section of the division.

(5) "Supervisor" – shall mean the supervisor of the division.

(6) "Shall" – where used, shall mean a mandatory requirement.

(7) "Should" – where used, shall mean the recommended practice recognized as satisfactory by the division.

(8) "Singular-plural" – the singular shall mean the plural and the plural the singular.

(9) "Adequate or effective" – shall mean the satisfactory conditions subject to the determination by the supervisor.

(10) "Combustible liquid" – any liquid which gives off flammable vapors, above 80°F. to and including 120°F. as determined by flash point with Tagliabue's open cup method as used for testing of burning oils.

(11) "Container" – an individual package such as, but not limited to, a bag, barrel, bottle, box, can, carboy, cylinder, drum, or tube that is used to store or dispense a hazardous substance. A container shall not include tank trucks, tank cars, pipe lines or equipment used to hold or convey hazardous substances during transportation or during the process of manufacture.

(12) "Corrosive (physiological)" – a substance which in contact with living tissue causes destruction of the tissue by chemical action. This term shall not refer to action on inanimate surfaces.

(13) "Dust" – solid particles suspended in air generated by handling, crushing, grinding, rapid impact, detonation, or decrepitation of organic or inorganic materials such as, rock, ore, metal, coal, wood, grain, etc. Dusts do not diffuse in air but settle under the influence of gravity.

(14) "Extremely flammable liquid" – any liquid which gives off flammable vapors, at or below a temperature of 20°F. as determined by flash point with Tagliabue's open cup method as used for testing of burning oils.

(15) "Flammable liquid" – any liquid which gives off flammable vapors, above 20°F. to and including 80°F. as determined by flash point with Tagliabue's open cup method as used for testing of burning oils.

(16) "Fume" – solid particles suspended in air generated by condensation from the gaseous state, generally after volatilization from molten metals, etc., and often accompanied by a chemical reaction such as oxidation. Fumes flocculate and sometimes coalesce.

(17) "Gas" – a normally formless fluid which occupies the space of enclosure and which can be changed to the liquid or solid state by the effect of increased pressure or decreased temperature or both. A gas diffuses.

(18) "Hazardous substance" – any substance or mixture of substances which is toxic, corrosive, an irritant, flammable, extremely flammable or generates pressure through decomposition, heat, or other means, if such substance or mixture of substances may cause substantial (as medically interpreted) personal injury or illness during or as a direct result of any customary or reasonably anticipated handling or use. Hazardous substances shall not include liquefied petroleum gases stored or used as fuels.

(19) "Irritant (physiological)" – any substance which on immediate, prolonged, or repeated contact with normal living tissue will induce a local inflammatory reaction.

(20) "Mist" – liquid droplets suspended in air generated by condensation from the gaseous to the liquid state or by breaking up a liquid into a dispersed state, such as by splashing, foaming or atomizing.

(21) "Mixture" – a physical commingling of two or more substances which may not bear a fixed proportion

to one another and which have not reacted chemically with one another.

(22) "Oxidizing material" – a substance that stimulates the oxidation or combustion of organic or inorganic matter.

(23) "Poison" – any substance or mixture of substances which falls within any of the following categories:

(a) Produces death within fourteen days in half or more than half of a group of ten or more laboratory white rats each weighing between two hundred and three hundred grams, at a single dose of fifty milligrams or less per kilogram of body weight, when orally administered, or

(b) Produces death within fourteen days in half or more than half of a group of ten or more laboratory white rats each weighing two hundred to three hundred grams, when inhaled continuously for a period of one hour or less at an atmospheric concentration of two hundred parts per million or less by volume of gas or vapor or two milligrams or less per liter of mist, fume or dust, provided such concentration is likely to be encountered by man when substances are used in any reasonable foreseeable manner, or

(c) Produces death within fourteen days in half or more than half of a group of ten or more rabbits tested in a dosage of two hundred milligrams or less per kilogram of body weight, when administered by continuous contact with the bare skin for twenty–four hours or less.

(d) If available data on human experience with any substance in the above named concentrations indicate results different from those obtained on animals, the human data shall take precedence.

(24) "Toxic substance" – a substance which has the inherent capacity to produce personal injury or illness to man through ingestion, inhalation or absorption through any body surface.

(25) "Vapor" – the gaseous form of a substance which is normally in the solid or liquid state. A vapor diffuses.

(26) "Label" – means a display of written or printed matter, upon or attached to the immediate container. [Standard II, effective 12/1/62.]

WAC 296-64-410 General requirements. (1) All containers holding hazardous substances in places of employment governed by the industrial insurance and medical aid acts shall be labeled in accordance with these standards.

(2) No employer shall distribute, make available, furnish or supply for use by his employees any hazardous substance unless its container is labeled accordance with these standards.

(3) No employer shall distribute, make available, or supply for re–use a container which has been used to hold a hazardous substance without thoroughly and properly cleaning (make inocuous or neutralized) such container, unless the container is to be used for the same substance. [Standard III, effective 12/1/62.]

WAC 296-64-415 General labeling requirements and attached appendices. (1) The following data shall appear on original containers of hazardous substances which shall include but be not limited to the substances used for illustrative purposes in the appendices attached hereto, consisting of:

Appendix I – MCA manual L–1, 1961 edition, table 1, Selection of Precautionary Statements.

Appendix II – MCA manual L–1, 1961 edition, Container Handling and Storage.

Appendix III – MCA manual L–1, 1961 edition, Illustrative Labels for Hazardous Chemicals.

(a) Name and place of business of manufacturer, distributor or seller.

(b) Chemical, common or recognized generic name (not trade name only) of each component that is a hazardous substance.

(c) A signal word in the following order of diminishing severity of hazard, "DANGER", "WARNING" or "CAUTION".

Note: Appendix III Illustrative Labels for Hazardous Chemicals

(d) Affirmative statement of principal hazard or hazards such as "FLAMMABLE", "VAPOR HARMFUL", "CAUSES BURNS", "ABSORBED THROUGH SKIN", "IRRITANT", or similar wording descriptive of the hazard.

(e) Precautionary measures covering actions to be followed or avoided.

(f) Instructions as to first aid treatment in case of contact or exposure, where advisable.

(g) the word "POISON" for poisonous substances as defined in WAC 296–64–405 or when required by any statute of this state, regulations of any state agency, or federal statute.

(h) In the case of poisons a practical first aid treatment or antidote immediately following the word "POISON", shall be included.

(i) Instructions, where necessary, for handling and storage of containers.

Note: Appendix II Container Handling and Storage

(j) Additional warnings may be indicated by the particular form or manner in which a product is sold or the circumstances surrounding its use.

(2) When original containers are of such small size as to make the requirements of subsection (1) of this section impractical, the following minimum data shall appear on such containers:

(a) Name and place of business of manufacturer, distributor or seller.

(b) Chemical, common or recognized generic name (not trade name only) of each component that is a hazardous substance.

(c) A signal word in the following order of diminishing severity of hazard, "DANGER", "WARNING", or "CAUTION".

Note: Appendix III Illustrative Labels For Hazardous Chemicals

(d) Affirmative statement of principal hazard or hazards such as "FLAMMABLE", "VAPOR HARMFUL", "CAUSES BURNS", "ABSORBED THROUGH SKIN", "IRRITANT", or similar wording descriptive of the hazard.

(e) Instructions as to first aid treatment in case of contact or exposure, where advisable.

(f) The word "POISON" for poisonous substances and a practical first aid treatment or antidote immediately after the word "POISON".

(g) Precautionary measures covering actions to be followed or avoided and handling and storage instructions may be abbreviated or deleted depending on the container size.

(h) Additional warnings may be indicated by the particular form or manner in which a product is sold or the circumstances surrounding its use.

(3) When containers of hazardous substances, other than original containers, are used or handled in industry, the following minimum data shall appear on such containers:

(a) Chemical, common or recognized generic name (not trade name only) of each component that is a hazardous substance.

(b) A signal word in the following order of diminishing severity of hazard "DANGER", "WARNING", or "CAUTION".

Note: Appendix III Illustrative Labels for Hazardous Chemicals

(c) Affirmative statement of principal hazard or hazards such as "FLAMMABLE", "VAPOR HARMFUL", "CAUSES BURNS", "ABSORBED THROUGH SKIN", "IRRITANT" or similar wording descriptive of the hazard.

(d) The word "POISON" for poisonous substances and a practical first aid treatment or antidote immediately after the word "POISON".

(e) Additional warnings may be indicated by the particular form or manner in which a product is sold or the circumstances surrounding its use.

(4) **Outside containers or wrappers.** Appropriate handling and storage instructions, as included in subsection (1)(j) of this section, must appear on the outside container or wrapper if outside containers or wrappers are used.

(5) **Required typography and location of warning test.** Warning statements or labels required by the provisions of these standards shall be displayed prominently on the container and shall be in contrast by typography, layout or color with other printed matter on the container.

(6) **Practical equivalent.** Use of wording on labels, which is the practical equivalent of that shown in Appendix I shall constitute compliance with these standards, except that no words shall be regarded as the practical equivalent of the words "POISON" or "POISONOUS".

(7) Hazardous substances which are in the process of manufacture, but are not in pipelines or equipment used to hold or convey such substances, may be declared by the director, or his authorized representative to be exempt in whole or in part from the labeling requirements of standard IV upon acceptable proof that there exist other provisions deemed adequate for the safety and health of the persons employed therein.

(8) Substances which are still in the developmental stage and are used solely for experimental purposes shall not be required to be labeled as herein before required, but shall bear warning labels advising the persons working on the development and/or testing of the substances of the precautions to take against any known hazards that exist, and warning of other possible hazards that may exist, by the following supplimentary statement or its practical equivalent: "Important! The properties of this substance have not been fully investigated and its handling or use may be hazardous. Exercise due care". [Standard IV, effective 12/1/62.]

WAC 296-64-420 Container handling and storage. Appropriate instructions shall be given in separate labels or in combination with the warning labels attached to the container whenever required for the safe handling and storage of containers. Care shall always be exercised in handling and storing containers of hazardous substances. The general instructions set out in Appendix II [See WAC 296-64-415] shall be used as a guide in labeling for special handling and storing certain classes of containers. Applicable phrases may be selected from these statements. [Standard V, effective 12/1/62.]

WAC 296-64-425 Exemptions. Containers of products coming under and labeled in accordance with the federal and Washington state food, drug and cosmetic acts, the federal insecticide fungicide and rodenticide act, the Washington pesticide act, the federal hazardous substances labeling act, the interstate commerce commission and foreign commerce regulations shall be exempt from the requirements of these standards. [Standard VI, effective 12/1/62.]

Chapter 296-78 WAC
SAFETY STANDARDS FOR SAWMILLS AND WOODWORKING OPERATIONS

WAC

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296-78-410 Veneer and plywood plants——Peeling and barking.
296-78-415 Veneer lathe.
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DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

296-78-010 General safety standards. [Rules A-1 through A-19, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-015 Minimum requirements for first aid. [Rule B-1, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-020 First aid kit. [Rule B-2, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-025 First aid room. [Rule B-3, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-050 Electrical utilization——Definitions. [Rule D-22, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-055 Electrical utilization——General requirements——Safety. [Rule D-23, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-060 Electrical utilization——General requirements——Current. [Rule D-24, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-065 Electrical utilization——General requirements——Grounding. [Rule D-25, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-070 Electrical utilization——General requirements——Circuits to be grounded. [Rule D-26, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-075 Electrical utilization——General requirements——Grounding noncurrent-carrying metal parts. [Rule D-27, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-080 Electrical utilization——Working spaces about electrical equipment——Dimensions. [Rule D-28, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-085 Electrical utilization——Guarding or isolating live parts——Inclosure or elevation. [Rule D-29, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-090 Electrical utilization——Separation and barriers. [Rule D-30, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-095 Electrical utilization——Hazardous locations. [Rule D-31, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-100 Electrical utilization——Suitability and size of conductors. [Rule D-32, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-105 Electrical utilization——Fuses and circuit breakers. [Rule D-33, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-110 Electrical utilization——General requirements for switches——Accessibility, marking and installation. [Rule D-34, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-115 Electrical utilization——Guarding switches. [Rule D-35, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-120 Electrical utilization——Platforms and mats. [Rule D-36, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-125 Electrical utilization——Switchboards and panelboards——Control or arrangement. [Rule D-37, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-130 Electrical utilization——Inclosure of parts. [Rule D-38, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-135 Electrical utilization——Motors and motor-driven machinery——Grounding machine frames. [Rule D-39, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-140 Electrical utilization——Mats and platforms. [Rule D-40, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-145 Electrical utilization——Water barrel rheostats prohibited. [Rule D-41, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-150 Electrical utilization——Employees——Safety requirements. [Rule D-42, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-155 Electrical utilization——"Bridging" fuses prohibited. [Rule D-43, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

296-78-160 Electrical utilization——Leakage of electricity shall be reported. [Rule D-44, effective 6/1/51, filed

	3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.
296-78-162	Electrical utilization——Safe standing room required. [Rule D-45, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.
296-78-165	Electrical utilization——Use of disconnected wires for starting machinery prohibited. [Rules D-46 through D-53, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.
296-78-175	Platform hoists. [Rule D-55, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.
296-78-310	Saws——Shingle saws. [Rule H-7, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.
296-78-370	Miscellaneous woodworking machines——Jointers——(Shingle). [Rule I-6, effective 6/1/51, filed 3/23/60.] Repealed by Order 74-28, filed 5/7/74 and Order 76-7, filed 3/1/76.

WAC 296-78-005 Foreword. (1) General Requirements. (a) This chapter 296-78 WAC shall apply to and include safety requirements for all installations where the primary manufacturing of wood building products takes place. The installations may be a permanent fixed establishment or a portable operation. These operations shall include but are not limited to log and lumber handling, sawing, trimming and planing, plywood or veneer manufacturing, canting operations, waste or residual handling, operation of dry kilns, finishing, shipping, storage, yard and yard equipment, and for power tools and affiliated equipment used in connection with such operations. WAC 296-78-450 shall apply to Shake and Shingle Manufacturing. The provisions of WAC 296-78-005 through 296-78-430 are also applicable in Shake and Shingle Manufacturing except in instances of conflict with the requirements of WAC 296-78-450. (Rev. 1-28-76)

(2) This standard shall augment the Washington State General Safety and Health Standards, General Occupational Health Standards, Electrical Workers Safety Rules, and any other standards which are applicable to all industries governed by chapter 80, Laws of 1973, Washington Industrial Safety and Health Act. In the event of any conflict between any portion of this chapter and any portion of any of the general application standards, the provisions of this chapter 296-78 WAC, shall apply.

(3) In exceptional cases where compliance with specific provisions of this chapter can only be accomplished to the serious detriment and disadvantage of an operation, variance from the requirement may be permitted by the Director of the Department of Labor and Industries after receipt of Application for Variance which meets the requirements of WAC 296-24-010, General Safety and Health Standards.

(4) No safety program will run itself. To be successful, the wholehearted interest of the employees' group (Labor Unions) and management must not only be behind the program, but the fact must also be readily apparent to all. [Order 76-7, § 296-78-005, filed 3/1/76; Order 74-28, § 296-78-005, filed 5/7/74; Foreward, effective 6/1/51, filed 3/23/60.]

WAC 296-78-007 Definitions applicable to this chapter. (1) "A-frame" means a structure made of two independent columns fastened together at the top and separated at the bottom for stability.

(2) "Annealing" means heating then cooling to soften and render less brittle.

(3) "Binder" means a chain, cable, rope, or other approved material used for binding loads.

(4) "Boom" means logs or timbers fastened together end to end and used to contain floating logs. The term includes enclosed logs.

(5) "Brow Log" means a log placed parallel to a roadway at a landing or dump to protect vehicles while loading or unloading.

(6) "Bunk" means a cross support for a load.

(7) "Cant" means a log slabbed on one or more sides.

(8) "Carriage" (log carriage) means a framework mounted on wheels which runs on tracks or in grooves in a direction parallel to the face of the saw, and which contains apparatus to hold a log securely and advance it towards the saw.

(9) "Carrier" means an industrial truck so designed and constructed that it straddles the load to be transported with mechanisms to pick up the load and support it during transportation.

(10) "Chipper" means a machine which cuts material into chips.

(11) "Chock", "bunk block", and "cheese block" mean a wedge that prevents logs or loads from moving.

(12) "Cold Deck" means a pile of logs stored for future removal.

(13) "Crotch Lines" means two short lines attached to a hoisting line by a ring or shackle, the lower ends being attached to loading hooks.

(14) "Dog" (carriage dog) means a steel tooth or assembly of steel teeth, one or more of which are attached to each carriage knee to hold log firmly in place on carriage.

(15) "Drag Saw" means a power-driven, reciprocating cross-cut saw mounted on suitable frame and used for bucking logs.

(16) "Head Block" means that part of a carriage which holds the log and upon which it rests. It generally consists of base, knee, taper set, and mechanism.

(17) "Head Rig" means a combination of head saw and log carriage used for the initial breakdown of logs into timbers, cants, and boards.

(18) "Hog" means a machine for cutting or grinding slabs and other coarse residue from the mill.

(19) "Husk" means a head saw framework on a circular mill.

(20) "Industrial Truck" means a mobile, power driven vehicle used to carry, push or pull material. It is designed for "in plant" or "on site" use rather than highway use.

(21) "Kiln Tender" means the operator of a kiln.

(22) "Lift Truck" means an industrial truck used for lateral transportation and equipped with a power-operated lifting device, usually in the form of forks, for piling or unpiling lumber units or packages.

(23) "Live Rolls" means cylinders of wood or metal mounted on horizontal axes and rotated by power, which are used to convey slabs, lumber, and other wood products.

(24) "Loading Boom" means any structure projecting from a pivot point and intended to be used for lifting and guiding loads for the purpose of loading or unloading.

(25) "Log Deck" means a platform in the sawmill on which the logs remain until needed for sawing.

(26) "Log Haul" means a conveyor for transferring logs to mill.

(27) "Lumber dimensions" means the nominal size of surfaced lumber, unless otherwise stated.

(28) "Lumber Hauling Truck" means an industrial truck, other than a lift truck or a carrier, used for the transport of lumber.

(29) "Package" means a unit of lumber.

(30) "Peavy" means a stout wooden handle fitted with a spike and hook and used for rolling logs.

(31) "Pike Pole" means a long pole whose end is shod with a sharp pointed spike.

(32) "Pitman Rod" means connecting rod.

(33) "Resaw" means band, circular, or sash gang saws used to break down slabs, cants, or flitches into lumber.

(34) "Running Line" means any moving rope as distinguished from a stationary rope such as a guyline.

(35) "Safety Factor" means a calculated reduction factor which may be applied to laboratory test values to obtain safe working stresses for wooden beams and other mechanical members; ratio of breaking load to safe load.

(36) "Saw Guide" means a device for steadying a circular or bandsaw.

(37) "Setwork" means a mechanism on a sawmill carriage which enables an operator to move the log into position for another cut.

(38) "Sorting Gaps" means the areas on a log pond enclosed by boom sticks into which logs are sorted.

(39) "Spreader Wheel" means a metal wheel that separates the board from the log in back of circular saws to prevent binding.

(40) "Splitter" means a knife-type, nonrotating spreader.

(41) "Sticker" means a strip of wood or other material used to separate layers of lumber.

(42) "Stiff Boom" means the anchored, stationary boom sticks which are tied together and on which boom persons work.

(43) "Swifter" is a means of tying boom sticks together to prevent them from spreading while being towed.

(44) "Telltale" means a device used to serve as a warning for overhead objects.

(45) "Top Saw" means the upper of two circular saws on a head rig, both being on the same husk.

(46) "Tramway" means a way for trams, usually consisting of parallel tracks laid on wooden beams.

(47) "Trestle" means a braced framework of timbers, piles or steelwork for carrying a road or railroad over a depression. [Order 74-28, § 296-78-007, filed 5/7/74.]

WAC 296-78-030 Construction and isolated equipment. (1) Construction when not specifically covered in these standards shall be governed by such other standards adopted by the Department of Labor and Industries as may apply.

(2) All buildings, docks, tramways, walkways, log dumps and other structures shall be so designed, constructed, and maintained as to provide a safety factor of 4. This means that all members shall be capable of supporting four times the maximum load to be imposed. This provision refers to buildings, docks and so forth designed and constructed subsequent to the effective date of these standards and also refers in all cases where either complete or major changes or repairs are made to such buildings, docks, tramways, walkways, log dumps and other structures.

(3) Basements on ground floors under mills shall be as evenly surfaced as local conditions permit, free from unnecessary obstructions and debris, and provided with lighting facilities in compliance with the requirements of the General Occupational Health Standards, WAC 296-62-09003.

(4) All engines, motors, transmission machinery or operating equipment installed in mill basements or ground floors shall be equipped with standard safeguards for the protection of workers.

(5) Hazard Marking. Physical hazard marking shall be as specified in WAC 296-24-135 through 296-24-13503 of the General Safety and Health Standards.

(6) Flooring of buildings, ramps and walkways not subject to supporting motive equipment shall be of not less than two inch wood planking or material of equivalent structural strength.

(7) Flooring of buildings, ramps, docks, trestles and other structure required to support motive equipment shall be of not less than full two and one-half inch wood planking or material of equivalent structural strength. However, where flooring is covered by steel floor plates, 2 inch wood planking or material of equivalent structural strength may be used.

(8) Walkways, Docks, and Platforms. (i) Walkways. Docks and platforms shall be constructed and maintained in accordance with the requirements of the General Safety and Health Standards, WAC 296-24-735 through 296-24-75011.

(ii) Maintenance. Walkways shall be evenly floored and kept in good repair.

(iii) Where elevated platforms are used they shall be equipped with stairways or ladders in accordance with the General Safety and Health Standards, WAC 296-24-765 through 296-24-81013.

(9) All floor openings either temporary or permanent, shall be protected as required by the General Safety and Health Standards, WAC 296-24-750 through 296-24-75011.

(10) The area under floor openings shall, where practical, be fenced off. When this is not practical, the areas shall be plainly marked with yellow lines and telltails shall be installed to hang within five and one-half feet of the ground or floor level.

(11) Where floor openings are used to drop materials from one level to another, audible warning systems shall be installed and used to indicate to employees on the lower level that material is to be dropped.

(12) Faces of docks except on loading and unloading sides of rail and truck loading platforms, and runways used for the operation of lift trucks and other vehicles shall have a guard or shear timber eight by eight inches set over three inch blocks and securely fastened to the floor by bolts of not less than 5/8" diameter.

(13) The flooring of buildings, docks and passageways shall be kept in good repair at all times. When a hazardous condition develops that cannot be immediately repaired, the area shall be fenced off and not used until adequate repairs are made.

(14) All working areas shall be kept free from unnecessary obstruction and debris.

(15) Floors around machines and other places where workers are required to stand shall be provided with effective means to prevent slipping.

(16) All footwalks and passageways subject to slipping hazards due to peculiarities of conditions or processes of the operation shall be provided with nonslip surfaces.

(17) Walkways in accordance with (8) of this section shall be provided over roll casings, transfer tables, conveyors or other moving parts except where stepping over such equipment is not in connection with usual and necessary traffic.

(18) Walkways alongside of sorting tables shall be of sufficient width to provide safe working area.

(a) Such walkways shall be evenly floored and kept in good repair at all times. They shall be kept free from obstructions and debris.

(19) Walkways and stairways with standard hand rails shall be provided wherever space will permit, for oilers and other employees whose duties require them to go consistently to elevated and hazardous locations.

(a) Where such passageways are over walkways or work areas, standard toeboards shall be provided.

(b) Protection as required by the General Safety and Health Standard, WAC 296-24-205 through 296-24-20533 shall be provided against contact with transmission machinery or moving conveyors.

(20) Stairways shall be used in preference over ladders wherever possible. Stairways or ladders, whichever is used; it shall be constructed and maintained in accordance with the provisions of the General Safety and Health Standard, WAC 296-24-75009 through 296-24-81011.

(21) Doors shall not open directly on a flight of stairs.

(22) Permanent ladders shall be fastened securely at both top and bottom.

(23) Portable ladders shall not be used upon footing other than suitable type.

Hooks or other means of securing portable ladders when in use, shall be provided.

(24) Portable ladders shall not be used for oiling machinery which is in motion.

(25) In all enclosed buildings, means of egress shall be provided in accordance with the provisions of the General Safety and Health Standard, WAC 296-24-550 through 296-24-56531.

(26) All swinging doors shall be provided with windows, the bottom of which shall be not more than forty-eight inches above the floor. One window shall be provided for each section of double swinging doors. All such windows shall be of shatter proof or safety glass unless otherwise protected against breakage.

(27) Outside exits shall open outward. Where sliding doors are used as exits, an inner door not less than two feet six inches by six feet shall be cut inside each of the main doors and arranged to open outward.

(28) At least two fire escapes or substantial outside stairways, shall be provided for mill buildings where the floor level is more than eight feet above the ground.

(a) Buildings over 150 feet in length shall have at least one additional fire escape or substantial outside stairway for each additional 150 feet of length or fraction thereof.

(b) Passageways to fire escapes or outside stairways shall be adequately marked and kept free of obstruction at all times.

(c) Fire Protection. The requirements of WAC 296-24-585 through 296-24-62003 of the General Safety and Health Standard, shall be complied with in providing the necessary fire protection for sawmills.

(29) Where a doorway opens upon a roadway, railroad track, or upon a tramway or dock over which vehicles travel, a barricade or other safeguard and a warning sign shall be placed to prevent workers from stepping directly into moving traffic.

(30) Tramways and trestles shall be substantially supported by piling or framed bent construction which shall be frequently inspected and maintained in good repair at all times. Tramways or trestles used both for vehicular and pedestrian traffic shall have a walkway with standard hand rail at the outer edge and shear timber on the inner edge, and shall provide three feet clearance to vehicles. When walkways cross over other thoroughfares, they shall be solidly fenced at the outer edge to a height of 42 inches over such thoroughfares.

(31) Where tramways and trestles are built over railroads they shall have a vertical clearance of twenty-two feet above the top of the rails. When constructed over carrier docks or roads, they shall have a vertical clearance of not less than six feet above the drivers foot rest on the carrier, and in no event shall this clearance be less than twelve feet from the surface of the lower roadway or dock.

(32) Walkways (either temporary or permanent) shall be not less than twenty-four inches wide and two inches thick, nominal size, securely fastened at each end. When such walkways are used on an incline the angle shall not be greater than twenty degrees from horizontal.

(33) Walkways from the shore or dock to floats or barges shall be securely fastened at the shore end only and clear space provided for the other end to adjust itself to the height of the water.

(34) Cleats of one by four inch material shall be fastened securely across walkways at uniform intervals of eighteen inches whenever the grade is sufficient to create a slipping hazard.

(35)(a) Inclined cableways shall have a central line between the rails in practical alignment with the center of the hoisting drums. A substantial bumper shall be installed at the foot of each incline.

(b) Barricades or warning signs shall be installed to warn pedestrians to stand clear of the cables on inclined cableways. The cables shall not be put into motion without activating an alarm system, either audible or visible, which will inform anyone on the tracks to stand clear.

(36) Employees shall not ride on or stand below the cars on an inclined cableway.

(37) All open vats and tanks into which workers may fall shall be guarded with standard railings or screen guards in all cases where such guarding is possible with regard to practical operation.

(38) Foundations of elevated tanks shall be accessible for inspections. When the tank platform is more than five (5) feet above the ground a stairway or ladder shall be permanently attached.

(39) Every open tank over five feet in height shall be equipped with fixed standard ladders both inside and out, extending from the bottom to the rim of the tank arranged to be accessible to each other, so far as local conditions permit.

(40) The use of chemicals for treating of lumber for prevention of sap stain or mold or as preservatives, shall be controlled in such a manner as to protect workers from contact with toxic materials.

(a) Storage, Handling, and Use of Chemicals. Threshold limits. Employees shall not be exposed to airborne concentration of toxic dusts, fumes, vapors, mists or gases that exceed the threshold limit values set forth in WAC 296-62-070 through 296-62-080 of the General Occupational Health Standards.

(b) Protective equipment. The use of chemicals shall be controlled so as to protect employees from harmful exposure to toxic materials. Where necessary, employees shall be provided with and required to wear such protective equipment as will afford adequate protection against harmful exposure as required by WAC 296-24-075 through 296-24-092 of the General Safety and Health Standards.

(41) Means shall be provided and used to collect any excess of chemicals used in treating lumber so as to protect workers from accidental contact with harmful concentrations of toxic chemicals or fumes.

(42) Where workers are engaged in the treating of lumber with chemicals or are required to handle lumber so treated they shall be provided with and required to use such protective equipment as will provide complete protection against contact with toxic chemicals or fumes therefrom.

(43) Sanitation Requirements. The requirements of WAC 296-24-120 through 296-24-13013 of the General Safety and Health Standards, shall govern sanitation practices.

(44) The sides of steam vats and soaking pits unless otherwise guarded shall extend forty-two inches above the floor level. The floor adjacent thereto shall be of nonslip construction.

(45) Large steam vats or soaking pits, divided into sections, shall be provided with substantial walkways between each section, each walkway to be provided with standard railings which may be removable if necessary.

(46) Dry kilns shall be so constructed upon solid foundations that tracks will not sag. Dry kilns shall be provided with suitable walkways. Each kiln shall have doors that operate from the inside or be provided with special escape doors operated from the inside and located in or near the main door. Escape doors shall swing in the direction of exit.

Ladders. A fixed ladder, in accordance with the requirements of WAC 296-24-810 through 296-24-81009 of the General Safety and Health Standards, or other adequate means shall be provided to permit access to the roof. Where controls and machinery are mounted on the roof, a permanent stairway with standard handrail shall be installed in accordance with the requirements of WAC 296-24-765 through 296-24-76523 of the General Safety and Health Standards.

(47) A heated room shall be provided for the use of kiln inspector in inclement weather. He should remain in such room for at least ten minutes after leaving a hot kiln before going into cold outside air.

(48) Where operating pits are used, they shall be well ventilated, drained and lighted. Substantial gratings shall be installed at the kiln floor line. Steam lines shall be provided with adequate insulation wherever exposed to contact by employees. Fans shall be enclosed by standard safeguards.

(49) Mechanical Equipment. All belts, pulleys, blowers, and other exposed moving equipment used in or about kilns shall be guarded in accordance with the requirements of WAC 296-24-205 through 296-24-20533 of the General Safety and Health Standards.

(50) Air requirements in buildings, where persons are habitually employed, shall meet the requirements of the General Occupational Health Standard, WAC 296-62-100 through 296-62-11013.

(51) Where the natural ventilation is not sufficient to remove dust, fumes or vapors that shall create or constitute a hazard, additional means of removal shall be provided.

(52) In lieu of a general ventilating system, local exhaust or blower units may be installed on the dust or fume producing machine, provided the required protection may be secured thereby.

(53) Fans used for ventilating shall be of ample capacity, as evidenced by the performance schedules of the manufacturers, and shall be guarded when exposed to contact. Hoods, dust conveyors, dust collectors and other accessory equipment necessary shall be large enough to insure free intake and discharge.

(54) The outlet or discharge of all ventilating equipment shall be so arranged that at no time will the dust, vapors, gases or other air borne impurities discharged, create or constitute a hazard.

(55) When proper ventilation is not provided, and temporary hazardous conditions are therefore encountered, the employer shall furnish approved protective respiratory and visual equipment: Provided, however, That the exposure to such hazard shall not be of more than two hours' duration. Protective measures and equipment shall meet the requirements of the General Occupational Health Standard, WAC 296-62-070 through 296-62-09001 and the requirements of the General Safety and Health Standard, WAC 296-24-081 through 296-24-08113.

(56) All mills containing one or more machines whose operations are attended by the creation of dust, shavings, chips or slivers during a period of time equal to or greater than one-fourth of the working day shall be equipped with a collecting system, either continuous or automatic in action of sufficient strength and capacity to enable it to remove thoroughly such refuse from the points of operation and immediate vicinities of machines and work areas.

Blower, Collecting, and Exhaust Systems. Design, construction, and maintenance. Blower collecting, and exhaust systems shall be designed, constructed, and maintained in accordance with American National Standards Z33.1——1961 (For the Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying) and Z12.2——1962 (R1969) (Code for the Prevention of Dust Explosions in Woodworking and Wood Flour Manufacturing Plants).

(57) Each woodworking machine whose operations are attended by the creation of dust, shavings, chips, slivers, etc., shall be equipped with an exhaust or conveyor system so located and adjusted as to remove the maximum amount of refuse material from the point of operation and immediate vicinity.

(58) Where a hood is used to form a part or all of the guard required on a given machine, it shall be constructed of not less than ten U.S. gauge sheet metal, or if of cast iron it shall be not less than three-sixteenths inches in thickness.

(59) All exhaust pipes shall be of such construction and internal dimensions as to minimize the possibility of clogging. They shall be readily accessible for cleaning.

(60) All exhaust pipes shall empty into settling or dust chambers which shall effectively prevent the dust or refuse from entering any work area. Such settling or dust chambers shall be so designed and operated as to reduce to a minimum the danger of fire or dust explosions.

(61) Provisions for the daily removal of refuse shall be made in all operations not required to have an exhaust system, or having refuse too heavy, or bulky, or otherwise unsuitable to be handled by the exhaust system.

(62) All spray painting operations shall be carried on in accordance with the requirements of the General Safety and Health Standard, WAC 296-24-370 through 296-24-37027 and the General Occupation Health Standard, WAC 296-62-11019.

(63) Lighting. (a) Adequacy. Illumination shall be provided and designed to supply adequate general and local lighting to rooms, buildings, and work areas during the time of use.

(b) Effectiveness. Factors upon which the adequacy and effectiveness of illumination will be judged, include the following:

(i) The quantity of light in footcandle intensity shall be sufficient for the work being done.

(ii) The quality of the light shall be such that it is free from glare, and has correct direction, diffusion, and distribution.

(iii) Shadows and extreme contrasts shall be avoided or kept to a minimum.

(c) Specific light footcandle tables are contained in the General Occupational Health Standards, WAC 296-62-09003. These standards shall be used as a minimum guideline.

(64) Gas Piping and Appliances. All gas piping and appliances shall be installed in accordance with the American National Standard Requirements for Gas Appliances and Gas Piping Installations, Z21.30-1964. [Order 77-12, § 296-78-030, filed 7/11/77; Order 76-7, § 296-78-030, filed 3/1/76; Order 74-28, § 296-78-030, filed 5/7/74; Rules C-1 through C-61, effective 6/1/51, filed 3/23/60.]

WAC 296-78-035 Mechanical, steam and electrical equipment——General provisions. (1) All machinery or other equipment located or used on the premises of the operation or in the processes incidental thereto, shall be provided and maintained with approved standard safeguards, irrespective of ownership.

(2) Machines shall be so located that each operator will have sufficient space in which to handle material with the least possible interference from or to other workers or machines.

(3) Machines shall be so placed that it will not be necessary for the operator to stand where passing traffic creates a hazard.

(4) Aisles of sufficient width to permit the passing of vehicles or employees without crowding shall be provided in all work areas and stock or storage rooms.

(5) All metal decking around machinery shall be equipped to effectively prevent slipping.

(6) All machinery or equipment started by a control so located as to create impaired vision of any part of such machinery or equipment shall be provided with an audible warning device, where such machinery or equipment is exposed to contact at points not visible to the operator. Such devices shall be sounded before starting up unless positive mechanical or electrical interlocking controls are provided which will prevent starting until all such posts are cleared.

(7) A mechanical or electrical power control device shall be provided at each machine which will make it possible for the operator to stop the machine feed without leaving his position at the point of operation.

(8) All machines operated by means of treadles, levers, or other similar devices, shall be provided with positive and approved nonrepeat devices except where such machine is being used as an automatic repeating device.

(9) Operating levers and treadles on all machines or machinery shall be so located and protected that they cannot be shifted or tripped accidentally.

(10) All power driven machinery shall be stopped and brought to a complete standstill before any repairs or adjustments are made or pieces of material or refuse removed, except where motion is necessary to make adjustments.

(11) Lock Out——Tag Out. (a) To avoid accidental activation of machinery, electrical devices or other equipment which could create a hazardous condition while performing maintenance, repair, cleanup or construction work, the main disconnect(s) (line circuit breakers) shall first be locked or tagged out in accordance with the following provisions.

(b) Padlocks, Tags, or Devices to be Supplied. The employer shall supply and the employee shall use as many padlocks, tags, chains, or devices as required to follow these procedures.

(c) Information Required on Tags. Tags used for tagging out purposes shall contain the following information: name of person authorizing placement; reason for placing; date; signature of person placing tag; and department with which such person is associated.

(d) Provisions for Locking or Tagging Out Power Supply. Provisions shall be made whereby the source of power to all power driven equipment can be effectively locked or tagged out.

(e) Lock or Tag–Out by Pushbutton Only Prohibited. Locking or tagging out a machine by use of a pushbutton or other local control device only will not be acceptable as meeting the intent of these rules.

(f) Coordination of Locking or Tagging Out Devices or Systems. When repair, adjustment or maintenance is required and the lock–out or tag–out procedures must be followed, any person involved who is not totally familiar with all power sources or material entry sources to any area involved shall consult with the operator, supervisor, or some person who is capable of informing him of proper lock or tag–out procedures.

(g) Lock–Out or Tag–Out Before Removing Guards. Equipment shall be stopped and tagged or locked out before employees remove guards or reach into any potentially hazardous area. The only exception will be when the equipment must be in motion in order to make proper adjustments.

(h) Each Person Involved to Lock–Out or Tag–Out. Each person actively engaged in the repair, maintenance or clean–up shall lock–out or tag–out the affected equipment and shall personally remove his lock or tag upon completion of his work except, when it is positively determined that an employee has left the premises without removing his lock or tag, other persons may remove the locks or tags in accordance with a procedure formulated by each firm and approved by the Division of Industrial Safety and Health.

(i) Valves to be Locked or Tagged Out. Each valve which is used to control the flow of materials into, or activate, the equipment being worked on shall be locked or tagged out.

(j) Piping Systems Deactivated. Prior to working on piping systems containing pressurized or hazardous materials the valve(s) controlling the flow to the affected area shall be locked out or tagged out. The piping in the area to be worked on shall be drained and purged, if needed.

To further safeguard the workers, it is recommended that the lines to be worked on be isolated from the system by the insertion of blank flanges.

(k) Lines Without Valves to be Blank Flanged. If pipelines or ducts are constructed without valves or closures, the lines or ducts shall be broken at a flange and a blank flange inserted to stop the accidental flow of any material.

(l) Testing After Lock–Out or Tag–Out. After tagging or locking out equipment, a test shall be conducted to ascertain that the equipment has been made inoperative or the flow of material has been positively stopped. Precautions shall be taken to ascertain that persons will not be subjected to hazard while conducting test if power source or flow of material is not shut off.

(m) Temporary or Alternate Power to be Avoided. Whenever possible, temporary or alternate sources of power to the equipment is being worked on shall be avoided. If the use of such power is necessary, all affected employees shall be informed and the source of temporary or alternate power shall be identified.

(12) Machines and other equipment shall not be oiled while in motion, unless provided with guards or other devices to permit oiling without any possibility of contact with moving parts of machinery.

(13) Inspections shall be made to assure that shaftings, bearings and machines are in proper alignment at all times and that bolts in shaft hangars, couplings and boxes are tight.

(14) Isolated bearings or other equipment not reached by walkway shall be served by a ladder or other means of safe access.

(15) Running belts under power on or off pulleys shall be accomplished by mechanical means which will not expose employees to moving elements of the operation.

(16) Counterweights located on or near passageways or work areas shall be provided with enclosures. Overhead counterweights shall be provided with substantial safety chains or cables, or otherwise secured against falling.

(17) Mechanical Power–Transmission Apparatus. The construction, operation, and maintenance of all mechanical power–transmission apparatus shall be in accordance with the requirements of WAC 296–24–205 through 296–24–20533 of the General Safety and Health Standard.

(18) Baffles shall be erected, where necessary, to protect employees from breaking belts, chains, ropes or cables.

(19) Overhead horizontal belts, chains or rope drives shall be provided with guards.

(20) Hydraulic Systems. Means shall be provided to block, chain, or otherwise secure equipment normally supported by hydraulic pressure so as to provide for safe maintenance. [Order 74–28, § 296–78–035, filed

5/7/74; Rules D-1 through D-19, effective 6/1/51, filed 3/23/60.]

WAC 296-78-040 Boiler and pressure vessels. Boilers and pressure vessels shall be constructed, maintained and inspected in accordance with the provisions of the Boiler and Unfired Pressure Vessel Law, chapter 70.79 RCW, and chapter 296-104 WAC as administered by the Boiler Inspection Section of the Department of Labor and Industries. [Order 74-28, § 296-78-040, filed 5/7/74; Rule D-20, effective 6/1/51, filed 3/23/60.]

WAC 296-78-045 Electrical service and equipment. (1) Electrical service and equipment shall be constructed, maintained, inspected and operated in accordance with the provisions of chapter 19.28 RCW, chapter 296-46 WAC, WAC 296-24-950 through 296-24-955, and the Electrical Standard as promulgated by the Division of Building and Construction Safety Inspection Services.

(2) Repairs. Electrical repairs shall be made only by authorized and qualified personnel.

(3) Identification. Marks of identification on electrical equipment shall be clearly visible.

(4) Protective Equipment. Rubber protective equipment shall be provided as required by WAC 296-24-092(1) of the General Safety and Health Standard.

(5) Open Switches. Before working on electrical equipment, switches shall be open and shall be tagged, blocked, or locked out.

(6) Concealed conductors. Where electrical conductors are known to be concealed, no work shall be performed until such conductors are located.

(7) Overload Relays. Overload relays shall be reset by authorized qualified personnel only.

(8) Passageways to Panels. Passageways to switch centers or panels shall at all times be kept free from obstruction. Not less than 3 feet of clear space shall be maintained in front of switch centers or panels at all times.

(9) Bridging Fuses. Fuses shall not be doubled or bridged. [Order 74-28, § 296-78-045, filed 5/7/74; Rule D-21, effective 6/1/51, filed 3/23/60.]

WAC 296-78-170 Elevators, moving walks and other lifting devices. (1) Elevators, moving walks and other lifting devices intended for either passenger or freight service shall be constructed, maintained, inspected and operated in accordance with the provisions of chapter 70.87 RCW, WAC 296-24-870 through 296-24-90009 of the General Safety and Health Standards, and those specific standards which are applicable from the Division of Building and Construction Safety Inspection Services, Elevator Section. [Order 76-29, § 296-78-170, filed 9/30/76; Order 74-28, § 296-78-170, filed 5/7/74; Rule D-54, effective 6/1/51, filed 3/23/60.]

WAC 296-78-180 Transportation——Lumber handling equipment——Cranes——Construction. (1) All apparatus shall be designed throughout, with not less than the following factors of safety, under static full rated load stresses, based on ultimate strength of the material used:

Material	Factor of Safety
Cast Iron	12
Cast Steel	8
Structural Steel	5
Forged Steel	5
Cables	5

(2) A notice shall be placed on every crane and hoist showing the maximum allowable load in pounds or tons. This notice shall be placed in such a manner as to be clearly legible from the floor.

(3) Cranes shall be of what is known as "all steel construction." No cast iron shall be used in parts subject to tension except in drums, trolley sides, bearings, brackets and brake shoes.

(4) The construction of cranes shall be such that all parts may be safely lubricated and inspected when cranes are not in operation.

(5) Bolts subject to stress shall be of the through type and all bolts shall be equipped with approved protection so that the bolt will not work loose or nuts work off.

(6) Outside Crane Cages Shall be Enclosed. There shall be windows on three sides of the cage and windows in the front, and the side opposite the door shall be the full width of the cage.

(7) Where a tool box or receptacle is used for the storing of oil cans, tools, etc., it shall be permanently secured in the cage or on the foot-walk of outside cranes and on the foot-walk of inside cranes. Tool boxes of hot metal cranes shall be constructed of metal.

(8) All gears on cranes shall be provided with standard guards.

(9) Keys projecting from revolving shafts shall be guarded.

(10) A braking apparatus shall be provided on every type of crane and shall be so designed and installed as to be capable of effectually braking a weight of at least one and one-half times the full rated load. [Order 74-28, § 296-78-180, filed 5/7/74; Rule E-1, effective 6/1/51, filed 3/23/60.]

WAC 296-78-185 Electrical equipment. (1) All exposed current-carrying parts except conductors, connected to circuits above three hundred volts to ground shall be so isolated, insulated, or guarded that no employee can come in contact with them. Exposed parts less than 300 volts shall be protected in some suitable way against possible accidental contact. Exposed metallic parts of conduit armored cable or molding shall be permanently grounded.

(2) Guards for the current-carrying parts of unisolated electrical equipment, such as controllers, motors, transformers, automatic cutouts, circuit breakers, switches, and other devices shall consist of cabinets, casings, or shields of permanently grounded metal or of insulating material.

(3) All parts of electrical equipment, such as fuses and the handles and arc chutes of circuit breakers, shall be so isolated or guarded that the liability of employees being struck or burned by sparking, flashing or movement during operation is reduced to a minimum.

(4) All exposed noncurrent carrying metal parts of electrical equipment shall be permanently grounded. The ground connection through well bonded track rails will be considered satisfactory.

(5) The metallic parts of portable cranes, derricks, hoists, and similar equipment on which wires, cables, chains, or other conducting objects are maintained shall be provided with an effective protective ground, where operated in the vicinity of supply lines.

(6) Readily accessible means shall be provided whereby all conductors and equipment located in cranes can be disconnected entirely from the source of energy at a point as near as possible to the main current collectors.

(7) Means shall be provided to prevent the starting of equipment by unauthorized persons.

(8) The control levers of traveling cranes shall be so located that the operator can readily face the direction of travel.

(9) A hoist limiting device shall be provided for each hoist.

(10) All fuses shall be of the enclosed arcless type. [Order 74-28, § 296-78-185, filed 5/7/74; Rule E-2, effective 6/1/51, filed 3/23/60.]

WAC 296-78-190 Chains, wire rope, cables and fiber rope. (1) Ropes, Cables, Slings, and Chains. (a) Safe Usage. Ropes, cables, slings, and chains shall be used in accordance with safe use practices recommended by the manufacturer or within safe limits recommended by the equipment manufacturer when used in conjunction with it.

(b) Work by Qualified Persons. Installation, inspection, maintenance, repair, and testing of ropes, cables, slings, and chains shall be done only by persons qualified to do such work.

(c) Slings. Slings and their fittings and fastenings, when in use, shall be inspected daily for evidence of overloading, excessive wear, or damage. Slings found to be defective shall be removed from service.

(2) Proper storage shall be provided for slings while not in use.

(3) Protection shall be provided between the sling and sharp unyielding surfaces of the load to be lifted.

(4) Hooks. No open hook shall be used in rigging to lift any load where there is hazard from relieving the tension on the hook from the load or hook catching or fouling.

(5) Ropes or Cables. (a) Wire rope or cable shall be inspected when installed and once each day thereafter, when in use. It shall be removed from hoisting or load-carrying service when kinked or when one of the following conditions exists:

(i) When three broken wires are found in one lay of 6 by 6 wire rope.

(ii) When six broken wires are found in one lay of 6 by 19 wire rope.

(iii) When nine broken wires are found in one lay of 6 by 37 wire rope.

(iv) When eight broken wires are found in one lay of 8 by 19 wire rope.

(v) When marked corrosion appears.

(vi) Wire rope of a type not described herein shall be removed from service when 4 percent of the total number of wires composing such rope are found to be broken in one lay.

(vii) Condemned. When cables deteriorate through rust, wear, broken wires, undue strain or other conditions to the extent of fifteen percent of their original strength, use of cables shall be discontinued.

(6) Wire rope removed from service due to defects shall be plainly marked or identified as being unfit for further use on cranes, hoists, and other load-carrying devices.

(7) The ratio between the rope diameter and the drum, block, sheave, or pulley tread diameter shall be such that the rope will adjust itself to the bend without excessive wear, deformation, or injury. In no case shall the safe value of drums, blocks, sheaves, or pulleys be reduced when replacing such items unless compensating changes are made for rope used and for safe loading limits.

(8) Drums, sheaves, and pulleys. Drums, sheaves, and pulleys shall be smooth and free from surface defects liable to injure rope. Drums, sheaves, or pulleys having eccentric bores or cracked hubs, spokes, or flanges shall be removed from service.

(9) Connections. Connections, fittings, fastenings, and other parts used in connection with ropes and cables shall be of the quality, size and strength recommended by the manufacturer for the use intended. These connections shall be installed in accordance with the manufacturer's recommendations.

(10) Socketing, Splicing, and Seizing. (a) Socketing, splicing, and seizing of cables shall be performed only by qualified persons.

(b) All eye splices shall be made in a manner recommended by the manufacturer and wire rope thimbles of proper size shall be fitted in the eye, except that in slings the use of thimbles shall be optional.

(11) Wire rope clips attached with U-bolts shall have these bolts on the dead or short end of the rope. The U-bolt nuts shall be retightened immediately after initial load carrying use and at frequent intervals thereafter.

(a) When a wedge socket-type fastening is used, the dead or short end of the cable shall be clipped with a U-bolt or otherwise made secure against loosening.

(b) Fittings. Hooks, shackles, rings, pad eyes, and other fittings that show excessive wear or that have been bent, twisted, or otherwise damaged shall be removed from service.

(12) Running Lines. Running lines of hoisting equipment located within 6 feet 6 inches of the ground or working level shall be boxed off or otherwise guarded, or the operating area shall be restricted.

(13) Preventing Abrasion. The reeving of a rope shall be so arranged as to minimize chafing or abrading while in use.

(14) Sheave Guards. Bottom sheaves shall be protected by close fitting guards to prevent cable from jumping the sheave.

(15) There shall be not less than two full wraps of hoisting cable on the drums of cranes and hoists at all times of operation.

(16) Where the cables are allowed to pile on the drums of cranes, the drums shall have a flange at each end to prevent the cables from slipping off the drum.

(17) Chains. Chains used in load carrying service shall be inspected before initial use and weekly thereafter.

(a) If at any time any 3-foot length of chain is found to have stretched one-third the length of a link it shall be discarded.

(18) Chains shall be spliced in compliance with the requirements of the General Safety and Health Standard, WAC 296-24-29413.

(19) Wherever annealing of chains is attempted, it shall be done in properly equipped annealing furnaces and under the direct supervision of a competent person thoroughly versed in heat treating.

(a) Chain shall be normalized or annealed periodically as recommended by the manufacturer.

(20) Fiber Rope. (a) Frozen fiber rope shall not be used in load carrying service.

(b) Fiber rope that has been subjected to acid shall not be used for load carrying purposes.

(c) Fiber rope shall be protected from abrasion by padding where it is fastened or drawn over square corners or sharp or rough surfaces. [Order 74-28, § 296-78-190, filed 5/7/74; Rule E-3, effective 6/1/51, filed 3/23/60.]

WAC 296-78-195 Floor operated cranes. (1) An unobstructed aisle not less than three feet wide shall be maintained for travel of the operator except in such cases where the control handles are hung from the trolleys of traveling cranes.

(2) The handles of control ropes shall be distinctly different in contour so that, without looking, the operator will know which is the hoisting and which is the lowering handle. The direction of all movements of the crane shall be clearly indicated in some manner so that the operator can easily become familiar with them.

(3) Means for effecting an automatic return to the "off position" shall be provided on controls of floor operated cranes and monorail hoists. [Order 74-28, § 296-78-195, filed 5/7/74; Rule E-4, effective 6/1/51, filed 3/23/60.]

WAC 296-78-200 Operators. (1) Cranes shall be operated only by regular crane operators, authorized substitutes who have had adequate experience and training under the supervision of a competent operator, or by crane repair person or inspectors.

(2) No person shall be permitted to operate a crane who cannot speak and read the English language, or who is under eighteen years of age.

(3) No person shall be permitted to operate a crane whose hearing or eyesight is impaired, or who may be suffering from heart disease or similar ailments.

(4) Hands shall be kept free when going up and down ladders. Articles which are too large to go into pockets or belts shall be lifted to or lowered from the crane by hand line. (Except where stairways are provided.)

(5) Cages shall be kept free of clothing and other personal belongings. Tools, extra fuses, oil cans, waste and other articles necessary in the crane cage shall be stored in a tool box and not left loose on or about the crane.

(6) The operator shall familiarize himself fully with all crane rules and with the crane mechanism and its proper care. If adjustments or repairs are necessary, he shall report the same at once to the proper authority.

(7) The operator shall not eat, smoke or read while actually engaged in the operation of the crane, or operate the crane when he is physically unfit.

(8) The operator or someone especially designated shall lubricate all working parts of the crane.

(9) Cranes shall be examined for loose parts or defects each day on which they are in use.

(10) Sawdust, oil or other debris shall not be allowed to accumulate to create a fire, health or slipping hazard.

(11) Operators shall avoid, as far as possible, carrying loads over workers. Loads shall not be carried over employees without sounding an audible warning alarm.

(12) Whenever the operator finds the main or emergency switch open, he shall not close it, even when starting on regular duty, until he has made sure that no one is on or about the crane. He shall not oil or repair the crane unless the main switch is open.

(13) If the power goes off, the operator shall immediately throw all controllers to "off" position until the power is again available.

(14) Before closing the main switch the operator shall make sure that all controllers are in "off" position until the power is again available.

(15) The operator shall pay special attention to the block, when long hitches are made, to avoid tripping the limit switch.

(16) The operator shall recognize signals only from the person who is supervising the lift except for emergency stop signals. Operating signals shall follow established standard crane signals as illustrated in WAC 296-78-260 of this chapter. Whistle signals may be used where one crane only is in operation. Cranes shall have audible warning device which shall be sounded in event of emergency.

(17) Before starting to hoist, the operator shall place the trolley directly over the load to avoid swinging it when being hoisted.

(18) The operator shall not make side pulls with the crane except when especially instructed to do so by the proper authority.

(19) When handling maximum loads, the operator shall test the hoist brakes after the load has been lifted a

few inches. If the brakes do not hold, the load shall be lowered at once and the brakes adjusted or repaired.

(20) Bumping into runway stops or other cranes shall be avoided. When the operator is ordered to engage with or push other cranes, he shall do so with special care for the safety of persons on or below cranes.

(21) When lowering a load, the operator shall proceed carefully and make sure that he has the load under safe control.

(22) When leaving the cage the operator shall throw all controllers to "off" position and open the main switch.

(23) If the crane is located out of doors the operator shall lock the crane in a secure position to prevent it from being blown along or off the track by a severe wind.

(24) Railroad cars shall not be pulled along the tracks with sidepulls on an overhead crane.

(25) Operators shall not move the crane or a load unless floor signals are clearly understood.

(26) The rated lifting capacity of a crane shall not be exceeded. If any doubt exists about the weight of a load which might exceed the rated capacity, the foreman in charge must be contacted before any attempt is made to lift the load. The foreman shall determine that the load is within the rated capacity of the crane or the load shall not be lifted.

(27) Crane operators and floormen should coordinate their activities on every lift or movement of the crane. Both the operator and signalman should clearly understand any problem a movement might create with regard to surrounding materials, structures, equipment or personnel. [Order 77-12, § 296-78-200, filed 7/11/77; Order 74-28, § 296-78-200, filed 5/7/74; Rule E-5, effective 6/1/51, filed 3/23/60.]

WAC 296-78-205 Signalmen. (1) Signalmen shall give all the signals to the operator in accordance with established standard signals as illustrated in WAC 296-78-260 of this chapter.

(2) Signalmen shall be responsible for the condition and use of all hoisting accessories and for all hitches.

(3) Before an operator moves a crane upon which an empty chain sling is hanging, the signalman shall hook both ends of the sling to the block.

(4) Signalmen, where necessary, shall walk ahead of the moving load and warn people to keep clear of it. They shall see that the load is carried high enough to clear all obstructions.

(5) Signalmen shall notify the foreman in advance when an extra heavy load is to be handled.

(6) No employee shall be permitted to stand or pass under an electric magnet in use.

(7) The electrical circuit for electric magnets shall be maintained in good condition. Means for taking up the slack cable shall be provided. [Order 74-28, § 296-78-205, filed 5/7/74; Rule E-6, effective 6/1/51, filed 3/23/60.]

WAC 296-78-210 Repairmen. (1) When repairs are necessary, repairmen shall have the crane run to a location where the repair work will least interfere with the other cranes and with operations on the floor.

(2) Before starting repairs, repairmen shall see that all controllers are thrown to "off" position, and that main or emergency switches are opened; one of these shall be locked or tagged out in compliance with WAC 296-78-035 of this chapter.

(3) Repairmen shall immediately place warning signs or "Out of Order" signs on a crane to be repaired and also on the floor beneath or hanging from the crane so that it can easily be seen from the floor. If other cranes are operated on the same runway, repairmen shall also place rail stops at a safe distance or make other safe provisions.

(4) When repairing runways, repairmen shall place rail stops and warning signs or signals so as to protect both ends of the section to be repaired.

(5) Repairmen shall take care to prevent loose parts from falling or being thrown upon the floor beneath.

(6) Repairs shall not be considered complete until all guards and safety devices have been put in place and the block and tackle and other loose material have been removed. [Order 74-28, § 296-78-210, filed 5/7/74; Rule E-7, effective 6/1/51, filed 3/23/60.]

WAC 296-78-215 Construction requirements. (1) Calculations for wind pressure on outside overhead traveling cranes shall be based on not less than 30 pounds per square foot of exposed surface.

(2) No overhung gears shall be used unless provided with an effective means of keeping them in place, and keys shall be secured to prevent gears working loose.

Safety lugs or brackets shall be provided on the trolley frames and bridge ends of overhead traveling cranes, so that in the event of a broken axle or wheel the trolley or bridge proper will not have a drop greater than one inch.

(3) Where there are no members over an outside overhead crane suitable for attaching blocks for repair work, and a locomotive crane is not available, a structural steel outrigger of sufficient strength to lift the heaviest part of the trolley shall be provided.

(4) Outside overhead traveling cranes shall be equipped with wind indicators and rail clamps as required by the General Safety and Health Standards, WAC 296-24-23503.

(5) Foot brakes, or other effective means shall be provided to control the bridge travel of all overhead traveling cranes. [Order 74-28, § 296-78-215, filed 5/7/74; Rule E-8, effective 6/1/51, filed 3/23/60.]

WAC 296-78-220 Crane platforms and footwalks. (1) Platforms shall be provided when changing and repairing truck wheels on end trucks.

(2) A platform or footwalk shall be located on crane or crane runway to give access to the crane cage, and it shall be accessible from one or more stairways or fixed ladders. This platform or footwalk shall be not less than eighteen inches in width.

(3) Where stairways are used to give access to platforms they shall make an angle of not more than fifty degrees with the horizontal and shall be equipped with substantial railing. If ladders are used to give access to platforms they shall extend not less than thirty-six inches above the platform. Railed stairways or ladders to be used as a means of ingress and egress to crane cages shall be located at either or both ends.

(4) A footwalk shall be placed along the entire length of the bridge on the motor side, and a short platform twice the length of the trolley placed at one end of the girder on the opposite side, with a vertical clearance of at least six feet six inches where the design of crane or building permits, but in no case shall there be less than four feet clearance. For hand operated cranes the footwalk shall not be required to be installed on the bridge of the crane, but there shall be a repair platform equal in strength and design to that required for motor operated cranes, installed on the wall of the building or supported by the crane runway at a height equal to the lower edge of the bridge girder to facilitate necessary repairs.

(5) Clear width of footwalks shall not be less than eighteen inches except around the bridge motor where it may be reduced to fifteen inches.

(6) Footwalks shall be of substantial construction and rigidly braced. Footwalks for outside service shall be constructed so as to provide proper drainage, but the cracks between the boards shall not be wider than one-fourth inch.

(7) Every footwalk shall have a standard railing and toe-board at all exposed edges. Railings and toe-boards shall conform in construction and design with the following requirements:

(a) Railings shall be not less than forty-two inches in height, with an additional rail midway between the top rail and the floor.

(b) Pipe railings shall be not less than one and one-quarter inch inside diameter if of iron or be not less than one and one-half inches outside diameter if of brass tubing.

(c) Metal rails other than pipe shall be at least equal in strength to that of one and one-half by one and one-half by three-sixteenths inch angle and shall be supported by uprights of equal strength.

(d) Posts or uprights shall be spaced not more than eight feet center to center.

(e) Toe-boards shall be not less than six inches in height.

(f) Toe-boards shall be constructed in a permanent and substantial manner of metal, wood or other material equivalent thereto in strength. Where of wood, toe-boards shall be at least equal in cross section to one inch by six inches; where of steel at least one-eighth inch by six inches; where of other construction at least equal to the requirements for steel. Perforations up to one-half inch are permissible in metal toe-boards.

(8) No openings shall be permitted between the bridge footwalk and the crane girders. Where wire mesh is used to fill this opening the mesh openings shall be not greater than one-half inch.

(9) All footwalks and platforms shall be so designed as to be capable of sustaining a concentrated load of one hundred pounds per lineal foot. [Order 74-28, § 296-78-220, filed 5/7/74; Rule E-9, effective 6/1/51, filed 3/23/60.]

WAC 296-78-225 Crane cages. (1) Safe means of escape shall be provided for operators of all cranes in all operating locations. Rope ladders shall not be used as a regular means of access but may be installed as an emergency escape device to be used in the event of fire, mechanical breakdown or other emergency.

(2) The operator's cage shall be located at a place from which signals can be clearly distinguishable, and shall be securely fastened in place and well braced to minimize vibration. It shall be large enough to allow ample room for the control equipment and the operator. The operator shall not be required to step over an open space of more than eighteen inches when entering the cage.

(3) Cab operated cranes shall be equipped with a portable fire extinguisher which meets the requirements of the General Safety and Health Standard, WAC 296-24-590 through 296-24-59007.

(4) In establishments where continuous loud noises prevail such as caused by the operation of pneumatic tools, steam exhausts from boilers, etc., adequate signals shall be installed on cranes or one or more employees shall be placed on the floor for each crane operated to give warning to other employees of the approach of a crane with a load. Where there are more than two cranes on the same runway or within the same building structure, signalling devices are required to give warning to other employees of the approach of a crane with a load.

(5) Cages of cranes subjected to heat from below shall be of non-combustible construction and shall have a steel plate shield not less than one-eighth inch thick, placed not less than six inches below the bottom of the floor of the cage.

(6) Outside crane cages shall be enclosed. There shall be windows on three sides of the cage. The windows in the front and the side opposite the door shall be the full width of the cage.

(7) The floor of the cage on out-door cranes shall be extended to form an entrance landing which shall be equipped with a handrail and toe-board constructed to the specifications of WAC 296-78-220 of this chapter.

(8) A copy of the rules for operators shall be permanently posted in the cages of all cage-operated cranes. [Order 74-28, § 296-78-225, filed 5/7/74; Rule E-10, effective 6/1/51, filed 3/23/60.]

WAC 296-78-230 Crane rail stops, bumpers and fenders. (1) Rail stops shall be provided at both ends of the crane runway and at ends of the crane bridge. When two trolleys are operated on the same bridge rails, bumpers shall be provided to prevent collision of trolleys.

(2) Bumpers and rail stops shall extend at least as high as the centers of the wheel.

(3) Rail stops shall be fastened to the girders or girders and rails, but not to the rails alone. This does not apply to portable rail stops. Portable rail stops shall not be used as permanent rail stops.

(4) Rail stops shall be built up of plates and angles or be made of cast steel.

(5) Fenders shall be installed which extend below the lowest point of the treads of gantry type crane wheels. They shall be of a shape and form that will tend to push or raise an employee's hand, arm or leg off the rail and away from the wheel. [Order 74-28, § 296-78-230, filed 5/7/74; Rule E-11, effective 6/1/51, filed 3/23/60.]

WAC 296-78-235 Crawler locomotive and truck cranes. (1) Crawler locomotive and truck cranes shall be constructed, maintained, inspected and operated in accordance with the provisions of WAC 296-24-240 through 296-24-24019 of the General Safety and Health Standards. [Order 74-28, § 296-78-235, filed 5/7/74; Rule E-12, effective 6/1/51, filed 3/23/60.]

WAC 296-78-240 Construction, operation and maintenance——Chain and electric hoists. (1) Chain and electric hoists shall be of what is known as "all steel construction." No cast iron shall be used in parts subject to tension except drums, bearings or brake shoes.

(2) The chains shall be made of the best quality steel or iron with welded links.

(3) Chain and electric hoists shall have a factor of safety of at least five.

(4) Chain and electric hoists shall be equipped with a device which will automatically lock the load when hoisting is stopped.

(5) Electric hoists shall be provided with a limit stop to prevent the hoist block from traveling too far in case the operating handle is not released in time.

(6) Workers shall not ride the load of any chain or electric hoist. If necessary to balance the load manually, it shall be done from a safe distance. [Order 74-28, § 296-78-240, filed 5/7/74; Rule E-13, effective 6/1/51, filed 3/23/60.]

WAC 296-78-245 Monorail hoists. (1) No attempt shall be made with a monorail hoist to lift or move an object by a side pull, unless designed for that purpose.

(2) A stop shall be provided at all switches and turntables which will prevent the trolley from running off should the switch be turned or be left in the open position.

(3) All monorail hoists operating on swivels shall be equipped with one or more safety catches which will support the load should a suspension pin fail. All trolley frames shall be safeguarded against spreading.

(4) Rail stops shall be provided at the ends of crane runways. Such rail stops shall extend at least as high as the centers of the wheels. [Order 74-28, § 296-78-245, filed 5/7/74; Rule E-14, effective 6/1/51, filed 3/23/60.]

WAC 296-78-250 Air hoists. (1) To prevent piston rod lock nuts from becoming loose and allowing rod to drop when supporting a load, lock nut shall be secured to piston rod by a castellated nut and cotter-pin.

(2) A clevis or other means shall be used to prevent hoist cylinder becoming detached from hanger. [Order 74-28, § 296-78-250, filed 5/7/74; Rule E-15, effective 6/1/51, filed 3/23/60.]

WAC 296-78-255 Jib, pillar, and portable floor cranes, crabs, and winches. (1) Side pulls shall not be made with jib or pillar cranes. The arm or boom shall be directly over the load when making a lift.

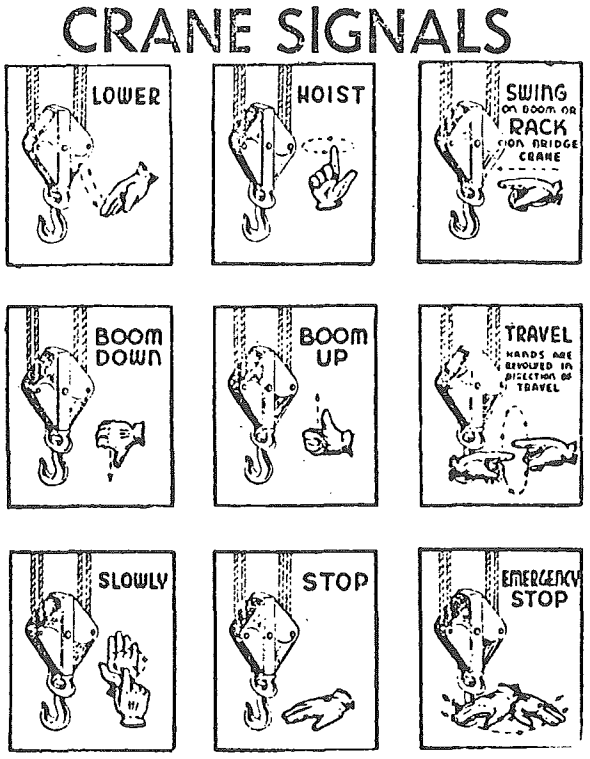
(2) The gears of all cranes shall be enclosed, and if hand operated by means of a crab or winch, a locking dog shall be provided to hold load when the handle is released.

(3) Some form of brake or safety lowering device shall be provided on all crabs, winches, and jib cranes.

(4) A hoist limiting device shall be provided on all jib cranes of ten or more tons capacity.

(5) Portable cranes shall be grounded by drag chains. [Order 74-28, § 296-78-255, filed 5/7/74; Rule E-16, effective 6/1/51, filed 3/23/60.]

WAC 296-78-260 Standard crane hand signals——Illustration.



[Order 74-28, § 296-78-260, filed 5/7/74; Rule E-17, effective 6/1/51, filed 3/23/60.]

WAC 296-78-265 Vehicles. (1) Vehicles. (a) Scope. Vehicles shall include all mobile equipment normally used in sawmill, planning mill, storage, shipping, and yard operations.

(b) Warning Signals and Spark Arrestors. All vehicles shall be equipped with audible warning signals and where practicable shall have spark arrestors.

(c) Lift Trucks. Lift trucks shall be designed, constructed, maintained, and operated in accordance with the requirements of WAC 296-24-230 through 296-24-23035 of the General Safety and Health Standards.

(d) Carriers. (i) Carriers shall be so designed and constructed that the operator's field of vision shall not be unnecessarily restricted.

(ii) Carriers shall be provided with ladders or equivalent means of access to the operators platform or cab.

(e) Lumber Hauling Trucks. (i) On trucks where the normal operating position is ahead of the load in the direction of travel, the cab shall be protected by a barrier at least as high as the cab. The barrier shall be capable of stopping the weight of the load capacity of the vehicle if the vehicle were to be stopped suddenly while traveling at its normal operating speed. The barrier shall be constructed in such a manner that individual pieces of a normal load will not go through openings in the barrier.

(ii) Stakes, stake pockets, racks, tighteners, and binders shall provide a positive means to secure the load against any movement during transit.

(iii) Where rollers are used, at least two shall be equipped with locks which shall be locked when supporting loads during transit.

(2) All vehicles used in a sawmill, lumber yard, factory or other establishment shall be equipped with audible warning signals that shall be maintained in good order at all times.

(3) Flywheels, gears, sprockets and chains and other exposed parts that constitute a hazard to workers shall be enclosed in standard guards.

(4) All vehicles operated after dark or in any area of reduced visibility shall be equipped with head lights which adequately illuminate the direction of travel for the normal operating speed of the vehicle. The vehicle shall also be equipped with tail lights which are visible enough to give sufficient warning to surrounding traffic at the normal traffic operating speed.

(5) All vehicles operated in areas where overhead hazards exist shall be equipped with an overhead guard for the protection of the operator.

(6) Where vehicles are so constructed and operated that there is a possibility of the operator being injured by backing into objects, a platform guard shall be provided and so arranged as not to hinder the exit of the driver.

(7) Trucks, lift trucks and carriers shall not be operated at excessive rates of speed. When operating on tramways or docks more than six feet above the ground or lower level they shall be limited to a speed of not more than twelve miles per hour. When approaching blind corners they shall be limited to four miles per hour.

(8) Vehicles shall not be routed across principal thoroughfares while employees are going to or from work unless pedestrian lanes are provided.

(a) Railroad tracks and other hazardous crossings shall be plainly posted and traffic control devices (American National Standard D8.1——1967 for Railroad–Highway Grade Crossing Protection) should be utilized.

(b) Restricted Overhead Clearance. All areas of restricted side or overhead clearance shall be plainly marked.

(c) Pickup and Unloading Points. Pickup and unloading points and paths for lumber packages on conveyors and transfers and other areas where accurate spotting is required, shall be plainly marked and wheel stops provided where necessary.

(d) Aisles, Passageways, and Roadways. Aisles, passageways, and roadways shall be sufficiently wide to provide safe side clearance. One–way aisles may be used for two–way traffic if suitable turnouts are provided.

(9) Where an operator's vision is impaired by the vehicle or load it is carrying, he shall move only on signal from someone so stationed as to have a clear view in the direction the vehicle is to travel.

(10) Lift trucks shall be equipped, maintained and operated in compliance with the requirements of the General Safety and Health Standard, WAC 296-24-230 through 296-24-23035.

(11) Load Limits. No vehicle shall be operated with loads exceeding its safe load capacity.

(12) Vehicles with internal combustion engines shall not be operated in enclosed buildings or buildings with ceilings less than 16 feet high unless the buildings have ventilation adequate to maintain air quality as required by the General Occupational Health Standard, chapter 296-62 WAC.

(13) Vehicles shall not be refueled while motor is running. Smoking or open flames shall not be allowed in the refueling area.

(14) No employee other than trained operators or mechanics shall crank or start the motor of, or operate any log or lumber handling vehicle.

(15) All vehicles shall be equipped with brakes capable of holding and controlling the vehicle and capacity load upon any grade or incline over which they may operate.

(16) Unloading Equipment and Facilities. (a) Machines used for hoisting, unloading, or lowering logs shall be equipped with brakes capable of controlling or holding the maximum load in midair.

(b) The lifting cylinders of all hydraulically operated log handling machines shall be equipped with a positive device for preventing the uncontrolled lowering of the load or forks in case of a failure in the hydraulic system.

(c) A limit switch shall be installed on powered log handling machines to prevent the lift arms from traveling too far in the event the control switch is not released in time.

(d) When forklift–type machines are used to load trailers, a means of securing the loading attachment to the fork shall be installed and used.

(e) A-frames and similar log unloading devices shall have adequate height to provide safe clearance for swinging loads and to provide for adequate crotch lines and spreader bar devices.

(f) Log handling machines used to stack logs or lift loads above operator's head shall be equipped with overhead protection.

(g) Unloading devices shall be equipped with a horn or other plainly audible signaling device.

(h) Movement of unloading equipment shall be coordinated by audible or hand signals when operator's vision is impaired or operating in the vicinity of other employees.

(17) Where spinners are used on steering wheels, they shall be of the automatic retracting type or shall be built into the wheel in such a manner as not to extend above the plane surface of the wheel. Vehicles equipped with positive antikickback steering are exempted from this requirement.

(18) Mechanical stackers and unstackers shall have all gears, sprockets and chains exposed to the contact of workers, fully enclosed by guards as required by WAC 296-78-030 of this chapter.

(19) Mechanical stackers shall be so designed and arranged as to prevent lumber falling off and workers shall not ride these lifts.

(20) Employees shall not stand or walk under loads being lifted or moved. Means shall be provided to positively block the hoisting platform when employees must go beneath the stacker or unstacker hoist.

(21) No unauthorized employee shall ride any lift truck or lumber carrier.

(22) Unstacking machines shall be provided with a stopping device which shall at all times be accessible to at least one employee working on the machine.

(23) Floor of unstacker shall be kept free of broken stickers and other debris. A bin or frame shall be provided to allow for an orderly storage of stickers.

(24) Drags or other approved devices shall be provided to prevent lumber from running down on graders.

(25) Liquified Petroleum Gas Storage and Handling. Storage and handling of liquified petroleum gas shall be in accordance with the requirements of WAC 296-24-475 through 296-24-47517 of the General Safety and Health Standards.

(26) Flammable Liquids. Flammable liquids shall be stored and handled in accordance with 296-24-330 through 296-24-33019 of the General Safety and Health Standards.

(27) Identifying Controls. Every manually operated control switch shall be identified and so located as to be readily accessible to the operator.

(28) Locking Main Control Switches. Main control switches shall be so designed that they can be locked in the open position.

(29) Guarding Side Openings. The hoistway side openings at the top level of the stacker and unstacker shall be protected by enclosures of standard railings.

(30) Guarding Hoistway Openings. When the hoist platform or top of the load is below the working platform, the hoistway openings shall be guarded.

(31) Guarding Lower Landing Area. The lower landing area of stackers and unstackers shall be guarded by enclosures that prevent entrance to the area or pit below the hoist platform. Entrances should be protected by electrically interlocked gates which, when open, will disconnect the power and set the hoist brakes. When the interlock is not installed, other positive means of protecting the entrance shall be provided.

(32) Inspection. At the start of each work shift, equipment operators shall inspect the equipment they will use for evidence of failure or incipient failure. Equipment found to have defects which might affect the operating safety shall not be used until the defects are corrected.

(33) Cleaning Pits. Safe means of entrance and exit shall be provided to permit cleaning of pits.

(34) Preventing Entry to Hazardous Area. Where the return of trucks from unstacker to stacker is by mechanical power or gravity, adequate signs, warning devices, or barriers shall be erected to prevent entry into the hazardous area. [Order 77-12, § 296-78-265, filed 7/11/77; Order 74-28, § 296-78-265, filed 5/7/74; Rules E-18 through E-39, effective 6/1/51, filed 3/23/60.]

WAC 296-78-270 Loading, piling, storage and conveying. (1) Units or loads of lumber built up for transportation by overhead cranes, lift trucks, auto trucks, or manually or mechanically operated transfers shall be provided with at least one set of stickers for each eighteen inches in height of unit or load. One set of stickers shall be not more than six inches from the top of units of lumber up to three inch dimension. Where dimension of material is greater than three inches, a set of stickers shall be placed under the top layer. Stickers shall extend the full width of the package, shall be uniformly spaced, and shall be aligned one above the other. Stickers may be lapped with a minimum overlapping of 12 inches. Stickers shall not protrude more than 2 inches beyond the sides of the package.

(2) Lumber Loading. Loads shall be built and secured to insure stability in transit.

(3) Units or loads of lumber shall not be lifted or moved until all workers are in the clear.

(4) Employees shall not ride on partially loaded cars.

(5) Gradient of roll sets or roll cases over which units of lumber are to be moved shall not exceed three per cent. The movement of units shall be under control at all times.

(6) Stacking of lumber in yards, either by units or in block piles, shall be supervised.

(7) Foundations for piling lumber in yards shall be capable of supporting the maximum applied load without tipping or sagging.

(8) The height of stacked units in storage areas shall not exceed seven of the usual four foot units, subject to the following qualifications:

(a) Units of lumber shall not be stacked more than four high unless two or more stacks of units are tied together with ties.

(b) Long units of lumber shall not be stacked upon shorter packages except where a stable pile can be made with the use of package separators.

(c) In unit package piles, substantial polsters or unit separators shall be placed between each package directly over the stickers.

(9) Wooden horses used for loading preformed loads of lumber shall be of material not less than four by six inches in cross section net measure.

(10) Unstable Piles. Piles of lumber which have become unstable shall be immediately made stable or the area into which they might fall shall be fenced or barricaded and employees prohibited from entering.

(11) Lift boards or pallets shall be loaded in such a manner as to prevent material from spilling or the material shall be secured with a binder.

(12) Packing rooms shall be kept free of debris and chutes shall be equipped with a means of slowing down the materials.

(13) Sorting chains shall be provided with a stopping device which shall at all times be readily accessible to at least one employee working on the chain.

(14) The inside of the walkway of all green chains and sorting tables shall be provided with a standard toeboard.

(15) Rollers or other devices shall be provided for removing heavy dimension lumber from the chain or table.

(16) Roll casings and transfer tables shall be cleaned regularly and shall be kept reasonably free from debris.

(17) In all permanent installations, green chains and sorting tables shall be roofed over to provide protection from inclement weather. Normal work stations shall be provided with a drained work surface which is evenly floored of nonslip material.

(18) Power driven rolls shall be operated in a manner to prevent end collisions.

(19) The space between live rolls shall be filled in on either side of crosswalks with material of structural strength to withstand the load imposed with a 4 to 1 safety factor.

(20) The driving mechanism of live rolls shall be guarded wherever exposed to contact.

(21) Live rolls shall be replaced when their surface develops a break or hole.

(22) Guarding. Spiked live rolls shall be guarded.

(23) Ramps or skidways used to transfer lumber or materials from one level to another shall be provided with all safeguards necessary for the protection of workers.

(24) Landings on a lower level where lumber or timbers are discharged over ramps or skidways shall be provided with a solid bumper not less than six inches in height at the outer edge. Such landing shall be maintained in good repair at all times.

(25) Ramps or skidways shall be so arranged that the person putting lumber down shall have a clear view of the lower landing. Lumber or timbers shall not be put down until all workers are in the clear.

(26)(a) The under face of all ramp or skidway landings shall be fenced off or other positive means provided to prevent persons from walking out under dropping timber.

(b) Return strands of sorting table ramp chains shall be supported by troughs of sufficient strength to support the weight of a broken chain.

(27) Conveyors. (a) Standards. Construction, operation, and maintenance of conveyors shall be in accordance with American National Standard B20.1——1957, Safety Code for Conveyors, Cableways and related equipment.

(b) Conveyor troughs in which the working strands of a conveyor operate shall be of ample dimension and strength to carry a broken chain and shall afford effective protection to all employees.

(28) 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.

(29) When the return strands of a conveyor pass over passageways or work areas such guards shall be placed under them as will effectively protect workers.

(30) When the working strand of a conveyor crosses within three feet of the floor level in passageways, the trough in which it works shall be bridged the full width of the passageway.

(31) Where conveyor, idler pulleys or other equipment is located over or dangerously near burning refuse, any worker going to such location shall use a safety line which shall be securely fastened to his body and tended by a helper.

(32) Transfer, kiln and dolly tracks shall be properly maintained at all times and shall have a grade of not more than one and one-fourth per cent. Bumpers or stops shall be installed at the ends of all tracks capable of stopping a normal load for which the track is installed.

(33) Doors. (a) Main Kiln Doors. (i) Main kiln doors shall be provided with a method of holding them open while kiln is being loaded.

(ii) Counterweights on vertical lift doors shall be boxed or otherwise guarded.

(iii) Means shall be provided to firmly secure main doors, when they are disengaged from carriers and hangers, to prevent toppling.

(34) Kilns whose operation requires inside inspection shall be maintained with not less than eighteen inches clearance between loaded cars and the walls of the kiln. The requirements for personal protective equipment specified in WAC 296-24-075 through 296-24-092 shall be complied with.

(35) Kiln loads shall be equipped or arranged for easy attachment and detachment of transfer cables. Means for stopping kiln cars shall be available at all times.

(36) Cars shall not be moved until tracks are clear and workers are out of the bight of transfer lines.

(37) When kiln or dolly loads of lumber are permitted to coast through or adjacent to any work area, audible warning shall be given.

(38) Stickers shall not be allowed to protrude more than two inches from the sides of kiln stacks.

(39) Yards and storage areas shall be kept reasonably free of debris and unnecessary obstruction. Warning signs shall be conspicuously posted wherever there is danger from moving vehicles or equipment.

(40) Chippers. (a) Whole-Log Chippers. The feed system to the chipper shall be arranged so the operator does not stand in direct line with the chipper spout (hopper). The chipper spout shall be enclosed to a height of not less than 36 inches from the floor or the operator's platform. A safety belt and lifeline shall be worn by workers when working at or near the spout unless the spout is guarded. The lifeline shall be short enough to prevent workers from falling into the chipper.

(41) Hog mills shall be provided with feed chutes so designed and arranged that from no position on the rim of the chute shall the distance to the knives be less than forty inches. Baffles shall be provided which shall effectively prevent material from being thrown from the mill.

(42) Employees feeding hog mills shall be provided with safety belts and lines, which they shall be required to use at all times, unless otherwise protected from any possibility of falling into the mill.

(43) Bins, Bunkers, Hoppers, and Fuel Houses. (a) Guarding. Open bins, bunkers, and hoppers whose upper edges extend less than 3 feet above working level shall be equipped with standard handrails and toeboards, or have their tops covered by a substantial grill or grating with openings small enough to prevent a person from falling through.

(44) Fuel hoppers shall be provided with doors that may be remotely operated.

(45) Fuel hoppers shall be provided with platforms with standard railings and adequately lighted for the protection of workers taking out fuel.

(46)(a) Fuel bins shall be provided with an approved railed platform or walkway near the top or other approved means, for the use of employees engaged in dislodging congested fuel. No employee shall enter any fuel bin except where adequately safeguarded.

(b) Recognizing however, the varying designs of fuel storage vaults and the type of fuel handled and certain peculiar local conditions, the adequacy of safety devices shall be determined by a duly authorized representative of the Department of Labor and Industries, Division of Industrial Safety and Health.

(c) During operations when the flow of normal fuel is interrupted but dust from operating sanders is received in the bin, workers shall not enter the fuel bin until the flow of sander dust has been discontinued and the dust has settled.

(d) Use of Wheeled Equipment to Load Bins. Where automotive or other wheeled equipment is used to move materials into bins, bunkers, and hoppers, adequate guard rails shall be installed along each side of the runway, and a substantial bumper stop provided when necessary.

(47)(a) Burners and smoke stacks other than the self-supporting type shall be adequately guyed. Buckle guys shall be installed if burner or stack is more than fifty feet in height.

(b) Runway. The conveyor runway to the burner shall be equipped with a standard handrail. If the runway crosses a roadway or thoroughfare, standard toeboards shall be provided in addition. [Order 76-7, § 296-78-270, filed 3/1/76; Order 74-28, § 296-78-270, filed 5/7/74; Rules F-1 through F-43, effective 6/1/51, filed 3/23/60.]

WAC 296-78-275 Log dumps and ponds—Headmills. (1) Log dumps, booms, ponds or storage areas, if used at night, shall be illuminated in accordance with the requirements of WAC 296-62-093, General Occupational Health Standards.

(2) A log dump shall be constructed at each log pond or decking ground.

(a) The roadbed shall be of hard packed gravel, heavy planking or equivalent material and shall be maintained at all times. Roadbeds at log dumps shall be of width and evenness to insure safe operation of equipment.

(b) A mechanical unloading device shall be provided and used for unloading logs. Log unloading areas shall be arranged and maintained to provide a safe working area.

(c) Signs prohibiting unauthorized foot or vehicle traffic in log unloading and storage areas shall be posted.

(3) Water Log Dumps. (a) Ungrounded electrically powered hoists using handheld remote control in grounded locations, such as log dumps or mill log lifts, shall be actuated by circuits operating at less than 50 volts to ground.

(4)(a) A brow log, skid timbers or the equivalent shall be installed on all log dumps.

(b) Where logs are unloaded onto skids, sufficient space shall be provided between the top of the skids and the ground to accommodate the body of a person.

(c) All truck dumps shall be built with not more than six inches variation of level from side to side.

(5)(a) All truck log dumps shall be equipped with a positive safeguard to prevent logs from leaving the load on the side opposite the brow log. Jill pokes shall not be used on truck log dumps.

(b) Unloading lines shall be attached and tightened or other positive safeguard in place before binder chains are released at any log dump.

(c) Stakes and chocks which trip shall be constructed in such manner that the tripping mechanism that releases the stake or chocks is activated at the opposite side of the load being tripped.

(d) Binders shall be released only from the side on which the unloader operates, except when released by remote control devices or except when person making release is protected by racks or stanchions or other equivalent means.

(e) Loads on which a binder is fouled by the unloading machine shall have an extra binder or metal band of equal strength placed around the load, or the load shall be otherwise secured so the fouled binder can be safely removed.

(6)(a) In unloading operations, the operator of unloading machine shall have an unobstructed view of the vehicle and the logs being unloaded.

(b) Unloading lines shall be arranged so that it is not necessary for the employees to attach them from the pond or dump side of the load except when entire loads are lifted from the log-transporting vehicle.

(7) All log dumps shall be kept reasonably free of bark and other debris.

(8) Employees shall remain in the clear until all moving equipment has come to a complete stop.

(9) Artificial log ponds subject to unhealthy stagnation shall be drained, cleansed, and water changed at least once every six months.

(10) All employees whose regular work requires walking on logs shall wear spiked or calked shoes, except when working in snow.

(11) Personal Floatation Devices and Life Rings shall be provided, worn and maintained as required by WAC 296-24-086, General Safety and Health Standards.

(12)(a) Wooden pike poles shall be of continuous, straight grained No. 1 material. Defective poles, blunt or dull pikes shall not be used.

(b) Aluminum or other metal poles shall not be used where hazard of coming in contact with live electric wires exists.

(13)(a) Walkways and floats shall be provided and securely anchored to provide safe passage for workers.

(b) Permanent cable swifters shall be so arranged that it will not be necessary to roll boom sticks in order to attach or detach them.

(c) Inspection of cable or dogging lines shall be made as necessary to determine when repair or removal from service is necessary.

(14)(a) Decks of floats or other walkways shall be kept above the waterline at all times and shall be capable of supporting four times the load to be imposed.

(b) Floating donkeys or other power-driven machinery used on booms shall be placed on a raft or float with enough buoyancy to keep the deck above water.

(15)(a) All regular boom sticks and foot logs shall be reasonably straight, have all protruding knots and bark removed, and shall be capable of supporting above the waterline at either end, any necessary weight of workers and equipment.

(b) Stiff booms shall be two float logs wide secured by boom chains or other connecting devices, and of a width adequate for the working needs. Walking surfaces shall be free of loose material and maintained in good repair.

(c) Boom sticks shall be fastened together with crossties or couplings.

(16) Every log haul used as a walkway shall have at least one walkway with standard railing to enable workers to stand clear of the logs in the chute. Cleats shall be installed to provide safe footing on sloping walkways.

(17) Workers shall not stand under or dangerously near to logs that are being hoisted vertically to the log deck.

(18)(a) Log haul gears and bull chain drive mechanism shall be adequately guarded for the protection of employees.

(b) Log haul bull chains or cable shall be designed, installed, and maintained to provide a 4 to 1 safety factor for the intended load.

(c) Troughs for the return strand of log haul chains shall be provided over passageways.

(d) Overhead protection shall be provided for employees working below logs being moved to the log deck.

(19) Log haul controls shall be arranged to operate from a position where the operator will at all times be in the clear of logs, machinery lines and rigging. Such controls shall operate mechanism only when moved toward the log slip or deck.

(20) Where possible an automatic stop shall be installed on all log hauls. A positive stop shall be installed on all log hauls to prevent logs from traveling too far ahead in the mill.

(21)(a) Slip persons shall handle pike poles in such manner as to be in the clear in case of a slip back.

(b) All sorting gaps shall have a stiff boom on each side.

(c) The banks of the log pond in the vicinity of the log haul shall be reinforced to prevent caving in.

(22) Pond Boats and Rafts. The applicable provisions of the Standard for Fire Protection for Motorcraft, NFPA No. 302-1968, shall be complied with.

(a) Decks of pond boats shall be covered with nonslip material.

(b) Powered pond boats or rafts shall be provided with at least one approved fire extinguisher, and one life ring with line attached.

(c) Boat fuel shall be transported and stored in approved safety containers as required by the General Safety and Health Standard, WAC 296-24-33009.

(d) Inspection, maintenance, and ventilation of the bilge area shall be provided to prevent accumulation of highly combustible materials.

(e) Ventilation shall be provided for the cabin area on enclosed cabin-type boats to prevent accumulation of harmful gases or vapors.

(23) Dry Deck Storage. (a) Dry deck storage areas shall be kept orderly and shall be maintained in a condition which is conducive to safe operation of mobile equipment.

(b) Logs shall be stored in stabilized piles, and roadways and traffic lanes shall be maintained at a width adequate for safe travel of log handling equipment.

(c) Logs shall be arranged to minimize the chance of accidentally rolling from the deck.

(24)(a) Employees shall not spool cable on winch or drums with their hands.

(b) Log wells shall be provided with safeguard to prevent logs from rolling back into well off log deck.

(25) Jump skids on log decks shall be installed in grooves in a manner that they cannot work out onto the carriage way.

(26)(a) Log decks shall be provided with effective means to prevent logs from accidentally rolling down the deck onto the carriage or its runway.

(b) Swing Saws. Swing saws on log decks shall be equipped with a barricade and stops for protection of

employees who may be on the opposite side of the log haul chute.

(c) Drag Saws. Where reciprocating log cutoff saws (drag saws) are provided, they shall not project into walkway or aisle.

(d) Circular Cutoff Saws. Circular log bucking or cutoff saws shall be so located and guarded as to allow safe entrance to and exit from the building.

(e) Entrance Doorway. Where the cutoff saw partially blocks the entrance from the log haul runway the entrance shall be guarded.

(27) A barricade or other positive stop shall be erected between the sawyer's stand and the log deck to protect the sawyer from rolling logs. Such barricade or stop shall be of sufficient strength to stop any log.

(28) Chains from overhead canting gear or other equipment shall not be allowed to hang over the log deck in such manner as to endanger workers.

(29) Canting gear control levers shall be so arranged that they move away from the carriage to operate.

(30) Moving parts or equipment on or about log decks shall be guarded.

(31) Peavies, canthooks and other hand tools shall be kept in good repair at all times.

(32) Workers shall not go below logs on decks that are likely to roll or be rolled. Means of access shall be provided to the head rig which does not subject employees to the hazard of moving logs or equipment.

(33) Mechanical Barkers. (a) Rotary Barkers. Rotary barking devices shall be so guarded as to prevent employees from flying chips, bark, or other extraneous material.

(b) Elevating Ramp. If an elevating ramp or gate is used, it shall be provided with a safety chain, hook, or other means of suspension while employees are underneath.

(c) Area Around Barkers. The hazardous area around ring barkers and their conveyors shall be fenced off or posted as a prohibited area for unauthorized persons.

(d) Enclosing Hydraulic Barkers. Hydraulic barkers shall be enclosed with strong baffles at the inlet and outlet. The operator shall be protected by adequate safety glass or equivalent.

(e) Holddown Rolls. Holddown rolls shall be installed at the infeed and outfeed sections of mechanical ring barkers to control the movement of logs.

(34) A clear walkway shall be provided along the upper side of the log deck and around the head rig unless an overhead walkway is provided.

(35) The sawyer shall be primarily responsible for the safety of the carriage crew and off-bearers. He shall exercise due care in the operation of the carriage and log turning devices.

(36) Feedworks and log turning control levers shall be so arranged that they may be securely locked when not in use and shall be guarded against accidental contact.

(37) An emergency control or equally effective means shall be provided so that the sawyer may stop the head rig section of the mill without leaving his stand.

(38) An effective method of disengaging the head rig saws from the power unit shall be installed on all head rigs where the power unit is not directly controlled by the sawyer. The saws shall be disengaged from the source of power while repairs or changes are made.

(39) A wire screen of not less than twelve gauge wire, one-half inch mesh, mounted in a frame in compliance with the requirements of WAC 296-24-20531 of the General Safety and Health Standard, shall be installed between the sawyer's stand and the saws in all circular mills. In band mills an approved safety glass shield may be used in place of the screen.

(40) Safety glasses, safety shields or other suitable eye protection shall be provided for and used by head rig off-bearers.

(41) Carriages upon which employees are required to work shall be solidly decked over.

(42) Dogs. Dogging devices shall be adequate to secure logs, cants, or boards, during sawing operations.

(43) The feed control lever of friction or belt driven carriage feed works shall be arranged to operate away from the saws or carriage track.

(44) Feed cable and set works sheaves, gears and pinions shall be adequately guarded.

(45) A quick action valve, controlled from the sawyer's stand, shall be located in the steam line to any steam operated feed works. The valve shall be tested daily.

(46) Valves in steam feeds shall be closed and locked in a neutral position before the sawyer leaves his station. Leaking steam valves or piping shall not be used on carriage drives.

(47)(a) Where employees ride the headrig carriage, clearance of the rear edge of the carriage shall be either not more than two inches or shall be not less than thirty inches from the side wall of the building. The side wall shall be boarded over smoothly to height of not less than six feet six inches from the setter's platform and for at least the length of the carriage travel. Where the clearance is thirty inches or more the floor between the back side of the setter's platform and the wall shall be raised to the level of the platform. The clearance between the floor edge and the platform shall not be more than two inches.

(b) Barriers and Warning Signs. A barrier shall be provided to prevent employees from entering the space necessary for travel of the carriage, with headblocks fully receded, for the full length and extreme ends of carriage runways. Warning signs shall be posted at possible entry points to this area.

(48) No roof truss or roof timber or other obstruction shall be located within six feet six inches of the upper surface of the setter's platform on any carriage.

(49) Doors which lead onto a passageway at the end or side of the carriage runway shall be provided with a handrail opposite such doorway. Handrail shall not be less than eighteen inches from the carriage run. A warning sign shall be posted on the entrance side of such doorways.

(50) A stop or bumper capable of stopping the loaded carriage at operating speed shall be installed at each end of the carriage run.

(51) Rail sweeps shall be installed in front of the front wheels in the direction of travel. Such sweeps shall extend to within one-fourth inch of the rails.

(52) Where power operated log turners are used, carriage knees shall be provided with goosenecks or other means of protecting the carriage crew from climbing logs.

(53) Employees shall use a stick or wire brush to clear head blocks of debris.

(54) All weakened or broken carriage boards which will not support the load to be imposed with a safety factor of 4, shall be immediately replaced. [Order 76-7, § 296-78-275, filed 3/1/76; Order 74-28, § 296-78-275, filed 5/7/74; Rules G-1 through G-50, effective 6/1/51, filed 3/23/60.]

WAC 296-78-280 Band saws——Saws. (1) Band head rigs shall be given a thorough daily inspection and any deficiency reported and corrected.

(2) Any band saw found to have developed a crack greater than one-tenth the width of the saw shall be removed from service until the width of the saw is reduced to eliminate the crack, the cracked section is removed, or the development of the crack is arrested by welding.

(3) Band saws shall not be continued in use on the head rig for which they have been designed after they have been reduced forty per cent in width.

(4) Band saw guides shall be maintained in proper condition and alignment at all times.

(5) All head band saw wheels shall have a minimum rim thickness of five-eighths inch, except for a distance of not to exceed one inch from the front edge of the wheel.

(6) Provisions shall be made for alerting and warning employees before starting band head saws, and measures shall be taken to insure that all persons are in the clear.

(7) No band saw shall be run at a peripheral speed in excess of that recommended by the manufacturer. The manufacturer's recommended maximum speed shall be stamped in plainly legible figures on some portion of the assembly.

(8) A band wheel that has developed a crack in the rim shall be immediately removed from service. If a crack has developed in a spoke the wheel shall be removed from service until repaired.

(9) All band wheels shall be completely encased or guarded on both sides. The exposed part of the saw blade on the uptravel between the two wheels shall be encased, and no portion of the blade exposed, except such part of the cutting edge as is essential for sawing the material at hand.

(10) All band wheel guards shall be constructed of not less than ten U.S. gauge metal, or not less than two inch wood material or equivalent, attached to the frames. Ventilating ports shall not exceed 2 x 4 inches in size. Openings necessary for lubrication or repair of the saw shall have doors or gates of equivalent strength to the remainder of the guard.

(11) Every band mill shall be equipped with a saw catcher, rest or guard of substantial construction.

(12) All band saws other than head mills shall be enclosed or guarded except the working side of the blade between the guide and the table. The guard for the portion of the saw between the sliding guide and the upper saw wheel guard shall be adjusted with the guide.

(13) Each gang ripper of band or straight saw type shall have the cutting edges of the saw guarded by a hood or screen secured to the framework of the machine.

(14) At the end of a shift, or at any time when it becomes necessary to stop the motion of a head saw, a designated employee shall attend the controls until motion of the blade has stopped. [Order 76-7, § 296-78-280, filed 3/1/76; Order 74-28, § 296-78-280, filed 5/7/74; Rule H-1, effective 6/1/51, filed 3/23/60.]

WAC 296-78-285 Circular saws. (1) Single Circular Head Saws. Circular head saws shall not be operated at speeds in excess of those specified by the manufacturer. Maximum speed shall be etched on the saw.

(2) On all circular saw mills the horizontal distance from the side of the saw to the nearest post of the husk or frame shall be at least one inch greater than the clear vertical distance between the collars of the top and bottom saws.

(3) Circular head saws shall be equipped with safety guides that can be readily adjusted without use of wrench or other hand tools. Brackets or edging supports shall be installed between the saw and the side of the husk.

(4) The upper saw of a double circular mill shall be provided with a hood or guard. A screen or other suitable device shall be placed so as to protect the sawyer from flying particles.

(5) All circular sawmills where live rolls are not used behind the head saw shall be equipped with an effective spreader or splitter. In any mill where the head saw is used for edging lumber, the splitter shall be solid and stationary and shall extend above the head blocks.

(6) Drag saws or circular cut-off saws shall be so arranged that they will not project into any passageway. When existing installations do not leave clear passage, saws shall be fenced off in order to make it impossible for anyone to walk into them. Means to securely hold material being sawed shall be provided wherever such material creates a hazard.

(7) Fuel wood saws shall be provided with approved safeguards and operated in accordance with the principles governing the operation of similar saws as outlined in these standards.

(8) All employees shall be in the clear before starting operation of drag or swing cut-off saws.

(9) Twin Circular Head Saws. Twin circular head saw rigs such as scrag saws shall meet the specifications for single circular head saws in subsection (1) of this section where applicable. [Order 74-28, § 296-78-285, filed 5/7/74; Rule H-2, effective 6/1/51, filed 3/23/60.]

WAC 296-78-290 Edgers. (1) Edgers shall be guarded by a metal housing of ten gauge sheet metal, ten gauge by one-half inch mesh wire screen, or by a baffle of not less than two inch wood material.

(2) Openings in end frames shall be enclosed with sheet metal, wire screen or wood and may be hinged or arranged to permit oiling and removal of saws.

(3) The top of the edger shall be guarded to prevent contact by employees or debris being thrown and all chains and gears fully enclosed as required by WAC 296-78-030 of this chapter.

(4) Vertical arbor edgers installed ahead of the main saw shall be so located and guarded that an employee cannot contact any part of the edger saws from his normal operating position.

(5) Edgers shall not be located in the main roll case behind the head saw.

(6) All edgers shall be equipped with pressure feed rolls. The controls shall be installed and located so that from the normal work station the operator can quickly stop the infeed drive without releasing the hold down tension of the pressure rolls.

(7) All edgers shall be provided with a method of preventing or guarding against kickbacks. Finger units or dogs installed at the edger, or hinged steel plates suspended across the feed table may be used for this purpose. A kickback barricade, in line with the edger, if fenced off may be used.

(8) Pressure and feed rolls on edgers shall be guarded against accidental contact by means of roll covers, bars or strips. The pressure rolls shall not be lifted while stock is being run, or while any person is in line with the feed side of the saws.

(9) Edger men shall not raise feed rolls and reach between saws while edger is in operation.

(10) Edger men shall not put hands on cants being run through the edger.

(11) Live rolls in back of edger shall operate at a speed not less than the speed of the edger feed rolls.

(12) Tables in back of edgers shall be kept clear of cants, edgings and unnecessary debris. [Order 77-12, § 296-78-290, filed 7/11/77; Order 76-7, § 296-78-290, filed 3/1/76; Order 74-28, § 296-78-290, filed 5/7/74; Rules H-3A through H-3J, effective 6/1/51, filed 3/23/60.]

WAC 296-78-295 Equalizer saws. (1) Equalizer saws for bolts, staves, heading, etc., shall have the saws encased, except that portion immediately adjacent to the feeding device.

(2) Feeding devices on all such equipment shall be provided with guards to prevent contact with the feeding device by employees. [Order 74-28, § 296-78-295, filed 5/7/74; Rule H-4, effective 6/1/51, filed 3/23/60.]

WAC 296-78-300 Gang saws and re-saws. (1) Gang saws and re-saws shall be fully guarded or housed in accordance with conditions.

(2) Feed rolls shall be enclosed by a cover over the top, front, and open ends except where guarded by location. Drive mechanism to feed rolls shall be enclosed.

(3) Feed rolls shall be enclosed and if the operator stands within thirty inches of the feed rolls, they shall be so guarded as to prevent operator coming into contact with them.

(4) Circular resaws or rip saws, except power feed rip saws with a roller or wheel back of the saw, shall be provided with splitters or spreaders.

(5) A hood of metal or wood of sufficient strength to give protection against splinters or flying teeth shall be provided over all circular rip saws.

(6) That portion of the saw extending below the table shall be so guarded as to prevent accidental contact.

(7) Circular rip saws shall be equipped with a standard anti-kickback device.

(8) Push sticks should be provided and used for putting stock through rip saws that are not equipped with power feed.

(9) Carriage cradles of whole-log sash gang saws, Swedish gangs shall be of adequate height to prevent logs from kicking out while being loaded.

(10) Band Resaws. Band resaws shall meet the specifications for band head saws as required in subsection (7) of WAC 296-78-280 of this chapter.

(11) Circular Gang Resaws. (a) Banks of circular gang resaws shall be guarded by a hood to contain teeth or debris which can be thrown by the saws.

(b) Circular gang resaws shall be provided with safety fingers or other anti-kickback devices.

(c) Circular gang resaws shall not be operated at speeds exceeding those recommended by the manufacturer.

(d) Feed belts and drive pulleys shall be guarded in accordance with the requirements of WAC 296-24-205 through 296-24-20533 of the General Safety and Health Standard.

(e) Feed rolls shall be guarded to prevent contact by employees.

(f) Each circular gang resaw, except self-feed saws with a live roll or wheel at back of saw, shall be provided with spreaders. [Order 74-28, § 296-78-300, filed 5/7/74; Rule H-5, effective 6/1/51, filed 3/23/60.]

WAC 296-78-305 Jump saws. (1) Jump saws shall have guards below the top of the table or roll case. A guard shall be placed over the roll casing to prevent persons from walking into or over the saw.

(2) Jump saws, underhung swing saws, or bed trimmers shall be so arranged that the saws are fully enclosed when not in actual use.

(3) A positive stop shall be installed to prevent the saw from passing the front edge of the rollcase or table. The throat in the table or roll case shall be only wide enough to permit unobstructed operation of the saw.

(4) Guards constructed of not less than two inch wood material or of heavy wire mesh mounted in a steel frame shall be placed in front of jump saw trimmers. Stops shall be installed to prevent timber from being thrown off the roll case.

(5) Foot treadle operated saws shall have an approved guard, over the treadle. A safety block shall be placed under the treadle while adjustments are being made. [Order 74-28, § 296-78-305, filed 5/7/74; Rule H-6, effective 6/1/51, filed 3/23/60.]

WAC 296-78-315 Trimmer and slasher saws. (1) Trimmer or slasher saws shall be guarded in front by a flat or round steel framework with a rigid metal screen or light iron bars attached thereto, or by wood baffles of not less than two inch wood material securely bolted to the frame.

(a) Maximum Speed. Trimmer saws shall not be run at peripheral speeds in excess of those recommended by the manufacturer.

(2) Front guards for a series of saws shall be set as close to the top of the feed table as is practical when considering the type of machine in use and the material being cut. The end saws of a series shall be guarded or fenced off.

(3) The rear of a series of saws shall have a stationary or swinging guard of not less than two inch wood material or equivalent the full width of the saws and as much wider as is necessary to protect persons at the rear of the trimmer.

(4) Safety Stops. Automatic trimmer saws shall be provided with safety stops or hangers to prevent saws from dropping on table.

(5) Feed chains shall be stopped while employees are on the feed table.

(6) Spotters for trimmers or slashers shall be provided with goggles or other eye protection when conditions so warrant. [Order 74-28, § 296-78-315, filed 5/7/74; Rule H-8, effective 6/1/51, filed 3/23/60.]

WAC 296-78-320 Barrel stave saws. (1) Barrel stave saws (cylindrical saws) shall have the saw and the revolving part to which the saw is bolted enclosed except that part of the saw immediately adjacent to the feeding device.

(2) Stave saw belt carriages shall be provided with a railing or baffle board on the operator's side. [Order 74-28, § 296-78-320, filed 5/5/74; Rule H-9, effective 6/1/51, filed 3/23/60.]

WAC 296-78-325 Swing saws. (1) Overhead swing cut-off saws shall be guarded by a hood which shall cover the upper half of the cutting edge at least to the depth of the teeth.

(2) The driving belts on overhead swing cut-off saws, where exposed to contact, shall be provided with guards as required by WAC 296-78-030 of this chapter.

(3) Saws shall be completely enclosed when in idle position.

(4) Power operated swing saws shall have controls so arranged that the operators will not stand directly in front of saw when making cut.

(5) All swing saws shall be equipped with a counter balance which shall be permanently fastened to the frame of the saw and so arranged or adjusted that it will return the saw beyond the rear edge of the table or roll case without a rebounding motion. Wire rope, chain or nonmetallic rope running to a weight over a sheave shall not be used for attaching counter balance.

(6) No swing cut-off or trim saw shall be located directly in line with stock coming from an edger.

(7) Swing limit stops shall be provided and so adjusted that at no time shall the forward swing of the saw extend the cutting edge of the saw beyond a line perpendicular with the edge of the saw table, roll case, guard or barrier.

(8) Saws that are fed into the cut by means of air, steam, hydraulic cylinders, or other power device or arrangement shall be designed so they can be locked or rendered inoperative to unauthorized employees.

(9) Foot treadle operated saws shall be provided with safeguards to prevent accidental contact. A safety block shall be placed under the treadle while adjustments are being made.

(10) Swing saws on log decks shall be equipped with a positive stop for the protection of persons who may be on the opposite side of the log haul chute.

(11) Operators of hand operated swing saws shall not stand directly in front of saw while making cut.

(12) Tables or roll casings for swing saws shall be provided with stops or lineup rail to prevent material being pushed off on opposite side. [Order 74-28, § 296-78-325, filed 5/7/74; Rule H-10, effective 6/1/51, filed 3/23/60.]

WAC 296-78-330 Table saws. (1) Each circular crosscut table saw shall be guarded by a hood which shall cover the saw at all times at least to the depth of the teeth. The hood shall adjust itself automatically to the thickness of, and shall remain in contact with, the material being cut except where finished surfaces of stock may be marred by contact with the guard, in which case the guard may be raised slightly to avoid contact. The hood shall be so designed as to protect the operator from flying splinters and broken saw teeth.

(2) Circular table saws used for plowing, rabbetting, grooving, and dado operations exclusively shall not be required to have spreaders (splitters) attached. All saws used for those operations, except the self-feed variety, shall be guarded by hoods in accordance with the provisions specified for circular saws.

(3) Combination rip and crosscut table saws shall be fully guarded in accordance with the provisions specified for circular saws. Nothing in this provision shall be construed to permit the operation of the rip-saw without a spreader (splitter) except when actually performing rabbetting, plowing, grooving, or dado operations. On completion of such operation, the spreader (splitter) shall be immediately replaced. Single disk combination rip and crosscut saws shall be guarded in accordance with the provisions for circular rip-saws.

(4) Single cut-off table saws in fixed position shall be guarded in accordance with the provisions specified for circular table saws. Traveling cut-off table saws shall have the hood supported from the saw carriage. Double or multiple cut-off table saws in fixed position shall be guarded in accordance with the provisions as specified for circular table saws. Traveling double or multiple cut-off table saws shall have the hood supported from the saw carriages. Both single and double multiple cut-off table saws shall not be required to have automatic hoods if carriage feed or some adaption of the carriage

feed principle is used, provided that each saw is equipped with a hood secured to the carriage, which will completely cover the saw when not in use and when the carriage is in the loading position or provided that the entire machine is fenced off at back and sides to a height level with the top of the saws. Form or jig feed shall be construed as an adaptation of the carriage feed principle.

(5) Titling table saws shall be guarded in accordance with the provisions specified for circular rip or crosscut saws.

(6) That portion of all circular saws which is below and behind the saw table shall be effectively guarded by the exhaust hood or approved device. Hinged or removable doors or gates shall be permitted where necessary to permit adjustment and oiling. [Order 74-28, § 296-78-330, filed 5/7/74; Rule H-11, effective 6/1/51, filed 3/23/60.]

WAC 296-78-335 Circular saws, speeds, repairs. (1) Circular saws shall not be operated at speeds in excess of that specified by the manufacturer. Speeds shall be etched on all new saws. When saws are repaired, remanufactured or retensioned in any way to change their operating speeds, such change of speed shall be etched on the saw. These etched speeds shall not be exceeded.

(2) Circular saws shall be inspected for cracks each time that the teeth are filed or set.

(3) A circular saw shall be discontinued from use until properly repaired when found to have developed a crack equal to the length indicated in the following table:

1/2"	12" diameter saw
1"	24" diameter saw
1 1/2"	36" diameter saw
2"	48" diameter saw
2 1/2"	60" diameter saw

(4) Saws larger than sixty inches in diameter when found to have developed a crack three inches or more in length shall be discontinued from service until repaired.

(5) Welding or slotting of cracked saws shall be done by a sawsmith under a procedure recommended by the saw manufacturer. Holes shall not be drilled in saws as a means of arresting cracks. After saws are repaired they shall be retensioned. Unless a sawsmith is employed, saws shall be returned to the manufacturer for welding or tensioning.

(6) To prevent cracking:

(a) The saw should be tensioned for the speed at which it is to operate.

(b) The teeth must have sufficient clearance (set or hollow grinding) to prevent burning.

(c) The saw should be in perfect round.

(d) The saw must be in perfect balance or cracking will result.

(e) Saws must be kept sharp at all times. [Order 74-28, § 296-78-335, filed 5/7/74; Rule H-12, effective 6/1/51, filed 3/23/60.]

WAC 296-78-340 Saw filing and grinding rooms and equipment. (1) Approaches to filing rooms shall be kept free from material and equipment at all times.

(2) Enclosed grinding and filing rooms shall be ventilated as specified in the General Occupational Health Standard, WAC 296-62-110 through 296-62-11019.

(3) Each filing and grinding room shall be provided with two exits so arranged as to permit easy escape in case of fire.

(4) Floor shall be cleaned regularly and shall be kept free from oil, grease and other materials that might cause employees to slip or fall.

(5) Flooring around machines shall be kept in good repair at all times.

(6) Saw grinding machine belts shall be provided with guards where these belts pass through the frame of the machine.

(7) All grinding wheels on such machines shall be provided with a metal retaining hood which shall also cover the arbor ends if they are exposed to contact.

(8) Filing room employees shall be provided with goggles, face shields, or other necessary protective equipment and are required to wear the same, unless grinding wheels are provided with adjustable safety glass eye shields and are so arranged as to prevent the escape of any foreign bodies which might constitute an eye hazard. [Order 74-28, § 296-78-340, filed 5/7/74; Rule H-13, effective 6/1/51, filed 3/23/60.]

WAC 296-78-345 Miscellaneous woodworking machines——Planers, stickers, molders, matchers. (1) Each planing, molding, sticking and matching machine shall have all cutting heads, and saws if used, covered by a solid metal guard.

(2) Planers and other machinery or equipment shall not be oiled while in motion, unless provided with guards or other devices to permit oiling without any possibility of contact with moving parts of machinery.

(3) Feed rolls shall be guarded by means of roll covers, bars or strips, attached to the roll frame in such manner as to remain in adjustment for any thickness of lumber.

(4)(a) Levers or controls shall be so arranged or guarded as to prevent accidental operation of machines.

(b) Foot treadle operated machines shall have a treadle guard fastened over the treadle.

(c) Locks, blocks, or other device shall be provided for positive immobilization of machine controls while repairs or adjustments are being made.

(5) Side head hoods shall be of sufficient height to safeguard the head set screw.

(6) Side heads shall not be adjusted while machine is in operation, except when extension adjusting devices are provided.

(7) Side belt and pulley guards shall be kept in place at all times the machine is in motion.

(8) All universal joints shall be enclosed. [Order 74-28, § 296-78-345, filed 5/7/74; Rule I-1, effective 6/1/51, filed 3/23/60.]

WAC 296-78-350 Planers (stave and heading). (1) Stave and heading planers shall be provided with exhaust fans, hoods and dust conveyors to remove the harmful dusts, etc., from the vicinity of the operator. Such hoods may be arranged to serve as guards for cutting heads.

(2) Sectional feed rolls should be provided. Where solid feed rolls are used, a sectional finger device (or other means equally effective) shall be provided to prevent kickbacks. [Order 74-28, § 296-78-350, filed 5/7/74; Rule I-2, effective 6/1/51, filed 3/23/60.]

WAC 296-78-355 Stave croziers. (1) Stave croziers shall have the heads guarded completely by the exhaust hood or other device, except that portion which actually inbeds itself in the stock.

(2) Each stave crozier shall have all feed chains and sprockets completely enclosed. [Order 74-28, § 296-78-355, filed 5/7/74; Rule I-3, effective 6/1/51, filed 3/23/60.]

WAC 296-78-360 Jointers. (1) Each hand feed jointer or buzz planer with horizontal head shall be provided with an automatic guard over the cutting head both in front of and in back of the guide.

(2) Each jointer or buzz planer with horizontal head shall be equipped with a cylindrical cutting head, the throat of which shall not exceed three-eighths inch in depth or one-half inch in width.

(3) Each jointer or buzz planer with vertical head shall be guarded by an exhaust hood or other approved device which shall completely enclose the revolving head except for a slot sufficiently wide to permit the application of material.

(4) Push sticks shall be provided and used for feeding stock through hand operated jointers or buzz planers. [Order 74-28, § 296-78-360, filed 5/7/74; Rule I-4, effective 6/1/51, filed 3/23/60.]

WAC 296-78-365 Jointers (stave and heading). (1) Stave and heading jointers and matchers shall have the heads guarded completely by the exhaust hood or other device, except that portion where the stock is applied.

(2) Foot power stave jointing machines shall have the knife effectively guarded to prevent the operator's fingers from coming in contact with it. [Order 74-28, § 296-78-365, filed 5/7/74; Rule I-5, effective 6/1/51, filed 3/23/60.]

WAC 296-78-375 Wood shapers. (1) The cutting head of each wood shaper, hand feed panel raiser, or other similar machine not automatically fed, shall be guarded with a cage or pulley guard or other device so designed as to keep the operator's hands away from the cutting edge. In no case shall a warning device of leather or other material attached to the spindle be acceptable. Cylindrical heads shall be used wherever the nature of the work permits. The diameter of circular shaper guards shall be not less than the greatest diameter of the cutter.

(2) All double spindle shapers shall be provided with a spindle starting and stopping device for each spindle or provision shall be made that only one spindle operate at any one time. [Order 74-28, § 296-78-375, filed 5/7/74; Rule I-7, effective 6/1/51, filed 3/23/60.]

WAC 296-78-380 Boring and mortising machines. Boring and mortising machines shall be provided with safety bit chucks without projecting set screws. Automatic machines shall be provided with point of operation guards. When necessary to prevent material from revolving with the bit, clamps or stops shall be provided and used to hold material firmly against the guides. [Order 74-28, § 296-78-380, filed 5/7/74; Rule I-8, effective 6/1/51, filed 3/23/60.]

WAC 296-78-385 Tenoning machines. (1) Each tenoning machine shall have all cutting heads, saws if used, and all exposed moving parts guarded. In the case of cutting heads and saws, the guard shall be of solid metal.

(2) If sheet metal is used, it shall be not less than ten U.S. gauge in thickness. If cast metal is used it shall be not less than three-sixteenths inch thick, or if aluminum is used, it shall be not less than five-eighths inch thick. The hood of the exhaust system may form part or all of the guard. When so used, the hood shall be constructed of metal of a thickness not less than that specified herein.

(3) Feed chains and sprockets of all double end tenoning machines shall be completely enclosed, except that portion of chain used for conveying stock. At rear ends of frames over which the feed conveyors run, sprockets and chains shall be guarded at the sides by plates projecting beyond the periphery of sprockets and ends of lugs.

(4) The rear end of the frame over which the feed conveyors run shall be so extended that the material as it leaves the machine will be guided to a point within easy reach of the person removing stock at the rear of the tenoner.

(5) Single end tenoners, hand fed, shall have a piece of sheet metal placed so that the operator's hands cannot slip off the lever handle into the tool in passing. Such guard shall be fastened to the lever. [Order 74-28, § 296-78-385, filed 5/7/74; Rule I-9, effective 6/1/51, filed 3/23/60.]

WAC 296-78-390 Lathe (pail and barrel). (1) Each profile, swing-head and back-knife lathe shall have all cutting heads covered by a solid metal guard.

(2) If sheet metal is used, it shall be not less than ten U.S. gauge in thickness. If cast metal is used, it shall be not less than three-sixteenths inch thick, or if aluminum is used, it shall be not less than five-eighths inch thick. The hood of the exhaust system may form part or all of the guard. When so used, the hood shall be constructed of metal of a thickness not less than that specified above.

(3) Pail and barrel lathes shall be guarded in accordance with the specifications for Profile and Back-knife lathes in so far as they are applicable. [Order 74-28, §

296–78–390, filed 5/7/74; Rule I–10, effective 6/1/51, filed 3/23/60.]

WAC 296–78–395 Sanding machines. (1) Each belt sanding machine shall have both pulleys enclosed in such a manner as to guard the points where the belt runs onto the pulleys. The edges of the unused run of belt shall be enclosed or otherwise guarded from contact by employees.

(2) Each drum sanding machine shall be provided with a guard so arranged as to completely enclose the revolving drum except such portion required for the application of the material to be finished. Guards with hinges to facilitate the insertion of sandpaper may be installed. The exhaust hood may form part or all of this guard. When so used, the hood shall conform to the specifications as given under exhaust systems in WAC 296–78–030 of this chapter.

(3) Each disc sanding machine shall be so guarded as to completely enclose the revolving disc except such portion of the working side as may be necessary for the application of material to be finished. If a table is used, the working side of the disk below the table shall be guarded.

(4) All standard stationary sanding machines shall be provided with exhaust systems in conformity with the section of this code dealing with exhaust systems.

(5) All portable sanding machines shall be provided with means of removing excessive dust, or employees using equipment shall be provided with such necessary respiratory protective equipment as will conform to the requirements of the General Occupational Health Standards, chapter 296–62 WAC. [Order 74–28, § 296–78–395, filed 5/7/74; Rule I–11, effective 6/1/51, filed 3/23/60.]

WAC 296–78–400 Glue machines. (1) Personal protective equipment as required by the General Safety and Health Standard, WAC 296–24–075 through 296–24–092, and the General Occupational Health Standard, WAC 296–62–11021, and proper washing facilities with noncaustic soap and sterilizers, shall be provided for all employees handling glue. Rubber gloves and other personal equipment must be sterilized when transferred from one person to another.

(2) Glue spreaders shall be enclosed on the in–running side, leaving only sufficient space to insert the stock.

(3) All glue mixing and handling rooms where located above work areas shall have water tight floors.

(4) All glue rooms shall be provided with ventilation in accordance with WAC 296–62–110 through 296–62–11013, of the General Occupational Health Standards. [Order 74–28, § 296–78–400, filed 5/7/74; Rule I–12, effective 6/1/51, filed 3/23/60.]

WAC 296–78–405 Lath mills. (1) Lath mills shall be so arranged that stock pickers shall be protected from slabs and blocks from slasher and trimmers.

(2) It is strongly recommended that stock pickers shall wear safety toe shoes and heavy (preferably leather) aprons.

(3) Bolters and lath machines shall be provided with a wall or shield of not less than two–inch wood material or equivalent, constructed in front of the machines, to protect stock pickers and passing employees from kickbacks.

(4) Lath bolters and lath mills shall have all feed rolls, belts, gears and moving parts provided with approved guards. Feed chains shall be guarded to as low a point as the maximum height of the stock will permit.

(5)(a) Lath bolters and lath mill saws shall be provided with a sheet metal guard not less than one–eighth inch thick, or a cast iron guard not less than three–sixteenths inch thick, or equivalent. These hoods may be hinged so that they can be turned back to permit changing of the saws.

(b) A metal plate baffle, finger device or other device, shall be installed to prevent kickbacks.

(6)(a) The feed rolls on bolters or lath mills shall not be raised while any employee is in line with the saws.

(b) The stock shall be pushed through the saws with another piece of stock or push stick.

(7)(a) The lath trimmer shall be provided with guards on the ends, the top and the rear so designed as to contain debris and prevent employee contact with the saw. The belt drive shall be provided with guards as required by WAC 296–78–030 of this chapter.

(b) The entire top half of all trimmer saws shall be provided with guards. The guards shall be so adjusted as to prevent employees from accidentally contacting saws. [Order 74–28, § 296–78–405, filed 5/7/74; Rule J–1, effective 6/1/51, filed 3/23/60.]

WAC 296–78–410 Veneer and plywood plants—Peeling and barking. (1) Where peeling or barking pits are located directly under the log cranes, logs shall not be moved over workers.

(2) Spuds, peeling irons, axes and other equipment used for peeling logs shall be kept in good repair at all times.

(3) Single spiked hooks without a bell shall not be used for handling logs. Hooks shall be equipped with hand holds and shall be maintained in condition to safely perform the job application.

(4) Mechanical barking devices shall be so guarded as to protect employees from flying chips, bark or other matter.

(5) Logs shall not be removed from barker until barking head has ceased to revolve, unless barker is so designed and arranged that barking head will not create or constitute a hazard to employees. [Order 74–28, § 296–78–410, filed 5/7/74; Rule K–1, effective 6/1/51, filed 3/23/60.]

WAC 296–78–415 Veneer lathe. (1) The elevating ramp (gate) shall be provided with a safety chain and hook or other positive means of suspension while employees are working underneath same.

(2) The area under the tipple from lathe to stock trays shall be provided with railings or other suitable means of preventing employees from entering this area, if access is not prevented by the construction of the machine and employees can enter this area.

(3) Catwalks shall be provided along stock trays so that employees will not have to climb on the sides of trays to straighten stock.

(4) Any section of stock trays shall be locked out or shall have an operator stationed at starting controls while stock is being removed or adjusted.

(5) Guards which will cover the cutting edge of veneer lathe and clipper blades shall be provided and used while such blades are being transported about premises. [Order 74-28, § 296-78-415, filed 5/7/74; Rules K-2 through K-4, effective 6/1/51, filed 3/23/60.]

WAC 296-78-420 Veneer slicer and cutter. Each veneer slicer and each rotary veneer cutter shall have all revolving and other moving knives provided with guards. [Order 74-28, § 296-78-420, filed 5/7/74; Rule K-5, effective 6/1/51, filed 3/23/60.]

WAC 296-78-425 Veneer clipper. (1) Each veneer clipper shall have either automatic feed or shall be provided with a guard which will make it impossible to place any portion of the hand under the knife while feeding stock. Where practicable, such guard shall be of the vertical finger type.

(2) The rear of each manually operated clipper shall be guarded either by a screen or vertical finger guard which shall make it impossible for any portion of the hand to be placed under the knife while removing clipped stock. [Order 74-28, § 296-78-425, filed 5/7/74; Rule K-6, effective 6/1/51, filed 3/23/60.]

WAC 296-78-430 Veneer wringer (swede). The entry side of each veneer wringer other than glue spreader shall be enclosed, leaving only sufficient space to insert stock. [Order 74-28, § 296-78-430, filed 5/7/74; Rule K-7, effective 6/1/51, filed 3/23/60.]

WAC 296-78-450 The shake and shingle industry. (1) Scope. The following terms and standards shall apply only in the manufacturing of shakes and shingles and these requirements shall take precedence over other Sawmill and Woodworking Standards.

(2) Definitions——Terms, General. (a) "Block(s)", shall mean those sections of a log cut in various lengths.

(b) "Block(s)" and "Bolt(s)" may be considered to be synonymous.

(c) "Clipper Saw", shall mean a circular saw used to trim manufactured shingles.

(d) "Groover", shall mean a cylinder-type knife (knives) similar to a planer knife (knives), used to cut grooves into the face surface of shakes or shingles.

(e) "Hip" and "Ridge Saw", shall mean a circular saw used to cut various angles on the side edge of shakes or shingles.

(f) "Johnson Bar", shall mean a shaft used to control the feed of the carriage.

(g) "Knee Bolter Circular Saw", shall mean a stationary circular saw used to trim and debark blocks (the blocks are manually maneuvered onto a carriage and fed into a saw).

(h) "Log Haul", shall mean a power conveyor used to move logs to mill.

(i) "Packers", shall mean employees who pack the manufactured shakes or shingles into bundles.

(j) "Panagraph Power Splitter", shall mean a hydraulically operated wedge, manually positioned into place, used to split blocks.

(k) "Power Saw Splitter", shall mean a stationary circular saw used to split (saw) blocks, (the blocks are manually maneuvered onto a carriage and fed into the saw).

(l) "Set Works", shall mean a component of the shingle machine, located on the machine frame, used to control the thickness of each shingle being manufactured.

(m) "Shake Machine", shall mean a band saw used to cut shake blanks into manufactured shakes.

(n) "Shake Splitter", shall mean a stationary hydraulically operated wedge, manually controlled, used to split shake blocks into shake blanks or boards.

(o) "Shim Saw", shall mean a circular saw used to re-cut manufactured shingles into narrow widths.

(p) "Shingle Machine", shall mean a machine used to manufacture shingles; composed of a feed, set works, and carriage system, all functioning in relation to a circular saw.

(q) "Shingle Saw", shall mean a circular saw used to cut shingles from blocks.

(r) "Spault", shall mean the first and last section(s) of a block as it is cut into shingles.

(s) "Spault Catcher", shall mean a device located on the shingle machine next to the solid feed rolls, used to hold the last section of each block being cut (called a spault), in place.

(t) "Track or Swing Cutoff Saw", shall mean a circular saw used to cut blocks from a log.

(3) Shake and Shingle Machinery——General. (a) Track or Swing Cutoff Circular Saw. (i) A power operated track or swing cutoff circular saw shall have controls so arranged that operators are not positioned directly in front of the saw while making a cut.

(ii) All track or swing cutoff circular saws shall be completely encased or guarded when the saw is in the retract position, except for that portion of the guard that must be left open for the operation of the saw.

(iii) Track or swing cutoff circular saw guards shall be constructed of sheet metal not less than one-eighth inch thick, or a wood guard of not less than nominal two inch thick wood material, or equivalent.

(A) Hinged or removable doors or gates will be permitted where necessary to permit adjusting and oiling.

(iv) The driving belt(s) on the track or swing cutoff circular saw shall be guarded in accordance with the General Safety and Health Standard, WAC 296-24-205 through 296-24-20533.

(v) A safety catch shall be provided to prevent the track cutoff saw from leaving the track.

(b) Overhead Deck Splitter——Panagraph. (i) Panagraph splitters shall have a shroud incorporated on the upper pressure plate to eliminate the possibility of the splitter moving from the operating area. This shroud shall be constructed of solid design with a minimum

width of three inches and a minimum thickness of three–eighths inch.

(ii) Mechanically operated overhead splitters shall have handles moving opposite the stroke of the piston.

(iii) When the leading edge of the panagraph splitter is completely extended, the maximum clearance from the deck to the splitting edge shall be two inches.

(c) Power Splitter Saw. (i) Power splitters shall have spreaders behind the saw to prevent materials from squeezing the saw or being thrown back on the operator. The top of the saw shall be completely covered.

(d) Knee Bolter Circular Saw. (i) A safety catch shall be provided to prevent the bolter carriage from leaving the track.

(ii) Bolter saws shall be provided with a canopy guard of sheet metal not less than one–eighth inch thick, or cast iron guard not less than three–sixteenths inch thick or a wood guard of not less than nominal four inch thick wood material or equivalent.

(A) The bolter canopy guard shall completely enclose the rear portion of the saw. It shall be so arranged and adjusted as to cover the front of the saw; not to exceed twenty inches from the top of the carriage to the bottom of the guard on sixteen inch and eighteen inch block and twenty–six inches on twenty–four inch blocks, of the material being cut.

(iii) Bolter saws shall be provided with wipers of belting or other suitable material. These wipers shall be installed on both sides of the saw in such a manner as to deflect knots, chips, slivers, etc., that are carried by the saw.

(iv) A positive device shall be provided and used to *manually* lock and hold the feed table in the neutral position when not in use.

(v) That portion of all bolter saws which is below and behind the saw table shall be guarded by the exhaust hood or other device. Hinged or removable doors or gates will be permitted where necessary to permit adjusting and oiling.

(4) Shake Machinery. (a) Shake Splitters. (i) A positive de–energizing device shall be provided within ready reach of each shake splitter operator.

(ii) Each shake splitter shall be provided with an adjustable stroke limiter to eliminate the splitting blade from striking the table.

(iii) All splitters shall have a maximum clearance of four inches, from the splitting edge to the table surface, when the splitter is in the extended position.

(iv) All splitter tables shall have a friction surface to reduce kick out of the material being split.

(v) Shake splitters shall not be operated at a speed that would cause chunks to be thrown in such a manner as to create a hazard to the operator.

(vi) The use of foot pedal (treadle) mechanisms shall be provided with protection to prevent unintended operation from falling or moving objects or by accidental stepping onto the pedal.

(A) The pedal shall have a nonslip surface.

(B) The pedal return spring shall be of the compression type, operating on a rod or guided within a hole or tube, or designed to prevent interleaving of spring coils in event of breakage.

(C) If pedal counterweights are provided, the path of the travel of the weight shall be enclosed.

(b) Shake Saw Guards. (i) Every shake band saw shall be equipped with a saw guard on both sides of the blade down to the top side of the guide.

(ii) The outside saw guard shall extend a minimum of three and one–half inches below the bottom edge of the saw guide.

(iii) The maximum opening between the saw guide and table rolls shall be fifteen inches.

(c) Shake Saw Band Wheel Guards. (i) The band wheels on all shake band saws shall be completely encased or guarded on both sides. The guards shall be constructed of not less than No. 14 U.S. gauge metal or material equal in strength.

(A) The metal doors, on such guards, shall have a wood liner of a minimum thickness of one–half inch.

(d) Shake Saw Band Wheel Speeds and Maintenance. (i) No band wheel shall be run at a peripheral speed in excess of that recommended by the manufacturer.

(ii) Each band wheel shall be carefully inspected at least once a month by management.

(A) Any band wheel in which a crack is found in the rim or in a spoke shall be immediately discontinued from service until properly repaired.

(iii) Each band saw frame shall be provided with a tension indicator.

(5) Upright Shingle Machine. (a) Upright Shingle Saw Guards. (i) Every shingle machine carriage shall be equipped with a hand guard which:

(A) Projects at least one inch beyond the cutting edge of the saw.

(B) Shall be located not more than one–half inch from the side of the saw blade.

(ii) Shingle saw guards shall have a rim guard so designed and installed as to prevent chips and knots from flying from the saws. Such guards shall cover the edge of the saw to at least the depth of the teeth, except such part of the cutting edge as is essential for sawing the material.

(iii) Saw arbors and couplings shall be guarded to prevent contact by employees.

(iv) Every part of a clipper saw blade, except that part which is exposed to trim shingles, shall be enclosed by a guard, so designed and installed to prevent contact with the clipper saw. An additional guard shall be installed not more that four inches above the clipper board and not more than one–half inch from the vertical plane of the saw.

(v) The underside of clipper saw boards shall be equipped with a finger guard to effectively protect the operator's fingers. The guard shall be a minimum of five inches long and one and one–quarter inches deep.

(b) Upright Carriage Guards. (i) Automatic revolving cam set works and rocker arms, on machine frame, shall be guarded where exposed to contact.

(ii) The spault catchers shall be not less that three–sixteenths inch thick and kept sharp at all times. Missing teeth shall be replaced.

(c) Carriage Feed Works. (i) The pinion gear, bull wheel and Johnson bar, operating the saw carriage, shall be guarded where exposed to contact.

(ii) Each shingle machine clutch treadle shall be arranged so that it is necessary to manually operate the treadle to start the machine. Devices which start the machine when the jaw treadle is released shall not be installed or used. The carriage shall have a brake to hold it in a neutral position.

(iii) Carriage speed shall not exceed thirty-four strokes per minute.

(6) Related Shake and Shingle Sawing Machinery. (a) Flat or Taper Saw. (i) A wood or metal guard or its equivalent shall be secured to the sliding table at the side nearest the sawyer to protect him from contact with the cutting edge of the saw when a block is not in the cut.

(b) Hip and Ridge Saws. (i) The hip and ridge saws shall be guarded with a hood-like device. This guard shall cover that portion of the saw not needed to cut the material, located above the cutting table.

(A) The remaining portion of the saw, located below the table, shall be guarded to prevent contact by employees.

(B) The hip and ridge guarding standard is applicable to both shake and shingle hip and ridge saws.

(c) Shim Stock Saws. (i) The top ends and sides of the shim stock saws shall be guarded.

(A) All shim stock saw power transmission mechanism shall be guarded.

(d) Shake or Shingle Groover. (i) The top ends and sides of the groover, to include the press rolls, shall be guarded to contain material or debris which can be thrown and to prevent contact.

(A) All groover machine power transmission mechanism shall be guarded in compliance with WAC 296-78-030 of this chapter.

(7) Circular Saws, Speeds and Repairs. (a) Maximum Allowable Speeds. (i) No circular saw shall be run at a speed in excess of that recommended by the manufacturer.

(ii) Such speed shall be etched or otherwise permanently marked on the blade, and that speed shall not be exceeded.

(b) Repairs and Reconditions. (i) Shingle saws when reduced in size to less than forty inches in diameter shall be discontinued from service as shingle saws on upright or vertical machines.

(ii) Shingle saws may be reconditioned for use as clipper saws provided the surface is reground and the proper balance attained.

(iii) Shingle saws may be used to no less than thirty-six inches on flat or taper saw machines.

(8) Safety Rules. (a) General. (i) Workers shall not leave shingle machines unattended while the carriage is in motion.

(ii) Shingle blocks shall not be piled more than one tier high on tables or roll cases. Chunks may be placed horizontally one tier high on top of shingle blocks. Shingle blocks shall be piled in a stable manner, not more than seventy-two inches high, within the immediate working area of the shingle sawyer or the area shall be barricaded.

(iii) Provisions shall be made to prevent blocks from falling into the packing area.

(iv) On each machine operated by electric motors, positive means shall be provided for rendering such controls or devices inoperative while repairs or adjustments are being made to the machines they control.

(v) Workers shall not stand on top of blocks while in the process of splitting other blocks into bolts.

(9) Jointers (Shingle). Shingle jointers shall have the front, or cutting face of the knives, housed except for a narrow slot through which the shingles may be fed against the knives. [Order 76-7, § 296-78-450, filed 3/1/76; Order 74-28, § 296-78-450, filed 5/7/74.]

Chapter 296-79 WAC
SAFETY STANDARDS FOR PULP, PAPER, AND PAPERBOARD MILLS AND CONVERTERS

WAC

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WAC 296-79-010 Scope and application. (1) This chapter applies to establishments, firms, persons and corporations dealing with the manufacturing, processing, storing, finishing or converting of pulp, paper or paperboard and all buildings, machinery and equipment pertaining thereto.

(2) This chapter shall augment the Washington State General Safety and Health Standards, General Occupational Health Standards, Electrical Workers Safety Rules, and any other standards which are applicable to all industries governed by chapter 80, Laws of 1973 (chapter 49.17 RCW), Washington Industrial Safety and Health Act. In the event of any conflict between any portion of this chapter and any portion of any of the general application standards, the provisions of this chapter 296-79 WAC, shall apply.

(3) When the words "shall" or "must" are used in this chapter, the requirement is compulsory. The words "may" or "should," as used in this standard, identify recommendations or suggestions only.

(4) The rules contained in this chapter are minimum requirements and the use of additional guards, or other means, methods or procedures may be needed in order to make the work or place of work safe. [Order 74-24, § 296-79-010, filed 5/6/74; Order 70-6, § 296-79-010, filed 7/10/70, effective 8/10/70.]

WAC 296-79-020 General requirements. (1) Housekeeping. Floors shall be kept reasonably clear of spilled or leaking oil, grease, water, broke, etc., that may cause slipping, tripping or falling. Non-skid type surfacing shall be installed in vehicular or pedestrian traffic areas in which slipping hazards otherwise would exist.

In areas where it is not possible to keep the floor free of materials which cause a slipping hazard, mats, cleats, or other suitable materials which will effectively minimize or eliminate the hazard shall be installed.

(2) Storage of Hoses, Cords, Slings or Similar Items or Equipment. Hoses, cords, slings or similar items or equipment shall be stored in such a manner that they will not create a hazard.

(3) Storage and Transportation of Materials. Materials, objects or equipment shall be stored or transported by use of means or methods which will prevent them from falling, tipping or rolling.

(4) Compressed Gas Cylinders. Compressed gas cylinders shall be stored away from heat sources, combustible materials or other materials which may cause hazardous conditions. Storage facilities shall comply with the requirements of the General Safety and Health Standards, chapter 296-24 WAC. Cylinders shall be secured in a manner which will prevent them from tipping or falling. Acetylene cylinders shall be stored, transported, or used while in the upright position only.

(5) Warning of Obstructions. Open manholes or excavations shall be roped off, barricaded, or adequately safeguarded by an approved method when located in or adjacent to walkways, aisleways, or roadways. During periods of darkness or reduced visibility, such areas shall be provided with warning lights or lanterns.

(6) Employees to be Instructed. Employees shall not be permitted to operate any machine or equipment until they have received proper instruction and are familiar with safe operating procedures.

(7) Training Personnel to Handle Emergencies. In each area where hazardous substances may be encountered, personnel shall be trained to cope with emergencies arising from breaks, ruptures, or spills which would create a hazardous condition.

(8) Working Alone. When an employee is assigned to work alone in a remote or isolated area, a system shall be instituted whereby such employee reports by use of radio or telephone to someone periodically or a designated person shall check on his safety at reasonable intervals. All persons involved in working alone shall be advised of the procedures to be followed.

(9) Lifting or Moving Objects. Employees shall be instructed in proper lifting or moving techniques and methods. Mechanical devices should be used or employees should ask for assistance in lifting or moving heavy objects.

(10) Reporting Hazards. Any faulty equipment or hazardous condition shall be promptly reported to the person in charge.

(11) Exists from Hazardous Areas. Where physically and reasonably possible, there shall be at least two unobstructed exits from any hazardous area. Such exits shall preferably be on opposite walls.

(12) Safe Work Area. Sufficient clearance shall be maintained between machines to allow employees a safe work area.

(13) Protection from Overhead Hazard. Warning signs shall be placed in conspicuous locations below areas where overhead work is being done and shall be removed promptly when work is completed.

(14) Welding Areas Protected. Areas in which welding is being done shall be screened or barricaded to protect persons from flash burns, when practical. If the welding process cannot be isolated, all persons who may

be exposed to the hazard of arc flash shall be properly protected.

(15) Testing Safety Devices. Brakes, back stops, anti-runaway devices, overload releases and other safety devices shall be inspected and tested frequently to insure that all are operative and maintained in good repair.

(16) Starting and Stopping Devices. Electrically or manually operated power disconnecting devices shall be provided within easy reach of the operator while in his normal operating position. If necessary for safety of the operation, the machine shall be so equipped that retarding or braking action can be applied at the time of or after the source of power is deactivated.

(17) Use of Compressed Air for Cleaning Purposes. Compressed air shall not be used for cleaning purposes if it may endanger other persons in the area or for cleaning clothing while it is being worn.

(18) Coupling High Pressure Air Hoses. Sections of high pressure air hoses shall be properly coupled and have safety chains or equivalent safety device attached between the sections (30 psi or more is high pressure air).

(19) Punch Bars. Open pipes shall not be used as punch bars if the use would create a hazard.

(20) Saw Table Limit Stop or Extension. Employees shall be protected from contact with the front edge of a circular saw by a limit stop which will prevent the forward swing of the cutting edge from extending beyond the edge of the table or a table extension shall be installed.

(21) Explosive-Actuated Tools. Explosive-actuated tool design, construction, operation and use shall comply with all requirements specified in "Safety Requirements for Explosive-Actuated Fastening Tools," adopted by the Department of Labor and Industries. In addition, after using such tools a careful check shall be made in order to ascertain that no cartridges or charges are left where they could enter equipment or be accidentally discharged in any area where they could create a fire or explosion hazard.

(22) Approved Life Buoys. Where work is being performed on docks or adjacent to open water five feet or more in depth U.S. Coast Guard approved life buoys shall be provided. Such life buoys shall have sufficient line attached and be spaced at intervals not exceeding 200 feet.

(23) Ladders Required on Waterfront Docks. Either permanent ladders or portable ladders which are readily available for emergency use shall be provided on all waterfront docks. Such ladders shall extend from the face of the dock to the water line at its lowest elevation. Spacing between ladder installations shall not exceed 400 feet. The dock area immediately adjacent to ladder locations shall be painted with a bright color which contrasts with the surrounding area. A suitable method shall be used to secure the ladders.

(24) Protection from Hot Pipes. All exposed hot pipes within seven feet of the floor or working platform, or within 15" measured horizontally from stairways, ramps or fixed ladders, shall be covered with an insulating material or be guarded in such a manner as to prevent contact.

(25) Prevent Overhang While Removing Materials. Extreme care shall be taken to prevent material from creating an overhang while removing the materials from piles or bins.

(26) Establishments subject to chapter 296-79 WAC shall comply with the following standards of the American National Standards Institute:

(a) ANSI Z24.22-1957, Method of Measurement of Real-Ear Attenuation of Ear Protectors at threshold;

(b) ANSI Z33.1-1961, Installation of Blower and Exhaust Systems for Dust, Stock and Vapor Removal or Conveying;

(c) ANSI B56.1-1969, Safety Standard for Powered Industrial Trucks. [Order 77-12, § 296-79-020, filed 7/11/77; Order 74-24, § 296-79-020, filed 5/6/74; Order 70-6, § 296-79-020, filed 7/10/70, effective 8/10/70.]

WAC 296-79-030 Guards and guarding. (1) General Safety and Health Standards to Prevail Where Applicable. Driving mechanisms, power transmission equipment or apparatus, prime movers, shear or pinch points or other similar hazardous areas of exposure shall be properly safeguarded with standard safeguards as required by the General Safety and Health Standards.

(2) Safeguarding Specific Areas, Machines or Conditions. To augment the general safeguarding requirements contained in the previous rule, certain equipment, tools, machines, and areas present definite hazards and shall be safeguarded by compliance with the following requirements:

(a) Conveyors. Hazardous areas of conveyors shall be adequately safeguarded or workers shall be protected from hazard by other effective means.

(b) Broke Shredders. Cutting heads shall be completely enclosed except for opening at feed side sufficient only to permit entry of stock. The enclosure shall be bolted or locked in place and shall be of solid material or with mesh or other openings not exceeding 1/2 inch.

(c) Sharp Edged Slitter Knives. Sharp edged slitter knives subject to accidental contact shall be effectively guarded. Carriers shall be provided and used when transporting or carrying sharp edged slitter knives.

(d) Wheels of Traveling Sections of Conveyors. Traveling sections of conveyors and other equipment with wheels which run on rails or guides, other than railroad equipment, shall be provided with wheel sweep guards installed in front of the traveling wheels in all areas where persons may be exposed to contact. Sweep guards shall have not greater than 1/4 inch clearance above the rail or guide.

(e) Stitching or Sewing Machine. Carton or bag stitching machines shall be properly safeguarded to prevent persons from coming in contact with the stitching head and other pinch or nip points.

(f) Beaters and Pulpers. Where the top edge of vessels or tubs is less than standard height guardrails above the floor or operator's platform, a guardrail of standard

height shall be installed. If necessary for the protection of the person feeding equipment, an intermediate guardrail or other suitable protection shall be installed. Beater rolls shall be provided with covers.

(g) First Dryer. A permanent guard or apron guard, or both, shall be installed to protect workers from any exposed ingoing nip of the first dryer drum in each section if the area is accessible to workers while the dryer is in operation.

(h) Floor and Drain Openings. Floor and drain openings in walkways and general work areas shall be covered with material or gratings with openings no larger than 2" in the narrow dimension.

(i) Mechanical Devices to Dump Chip Cars, Trucks or Trailers. When using mechanical equipment to elevate the front end of the chip containers for dumping into a hopper, the shear area between the floor and the elevated section shall be safeguarded. The pit area shall be adequately safeguarded or barricaded. Safeguards shall be installed around the exposed sides of a chip hopper.

(3) Replacing Guards. All permanent guards must be replaced or adequate temporary safeguards provided before a machine is put into operation.

(4) Protection from Moving Materials. When material, such as chunks, slivers, cants, or logs could be thrown or flipped by a saw, barker, or other machines, adequate barricades, screens, netting, or other safeguards shall be provided and maintained.

(5) Circular Saws (Not Slasher Saws). Saws shall be provided with standard guards, in accordance with American National Standard 01.1–1954 (Reaffirmed 1961).

(6) Protection for Areas Where Guards Are Impractical. Where normal guarding is impractical the hazard shall be reduced to a minimum by use of safety chains, lifelines, signs or other reasonable means. Areas which present a major physical hazard which cannot be reasonably safeguarded shall be identified by use of paint or other materials.

(7) Transporting Knives. Knives used for chip or hog fuel machines, or guillotine cutters, shall be secured in properly constructed containers during transportation.

(8) Hand Knife or Scissors. Workers shall be furnished properly designed and constructed sheaths for safely carrying knives and scissors used for cutting or trimming pulp and paper.

(9) Safe Storage for Knives and Scissors. Tables where paper is being cut shall be equipped with sheaths or shelves for safe storage of knives and scissors.

(10) Safeguard for Foot Operated Treadle Switch Used to Activate Power Driven Equipment. Foot operated treadle switches used for activation of power driven equipment shall be protected by a stirrup type guard or equivalent protection shall be provided to prevent accidental activation.

(11) Automatic Pressure Actuated Stopping Devices. Hand fed machines and other moving equipment which create shear or pinch points which cannot be reasonably guarded may be safeguarded by the installation of pressure activated bars or sensing devices which, when contacted, will automatically stop the machine or equipment. [Order 74–24, § 296–79–030, filed 5/6/74; Order 70–6, § 296–79–030, filed 7/10/70, effective 8/10/70.]

WAC 296–79–040 Fire protection and ignition sources. (1) Portable Fire Extinguishers. Portable fire extinguishers shall be constructed, tested, maintained, and used in accordance with the recommendations specified by the National Fire Protection Association or other similar recognized agencies.

(2) Suitable Fire Extinguishing Equipment. Fire extinguishing equipment suitable for use for the type or types of fire which could be expected in an area shall be provided.

(3) Vaporizing Liquid Type Extinguishers. Vaporizing liquid type extinguishers shall not be used if known to create a condition which is hazardous to health.

(4) Proper Type of Fire Extinguisher to be Used. Each person who is expected or required to use fire extinguishing equipment shall be instructed as to the proper type or types of extinguishing equipment to be used for each class of fire.

(5) Fire Drills, etc. Personnel shall be instructed on procedures to be followed in case of fire.

(6) Posting Areas Where Fire or Explosion Hazards Exist. Areas where a fire or explosion hazard exists shall be posted with NO SMOKING or other suitable signs which would indicate that such hazard exists.

(7) Sources of Ignition Prohibited in Hazardous Areas. Spark–producing tools, lights or other sources of ignition shall not be used in any area where the hazard of explosion exists.

(8) Welding and Burning Permits. A written welding or burning permit shall be secured from a delegated person when welding and burning is to be done in an area near flammable or combustible materials or in areas where a potentially explosive condition exists. Permits shall not be valid for more than 24 hours.

(9) Internal Dust Fires in or Around Gas Hoods. A safe written procedure shall be developed by the company for control of dust fires in or around gas hoods. Personnel shall be properly instructed and trained in this procedure. [Order 74–24, § 296–79–040, filed 5/6/74; Order 70–6, § 296–79–040, filed 7/10/70, effective 8/10/70.]

WAC 296–79–050 Personal protection. (1) Personal Protective Equipment and Clothing. Personal protective clothing and equipment as required by the General Safety and Health Standards and the General Occupational Health Standards shall be furnished by the employer and worn or used by the employee when needed to eliminate or minimize the degree of hazard involved with any specific operation.

(a) Required Clothing, Caps, etc. Employees shall wear sufficient clothing to protect them from hazards to which they may be exposed while performing their duties. Consideration must be given to temperatures in

certain areas in which persons work. Employees whose hair is long enough to be caught in machinery or equipment around which they work shall wear caps, hair nets or other protection which will adequately confine the hair while performing their duties.

Rings or other jewelry which could create a hazard should not be worn by employees while in the performance of their work.

(b) Protective Footwear. Employees who work in areas where there is a possibility of foot injury due to falling or rolling objects shall wear safety type footwear. Shoe guards and toe protectors will be supplied by management. Management shall also make safety shoes available for purchase by employees at not more than actual cost to management.

Calks or other suitable footwear which will afford reasonable protection from slipping shall be worn while working on logs. Calk boots shall be made available at cost.

(2) Working Over or Near Water. (a) Employees working over or near water who are exposed to the danger of drowning shall be provided with and shall wear U.S. Coast Guard approved personal flotation devices.

(b) Prior to and after each use, buoyant work devices shall be inspected for defects which would alter their strength or buoyancy. Defective units shall not be used.

(3) Protection from Noise. (a) Employees shall be protected from the effects of noise exposures which exceed the noise levels deemed to be safe as defined by the General Occupational Health Standards adopted by the Department of Labor and Industries.

(b) Noise levels which exceed the maximum allowable amount deemed to be safe shall be reduced by feasible administrative or engineering control.

(c) When feasible administrative and engineering controls do not lower the noise levels below the limits deemed to be safe, all persons exposed shall be provided with and shall use proper personal protective equipment.

(d) In all cases where the noise levels in any area exceed the levels deemed to be safe, a continuing effective hearing conservation program as defined in WAC 296-62-09011, General Occupational Health Standards, shall be administered.

(4) Respiratory Protection. (a) Respiratory protective equipment is designed to protect the wearer from inhalation of hazardous atmospheres. Such equipment shall include air purifying respirators, airline respirators, hose masks, self-contained breathing apparatus and combinations thereof.

(b) Where reasonable engineering or operational controls will afford the proper protection, these shall be instituted by the employer in preference to requiring employees to wear respiratory protective equipment. Where control by engineering or operational means is impractical, workers shall be required to wear respiratory protective equipment in hazardous atmospheres.

(c) The Respiratory Protective Devices Manual published by the American Conference of Governmental Industrial Hygienists and the American Industrial Hygiene Association shall be used as a guide for selecting respiratory protective equipment.

(d) Respiratory protective equipment and its use shall be approved by the Department of Labor and Industries. The Department will accept approval by the U.S. Bureau of Mines, U.S. Department of Agriculture, Atomic Energy Commission and the U.S. Department of Defense for the conditions for which the equipment has been approved.

(e) When the use of respiratory protective equipment is required the proper equipment shall be furnished by the employer and it shall be used in the prescribed manner by the employee. The employer shall provide training, maintenance and surveillance to insure this equipment is properly used. (Refer to the General Occupational Health Standards.)

(f) Self-contained breathing apparatus, air supplied masks or other approved respiratory protective equipment compatible with the conditions which may be encountered shall be provided for emergency or rescue purposes in areas throughout the plant where they may be needed. Storage locations shall be clearly identified and persons shall familiarize themselves with the locations. [Order 74-24, § 296-79-050, filed 5/6/74; Order 70-6, § 296-79-050, filed 7/10/70, effective 8/10/70.]

WAC 296-79-060 Protection from radiation. Special rules and regulations regarding the use of ionizing radiation shall be posted and followed as required by the Atomic Energy Commission or the appropriate state agency, whichever has authority. For protection from other types of radiation, the rules contained in the General Occupational Health Standards, chapter 296-62 WAC, shall prevail. [Order 74-24, § 296-79-060, filed 5/6/74; Order 70-6, § 296-79-060, filed 7/10/70, effective 8/10/70.]

WAC 296-79-070 Illumination. (1) Sufficient Illumination Required. All areas shall be sufficiently illuminated in order that persons in the area can safely perform their assigned duties. The recommended levels of illumination specified in the General Occupational Health Standards shall be followed where applicable. When areas are not specifically referred to in the General Occupational Health Standards and the adequacy of illumination for the area or task performed is questionable, a determination of the amount of illumination needed shall be made by the Industrial Hygiene Section of the Division of Industrial Safety and Health.

(2) Emergency or Secondary Lighting System Required. (a) There shall be an emergency or secondary lighting system which can be actuated immediately upon failure of the normal power supply system. The emergency or secondary lighting system shall provide illumination in the following areas:

(i) Wherever it is necessary for workers to remain at their machine or station to shut down equipment in case of power failure.

(ii) At stairways and passageways or aisleways used by workers as an emergency exit in case of power failure.

(iii) In all plant first aid and/or medical facilities.

(b) Emergency lighting facilities shall be checked at least every 30 days for mechanical defects. Defective equipment shall be given priority for repair schedule.

(3) Extension Cord Type Lights. All extension cord type lights shall be provided with proper guards. [Order 74-24, § 296-79-070, filed 5/6/74; Order 70-6, § 296-79-070, filed 7/10/70, effective 8/10/70.]

WAC 296-79-080 Elevators, manlifts and other lifting devices. (1) Elevators, Manlifts, etc. All elevators, manlifts or other lifting devices shall be installed and maintained in conformity with the requirements specified in the Washington State Elevator Laws and regulations adopted by the Elevator Section of the Division of Building and Construction Safety Inspection, Department of Labor and Industries.

(2) Inspection of Elevators, etc., for Acid Towers. Outside elevators shall be inspected daily during winter months when ice materially affects safety. Elevators, runways, stairs, etc., for acid towers shall be inspected monthly for defects that may occur because of exposure to acid or corrosive gases.

(3) Gas Masks on Elevators. Elevators located in areas where exposure to potentially harmful concentrations of toxic substances may occur shall be equipped with an adequate supply of gas masks to protect the maximum number of passengers.

(4) Posting Elevators. Elevators shall be posted indicating the maximum number of persons allowed to ride. [Order 74-24, § 296-79-080, filed 5/6/74; Order 70-6, § 296-79-080, filed 7/10/70, effective 8/10/70.]

WAC 296-79-090 Electrical equipment and distribution. (1) National Electrical Code to Prevail. All electrical installations and electrical utilization equipment shall comply with the National Electrical Code requirements.

(2) Authorized Personnel to do Electrical Work. Only those persons who are qualified to do the work assigned and are authorized by the employer shall be allowed to perform electrical work on any electrical equipment or wiring installations.

(3) High Voltage Areas to be Guarded. Motor rooms, switch panel rooms or other areas where persons may come in contact with high voltages shall be fenced off or be enclosed in a separate area. The gate, door or access to such area shall be posted with a notice stating that only authorized persons are allowed in the area.

(4) Control Panels. Floor stand panels should be protected from being struck by moving equipment and handles and buttons shall be protected from accidental actuation.

(5) Switches or Control Devices. Switches, circuit breakers or other control devices shall be so located that they are readily accessible for activation or deactivation and shall be marked to indicate their function or machine which they control. The positions of ON and OFF shall be marked or indicated and provision shall be made for locking or tagging out the circuit.

(6) Starting Requirements for Electrically Driven Equipment After Power Failure. Electrically driven equipment shall be so designed that it will not automatically start upon restoration of power after a power failure if it will create a hazard to personnel.

(7) Posting Equipment Automatically Activated or Remotely Controlled. Equipment which is automatically activated or remotely controlled shall be posted, warning persons that machine may start automatically if it will create a hazard to personnel. [Order 74-24, § 296-79-090, filed 5/6/74; Order 70-6, § 296-79-090, filed 7/10/70, effective 8/10/70.]

WAC 296-79-100 Floors, platforms, stairways, ladders, loading docks. (1) Construction and Maintenance. Floors, platforms, stairways, ladders, and loading docks shall be constructed, maintained and used in accordance with the requirements specified in the General Safety and Health Standards and shall have non-skid type surfaces where needed to minimize the hazard of slipping. [Order 74-24, § 296-79-100, filed 5/6/74; Order 70-6, § 296-79-100, filed 7/10/70, effective 8/10/70.]

WAC 296-79-110 Elevated runways and ramps used by vehicles. (1) Elevated Runway and Ramp Construction. Elevated runways or ramps shall be constructed to safely support four times the weight of any load to which it may be subjected. Runways and ramps shall be cleated, grooved, rough surfaced, or covered with a material which will minimize the danger of skidding. The maximum inclination of a ramp used for wheeled equipment shall not exceed 20° from horizontal.

(2) Guarding Exposed Sides. Elevated ramps or runways used for the travel of wheeled equipment shall have exposed sides guarded with a substantial bull rail or shear rail of sufficient height to prevent wheeled equipment from going over the rail. Standard guardrails shall be installed on runways wherever the height exceeds 4 feet above the adjacent area except where used for loading or unloading purposes. [Order 74-24, § 296-79-110, filed 5/6/74; Order 70-6, § 296-79-110, filed 7/10/70, effective 8/10/70.]

WAC 296-79-120 Scaffolds, construction, use and maintenance. Whenever work must be performed at a height which cannot be reached from the floor or permanent platform and where it would not be safe practice to use a ladder, a properly constructed scaffold shall be provided and used. All scaffolds shall have a factor of safety of four times any load to which they may be subjected and be adequately secured or stabilized to prevent tipping. Scaffolds shall be constructed in accordance with acceptable engineering practices and shall be maintained in a safe condition. Tools or materials which would create a tripping hazard or which may fall from the platform shall be secured or removed. Persons shall not ride on a roller scaffold while it is being moved. [Order 74-24, § 296-79-120, filed 5/6/74; Order 70-6, § 296-79-120, filed 7/10/70, effective 8/10/70.]

WAC 296-79-130 Crossovers, aisles, passages. (1) Crossing Conveyors. Where access is required, crossovers or underpasses with proper safeguards shall be provided over or under all conveyors.

(2) Clearances to be Marked. Low clearance areas under conveyors which could present a hazard to mobile equipment operations shall be identified by a suitable means, such as signs, contrasting colors, or tell-tales.

(3) Aisles or Passageways. Aisles or passageways should be at least three feet wider than the widest vehicle or load traveling the aisle or passageway. When this clearance cannot be maintained, adequate precautions shall be taken.

(4) Crossovers Over Obstructions in Passageways. Crossovers shall be provided where employees are required to cross over transmission drive lines or other permanent obstructions in passageways or walkways. [Order 74-24, § 296-79-130, filed 5/6/74; Order 70-6, § 296-79-130, filed 7/10/70, effective 8/10/70.]

WAC 296-79-140 Pipes, piping systems, hoses. (1) Installation and Maintenance. Pipes and piping systems should be installed and maintained in accordance with the recommendations of the American Society of Mechanical Engineers Code for Pressure Piping, National Fire Protection Association, Washington State Pressure Vessel Requirements administered by the Boiler and Pressure Vessels Section of the Division of Building and Construction Safety Inspection, Department of Labor and Industries, or recommendations adopted by reputable societies, manufacturers or organizations based on sound engineering practices.

(2) Piping Systems to be Identified. Pipes containing hazardous materials shall be identified. It is recommended that USAS A13.1 "Scheme for Identification of Piping Systems" be followed.

(a) Positive identification of a piping system content shall be lettered legend giving the name of the content in full or abbreviated form. Such identification shall be made at suitable intervals and at valves, fittings, and on both sides of walls or floors as needed. Arrows may be used to indicate the direction of flow. Where it is desirable or necessary to give supplementary information such as hazard of use of the piping system content, this may be done by additional legend or by color applied to the entire piping system or as colored bands. Legends may be placed on colored bands.

Examples of legend which may give both positive identification and supplementary information regarding hazards or use are:

Ammonia	Hazardous liquid or gas
Chlorine	Hazardous liquid or gas
Chlorine Dioxide	Hazardous liquid or gas
Cooking Acid	Hazardous liquid or gas
Sulphur Dioxide	Hazardous gas
Green Liquor	Hazardous liquid
White Liquor	Hazardous liquid
Liquid Caustic	Hazardous liquid
Liquid Sulphur	Hazardous liquid
Sulphuric Acid	Hazardous liquid
Sodium Chlorate	When dry, danger of fire or explosion

NOTE: Manual L-1, published by Manufacturing Chemists Association, Inc., is a valuable guide in respect to supplementary legend.

(b) When color, applied to the entire piping system or as colored bands, is used to give supplementary information it should conform to the following:

CLASSIFICATION	PREDOMINANT COLOR
F——Fire-Protection Equipment	Red
D——Dangerous Materials	Yellow (or orange)
S——Safe Materials	Green (or the achromatic colors, white, black, gray or aluminum)

and, when required,

P——Protective Materials	Bright blue

(3) Test Holes Not to be Covered. Test holes in blow lines of piping systems shall not be covered with insulation or other materials.

(4) Steam Hoses. Steams hoses shall be specifically designed to safely carry steam at any pressures to which they may be subjected. [Order 74-24, § 296-79-140, filed 5/6/74; Order 70-6, § 296-79-140, filed 7/10/70, effective 8/10/70.]

WAC 296-79-150 Mobile equipment and lift trucks. (1) All industrial powered trucks should be engineered, designed, constructed, maintained and used in accordance with the recommendations specified in USAS B56.1-1969 "Safety Code for Powered Industrial Trucks."

(2) Operator Training. Methods shall be devised by management to train personnel in the safe operation of powered industrial trucks and only trained and authorized operators shall be permitted to operate such vehicles.

(3) Special Duties of Operator. Special duties of the operator of a power-driven vehicle shall include the following:

(a) To test brakes, steering gear, lights, horns, warning devices, clutches, etc., before operating vehicle;

(b) Not to move a vehicle while an unauthorized rider is on his vehicle;

(c) To slow down and sound horn upon approaching blind corners or other places where vision or clearance is limited;

(d) To comply with all speed and traffic regulations and other applicable rules;

(e) To have the vehicle he operates under control at all times so that he can safely stop the vehicle in case of emergency; and

(f) When driving a fork lift vehicle on a grade, the load shall be kept on the upgrade side.

(4) Operator to be in Proper Position. Control levers of lift trucks, front end loaders, or similar types of

equipment shall not be operated except when the operator is in his proper operating position.

(a) No person shall be permitted to ride on a powered hand truck unless it is so designed by the manufacturer. A limit switch shall be on operating handle——30 degrees each way from a 45–degree angle up and down.

(b) When a powered industrial truck is left unattended, load engaging means shall be fully lowered, controls shall be neutralized, power shall be shut off, and brakes set. Wheels shall be blocked if the truck is parked on an incline.

(c) A powered industrial truck is unattended when the operator is 25 feet or more away from the vehicle which remains in his view, or whenever the operator leaves the vehicle and it is not in his view.

(d) When the operator of an industrial truck is dismounted and within 25 feet of the truck still in his view, the load engaging means shall be fully lowered, controls neutralized, and the brakes set to prevent movement.

(5) Raised Equipment to be Blocked. Employees shall not work below the raised bed of a dump truck, raised buckets of front end loaders, raised blades of tractors or in similar positions without blocking the equipment in a manner that will prevent it from falling. When working under equipment suspended by use of jacks, safety stands or blocking shall also be used in conjunction with the jack.

(6) Precautions to be Taken While Inflating Tire. Unmounted split rim wheels shall be placed in a safety cage or other device shall be used which will prevent a split rim from striking the worker if it should dislodge while the tire is being inflated.

(7) Reporting Suspected Defects. If, in the opinion of the operator, a power–driven vehicle is unsafe, the operator shall report the suspected defect immediately to the person in charge. Any defect which would make the vehicle unsafe to operate under existing conditions shall be cause to take the vehicle out of service and it shall not be put back into use until it has been made safe.

(8) Safe Speed. Vehicles shall not be driven faster than a safe speed which is compatible with existing conditions.

(9) Unobstructed View. Vehicle operators shall have a reasonably unobstructed view of the direction of travel, or, where this is not possible, the operator shall be directed by a person or by a safe guidance means or device.

Where practical, mirrors shall be installed at blind corners or intersections which will allow operators to observe oncoming traffic.

It is recommended that vehicles operating in congested areas should be provided with an audible or visual alarm system.

(10) Passengers to Ride Properly. Passengers shall not be permitted to ride with legs or arms extending outside any vehicle nor shall they be permitted to ride unless a passenger seat or other protective device is provided.

(11) Horns and Lights. (a) Each vehicle shall be provided with a horn.

(b) Any vehicle required to travel away from an illuminated area shall be equipped with a light or lights which adequately illuminate the direction of travel.

(12) Guard on Operator's Platform. Every power truck operated from an end platform or standing position shall be equipped with a platform extending beyond the operator's position, strong enough to withstand a compression load equal to the weight of the loaded vehicle applied along the longitudinal axis of the truck with the outermost projection of the platform against the flat vertical surface.

(13) Brakes on Power–Driven Vehicles. Vehicles shall be equipped with brakes and devices which will hold a parked vehicle with load on any grade on which it may be used. The brakes and parking devices shall be kept in proper operating condition at all times.

(14) Cleaning Vehicles. All vehicles shall be kept free of excessive accumulations of dust and grease that may present a hazard.

(15) Moving Vehicles. Vehicles shall be controlled manually while being pushed or towed except when a tow bar is used. Special precautions shall be taken when pushing vehicles where view is obstructed. Pushing of vehicles or railroad cars with the forks or clamps of a lift truck is prohibited.

(16) Prohibited Forms of Riding. Riding on tongue or handles of trailers or forks of vehicles is prohibited.

(17) Jumping On or Off Moving Vehicles. Jumping on or off moving vehicles is prohibited.

(18) Traffic Lanes, Designation and Systems. Regular traffic lanes should be established and clearly designated and followed whenever practical. A one–way traffic system should be employed if practical.

(19) Clear Lanes. Traffic lanes being used by pedestrians or equipment shall be kept clear of dunnage, pallets, etc., and equipment not in use.

(20) Lifting Capacity of Vehicle to be Observed. At no time shall a load in excess of the manufacturer's maximum lifting capacity rating be lifted, carried, or moved by a lift truck. Such lifting capacity can be altered with the approval of the equipment manufacturer.

(21) Posting Rated Capacity. The maximum rated lifting capacity of all lift trucks shall at all times be posted on the vehicle in such a manner that it is readily visible to the operator.

(22) Carrying Loose Material. Lift trucks shall not be used to carry loose loads of pipe, steel, iron, lumber, palletized material, rolls of paper, or barrels unless adequate clearance is provided and the loads are stabilized.

(23) Position of Lift Forks or Clamps. The forks or clamps of lift trucks shall be kept as low as possible while the vehicle is moving. They shall be lowered to the floor when the vehicle is parked.

(24) Walking Under Loads Prohibited. No person shall be allowed under the raised load of a lift truck.

(25) Hoisting of Personnel on Vehicle Forks Prohibited. Personnel shall not be hoisted by standing directly on the forks of vehicles.

(26) Using Forklifts as Elevated Work Platforms. A platform or structure built specifically for hoisting persons may be used providing the following requirements are complied with:

(a) The structure must be securely attached to the forks and shall have standard guardrails and toeboards installed on all sides.

(b) The hydraulic system shall be so designed 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 shall be identified that they are so designed.

(c) A safety strap shall be installed or the control lever shall be locked to prevent the boom from tilting.

(d) An operator shall attend the lift equipment while workers are on the platform.

(e) The operator shall be in the normal operating position while raising or lowering the platform.

(f) 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.

(g) The area between workers on the platform and the mast shall be adequately guarded to prevent contact with chains or other shear points.

(27) Overhead Guards on Lift Trucks. All lift trucks shall be equipped with an overhead guard constructed and installed to conform to USAS B56.1-1969 "Safety Code for Powered Industrial Trucks." This guard may be removed only when it cannot be used due to the nature of the work being performed in which case loads shall be maintained so as not to create a hazard to the operator.

(28) Protection from Exhaust System. Any exhaust system which would be exposed to contact shall be properly insulated or isolated to prevent personnel from being burned. Exhaust systems on lift trucks and jitneys shall be constructed to discharge either within 20" from the floor or 84" or more above the floor. The exhausted gases shall be directed away from the operator and the equipment shall be designed in such a manner that the operator will not be exposed to the fumes.

(29) Emergency Exit from Mobile Equipment. Mobile equipment with an enclosed cab shall be provided with an escape hatch or other method of exit in case the regular exit cannot be used.

(30) Vehicle Wheels Chocked. When driving mobile equipment onto the bed of a vehicle, the wheels of the vehicle shall be chocked.

(31) Prevent Trailer from Tipping. Suitable methods shall be used or devices installed which will prevent the trailer from tipping while being loaded or unloaded.

(32) Refueling. Gasoline or LPG engines shall be shut off during refueling.

(33) Close Valve on LPG Container. Whenever vehicles using LP gas as a fuel are parked overnight or stored for extended periods of time indoors, with the fuel container in place, the service valve of the fuel container shall be closed.

(34) LP Tanks. LP vehicle fuel tanks shall be installed and protected in a manner which will minimize the possibility of damage to the tank.

(35) Inspecting and Testing of LPG Containers. LPG containers shall be inspected and tested periodically.

(36) Spinners on Steering Wheels. The use of spinners on steering wheels shall be prohibited unless an anti-kick device is installed or the equipment has a hydraulic steering system. [Order 74-24, § 296-79-150, filed 5/6/74; Order 70-6, § 296-79-150, filed 7/10/70, effective 8/10/70.]

WAC 296-79-160 Requirements for cranes and hoists——General Safety and Health Standards to prevail. All applicable rules for design, construction, maintenance, operation and testing of cranes and hoists contained in the General Safety and Health Standards shall be complied with. [Order 74-24, § 296-79-160, filed 5/6/74; Order 70-6, § 296-79-160, filed 7/10/70, effective 8/10/70.]

WAC 296-79-170 Requirements for crawler and truck cranes. (1) Rated Capacity Chart. A chart indicating the manufacturer's rated capacity at all operating radii for all permissible boom lengths and jib lengths with alternate ratings for optional equipment affecting such ratings shall be posted in all mobile type cranes and shall be readily visible to the operator in his normal operating position.

(2) Boom Length Indicated. The length shall be plainly marked on each boom section of a mobile crane having a sectioned boom.

(3) Radius or Boom Angle Indicator. A radius or boom angle indicator shall be installed where it is readily visible to the operator in his normal operating position on all cranes having a movable working boom.

(4) Safety Device for Light Fixtures. Any light fixtures attached to crane boom or machinery house shall have a safety strap or other device attached which will prevent the fixture from falling.

(5) Boom Stops. Boom stops shall be installed to govern the upward travel of the boom to a safe limit. Boom stops shall be of adequate strength to prevent the boom from traveling past the vertical position.

(6) Controls Marked. Crane operating controls shall be marked or an explanation of the controls' functions shall be posted in full view of the operator.

(7) Locking Hydraulic Outriggers. Hydraulic outriggers shall be equipped with a pilot operated check valve or a mechanical lock shall be installed which will prevent outriggers from retracting in case of failure of the hydraulic system.

(8) Top of Boom Painted. The top six feet of the boom or jib shall be painted bright yellow.

(9) Warning Devices. All cranes shall be equipped with a suitable warning device such as a horn or whistle.

(10) Hook Safety Device. All hooks shall be equipped with a safety device or other effective means shall be used to prevent accidental unhooking of the load.

(11) Counterweight Limited. The amount of crane counterweight shall not exceed the maximum amount specified by the crane manufacturer.

(12) Use Proper Size Wire Rope for Sheaves. The size and diameter of sheaves and wire rope shall be compatible and follow the recommendations published by the Wire Rope Institute or other acceptable engineering practices.

(13) Loading or Unloading Gear. Unloading gear such as grapples, tongs, and buckets, shall not be left suspended when not in use.

(a) Where grapples, trip tongs or similar device is used for loading, the log holding device shall be lowered to the ground whenever the machine is unattended.

(14) No One Under Load. Personnel shall not position themselves under crane loads and such loads shall not be carried over workers.

(15) Operating Clearance from Stationary Objects. A distance of 30" shall be maintained between the outermost part of a revolving crane and any stationary object within the swing radius of the crane where the area is accessible to workers or the hazardous area must be temporarily guarded or barricaded.

(16) Operating Clearance for Unprotected Energized Lines. (a) Crane booms, lines or material shall be kept 10 feet or more from unprotected energized power lines.

(b) For unprotected 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.

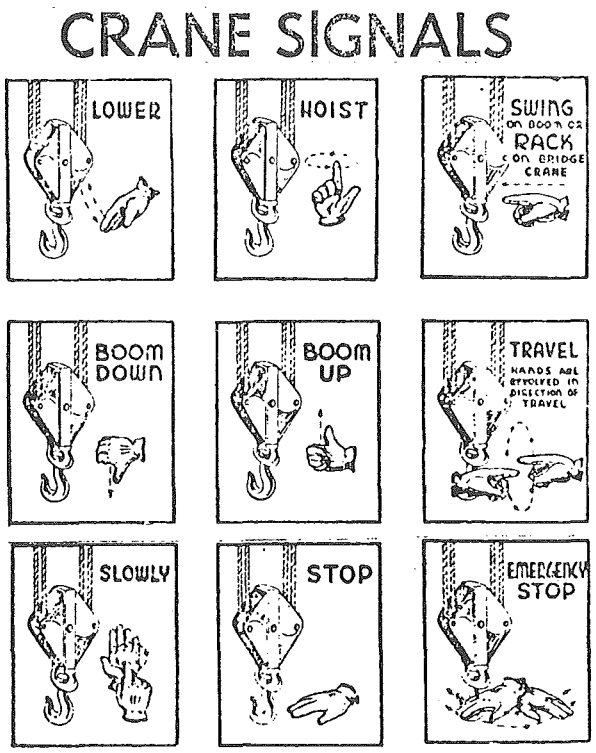
(c) In transit with no load and boom lowered the clearance shall be a minimum of 4 feet.

(17) Operating Clearances for Shielded Distribution or Transmission Lines. When lines are shielded to the voltage rating of the line in accordance with NFPA requirements, the operating clearance requirements for energized lines may be omitted provided, adequate care is exercised not to contact the line.

(18) Safe Travel Across Thoroughfares or Railroad Tracks. When moving across thoroughfares or railroad tracks with cranes, shovels or similar types of equipment, which by its design does not allow the operator clear vision of approaching traffic, a flagman shall be stationed where he can control other traffic and signal the equipment operator.

(19) One Crew Member to Give Signals. Only a designated member of the crew shall give signals to the crane operator except that anyone may give an emergency stop signal.

(20) Standard Hand Signals. When visual signals are used standard hand signals, as illustrated in the General Safety and Health Standards, shall be used for directing crane operators.



(21) Signals by Use of Radio Frequencies. Class "D" citizen's band radio frequencies shall not be used for signalling crane operators. [Order 74-24, § 296-79-170, filed 5/6/74; Order 70-6, § 296-79-170, filed 7/10/70, effective 8/10/70.]

WAC 296-79-180 Standard guage railroad operations. (1) Blue Flag or Light. A blue signal (blue flag or blue light for non-illuminated areas) shall be displayed at one or both ends of an engine, car(s), or train, to indicate that workers are under or about the railway equipment. When such warning devices are displayed, the equipment shall not be coupled to or moved. On a dead end spur, a blue signal may be displayed adjacent to the switch opening while cars are being loaded or unloaded.

(2) Work being carried on which subjects employees to the hazard of moving railroad equipment shall be protected by blue signals and derails set a minimum of 50 feet from one or both ends of the worksite. Where the spur track switch is less than 50 feet from the work location, the switch padlocked in the open position will take the place of the derail and the blue signal shall be placed at that point.

(3) Signals Unobscured. Equipment which would obscure the blue signal shall not be placed on the track.

(4) Signals Displayed by Each Maintenance Crew. Each maintenance crew shall display and remove its own set of blue signals.

(5) Warning Device. A flashing warning light or other device shall be installed near any opening which leads to a passageway crossing railroad tracks adjacent to the building. Such light or device shall be activated prior to any switching or movement of railroad equipment to warn workers of the dangerous condition in the area.

(6) Cars to be Immobilized. Spotted cars shall either have brakes set, wheels blocked, or shall be coupled to other immobilized cars to prevent each car from rolling.

(7) Crawling Under or Between Coupled Cars Prohibited. Workers shall not crawl under or pass between coupled railroad cars to cross tracks.

(8) Warning at Road Crossing. An audible whistle, horn or bell shall be sounded by the locomotive engineer to give adequate warning prior to switching across any road crossing.

(9) Flying Switches. When switching railroad equipment in congested areas or across roadways or walkways "flying switches" shall be prohibited.

(10) Car Opening Devices. All box car doors and associated mechanisms shall be carefully inspected before workers attempt to open or close them. If the door is not free and cannot be opened safely by hand, equipment shall be provided, where necessary, and a safe method shall be used to open or close the door.

(11) Clearance from Railroad Tracks. Materials shall not be stacked or piled closer than 8 1/2' from the center line of a standard gauge railroad track. [Order 74-24, § 296-79-180, filed 5/6/74; Order 70-6, § 296-79-180, filed 7/10/70, effective 8/10/70.]

WAC 296-79-190 Loading and unloading materials from railway cars or trucks. (1) Safe Access to Top of Railroad Cars or Trucks. Platforms with ladders or stairways shall be installed or made available when needed so that workers may safely gain access to and perform work on the top of railroad cars or trucks when ladders are not installed on such equipment.

(2) Nets Not to Cover Ladders. Rolled chip nets shall not be positioned where they cover the ladders on railroad cars or trucks.

(3) Tipple Type Unloading Device. When a tipple type unloading device is used for removing chips from cars, the cars shall be properly secured in place and all employees shall be in the clear before dumping operation is started.

(4) Handling Pulp Chips and Hog Fuel from Trucks and Trailers. (a) Elevating platform-type or cable-lift type unloading devices shall have adequate back bumper stops.

(b) Side rails or other positive means to prevent the trailer from falling shall be used while unloading single trailer units.

(c) The truck or tractor shall be secured when elevating platform lifts are used to elevate both the tractor and trailer or single unit trucks.

(d) All personnel shall be clear of all hoisting or elevating mechanisms before dumping commences.

(e) No person shall remain in any truck while the truck is being elevated.

(5) Taking Chip Samples. A safe area and suitable device shall be provided for the chip tester to use while taking chip samples.

(6) Derail Required While Unloading Hazardous Materials. To protect tank cars from being moved while loading or unloading hazardous materials by use of pipes or hoses, a derail and blue flag shall be set between the spotted tank cars and any moving railroad equipment.

(7) Moving Cars by Tugger or Powered Drums. When rail cars are moved by a tugger or powered drums with cables, a means should be provided or the area barricaded in such a manner that the moving cables do not endanger the workers.

(8) Handling Pulpwood from Flatcars and all Other Railway Cars. (a) Railroad flatcars for the conveyance of pulpwood loaded parallel to the length of the car shall be equipped with safety-stake pockets.

(b) Where pulpwood is loaded crosswise on a flatcar sufficient stakes of sizes not smaller than 4 by 4 inches shall be used to prevent the load from shifting.

(c) When it is necessary to cut stakes, those on the unloading side should be partially cut through first, and then the binder wires cut on the opposite side. Wire cutters equipped with long extension handles shall be used. No person shall be permitted along the dumping side of the car after the stakes have been cut.

(d) Cutting Bands on Log Bundles. When cutting bands on bundled logs, workers shall position themselves in a safe location. Double bitted axes shall not be used for cutting bands. Caution shall be used to prevent being struck by ends of bands being cut and, if needed, personal protective equipment shall be worn.

(e) Flatcars and all other cars shall be chocked during unloading. Where equipment is not provided with hand brakes, rail clamping chocks shall be used.

(9) Handling Pulpwood from Trucks. (a) Cutting of stakes and binder wires shall be done in accordance with (8)(c) of this section.

(b) Binders or stakes shall not be loosened or removed until the logs are secured and held by equipment which will prevent them from rolling off the truck, or barricades shall be provided which will prevent logs from striking the person removing the binders or stakes.

(c) Where binder chains and crane slings are used, the crane slings shall be attached and taut before the binder chains are released. The hooker shall see that the helper is clear before signaling for the movement of the load.

(d) Driver to Leave Truck Cab While Unloading. The truck driver shall leave the truck cab and be in the clear, preferably in a designated area, and shall be in clear view of the unloading equipment operator while the unloader is approaching the loaded truck.

(e) Driver to Remain Outside Cab During Unloading. The truck driver shall remain outside the cab and clear of the load while logs are being unloaded except that after a complete load is lifted as a unit and held stationary he may enter the cab and drive forward from under the suspended load. [Order 74-24, § 296-79-190, filed 5/6/74; Order 70-6, § 296-79-190, filed 7/10/70, effective 8/10/70.]

WAC 296-79-200 Bridge and dock plates. Properly constructed bridge or dock plates shall be furnished and used to bridge the area between a dock and truck or railroad car. The following requirements shall be complied with for construction and use of such bridge or dock plates:

(1) Strength. The plate shall be capable of supporting three times the maximum load to which it will be subjected.

(2) Stops Required. The plates shall be provided with positive stops to prevent the plates from shifting or moving.

(3) Plates to Bear Solidly. The plates shall bear solidly on the dock and on the floor of the car or truck. Plates with excessive teeter or rock shall be repaired or replaced.

(4) Upturn or Lip on Plates. The sides of bridge or dock plates shall have an upturn or lip of at least 4" covering the area between the edge of the loading dock and edge of car or truck floor whenever this distance exceeds 18" to prevent wheeled equipment from running off the sides.

(5) Bearing Surface. Bridge or dock plates shall have at least 6" bearing surface on the loading dock.

(6) Suitable Fittings to be Used. Bridge or dock plates intended to be moved by mechanized equipment shall be designed for this purpose or appropriate fittings or attachments shall be used. [Order 74-24, § 296-79-200, filed 5/6/74; Order 70-6, § 296-79-200, filed 7/10/70, effective 8/10/70.]

WAC 296-79-210 Belt, chain and roller type conveyors, maintenance and inspection. (1) Protection from Falling Material. Whenever conveyors pass adjacent to or over working areas or passageways used by personnel, protective guards shall be installed. These guards shall be designed to catch and hold any load or materials which may fall off or become dislodged and injure a worker.

(2) Walking on Rolls Prohibited. Employees shall not be allowed to walk on the rolls of roller type conveyors except for emergency.

(3) Guarding Shaftway and Material Entrances of Elevator Type Conveyors. Guards, screens or barricades of sufficient strength and size to prevent material from falling shall 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 shall be installed at each floor level where material is loaded or unloaded from the platform.

(4) Emergency Conveyor Stops. Conveyors shall be provided with an emergency stopping device which can be reached from the conveyor. Such device shall be located near the material entrance to each barker, chipper, saw, or similar type of equipment except where the conveyor leading into such equipment is under constant control of an operator who has full view of the material entrance and is located where he cannot possibly fall onto the conveyor.

(5) Safe Access to Conveyors. Where conveyors are in excess of 7' in height, means shall be provided to safely permit essential inspection and maintenance operations.

(6) Adjustment. All take-up devices provided for the purpose of adjusting for stretch in the belt, chain or cable should be checked at intervals for proper functioning and adjustment.

(7) Worn Parts. Any part showing signs of significant wear shall be inspected carefully and replaced prior to reaching a condition where it may create a hazard.

(8) Replacement of Parts. Replacement parts shall be equal to or exceed the manufacturer's specifications. [Order 74-24, § 296-79-210, filed 5/6/74; Order 70-6, § 296-79-210, filed 7/10/70, effective 8/10/70.]

WAC 296-79-220 Deenergizing and lock-out procedures. It is recommended that tag-out systems or other alternate systems be phased out and replaced by lock-outs exclusively as soon as possible and tags used only for information purposes.

(1) Whenever the unexpected startup of machinery or electrical equipment, or the opening of valves would endanger anyone while maintenance, adjustment, cleanup, or construction work is being done on this equipment, the main disconnect(s) (line circuit breakers) or supply valve(s) shall first be locked or tagged out to avoid such accidental startup.

(2)(a) Padlocks, Tags, or Devices to be Supplied. The employer shall supply and the employee shall use as many padlocks, tags, chains, or devices as required to follow these procedures.

(b) Where a "tag out" system is used in deactivating equipment, the tag and attachment device shall be constructed of such material that it will not be likely to deteriorate in the environment that it is used. The attachment device shall also offer definite resistance to accidental removal.

(3) Information Required on Tags. Tags used for tagging out purposes shall contain the following information: name of person authorizing placement; reason for placing; date; signature of person placing tag; and department with which such person is associated.

(4) Provisions for Locking or Tagging Out Power Supply. Provisions shall be made whereby the source of power to all power driven equipment can be effectively locked or tagged out.

(5) Lock or Tag-Out by Pushbutton Only Prohibited. Locking or tagging out a machine by use of a pushbutton or other local control device only will not be acceptable as meeting the intent of these rules.

(6) Coordination of Locking or Tagging Out Devices or Systems. When repair, adjustment or maintenance is required and the lock-out or tag-out procedures must be followed, any person involved who is not totally familiar with all power sources or material entry sources to any area involved shall consult with the operator, supervisor, or some person who is capable of informing him of proper lock or tag-out procedures.

(7) Lock-Out or Tag-Out Before Removing Guards. Equipment shall be stopped and tagged or locked out before personnel remove guards or reach into any potentially hazardous area. The only exception will be when the equipment must be in motion in order to make proper adjustments.

(8) Each Person Involved to Lock-Out or Tag-Out. Each person actively engaged in the repair, maintenance or clean-up shall lock-out or tag-out the affected equipment and shall personally remove his lock or tag

upon completion of his work except, when it is positively determined that an employee has left the premises without removing his lock or tag, other persons may remove the locks or tags in accordance with a procedure formulated by each firm and approved by the Division of Industrial Safety and Health.

(9) Valves to be Locked or Tagged Out. Each valve which is used to control the flow of materials into, or activate, the equipment being worked on shall be locked or tagged out.

(10) Piping Systems Deactivated. Prior to working on piping systems containing pressurized or hazardous materials the valve(s) controlling the flow to the affected area shall be locked out or tagged out. The piping in the area to be worked on shall be drained and purged, if needed.

To further safeguard the workers, it is recommended that the lines to be worked on be isolated from the system by the insertion of blank flanges.

(11) Lines Without Valves to be Blank Flanged. If pipelines or ducts are constructed without valves or closures, the liens or ducts shall be broken at a flange and a blank flange inserted to stop the accidental flow of any material.

(12) Testing After Lock–Out or Tag–Out. After tagging or locking out equipment, a test shall be conducted to ascertain that the equipment has been made inoperative or the flow of material has been positively stopped. Precautions shall be taken to ascertain that persons will not be subjected to hazard while conducting test if power source or flow of material is not shut off.

(13) Procedure for Continuous Flow Digesters. Alternate lock–out or tag–out procedures, acceptable to the Division of Industrial Safety and Health, may be used to replace regular lock–out or tag–out procedures while performing work on continuous flow digesters.

(14) Making Paper Machine Clothing Change or Repairing Clothing. Whenever employees must position themselves in hazardous locations in or about the machine, the lock–out or tag–out procedure shall be followed. The machine shall be so designed that it may be run at slow or job speed when roping up or threading new clothing through the machine by using existing clothing as a guide. Any adjoining section which would create a hazardous condition for the employees making clothing changes or repairs shall be made inoperative.

(15) Temporary or Alternate Power to be Avoided. Whenever possible, temporary or alternate sources of power to the equipment being worked on shall be avoided. If the use of such power is necessary, all affected employees shall be informed and the source of temporary or alternate power shall be identified. [Order 76–7, § 296–79–220, filed 3/1/76; Order 74–24, § 296–79–220, filed 5/6/74; Order 70–6, § 296–79–220, filed 7/10/70, effective 8/10/70.]

WAC 296–79–230 Vessel or confined area requirements. (1) Management's Responsibility for Planning. Management shall be responsible for developing a written procedure to be followed for safe entry of employees into confined areas, tanks, vessels, or sewers and for maintaining a safe condition while work is being performed therein. Such procedure shall include the following minimum requirements:

(a) All vessels, sewers or confined areas must be properly ventilated at all times. Such areas shall be tested and/or evaluated by a person thoroughly trained and instructed in the use of instruments required, or qualified to make evaluations of conditions which may be encountered, before employees enter and at reasonable intervals as work progresses. Special consideration shall be given to the possibility that the area may be deficient of oxygen or may contain dangerous concentrations of gases or toxic substances.

(b) Each vessel, tank or confined area shall be cleaned and/or purged as thoroughly as practical prior to entry.

(c) All equipment necessary to perform the work, including safety equipment, must be at the job site and shall be inspected or tested to assure that it functions properly.

(d) All electrical circuits, valves, ducts, pipes, and other equipment shall be locked out, tagged out, or blanked as required in accordance with the applicable rules contained in WAC 296–79–220 of this chapter.

(e) Prior to and while welding or burning is being done in areas where a fire or explosion hazard may exist, the applicable rules contained in WAC 296–79–040 of this chapter, shall be complied with.

(f) For evaluating conditions concerning health, fire or explosion hazards, requirements outlined in the General Occupational Health Standards, chapter 296–62 WAC, shall be followed.

(2) Designated Person in Charge. Management shall designate an individual who shall be responsible for the safety of the employees and institute such means, methods, and practices as to render the work and place of work safe. The designated person shall ascertain that the required written procedures are followed.

(3) Employees to be Thoroughly Instructed in Procedure. All employees involved in the entry of vessels or confined areas shall be thoroughly instructed in safe procedures to be followed.

(4) Protective Equipment Required. Any employee entering a vessel or enclosed area shall use any protective equipment or clothing needed to afford him proper protection. Each person shall wear equipment capable of providing safe respirable air if the area may be deficient of oxygen or shall wear proper respiratory protective equipment if the atmosphere may contain a hazardous concentration of contaminants. In addition, while entering or working in an atmosphere immediately hazardous to health, employees shall wear a safety harness with lifeline attached and continue to wear such equipment so long as the hazard exists.

(5) Attendant Required. An attendant shall remain outside at the opening of the confined area to render assistance necessary to persons inside. The attendant shall be provided with life support equipment necessary for his protection if an emergency arises which would require him to enter the area.

(6) Life Support Equipment Required. Life support equipment which will afford proper protection to the

employee from any condition which may arise shall be available either within the vessel or confined area or at the entrance thereto.

(7) Mechanical Device Required When Entry from the Top. Where employees must enter a vessel or confined area from the top, and where it would be impossible to manually rescue or remove overcome persons in the area, a mechanical device shall be provided with which the attendant can lift employees out.

(8) Electrical Shock Protection. Electrical circuits leading into vessels or confined areas where electrical conductive hazards exist shall be protected by a ground fault interrupter or the voltage shall not exceed 24 volts.

(9) Battery Operated Flashlights or Lanterns. Battery operated flashlights or lantern shall be readily available for use by persons working in areas where escape would be difficult if normal lighting system should fail. Only explosion–proof type lights shall be taken into any atmosphere which may contain an explosive concentration.

(10) Use of Materials Which May Create Hazardous Atmosphere. Tests shall be conducted at reasonable intervals when using materials for cleaning, coating or other purposes which may cause the atmosphere to become hazardous. [Order 74–24, § 296–79–230, filed 5/6/74; Order 70–6, § 296–79–230, filed 7/10/70, effective 8/10/70.]

WAC 296–79–240 Storage of fuel, oil, flammables and chemicals. (1) Handling and Labeling of Flammable and Hazardous Materials. Containers of toxic, flammable or irritating substances shall be properly labeled and stored as specified in "Precautionary Labeling of Hazardous Substances Used in Places of Employment," as adopted by the Department of Labor and Industries.

(2) To Be Stored Away From Sources of Ignition. Fuels, oils, flammable chemicals or other flammable materials shall be stored in a room or area away from sources of ignition.

(3) Provide for Safe Handling. Provisions shall be made for handling drums safely and means shall be afforded to position drums on their sides when material must be discharged from a valve or spigot placed in the top of the drum.

(4) Bonding (Grounding) Required. When dispensing material which may be ignited by static electricity, a method shall be provided to properly bond (ground) the drum and container into which material is being dispensed.

(5) Storage of Drums. Drums shall be stored in a manner which will prevent them from falling or rolling.

(6) Bagged or Drummed Chemicals. Bagged or drummed chemicals shall be handled properly to prevent spillage or damage to the containers. Chemicals shall be stored in such a manner that they will not decompose, contaminate, or react with other chemicals which could present a hazard. The manufacturer's safe practices recommendations or those published by the Manufacturing Chemists Association should be followed.

(7) Storing Liquid Chlorine Tanks. Sufficient and adequate ventilation shall be provided when liquid chlorine tanks are stored in a room. At least two exits, remote from each other, shall be provided for all rooms in which chlorine is stored.

(8) Hoops for Acid Storage Tanks. Hoops of tanks shall be made of rods rather than flat strips and shall be safely maintained by scheduled inspections.

(9) Turpentine Systems and Storage Tanks. Nonsparking tools and ground hose shall be used when pumping out the tank. The tank shall be surrounded by a berm or moat. Drainage or diking of tanks shall comply with the General Safety and Health Standards, WAC 296–24–33005. [Order 76–7, § 296–79–240, filed 3/1/76; Order 74–24, § 296–79–240, filed 5/6/74; Order 70–6, § 296–79–240, filed 7/10/70, effective 8/10/70.]

WAC 296–79–250 Safety procedure for handling dry sulfur. (1) Sulfur Burners. Sulfur–burner houses shall be safely and adequately ventilated, and every precaution shall be taken to guard against dust, explosion hazards and fires, in accordance with American National Standards Z9.2–1960 and Z12.12–1968.

(a) Nonsparking tools and equipment shall be used in handling dry sulfur.

(b) Sulfur storage bins shall be kept free of sulfur dust accumulation, and buildings should be designed with explosion relief, in accordance with American National Standard Z9.2–1960.

(c) Electrical equipment shall be of the explosion–proof type, in accordance with the Safety Standard for Installing Electric Wires and Equipment, chapter 296–46 WAC, and WAC 296–24–950 and WAC 296–24–955, General Safety and Health Standards.

(d) Sulfur–melting equipment shall not be located in the burner room. [Order 76–7, § 296–79–250, filed 3/1/76; Order 74–24, § 296–79–250, filed 5/6/74; Order 70–6, § 296–79–250, filed 7/10/70, effective 8/10/70.]

WAC 296–79–255 Safety procedure for handling liquid sulfur. (1) Each facility utilizing liquid sulfur shall carefully examine its own handling system and formulate a written procedure for maintenance, receiving, storing and using this product. Minimum requirements for the procedure shall be as follows:

(a) Maintenance personnel and all personnel who work at unloading or usage points shall be adequately trained to recognize the dangers of escapement from the system and first aid practices to be followed in the event of exposure.

(b) Adequate protective equipment (gloves, goggles, etc.) and respiratory protective equipment shall be provided at appropriate locations and personnel who reasonably could be exposed shall be trained in the proper use of these items.

(c) A minimum of two (2) trained employees shall be assigned when a tank car is first opened in preparation for venting and unloading. Approved respiratory protective equipment for H_2S exposure, chemical splash goggles and gloves shall be worn when performing this work. Spark producing or electric operated tools shall not be used to unplug railroad car vents.

(d) Where venting can cause harmful exposure to other unprotected workers in the area, a venting system shall be installed which adequately contains any gas escapement from a tank car while venting. The vented gas shall be carried to a safe location for discharge or circulated through a scrubbing system. The venting system shall be connected before valves which would allow escapement are opened.

(e) No smoking, open burning or welding shall be permitted while unloading is in process or danger of gas escapement exists.

(2) Maintenance. (a) Any maintenance which involves opening a part of the handling system shall be attempted only after purging that portion of the system as completely as is practical.

(b) All sources of possible contamination into the purged section shall be isolated by valving off or blank flanging. The lockout–tagout procedures contained in WAC 296–79–220 of this chapter, shall be followed.

(c) When opening the system, protective equipment shall be worn by the person or persons involved until such time as the equipment is proven to be free of contamination in harmful quantity.

(d) The danger of heating any portion of the system shall be carefully explained to maintenance crews. Adequate safety procedures shall be followed if heating, welding or cutting are to be attempted.

(e) Any maintenance requiring entry into a portion of the system shall be done in compliance with WAC 296–79–230 of this chapter. [Order 74–24, § 296–79–255, filed 5/6/74.]

WAC 296–79–260 Pulpwood storage and handling. (1) Proper Piling of Logs. Logs shall be piled or removed in an orderly manner. The piles shall be stable and individual logs properly placed to prevent them from rolling or falling. The ends shall not project into walkways, roadways or areas reserved for other purposes and sufficient clearance shall be maintained for safe travel of all vehicles and loads.

(2) Prohibited Use of Wire Rope Doglines. Wire rope doglines used for towing or rafting shall not be used when:

(a) They acquire jaggers to the extent that they present a hazard to the employees handling them; or

(b) When they are weakened to the extent that they are hazardous.

(3) Boom Stick to Support Weight. Boom sticks shall be capable of safely supporting the weight imposed upon them.

(4) Stiff Boom Construction. Stiff booms shall be made by fastening not less than two boom sticks together. The width of the stiff boom shall be not less than 36" measured from outside to outside of the outer logs. The boom sticks shall be fastened together with not less than 4" by 6" cross ties or cable lashing properly recessed into notches in the boom sticks and secured.

(5) Pike Poles. Pike poles shall be kept in good repair. Conductive pike poles shall not be used when it is possible that they may come in contact with electrical conductors.

(6) Logs Not to be Lifted Over Employees. Logs shall not be lifted over employees and employees shall stay clear of the hazardous area near where logs are being lifted or swung.

(7) Log Storing or Sorting in Water. Storing or sorting on water or any boom work other than boom boat operations, shall require a minimum of two persons.

(8) Overhead Protection on Mobile Equipment. All mobile equipment used to handle logs, blocks or cants shall be provided with adequate overhead protection.

(9) Arrangement of Unloading Lines. Unloading lines shall be so arranged that it is not necessary for the worker to attach them on the pond or dump side of the load.

(10) Unauthorized Traffic Prohibited. Unauthorized vehicles and unauthorized foot traffic shall not be allowed in any active sorting, storing, loading, or unloading areas.

(11) Safe Movement of Equipment. Log unloaders shall not be moved about the premises with loads raised higher than absolutely necessary.

(12) High Visibility Jackets or Vests Required. Jackets or vests of fluorescent or other high visibility material shall be worn by persons working on dry land log storage.

(13) Dumps to be Cleaned. All log dumps shall be periodically cleared of bark and other debris.

(14) Hand Tools. Handles of wood hooks shall be locked to the shank to prevent them from rotating. [Order 74–24, § 296–79–260, filed 5/6/74; Order 70–6, § 296–79–260, filed 7/10/70, effective 8/10/70.]

WAC 296–79–270 Pulpwood preparation——Scope and application. All sections of this chapter which include WAC 296–79–270 in the section number apply to Pulpwood Preparation. [Order 74–24, § 296–79–270, filed 5/6/74; Order 70–6, § 296–79–270, filed 7/10/70, effective 8/10/70.]

WAC 296–79–27001 Barkers, chippers, and hog feed devices. (1) Barker feeding devices shall be designed in such a manner that the operator will not be required to hold or make any physical contact with any log or bolt during the barking operations.

(2) Walkways or floors alongside the drum of any barker shall be equipped with standard guardrails on each side exposed to the drum.

(3) Employees shall not enter any hazardous area in or around a barker until the main disconnect switch has been opened and locked or tagged out and the switch has been tried to assure that the equipment is de–energized.

(4) A dog or locking device in addition to the motor switch, clutch, belt shifter or other power disconnecting device shall be installed on all intermittent barking drums to prevent the drum from moving while it is being filled or emptied.

(5) Hydraulic Barkers. (a) The inlet and outlet areas of hydraulic barkers shall be equipped with baffles or devices which will reasonably prevent material from flying out while the machine is in operation.

(b) The operator shall be protected by at least five-ply laminated glass or material of equivalent strength.

(6) When changing knives in a barker, chipper or hog, the main disconnect switch shall be opened and locked or tagged out.

(7) The high pressure hoses of hydraulic barkers shall be secured in such a manner that the hose connection ends will be restrained if a hose connection fails.

(8) The feed operator's station shall not be in direct line with the chipper blades. Suitable safeguards shall be installed to prevent chips or chunks from being thrown out and striking the person feeding the machine.

(9) The feed entrance shall be barricaded by means of a standard height guardrail so as to prevent anyone from falling into the chipper.

(10) When the operator cannot readily observe the material being fed into the chipper, a mirror shall be installed in such a position that the ingoing material can be observed.

(11) Safety belts with lifelines attached and face protection shall be worn by employees who manually feed material or clear jams in machines unless other provisions are made which will protect the employees.

(12) Iron bars shall not be used to clear jams or plug-up at the feed entrance to a chipper or hog while the machine is running.

(13) Speed Governor. Water wheels, when directly connected to marker disks or grinders, shall be provided with speed governors, if operated with gate wide open. Water wheels directly connected to pulp grinders shall be provided with speed governors limiting the peripheral speed of the grinder to that recommended by the manufacturer.

(14) Knot Cleaners. The operators of knot cleaners of the woodpecker type shall wear eye protection equipment. Knot cleaners of the woodpecker type should be enclosed to protect passersby from flying chips. [Order 74-24, § 296-79-27001, filed 5/6/74.]

WAC 296-79-27003 Log hauls, slips, and carriages. (1) Controls shall be arranged to operate from a position where the operator will at all times be in the clear of logs, machinery, lines, and rigging. Controls shall be marked to indicate their function.

(2) A guard shall be provided to prevent logs from rolling off the log deck into the well.

(3) When needed for protection of personnel, an automatic stop or interlocking device shall be installed on log hauls or slips.

(4) A barricade or other positive stop of adequate strength shall be provided to protect the sawyer from rolling logs.

(5) Canting gear or other equipment shall not be allowed to hang over the log deck in such a manner as to endanger employees.

(6) Canting gear controls shall be marked to indicate their function.

(7) The sawyer shall be primarily responsible for the safety of the carriage crew and offbearers. He shall exercise due care in the operation of the carriage and log turning devices.

(8) Feed works and log turning control levers shall be so arranged that they may be secured when not in use and shall be adequately guarded against accidental activation.

(9) A control device shall be provided so that the sawyer may stop the head rig section of the mill without leaving his stand.

(10) An effective method of disengaging the head rig saws from the power unit shall be installed on all head rigs where the power unit is not directly controlled by the sawyer. The saws shall be disengaged from the source of power and locked or tagged out before repairs or changes are made.

(11) The sawyer shall be safeguarded either by his location or by use of substantial screens or approved safety glass.

(12) Carriages upon which persons are required to work shall be solidly decked over and the employee properly protected.

(13) The feed control lever of friction or belt driven carriage feed works shall be designed to operate away from the saws or carriage track.

(14) A substantial stop or bumper shall be installed at each end of the carriage run.

(15) Substantial sweeps shall be installed in front of each carriage wheel. Such sweeps shall extend to within 1/4 inch of the rails.

(16) Where power operated log turners are used, carriage knees shall be provided with goosenecks or other substantial means of protecting the carriage crew. [Order 74-24, § 296-79-27003, filed 5/6/74.]

WAC 296-79-27005 Band saws. (1) Band saws shall be given a thorough daily inspection and any deficiency reported and corrected.

(2) Any band saw found to have developed a crack greater than one-tenth the width of the saw shall be removed from service until the width of the saw is reduced to eliminate the crack, the cracked section is removed, or the development of the crack is arrested by welding.

(3) Band saws shall not be continued in use on the head rig for which they have been designed after they have been reduced 40% in width.

(4) Band saw guides shall be maintained in good condition and proper alignment at all times.

(5) All head band saw wheels shall have a minimum rim thickness of 5/8", except for a distance not to exceed one inch from the front edge of the wheel.

(6) Band saws shall not be run at a speed in excess of the manufacturer's recommendations.

(7) A band wheel that has developed a crack in the rim shall be immediately removed from service. If a crack has developed in a spoke, the wheel shall be removed from service until properly repaired.

(8) All band wheel guards shall be constructed of not lighter than ten U.S. Gauge metal, or not less than two-inch wood material or equivalent, attached to substantial frames. Necessary ventilating ports, not larger than two by four inches, and suitable doors or gates for the lubrication and repair of the saw will be permitted.

(9) Every band mill shall be equipped with a saw catcher, rest or guard of substantial construction.

(10) Each gang ripper of band or straight saw type shall have the cutting edges of the saw guarded by a hood or screen substantially secured to the framework of the machine. [Order 74-24, § 296-79-27005, filed 5/6/74.]

WAC 296-79-27007 Circular saws speeds and repairs. (1) Circular saws shall not be operated at speeds in excess of those specified by the manufacturers.

(2) Circular saws shall be inspected for cracks each time the teeth are filed or set. They shall be discontinued from use until properly repaired when found to have developed a crack exceeding the safe limits specified by the manufacturer.

(3) Damaged saws shall be repaired only by persons experienced and knowledgable in this type of work or by a manufacturers representative. [Order 74-24, § 296-79-27007, filed 5/6/74.]

WAC 296-79-27009 Slasher saws-tables. (1) Slasher saws shall be guarded in accordance with WAC 296-79-030(4) of this chapter.

(2) Saws shall be stopped and locked or tagged out whenever it is necessary for any person to be on the slasher table.

(3) Saws below table where not protected by the frame of the machine, the underside of the slasher saws shall be adequately guarded. [Order 74-24, § 296-79-27009, filed 5/6/74.]

WAC 296-79-27011 Circular swing saws. (1) Each circular swing saw shall be provided with a hood guard that completely encloses the upper half of the saw.

(2) Each swing saw shall be equipped with a positive stop at the extent of the swing necessary to cut the material. [Order 74-24, § 296-79-27011, filed 5/6/74.]

WAC 296-79-27013 Drag saws——Fixed chain saws——Circular cut-off saws. (1) Saws shall be so arranged that they will not project into any passageway when in an idle or working position. When existing conditions do not leave clear passage the saws shall be fenced off in order to make it impossible for anyone to walk into them.

(2) Log decks shall be equipped with a device to hold the material stable when being cut.

(3) Drag saws and fixed chain saws shall be equipped with a device that will safely lock them in an "up" position.

(4) All persons shall be in the clear before starting operations of a drag-chain or swing saw. [Order 74-24, § 296-79-27013, filed 5/6/74.]

WAC 296-79-27015 Construction and use of pulpwood splitters. (1) The activating control unit for a splitter shall be of the clutch or positive acting type and shall be so arranged and designed that it will not repeat without additional activation before starting a second cycle.

(2) The base or rest upon which the wood seats while being split shall have a corrugated surface or other means shall be provided which will prevent the wood block or log from shifting as the pressure is applied.

(3) The splitter base or rest and wood to be split shall be free of ice, snow, and chips.

(4) The splitter machine operator shall have a clear, unobstructed view of the work area adjacent to the splitting operation when other workers must be in such area while blocks are being split. [Order 74-24, § 296-79-27015, filed 5/6/74.]

WAC 296-79-280 Chip and hog fuel storage. (1) Entry Into Bins and Silos. (a) No worker shall be permitted to enter a bin unless provided with a safety belt, with line attached, and an attendant stationed at the bin to summon assistance.

(b) Before entry into chip bins and silos, all applicable rules under Vessel Entry, Wac 296-79-230, of this chapter, shall be complied with.

(c) Chip and Sawdust Bins. Steam or compressed air lances, or other facilities, shall be used for breaking down the arches caused by jamming in chip lofts.

(d) Employees shall be prohibited from working under overhangs or bridges. Extreme care shall be taken to prevent chips or hog fuel from creating an overhang or bridging.

(e) Hog fuel bins shall be provided with an approved railed platform or walkways near the top or other approved means shall be provided for use of employees engaged in dislodging hog fuel.

(2) Exterior Chip and Hog Fuel Storage. When mobile equipment is used on top of hog fuel or chip piles, a roll-over protection system shall be installed on the equipment. If the cab is of the enclosed type, windshield wipers shall be installed. If used during hours of darkness the area shall be adequately illuminated or the equipment shall have adequate lights to provide the operator sufficient illumination to safely perform the work. [Order 74-24, § 296-79-280, filed 5/6/74; Order 70-6, § 296-79-280, filed 7/10/70, effective 8/10/70.]

WAC 296-79-290 Stock preparation and reprocessing——Scope and application. All sections of this chapter which include WAC 296-79-290 in the section number apply to Stock Preparation and Reprocessing. [Order 74-24, § 296-79-290, filed 5/6/74; Order 70-6, § 296-79-290, filed 7/10/70, effective 8/10/70.]

WAC 296-79-29001 Digester valves and piping. The blow valve of a digester shall be arranged so as to be operated from another room, remote from safety valves.

(1) Digester piping shall meet the criteria of the boiler and pressure vessel standards.

(2) Heavy duty pipe, valves, and fittings shall be used between the digester and blow pit. These valves, fittings, and pipes shall be inspected at least semiannually to determine the degree of deterioration and should be replaced when necessary.

(3) Digester blow valves or controls shall be pinned or locked in closed position throughout the entire cooking period. [Order 74-24, § 296-79-29001, filed 5/6/74.]

WAC 296-79-29003 Warning of digester being blown. Audible warning signals and red warning lights shall be installed in areas which may be hazardous to personnel while digesters are being blown. Such devices shall be activated prior to blowing a digester and the warning lights shall remain lighted as long as the hazard exists.

(1) Blowing Digester. Blowoff valves shall be opened slowly.

(2) After the digester has started to be blown, the blow-off valve shall be left open, and the hand plate shall not be removed until the person responsible signals the blow-pit person that the blow is completed. Whenever it becomes necessary to remove the hand plate to clear stock, operators shall wear eye protection equipment and protective clothing to guard against burns from hot stock.

(3) In addition to the vessel entry procedure of WAC 296-79-230, of this chapter, the blow pit door or hatch shall be locked open whenever a person is in the blow pit.

(4) Blow pit hoops shall be maintained in a safe condition.

(5) Where the processes of the sulfate and soda operations are similar to those of the sulfite processes, the standard of WAC 296-79-29001 and 296-79-29003, of this chapter, shall apply to both processes.

(6) At least one unobstructed exit at each end of the room shall be provided on each floor of a digester building.

(7) Means shall be provided whereby the digester cook shall signal the man in the chip bin before starting to load the digester. [Order 77-12, § 296-79-29003, filed 7/11/77; Order 76-7, § 296-79-29003, filed 3/1/76; Order 74-24, § 296-79-29003, filed 5/6/74.]

WAC 296-79-29005 Unplugging quick lime stoppages. Water shall not be used to unplug quick lime stops or plugs in pipes or confined spaces. [Order 74-24, § 296-79-29005, filed 5/6/74.]

WAC 296-79-29007 Bleach plant. (1) Work areas used for preparation and processing of bleaching mixtures shall be equipped with properly designed exhaust ventilation systems capable of clearing the area of toxic gases.

(2) Bleaching containers, such as cells, towers, etc., except the Bellmer type, shall be completely covered on the top, with the exception of one small opening large enough to allow filling but too small to admit a person. This opening should be covered by a door and guarded with standard guardrail and toeboards. Platforms leading from one engine to another shall have standard guardrails in accordance with the General Safety and Health Standards, WAC 296-24-75007. [Order 74-24, § 296-79-29007, filed 5/6/74.]

WAC 296-79-29009 Audible alarm in bleach plant. An audible alarm system shall be installed and it shall be activated whenever a serious leak or break develops in the bleach plant area which creates a health or fire hazard. [Order 74-24, § 296-79-29009, filed 5/6/74.]

WAC 296-79-29011 Pocket grinder doors. Doors of pocket grinders shall be so designed and arranged as to keep them from closing accidentally. [Order 74-24, § 296-79-29011, filed 5/6/74.]

WAC 296-79-29013 Pulping device procedures. Each company shall develop a safe procedure which shall be followed for feeding, clearing jams, or removing foreign objects from any pulping device. These procedures shall comply with applicable provisions of this standard. [Order 74-24, § 296-79-29013, filed 5/6/74.]

WAC 296-79-29015 Off machine repulping devices. (1) When fed manually from the floor above, conveniently located emergency stop devices shall be provided at the top level.

(2) When fed from floor above, the chute opening, if less than standard guardrail height from the feed platform or floor, shall be provided with a complete guardrail or other enclosure to standard guardrail height. Openings for manual feeding shall be sufficient only for entry of stock and shall be provided with at least two permanently secured crossrails, in accordance with, the General Safety and Health Standards, WAC 296-24-75003. [Order 74-24, § 296-79-29015, filed 5/6/74.]

WAC 296-79-29017 Pulping device cleaning, inspection and repairing. When cleaning, inspecting or other work requires that persons enter pulping devices, all control devices shall be locked or tagged out in accordance with the requirements of this standard. [Order 74-24, § 296-79-29017, filed 5/6/74.]

WAC 296-79-29019 Guarding hand knives and sharpening steels. Hand knives and sharpening steels used in rag and old paper preparation, shall be provided with guards at the junction of the handle and the blade. Stanley-type utility knives with blade exposure 2 1/2 inches or less are exempted from this requirement. [Order 74-24, § 296-79-29019, filed 5/6/74.]

WAC 296-79-29021 Shredders and blowers. On manually fed broke shedders, the feed table shall be of such height and distance from the knives as to prevent the operator from reaching or falling into the knives or the operator shall be safeguarded by other acceptable means.

(1) A smooth-pivoted idler roll resting on the stock or feed table shall be provided in front of feed rolls except when arrangements prevent the operator from standing closer than 36 inches to any part of the feed rolls.

(2) Any manually fed cutter, shredder, or duster shall be provided with an idler roll as specified in (1) of this section or the operator shall use special hand-feeding tools.

(3) Hoods of cutters, shredders, and dusters shall have exhaust ventilation, in accordance with American National Standard Z9.2–1960 and chapter 296–62 WAC, General Occupational Health Standards.

(4) Blowers used for transporting rags shall be provided with feed hoppers having outer edges located not less than 48 inches from the fan.

(5) The arrangement of the blower discharge outlets and work areas shall be such as to prevent material from falling on workers. [Order 74–24, § 296–79–29021, filed 5/6/74.]

WAC 296–79–29023 Clearing shredder jams. To clear jams or blockage to the machine, the operator shall use objects which will not create a hazard. The use of metal bars for such purposes is prohibited. [Order 74–24, § 296–79–29023, filed 5/6/74.]

WAC 296–79–29025 Repairing shredders. Repairs shall be done only when the shredder is shut down and the control devices are locked or tagged out in accordance with the requirements of this standard. [Order 74–24, § 296–79–29025, filed 5/6/74.]

WAC 296–79–29027 Guillotine type roll splitters. (1) The engaging control for activating the guillotine blade shall be a positive two–hand operating control or located far enough from the cutting location so that the operator cannot reach the blade during the cutting process. In either control method, "deadman type" switch gear which demands continuous operator activation shall be installed and used.

(2) Personnel shall not position any part of the body under the blade.

(3) Rolls shall be in the horizontal position while being split.

(4) Rolls shall be centered directly below the blade. [Order 76–7, § 296–79–29027, filed 3/1/76; Order 74–24, § 296–79–29027, filed 5/6/74.]

WAC 296–79–29029 Broke hole. (1) An alarm bell or flashing light shall be actuated or other suitable warning shall be given before dropping material through a broke hole when persons working below may be endangered.

(2) Broke holes shall be guarded in accordance with the provisions of WAC 296–79–030(6), of this chapter. [Order 74–24, § 296–79–29029, filed 5/6/74.]

WAC 296–79–29031 Industrial kiln guns and ammunition. Management shall develop written instructions, including safety procedures, for storing and operating industrial kiln guns and ammunition. All personnel working with this equipment shall be instructed in these procedures and shall follow them. [Order 74–24, § 296–79–29031, filed 5/6/74.]

WAC 296–79–29033 Chlorine dioxide system. (1) Sodium Chlorate. (a) Personnel handling and working with Sodium Chlorate shall be thoroughly instructed in precautions to be used in handling and special work habits. Refer to Manufacturing Chemists Association Chemical Data Sheet No. SD–42 (Sodium Chlorate).

(b) Personnel exposed to direct contact with Sodium Chlorate shall wear Neoprene or other special protective clothing and special footwear.

(c) Facilities for storage and handling of Sodium Chlorate shall be constructed so as to eliminate possible contact of dry or evaporated Sodium Chlorate with wood or other material which could cause a fire or explosion. Refer to Manufacturing Chemists Association Chemical Data Sheet No. SD–42 (Sodium Chlorate).

(d) Sodium Chlorate facilities should be constructed with a minimum of packing glands, stuffing boxes, etc. Refer to Manufacturing Chemists Association Chemical Data Sheet No. SD–42 (Sodium Chlorate).

(2) Chlorine Dioxide. (a) Chlorine Dioxide generating and storage facilities shall be placed in areas which are adequately ventilated and are easily kept clean of wood, paper, pulp, etc., to avoid contamination which might cause a reaction. This can be accomplished by placing these facilities in a separate room or in a designated outside space.

(b) Only authorized personnel shall be allowed in close proximity to the Chlorine Dioxide generating equipment. The generating area shall have signs warning of the hazard and restricting entrance to authorized personnel only.

(c) When reasonably possible, the sample station should be located on the outside of the generating room. Goggles must be worn when taking samples.

(d) Two alternate direction exits shall be provided from the generator working areas.

(3) General. (a) Safety showers and/or jump tanks and eye wash facilities shall be provided for persons working around Sodium Chlorate and the other hazardous chemicals involved in this process.

(b) Water hoses for flushing spills shall be adequate in size and located where needed.

(c) All equipment involved in this process where pressure may be generated shall be provided with adequate pressure relief.

(d) Welding or burning shall not be performed on the generator system while it is operating. Immediately before maintenance can be performed on the inside of any of this equipment, it shall be thoroughly flushed with water and purged of hazardous gases.

(e) Respiratory protective equipment approved for use in Chlorine and Chlorine Dioxide exposures shall be provided at appropriate locations.

(f) Facilities handling Sodium Chlorate and Chlorine Dioxide shall be declared "No Smoking" areas and shall have signs posted accordingly.

(g) Management shall be responsible for developing written instructions including safety procedures for operating and maintaining the generator and associated equipment. All personnel working on this equipment shall be thoroughly trained in these procedures and shall follow them. A periodic review of these procedures is recommended. [Order 74–24, § 296–79–29033, filed 5/6/74.]

WAC 296-79-29035 Piling and unpiling pulp. (1) Piles of wet lap pulp (unless palletized) shall be stepped back one-half the width of the sheet for each 8 feet of pile height. Sheets of pulp shall be interlapped to make the pile secure. Pulp shall not be piled over pipelines to jeopardize pipes, or so as to cause overloading of floors, or to within 18 inches below sprinkler heads.

(2) Piles of pulp shall not be undermined when being unpiled.

(3) Floor capacities shall be clearly marked on all floors.

(4) Baled paper and rags shall be stored in stable piles which do not extend into the area necessary for the proper function of sprinkler systems, where sprinklers are used for fire protection in the storage are. [Order 76-7, § 296-79-29035, filed 3/1/76; Order 74-24, § 296-79-29035, filed 5/6/74.]

WAC 296-79-29037 Chocking rolls. (1) Where pulp or paper rolls are of uniform size, cribbing should be constructed to keep rolls from moving.

(2) Where rolls are stacked and not nested two or more high, chocks shall be installed between each roll on the floor and at every row. The face of each chock should be formed on a radius to conform to the average roll size in use, and the chock shall prevent roll movement.

(3) When rolls are decked two or more high, the bottom rolls shall be chocked on each side to prevent shifting in either direction.

(4) A supply of portable roll chocks should be available to be used where there are gaps in the bottom row of rolls. These should be as light as possible while still providing maximum blocking effect. [Order 74-24, § 296-79-29037, filed 5/6/74.]

WAC 296-79-300 Machine room equipment and procedures. (1) Lock-Out and Tag-Out Procedures to be Followed. Lock-out and tag-out requirements and procedures contained in these standards shall be complied with.

(2) Stopping Devices for Pulp and Paper Machines. Pulp and paper machines shall be equipped with stopping devices. The devices shall be located where they can be used readily to stop the machines or sections of the machine.

(3) Walkways. Steps and footwalks along the fourdrinier and press section shall have non-slip surfacing and be complete with standard handrails, when practical.

(4) Machine Lubrication. If a machine must be lubricated while in operation an automatic lubricating device shall be provided or oil cups and grease fittings shall be provided which can be serviced safely without exposing the worker to any hazards.

(5) Weights on Levers. All levers carrying weights shall be so constructed that weights will not slip or fall off.

(6) Guarding Inrunning Nip Points. (a) The drums on pulp and paper machine winders shall be provided with suitable guards to prevent a person from being caught between the roll and the front drum on the winder when the pinch point is on the operator's side. Any such guard shall be interlocked with the drive mechanism to prevent the winder from running while the guard is not in place except that the winder may be wired to allow it to run at a slow speed only for adjustment and start-up purposes while the guard is not in position. A zero speed switch or locking device shall be installed to prevent the guard from being removed while the roll is turning.

Paper machine winders when used to produce rolls of 15 inches or less in diameter may be exempted from this subsection but must comply with the provisions of (6)(b).

(b) Rewinders. (i) When rewinding large rolls and the nip point is adjacent to the normal work area, the nip point shall be protected by a barrier guard. Such guard shall be interlocked with the drive mechanism to prevent operating the machine above jog speed without the guard in place. A zero speed switch shall be installed to prevent the guard from being raised while the roll is turning.

(ii) On small rolls 15 inches or less in diameter where barrier guards are impractical they shall not be required if the nip point is separated from the employees by at least 18" while operating at more than jog speed. When the rewinder is running at more than jog speed no worker shall place any part of his body closer than 18" from the nip.

(c) Inrunning nips where paper is not being fed into a calender should be protected by barriers.

(7) Audible Alarm in Dryer Section. An audible alarm shall be sounded prior to starting up any section of a pulp or paper machine. Sufficient time shall be allowed between activation of the alarm system and start-up of the equipment to allow any persons to clear the hazardous area.

(8) Starting Up Dryer Section. In starting up a dryer section, steam to heat the drums shall be introduced slowly and while the drums are revolving.

(9) Starting Paper Into Nip. When starting paper into the nip of drum type reels or calender stacks a safe method shall be used. This may be accomplished by the use of feeder belts, carrier ropes, air carriage or other device or instrument. A rope carrying system should be used wherever possible at points of transfer. Sheaves should be spaced so that they do not create a nip point with each other and the sheave and its support should be capable of withstanding the speed and breaking strength of the rope for which they are intended.

(10) Feeding Stack with Hand Held Device. Employees shall not feed a stack with any hand held device which is capable of going through the nip.

(11) Broken Carrier Rope. Employees shall not attempt to remove a broken carrier rope from a dryer while the section is running at operating speed.

(12) Removing a Wrap. Employees shall stop dryer to remove a wrap except in cases where it can be safely removed by using air or other safe means.

(13) Deposits on Rolls. To remove deposits from rolls, a specially designed scraper or tool shall be used.

Scraping of rolls shall be performed on the outgoing nip side.

(14) Cleaning Doctor Blades. Employees shall not place their hands between the sharp edge of an unloaded doctor blade and the roll while cleaning the doctor blade.

(15) Sharp Edges of Doctor Blades to be Covered. Doctor blades shall have the sharp edges properly guarded during transportation and storage.

(16) Handling Doctor Blades. Special protective gloves shall be provided and shall be worn by employees when filing or handling sharp edged doctor blades.

(17) Steps, Platforms or Walkways for Calender Stacks. When steps, platforms, or walkways are necessary to perform work on calender stacks they shall have non-skid type surfaces. Guardrails shall be installed where possible.

(18) Lifting Reels. (a) Reels shall stop rotating before being lifted away from reel frame.

(b) All lifting equipment (clamps, cables, and slings) shall be maintained in a safe condition and inspected regularly.

(c) Exposed rotating reel shafts with square block ends shall be guarded.

(19) Reels to be Properly Seated. The crane operator shall ascertain that reels are properly seated at winder stand or at reel arms before he disengages the hooks.

(20) Space Between Reels. On stack reels, a clearance of at least 8 inches between the reels of paper shall be maintained.

(21) Set Screws. Set screws for securing core collars to winding and unwinding shafts shall not protrude above the face of the collar. All edges of the collar that an operator's hand may come in contact with shall be beveled to remove all sharp corners.

(22) Properly Set Up Core Cutting Device. The worker shall make certain that any core cutting device is properly set up and guard is in proper position before using the machine.

(23) Winder Shaft. All winder shafts should be equipped with a winder collar guide. The winder should have a guide rail to align the shaft for easy entrance into the opened rewind shaft bearing housing. If winder shafts are too heavy for manual handling, mechanical equipment shall be used.

(24) Barrier Guards for Shaftless Winders. Shaftless winders shall be provided with a barrier guard of sufficient strength and size to confine the rolls in the event they become dislodged while running.

(25) Grounding. All calender stacks and spreader bars shall be grounded as protection against shock induced by static electricity.

(26) Sole Plates. All exposed sole plates between dryers, calenders, reels and rewinders shall have a non-skid type surface.

(27) Non-Skid Type Surface Required. A non-skid type surface shall be provided in the work areas around the winders or rewinders. Areas in front of the winder shall be kept clear of oil, broke, and other debris that may cause workers to slip, trip, or fall.

(28) Roll Lowering Table. If a powered roll ejector is used it should be interlocked to prevent accidental actuation until the receiving platform or roll lowering table is in position to receive the roll.

(29) Lowerator. Employees shall keep clear of hazardous areas around the lowerator, especially all lowerator openings in a floor and where roll is being discharged.

(30) Rider Rolls. Provision shall be made to hold the rider roll when in a raised position unless counterbalancing eliminates the hazard.

(31) Gas Hood Entry Procedures. Whenever an employee is inside a gas hood he shall be accompanied by another worker or a person shall be stationed near the entrance.

(32) Drain Openings in Pits. Flush floor drain openings larger than 3" in diameter in the bottom of pits shall be guarded to prevent workers from stepping through, while working in this area. [Order 76-7, § 296-79-300, filed 3/1/76; Order 74-24, § 296-79-300, filed 5/6/74; Order 70-6, § 296-79-300, filed 7/10/70, effective 8/10/70.]

WAC 296-79-310 Converting operations (bag and container manufacturing, printing, coating, finishing and related processes)——Scope and application. All sections of this chapter which include WAC 296-79-310 in the section number apply to Converting Operations (Bag and Container Manufacturing, Printing, Coating, Finishing and Related Processes). [Order 74-24, § 296-79-310, filed 5/6/74; Order 70-6, § 296-79-310, filed 7/10/70, effective 8/10/70.]

WAC 296-79-31001 General requirements. (1) Applicable Rules of this standard to Prevail. Rules contained in this standard shall prevail where applicable to converting operations.

(2) Use of Both Hands Required to Activate Guillotine Trimmers. Guillotine-type trimmers shall be designed in a manner which will require the operator to use both hands simultaneously to activate the cutting blade. If machine helpers are employed in the control function of the cutter, separate two-hand controls shall be provided for the control function performed by the helper.

(3) Non-Repeat Device Required for Guillotine Trimmers. Guillotine-type trimmers shall be designed in a manner that the trimming blade will not repeat unless manually reactivated.

(4) Sorting and Counting Tables. Tables shall be smooth and free from splinters, with edges and corners rounded.

(a) Paddles shall be smooth and free from splinters.

(5) Mirrors should be installed to assist the converting machine operator in viewing blind work stations where a hazard exists.

(6) Mechanical lifting devices shall be provided for placing and removing rolls from rewinders. Rolls shall not be left suspended overhead while the controls are unattended.

(7) Rolls handled by cranes or hoists shall not be handled over the heads of workers.

(8) When using a crane or hoist to place rolls into a backstand and the operator cannot see both ends of the backstand, assistance will be provided or appropriate devices will be installed to eliminate the hazards involved. The operator shall ascertain that rolls are properly seated at winder stand or at roll arms before he disengages the hooks.

(9) Slitters, Slotters, and Scorers not in use shall be properly stored as not to create a hazard.

(10) All power closing sections shall be equipped with an audible warning system which will be activated when closing the sections.

(11) Roll–type Embosser. The nipping point located on the operator's side shall be guarded by either automatic or manually operated barrier guards interlocked with the drive. [Order 76–7, § 296–79–31001, filed 3/1/76; Order 74–24, § 296–79–31001, filed 5/6/74.]

WAC 296–79–31003 Corrugator. (1) Every recessed floor conveyor system shall be identified by standard color coding, and so designed and installed to minimize tripping hazards.

(2) All areas subject to wet processes shall be provided with drains.

(a) Drain trenches shall be provided with gratings flush with the adjoining floor.

(b) Use of curbing in work areas should be avoided in new installations. If the use of curbing cannot be avoided, the design shall be such that the curbs do not constitute a tripping hazard in normal working areas. When curbing exists and consitute [constitutes] a hazard, it shall be color coded.

(3) Rails of rail mounted devices such as roll stands shall be flush with the adjacent floor, and so installed to provide a minimum of 18" clearance between the equipment and walls or other fixed objects.

(4) All corrugating and pressure rolls shall be equipped with appropriately designed and installed threading guides so as to prevent contact with the infeed nip of the various rolls by the operator.

(5) A minimum of 4" clearance shall be maintained between heated drums, idler rolls, and cross shafting on all preheaters and preconditioners.

(6) Lower elevating conveyor belt rolls on the single facer bridge shall have a minimum nip clearance of 4".

(7) Web shears at the discharge end of the double facer shall be equipped with barrier type guards.

(8) Slitter stations not in use shall be disconnected from the power source by positive means.

(9) Elevating type conveyors shall have the floor area color–coded. [Order 74–24, § 296–79–31003, filed 5/6/74.]

WAC 296–79–31005 Adhesive system. (1) The adhesive system shall be so designed and installed as to keep fumes and airborne dust within limits set by the Occupational Health Standards, chapter 296–62 WAC. [Order 74–24, § 296–79–31005, filed 5/6/74.]

WAC 296–79–31007 Printing and cutting. (1) Printer Slotter.

(a) The in–feed nip shall be guarded to prevent contact with the in–running feed rolls. Shear and pinch points at the feed mechanism shall be color–coded and/or identified by signs.

(b) Employees shall wear eye protection while removing staples from the dies or while adjusting slotter knives. [Order 74–24, § 296–79–31007, filed 5/6/74.]

WAC 296–79–31009 Die cutting. (1) Bobst Type Die Cutters. (a) The space where the sheet enters the die shall be guarded to prohibit entry of the operator's hand. If this guard is hinged or otherwise moveable it shall be interlocked to prevent the equipment from moving unless the guard is in the proper position.

(b) A minimum of 4" shall be provided between the end of the slat and the guide bar. [Order 74–24, § 296–79–31009, filed 5/6/74.]

WAC 296–79–31011 Power lifts on gluers, tapers and stitchers. (1) Elevated operator stands for lifts shall have toe boards on three sides. [Order 74–24, § 296–79–31011, filed 5/6/74.]

WAC 296–79–31013 Strapping–banding operations. (1) Eye protection shall be worn when hand strapping or breaking bands. [Order 74–24, § 296–79–31013, filed 5/6/74.]

WAC 296–79–320 Recovery furnace area requirements. (1) Warning System. An audible warning system shall be installed in kraft and soda base sulfite recovery furnace areas and shall be actuated whenever an emergency exists.

(2) Personnel to be Instructed in Emergency Procedures. All personnel working in recovery furnace areas shall be instructed on procedures to be followed when emergency warning systems are actuated.

(3) Warning System Maintenance. Emergency warning systems in the recovery furnace areas shall be kept in proper working condition and shall be tested or checked weekly.

(4) Personnel to Stand to Side While Opening Firebox Door. Personnel shall stand to the side while opening a furnace or boiler firebox door.

(5) Smelt Tanks. Smelt–dissolving tanks shall be covered and the cover kept closed, except when samples are being taken. [Order 74–24, § 296–79–320, filed 5/6/74; Order 70–6, § 296–79–320, filed 7/10/70, effective 8/10/70.]

Chapter 296–80 WAC
SAFETY RULES GOVERNING THE CONSTRUCTION, OPERATION, MAINTENANCE AND INSPECTION OF INCLINED PASSENGER LIFTS

WAC

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WAC 296-80-010 Scope. These regulations apply to the construction, operation, maintenance and inspection of all inclined passenger lifts for public, private or industrial use installed in the state of Washington after the date these regulations come into force. [Order 71-16, § 296-80-010, filed 12/7/71.]

WAC 296-80-020 Definitions. (1) "Inclined passenger lift" means a device constructed and operated for transporting persons from one elevation to another and consisting essentially of a car or platform traveling on guide rails in an inclined plane. For the purpose of these rules, the terms "inclined passenger lifts" shall have the same meaning as the terms "passenger elevator" as defined by RCW 70.87.010(4)(a).

(2) Devices installed indoors on stairways and utilizing chairs for carrying passengers are not considered as being inclined passenger lifts insofar as these regulations are concerned.

(3) "Enforcing authority" means the division of building and construction safety inspection services of the department of labor and industries. [Order 71-16, § 296-80-020, filed 12/7/71.]

WAC 296-80-030 Approval of plans and specifications. (1) Before commencing construction of any inclined passenger lift the owner shall submit complete plans and specifications to the enforcing authority for approval.

(2) Plans and specifications covering the installation of an inclined passenger lift shall be endorsed by a professional engineer before approval by the enforcing authority will be considered. [Order 71-16, § 296-80-030, filed 12/7/71.]

WAC 296-80-040 Runway enclosures. (1) Runways of inclined passenger lifts shall be enclosed along each side except at landing areas with wire fencing of the chain-link type or equal wherever the possibility exists of third parties gaining access to the track.

(2) Runway enclosures shall extend to a height of at least six (6) feet above the grade level or the highest working level adjacent to the runway or from the threads of adjoining stairways or platforms.

(3) Wire used for runway enclosures shall not be less than the number 9 A.W.G. and open work in the enclosure shall reject a ball two (2) inches in diameter.

(4) Emergency exits shall be provided in the runway enclosure of an inclined passenger lift.

(5) Emergency doors shall be installed in the side of the runway enclosure adjacent to the entrance in the car enclosure and shall be fitted with locks that will permit the doors to be opened from inside without a key. [Order 71-16, § 296-80-040, filed 12/7/71.]

WAC 296-80-050 Landing enclosure. (1) The landing area of an inclined passenger lift adjacent to the runway shall be enclosed with substantial masonry, concrete, metal, wood, safety glass or screen walls.

(2) Landing enclosure walls shall be a minimum of six (6) feet in height and any open work in the walls shall reject a ball one (1) inch in diameter. [Order 71-16, § 296-80-050, filed 12/7/71.]

WAC 296-80-060 Enclosure clearances. (1) No section of the runway enclosure shall be less than three (3) feet from the running line of the car.

(2) There shall be a clearance of not less than three-fourths (3/4) inch between the sides of the car and the landing area enclosure.

(3) Where a landing platform is used the minimum clearance between the car platform and the landing sill shall be three-fourths (3/4) inch and the maximum permissible clearance shall be one and one-fourth (1 1/4) inch. [Order 71-16, § 296-80-060, filed 12/7/71.]

WAC 296-80-070 Machine rooms. (1) Safe and convenient access shall be provided to machine rooms of inclined passenger lifts from outside the runway enclosure.

(2) Machine rooms shall be substantially constructed to protect equipment from the weather and shall be secured against unauthorized persons.

(3) A minimum of seven (7) feet head room shall be maintained in machine rooms.

(4) Machine room illumination shall be not less than ten (10) foot candles at floor level.

(5) Light switches and motor disconnect switches shall be located as close as possible to the lock jamb side of machine room access doors.

(6) Machine enclosures shall provide a minimum of twelve (12) inches horizontal or vertical clearance as necessary to give access to such parts of the machinery as require maintenance. [Order 71-16, § 296-80-070, filed 12/7/71.]

WAC 296-80-080 Machine supports and factors of safety. (1) Machinery and sheaves shall be so supported

and held as to effectually prevent any part becoming displaced.

(2) The factor of safety for machine beams and their immediate supporting beams shall be as follows, based on the breaking strength of the material used:

(a) For steel — 5.

(b) Reinforced concrete — 7. [Order 71-16, § 296-80-080, filed 12/7/71.]

WAC 296-80-090 Car clearances. (1) When the car is at its top landing the clear distance between the front of the car and the corresponding point of any obstruction at the upper end of the runway shall be at least the sum of the following:

(a) The clearance between the counterweight buffer and its striking block which shall be at least six (6) inches on cars using counterweights.

(b) The stroke of the buffer used.

(c) Two (2) feet.

(2) When the car is resting on its fully compressed buffer there shall be a minimum clear distance of two (2) feet between the rear of the car and the lower end of the runway enclosure. [Order 71-16, § 296-80-090, filed 12/7/71.]

WAC 296-80-100 Counterweights when used. When the car is at its lower landing the clear distance between the upper end of the counterweight and the corresponding point of any obstruction at the upper end of the runway shall be at least the sum of the following:

(a) The clear distance between the top of the car buffer and its striking block which shall be at least three (3) inches.

(b) The stroke of the car buffer used.

(c) Six (6) inches. [Order 71-16, § 296-80-100, filed 12/7/71.]

WAC 296-80-110 Landing doors or gates. (1) At each landing area of an inclined passenger lift the opening providing access to the car shall be protected by a door or gate.

(2) Landing doors or gates shall be adequate in height and shall be either solid or of open work construction rejecting a ball one (1) inch in diameter.

(3) Landing doors or gates shall be equipped with a locking device which will prevent the opening of a door or gate if the car is not within the landing zone, and the starting of the car if a door or gate is not closed.

(4) The maximum distance between the runway side of the landing door and the runway side of the landing sill shall not exceed four (4) inches. [Order 71-16, § 296-80-110, filed 12/7/71.]

WAC 296-80-120 Landing sills. Landing sills for inclined passenger lifts shall be constructed and maintained so that persons will not readily slip thereon and shall be flush with adjacent floor surfaces. [Order 71-16, § 296-80-120, filed 12/7/71.]

WAC 296-80-130 Guide rails. (1) Guide rails for inclined passenger lifts shall be rigidly fixed and supported in proper alignment to withstand the loads likely to be imposed upon them by the car or counterweight.

(2) Guide rails shall be constructed of metal. [Order 71-16, § 296-80-130, filed 12/7/71.]

WAC 296-80-140 Car enclosure. (1) Inclined passenger lift cars shall have metal frames and metal outside frames of platforms.

(2) Cars shall be enclosed on the sides with solid or perforated materials or other effective means to protect passengers to a height of six (6) feet, and if perforated materials be used, openings shall reject a ball one (1) inch in diameter.

(3) Car enclosures shall be metal, wood or other suitable material capable of safely withstanding any load or pressure to which they may be subjected.

(4) Each entrance to an inclined passenger lift car shall be provided with a door or gate covering the full width and height of the opening.

(5) Car doors or gates may be solid or have openings that will reject a ball one (1) inch in diameter.

(6) Each car door or gate shall be of the sliding type.

(7) Inclined passenger lift car doors or gates shall be equipped with a contact that shall prevent operation of the car unless the door or gate is fully closed. On leaving landing or landings car door or gates shall be mechanically locked.

(8) Cars of inclined passenger lifts shall be provided with a device that will prevent the car from leaving the guide rails.

(9) In addition to a capacity plate that shall be posted in the car of every inclined passenger lift, a data plate specifying the following shall also be attached to the car:

(a) Manufacturer.

(b) Speed.

(c) Number and size of ropes.

(10) Use of Glass in Elevator Cars. If glass is used, it shall be laminated type.

(11) Ventilation. Where car doors are used, means for ventilation shall be provided in the car. Vent openings shall reject a ball one (1) inch in diameter. [Order 71-16, § 296-80-140, filed 12/7/71.]

WAC 296-80-150 Safeties. (1) Every inclined passenger lift shall have a car safety installed on the car and must function independently of the cable and hoisting systems, and shall be applied automatically where a governor driven by the movement of the car exceeds a predetermined maximum speed.

(2) Car safeties shall be capable of stopping and sustaining the car with contract load. [Order 71-16, § 296-80-150, filed 12/7/71.]

WAC 296-80-160 Car speed governors. (1) The car speed governor shall be set to cause application of the safety at a speed not more than forty (40) percent and not less than fifteen (15) percent above the contract speed of the car.

(2) Car speed governors shall be equipped with a data plate specifying:

(a) The manufacturer, and

(b) The rated tripping speed.

(3) Governor Operated Switch. A switch shall be provided on the speed governor and operated by the over-speed action of the governor which will remove power from the driving-machine motor and brake when over-speed occurs.

(4) On inclined passenger lifts every car safety shall be provided with a safety mechanism switch operated by the car safety mechanism when the safety is applied.

(5) The car safety mechanism switch shall, when operated, remove power from the driving-machine motor and brake before or at the time of application of the safety.

(6) The car safety mechanism switch shall be designed to prevent automatic reset on release of safeties. [Order 71-16, § 296-80-160, filed 12/7/71.]

WAC 296-80-170 Machines. (1) Drums and sheaves shall be of cast iron or steel and shall have finished grooves which may be faced with material, other than iron or steel, having sufficient traction.

(2) The radius of U grooves shall be approximately one thirty-second (1/32) inch larger than the radius of the ropes.

(3) The diameter of sheaves or drums for hoisting ropes shall be at least forty (40) times the diameter of the ropes used.

(4) The factors of safety based on static loads to be used in the design of inclined lift hoisting machines based on the ultimate strength of material shall be at least:

(a) Wrought iron or wrought steel — 8.

(b) Cast iron, cast steel or other materials — 10.

(5) Set-screw fastenings shall not be used instead of keys or pins except when the connection is not subject to torque.

(6) The use of friction gearing or clutch mechanisms for connecting drums or sheaves to the main driving gear is forbidden.

(7) The installation of belt or chain-driven machines to drive an inclined passenger lift is forbidden.

(8) The use of worm gearing with cast iron teeth or the use of cast iron pinion of spur gearing is prohibited.

(9) Inclined passenger lift machines shall be equipped with electrically-released brakes capable of stopping and holding the car with its rated load.

(10) Brakes shall be applied automatically by springs or gravity when the operating devise is at the "stop" position.

(11) Brakes shall not be released until power has been applied to the motor on the "up" direction. [Order 71-16, § 296-80-170, filed 12/7/71.]

WAC 296-80-180 Terminal stopping and safety devices. (1) Inclined passenger lifts shall be provided with upper and lower normal terminal stopping devices arranged to stop the car automatically at the top and bottom terminal landings.

(2) Inclined passenger lifts shall be provided with upper and lower final terminal stopping devices, arranged to stop the car and counterweight automatically from contract speed within the top clearance and the bottom over-travel, independently of the operating device.

(3) Final limit switches shall be set to operate with the car as close to the terminal landing as practical, without interfering with normal operation and shall be set to open on contact with the buffer.

(4) Final limit switches shall be located in the runway and be operated by the movement of the car.

(5) The final terminal stopping device shall act to prevent movement of the car in both directions.

(6) The normal and final terminal stopping devices shall not control the same switches on the controller unless two or more separate and independent switches are provided, two of which shall be closed to complete the motor and brake circuit in each direction of travel.

(7) When 2-phase or 3-phase alternating current is used to operate the inclined passenger lift, the controller switches referred to in sub-section (6) shall be of the multipole type.

(8) Normal and final terminal stopping switches shall be of the enclosed type.

(9) The cams for operating the terminal stopping switches shall be of metal and shall be so located and of sufficient length to maintain the switches in the "open" position when the car has reached its maximum travel at either end of the runway.

(10) Inclined passenger lifts utilizing machines of the winding-drum type shall have, in addition to final limit switches located in the runway and operated by the movement of the car, final terminal stopping switches on the machine.

(11) Chain, rope or belt-driven machine terminal stopping devices shall not be used for inclined passenger lifts having winding-drum machines.

(12) Inclined passenger lifts having winding-drum machines driven by 2-phase or 3-phase a.c. motors shall have the mainline circuit to the motor and the brake directly opened either by:

(a) Contacts in the machine stop-motion switch, or

(b) Runway limit switches.

(13) The runway limit switches referred to in sub-section (12-b) may be operated either by a cam attached to the car or, the up-travel limit switch may be operated by a cam attached to the car and the down-travel limit switch may be operated by a cam attached to the counterweight; and the opening of the contacts shall take place before or coincident with the opening of the final terminal stopping device and shall prevent movement of the machine in either direction.

(14) Inclined passenger lifts having winding-drum machines shall be provided with a slack cable device which will cut off the power and stop the machine if the car is obstructed in its descent.

(15) Slack cable switches shall be so constructed that they will not automatically reset when the slack in the cable is removed.

(16) Electric slack cable switches shall be of the enclosed type. [Order 71-16, § 296-80-180, filed 12/7/71.]

WAC 296-80-190 Operation and control. (1) The controls of an automatic inclined passenger lift shall be so constructed that:

(a) It is impossible to start the car unless all runway doors are closed and in a position to be locked when the car leaves a landing.

(b) After car has started for a given landing, it is impossible for an impulse to be given from any landing to reverse direction of the car until it has reached the destination corresponding to the first impulse.

(2) Every inclined passenger lift shall be provided with a stopping device which can be operated from the car, that when operated, will cut off power to the driving machine and set the brake.

(3) MANUALLY OPERATED INCLINE LIFT. Exception: Controls shall be so arranged when in compliance and required with section 1, subsection (a) and section (2). The operator located either in the hoisting room or in the car may stop the incline passenger lift or reverse direction at his discretion. [Order 71-16, § 296-80-190, filed 12/7/71.]

WAC 296-80-200 Limits of speed. Maximum speed for inclined passenger lifts shall not exceed four hundred (400) feet per minute. [Order 71-16, § 296-80-200, filed 12/7/71.]

WAC 296-80-210 Ropes. (1) The factor of safety based on static loads for car and counterweight ropes shall be at least 7:1.

(2) The minimum number of hoisting ropes shall be as follows:

(a) Traction machines — 3.

(b) Winding-drum machines — 2.

(3) A hoisting rope less than one-half (1/2) inch diameter shall not be used.

(4) The repair or lengthening of car or counterweight ropes by splicing is forbidden.

(5) All ropes anchored to a winding drum shall have not less than one and one-half (1 1/2) turns of rope on the drum when the car or counterweight has reached the extreme limits of its overtravel.

(6) When the ropes are fastened inside a winding drum, they shall pass around the shaft before being fastened, or be fastened to a clevis passing around the shaft in cases where the shaft revolves in an opposite direction to the drum and the end of such ropes shall be secured by clips or by individual tapered babbitted sockets.

(7) The hoisting ropes of incline passenger lifts having drum type driving machines with one-to-one roping shall be reshackled at the car ends at intervals not longer than two years. [Order 71-16, § 296-80-210, filed 12/7/71.]

WAC 296-80-220 Fastening car and counterweight ends of ropes. (1) The car and counterweight ends of ropes shall be fastened by individual tapered babbitted sockets or

(2) By other types of rope fastenings that meet the approval of the enforcing agency.

(3) The rope sockets shall be of a type which will develop at least eighty (80) percent of the breaking strength of the strongest rope to be used in such fastenings, and U-bolt type rope clips (clamps) shall not be used for load line fastenings. [Order 71-16, § 296-80-220, filed 12/7/71.]

WAC 296-80-230 Rope tags. (1) Every person installing a hoisting, counterweight, or governor rope shall provide a metal or plastic tag legibly showing the date of installation, the grade of material, diameter, ultimate strength and notice if rope is "preformed" or "non-preformed."

(2) The tag required under subsection (1) shall be attached to the rope at the car, counterweight or governor, as the case may be. [Order 71-16, § 296-80-230, filed 12/7/71.]

WAC 296-80-240 Buffers. (1) Spring or oil buffers shall be provided for the car and counterweight where used at the lower end of the runway.

(2) Buffers shall be mounted on substantial supports and shall withstand without damage the impact of the fully loaded car or counterweight at contract speed. [Order 71-16, § 296-80-240, filed 12/7/71.]

WAC 296-80-250 Electrical equipment. The installation of all electrical equipment used in connection with an inclined passenger lift shall comply with the requirements of the National Electrical Code 1971 Edition A USA Standard. [Order 71-16, § 296-80-250, filed 12/7/71.]

WAC 296-80-260 Inspections and tests. (1) On completion of every new or altered inclined passenger lift installation, test shall be made with contract load in the car under supervision of the enforcing authority, before the equipment is placed in regular service.

(2) In the tests required under subsection (1) brakes, limit switches, buffers, car safeties, speed governors, and all other safety devices shall be caused to function.

(3) Prior to placing any new or altered inclined passenger lift into regular service, a thorough examination of the entire installation shall be made by the enforcing authority to insure conformity with these regulations in all respects.

(4) Failure of any safety device to function properly under test, or non-compliance with any part of the governing regulations shall be cause to withhold clearance for operation until satisfactory repairs or alterations are effected.

(5) Every existing inclined passenger lift shall be inspected at least once each year by the enforcing authority, and repairs or tests deemed necessary by the inspector shall be made as directed unless a variance is obtained pursuant to WAC 296-80-290. [Order 71-16, § 296-80-260, filed 12/7/71.]

WAC 296-80-270 Maintenance. (1) Owners of inclined passenger lifts shall be responsible for maintaining their equipment in safe operating condition at all times.

(2) When an inspector discovers an unsafe condition in connection with an inclined passenger lift that is not specifically covered by these regulations, he shall issue an order requiring the owner to make such changes, improvements or repairs as may be necessary to remove hazards to persons or reduce the possibility of accidents and the owner shall comply with the order of the inspector.

(3) These regulations become operative on and after the date of [See RCW 34.04.040 ". . . (2) Emergency rules adopted under RCW 34.04.030 shall become effective upon filing. All other rules hereafter adopted shall become effective upon the expiration of thirty days after the date of filing, unless a later date is required by statute or specified in the rule. . . ."] [Order 71-16, § 296-80-270, filed 12/7/71.]

WAC 296-80-280 Rack and pinion drive. Rack and pinion drive may be used for inclined passenger lifts. [Order 71-16, § 296-80-280, filed 12/7/71.]

WAC 296-80-290 Variances from requirements——How granted. Variances from the requirements of these rules may be granted by the supervisor of the elevator section when it is determined that the inclined passenger lift gives adequate protection to the safety of passengers. [Order 71-16, § 296-80-290, filed 12/7/71.]

Chapter 296-81 WAC
SAFETY RULES GOVERNING EXISTING ELEVATORS, DUMBWAITERS, ESCALATORS AND OTHER LIFTING DEVICES--MOVING WALKS

WAC

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Reviser's Note: As a part of Order 70-11, filed 9/18/70, effective date 10/21/70, the administration of chapter 296-81 WAC, Safety Rules Governing Elevators, Dumbwaiter, Escalator and Other Lifting Devices—Moving Walks shall be under the jurisdiction of the Division of Building and Construction Safety Inspection Services of the Department of Labor and Industries.

WAC 296-81-002 Foreword. Industries, associations, and organization within the State of Washington have recognized the need for rules and regulations governing the construction, operation, erection, alteration, and repair of elevators, escalators, dumbwaiters, and moving walks. In the 1963 Legislature, such an act was passed. Section III of that act provides for the promulgation and adoption of regulations for existing installations by and through the Division of Safety. The following rules for existing elevator installations have been promulgated with assistance from persons concerned with the installation, operation, inspection, or use of such types of conveyances. Public hearings and meetings to adopt have been held as required by the Administrative Procedure Act (chapter 34.04 RCW) and other Acts governing the adoption or promulgation of such regulations.

The Act gives the authority for the administration of these rules and special requirements enumerated by the Act to the Department of Labor and Industries, Division of Safety and it's representatives who have been or may be appointed for this purpose.

The Supervisor of Safety shall appoint an advisory committee of at least five individuals from different fields associated with or governed by such regulations, such as manufacturers, users, inspectors, lessors, owners, or other interested parties. This committee shall consider grievances of individuals, firms, or corporations arising from the administration of these rules and shall make recommendations to the Supervisor of Safety of the Department of Labor and Industries which may help to resolve differences of opinions between the Supervisor of Safety of the Department of Labor and Industries and an aggrieved person or representative of a firm or corporation. Persons serving on this committee will do so at the pleasure of the Supervisor of Safety and may be removed at his discretion. They shall serve without remuneration or compensation.

Representatives of the Department shall allow a person, firm, or corporation five years from the date of the adoption of these rules to comply with the requirements hereinafter outlined. [Foreword, filed 9/28/64.]

WAC 296-81-003 Waiver and variance. The Supervisor of Safety may, upon receipt of application and after adequate investigation by the Department, permit a variation from these requirements when other accepted means of protection are provided. Any variation granted under the provisions of this paragraph shall be limited to the particular case of cases covered in the application for variation and may be revoked for cause. The permit for variance shall be conspicuously posted on the premises prior to becoming effective and shall remain posted during the life of such waiver. [Waiver and Variance, filed 9/28/64.]

WAC 296-81-005 National elevator codes adopted. (1) American Standard Safety Code for Elevators, Dumbwaiters and Escalators A 17.1 1960 shall apply to all new installations.

(2) American Standard Safety Code Rules for Moving Walks A.S.A. 17.1.13 1962. This shall apply to all installations.

(3) Safety Standards for Belt Manlifts adopted by department of labor and industries, safety division and was effective December 1, 1962. [Chapter 296-82 WAC.] This for new installations.

(4) Part X of A.S.A. A17.1 1960 Maintenance shall apply to existing installations. [Effective 11/1/63.]

WAC 296-81-006 National elevator code adopted--1967. USAS STANDARD A 17.1-1965 "Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks" (Revision and Consolidation of A17.1-1-1960, A17.1a-1963, and A17.1-13-1962) plus Supplement USAS-A17.1a-1967, USAS A17.1b-1968, USAS A17.1c-1969 (excluding Appendix E) and ANSI A17.1d-1970. [Order 70-11, § 296-81-006, filed 9/18/70; filed 12/29/67.]

Reviser's Note: The A.S.A. publications are published by the American Society of Mechanical Engineers at 345 47th Street, New York, New York 10017.

WAC 296-81-007 National elevator code adopted. The American National Standard Safety Code for elevators, dumbwaiters, escalators and moving walks, American National Standards Institute A17.1, as amended or revised through the year 1971, are hereby adopted as the standards for compliance in this state for elevators, dumbwaiters, escalators and moving walks and by this reference such standards are incorporated herein as though fully set forth. A full, complete and accurate copy of the American National Standards Institute A17.1 for elevators, dumbwaiters, escalators and moving walks will be at all times available in the offices of the Elevator Section of the Division of Building and Construction Safety Inspection Services, of the Department of Labor and Industries at Olympia and available during business hours at such office for public inspection and review. [Order 72-2, § 296-81-007, filed 2/25/72.]

WAC 296-81-008 National elevator code supplement adopted. The American National Standard Supplement to Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks, A17.1-1971, ANSI A17.1a-1972 is hereby adopted as additional standards for compliance in this state for elevators, dumbwaiters, escalators and moving walks and by this reference such standards are incorporated herein as though fully set forth. Copies of this supplement may be obtained from The American Society of Mechanical Engineers, 345 East 47th Street, New York, New York 10017. [Order 76-37, § 296-81-008, filed 12/3/76; Order 74-31, § 296-81-008, filed 6/14/74.]

WAC 296-81-009 National safety standard for manlifts adopted. The USA Safety Standard for Manlifts, USAS A90.1-1969, is hereby adopted as the standards for compliance in this state for Belt Manlifts, and by this reference such standards are incorporated herein as though fully set forth. Copies of these standards may be obtained from The American Society of Mechanical Engineers, United Engineering Center, 345 East 47th Street, New York, New York 10017. [Order 74-31, § 296-81-009, filed 6/14/74.]

EXISTING INSTALLATIONS

WAC 296-81-010 Hoistway enclosures. (1) Local laws and ordinances shall govern the fire-resistive requirements for the hatchway enclosures.

(2) Where doors and hoistway enclosures are not required to be fire resistant, the hoistway shall be enclosed with material, which may be solid or with openings that do not exceed one-half inch in diameter, to a height of six feet above each floor or landing and above the treads of adjacent stairways.

(3) Enclosures shall be so supported and braced as to deflect not over one inch when subjected to a force of one hundred pounds applied perpendicularly at any point. Adjacent to the counterweights, the enclosure must extend the full height of the floor and extend six inches past the counterweight raceway.

(4) The hoistway enclosures on the sides used for entrance and exit shall extend from the required landing opening to the underside of the floor above, except for elevators equipped with car gates or doors provided with car door or gate electric contacts.

(5) Where an elevator does not have a car door and the sill projects inward from the general line of the hoistway, the projections which are opposite the car entrance (except door operating devices, interlocks, indicator and signal devices) shall be beveled on the under side or shall be guarded with a metal plate of not less than No. 16 U.S. gauge, or three quarter inch metal covered wood. The angle of such bevels of guard plates shall be not less than sixty degrees from the horizontal and not over seventy-five degrees, and they shall be smooth and

firmly and permanently fastened to the hoistway enclosure. [Rules 1.010–1.050, filed 9/28/64.]

WAC 296-81-020 Hoistway gates and doors. (1) Freight elevator landing openings shall be provided with manually or power operated gates or doors at each landing, guarding the full width of the opening. Gates and doors shall conform to the following requirements:

(a) Balanced type vertically sliding hoistway gates shall extend from a point not more than two inches from the landing threshold to a point not less than sixty–six inches above the landing threshold. Gates shall be solid or shall be openwork of a design to reject a ball two inches in diameter and shall be so located that the distance from the hoistway face of the gate to the hoistway edge of the landing sill shall be not more than two and one–half inches. Gates shall be constructed of metal or wood and shall be so designed and guided that they will withstand a lateral pressure of one hundred pounds applied at approximately their center without breaking or being permanently deformed and without displacing the gate from its guides or tracks. Where handline operations are used, an opening in the hoistway door or gate will be permitted providing it is at least thirty inches from the floor and is not over five inches in width and not more than thirty–six inches high.

(2) Hoistway doors shall be of the vertically sliding, biparting counter–balanced type or of the horizontally swinging or sliding type.

(a) Hoistway gates or doors of electric or electro–hydraulic elevators shall be equipped with an approved type combination electric contact and mechanical lock or an approved type hoistway door interlock which shall prevent operation of the elevator by the normal operating devices unless the door or gate is closed or is locked in the closed position, providing that where the rated speed of the elevator exceeds one hundred and fifty feet per minute hoistway door interlocks shall be provided.

(b) Power door or gate operating devices, if provided, shall be of a type and design approved by the enforcing agency.

(3) Every existing passenger elevator entrance shall be equipped with hoistway doors, and hoistway door interlocks.

(4) Where hoistway doors at all landings are equipped with mechanical unlocking devices, they shall conform to the following:

(a) The device shall be designed to prevent unlocking the door with common tools.

(b) The operating means for unlocking the door shall be available to and used only by inspectors, maintenance men, and repair men.

(5) Installation of hoistway door unlocking devices may be made on hoistway doors of power elevators subject to the following provisions:

(a) The elevator shall have hoistway doors which are unlocked when closed with the car at floor, or locked but openable from landing by means effective only when car is in landing zone.

(b) The operating means for unlocking the door shall be mounted in a receptacle with a breakable, transparent cover clearly marked in letters at least one eighth inch high: ELEVATOR DOOR KEY FOR FIRE DEPARTMENT AND EMERGENCY USE ONLY.

(c) The receptacle shall be located at the bottom landing.

(6) Where automatic operation elevators with swinging doors have clearance greater than two and one–half inches between the inside face of the hoistway door and the hoistway edge of the threshold, the hoistway door shall be equipped with an extension panel on the lower portion of the door extending up at least thirty–six inches above the bottom of the door and having the inside face of this panel within two and one–half inches of the line of the threshold when the door is closed and the top surface of this panel shall be beveled at not less than sixty degrees from the horizontal. [Rules 2.010–2.060, filed 9/28/64.]

WAC 296-81-030 Car enclosures. Car enclosures for freight and passenger cars shall conform with the following:

(1) Freight elevator cars shall be enclosed to a height of at least six feet from the floor on all sides, where there are no hoistway doors or gates, with solid panel or openwork which will reject a two inch ball. On the side of the car adjacent to the counterweight runway and extending six inches each side of the counterweight runway, the enclosure shall extend to the car top or underside of car crosshead. Overhead protection of solid or openwork material: If openwork, it shall reject a one and one–half inch ball and shall be sufficiently strong to support three hundred pounds applied at any point. Simultaneous application of these loads is not required. Suitable overhead protection may be installed directly over the area where the operator runs the controls, providing the overhead protection covers sufficient area for safe protection of operator.

(2) Passenger elevator cars shall be fully enclosed on all sides and the top, except the opening for entrances. It shall be of metal or wood in conformity with the local fire regulations. The car top shall be capable of sustaining a load of three hundred pounds on any square area of two feet on a side and one hundred pounds applied at any point. Simultaneous application of these loads is not required. [Rule 3.010, filed 9/28/64.]

WAC 296-81-040 Car doors and gates. (1) Car doors or gates shall be required at each entrance to the elevator car.

(2) Car doors or gates may be horizontal or vertical sliding.

(3) Gates, except collapsible, may be solid or may be openwork of a design to reject a ball two inches in diameter. Gates shall be constructed of metal or wood and shall be so designed that they will withstand a lateral pressure of one hundred pounds applied at approximately their center without breaking or being permanently deformed and without displacing the gate from its guides or tracks.

(4) Collapsible gates shall reject a three inch diameter ball when fully extended (closed position) when installed

on passenger cars and shall reject a four and one–half inch ball when fully extended (closed position) when installed on freight cars. Such gates shall not be power opened for more than one–third of their clear opening distance or for a maximum power opening distance not to exceed ten inches. Collapsible gates shall have at least every fourth vertical member guided at the top and every second vertical member guided at the bottom.

(5) Car doors and gates when in the fully closed position shall conform to the following:

(a) For passenger cars they shall protect the full width and height of the car entrance opening provided that vertically sliding gates may extend from a point not more than one inch above the car floor to a point not less than six feet above the floor.

(b) For freight elevators they shall protect the full width of the car entrance opening. Car doors shall extend from the car floor to a height of not less than six feet above the car floor. Vertically sliding gates shall extend from a point not more than one inch above the car floor to a point not less than six feet above the car floor.

(6) Car doors and gates of electric and electro–hydraulic elevators shall be equipped with approved car door or gate electric contacts which will prevent operation of the elevator by the normal operating device unless the car door or gate is in the closed position. [Order 74–31, § 296–81–040, filed 6/14/74; Rules 4.010–4.060, filed 9/28/64.]

WAC 296–81–050 Brakes. All electric elevators shall be equipped with effective brakes that are released electrically and applied by springs. The brakes shall be designed to have a capacity sufficient to hold the car at rest with its rated load. At least one brake shall be mounted on the driving machine worm shaft. Exceptions to this rule may be made by the enforcing agency if an impractical condition is encountered, providing other safe means are provided. [Rule 5.010, filed 9/28/64.]

WAC 296–81–060 Car safeties. The car of every elevator suspended by wire ropes shall be provided with car safeties as hereinafter defined. The safety device shall be capable of stopping and sustaining the entire car with its rated load in the event of cable severance or overspeed. There shall be a switch provided on the car actuated by the setting of the safeties that will remove the electric power from the driving machine motor and brake. Car safety devices (safeties) are identified and classified on the basis of performance characteristics after the safety begins to apply pressure on the guide rails.

(1) **Type A safeties.** Safeties which develop a rapidly increasing pressure on the guide rails during the stopping interval, the stopping distance being very short due to the inherent design of the safety. The operating force is derived entirely from the mass and the motion of the car or the counterweight being stopped. These safeties apply pressure on the guide rails through eccentrics, rollers, or similar devices without any flexible medium purposely introduced to limit the retarding force and increase the stopping distance.

(2) **Type B safeties.** Safeties which apply limited pressure on the guide rails during the stopping interval, and which provide stopping distances that are related to the mass being stopped and the speed at which application of the safety is initiated. Retarding forces are reasonably uniform after the safety is fully applied. Continuous tension in the governor rope may or may not be required to operate the safety during the entire stopping interval. Minimum and maximum distances are specified on the basis of governor tripping speed.

(3) **Type C safeties (Type A with oil buffers).** Safeties which develop retarding forces during the compression stroke of one or more oil buffers interposed between the lower members of the car frame and a governor–operated type A auxiliary safety plank applied on the guide rails. The stopping distance is equal to the effective stroke of the buffers.

(4) **Type G safeties.** Safeties similar to type B except having a gradually increasing retarding force. This safety may be either of the wedge clamp type or the flexible guide clamp type applied by a cable which unwinds a drum below the car floor.

(5) **Slack rope safeties that are actuated by the slackening or breaking of the hoisting ropes.** This type of safety is not actuated by an overspeed governor. [Rule 6.010, filed 9/28/64.]

WAC 296–81–070 Overspeed governors. A speed governor or inertia trip safety or a slack cable operated safety shall be installed on all elevators except hydraulic elevators and shall be so designed that it will actuate the car safeties before the car attains a speed of one hundred and forty percent of the rated speed. Governor ropes shall be not less than three eighths inch in diameter, if iron or steel rope, and not less than three quarter inch manila rope. Tiller rope shall not be used. [Rule 7.010, filed 9/28/64.]

WAC 296–81–080 Periodic inspections and tests. (1) Periodic inspections shall be made of all existing installations at regular intervals to determine that the equipment is in a proper operating condition and in conformity with these rules.

(2) The owner or his authorized agent shall cause periodic tests to be made by a person qualified to perform such service and a report indicating the date of inspection with all pertinent data included, which shall be sent to the supervisor of the division of safety.

(3) All parts of the equipment including all safeties, governors, and oil buffers shall be inspected at twelve month intervals, and when necessary tested to determine that they are in a proper operating condition and that parts subject to wear, such as ropes, bearings, gears, car safety, guide rails and fastenings, and governor parts, oil buffers, etc., have not worn or become defective to such an extent as to affect the proper operation of the equipment or installation. Any such worn or defective equipment or part shall be adjusted, repaired or replaced. [Rules 8.010–8.030, filed 9/28/64.]

WAC 296-81-090 Maintenance inspection and test periods. Tests of elevator car and counterweight safeties, governors, and oil buffers shall be made at intervals not exceeding five years. The owner or his authorized agent shall have these tests made in lieu of one of the periodic inspections and tests. The car safety, counterweight safety where provided, and the governor shall be subjected to inspections and tests as follows: (1) Type A safeties and type A safety parts of type C safeties shall, prior to the safety tests, be inspected and the safety operated by hand to determine that:

(a) They are in a proper operating condition and in conformity with the requirements as set forth in Rule 8.030.

(b) Following hand operation the safety rollers or dogs operate simultaneously and have approximately the same travel.

(c) There is sufficient remaining travel of the rollers of dogs to bring the car and its rated load to rest from rated speed. The safety tests for type A, B, and C shall be made with the rated load in the car by tripping the governor by hand at rated speed. The tests shall also specify the stopping distances. A metal or plastic tag shall be attached to the safety–releasing carrier in a permanent manner, giving the date of the safety test together with the name of the person or firm who performed the test. [Rule 9.010, filed 9/28/64.]

WAC 296-81-100 Ropes, rope connections, data and record. (1) Elevator cars of electric and roped hydraulic elevators shall be suspended by steel wire ropes. Only iron (low carbon steel) or steel wire ropes with fibre cores, having the commercial classification of "Elevator wire rope," shall be used for the suspension of elevator cars and for the suspension of counterweights.

(2) The minimum number of hoisting ropes used shall be three for traction elevators and two for drum type elevators.

(3) Hoisting chains where permitted on double car units, shall comply with the chain manufacturer's specifications as to maintenance and inspection. The operation of these units must be by remote control, and no one shall be allowed to ride on the cars at any time.

(4) The car and counterweight ends of car and counterweight wire ropes, or the stationary hitch ends where multiple roping is used shall be fastened in such a manner that the looped ends of the turned back portion in the rope sockets shall be readily visible.

Fastenings shall be:

(a) By individual tapered babbitted rope sockets or,

(b) By other types of rope fastenings that meet the approval of the enforcing agency.

(5) The rope sockets shall be of a type which will develop at least eighty percent of the breaking strength of the strongest rope to be used in such fastenings, and U–bolt type rope clips (clamps) shall not be used for load line fastenings.

(6) A metal or plastic data tag shall be securely attached to one of the wire rope fastenings each time the ropes are renewed or reshackled. This data tag shall bear the following information:

(a) Name of rope manufacturer.

(b) The diameter in inches.

(c) The manufacturer's rated breaking strength.

(d) The month and year the ropes were installed.

(e) Whether nonpreformed or preformed.

(f) Name of the person or firm who installed ropes. [Rules 10.010–10.060, filed 9/28/64.]

WAC 296-81-110 Electric and electro-hydraulic dumbwaiters. (1) Dumbwaiter cars may be constructed of metal or wood and shall be in compliance with local ordinances as to fire resistivity providing it is constructed to carry its rated load without distortion. The dumbwaiter car must be fully enclosed except for the landing sides. The car floor shall not exceed nine square feet in area and the total inside height shall not exceed four feet and the maximum capacity shall not exceed five hundred pounds. The fire resistance rating for the hoistway and hoistway doors shall conform with the local area fire ordinances where required. Hoistway doors shall be installed at each hoistway opening. Hoistway doors shall be equipped with electric contacts and mechanical locks.

(2) Electrically operated machines shall be equipped with brakes that are electrically released and applied automatically by springs in conformity with the requirements set forth in WAC 296–81–050(1).

(3) Dumbwaiters equipped with winding drum machines having a travel of more than thirty feet and a rated load of more than one hundred pounds, shall be equipped with a slack rope switch which will automatically remove the power from the motor and brake when the hoisting ropes become slack. [Rules 11.010–11.030, filed 9/28/64.]

WAC 296-81-120 Hydraulic elevators. All hydraulic elevators shall be equipped with electrically operated anti–creep leveling devices. [Order 74–31, § 296–81–120, filed 6/14/74; Rule 12.010, filed 9/28/64.]

WAC 296-81-130 Sidewalk elevators. Electrically operated sidewalk elevators shall be in conformity with the following requirements: (1) Where the top opening is located in the sidewalk or other area exterior to the building, all electrical equipment on the car or in the hoistway shall be weatherproof. The operation of power sidewalk elevators through openings in the sidewalk, or through openings in other exterior areas which are protected by hinged doors or vertically lifting covers, shall conform to the following:

(a) The elevator shall be operated in both the up and down directions through the opening, only from the sidewalk or other exterior area. The operation shall be by means of:

(i) Key–operated continuous–pressure type, up and down switches, or

(ii) Continuous–pressure–type up–and–down operating buttons on the free end of a detachable, flexible cord five feet or less in length.

(iii) Continuous–pressure–type up–and–down operating buttons may be installed on the elevator car providing the control is so designed that the buttons will not function unless the sidewalk doors are locked in the open position and that a safety screen that will open and close with the car is installed.

(b) Key–operated switches shall be of continuous–pressure spring–return type, with the key removable only when the switch is in the off position.

(2) A sidewalk elevator that derives its power directly from city water mains, and that is controlled by a manually operated three position valve may be operated by a handline providing that a device is permanently installed on the hand line that will stop the car in the up direction before the bow iron on the car comes in contact with the sidewalk doors. The device must be so designed that it will not deflect or become deformed under a minimum stress of one hundred fifty pounds. There also must be installed over the sidewalk area a substantial screen that will open and close with the car when the sidewalk doors are in the open position. [Rules 13.010–13.020, filed 9/28/64.]

WAC 296-81-140 Hand power elevators and dumbwaiters. (1) Cars of hand power elevators and dumbwaiters shall be enclosed on all sides not used for entrance. Elevator cars upon which an operator is permitted to ride shall have not more than one compartment.

(2) Hand elevators having a travel of more than fifteen feet shall be provided with a car safety, capable of stopping and sustaining the car and rated load. The car safety device is not required to be operated by a speed governor, and may be of the instantaneous type operated as a result of the breaking or slackening of the suspension members.

(3) Hoistway doors for hand powered elevators shall be so designed that they will insure protection at each landing.

(4) Doors for hand powered dumbwaiters shall be so designed that they will insure protection at all landings.

(5) Every hoistway door, gate, or entrance of hand elevators and hand dumbwaiters shall have conspicuously displayed on the landing side in letters not less than two inches high, the words: DANGER–ELEVATOR–KEEP CLOSED or DANGER–DUMBWAITER–KEEP CLOSED. [Rules 14.010–14.050, filed 9/28/64.]

WAC 296-81-150 Car operating and terminal stopping devices and electrical protective devices. (1) Handles of lever–type operating devices of car–switch operation elevators shall be so arranged that they will return to the stop position and latch in this position automatically when no pressure is exerted against the handle.

(2) All electric operating devices shall be of the enclosed type. Handrope, wheel, lever, rod or crank type operating devices may be permitted only on freight elevators, provided that electric elevators equipped with these types of operating devices shall be provided with a sequence device.

(3) **Phase reversal and failure protection.** Elevators having polyphase alternating current power supply shall be provided with means to prevent the starting of the elevator motor if:

(a) The phase rotation is in the wrong direction, or

(b) There is a failure of any phase. This does not apply to hydro–electric elevators.

(4) **Main line contactor.** A contactor shall be installed in addition to the direction switches, which will cut off main line current to the motor and apply the brake when any of the final terminal stopping devices operate.

(5) Final terminal stopping devices shall be provided for the following conditions:

(a) Final terminal stopping devices shall be provided and arranged to cause the electric power to be removed automatically from the elevator driving–machine motor and brake after the car has passed a terminal landing but so that under normal operating conditions, it will not function when the car is stopped by the normal terminal stopping device. Where spring buffers are provided, the device shall function before the buffer is engaged.

(b) Elevators having traction machines shall have final terminal stopping switches located in the hoistway and operated by cams attached to the car.

(c) Elevators having winding–drum machines shall have final terminal stopping switches, located on and operated by the driving machine, which shall not be driven by chain, rope, or belt. Also, stopping switches shall be installed in the hoistway that are operated by cams attached to the car or counterweights.

(6) All elevators having winding–drum machines shall have a slack rope device with an electric switch of the enclosed, manually reset type which will cause the electric power to be removed from the driving machine motor and brake if the hoisting ropes become slack.

(7) The emergency stop switch shall be of the manually opened and closed, or manually opened and automatically closed type operated from within the car and shall be located within or adjacent to the car operating panel. When operated this switch shall cause the electric power to be removed from the driving–machine motor and brake of an electric elevator or from the electrically operated valves and/or pump motor of a hydraulic elevator. [Rules 15.010–15.070, filed 9/28/64.]

WAC 296-81-160 Power supply switch. A fused disconnect switch or a circuit breaker shall be installed and connected into the power supply line to each elevator motor or to the motor of the motor generator set. Disconnect switches or circuit breakers shall be of the manually closed multi–pole type. Where circuit breakers are used as a disconnecting means, they shall not be of the instantaneous type and shall not be opened automatically by a fire alarm system. [Rule 16.010, filed 9/28/64.]

WAC 296-81-170 Access to machine room and machinery space. A permanent safe means of access shall be provided either by stairway or ladder to elevator and dumbwaiter machine rooms, and overhead machinery space. Ladders shall be constructed in conformity with

the safety factors as recognized by the American Standard Association, or by other sound engineering practices. Ladders shall have not less than six and one-half inches from the back of the rungs to the building structure or other objects. There must be at least thirty inches of clear climbing space from the face of the ladder to any fixed object. Carrying of material with hands or arms while ascending or descending the ladder shall be prohibited. Access ladders to the machine room or machinery space shall not be installed within the elevator hatchway. Trap doors that are used as a means of access to the elevator machine room shall be of the counter-balanced type. [Rule 17.010, filed 9/28/64.]

WAC 296-81-180 Capacity posting. Every elevator and dumbwaiter shall be provided with a capacity plate or sign permanently and securely fastened in place in the elevator car. Capacity plates or signs shall indicate the rated load of the elevator in pounds. On freight elevator cars the plate or sign shall also specify "FOR FREIGHT ONLY". [Rule 18.010, filed 9/28/64.]

WAC 296-81-190 Illumination. All elevator cars shall be provided with an electric light or lights. Where the car lights are controlled by a switch in the car, the control switch shall be located in or adjacent to the car operating device. It is recommended that light switches, if installed in cars of automatic operation elevators, be of the key operated type. [Rule 19.010, filed 9/28/64.]

WAC 296-81-200 Adoption of elevator codes. (1) Public hearings were held July 23, 1963 and September 24, 1963 at Olympia, Washington, in accordance with section 25, chapter 130, Laws of 1919, as amended by RCW 49.16.090, chapter 34.04 RCW to consider safety rules governing construction, alterations, use and maintenance of elevators, belt manlifts and moving walks.

(2) American standard safety code for elevators, dumbwaiters and escalators A17.1 1960 shall apply to all new installations.

(3) American standard safety code rules for moving walks A.S.A. 17.1.13 1962. This shall apply to all installations.

(4) Part X of A.S.A. A17.1 1960 Maintenance shall apply to existing installations. This part gives maintenance instructions in regard to lubrication, cleanliness, painting, and refinishing, reshackeling and tagging of hoisting ropes, and the inspection and testing of pressure tanks and piston rods.

(5) These requirements became effective as of November 1, 1963.

National Elevator Code adopted—1967: WAC 296-81-006.

[Section 20 of rules, filed 9/28/64.]

WAC 296-81-220 Illumination of pits. A permanent lighting fixture shall be provided in all pits which shall provide an illumination of not less than five foot candles at the pit floor. A light switch shall be provided and shall be so located as to be accessible from the pit access door. [Order 73-1, § 296-81-220, filed 4/16/73.]

WAC 296-81-240 Valves. A shut-off valve shall be installed in the pit on all hydraulic elevators. (For new installations). [Order 73-1, § 296-81-240, filed 4/16/73.]

WAC 296-81-260 Photo electric or electric eye devices. Elevators equipped with photo electric or electric eye devices for reopening of the car and hoistway doors shall be provided with a means that will automatically bypass the light ray in case of its failure or if the doors become inoperative due to smoke or other abnormal conditions within 20 seconds after normal door opening time: *Provided*, That upon a sufficient showing of need by a hospital or a nursing home, the department may authorize an automatic bypass means that will cause the doors to close within a time period of up to 35 seconds after normal door open time. [Order 76-37, § 296-81-260, filed 12/3/76; Order 73-1, § 296-81-260, filed 4/16/73.]

WAC 296-81-270 Counterweight pit guards. (1) Where practicable. Unperforated metal guards shall be installed in the pit on the open side or sides on all counterweights where spring or solid-type buffers are used or where oil buffers attached to the counterweight are used.

EXCEPTION: Where compensating chains or ropes are attached to the counterweight the guard may be omitted on the side facing the elevator car to which the chains or ropes are attached.

(2) Design, Construction and Location of Guards. Guards shall extend from a point not more than twelve inches above the pit floor to a point not less than seven feet nor more than eight feet above such floor, and shall be fastened to a metal frame properly reinforced and braced to be at least equal in strength and stiffness to No. 14 U.S. gauge sheet steel. [Order 73-1, § 296-81-270, filed 4/16/73.]

WAC 296-81-300 Operation and Leveling. The elevator shall be automatic and be provided with a self-leveling feature that will automatically bring the car to the floor landings within a tolerance of plus or minus 1/2 inch under normal loading and unloading conditions. This self-leveling shall within its zone, be entirely automatic and independent of the operating device and shall correct for overtravel or undertravel. The car shall also be maintained approximately level with the landing irrespective of load. [Statutory Authority: RCW 70.87-.030. 81-01-034 (Order 80-26), § 296-81-300, filed 12/10/80.]

WAC 296-81-305 Door operation. Power operated car and hoistway doors opened and closed by automatic means shall be provided.

DOOR SIZE. Minimum clear width for elevator doors shall be 32 inches.

DOOR PROTECTIVE AND REOPENING DEVICE. Doors closed by automatic means shall be provided with a door reopening device which will function to stop and reopen a car door and adjacent hoistway door in case the car door is obstructed while closing. This reopening device shall also be capable of sensing an object or person in the path of a closing door without requiring contact for activation at a nominal 5 and 20 inches above the floor. [Statutory Authority: RCW 70-.87.030. 81-01-034 (Order 80-26), § 296-81-305, filed 12/10/80.]

WAC 296-81-310 Door delay. (1) HALL CALL. The minimum acceptable initial transfer time from notification that a car is answering a call (Lantern and Audible Signal) until the doors of the car start to close shall be 0 to 5 ft. – 4 sec., 10 ft. – 7 sec., 15 ft., – 10 sec., 20 ft. – 13 sec. The distance shall be established from a point in the center of the corridor or lobby (maximum 5 feet) directly opposite the farthest hall button controlling that car to the centerline of the hoistway entrance.

(2) CAR CALL. The minimum acceptable initial transfer time for doors to remain fully open shall be not less than 3 seconds. [Statutory Authority: RCW 70.87-.030. 81-01-034 (Order 80-26), § 296-81-310, filed 12/10/80.]

WAC 296-81-315 Car interior. The car interior shall allow for the turning of a wheelchair. The minimum clear distance between walls or between wall and door, excluding return panels, shall be not less than 68 x 54 inches. Minimum distance from wall to return panel shall be not less than 51 inches.

EXCEPTION. Elevators provided in existing schools, institutions, or other buildings specifically authorized by local authorities may have a minimum clear distance between walls or between wall and door including return panels of not less than 54 x 54 inches. Minimum distance from wall to return panel shall be not less than 51 inches. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-81-315, filed 12/10/80.]

WAC 296-81-320 Car controls. At least one set of controls shall be readily accessible from a wheelchair upon entering an elevator.

The centerline of the alarm button and emergency stop switch shall be at nominal (35) inches and the highest floor buttons no higher than (54) inches from the floor. Floor registration buttons, exclusive of border, shall be a minimum of (3/4) inch in size, raised or flush. Visual indication shall be provided to show each call registered and extinguished when call is answered. Depth of flush buttons when operated shall not exceed (3/8) inch.

Markings shall be adjacent to the controls on a contrasting color background to the left of the controls. Letters or numbers shall be a minimum of (5/8) inch high and raised (.030) inch. Applied plates permanently attached shall be acceptable. Emergency controls shall be grouped together at the bottom of the control panel. Symbols as indicated shall be used to assist in readily identifying essential controls (see ANSI A17.1, page 114, Rule 211.1). Controls not essential to the operation of the elevator may be located as convenient. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-81-320, filed 12/10/80.]

WAC 296-81-325 Car position indicator signal. A car position indicator shall be provided above the car operating panel or over the opening of each car to show the position of the car in the hoistway by illumination of the indication corresponding to the landing at which the car is stopped or passing.

Indications shall be on a contrasting color background and a minimum of (1/2) inch in height. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-81-325, filed 12/10/80.]

WAC 296-81-330 Telephone or intercommunicating system. A means to two-way communication shall be provided between the elevator and a point outside the hoistway in accordance with the requirements found in the latest edition of ANSI A17.1. If a telephone is provided, the highest part shall be located a maximum of (54) inches from the floor with a minimum cord length of (36) inches.

Markings or the international symbol for telephones shall be on or adjacent to the control on a contrasting color background. Letters or numbers shall be a minimum of (5/8) inch high and raised (.030) inch. Applied plates permanently attached shall be acceptable. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-81-330, filed 12/10/80.]

WAC 296-81-335 Floor covering. Floor covering should have a nonslip hard surface which permits easy movement of wheelchairs. If carpeting is used, it should be securely attached, heavy duty, with a tight weave and low pile, installed without padding. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-81-335, filed 12/10/80.]

WAC 296-81-340 Handrails. A handrail shall be provided on all walls of the car not used for normal exits. There shall be a space of (1 1/2) inches between the wall and the rail. The rail shall be at a nominal height of (35) inches from the floor. The hand grip portion of handrails shall be not less than (1 1/4) inches nor more than 2 inches in width and shall be basically oval or round in cross-section and shall have smooth surfaces with no sharp corners, with handrail ends returned to the wall. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-81-340, filed 12/10/80.]

WAC 296-81-345 Minimum illumination. The minimum illumination shall be in accordance with the latest edition of ANSI A17.1. [Statutory Authority: RCW 70-.87.030. 81-01-034 (Order 80-26), § 296-81-345, filed 12/10/80.]

WAC 296-81-350 Door jam marking. The floor designation shall be provided at each hoistway entrance

on both sides of jamb visible from within the car and the elevator lobby at a centerline height of (60) inches above the floor. Designations shall be on contrasting color background (2) inches high and raised (.30) inch. Applied plates permanently attached shall be acceptable. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-81-350, filed 12/10/80.]

WAC 296-81-355 Hall buttons. The centerline of the hall call buttons shall be a nominal (42) inches above the floor. The button designating the UP direction shall be on top.

Direction buttons, exclusive of border, shall be a minimum of (3/4) inch in size, raised, or flush. Visual indication shall be provided to show each call registered and extinguished when the call is answered. Depth of flush buttons when operated shall not exceed (3/8) inch. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-81-355, filed 12/10/80.]

WAC 296-81-360 Hall lantern. A visual and audible signal shall be provided at each hoistway entrance, indicating to the prospective passenger, the car answering the call and its direction of travel.

The visual signal for each direction shall be direction indicators, white to indicate "UP" and red to indicate "DOWN" and shall be a minimum of (2 1/2) inches in size and visible from the proximity of the hall call button. The audible signal shall sound once (1) for the UP direction and twice (2) for the DOWN direction.

The centerline of the fixture shall be located a minimum of (6) feet from the floor.

The use of in car lanterns conforming to above and located in jamb shall be acceptable. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-81-360, filed 12/10/80.]

WAC 296-81-365 Emergency use. Elevators shall comply with ANSI Standard A17.1, Rule 211.3a. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-81-365, filed 12/10/80.]

WAC 296-81-370 Effective date. The preceeding WAC rules, 296-81-300 through 296-81-365, shall apply to all new installations made after the adoption of these rules. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-81-370, filed 12/10/80.]

Chapter 296-82 WAC
SAFETY STANDARDS FOR EXISTING BELT MANLIFTS

WAC

296-82-010 Belt manlifts——Definitions.
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296-82-066 Belt manlifts mechanical requirements——Instruction and warning signs.
296-82-070 Operating rules——Carrying of materials and tools.
296-82-078 Tests and inspections——Periodic inspection.

Reviser's note: RCW 70.87.030 as last amended by section 10, chapter 52, Laws of 1973 1st ex. sess. reads in part: "The director of the Department of Labor and Industries shall administer this chapter through the supervisor of the Division of Building and Construction Safety Inspection Services: *Provided*, That, except for the new construction thereof, all hand-powered elevators, belt manlifts, and one-man capacity manlifts installed in or on grain elevators shall be the responsibility of the Division of Industrial Safety and Health of the Department of Labor and Industries. The supervisor shall promulgate and adopt such rules and regulations governing the mechanical and electrical operation, erection, installation, alterations, inspections, acceptance tests, and repair of conveyances as may be necessary and appropriate and shall also promulgate and adopt minimum standards governing existing installations: . . ."

DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

296-82-013 General requirements——Floor openings. [Rule 1.010, effective 12/1/62.] Repealed by Order 74-31, filed 6/14/74.

296-82-063 Belt manlifts mechanical requirements——Factors of safety. [Rule 2.070, effective 12/1/62.] Repealed by Order 74-31, filed 6/14/74.

296-82-075 Tests and inspection——Acceptance tests. [Rule 4.010, effective 12/1/62.] Repealed by Order 74-31, filed 6/14/74.

WAC 296-82-010 Belt manlifts——Definitions. (1) **Factor safety.** The factor of safety is the ratio of the ultimate strength of the material to the allowable stress when a part is subjected to full load operation.

(2) **Handhold (handgrip).** A handhold is a device attached to the belt to assist a passenger in maintaining balance.

(3) **Open type.** One which has a handgrip surface fully exposed.

(4) **Closed type.** A cup-shaped device in which the handgrip surface is available only in the direction of travel and is covered on the opposite run.

(5) **Limit switch.** A device the purpose of which is to cut off the power to the motor and apply the brake to stop the carrier in the event that a loaded step passes the top terminal landing.

(6) **Manlift.** A manlift is a device consisting of a power-driven endless belt provided with steps or platforms and handholds attached to it for the transportation of personnel from floor to floor.

(7) **Rated speed.** Rated speed is the speed for which the device is designed and installed.

(8) **Step (platform).** A step is a passenger carrying unit. [Rules (part), effective 12/1/62.]

WAC 296-82-016 General requirements——Landings. (1) **Vertical clearance.** The clearance between the floor or mounting platform and the lower edge of the conical guard above it required by WAC 296-82-019 shall be not less than seven feet, six inches. Where this clearance cannot be obtained no access to the manlift shall be provided and the manlift runway shall be enclosed where it passes through such floor.

(2) **Clear landing space.** The floor space adjacent to the floor openings shall be free from obstructions and kept clear at all times.

(3) **Lighting of landings.** Adequate lighting, not less than three foot-candles, shall be provided at each floor landing at all times when the lift is in operation.

(4) **Landing surface.** The landing surfaces at the entrances and exits to the manlift shall be so constructed and maintained as to provide safe footing at all times.

(Coefficient of friction of not less than 0.5).

(5) **Emergency landings.**

(a) Emergency landings shall be provided so that anyone who is required to transfer from the belt manlift to the emergency ladder will not be required to travel on an emergency ladder a distance greater than twenty five feet to a floor landing or an emergency landing.

(b) Such emergency landings shall be accessible from both runs of the manlift and shall give access to the ladder required in WAC 296-82-037.

(c) Emergency platforms shall be completely enclosed with a standard railing and toeboard. [Rule 1.020, effective 12/1/62.]

WAC 296-82-019 General requirements——Floor opening guards. (1) On the ascending side of the manlift all landings shall be provided with a bevel guard or cone meeting the following requirements:

(a) Slope. Where possible, the cone shall make an angle of not less than forty-five (45) degrees with the horizontal. An angle of sixty (60) degrees or greater shall be used where ceiling heights permit.

(b) Extent. Where possible, the guard shall extend at least forty-two (42) inches outward from any handhold on the belt. It shall not extend beyond the upper surface of the floor above.

(c) Material and Construction. The cone shall be made of not less than Number 18 U.S. gage sheet steel or material of equivalent strength or stiffness. The lower edge shall be rolled to a minimum diameter of one-half (1/2) inch and the interior shall be smooth with no rivets, bolts or screws protruding.

(2) Obstructions shall be guarded in the same manner as floor openings with the same minimum distances observed. [Order 74-31, § 296-82-019, filed 6/14/74; Rule 1.030, effective 12/1/62.]

WAC 296-82-022 General requirements——Protection of entrances and exits. (1) **Guardrail requirement.** The entrances and exits at all floors or landings affording access to the manlift shall be guarded by a maze (staggered railing) or a handrail equipped with self closing gates.

(2) **Construction.** The rails shall be standard guardrails with toeboards meeting the requirements of the General Safety Standards.

(3) **Gates.** Gates, if used, shall open outward and shall be self closing. Corners of gates shall be rounded.

(4) **Maze.** Maze or staggered openings shall offer no direct passage between enclosure and outer floor space.

(5) Rails shall be located at least two feet but not more than four feet from the edge of the opening measured at right angles to the face of the belt. The intersection of the top rail and the end post at openings shall be a bend or standard long sweep "ell".

(6) Except where building layout prevents, entrances at all landings shall be in the same relative position. [Rule 1.040, effective 12/1/62.]

WAC 296-82-025 General requirements——Guards for openings. (1) **Construction.** The floor opening at each landing shall be guarded on sides not used for entrances or exit by a standard railing and toeboard or by panels of wire mesh of not less than number 10 U.S. gage, expanded metal of not less than number 13 U.S. gage or sheet metal of equivalent strength or metal on a frame of angle iron not less than one and one quarter by one eighth inch or of one and one quarter inch iron pipe.

(2) When belt manlift is installed in a stair well a standard guard rail shall be placed between the floor openings of the manlift and the stairways.

(3) **Height and location.** Such rails or guards shall be at least forty two inches in height on the up-running side and sixty six inches on the down running side. If a guardrail is used the section of the guard above the rail may be of the construction specified in subsection (1) above or may consist of vertical or horizontal bars which will reject a ball six inches in diameter. Rails or guards shall be located not more than one foot from the edge of the floor opening. [Rule 1.050, effective 12/1/62.]

WAC 296-82-028 General requirements——Guards at floor landings. Expanded metal, sheet metal or wood guards must be installed to cover the area from the floor to seven feet above the floor on each exposed side of the belt manlift at each floor landing, so persons can not place their hands in the area where the step rollers travel. [Rule 1.060, effective 12/1/62.]

WAC 296-82-031 General requirements——Bottom arrangement. (1) Bottom Landing. (Where possible.) At the bottom landing the clear area shall be not smaller than the area enclosed by the guardrails on the floors above, and any wall in front of the "down" running side of the belt shall be not less than forty-eight (48) inches from the face of the belt. This space shall not be encroached upon by stairs or ladders.

(2) Location of Lower Pulley. The lower (boot) pulley shall be installed so that it is supported by the lowest landing served.

(3) Mounting Platform. (a) A mounting platform shall be provided in front or to one side of the up-run at the lowest landing, unless the floor level is such that the following requirement can be met: The floor or platform

shall be at or above the point at which the upper surface of the ascending step assumes a horizontal position.

(b) A platform shall be provided in front or to one side of the down-run at the lowest landing unless the floor level is such that the following requirements can be met: The floor or platform shall be at or above the point at which the upper surface of the descending step leaves the horizontal position. [Order 74-31, § 296-82-031, filed 6/14/74; Rule 1.070, effective 12/1/62.]

WAC 296-82-034 General requirements——Top clearance. Top Emergency Landing. (Where possible.) Where the center of the head pulley is greater than six (6) feet above the top landing, an emergency landing and ladder must be installed. The landing shall be twenty-four (24) inches below the center of the head pulley. [Order 74-31, § 296-82-034, filed 6/14/74; Rule 1.080, effective 12/1/62.]

WAC 296-82-037 General requirements——Emergency exit ladders. (1) **Where required.** A fixed metal ladder accessible from both the "up" and "down" run of the manlift shall be provided where the vertical distance between landings exceeds twenty feet.

(2) **Construction.** Such ladder shall be in accordance with the existing general safety standards for ladders except that enclosing cages shall not be provided. [General Safety Standards WAC 296-25.] [Rule 1.090, effective 12/1/62.]

WAC 296-82-040 General requirements——Illumination. (1) **General.** Both runs of the manlift shall be illuminated at all times when the lift is in operation. An intensity of not less than one foot-candle shall be maintained at all points.

(2) **Control of illumination.** Lighting of manlift runways shall be by means of circuits permanently tied in to the building circuits (no switches), or shall be arranged to be turned on by the starting switch controlling the manlift motor, or shall be controlled by switches at each landing. Where separate switches are provided at each landing, any switch shall turn on all lights necessary to illuminate the entire runway. [Rule 1.100, effective 12/1/62.]

WAC 296-82-045 Belt manlifts mechanical requirements——Machines. (1) Types. Machines shall be of the direct connected type or shall be driven by multiple V-belts. Cast-iron gears shall not be used.

(2) Brake. A mechanically applied, electrically released brake shall be applied to the motor shaft for direct connected units or to the in-put shaft for belt driven units. The brake shall be capable of stopping and holding the manlift with its rated capacity.

(3) Belt Fastenings. Belts shall be fastened by a lapped splice or shall be butt spliced with a strap on the side of the belt away from the pulley. For lapped splices, the overlap of the belt at the splice shall be not less than three (3) feet where the total travel of the manlift does not exceed one hundred (100) feet and not less than four (4) feet, if the travel exceeds one hundred (100) feet.

Where butt splices are used the straps shall extend not less than three (3) feet on one side of the butt for a travel not in excess of one hundred (100) feet, and four (4) feet for a travel in excess of one hundred (100) feet.

For twelve (12) inch belts, the joint shall be fastened with not less than twenty (20) special elevator bolts, each of a minimum diameter of one-quarter (1/4) inch. These bolts shall be arranged symmetrically in five rows so arranged as to cover the area of the joint effectively. The minimum number of bolts for a belt width of fourteen (14) inches shall be not less than twenty-three (23) and for belt widths of sixteen (16) inches, the number of bolts shall be not less than twenty-seven (27).

(4) Overspeed Protection. The machine shall be so designed and constructed to hold the driving pulley in event of shaft failure or overspeed. This applies to new and existing installations. [Order 74-31, § 296-82-045, filed 6/14/74; Rule 2.010, effective 12/1/62.]

WAC 296-82-048 Belt manlifts mechanical requirements——Speed. All manlifts in a given plant should run at approximately the same speed. [Order 74-31, § 296-82-048, filed 6/14/74; Rule 2.020, effective 12/1/62.]

WAC 296-82-051 Belt manlifts mechanical requirements——Platforms or steps. (1) Minimum Depth. Steps or platforms shall be not less than twelve (12) inches nor more than fourteen (14) inches deep, measured from the belt to the edge of the step or platform.

(2) Width. The width of the step or platform shall be not less than the width of the belt to which it is attached.

(3) Distance Between Steps. The distance between steps shall be equally spaced and not less than sixteen (16) feet measured from the upper surface of one step to the upper surface of the next step above it.

(4) Angle of Step. The surface of the step shall make approximately a right angle with the "up" and "down" run of the belt, and shall travel in an approximately horizontal position with the "up" and "down" run of the belt.

(5) Surfaces. The upper or working surfaces of the step shall be of a material having inherent nonslip characteristics (coefficient of friction not less than 0.5) or shall be covered completely by a nonslip tread securely fastened to it.

(6) Strength of Step Supports. Step frames or supports and their guides shall be adequate strength to:

(a) Prevent the disengagement of any step roller.

(b) Prevent any appreciable misalignment.

(c) Prevent any visible deformation of the step or its support.

(7) Prohibition of Steps Without Handholds. No step shall be provided unless there is a corresponding handhold above or below it meeting the requirements of WAC 296-82-054. If a step is removed for repairs or permanently, the handholds immediately above and below it shall be removed before the lift is again placed in service. [Order 74-31, § 296-82-051, filed 6/14/74; Rule 2.030, effective 12/1/62.]

WAC 296-82-054 Belt manlifts mechanical requirements——Handholds. (1) Location. Handholds attached to the belt shall be provided and so installed that they are not less than four (4) feet nor more than four (4) feet eight (8) inches above the step tread. These shall be so located as to be available on both the "up" and "down" run of the belt.

(2) Size. The grab surface of the handhold shall be not less than four and one-half (4 1/2) inches in width. Fastenings for handholds shall not come within one (1) inch of the belt edge.

(3) Strength. The handhold shall be capable of withstanding without damage a load of three hundred (300) pounds applied parallel to the run of the belt.

(4) Prohibition of Handhold Without Steps. No handhold shall be provided without a corresponding step. If a handhold is removed permanently or temporarily, the corresponding step and handhold for the opposite direction of travel shall also be removed before the lift is again placed in service. [Order 74-31, § 296-82-054, filed 6/14/74; Rule 2.040, effective 12/1/62.]

WAC 296-82-057 Belt manlifts mechanical requirements——Up limit stops. (1) **Requirements.** Two separate automatic stop devices shall be provided to cut off the power and apply the brake when a loaded step passes the upper terminal landing. One of these shall consist of a switch mechanically operated by the belt or step roller. The second may consist of any of the following:

(a) Roller switch placed above and out of line with the first limit switch.

(b) Photocell and light source ("electric eye").

(c) A switch actuated by a lever, rod, or plate, the latter placed above the head pulley so as to just clear a passing step.

(2) **Manual reset location.** After the manlift has been stopped by this device it shall be necessary to reset the automatic stop manually. The device shall be so located at the top landing that a person resetting it shall have a clear view of both the "up" and "down" runs of the manlift. It shall not be possible to reset the device from any step or platform.

(3) **Cut-off point.** The device shall function so that the manlift will be stopped before the loaded step has reached a point twenty four inches above the top terminal landing.

(4) **Electrical requirements.**

(a) Where such switches open the main motor circuit directly they shall be of the multiple type.

(b) Where photoelectric devices are used they shall be so designed and installed that the failure of the light source, or of the light sensitive element, or of any other vacuum tubes employed in the circuit will result in shutting off the power to the driving motor.

(c) Where flammable vapors or dusts may be present all electrical installations shall be in accordance with national electrical code requirements for such locations.

(d) Unless of the oil immersed type, controller contacts carrying the main motor current shall be copper to carbon, except where the circuit is broken at two or more points simultaneously. [Rule 2.050, effective 12/1/62.]

WAC 296-82-060 Belt manlifts mechanical requirements——Emergency stop. (1) Requirement. An emergency stop means shall be provided.

(2) Location. This stop means shall be within easy reach of the ascending and descending runs of the belt.

(3) Operation. This stop means shall be so connected with the control lever or operating mechanism that it will cut off the power and apply the brake when pulled in the direction of travel.

(4) Material. This stop may consist of a cotton rope with a wire center, manila or sisal rope, or may be made up of suitable lengths of metallic pipe or tubing. If rope is used, it shall be not less than three-eighths (3/8) inch in diameter. Wire rope, unless marlin covered, shall not be used.

(5) Normal Stopping Use. This emergency stop may be used for normal stopping (and starting) where the manlift does not run continuously.

(6) Emergency Stop Switch, Treadle Type on Down Side. An emergency stop treadle switch shall be placed in the area below the lowest landing on the "down" side. This switch must stop the mechanism if a person should fail to get off at the lowest landing and be ejected from the step as it approaches its position to travel around the boot pulley. The treadle stop switch shall be of the manual reset type. [Order 74-31, § 296-82-060, filed 6/14/74; Rule 2.060, effective 12/1/62.]

WAC 296-82-066 Belt manlifts mechanical requirements——Instruction and warning signs. (1) **Instruction signs at landings or on belt.** Signs of conspicuous and easily read style giving instructions for the use of the manlift shall be posted at each landing or stenciled on the belt.

(a) Size and legibility. Such signs shall be of letters not less than one inch in height and of a color having high contrast with the surface on which it is stenciled or painted (white or yellow on black or black on white or gray).

(b) Inscription. The instructions shall read approximately as follows:

"Face the Belt"
"Use the Handhold"
"To Stop – Pull Rope"

(2) **Top floor warning sign or light.**

(a) Requirement. At the top floor an illuminated sign be displayed bearing the following wording:

"Top Floor – Get Off".

(b) Size of letters. Signs shall be in block letters not less than two inches in height

(c) Location. This sign shall be located within easy view of an ascending passenger and not more than two feet above the top terminal landing.

(d) Alternate warning light. As an alternate for the sign required by (2)(a) above, a red light of not less than forty watt rating may be provided immediately below

the upper terminal landing and so located as to shine in a passenger's face will be accepted.

(3) **Visitor warning.**

(a) Requirement. A conspicuous sign having the following legend – "Employees Only – Visitors Keep Off" – shall be displayed at each landing.

(b) Size of letters. Sign shall be of block letters not less than two inches in height and shall be of a color offering high contrast with the background color.

(4) **Bottom of manlift warning sign or light.**

(a) A sign or light warning the passenger he is approaching bottom landing shall be posted above bottom landing in a conspicuous place. Sign or light to be similar in size to top warning light and sign noted above.

(b) An electric buzzer. An electric buzzer shall be installed five feet above the bottom landing on the down side to warn the rider that he is approaching the bottom landing and the buzzer shall be activated automatically by the weight of a load on a step. [Rule 2.080, effective 12/1/62.]

WAC 296-82-070 Operating rules——Carrying of materials and tools. (1) No freight or packaged goods shall be carried on any manlift.

(2) No pipe, lumber, or other construction materials shall be handled on any manlift.

(3) No tools except those which will fit entirely within a pocket in usual working clothes shall be carried on any manlift except as provided in subsection (4) below.

(4) Tools may be carried in a canvas bag having dimensions not larger than eleven inches by thirteen inches and provided with carrying loops or handles. Such bag shall be provided with a leather bottom. Such bag shall not be provided with shoulder straps but shall be carried in the passenger's hand while he is riding the manlift. [Rule 3.010, effective 12/1/62.]

WAC 296-82-078 Tests and inspections——Periodic inspection. (1) **Frequency.** All manlifts shall be inspected by a competent designated person at intervals of not more than thirty days.

(2) **Items covered.** This periodic inspection shall cover but is not limited to the following items:

Steps
Step fastenings
Rails
Rail supports and fastenings
Rollers and slides
Belt and belt tension
Handholds and fastenings
Guardrails
Lubrication
Warning signs and lights
Signal equipment
Drive pulley
Bottom (boot) and pulley
Clearance
Pulley supports
Motor
Driving mechanism
Brake
Electrical switches

(3) **Inspection log.** A written record shall be kept of findings at each inspection. Records of inspection shall be made available to duly qualified inspectors. [Rule 4.020, effective 12/1/62.]

Chapter 296-83 WAC
ELECTRIC MANLIFTS

WAC

296-83-010 Scope and application.
296-83-015 Waiver and variance.
296-83-020 Hoistway enclosures and landings.
296-83-025 Hoistway gates.
296-83-030 Elevator car.
296-83-035 Elevator doors.
296-83-040 Counterweight, enclosures and fastenings.
296-83-045 Guide rails.
296-83-050 Hoisting ropes.
296-83-055 Space under hoistway.
296-83-060 Car safeties.
296-83-065 Brakes.
296-83-070 Car controls and safety devices.
296-83-075 Hoisting machine mechanisms.
296-83-080 Elevator car and counterweight buffers.
296-83-085 General requirements.

Reviser's note: RCW 70.87.030 as last amended by section 1, chapter 66, Laws of 1971, reads in part: "The director of the Department of Labor and Industries shall administer this chapter through the supervisor of the Division of Building and Construction Safety Inspection Services: *Provided*, That, except for the new construction thereof, all handpowered elevators, belt manlifts, and one-man capacity manlifts installed in or on grain elevators shall be the responsibility of the Division of Safety of the Department of Labor and Industries. The supervisor shall promulgate and adopt such rules and regulations governing the mechanical and electrical operation, erection, installation, alterations, inspection, acceptance tests, and repair of conveyances as may be necessary and appropriate and shall also promulgate and adopt minimum standards governing existing installations: . . ."

WAC 296-83-010 Scope and application. The following requirements shall apply to the installation, design and use of all one man capacity, electric elevators, subject to inspections as required by RCW 49.16.120. [Rules (part), effective 5/15/64.]

WAC 296-83-015 Waiver and variance. The supervisor of safety may, upon receipt of application and after adequate investigation by the department, permit a variation from these requirements when other accepted means of protection are provided. Any variation granted under the provisions of this paragraph shall be limited to the particular case or cases covered in the application for variation and may be revoked for cause. The permit for variance shall be conspicuously posted on the premises prior to becoming effective and shall remain posted during the life of such waiver. [Rules (part), effective 5/15/64.]

WAC 296-83-020 Hoistway enclosures and landings. Hoistways shall be fully enclosed or enclosed on all landings to a height of six feet above the landing floor or six feet above highest working level or stair level adjacent to the hoistway. Perforated hoistway enclosures can be used where fire resistivity is not required provided it

conforms to the following: (1) Steel wire grill or expanded metal grill shall be at least 13 U.S. gauge steel wire.

(2) Opening in the enclosure shall reject a one inch steel ball.

(3) All hoistway landings shall be properly and adequately lighted. [§ I, Rule 1.010, effective 5/15/64.]

WAC 296-83-025 Hoistway gates. (1) Hoistway gates may be constructed of wood slat, steel wire grill, expanded metal or solid material, providing all openings reject a two inch ball and will resist a two hundred fifty pound horizontal thrust.

(a) Steel wire and expanded metal gates shall be of at least 13 U.S. gauge steel.

(b) Wood slats must be not less than two inches wide and one-half inch thick, nominal size.

(c) Solid material shall be not less than one eighth inch reinforced sheet steel or one-half inch plywood.

(2) Hoistway gates can be horizontal swinging, vertical or horizontal sliding or biparting gates.

(a) Hoistway gates shall extend the full width of the elevator car and from one inch above the landing floor to six feet or more above the floor.

(b) Horizontal swinging gates shall be full stopped from swinging into hoistway.

(3) Gates shall be equipped with interlocks or mechanical locks and electric contacts designed so that hoistway gates cannot be opened when the car is away from the landing. [§ II, Rules 2.010-2.030, effective 5/15/64.]

WAC 296-83-030 Elevator car. (1) Elevator cars will be fully enclosed to height of car or to a height of not less than six feet six inches. Elevator cars can be of perforated or solid material provided material will withstand a horizontal thrust of seventy-five pounds without deflecting one-quarter inch and all openings will reject a one inch ball.

(a) Car frames shall be of substantial metal or wood construction with a safety factor of four on metal and six on wood.

(b) Wood frames shall be gusseted and bolted or otherwise secured with large washers and lock washers.

(c) Car platform cannot exceed thirty inches inside dimension on each side (6.25 square foot area).

(2) Every car shall have a substantial protective top. The front half may be hinged. The protective top may be made from number 9 U.S. wire gauge screen, 11 gauge expended metal, 14 gauge sheet steel or three-quarter inch or heavier plywood. If made of wire screen or metal, the openings shall reject a one-half inch diameter ball. [§ III, Rules 3.010-3.020, effective 5/15/64.]

WAC 296-83-035 Elevator doors. Elevator car doors shall be provided on all elevators except on fully enclosed hoistways equipped with hoistway gates and hoistways enclosed from the top of the hoistway opening to the ceiling on the landing side. (1) Car doors can be of solid or perforated construction capable of resisting a seventy-five pound thrust without deflecting one-quarter inch.

(2) Car doors may be biparting or otherwise horizontal swung provided the door swings within the elevator car.

(3) A positive locking latch device shall be provided to resist a two hundred fifty pound thrust.

(4) Interlocks or mechanical locks and electric contacts must be provided on cars operating in open hoistways. [§ IV, Rule 4.010, effective 5/15/64.]

WAC 296-83-040 Counterweight, enclosures and fastenings. All counterweights shall be fully enclosed for their full length of travel except in closed hoistways where counterweight guide rails have been provided.

(1) Counterweight enclosures shall provide an inspection opening in the bottom of the enclosure large enough to provide for the inspection of cable fastenings, counterweight and buffer. Counterweights of rectangular shape shall be secured by not less than two one-half inch mild steel bolts with locknuts. Round counterweights shall be fastened with a center bolt not less than three-quarter inch diameter and secured with a locknut.

(2) Bolt eyes shall be welded closed.

(3) Cable fastenings shall be not less than three U-shaped clamps with U's on the dead side of the rope or babbitted tapered elevator sockets. [§ V, Rule 5.010, effective 5/15/64.]

WAC 296-83-045 Guide rails. A minimum of two car guide rails shall be provided and they shall (1) Extend at least six inches beyond the maximum travel of the car with buffers compressed.

(2) Be securely fastened to a vertical supporting member for the full length of elevator travel.

(3) Be not less than one and one-half inch by one and one-half inch vertical grain fir or equivalent or one-quarter inch by two inch by two inch angle iron or equivalent.

(4) Not vary more than three-sixteenths inch thickness on brake surfaces for wood guide rails.

(5) Be secured to resist more than one-half inch total deflection on car safety application and resist a two hundred fifty pound horizontal thrust. [§ VI, Rule 6.010, effective 5/15/64.]

WAC 296-83-050 Hoisting ropes. Hoisting ropes shall be of good grade elevator traction wire rope and shall (1) Be not less than two ropes of not less than three-eights inch diameter and provide a safety factor of five.

(2) Be fastened by at least three U-type cable clamps with the U on the dead return end of the rope or by approved elevator sockets of the babbitted type.

(3) Hoisting rope shall be of such length that the car platform will not be more than six inches above the top landing when the counterweight buffer is fully compressed and the counterweight shall be six inches or more away from the counterbalance sheave when the car buffer is fully compressed. [§ VII, Rule 7.010, effective 5/15/64.]

WAC 296-83-055 Space under hoistway. There shall be no habitable space below the elevator hoistway and counterweight shaft unless the floor is designed to withstand and impact 125 percent greater than the impact generated by a free fall of either the car or counterweight from the full height of the hoistway. [§ VIII, Rule 8.010, effective 5/15/64.]

WAC 296-83-060 Car safeties. All cars suspended or operated from overhead machinery shall be equipped with an approved car safety capable of stopping and holding the car with rated load. (1) Car safeties shall operate mechanically and be independent of interruption of any electrical circuit.

(2) Car safeties will automatically operate and control circuit will be broken in the event of cable breakage and on governor controlled safeties. [§ IX, Rule 9.010, effective 5/15/64.]

WAC 296-83-065 Brakes. All elevators shall be equipped with brakes designed to engage mechanically and release electrically. (1) Brakes shall be located on the final drive of all elevator machines.

(2) The brake actuating circuit will be so designed that interruption of power by slack cable switch, control switch, and limit switches, will actuate the brake.

(3) The brakes shall actuate under short circuit, phase failure, or reverse phase conditions. [§ X, Rule 10.010, effective 5/15/64.]

WAC 296-83-070 Car controls and safety devices. (1) Car controls may be automatic pushbutton, constant pressure pushbutton or momentary pushbutton types. Hand rope and car switch controls shall not be used.

(2) Manually operated emergency stop switches shall be installed in all cars not equipped with constant pressure pushbutton controls. Switch shall be clearly marked "Emergency Stop".

(3) Terminal limiting devices shall operate independently of the car controls and automatically stop the car at the top and bottom terminal landings.

(4) All winding drum machine type elevators shall be equipped with top and bottom final limit switches.

(5) A slack rope device of the manual reset design shall be required on all winding drum type machines. The device shall be designed to de-energize the circuit to the drive motor and brake.

(6) All new installations shall be equipped with an overspeed governor. This governor shall be set not to exceed one hundred seventy-five feet per minute and shall be designed to de-energize the brake control and motor drive circuits simutaneously with the activation of the car safeties mechanism. Car speeds for these types of installations shall not exceed a speed of one hundred twenty-five feet per minute. [§ XI, Rules 11.010-11.060, effective 5/15/64.]

WAC 296-83-075 Hoisting machine mechanisms. (1) Elevator machines shall be driven by approved type units.

(a) On direct drive or approved worm gear driven type, a mechanically actuated, electrically released brake shall be installed on the driving unit.

(b) On V belt driven types, a minimum of four belts, one -half inch minimum size, shall be used to transmit power from the motor to the drive shaft and a mechanically actuated, electrically released brake shall be installed on the final drive shaft.

(2) Wherever practical, elevator machines shall be installed on the top side of their supporting structure.

(3) All components of the driving mechanism or parts subject to stress involved in suspending the load or related equipment shall be designed to withstand eight times the total weight to be suspended, which would include load, counterweight, car and cables.

(4) Gears shall be made of steel or equivalent material. Cast iron gears are prohibited. [§ XII, Rules 12.010-12.040, effective 5/15/64.]

WAC 296-83-080 Elevator car and counterweight buffers. (1) On new installations, elevator cars shall be provided with adequate car buffers.

(2) All elevators using a counterweight shall be provided with adequate counterweight buffers. [§ XIII, Rules 13.010-13.020, effective 5/15/64.]

WAC 296-83-085 General requirements. (1) Adequate lighting shall be provided at each landing and in the shaftway.

(2) A sign bearing the following information shall be conspicuously posted within the car:

(a) Maximum capacity one person

(b) Total load limit in pounds

(c) For authorized personnel use only

(3) A fire extinguisher in proper working condition shall be attached to the car structure. [§ XIV, Rules 14.010-14.030, effective 5/15/64.]

Chapter 296-84 WAC
HAND POWER MANLIFTS

WAC

296-84-010 Scope and application.
296-84-015 Waiver and variance.
296-84-020 Hoistway landings.
296-84-025 Hoistway clearances.
296-84-030 Habitable space under hoistways.
296-84-035 Hoistway guide rails.
296-84-040 Buffer springs and overtravel of car.
296-84-045 Car specifications.
296-84-050 Counterweights.
296-84-055 Sheaves.
296-84-060 Hoisting ropes.
296-84-065 Operating rope.
296-84-070 Lighting.
296-84-075 Overhead supports.
296-84-080 General requirements.

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installed in or on grain elevators shall be the responsibility of the Division of Safety of the Department of Labor and Industries. The supervisor shall promulgate and adopt such rules and regulations governing the mechanical and electrical operation, erection, installation, alterations, inspection, acceptance tests, and repair of conveyances as may be necessary and appropriate and shall also promulgate and adopt minimum standards governing existing installations: . . ."

WAC 296-84-010 Scope and application. The following requirements shall apply to the installation, design and use of all one man capacity, hand power counterweighted elevators subject to inspection as required by RCW 49.16.120. [Rules (part), effective 5/15/64.]

WAC 296-84-015 Waiver and variance. The supervisor of safety may, upon receipt of application and after adequate investigation by the department, permit a variation from these requirements when other accepted means of protection are provided. Any variation granted under the provisions of this paragraph shall be limited to the particular case or cases covered in the application for variation and may be revoked for cause. The permit for variance shall be conspicuously posted on the premises prior to becoming effective and shall remain posted during the life of such waiver. [Rules (part), effective 5/15/64.]

WAC 296-84-020 Hoistway landings. (1) Every hoistway landing shall be protected on sides other than the landing opening side with a standard guard rail and intermediate guard rail. All landings except the bottom landing shall have a toe board installed on all sides except the landing opening side.

(2) All hoistway entrances shall be not less than six feet six inches in height and in no case shall the width exceed the corresponding car dimensions.

(3) All hoistway entrances must be provided with an approved maze or with a hoistway gate which shall:

(a) Be at least thirty–six inches in height.

(b) Extend downward to within one inch of the landing sill.

(c) Be of the self–closing type, designed to swing horizontally out from the hoistway and closing against a full jam stop.

(d) Be located within four inches of the hoistway edge of the landing sill.

(e) Have a "DANGER" sign conspicuously posted on the landing side of the hoistway gate.

(f) Withstand a two hundred fifty pound horizontal thrust.

(4) For any new installation, all projections extending inwardly from the hoistway enclosure at the entrance side of the car platform shall be bevelled and substantially guarded on the underside by smooth solid material set at an angle of not less than sixty degrees, nor more than seventy–five degrees from the horizontal when cars are not equipped with gates. [§ I, Rules 1.010–1.040, effective 5/15/64.]

WAC 296-84-025 Hoistway clearances. (1) The minimum clearance between the side of the car and a hoistway enclosure shall be one inch.

(2) The clearance between the car platform and the landing sill shall not be less than one–half inch and not more than one and one–half inches. [§ II, Rules 2.010–2.020, effective 5/15/64.]

WAC 296-84-030 Habitable space under hoistways. There shall be no habitable space below the elevator hoistway or counterweight shaft unless the floor is supported to withstand any impact caused by the car or counterweight dropping freely onto the floor. [§ III, Rule 3.010, effective 5/15/64.]

WAC 296-84-035 Hoistway guide rails. (1) There shall be a minimum of two opposing guide rails extending to a point six inches beyond the full height of travel of the car when the counterweight buffer is fully compressed.

(2) All rails shall be supported by bolts, lag screws or other approved methods to a vertical supporting member which shall not exceed one–half inch deflection with the application of a two hundred fifty pound horizontal thrust at any point.

(3) Wood guide rails shall be at least one and one–half inch by one and one–half inch vertical grain fir or equivalent and shall not vary more than three–sixteenth inch in thickness on the sides to which the brakes make contact. All joints shall be kept smooth and even. [§ IV, Rules 4.010–4.030, effective 5/15/64.]

WAC 296-84-040 Buffer springs and overtravel of car. Substantial spring buffers shall be installed below the car and also below the counterweight on all new installations. All installations shall have spring buffers attached below the counterweight. The hoisting rope shall be of such length that the car platform will not be more than eight inches above the top landing when the counterweight buffer spring is fully compressed. [§ V, Rule 5.010, effective 5/15/64.]

WAC 296-84-045 Car specifications. (1) The car shall be built to the following specifications:

(a) The car platform shall be not greater than thirty inches on either side, (6.25 square feet area).

(b) The car frame and platform shall be of steel or sound seasoned wood construction and be designed with a factor of safety of not less than four for metal and six for wood, based on a maximum capacity of two hundred fifty pounds.

(c) All frame members shall be securely bolted, riveted or welded and braced. If bolted, lock washers or lock nuts must be used.

(d) Where wooden frame members are bolted, large washers or metal plates shall be used to minimize the possibility of splitting or cracking the wood.

(2) The sides of the car shall be enclosed by a minimum of two safety guard rails with the top rail not less than thirty–six inches nor more than forty–two inches from the car floor and with the intermediate bar bisecting the height. Rails shall sustain a horizontal thrust of two hundred fifty pounds. If solid material is used it shall be smooth surfaced and not less than one–half inch

thickness, if wood; and not less than sixteen gauge thickness, if steel; and shall be constructed from the car floor to a height of not less than three feet.

(a) Where the hoistway is not enclosed on the entrance side of the car, a self–locking or drop bar positive stop type car gate must be provided. Car gate may be of the folding type, horizontally swung, provided it swings into the car enclosure. Drop bar gates must be of two bar construction, parallelogram type, and conform to requirements specified for car guard rails.

(b) The car gate shall drop into locking slots or be provided with a positive locking type latch capable of withstanding two hundred fifty pounds horizontal thrust.

(3) Every car shall have a substantial protective top. The front half may be hinged. The protective top may be made from number 9 U.S. wire gauge screen, 11 gauge expanded metal, 14 gauge sheet steel or three–quarter inch or heavier plywood. If made of wire screen or metal, the openings shall reject a one–half inch diameter ball.

(4) Every car shall have a proper rack to hold the balance weights.

(5) A sign bearing the following information shall be conspicuously posted within the car:

(a) Maximum capacity one person

(b) Total load limit in pounds

(c) For authorized personnel use only.

(6) Every car shall be equipped with a spring loaded foot brake which:

(a) Will operate independently of the car safeties.

(b) Will operate in both directions and will stop and hold the car and its load.

(c) Will lock the car in its position automatically whenever the operator releases the pressure on the foot pedal.

(7) Every car shall be equipped with a car safety device which will:

(a) Apply to the sides of the main guide rails.

(b) Stop and hold the car and its load immediately when the hoisting rope breaks.

(8) Every car shall have a minimum clearance of six feet six inches from the top of the car platform to the bottom edge of the crosshead or any other obstruction.

(9) A tool box with minimum dimensions of four inches wide by sixteen inches long by three inches in depth shall be provided and firmly attached to the car structure. [§ VI, Rules 6.010–6.090, effective 5/15/64.]

WAC 296-84-050 Counterweights. (1) The assembly of sectional counterweight shall conform to the following requirements:

(a) Rectangular type shall be held together by at least two tie rods one–half inch in diameter fastened with lock washers and double nuts or other approved means.

(b) One three–quarter inch rod may be used to hold the sections of a round counterweight together. Any additional sections or weights shall be secured by an approved means.

(2) The eye bolt for the rope hitch shall be attached to the counterweight in a manner that will prevent the eye bolt from coming loose. The eye of eye bolts shall be welded to prevent them from opening.

(3) Every counterweight runway shall be enclosed with substantial unperforated material for its full distance of travel. Inspection openings shall be provided at either the top or bottom of the counterweight runway. These openings shall be substantially covered at all times except when actually engaged in inspection of counterweight fastenings.

(4) Workmen shall load the counterweight for the proper balance of the heaviest person using the elevator and others shall use compensating weights, which shall be available, to maintain a balance suitable for their needs.

(5) On elevators with travel of seventy–five feet or more, a compensating chain or cable shall be installed to maintain the proper balance of the counterweight to the car and load in all positions. [§ VII, Rules 7.010–7.050, effective 5/15/64.]

WAC 296-84-055 Sheaves. The minimum sheave diameter shall be forty times the diameter of the ropes used, i.e., fifteen inch for three–eighths inch rope. [§ VIII, Rule 8.010, effective 5/15/64.]

WAC 296-84-060 Hoisting ropes. (1) Hoisting rope shall be of good grade traction elevator wire rope, and shall:

(a) Be not less than three–eighths inches in diameter.

(b) Provide a factor of safety of five based on the maximum weight supported.

(c) Be of such length to prevent the counterweight from striking the overhead structure when car is at bottom landing, and prevent the car from striking the overhead before the counterweight is at its lower limit of travel.

(d) Be fastened at each end by at least three or more clamps, the "U" of the clamp bearing on the dead end of the rope.

(e) Where passed around a metal or other object less than three times the diameter of the cable, have a thimble of the correct size inserted in the eye.

(2) Approved sockets or fittings with the wire properly turned back and babbitted may be used in place of clamps noted in subsection (1)(d) above. [§ IX, Rules 9.010–9.020, effective 5/15/64.]

WAC 296-84-065 Operating rope. The operating rope shall be of soft hemp or cotton at least three–quarter inch in diameter, and be securely fastened at each end and shall be in proper vertical alignment to prevent bending or cutting where it passes through the openings in the platform or the protective top of the car. [§ X, Rule 10.010, effective 5/15/64.]

WAC 296-84-070 Lighting. Adequate lighting shall be provided at each landing and in the shaftway. [§ XI, Rule 11.010, effective 5/15/64.]

WAC 296-84-075 Overhead supports. The overhead supporting members shall be designed, based upon impact loads, with a factor of safety of: (1) Nine if wood;

(2) Five if steel. [§ XII, Rule 12.010, effective 5/15/64.]

WAC 296-84-080 General requirements. (1) No person other than an employee or duly authorized person shall ride or be permitted to ride in the car.

(2) Escape ladders shall be installed to extend the full length of the hoistway and shall be located in a position whereby, in an emergency, a person can safely transfer from the car platform to the ladder. "IMPAIRED CLEARANCE" sign to be posted at bottom of ladders when face of ladder is less than thirty inches from any structure.

(3) An automatic safety dog or device shall be installed at the bottom landing which will prevent the car from leaving the landing until manually released by the operator.

(4) A fire extinguisher in proper working condition shall be attached to the car structure. [§ XIII, Rules 13.010–13.040, effective 5/15/64.]

Chapter 296-85 WAC
MECHANIZED PARKING GARAGE EQUIPMENT

WAC

296-85-005 National code adopted.

WAC 296-85-005 National code adopted. USASI Standard A113.1–1964 "Safety Code for Mechanized Parking Garage Equipment". [Filed 12/29/67, effective 2/1/68.]

Reviser's note: A part of Order 70–11, filed 9/18/70, effective date 10/21/70, states that the administration of WAC 296–85–005, Safety Code for Mechanized Parking Garage Equipment shall be under the jurisdiction of the Division of Building and Construction Safety Inspection Services of the Department of Labor and Industries.

Reviser's note: The A.S.A. publications are published by the American Society of Mechanical Engineers, United Engineering Center, 345, East 47th Street, New York, New York 10017.

Chapter 296-86 WAC
REGULATIONS AND FEES FOR FREIGHT AND PASSENGER ELEVATORS, MANLIFTS, DUMBWAITERS, ESCALATORS, MOVING WALKS, AUTOMOBILE PARKING ELEVATORS, AND PERSONNEL ELEVATORS

WAC

296-86-010 Permits for construction, alteration, relocation of installations.
296-86-020 Construction and alteration fee.
296-86-030 Installation fee for personnel elevators, material hoists and cantilever hoists.
296-86-040 Submission of plans for new installations.
296-86-050 Fee for checking plans for new installations.
296-86-060 Annual operating permit fees.
296-86-070 Supplemental inspections.
296-86-075 Reinspection fees.
296-86-080 Fee for inspection of regular elevators being used as temporary personnel elevators.

WAC 296-86-010 Permits for construction, alteration, relocation of installations. Before a permit is issued for the construction, alteration, relocation or installation of a conveyance subject to the provisions of this act, application for such a permit shall be made to the supervisor accompanied by a fee as set forth in the fee schedule in this section. No work shall be done until the permit has been issued. Construction and alteration permits shall be valid for one year from date of issue. Renewals may be obtained for one dollar for each permit. No permit or fee shall be required for ordering repairs and replacement of damaged, broken or worn parts necessary for normal maintenance and no permit or fee shall be required for any conveyance exempted by RCW 70.87.200. [Order 70–5, § 296–86–010, filed 6/2/70.]

WAC 296-86-020 Construction and alteration fee. The construction and alteration fee schedule shall be:

TOTAL COST	FEE
$250.00 to and including $1,000	$20.00
$1,001 to and including $15,000	
For first $1,001	30.00
For each additional $1,000 or fraction	5.00
$15,001 to and including $50,000	
For first $15,001	125.00
For each additional $1,000 or fraction	4.00
$50,001 to and including $100,000	
For first $50,001	265.00
For each additional $1,000 or fraction	4.00
Over $100,001	
For first $100,001	500.00
For each additional $1,000 or fraction	3.00

[Order 70–5, § 296–86–020, filed 6/2/70.]

WAC 296-86-030 Installation fee for personnel elevators, material hoists and cantilever hoists. The fee for the installation of each personnel elevator, material hoist and cantilever hoist shall be $45.00. [Order 76–37, § 296–86–030, filed 12/3/76; Order 74–36, § 296–86–030, filed 10/1/74; Order 70–11, § 296–86–030, filed 9/18/70, effective 10/21/70; Order 70–5, § 296–86–030, filed 6/2/70.]

WAC 296-86-040 Submission of plans for new installations. Plans shall be submitted in duplicate to the elevator section prior to construction for approval in accordance with the American Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks A 17.1–1971. [Order 74–36, § 296–86–040, filed 10/1/74; Order 70–5, § 296–86–040, filed 6/2/70.]

WAC 296-86-050 Fee for checking plans for new installations. The fee for checking plans shall be $20.00 for each installation. [Order 70–5, § 296–86–050, filed 6/2/70.]

WAC 296-86-060 Annual operating permit fees. Fees for annual operation shall be paid in accordance with the following schedule and no operating permit shall be issued for the operation of a conveyance until such fees have been received.

CONVEYANCE	ANNUAL FEE
Each passenger elevator	$45.00
Each freight elevator	45.00
Each sidewalk freight elevator	45.00
Each hand power freight elevator	15.00
Each hand power manlift	20.00
Each incline lift	45.00
Each belt manlift	45.00
Each boat launching elevator	45.00
Each auto parking elevator	45.00
Each escalator	40.00
Each moving walk	40.00
Each dumbwaiter	15.00
Each people mover	35.00
Each stair lift	10.00
Each wheel chair lift	10.00
Each personnel elevator	45.00
Each material hoist	45.00
Each cantilever hoist	45.00

[Order 76-37, § 296-86-060, filed 12/3/76; Order 74-36, § 296-86-060, filed 10/1/74; Order 71-16, § 296-86-060, filed 12/7/71; Order 70-11, § 296-86-060, filed 9/18/70, effective 10/22/70; Order 70-5, § 296-86-060, filed 6/2/70.]

WAC 296-86-070 Supplemental inspections. Any person, firm, corporation or governmental agency may secure supplemental inspections of conveyances by paying to the division a fee of $180 per day plus the standard per diem and mileage allowed by the division to its inspectors. [Order 76-37, § 296-86-070, filed 12/3/76; Order 74-36, § 296-86-070, filed 10/1/74; Order 70-11, § 296-86-070, filed 9/18/70, effective 10/21/70.]

WAC 296-86-075 Reinspection fees. No fee shall be charged for the yearly inspection or for the initial inspection after installation or alteration. If, however, the conveyance does not meet the requirements of the department, and if another inspection is required to confirm compliance by the person having control over the conveyance with the regulations of the department, then an inspection fee of $35 per conveyance to be inspected shall be charged for such reinspection, and if there is still failure to comply with the rules of the department, a fee of $40 shall be charged for every unit requiring a further reinspection. These fees are in addition to the fees charged under WAC 296-86-020 and must be paid before issuance of an operating permit: *Provided*, The department may waive the assessment of a reinspection fee where reinspection is not possible due to no fault of the requesting person or agency or person or agency responsible for payment of the reinspection fee, or for other reasons which in justice or equity should obviate the necessity of payment of the reinspection fee. [Order 76-37, § 296-86-075, filed 12/3/76; Order 72-2, § 296-86-075, filed 2/25/72.]

WAC 296-86-080 Fee for inspection of regular elevators being used as temporary personnel elevators. The fee for the inspection and testing of regular elevators for use as temporary personnel elevators shall be $45.00. [Order 76-37, § 296-86-080, filed 12/3/76; Order 70-11, § 296-86-080, filed 9/18/70, effective 10/21/70.]

Chapter 296-87 WAC
SAFETY REQUIREMENTS FOR WORKMEN'S CONSTRUCTION ELEVATORS

WAC

296-87-010 Hoistway construction.
296-87-020 Guide rail brackets and building supports.
296-87-030 Hoistway enclosure.
296-87-040 Hoistway doors.
296-87-050 Landing platform.
296-87-060 Car operating and terminal stopping devices and electrical protective devices.
296-87-070 Car safeties.
296-87-080 Ropes, rope connections, data and record.
296-87-090 Car frames and platforms.
296-87-100 Capacity posting.
296-87-110 Platform size.
296-87-120 Maintenance inspection and test periods.
296-87-130 Car and counterweight buffers.

WAC 296-87-010 Hoistway construction. (1) The hoistway construction forming the supports for the machinery and guide rails shall be designed and installed to support the loads specified. Overhead beams, floors, and their supports shall be designed for not less than the sum of the following loads:

(a) The load resting on the beams and supports which shall include the complete weight of the machine sheaves, controller, governor and any other equipment together with that portion, if any, of the machine room floor supported thereon.

(b) Twice the sum of the tensions in all wire ropes passing over sheaves or drums supported by the beams with rated load in the car.

(2) Foundations, beams and floors for machinery and sheaves not located directly over the hoistway. For machines and sheaves located below or at the sides of the hoistway, the foundation for the machine and sheave beams and their supports shall be designed to withstand the following loads:

(a) The foundation shall support the total weight of the machine, sheaves and other equipment, and the floor, if any.

(b) The sheave beams and the foundation bolts shall withstand twice the vertical component of the tensions in all hoisting ropes passing over sheaves or drums on the foundation or beams, less the weight of the machine or sheaves.

(c) The sheave beams and the foundation bolts shall withstand twice the horizontal component, if any, of the tensions in all hoisting ropes passing over sheaves or drums on the foundation or beams.

(d) The foundation shall withstand twice the overturning moment, if any, developed by the tension in all the hoisting ropes passing over sheaves or drums on the foundation or beams. [Order 70-11, § 296-87-010, filed 9/18/70, effective 10/21/70.]

WAC 296-87-020 Guide rail brackets and building supports. The building construction forming the supports for the guide rails and guide rail brackets shall be of such a design as to:

(1) Safely withstand the application of the car or counterweight safety when stopping the car and its rated load or the counterweight.

(2) Withstand the forces imposed by the class of loading. Where necessary the building construction shall be reinforced to provide adequate support for the guide rails.

(3) Each elevator tower shall be anchored to the building at not to exceed thirty foot vertical intervals, or if guy wires are used, such guys shall be not less than one-half inch wire rope and terminal fastening be tagged PERSONNEL ELEVATOR-DO NOT REMOVE. [Order 70-11, § 296-87-020, filed 9/18/70, effective 10/21/70.]

WAC 296-87-030 Hoistway enclosure. (1) Hoistways or towers located inside of buildings shall be enclosed to the full height and width on all sides where no entrances occur, and shall be constructed as specified in WAC 296-87-030(3).

(2) Hoistway or towers located outside or adjacent to buildings shall be enclosed on all four sides at their lowest landing to a height of ten feet, and to a height of ten feet throughout the entire height where entrances occur, and shall be constructed as specified in WAC 296-87-030(3).

(3) Hoistway enclosures shall be constructed of solid or openwork material conforming to the following requirements:

(a) Openwork material shall reject a ball one and one-half inches in diameter.

(b) Metal enclosures shall be made of wire at least No. 16 steel wire gage or of expanded metal at least No. 16 U.S. gage.

(c) Wood enclosures shall be installed without openings.

(d) Hoistway enclosures shall be so supported and braced that when subjected to a pressure of one hundred pounds applied horizontally at any point the deflection shall not exceed one inch. [Order 70-11, § 296-87-030, filed 9/18/70, effective 10/21/70.]

WAC 296-87-040 Hoistway doors. (1) For hoistways or towers located inside of buildings the hoistway door shall guard the full height and width of the openings, and shall be so constructed as to withstand one hundred pounds applied at right angles to the center of the door without causing the door to break or be permanently deformed. Each hoistway door shall be equipped with an approved combination of electric contact and mechanical lock.

(2) For hoistways or towers located outside of buildings the hoistway door shall be not less than six feet six inches in height and shall protect the full width of the opening and shall be of strength and design conforming to the hoistway construction. Each hoistway door shall be equipped with an approved combination of electric contact and mechanical lock. [Order 70-11, § 296-87-040, filed 9/18/70, effective 10/21/70.]

WAC 296-87-050 Landing platform. The landing platform from all hoistways or towers to the building shall be constructed to provide a safety factor of three based on the capacity of the elevator and shall be provided with adequate handrails. [Order 70-11, § 296-87-050, filed 9/18/70, effective 10/21/70.]

WAC 296-87-060 Car operating and terminal stopping devices and electrical protective devices. (1) The operation shall be by car switch or constant pressure push button and shall be so arranged that the elevator car can be operated from within the car only. It shall also be equipped with an emergency stop switch located within or adjacent to the car operating panel.

(2) The travel control cable shall be attached from within the hoistway and securely fastened to the car. The control cable can be of the suspended type, retractable type, or coiled in a suitable container at the base of the tower.

(3) Terminal and final limits switches shall be installed at the upper and lower landings. These may be mounted on the car or in the hoistway operated by cams attached to the car or in the hoistway.

(4) Phase reversal and failure protection. Elevators having polyphase alternating current power supply shall be provided with means to prevent the starting of the elevator motor if,

(a) The phase rotation is in the wrong direction, or

(b) There is a failure of any phase.

(5) Main Line Contactor. A contactor shall be installed in addition to the direction switches which will cut off main line current to the motor and apply the brake when any of the final terminal stopping devices operate.

(6) A fused disconnect switch of adequate size shall be installed and connected into the power supply line to the controller and be accessible at the lower terminal landing.

(7) Where the hoistway is exposed to the weather the electrical control equipment, fixtures and switches shall be weatherproof.

(8) Machinery and control equipment shall be protected from the weather, falling debris and from access by unauthorized persons. Spaces containing elevator driving machine and control equipment shall be provided with adequate lighting.

(9) All electric elevators shall be equipped with effective brakes that are released electrically and applied by springs. The brakes shall be designed to have a capacity sufficient to hold the car at rest with its rated load, and shall be mounted on the main driving shaft of the machine.

(10) The maximum speed allowable shall be three hundred feet per minute. [Order 70-11, § 296-87-060, filed 9/18/70, effective 10/21/70.]

WAC 296-87-070 Car safeties. (1) The car of every elevator shall be provided with car safeties. The safety device shall be capable of stopping and sustaining the entire car with its rated load in the event of a free fall or overspeed.

(2) A speed governor shall be installed on all elevators and shall be so designed that it will actuate the car safeties before the car attains a speed of one hundred and forty per cent of the rated speed. If a governor rope is used, it shall be not less than three-eights inch in diameter and shall be of iron or steel material.

(3) There shall be a switch provided on the car actuated by the setting of the safeties that will remove the electric power from the driving machine motor and brake. [Order 70-11, § 296-87-070, filed 9/18/70, effective 10/21/70.]

WAC 296-87-080 Ropes, rope connections, data and record. (1) Elevator cars shall be of the tractor drive type suspended by steel wire ropes or approved rack and gear. If wire ropes are used, only iron (low carbon steel) or steel wire ropes with fibre cores, having the commercial classification of "elevator wire rope," shall be used for the suspension of elevator cars and for the suspension of counterweights.

(2) The minimum number of hoisting ropes used shall be three.

(3) Hoisting and counterweight wire ropes may be attached to cars and counterweights by means of approved clamps and wire rope thimbles or by approved special fastening devices. Where clamps are used, the fastening shall conform to the following:

(a) Clamps shall not be of the U-bolt type.

(b) Both members of the clamps shall be provided with seats conforming to the lay of the rope.

(c) Clamps shall be drop forgings.

(d) The ropes to be clamped shall be passed around metal thimbles having not less than the following dimensions and fastened by at least the number of clamps specified with not less than the spacing indicated in the following table.

Dia. of Wire Rope	Inside Width of Thimble	Length of Thimble In.	Min. No. of Clamps	Min. Spacing of Clamps
1/2	1 1/2	2 3/4	3	3
5/8	1 3/4	3 1/4	3	3 3/4
3/4	2	3 3/4	4	4 1/2
7/8	2 1/4	4 1/4	4	5 1/4
1	2 1/2	4 1/2	4	6

[Order 70-11, § 296-87-080, filed 9/18/70, effective 10/21/70.]

WAC 296-87-090 Car frames and platforms. (1) Every elevator suspended by wire ropes shall have a car frame consisting of a crosshead, uprights (stiles) and a plank located approximately at the middle of the car platform. Car frames suspended by wire ropes or cantilevered rack and gear shall be guided on each guide rail by upper and lower guiding members attached to the frame. The frame and its guiding member shall be designed to withstand the forces resulting under the loading conditions for which the elevator is designed.

(2) Every elevator car shall have a platform consisting of a nonperforated floor attached to a platform frame supported by the car frame and extending over the entire area within the car enclosure. The platform frame members and the floor shall be designed to withstand the forces developed under the loading conditions for which the elevator is designed and installed.

(3) Materials used in the construction of car frames and platforms shall be made of steel. The platform stringers shall be made of steel or of wood.

(4) The car shall be completely enclosed with metal except where entrances occur. The car shall have a top sufficiently strong to support three hundred pounds applied at any point.

(5) A door or gate shall be provided at each entrance of the car. Each door or gate shall be equipped with an electric contact, and for cars equipped with doors away from the building or structure, a positive mechanical type lock shall be installed to prevent opening except at designated landings.

(6) Doors and gates and their guides, guide shoes, tracks, and hangers shall be so designed, constructed, and installed that when the fully closed door or gate is subjected to a force of seventy-five pounds applied on an area of one foot square at right angles to and approximately at the center of the door or gate, it will not deflect beyond the line of the car sill. When subjected to a force of two hundred and fifty pounds, similarly applied, doors and gates shall not break nor be permanently deformed, and shall not be displaced from their guides or tracks.

(7) Gates shall be constructed of metal and shall be of a design which will reject a ball two inches in diameter.

(8) Doors or gates shall guard the full width and height of the car entrance opening. [Order 70-11, § 296-87-090, filed 9/18/70, effective 10/21/70.]

WAC 296-87-100 Capacity posting. Every elevator shall be provided with a capacity plate and a data plate permanently and securely fastened in place. Capacity plates shall be located in a conspicuous place inside the car. Data plates shall be attached to the car crosshead. The height of the letters and figures shall be not less than one inch for capacity plates and one inch for data plates. Capacity plates shall indicate the rated load of the elevator in pounds. [Order 70-11, § 296-87-100, filed 9/18/70, effective 10/21/70.]

WAC 296-87-110 Platform size. (1) Elevators shall not exceed five thousand pounds capacity and shall not exceed a speed of three hundred feet per minute, unless specifically authorized by the Department of Labor and Industries for each installation.

(2) Maximum inside net platform areas for the various rated loads.

Rated Load (lbs.)	Square Feet
1,000	13.25
1,200	15.6
1,500	18.9
1,800	22.1
2,000	24.2
2,500	29.1
3,000	33.7
3,500	38.0
4,000	42.2
5,000	50.0

[Order 70-11, § 296-87-110, filed 9/18/70, effective 10/21/70.]

WAC 296-87-120 Maintenance inspection and test periods. (1) A full load overspeed safety test shall be performed before the elevator is put into operation and each time the elevator is moved to a new location a full load overspeed test and inspection shall be mandatory and approved by a state inspector.

(2) Periodic maintenance shall be made by an experienced elevator mechanic at not more than thirty days, or thirty shifts, whichever occurs first. Once each shift the equipment shall be inspected by the operator to determine that the equipment is in a proper operating condition. The erection and dismantling of any personnel elevator shall be under the direct supervision of a person experienced in this type of work. [Order 70-11, § 296-87-120, filed 9/18/70, effective 10/21/70.]

WAC 296-87-130 Car and counterweight buffers. An oil or spring buffer shall be provided for the car and counterweights except cars in excess of two hundred feet per minute shall require oil buffers. [Order 70-11, § 296-87-130, filed 9/18/70, effective 10/21/70.]

Chapter 296-88 WAC
SAFETY RULES FOR GRAIN ELEVATOR OPERATIONS

WAC

296-88-001 Foreword.
296-88-010 Scope and application.
296-88-020 Purpose.
296-88-030 General requirements.
296-88-040 Entering storage type bins.
296-88-050 Entering silo type bins.
296-88-060 Inspection of shovel equipment.
296-88-070 Railroad car safety.
296-88-080 Manlifts.
296-88-090 Fumigation.
296-88-100 Insecticides and disinfectants.
296-88-110 Structural requirements and safeguards.
296-88-120 Reference material.
296-88-130 Glossary.

WAC 296-88-001 Foreword. (1) These regulations are adopted by the state of Washington, department of labor and industries in accordance with applicable statute requirements and provisions. A public hearing was held in Olympia, Washington, on November 24, 1964.

(2) The effective date of these regulations is January 2, 1965. [Foreword, effective 1/2/65.]

WAC 296-88-010 Scope and application. These regulations shall apply to those persons employed in grain handling, storage and related employment in conjunction with grain elevator operations, where applicable and when employment is governed by the provisions of the state of Washington industrial insurance and medical aid acts (Title 51 RCW). [Rules (part), effective 1/2/65.]

WAC 296-88-020 Purpose. These regulations are to be considered minimum safety requirements for this type of operation and shall be used as a guide by employers and employees to adopt such safe means, methods and processes which will assist in the reduction of injuries and accidents within this type of operation. [Rules (part), effective 1/2/65.]

WAC 296-88-030 General requirements. (1) **Conveyor crossovers.** Workmen shall cross moving belts or open conveyors only at bridges or crossovers constructed for that purpose.

(2) Starting of conveyor belts. Conveyor belts shall not be started until all persons are in the clear. When the full length of the belts cannot be observed by the operator, an adequate warning system shall be employed and the operator shall give a timely warning prior to the activation of such belts.

(3) **Lockout of electrical switches.** A lockout system shall be used to lock control switches in the "off" position when repair work or adjustments are being made to machinery or equipment except when motion is required for adjustment. When motion is required, it shall be started only by the direction of the person making such adjustments. Locks shall be removed only by the person who placed the lock or by someone to whom he has given permission to remove the lock.

(4) **Smoking areas.** Smoking shall be done only at designated locations on the premises and "No Smoking" signs shall be conspicuously posted about the premises.

(5) **Welding and burning.** Welding and burning shall, whenever possible, be done in a designated area or room where such work can be done safely. Permission to weld or burn outside the designated area must be received from the responsible supervisor of that area. The supervisor shall, to the best of his ability, determine that the area is free of fire or explosion hazard and shall require that safe methods and procedures be used to accomplish the work intended.

(6) **Floor openings.** In any area and on any surface where workmen work or use as a walkway surface, all floor openings shall be kept covered when not in use or shall be guarded by a standard safeguard on all exposed sides.

(7) **Bin control valves.** The control valves for all bins shall be placed in such a manner and position that they are easily and readily accessible.

(8) **Mobile equipment.** Mobile equipment used for raising and dumping grain into hoppers or bins shall be

equipped with windshield and adequate windshield wiper. This rule shall not apply to machines used exclusively to push grain into floor openings.

(9) **Sweeping around conveyor belts.** Workmen shall not be allowed or required to sweep, scrape or perform similar work under moving conveyor belts unless adequate clearance is provided so that work can be performed without contact of the equipment or workmen with the belt.

(10) **Working alone.** Workmen shall not be required to perform extrahazardous work in isolated areas where they are beyond the visible or audible range of other workmen except where procedures are established where the workman is in reasonably frequent contact with others or when a reporting procedure has been prearranged.

(11) **Working in moving grain.** Workmen shall not work in moving grain where there is a possibility of being covered by sliding or shifting of the grain or where they may be pulled down or covered by the movement of grain into or out of bins or structures. [§ I, Rules 1.010—1.110, effective 1/2/65.]

WAC 296-88-040 Entering storage type bins. Any workman preparing to enter a bin at the top shall first inspect such bin to ascertain that it is safe and no grain is hung up. When entering, the workman shall wear an approved safety belt with lifeline attached. At least one other person shall tend the lifeline and observe the person in the bin constantly. [§ II, Rule 2.010, effective 1/2/65.]

WAC 296-88-050 Entering silo type bins. (1) **Notification of bin entry and clearing.** The weighman and basementmen shall be notified by the supervisor that a workman is entering a bin prior to his entry and shall inform the person entering that they have been notified. No grain shall be directed into such bin until they are again notified that the bin has been cleared of workmen.

(2) **Setting of distribution equipment.** On bins with movable or selective distribution systems the turnheads, spouts and tripper shall be set for bins other than those in which workmen are working.

(3) **Bins with fixed spouts.** When workmen are required to enter bins with fixed distribution or fill spouts, the equipment carrying grain to such bin shall be locked or tagged out or some effective means provided to insure that no grain will be directed into such bin while a person is in the bin. [§ III, Rules 3.010—3.030, effective 1/2/65.]

WAC 296-88-060 Inspection of shovel equipment. (1) **Inspection of equipment.** Before starting shoveling operations, all equipment such as eye bolts, slings, sheaves and clevices shall be inspected by a competent person.

(2) **Make adjustments after power is off on shovel.** Power must be completely shut off on shovels before any adjustments are made to the shovel, cables, slings, sheaves or associated equipment.

(3) **Adjustment of equipment in hopper area.** The hopper must be closed or the belt connected to the operation positively stopped prior to the adjusting of shovels, cables, slings or sheaves in the hopper area. [§ IV, Rules 4.010—4.030, effective 1/2/65.]

WAC 296-88-070 Railroad car safety. (1) **Railroad car doors.** The workman shall inspect the railroad car door to determine that it is properly tracked prior to opening or closing the door. Bars longer than thirty-six inches shall not be used to open stuck doors. Nylon or plastic material shall not be used to pull doors open. When a mechanical means is used to open stuck doors, workmen shall stand in clear in case door should fall off the track.

(2) **Approach ladders properly.** Workmen shall not jump to or from the ladders of railroad cars.

(3) **Loading bulk grain in cars.** Workmen shall not be allowed in railroad cars while bulk grain is pouring into the cars except to turn spouts or trim the car and then only when they are wearing proper protective equipment and being observed by another workman.

(4) **Railroad car pullers.** The hook of a car puller shall be placed on the frame of the car. Placing the hook on braces or on the ladder is prohibited. The use of plastic, nylon or synthetic ropes for pulling cars is prohibited.

(5) **Blocks for railroad cars.** When cars must be blocked, a car block with a handle or lumber thirty-six inches long or longer shall be used.

(6) **Placing hooks on railroad cars.** Car puller hooks shall not be placed on a railroad car while the car is moving. The hook shall not be attached to the car while the hook is being moved in the forward direction by the car puller.

(7) **Find safe place to stand.** Workmen shall always be alert to the possibility of the cable or hook breaking when a car is being pulled, and shall position themselves where there is the least chance of being struck by the hook or cable, if either should break.

(8) **Warning system associated with moving of cars.** A clearly audible warning system shall be employed when cars are being moved by car pullers or locomotives, and when the person responsible for the moving does not have assurance that the area is clear, and it is safe to move the car or cars. [§ V, Rules 5.010—5.080, effective 1/2/65.]

WAC 296-88-080 Manlifts. Installation, operation, use and maintenance of manlifts shall be in accordance with the safety standards for manlifts as adopted by the safety division, department of labor and industries. [See chapters 296-82, 296-83 and 296-84 WAC.] [§ VI, Rule 6.010, effective 1/2/65.]

WAC 296-88-090 Fumigation.* (1) **Training and instruction required for applicator.** Only properly trained and instructed personnel shall handle and apply fumigant.

(2) **Posting of fumigation notice in advance.** No person shall space fumigate any building without giving at least twenty-four hours written posted notice.

(3) **Where notices required to be posted.** Notices shall be posted at all doors and any other entrances or exits of the building to be space fumigated.

(4) **Warning notices.** Notices warning persons that an area or building is being space fumigated shall be of red letters of at least two inches high on a white background. The notice shall also include the type of fumigant to be used and approximate time the space fumigation process will commence.

(5) **Fumigation of silo type bins.** No person shall fumigate any silo type bin without first sealing the lower end, installing the proper warning sign on the grain control outlet and notifying all workmen who work below such bin. After the fumigants have been applied and the top sealed, a warning notice shall also be posted at the top entrance.

(6) **Examine area prior to fumigation.** The fumigator shall immediately prior to fumigation, cause a careful examination to be made of all parts of the place to be fumigated, and the surrounding area endangered by the fumigation, to see that no persons remain therein.

(7) **Building or structure to be sealed.** All cracks, crevices, openings and apertures in the walls, ceilings and floors shall be sealed in such manner as to confine the fumigant exclusively to the building, tank or spaces.

(8) **Fumigator to declare area safe.** All buildings, tanks or places that have been fumigated shall be securely sealed and locked. Prior to the opening of any area for normal work, a person who has been properly trained and instructed shall investigate, test and declare the area safe for entry.

(9) **Safe methods of handling fumigated grain.** When grain has been fumigated, it must be aerated or equally effective means must be taken to assure that no workman will be exposed to a concentration of the material which will cause him harm.

(10) **Protective equipment and clothing.** While fumigating or working in a fumigated area, every person shall wear an approved type of gas mask and clothing suitable for protection from the particular gas or fumes used, until a person who is properly trained and instructed, declares the area is safe for normal entry.

(11) **Applying liquid fumigants to moving grain.** The application of liquid fumigants to grain being carried on belts, conveyors or legs, is prohibited where other workmen are in the vicinity or within a confined space that workmen may be working in or passing through. [§ VII, Rules 7.010—7.110, effective 1/2/65.]

*NOTE: Where the requirements of this section cannot be strictly adhered to in wood constructed crib elevators, other methods shall be used which will afford equal safety protection for the workmen.

WAC 296-88-100 Insecticides and disinfectants. (1) **Examine area and warn of danger.** Persons applying insecticides and disinfectants shall cause a careful examination of all areas to be affected and inform or warn any persons of the danger, immediately prior to the commencement of the operation.

(2) **Avoid skin contact.** Persons shall not allow insecticides or disinfectants to come in contact with their skin. [§ VIII, Rules 8.010 & 8.020, effective 1/2/65.]

WAC 296-88-110 Structural requirements and safeguards. (1) **Walkways.** All walkways shall be constructed of a minimum of two inch by ten inch planks or materials of equivalent strength and shall be at least twenty inches wide. Planks shall be supported at least every eight feet, and if other materials are used, they shall be adequately supported. When walkways are elevated more than four feet above the ground or floor, standard guardrails and toeboards shall be installed.

(2) **Escape ladder.** All grain elevators shall have an outside escape ladder installed. It shall extend from the top of the structure to within ten feet of the ground. Such ladder shall be built in accordance with the requirements outlined in the general safety standards [chapter 296-25 WAC]. A safe access to such ladder shall be provided in the form of walkways, landing or whatever is needed.

(3) **Deluge shower.** Deluge type showers shall be provided in the immediate vicinity where practical, when caustics, corrosives or skin irritants are being used. When showers are not practical, first aid materials shall be available which will counteract the action of the materials being used.

(4) **Flames or heating elements.** Exposed element type electric heaters, open flame heaters, hot plates or similar type equipment shall not be used in areas where dust or other materials may cause a fire or explosion.

(5) **Guards for portable augers.** All portable augers to which workmen may be exposed to the hazards created by the moving parts, shall be guarded with a standard safeguard.

(6) **Safety belts and lifelines.** Workmen shall be provided with and shall wear safety belts and lifelines when working from suspended scaffolds or bosuns chairs at a height or more than eight feet.

(7) **Removal of injured workman.** A safe means shall be provided for the removal of an injured workman from all elevated areas of the structure. If possible, this shall be accomplished by the use of stairways, elevators or carriers. If a doubt arises over whether a certain method is safe, the department may require a demonstration and make a decision based upon their observations. [§ IX, Rules 9.010—9.070, effective 1/2/65.]

WAC 296-88-120 Reference material. Any person handling or using fumigants, insecticides or disinfectants shall refer to the warning labels and instructions given for such material as included in Appendix 3 of "Standards Relating to Precautionary Labeling of Hazardous Substances Used in Places of Employment". [See WAC 296-64-400 et seq.]. [Rules (part), effective 1/2/65.]

WAC 296-88-130 Glossary. (1) **Fumigant.** The term "fumigant" means and includes any substance which by itself or in combination with any other substance emits or liberates a gas, fume or vapor used for the destruction or control of insects, fungi, vermin, germs, rodents, or other pests, and is distinguished from insecticides and disinfectants which are essentially effective in the solid or liquid phases.

(2) **Insecticides and disinfectants.** The terms "insecticides and disinfectants" are essentially effective in the solid or liquid form for the destruction or control of insects, fungi, vermin, germs, rodents or other pests. [Rules (part), effective 1/2/65.]

Chapter 296-89 WAC
SAFETY REQUIREMENTS FOR BOAT LAUNCHING ELEVATORS

WAC

296-89-010 Definitions.
296-89-020 Car or platform enclosures.
296-89-030 Electric wiring.
296-89-040 Brakes.
296-89-050 Car operating and terminal stopping devices and electrical protective devices.
296-89-060 Cables.
296-89-070 Hoistway gates and doors.
296-89-080 Hoistway enclosures.

WAC 296-89-010 Definitions. (1) Boat Launching Elevator shall mean a boat launching device equipped with a car or platform which moves in guides in a substantially vertical direction and serves one or more floors or landings of a boat launching structure and a beach or water surface, and is used for the carrying or handling of boats in which people ride.

(2) Boat Launching Structure shall mean any structure which houses and supports any boat launching elevator. [Order 70-11, § 296-89-010, filed 9/18/70, effective 10/21/70.]

WAC 296-89-020 Car or platform enclosures. All boat launching elevator cars or platforms shall be enclosed to a height of at least six (6) feet from the floor on all sides where there are no hoistway doors or gates with solid panel or openwork which will reject a two (2) inch ball. [Order 70-11, § 296-89-020, filed 9/18/70, effective 10/21/70.]

WAC 296-89-030 Electric wiring. (1) All electric wiring used in conjunction with boat launching elevators shall be in rigid metal conduit except the traveling cable required between a terminal stopping switch mounted on the car or platform and the hoistway, which shall be of the flexible nonmetallic moisture-retardent and flame-retardent type.

(2) All electrical outlets, switches, junction boxes and fittings used in conjunction with boat launching devices shall be of the weather-proof type. [Order 70-11, § 296-89-030, filed 9/18/70, effective 10/21/70.]

WAC 296-89-040 Brakes. All electric boat launching elevators shall be equipped with effective brakes that are released electrically and applied by springs. The brakes shall be designed to have a capacity sufficient to hold the elevator at rest with its rated load. [Order 70-11, § 296-89-040, filed 9/18/70, effective 10/21/70.]

WAC 296-89-050 Car operating and terminal stopping devices and electrical protective devices. (1) All electric boat launching elevators shall be equipped with a bottom terminal stopping switch which is operated by a float or other approved means and the necessary traveling cable attached to the car or platform.

(2) All electric boat launching elevators shall be equipped with a top terminal stopping switch located in the hoistway which is operated by a cam attached to the car, or by other approved means.

(3) All boat launching elevators having winding drum machines shall be equipped with a final stopping switch located on and operated directly by the driving machine. This final stopping switch shall not be driven by a chain, rope or belt.

(4) All boat launching elevators driven by a polyphase alternating current motor shall be equipped with the following approved relays:

(a) Reverse phase relay. A device which will prevent starting of the driving machine motor if the phase rotation is in the wrong direction, or if there is a failure in any phase.

(b) Main line relay. A relay or contact which will automatically interrupt the power to the driving machine motor and brake and cause the brake to be applied in event of operation of any of the safety devices.

(5) Operating switches for electric boat launching elevators shall be of the key-operated continuous pressure type located outside of the hoistway and within sight of the car or platform.

(6) Hand rope controls shall not be used for any boat launching elevator. [Order 70-11, § 296-89-050, filed 9/18/70, effective 10/21/70.]

WAC 296-89-060 Cables. The hoisting cables of all boat launching elevators shall be reshackled or refastened at the load end every twelve (12) months. [Order 70-11, § 296-89-060, filed 9/18/70, effective 10/21/70.]

WAC 296-89-070 Hoistway gates and doors. (1) All boat launching elevators shall be provided with hoistway entrance protection at every landing, except the beach or water surface landings, which shall comply with or be equivalent to the following minimum requirements.

(a) A full-bodied, balanced type safety gate which guards the full width of the hoistway opening and comes within two (2) inches of the landing threshold at all points.

(b) Gate bodies shall be not less than forty-two (42) inches in height above the threshold at the top landing and not less than sixty-six (66) inches in height above the threshold at intermediate landings.

(c) Gates shall be constructed of metal or wood and shall be capable of withstanding a lateral pressure two hundred fifty (250) pounds at any point without breaking or being permanently deformed, and without displacing the gate body from its guides or tracks.

(d) Openings in safety gate bodies of grille, lattice or other open work shall be of a design that will reject a two (2) inch ball.

(2) All hoistway safety gates of a boat launching elevator shall be equipped with an approved combination electric contact and mechanical lock. [Order 70-11, § 296-89-070, filed 9/18/70, effective 10/21/70.]

WAC 296-89-080 Hoistway enclosures. Boat launching elevator hoistway protection equal to and complying with all of the dimensional and pressure requirements of hoistway safety gates shall be provided on all other sides of the hoistway that are adjacent to a dock area platform, walkway or ramp. [Order 70-11, § 296-89-080, filed 9/18/70, effective 10/21/70.]

Chapter 296-90 WAC
SAFETY REQUIREMENTS FOR CANTILEVER HOISTS

WAC

296-90-010 Material hoist platforms.
296-90-020 Guard rails.
296-90-030 Tower construction.
296-90-040 Hoisting machines.
296-90-050 Car platform enclosure.
296-90-060 Landing platforms.
296-90-070 No rider posting.
296-90-080 Maintenance, inspection and test periods.
296-90-090 Compliance with codes.

DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

296-90-100 Annual fee. [Order 71-7, § 296-90-100, filed 6/17/71.] Repealed by Order 74-36, filed 10/1/74.

WAC 296-90-010 Material hoist platforms. (1) Material Hoist platforms shall be substantially constructed and of sufficient strength with a factor of safety of five (5) for the rated load capacity.

(2) Maximum overhang shall be four (4) feet at either or both ends of the platform or other device for longer material which is approved by the department of labor and industries. All overhang loads shall be within the rated capacity of hoist and shall be securely fastened to the platform.

(3) Provide suitable blocking and cleats on all platforms when wheelbarrows or other rolling equipment are transported to hold them securely in place and shall be properly positioned for safe removal. [Order 71-7, § 296-90-010, filed 6/17/71.]

WAC 296-90-020 Guard rails. A standard guard rail, forty-two (42) inches in height, with an intermediate rail shall be installed at ground level, around the perimeter of the hoist platform. Minimum distance from the hoist platform shall be twenty-four (24) inches; maximum distance shall be forty-eight (48) inches. Guard rails shall comply with standard requirements. A bar or gate shall be installed on the access side and shall be closed when the hoist is in motion. [Order 71-7, § 296-90-020, filed 6/17/71.]

WAC 296-90-030 Tower construction. (1) Material hoist towers erected outside of buildings shall be constructed of strong, sound material and of ample strength with a factor of safety of five (5) to carry the loads intended.

(2) All splices and/or extensions shall be so constructed as to provide a safety factor of five (5).

(3) The overhead framework of all towers shall be of sufficient strength to take the total load of all sheaves, car and material to be hoisted with a factor of safety of five (5).

(4) Foundations for hoist towers shall be sufficiently large to spread the hoist load so that it will not exceed the safe bearing capacity of the soil on which it stands. Foundations shall be level.

(5) Hoist towers shall be erected plumb, square at the corners and sufficiently braced to make them rigid and stable. Bracing and/or cables shall be installed at no more than thirty (30) foot intervals.

(6) When extremely high hoist towers are to be erected, and it is not practical to fully secure this tower by means of bracing or guys, they shall be built in sections, by erecting the lower section to an altitude to suffice for immediate needs, and extending it upward when the construction work has progressed sufficiently to make it possible to provide a support or bracing for the tower.

(7) The hoist shall be properly positioned to provide safe access to the hoist platform, for the material to be hoisted.

(8) The towers shall be securely guyed and well anchored. The guys shall be securely clamped to "dead men" of sufficient size and well buried. [Order 71-7, § 296-90-030, filed 6/17/71.]

WAC 296-90-040 Hoisting Machines. (1) All gearing on hoisting machines shall be enclosed. If electrical equipment is used, it shall be effectively grounded.

(2) Hoisting machines shall be protected against the weather and falling objects by a substantial covering.

(3) Guards shall be provided to prevent persons coming in contact with hoisting cables.

(4) Brake drums shall be kept free of oil or grease, as it prevents the brake from holding the load.

(5) Hoisting machines shall be of ample capacity and equipped with brakes capable of sustaining one hundred and fifty (150) percent of rated load for stopping and sustaining the maximum load in any position. [Order 71-7, § 296-90-040, filed 6/17/71.]

WAC 296-90-050 Car platform enclosure. When transporting loose material, every hoist platform shall be enclosed to a height of at least forty-two (42) inches above the platform where no access is necessary with solid panel or open framework which will reject a two (2) inch ball. [Order 71-7, § 296-90-050, filed 6/17/71.]

WAC 296-90-060 Landing platforms. (1) Access platforms of ample size and strength with railings and toeboards shall be built at each level where men work and constructed with a safety factor of three (3).

(2) Standard railing and toeboards shall be placed on the open sides of runways connecting the tower to the

structure and a bar or a gate provided at all openings into the tower and constructed with a safety factor of three (3). [Order 71-7, § 296-90-060, filed 6/17/71.]

WAC 296-90-070 No rider posting. Workmen shall not be allowed to ride on material hoists and a sign prohibiting such practice shall be posted on the crossbar of the platform and on the shaftway enclosure at each floor opening. [Order 71-7, § 296-90-070, filed 6/17/71.]

WAC 296-90-080 Maintenance, inspection and test periods. (1) All hoisting equipment shall be frequently inspected, and brakes, gears and operating levers kept in perfect working condition. Records shall be maintained of all inspections and/or tests.

(2) A static test of 110% of the hoist rated capacity shall be performed annually.

(3) A "no load" test shall be performed annually to determine that broken cable safeties function properly. [Order 71-7, § 296-90-080, filed 6/17/71.]

WAC 296-90-090 Compliance with codes. (1) Twin hoists when used for personnel and material shall comply with the personnel elevator code.

(2) Twin tower hoists used for material only, shall comply with cantilever hoist code. [Order 71-7, § 296-90-090, filed 6/17/71.]

Chapter 296-91 WAC
SAFETY REGULATIONS FOR CASKET LIFTS IN MORTUARIES

WAC

296-91-010 Scope.
296-91-020 Machine rooms and machinery spaces.
296-91-030 Equipment in machine rooms.
296-91-040 Electrical wiring, pipes and ducts in elevator hoistways and machine rooms.
296-91-050 Pits.
296-91-060 Protection of hoistway landing openings.
296-91-070 Hangers, guides and guide shoes for hoistway doors.
296-91-080 Location of hoistway doors.
296-91-090 Hoistway doors and door locking devices.
296-91-100 Protection of spaces below hoistways.
296-91-110 Car doors or gates.
296-91-120 Car enclosures.
296-91-130 Car frames and platforms.
296-91-140 Car frames and platform connections.
296-91-150 Capacity and loading.
296-91-160 Driving machine and sheaves.
296-91-170 Material and grooving for sheaves and drums.
296-91-180 Driving machine brakes.
296-91-190 Terminal stopping devices.
296-91-200 Ropes, rope connections, data and record.
296-91-210 Hydraulic elevators.
296-91-220 Valves, supply piping and fittings.
296-91-230 Stopping devices.
296-91-240 Operating devices.

WAC 296-91-010 Scope. This code applies to hoisting and lowering mechanisms equipped with cars which move in guides in a substantially vertical direction, the cars of which have a net inside area not exceeding twenty-eight square feet and a total internal height not exceeding four feet, and the width not to exceed three and one-half feet. The platform shall consist of a series of rollers and which are used exclusively for carrying caskets.

Hoistways, hoistway enclosures and related construction which is in substantial compliance with Part 1, section 100 of the American Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks A17.1-1965 shall be deemed to meet the requirements of these regulations. [Order 71-16, § 296-91-010, filed 12/7/71.]

WAC 296-91-020 Machine rooms and machinery spaces. Machines and their control equipment may be located inside the hoistway enclosure at the top or bottom without intervening enclosures or platforms. Machines and control equipment located outside the hoistway shall be enclosed in enclosures of incombustible material not less than six feet high. If of openwork material, the enclosure shall reject a ball two inches in diameter with a self-closing and locking door, except that control equipment located outside the hoistway may be enclosed in a metal cabinet equipped with a self-closing and locking door to prevent access by unauthorized persons. Permanent electric lighting shall be provided in all machine rooms and machinery spaces. [Order 71-16, § 296-91-020, filed 12/7/71.]

WAC 296-91-030 Equipment in machine rooms. Only machinery and equipment required for the operation of the elevator shall be permitted in the elevator machine room. [Order 71-16, § 296-91-030, filed 12/7/71.]

WAC 296-91-040 Electrical wiring, pipes and ducts in elevator hoistways and machine rooms. (1) Only such electrical wiring raceways and cables used directly in connection with the elevator may be installed inside the hoistway.

(2) Pipes or ducts conveying gases, vapors or liquids and not used in connection with the elevator shall not be installed in any hoistway, machine room or machinery space.

(3) Machinery and sheave beams, supports and foundations shall comply with Section 105 of the American Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks A17.1-1965. [Order 71-16, § 296-91-040, filed 12/7/71.]

WAC 296-91-050 Pits. Pits are not required. [Order 71-16, § 296-91-050, filed 12/7/71.]

WAC 296-91-060 Protection of hoistway landing openings. The size and location of door openings shall conform to the following:

(1) Size of openings. The width and height of door openings shall not exceed the width and height of the elevator car by more than one inch in each dimension.

EXCEPTION: One door opening may be of sufficient size to permit installing and removing the car, but shall be not more than four feet nine inches in height.

(2) Location of door opening. The bottom of the door opening shall be not less than twenty-four inches above the floor. [Order 71-16, § 296-91-060, filed 12/7/71.]

WAC 296-91-070 Hangers, guides and guide shoes for hoistway doors. Hoistway doors shall be so hung and guided that the doors will not be displaced from their guides or tracks when in normal service nor when the doors are subjected to a constant horizontal force of two hundred and fifty pounds applied at right angles to and approximately the center of the door or to the center of each door section where multi-section doors are used. [Order 71-16, § 296-91-070, filed 12/7/71.]

WAC 296-91-080 Location of hoistway doors. Hoistway doors shall be so located that the distance from the hoistway face of the doors to the edge of the hoistway landing sill measured from the face of the door section nearest to the car shall be not more than two and one-half inches. [Order 71-16, § 296-91-080, filed 12/7/71.]

WAC 296-91-090 Hoistway doors and door locking devices. Hoistway doors shall be provided which will guard the full height and width of the openings and shall be provided with a combination mechanical locks and electric contacts. [Order 71-16, § 296-91-090, filed 12/7/71.]

WAC 296-91-100 Protection of spaces below hoistways. Where the space below the hoistway is used for a passageway or is occupied by persons, or if unoccupied is not secured against unauthorized access, the cars and their counterweights shall be provided with safeties which may be operated as a result of the breaking of the suspension means and which may be of the inertia type without governors. [Order 71-16, § 296-91-100, filed 12/7/71.]

WAC 296-91-110 Car doors or gates. (1) There shall be not more than two entrances to the car.

(2) Each entrance shall be provided with a car door or gate which when in fully closed position shall protect the full width and height of the car entrance opening.

(a) Collapsible type gates shall, when extended (closed position), reject a ball four and one-half inches in diameter. [Order 71-16, § 296-91-110, filed 12/7/71.]

WAC 296-91-120 Car enclosures. (1) Extent of enclosures. Elevator car shall be permanently enclosed on all sides and the top.

(2) Securing of enclosures. The enclosure shall be securely fastened to the car platform and so supported that it cannot loosen or become displaced in ordinary service.

(3) Deflection of enclosure walls. The enclosure walls shall be of such strength and so designed and supported that when subjected to a pressure of seventy-five pounds applied horizontally at any point on the walls of the enclosure, the deflection will not reduce the running clearance to exceed one inch.

(4) Car top enclosure. Top of car enclosure shall be so designed and installed as to be capable of sustaining a load of three hundred pounds on any square area two feet on a side and one hundred pounds applied at any point. Simultaneous application of these loads is not required. [Order 71-16, § 296-91-120, filed 12/7/71.]

WAC 296-91-130 Car frames and platforms. (1) Every elevator suspended by wire ropes shall have a car frame consisting of a crosshead, uprights (stiles), and a plank located approximately at the middle of the car platform and in no case farther from the middle than one-eighth of the distance from front of the platform.

(2) Guiding members. Car frames shall be guided on each guide rail by upper and lower guiding members attached to the frame.

(3) Materials for car frames and platform frames. Car frames and outside members of platform shall be made of steel. [Order 71-16, § 296-91-130, filed 12/7/71.]

WAC 296-91-140 Car frames and platform connections. Connections between members of car frames and platform shall be riveted, bolted or welded and shall conform to the following:

(1) Bolts. Bolts where used through sloping flanges of structural members shall have boltheads of the tipped head type or shall be fitted with beveled washers.

(2) Nuts. Nuts used on sloping flanges of structural members shall seat on beveled washers.

(3) Welding. Welding of parts upon which safe operation depends shall be done in accordance with the appropriate standards established by the American Welding Society. [Order 71-16, § 296-91-140, filed 12/7/71.]

WAC 296-91-150 Capacity and loading. (1) Driving machines, car and counterweight suspension means and overhead beams and supports shall be designed and installed to sustain the car with a structural capacity load based on the inside net platform area as indicated in Table No. 207.1 of the American Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks A17.1-1965.

(2) Capacity plate. A metal plate shall be fastened in a conspicuous place in the car and shall give the rated load in letters and figures not less than one-fourth inch high stamped, etched or raised on the surface of the plate. [Order 71-16, § 296-91-150, filed 12/7/71.]

WAC 296-91-160 Driving machine and sheaves. Types of power driving machines permitted. Driving machines shall be one of the following types:

(1) Drum.

(2) Traction.

(3) Plunger.

[Order 71-16, § 296-91-160, filed 12/7/71.]

WAC 296-91-170 Material and grooving for sheaves and drums. Material and grooving for sheaves and drums shall:

(1) Be of metal finished grooves.

(2) Have a pitch diameter not less than forty times the diameter of the rope. [Order 71-16, § 296-91-170, filed 12/7/71.]

WAC 296-91-180 Driving machine brakes. The elevator driving machine shall be equipped with a friction brake applied by a spring or springs and released electrically. The brake shall be designed to have a capacity sufficient to hold the car at rest with its rated load. [Order 71-16, § 296-91-180, filed 12/7/71.]

WAC 296-91-190 Terminal stopping devices. (1) Upper and lower normal stopping devices shall be provided at the top and bottom of hoistway.

(2) Final terminal stopping devices shall be provided and arranged to cause the electric power to be removed from the elevator driving machine motor and brake after the car has passed a terminal landing but so that under normal operating conditions it will not function when the car is stopped by the normal terminal stopping device.

(3) Elevators having traction machines shall have final terminal stopping switches located in the hoistway and operated by cams attached to the car.

(4) Elevators having winding-drum machines shall have final terminal stopping switches located on and operated by the driving machine, which shall not be driven by chain, rope or belt. Also, stopping switches shall be installed in the hoistway that are operated by cams attached to the car or counterweights.

(5) All elevators having winding-drum machines shall have a slack rope device with an electric switch of the enclosed manually reset type which will cause the electric power to be removed from the driving machine motor and brake if the hoisting ropes become slack. [Order 71-16, § 296-91-190, filed 12/7/71.]

WAC 296-91-200 Ropes, rope connections, data and record. (1) Elevator cars shall be suspended by steel wire ropes. Only iron (low carbon steel) or steel wire ropes with fibre cores, having the commercial classification of "elevator wire rope" shall be used for the suspension of elevator cars and for the suspension of counterweights.

(2) The minimum number of hoisting ropes shall be three one-half inch ropes for traction elevators and two one-half inch ropes for drum type elevators.

(3) Fastenings shall be:

(a) By individual tapered babbitted rope sockets or,

(b) By other types of rope fastenings that meet the approval of the enforcing agency.

(4) The rope socket shall be of a type which will develop at least eighty percent of the braking strength of the strongest rope to be used in such fastenings and U-bolt type rope clips (clamps) shall not be used for load line fastenings. [Order 71-16, § 296-91-200, filed 12/7/71.]

WAC 296-91-210 Hydraulic elevators. (1) Shall be of the plunger type.

(2) The plunger shall be securely attached to the car platform.

(3) Plungers composed of more than one section shall have the joints designed and constructed to carry in tension the weight of all plunger sections below the joints.

(4) Plungers shall be provided with solid metal stops to prevent the plunger from traveling beyond the limits of the cylinder. Stops shall be so designed and constructed as to stop the plunger from maximum speed in the "up" direction under full pressure without damage to the hydraulic system.

(5) Means shall be provided to collect any oil leakage. [Order 71-16, § 296-91-210, filed 12/7/71.]

WAC 296-91-220 Valves, supply piping and fittings. (1) Valves, piping and fittings shall not be subjected to working pressures exceeding those recommended by the manufacturer for the type of service for which they are used.

(2) Piping shall be so supported as to eliminate undue stresses at joints and fittings particularly at any section of the line subject to vibration.

(3) A shut-off valve shall be installed in the pit.

(4) Each pump shall be equipped with a relief valve conforming to the following requirements:

(a) Type and location. The relief valve shall be located between the pump and the check valve and shall be of such type and so installed in a by-pass connection that the valve cannot be shut off from the hydraulic system.

(b) Setting. The relief valve shall be pre-set to open at a pressure not greater than one hundred and twenty-five percent of the working pressure at the pump.

EXCEPTION: No relief valve is required for centrifugal pump driven by induction motors providing the shut-off or maximum pressure which the pump can develop is not greater than one hundred thirty-five percent of the working pressure at pump.

(c) Check valve. A check valve shall be provided and shall be so installed that it will hold the elevator car with rated load at any point when the pump stops or the maintained pressure drops below the minimum operating pressure. [Order 71-16, § 296-91-220, filed 12/7/71.]

WAC 296-91-230 Stopping devices. (1) Normal stopping devices shall be installed at the top and bottom of the hoistway operated by cams attached to the car.

(2) Final terminal stopping devices are not required.

(3) Anti-creep leveling devices are not required. [Order 71-16, § 296-91-230, filed 12/7/71.]

WAC 296-91-240 Operating devices. The operation of the elevator shall be from outside the hoistway only and shall be of the constant pressure or automatic types. [Order 71-16, § 296-91-240, filed 12/7/71.]

Chapter 296-92 WAC
SAFETY RULES GOVERNING WHEELCHAIR LIFTING DEVICES

WAC
296-92-010 Definitions.
296-92-020 Location, travel and speed.
296-92-030 Guards and ramps.
296-92-040 Supports.
296-92-050 Frames, platforms and capacity.
296-92-060 Controls and electrical equipment.
296-92-070 Public assembly and institutional installations.
296-92-080 Nonskid surfacing.
296-92-090 Installation permits and acceptance inspections.
296-92-100 Submission of plans for installation.
296-92-110 Operation and maintenance manuals.

WAC 296-92-010 Definitions. (1) These rules apply to an electric or hydraulic vertical elevating device used to raise or lower a person in a wheelchair from one level to another, hereinafter in these rules referred to as a device. The device shall be restricted to two levels and shall serve not more than two landings and not to exceed eight feet. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-92-010, filed 12/10/80.]

WAC 296-92-020 Location, travel and speed. A device may be installed adjacent to a porch, at the end of a ramp or inside of a building.

The rated speed of a device shall not exceed 30 feet per minute. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-92-020, filed 12/10/80.]

WAC 296-92-030 Guards and ramps. (1) All exposed equipment on a device shall be guarded to protect against accidental contact which could cause bodily injury.

(2) An approved guard shall be provided on any side of the platform which is not guarded as provided in subsection 3.

(3) A metal guard not less than 1/8 inch thick and 6 inches high shall be provided the full width of the platform to prevent a wheelchair from rolling off the lower access end of the platform when in use. The guard may be actuated automatically by movement from the landing.

(4) A ramp shall be provided, as required, for access to and from the platform and shall safely carry the load. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-92-030, filed 12/10/80.]

WAC 296-92-040 Supports. (1) The assembled unit of a lifting device shall be supported and maintained in place so as to prevent any part from becoming loose or displaced.

(2) Adequate support shall be provided to maintain the device in a level position.

(3) The framework shall be securely anchored in place to the foundation of the device. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-92-040, filed 12/10/80.]

WAC 296-92-050 Frames, platforms and capacity. (1) The frame of a device shall be constructed of metal.

(2) The platform shall not exceed 3 feet wide by 5 feet long.

(3) The rated capacity shall be not less than 350 pounds.

(4) A production model shall be subjected to a static load test to establish that all components of the device will withstand stresses of five times the rated load of the device to insure a factor of safety of at least five. A registered, professional engineer shall certify the safety factor and affix his signature and seal to the certification.

(5) All welding shall be in accordance with standards established by the American Society of Mechanical Engineers. These standards may be purchased from the American Society of Mechanical Engineers, United Engineering Center, 345 East Forty-seventh Street, New York, New York 10017.

(6) Means shall be provided on vertically traveling devices to prevent access below the platform when it is in a raised position; or the platform shall have equipment which will open an electric contact in the control circuit and thus stop the down travel of the platform if the platform is obstructed in its downward travel by a force of not more than four pounds. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-92-050, filed 12/10/80.]

WAC 296-92-060 Controls and electrical equipment. (1) The operating control shall be of the constant pressure type.

(2) A disconnecting means shall be provided that is not accessible to the general public.

(3) Electrical wiring shall comply with the National Electrical Code.

(4) A slack cable switch shall be provided where applicable.

(5) An upper terminal stopping switch shall be provided to stop a device at the upper terminal landing.

(6) A lower terminal stopping switch shall be provided to stop a device at the lower terminal landing. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-92-060, filed 12/10/80.]

WAC 296-92-070 Public assembly and institutional installations. (1) In addition to the requirements of WAC 296-92-010 to 070, a device installed in a place of public assembly or in an institution shall be equipped with the following:

(a) A permanent, weatherproof enclosure when exposed to the outside elements.

(b) An operating control of the constant pressure keyed type. Only authorized persons shall have access to the keys. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-92-070, filed 12/10/80.]

WAC 296-92-080 Nonskid surfacing. Related surfacing on which a wheelchair rolls when using a device shall be of the nonskid type. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-92-080, filed 12/10/80.]

WAC 296-92-090 Installation permits and acceptance inspections. (1) An installation permit shall be obtained before a device is installed. Installation shall be by a qualified contractor licensed by the state of Washington.

(2) An acceptance inspection shall be made by an elevator inspector before the device is operated by the owner or user. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-92-090, filed 12/10/80.]

WAC 296-92-100 Submission of plans for installation. Plans shall be supplied to the elevator section and shall include the following:

(1) Construction of an upper terminal ramp or dock-like landing of adequate strength and rigidity, with substantial handrails on each side for access to and from the device.

(2) A self-closing gate or door shall be installed at the terminal landings with electric contact with mechanical lock to prevent entrance when the device is not at that landing.

(3) The horizontal surface of the landings upon which a wheelchair rolls shall be so constructed as to safely carry the weight.

(4) A terminal landing shall be permanently fastened in place. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-92-100, filed 12/10/80.]

WAC 296-92-110 Operation and maintenance manuals. (1) The manufacturers shall provide an operational manual for each device describing the function and operation of the components, including instructions for correct use of the device.

(2) The manufacturer shall provide a maintenance manual for each device, including recommended maintenance procedures as follows:

(a) Types of lubricants required and frequency of application.

(b) Definition and measurement to determine excessive wear.

(c) Recommended frequency of service to specific components. [Statutory Authority: RCW 70.87.030. 81-01-034 (Order 80-26), § 296-92-110, filed 12/10/80.]

Chapter 296-100 WAC
SAFETY REQUIREMENTS FOR MATERIAL HOISTS

WAC

296-100-010 Material hoist platforms.
296-100-020 Inside material hoist shaftways.
296-100-030 Outside hoisting towers.
296-100-040 Hoisting machines.

WAC 296-100-010 Material hoist platforms. (1) Material hoist platforms shall be substantially constructed and of sufficient strength with a factor of safety of five (5) for the rated load and capacity.

(2) Overhead protective covering of planking or heavy wire mesh shall be provided on the cross-head of every material hoist platform to prevent objects falling on the workmen when loading or unloading the hoist.

(3) The protection on the cross-head shall be made in sections and each section hinged, so they may be raised when hoisting long material.

(4) When using a hoist for long material, the several pieces of the material shall be securely fastened together, and made fast to the hoist so that no part of the load can fall or project beyond the sides of the hoist.

(5) Provide suitable blocking and cleats on all platforms when wheelbarrows or other rolling equipment are transported to hold them securely in place.

(6) Workmen shall not be allowed to ride on material hoists and a sign prohibiting such practice shall be posted on the cross bar of the platform or on the shaftway enclosure at each floor opening.

(7) The platforms of every hoist shall be enclosed on all sides where openings are not to be left with toeboards and a heavy wire screen enclosure formed of number sixteen (16) U.S. gauge wire, one and one-half (1 1/2) inch mesh. [Order 70-11, § 296-100-010, filed 9/18/70, effective 10/21/70.]

WAC 296-100-020 Inside material hoist shaftways. (1) All material hoist shaftways erected inside buildings shall preferably be enclosed tightly their entire height. When this is not practicable, the sides of shaftway not used for entrance shall be enclosed on each floor to a height of at least eight (8) feet with wire netting formed of not less than number sixteen (16) U.S. gauge wire, one and one-half (1 1/2) inch mesh, or enclosed with wooden slats spaced vertically not more than four (4) inches apart, with a toeboard placed around all sides except at the entrance.

(2) When two (2) material shaftways are erected side by side, similar protection shall be placed between them.

(3) The enclosure shall extend at least two (2) feet in front of the shaftway unless the entrances are protected with gates.

(4) All entrances into the shaftway shall be protected by hinges or pivoted bars or gates.

If bars are used, they shall not be less than two be three (2 x 3) inches in section, placed at a height of not less than three (3) feet nor more than four (4) feet above the floor and located not nearer than two (2) feet from the shaftway.

The bar shall be bolted to one side of the enclosure frame by a single bolt on which the bar may swing, and a slot provided at the opposite side to receive the end of the bar when it is lowered to a horizontal position. A hook or wooden button shall be provided to hold the bar up out of the way while loading or unloading the hoist.

If a gate is used, it shall be located not nearer than six (6) inches from the front of the shaftway, at least five and one-half (5 1/2) feet high, and the bottom not more than two (2) inches off the floor.

(5) The guide rails of all hoists shall be kept rigid and in perfect alignment at all times.

(6) The guide rails shall be of sound lumber or steel of adequate uniform size to provide a firm track.

(7) Overhead sheave beams and their supports shall be of good sound timber or steel of strength and stiffness with a factor of safety of five (5) to support the combined live and dead loads imposed.

(8) Protective covering of planking or heavy wire netting shall be provided above the overhead work of all hoists to prevent objects falling down the shaftway. [Order 70-11, § 296-100-020, filed 9/18/70, effective 10/21/70.]

WAC 296-100-030 Outside hoisting towers. (1) Material hoist towers erected outside of buildings shall be constructed of strong, sound material and of ample strength with a factor of safety of five (5) to carry the loads intended.

(2) Foundations for hoist towers shall be sufficiently large to spread the hoist load so that it will not exceed the safe bearing capacity of the soil on which it stands. Foundations shall be level.

(3) Hoist towers shall be erected plumb, square at the corners and sufficiently braced to make them rigid and stable.

(4) All splicing material on posts shall be not less than two (2) inches in thickness, four (4) feet long, and shall be spiked or bolted to at least two (2) adjacent sides of the posts. All splices shall be staggered.

(5) An approved ladder securely fastened to the tower shall extend its entire height.

(6) Hoist towers shall be securely guyed and well anchored.

(7) The guys shall be securely clamped to "dead men" of sufficient size and well buried.

(8) Platforms of ample size and strength with railings and toeboards shall be built at each level where men work.

(9) Hoist towers shall be enclosed on all sides to a height of eight feet at lower landing with wire screen enclosure formed of number sixteen U.S. gauge wire, and one and one-half inch mesh, or other suitable material, securely fastened to the tower structure to prevent access to the space under any hoist platform.

(10) The overhead framework of all towers shall be of sufficient strength to take the total load of all sheaves, car and material to be hoisted with a factor of safety of five.

(11) When extremely high hoist towers are to be erected, and it is not practical to fully secure this tower by means of bracing or guys, they shall be built in sections, by erecting the lower section to an altitude to suffice for immediate needs, and extending it upward when the construction work has progressed sufficiently to make it possible to provide a support or bracing for the tower.

(12) Standard railing and toeboards shall be placed on the open sides of runways connecting the tower to the structure, and a bar or gate provided at all openings into the tower. [Order 70-11, § 296-100-030, filed 9/18/70, effective 10/21/70.]

WAC 296-100-040 Hoisting machines. (1) All gearing on hoisting machines shall be enclosed. If electrical equipment is used, it shall be effectively grounded.

(2) Hoisting machines 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 machines shall be protected against the weather and falling objects by a substantial covering.

(4) All hoisting equipment shall be frequently inspected, and brakes, gears and operating levers kept in perfect 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, as it prevents the brake from holding the load. [Order 70-11, § 296-100-040, filed 9/18/70, effective 10/21/70.]

Chapter 296-104 WAC
BOARD OF BOILER RULES--SUBSTANTIVE

WAC

296-104-001 Promulgation.
296-104-002 Approval by director.
296-104-010 Definitions.
296-104-015 Board meetings.
296-104-020 Administration—Filing requirements before installation.
296-104-025 Administration—Owner to notify chief inspector in case of accident.
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296-104-035 Administration—Inspectors to have no other interests.
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296-104-100 Inspection—Frequency of inspections.
296-104-105 Inspection—Notification of inspection.
296-104-110 Inspection—Inspectors to notify the chief inspector of defective boilers or unfired pressure vessels.
296-104-115 Inspection—Defective conditions disclosed at time of external inspection.
296-104-120 Inspection—Condemned boilers or unfired pressure vessel.
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296-104-130 Inspection—Validity of inspection certificate.
296-104-135 Inspection—Restamping of boilers and unfired pressure vessels.
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296-104-150 Inspection of systems—Unfired steam boilers.
296-104-155 Inspection of systems—Preparation for internal inspection.
296-104-160 Inspection of systems—Boilers or unfired pressure vessels improperly prepared for inspection.
296-104-165 Inspection of systems—Removal of covering to permit inspection.
296-104-170 Inspection of systems—Shop inspections.
296-104-200 Inspection of systems—Standard for new construction.
296-104-201 Inspection of systems—Standard for water chillers.
296-104-205 Inspection of systems—Nonstandard regulations.
296-104-210 Inspection of systems—Special designs and/or great pressures.

296-104-215 Inspection of systems—Nonstandard boilers and unfired pressure vessels.
296-104-220 Inspection of systems—Nonstandard second hand boilers or unfired pressure vessels.
296-104-225 Inspection of systems—Reinstalled boiler or unfired pressure vessel.
296-104-230 Inspection of systems—Hot water supply boilers and tanks.
296-104-235 Inspection of systems—Safety relief valves.
296-104-240 Inspection of systems—Unfired pressure vessels fabricated of pipe or pipe fittings.
296-104-245 Inspection of systems—Oil heaters.
296-104-255 Inspection of systems—Clearance at top of boilers.
296-104-260 Inspection of systems—Clearance at front, back and sides.
296-104-265 Inspection of systems—Low water cut-offs and water feeding devices.
296-104-270 Inspection of systems—Explosion doors.
296-104-285 Unfired pressure vessels in places of public assembly.
296-104-300 New installations—Ladders and runways.
296-104-305 New installations—Exits from boiler rooms.
296-104-310 New installations—Discharge from safety valves, blow offs and drains.
296-104-315 New installations—Blow off tanks.
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296-104-325 New installations—Supports.
296-104-330 New installations—Pressure reducing valves.
296-104-400 Existing installations—Stamping of existing boilers and unfired pressure vessels.
296-104-405 Existing installations—Existing boiler or unfired pressure vessels.
296-104-410 Existing installations—Noncode steel heating boilers.
296-104-415 Existing installations—Noncode cast iron boilers.
296-104-500 Repairs—Major repairs.
296-104-505 Repairs—Repairs by fusion welding.
296-104-510 Repairs—Riveted patches.
296-104-515 Repairs—Safety devices.
296-104-520 Repairs—Lap seam crack.
296-104-525 Repairs—Hydrostatic pressure tests.
296-104-530 Repairs—Air or vapor testing.
296-104-600 General requirements—Conditions not covered by these rules.
296-104-700 Inspection fees—Certificate fees—Expenses—Schedules.

DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

296-104-250 Inspection of systems—Hot water heating systems. [Part IV, § 11, filed 3/23/60.] Repealed by 78-03-057 (Order 78-3), filed 2/22/78. Statutory Authority: RCW 70.79.030.

296-104-275 Inspection of systems—Hydro-pneumatic tanks. [Part IV, § 16, filed 3/23/60.] Repealed by 78-03-057 (Order 78-3), filed 2/22/78. Statutory Authority: RCW 70.79.030.

296-104-280 Inspection of systems—Electric steam generators. [Part IV, § 17, filed 3/23/60.] Repealed by 78-03-057 (Order 78-3), filed 2/22/78. Statutory Authority: RCW 70.79.030.

WAC 296-104-001 Promulgation. The following rules and regulations apply to all boilers and unfired pressure vessels except those exempt under section 8, chapter 32, Laws of 1951 (RCW 70.79.080). Boilers and unfired pressure vessels listed under section 9, chapter 32, Laws of 1951 (RCW 70.79.090) are exempt from inspection and fees, but shall comply with all rules for construction, installation, repairs and general requirements.

The following rules and regulations were formulated in accordance with the law and are hereby promulgated.

Date: December 18, 1958. [Promulgation, filed 3/23/60.]

WAC 296-104-002 Approval by director. The following rules and regulations are hereby approved. They have the force and effect of law in accordance with chapter 32, section 5, Laws of 1951 (RCW 70.79.050).

Date: December 24, 1958 Department of Labor and Industries,
Jerry Hagan, Director.

[Approval, filed 3/23/60.]

Reviser's Note: Each rule to follow will have in its bracketed history note the date of its filing with the code reviser's office.

For the effective date of various rules, note the application thereto of RCW 70.79.050.

WAC 296-104-010 Definitions. (1) "Director" shall mean the director of the department of labor and industries.

(2) "Board of boiler rules" shall mean the board created by law and empowered to make, alter, amend, and interpret rules and regulations for the safe and proper construction, installation, repair, and use of boilers and for the proper construction, installation, and repair of unfired pressure vessels in this state.

(3) "Chief inspector" shall mean the chief boiler inspector appointed under RCW 70.79.100.

(4) "Deputy inspector" shall mean a deputy inspector of boilers and unfired pressure vessels appointed by the chief boiler inspector of Washington under the provisions of RCW 70.79.120.

(5) "Special inspector" shall mean an inspector holding a Washington commission, who is regularly employed by an insurance company authorized to insure against loss from explosion of boilers and unfired pressure vessels in this state, or who is continuously employed by any company operating unfired pressure vessels in this state for the purpose of making inspections of unfired pressure vessels used or to be used by such company.

(6) "Inspector" shall mean the chief boiler inspector, a deputy inspector, or a special inspector.

(7) "Certificate of competency" shall mean a certificate issued to a person who has passed an examination prescribed by the board of boiler rules.

(8) "Department" as used herein shall mean the department of labor and industries of the state of Washington.

(9) "Owner" or "User" shall mean a person, firm, or corporation owning or operating any boiler or unfired pressure vessel within the state.

(10) "ASME Code" shall mean the Boiler and Pressure Vessel Code of the American Society of Mechanical Engineers with amendments and interpretations thereto made and approved by the council of the society which have been regularly adopted by the board of boiler rules in accordance with the provisions of RCW 70.79.030.

(11) "Existing installations" shall mean any boiler or unfired pressure vessel constructed, installed, placed in operation, or contracted for before January 1, 1952.

(12) "Approved" shall mean approved by the chief boiler inspector as evidenced by his issuance of an inspection certificate.

(13) "Standard boiler or unfired pressure vessel" shall mean a boiler or unfired pressure vessel which bears the ASME stamp.

(14) "Nonstandard boiler or unfired pressure vessel" shall mean a boiler or unfired pressure vessel that does not bear the ASME stamp.

(15) "Boiler" shall mean a closed vessel used for heating water or liquid or for generating steam or vapor by the direct application of heat.

(16) "Direct application of heat" shall mean the firing of any fuel, solid, liquid, or gaseous, including electrical elements of any description.

(17) "Power boiler" shall mean a boiler used to produce steam or vapor at a pressure exceeding 15 lbs. per square inch gage, or a boiler used for heating water or liquid to a pressure exceeding 160 psi. or to a temperature exceeding 250°F.

(18) "Low pressure heating boiler" shall mean a boiler operated at a pressure not exceeding 15 lbs. per square inch gage steam, or at a pressure not exceeding 160 lbs. per square inch and a temperature not exceeding 250°F. for water.

(19) "Hot water supply boiler" shall mean a low pressure boiler used to heat water to a temperature not exceeding 200°F.

(20) "Unfired steam boiler" shall mean a pressure vessel in which steam is generated by an indirect application of heat.

(21) "Unfired pressure vessel" shall mean a closed vessel in which pressure is obtained from an external source, or from an indirect application of heat, including steam or hot water coils, converters or heat exchangers.

(22) "Reinstalled boiler or unfired pressure vessel" shall mean a boiler or unfired pressure vessel removed from its original setting and reerected at the same location or at a new location without change of ownership.

(23) "Second hand boiler or unfired pressure vessel" shall mean a boiler or unfired pressure vessel of which both the location and ownership have changed after primary use.

(24) "Condemned boiler or unfired pressure vessel" shall mean a boiler or unfired pressure vessel that has been inspected and declared unsafe or disqualified by legal requirements by an inspector who has applied a stamping or marking designating its condemnation.

(25) "Internal inspection" shall mean an inspection made when a boiler or unfired pressure vessel is shut down and handholes, manholes, or other inspection openings are open or removed for inspection of the interior.

(26) "External inspection" shall mean an inspection made while a boiler or unfired pressure vessel is in operation and includes the inspection and demonstration of controls and safety devices.

(27) "Place of public assembly" shall mean a building used in whole or in part for occupation by persons for such purposes as worship, hospitals, education, instruction, entertainment, amusement, or waiting transportation.

(28) "Fusion welding" shall mean a process of welding metals in a molten, or molten and vaporous state, without the application of mechanical pressure or blows. Such welding may be accomplished by the oxy–acetylene or oxy–hydrogen flame or by the electric arc. Thermit welding shall be classified as fusion welding.

(29) "Major repair" shall mean one upon which the strength of a boiler or unfired pressure vessel depends.

(30) "Agriculture purposes" shall mean any act performed on a farm in production of crops or livestock, and shall include the storage of such crops and livestock in their natural state, but shall not be construed to include the processing or sale of crops or livestock.

(31) "Attendant" shall mean the person in charge of the operation of a boiler or unfired pressure vessel.

(32) "Automatic operation of a boiler" shall mean full control of feed water and fuel in order to maintain the pressure and temperature constant within the limits set. Controls must be such that the operation follows the demand without interruption. Manual restart may be required when the burner is off because of low water, flame failure, or power failure.

(33) "Alteration" is a structural modification of, or a departure from an original design or existing construction.

(34) "Repair" is a restoration of any damaged or impaired part to an effective and safe condition. [Order 72–11, § 296–104–010, filed 7/7/72; Part I, filed 3/23/60.]

WAC 296–104–015 Board meetings. The board of boiler rules shall hold its regular meetings on the third Tuesday of January, March, May, September and November of each year at the hour of 10 a.m. at the office of the chief boiler inspector, 300 West Harrison Street, Seattle, Washington. [Order 72–11, § 296–104–015, filed 7/7/72.]

WAC 296–104–020 Administration--Filing requirements before installation. Manufacturers data reports on boilers and pressure vessels as required by the provisions of the ASME Code and The National Board of Boiler and Pressure Vessel Inspectors shall be filed by the owner or his agent with the chief inspector before installation. When the boilers or pressure vessel are of special design or construction not covered by the ASME Code (unless otherwise exempted by the rules and regulations), the proposed owner or user shall apply to the chief inspector in writing for permission to install such boilers or pressure vessels and shall supply such details of design and construction as may be required by the chief inspector and his approval shall be secured before construction is started. When used or second hand boilers or pressure vessels are to be installed, the owner or user shall similarly apply and secure approval before starting installation. [Order 74–37, § 296–104–020, filed 11/8/74; Part II, § 1, filed 3/23/60.]

WAC 296-104-025 Administration--Owner to notify chief inspector in case of accident. When an accident occurs which serves to render a boiler or unfired pressure vessel inoperative, the owner or user shall immediately notify the chief inspector, and submit a detailed report of the accident. In case of serious accident, such as explosion, notice shall be given immediately by telephone, telegraph, or messenger and neither the boiler or unfired pressure vessel nor any parts thereof shall be removed or disturbed before and inspection has been made by the chief inspector, deputy inspector or special inspector, unless for the purpose of saving life. The inspector making the investigation and inspection shall report to the chief inspector as soon as possible. [Part II, § 2, filed 3/23/60.]

WAC 296-104-030 Administration--Penalty for operation of unsafe boilers or unfired pressure vessels. If upon inspection a boiler or unfired pressure vessel is found to be in such condition that it is unsafe to operate, the inspection certificate shall be suspended by the inspector. Any person, firm, partnership, or corporation causing such objects to be operated without a valid certificate of inspection shall be subject to the provisions of RCW 70.79.310. [Part II, § 3, filed 3/23/60.]

WAC 296-104-035 Administration--Inspectors to have no other interests. Inspectors commissioned by the state of Washington shall not be engaged in the sale of any article or device related to boilers or unfired pressure vessels and shall devote their full time to inspection work. [Part II, § 4, filed 3/23/60.]

WAC 296-104-040 Administration--Inspectors to submit reports. Inspectors shall submit reports of inspections of boilers and pressure vessels on appropriate forms as approved by the chief inspector. Reports of inspections shall be submitted within thirty days of inspection. Requests for variance from regular inspection date shall be in writing. When hazardous conditions are discovered during any inspection remedial action shall be initiated at once and reported to the chief inspector. [Order 74-37, § 296-104-040, filed 11/8/74; Part II, § 5, filed 3/23/60.]

WAC 296-104-045 Administration--Insurance companies to notify the chief inspector of new, canceled or suspended risks. All insurance companies shall notify the chief inspector within thirty days of all boiler or unfired pressure vessel risks written, canceled, not renewed or suspended because of unsafe conditions. [Part II, § 6, filed 3/23/60.]

WAC 296-104-050 Administration--Examination for inspector. Examination for certificate of competency as inspector of boilers shall be held at the office of the chief boiler inspector for the state of Washington, or at any location to be selected by the board, four times each year, namely, the first Wednesday of the months of March, June, September and December. Special examinations will be held when considered necessary by the board.

Applicants for examination shall have had at least three years practical experience in the construction, maintenance, repair or operation of high pressure boilers or unfired pressure vessels as a mechanical engineer, steam engineer or boiler maker, or shall have had at least three years experience as an inspector of high pressure boilers. A credit of two years of the required experience will be given to applicants holding a mechanical engineering degree from a recognized college of engineering.

Application for examination for certificate of competency shall be in writing upon a form to be furnished by the director stating the school education of the applicant, a list of his employers, his period of employment and position held with each employer. Applications containing willful falsification or untruthful statements shall be rejected. If the applicant's history and experience meet with the approval of the board of boiler rules, he shall be given a written examination dealing with the construction, installation, operation, maintenance and repair of boilers and unfired pressure vessels and their appurtenance, and the applicant shall be accepted or rejected on the merits of this examination. If the applicant is successful in meeting the requirements of the examining board, a certificate of competency will be issued by the chief inspector. After the expiration of ninety days, an applicant who fails to pass the examination will be permitted to take another written examination, and his acceptance or rejection will be determined by the board on the basis of this examination. [Statutory Authority: RCW 70.79.030. 78-03-057 (Order 78-3), § 296-104-050, filed 2/22/78; Part II, § 7, filed 3/23/60.]

WAC 296-104-055 Administration--Examination fees. A fee of twenty-five dollars will be charged for each applicant taking the examination for a Certificate of Competency or any examination sponsored by The National Board of Boiler and Pressure Vessel Inspectors. In the event an applicant fails to pass the examination this fee shall be good for a period of one year during which a re-examination may be taken. Checks for examination fees shall be made payable to the state treasurer. [Order 74-37, § 296-104-055, filed 11/8/74; Part II, § 8, filed 3/23/60.]

WAC 296-104-060 Administration--Commissions. Upon the request of any company authorized to insure and insuring against loss from explosion of boilers and pressure vessels in this state, or upon the request of any company operating pressure vessels in this state a commission as a special inspector and an identifying Commission Card shall be issued by the chief inspector, to any inspector actively engaged in boiler or pressure vessel inspection in this state who is in the employ of such company provided the inspector has successfully passed the written examination and holds a Certificate of Competency as set forth in WAC 296-104-050. Commissions issued to inspectors in the employ of such

companies shall be held at the home office of the employing company. Identifying Commission Cards shall be carried by inspectors while inspecting and shall be valid for no longer than one year and may be renewed annually at the request of the employing company. The commission and the identifying Commission Card shall be returned at once to the chief inspector when the inspector to whom the commission was issued is no longer in its employ, or at the request of the chief inspector. The Certificate of Competency and commission issued to such inspector may be suspended by the director and may be revoked upon ten days notice to the inspector and to the employer of such inspector for incompetency or untrustworthiness; for wilful falsification of any matter or statement contained in his application, or in the report of any inspection; or for other application, or in the report of any inspection; or for other sufficient reason; but in the case of a Certificate of Competency, the holder thereof shall be entitled to a hearing before the board prior to the revocation of said Certificate of Competency. A person whose commission has been suspended or revoked, except for untrustworthiness, shall be entitled to apply to the board for reinstatement or, in the case of a revocation, for a new examination and commission after ninety days from such revocation; and in all cases, such person shall be entitled to an appeal as provided in RCW 70.79.190. [Order 74-37, § 296-104-060, filed 11/8/74; Part II, § 9, filed 3/23/60.]

WAC 296-104-065 Administration--Reciprocal commissions. Upon the request of a boiler insurance company authorized to insure and insuring against loss from explosion of boilers and pressure vessels in this state, a commission as a Special Inspector shall be issued by the Chief Inspector to an inspector in the employ of such company provided the inspector has had the experience prescribed in RCW 70.79.130 and holds a Certificate of Competency or Commission issued by a state which has adopted one or more sections of the ASME Code and which holds a written examination equivalent to that required by the state of Washington and a National Board Commission. Application for a reciprocal commission shall be made on a form to be furnished by the Chief Inspector, and shall be accompanied by a photostatic copy of the applicant's Commission and Certificate of Competency. [Statutory Authority: RCW 70.79.030. 78-03-057 (Order 78-3), § 296-104-065, filed 2/22/78; Order 74-37, § 296-104-065, filed 11/8/74; Part II, § 10, filed 3/23/60.]

WAC 296-104-100 Inspection--Frequency of inspections. Power boilers shall be inspected annually both internally and externally while not under pressure, and annually externally while under pressure.

Low pressure heating boilers shall be inspected externally biennially. Where construction permits, they shall in addition be inspected internally at the same time.

Unfired pressure vessels shall be inspected externally biennially. Where subject to corrosion and construction permits they shall in addition be inspected internally biennially.

Unfired pressure vessels not subject to internal corrosion shall be inspected externally biennially. [Part III, § 1, filed 3/23/60.]

WAC 296-104-105 Inspection--Notification of inspection. The owner or user shall prepare each boiler and unfired pressure vessel for internal inspection and shall prepare for and apply a hydrostatic pressure test whenever necessary on the date specified by the inspector, which date shall not be less than seven days after the date of notification. [Part III, § 2, filed 3/23/60.]

WAC 296-104-110 Inspection--Inspectors to notify the chief inspector of defective boilers or unfired pressure vessels. If an inspector, upon inspection of a boiler or unfired pressure vessel or any of their appurtenances finds that they do not comply with the Washington state boiler and unfired pressure vessels law rules and regulations, he shall immediately notify the chief inspector and submit a report of the defects. [Part III, § 3, filed 3/23/60.]

WAC 296-104-115 Inspection--Defective conditions disclosed at time of external inspection. If upon an external inspection there is evidence of a leak or crack, enough of the covering of the boiler or unfired pressure vessel shall be removed to satisfy the inspector in order that he may determine as to the safety of the boiler or unfired pressure vessel, or if the covering cannot be removed at the time, he may order the operation of the boiler or unfired pressure vessel stopped until such time as the covering can be removed and proper examination made. [Part III, § 4, filed 3/23/60.]

WAC 296-104-120 Inspection--Condemned boilers or unfired pressure vessel. Any boiler or unfired pressure vessel having been inspected and declared unsafe by the inspector, shall be stamped by the inspector with an arrowhead stamp having an overall length of 1/2 inch and width of 3/8 inch on either side of the letter "X" and the letter "W", as shown by the following facsimile, which will designate a condemned boiler or unfired pressure vessel. [Part III, § 5, filed 3/23/60.]

WAC 296-104-125 Inspection--Certificate fees. If upon inspection a boiler or unfired pressure vessel is found to be suitable for use and to conform to these rules and regulations, the owner or user shall pay directly to the chief inspector fees as scheduled in RCW 70.79.290. Inspections are not complete until the certificate of inspection is posted.

If the owner or user of each boiler or unfired pressure vessel required to be inspected refuses to allow an inspection to be made, or refuses to pay the above fee, the certificate of inspection shall be suspended by the chief inspector until the owner or user complies with the requirements. [Part III, § 6, filed 3/23/60.]

WAC 296-104-130 Inspection--Validity of inspection certificate. An inspection certificate, issued in accordance with RCW 70.79.290, shall be valid until expiration unless some defect or condition affecting the

safety of the boiler or unfired pressure vessel is disclosed: *Provided, however,* That a certificate issued for a boiler or unfired pressure vessel inspected by a special inspector shall be valid only if the boiler or unfired pressure vessel for which it was issued continues to be insured by a duly authorized insurance company or operated by a duly authorized company. [Part III, § 7, filed 3/23/60.]

WAC 296-104-135 Inspection--Restamping of boilers and unfired pressure vessels. When the stamping on a boiler or unfired pressure vessel becomes indistinct the inspector shall instruct the owner or user to have it restamped. Request for permission to restamp the boiler or unfired pressure vessel shall be made to the chief inspector and proof of the original stamping shall accompany the request authorized by the chief inspector. Restamping authorized by the chief inspector shall be done only by an inspector, and shall be identical with the original stamping except that it will not be required to restamp the ASME symbol. Notice of completion of such restamping shall be filed with the chief boiler inspector by the inspector who stamped the boiler or unfired pressure vessel together with a facsimile of the stamping applied. [Part III, § 8, filed 3/23/60.]

WAC 296-104-140 Inspection--State stamp. Upon completion of the installation, all boilers and unfired pressure vessels shall be inspected by the chief inspector, a deputy inspector, or a special inspector. At the time of this inspection, each boiler or unfired pressure vessel shall be stamped with a serial number of the state of Washington followed by the letter "W," said letter and figures to be not less than 5/16 in. in height. The stamping shall not be concealed by lagging or paint and shall be exposed at all times. A metal tag 1 inch by 3 inches minimum, with the state number stamped thereon may be used where construction does not permit a direct stamp on the boiler or unfired pressure vessel.

Data sheets properly filled in and signed shall be made available at the time of first inspection.

Washington special numbers when assigned by the chief inspector shall be preceded by the letters: WS. [Order 73-1, § 296-104-140, filed 3/22/73; Part III, § 9, filed 3/23/60.]

WAC 296-104-145 Inspection of systems. A group of unfired pressure vessels operating as a single unit such as the vessels in a refrigeration system, evaporators, ironers and paper machines shall be classed as a single unit and shall be given one number, designating the different vessels of the unit as a-b-c, etc. The inspector's report shall cover all pressure vessels in the system. One certificate shall be issued for the unit. Certificate charge shall be as outlined in RCW 70.79.290, for each vessel of the system. [Part III, § 10, filed 3/23/60.]

WAC 296-104-150 Inspection of systems--Unfired steam boilers. Unfired steam boilers operating at pressures of 50 psi or more shall be inspected as power boilers. Unfired steam boilers operating at less than 50 psi shall be inspected as unfired pressure vessels. [Part III, § 11, filed 3/23/60.]

WAC 296-104-155 Inspection of systems--Preparation for internal inspection. The owner or user shall prepare a boiler for internal inspection in the following manner:

(a) Water shall be drawn off and the boiler thoroughly washed.

(b) All manhole and handhole plates and wash-out plugs and water column connections shall be removed, the furnace and combustion chambers thoroughly cooled and cleaned.

(c) All grates of internally fired boilers shall be removed.

(d) At each annual inspection brickwork shall be removed as required by the inspector in order to determine the condition of the boiler headers, furnace, supports, or other parts.

(e) The steam gage shall be removed for testing.

(f) Any leakage of steam or hot water into the boiler shall be cut off by disconnecting the pipe or valve at the most convenient point.

(g) The low water cutout shall be disassembled to such a degree as the inspector shall require. [Part III, § 12, filed 3/23/60.]

WAC 296-104-160 Inspection of systems--Boilers or unfired pressure vessels improperly prepared for inspection. If a boiler or unfired pressure vessel has not been properly prepared for an internal inspection, or the owner or user fails to comply with the requirements for hydrostatic test as set forth in these rules, the inspector may decline to make the inspection or test and the certificate of inspection shall be withheld until the owner or user complies with the requirements.

Unfired pressure vessels shall be prepared for inspection to the extent deemed necessary by the inspector. [Part III, § 13, filed 3/23/60.]

WAC 296-104-165 Inspection of systems--Removal of covering to permit inspection. If the boiler or unfired pressure vessel is jacketed so that the longitudinal seams of shells, drums, or domes cannot be seen, enough of the jacketing, setting wall, or other form of casing or housing shall be removed so that the size of the rivets, pitch of the rivets, and other data necessary to determine the safety of the boiler or unfired pressure vessel may be obtained provided such information cannot be determined by other means. [Part III, § 14, filed 3/23/60.]

WAC 296-104-170 Inspection of systems--Shop inspections. Shop inspections shall be as outlined in the applicable sections of the ASME Code. Only inspectors holding a national board commission and a commission issued by the state of Washington shall make shop inspections in this state. [Statutory Authority: RCW 70-.79.030. 78-03-057 (Order 78-3), § 296-104-170, filed 2/22/78; Part III, § 15, filed 3/23/60.]

WAC 296-104-200 Inspection of systems--Standard for new construction. The standard for new construction shall be the 1980 edition of the ASME Boiler & Pressure Vessel Code and ANSI B31.3 for oil and chemical plants and ANSI B31.1 for other non-nuclear construction with all addenda made thereto prior to December 1, 1980. The 1980 code as applicable may be used on and after the date of issue and becomes mandatory twelve months after adoption by the board as defined in RCW 70.79.050(2). The board recognizes that the ASME Code states that new editions of the code become mandatory on issue and that subsequent addenda become mandatory six months after the date of issue. Also, in circumstances such as nuclear systems the time period for addenda becoming mandatory is defined in the Code of Federal Regulations. Note: Editions of the ASME Code including semi-annual addenda will be adopted in accordance with the Administrative Procedure Act. Check with the Office of the Chief Boiler Inspector for the current code date. [Statutory Authority: RCW 70.79.030. 81-01-114 (Order 80-28), § 296-104-200, filed 12/24/80; 80-05-065 (Order 80-7), § 296-104-200, filed 4/23/80; 79-05-054 (Order 79-7), § 296-104-200, filed 4/30/79; 78-10-096 (Order 78-19), § 296-104-200, filed 10/3/78; Order 77-23, § 296-104-200, filed 11/8/77; Order 77-9, § 296-104-200, filed 5/26/77; Order 75-35, § 296-104-200, filed 10/29/75; Order 74-37, § 296-104-200, filed 11/8/74; Order 73-1, § 286-104-200, filed 3/22/73; Order 72-17, § 296-104-200, filed 9/28/72; Order 72-11, § 296-104-200, filed 7/7/72; Part IV, § 1, filed 3/23/60.]

WAC 296-104-201 Inspection of systems--Standard for water chillers. Pressure vessels that serve to transport water as part of a system that produces chilled water shall be constructed in accordance with the standards contained in the 1978 edition of the Safety Code for Mechanical Refrigeration published by the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., a member of the American National Standards Institute. The Safety Code for Mechanical Refrigeration shall apply to pressure vessels in place of the ASME Code adopted in WAC 296-104-200 only if the vessels meet the following criteria:

(1) The vessel serves to transport water as part of a system that produces chilled water.

(2) The vessel is part of a system that circulates water is such a way that water in the system returns to the vessel in a continuous recycling process.

(3) The water transported by the vessel does not come into direct contact with refrigerant or similar heat exchange media.

(4) The water transported by the vessel cannot exceed 135°F. in temperature, and the pressure exerted by the water on the vessels never exceeds 300 PSIG.

(5) The vessel, in performing its normal functions, does not serve as a storage tank for water or any other substance. [Statutory Authority: RCW 70.79.030. 80-14-015 (Order 80-12), § 296-104-201, filed 9/23/80.]

WAC 296-104-205 Inspection of systems--Nonstandard regulations. Those boilers and unfired pressure vessels that are not considered to be within the jurisdiction of the ASME Code and those of special design and construction require a special certificate, section VIII, U-1, and section 1, power boilers preamble of the ASME Code. [Part IV, § 2, filed 3/23/60.]

WAC 296-104-210 Inspection of systems--Special designs and/or great pressures. Prints and calculations shall be supplied for special designs or construction, and for vessels designed for working pressure in excess of 3,000 psi. Upon approval a Washington special number will be assigned by the chief inspector. The installation will be subject to the regular annual inspection in the case of boilers, and biennial inspection in the case of unfired pressure vessels. [Order 73-1, § 296-104-210, filed 3/22/73; Part IV, § 3, filed 3/23/60.]

WAC 296-104-215 Inspection of systems--Nonstandard boilers and unfired pressure vessels. Nonstandard boilers and unfired pressure vessels may be used provided they have not been moved from their original setting since January 1, 1952, or ownership has not changed since January 1, 1952. [Part IV, § 4, filed 3/23/60.]

WAC 296-104-220 Inspection of systems--Nonstandard second hand boilers or unfired pressure vessels. Nonstandard, second hand boilers or unfired pressure vessels cannot be used in this state. [Part IV, § 5, filed 3/23/60.]

WAC 296-104-225 Inspection of systems--Reinstalled boiler or unfired pressure vessel. In any case where a stationary boiler or unfired pressure vessel is moved and reinstalled, the fittings and appliances must comply with the latest edition of the ASME Code. [Part IV, § 6, filed 3/23/60.]

WAC 296-104-230 Inspection of systems--Hot water supply boilers and tanks. Hot water supply boilers and tanks for operation below all of the following limitations; 200,000 btu input, 200°F. temperature, 160 psi pressure, and 120 Gal. capacity, shall be tested as follows:

One boiler or tank of each design and size taken from the manufacturer's stock at random, shall be subjected to a hydrostatic test in the presence of an inspector holding a National Board Commission. The boiler or tank shall withstand a pressure of 300 psi without leaks or excessive distortion. Samples shall be taken from the longitudinal seam and tests made as outlined in Section IX ASME Code for root and face bends and reduced tensile coupons. Upon successfully passing the above tests, a maximum allowable working pressure of 150 psi will be allowed for all boilers or tanks constructed to identical specifications. The company name, serial number, working pressure, and energy input shall be stamped or marked in a permanent manner on each boiler or tank. A retest shall be made at the inspector's discretion

or by the request of the chief inspector. Hot water supply boilers or tanks for operation exceeding any of the above limitations shall be constructed in accordance with the ASME Code. [Order 74-37, § 296-104-230, filed 11/8/74; Part IV, § 7, filed 3/23/60.]

WAC 296-104-235 Inspection of systems--Safety relief valves. The boilers and tanks covered by WAC 296-104-230 shall be protected by the installation of ASME Code relief valves with trial levers, set pressure not to exceed 160 psi. Relief valves shall be installed on top of tank or on outlet piping as close as possible to the boiler or tank, with a minimum of fittings and no valves intervening. The outlet of the relief valve shall be run full size to a safe place. [Statutory Authority: RCW 70-.79.030. 78-03-057 (Order 78-3), § 296-104-235, filed 2/22/78; Part IV, § 8, filed 3/23/60.]

WAC 296-104-240 Inspection of systems--Unfired pressure vessels fabricated of pipe or pipe fittings. Pressure vessels may be constructed of pipe or pipe fittings, the material complying with the specifications in the applicable sections of the ASME Code. When the part has significant duties other than transportation of a liquid, gas, or other material, such as storage, catch basin, scrubber, snubber, absorber, or pulsating dampener, it shall be deemed to be an unfired pressure vessel and shall conform to the rules governing the design, construction, inspection, and stamping of unfired pressure vessels. [Part IV, § 9, filed 3/23/60.]

WAC 296-104-245 Inspection of systems--Oil heaters. Steam or hot water oil heaters shall be so designed and constructed that in the event of failure of any part, oil cannot enter the boiler water. [Statutory Authority: RCW 70.79.030. 78-03-057 (Order 78-3), § 296-104-245, filed 2/22/78; Part IV, § 10, filed 3/23/60.]

WAC 296-104-255 Inspection of systems--Clearance at top of boilers. When boilers are replaced or new boilers installed in either existing or new buildings, a minimum clearance as specified below shall be provided between the top of boiler proper and ceiling:

(1) Power boilers having a steam generating capacity in excess of 5,000 pounds per hour or having a heating surface in excess of 1,000 sq. ft. or input in excess of 5,000,000 btu per hour. Clearance shall be ..... 7 feet.

(2) Low pressure boilers which exceed any one of the following limits: 5,000,000 btu input; 5,000 lbs. steam per hour capacity or 1,000 sq. ft. heating surface; and power boilers which do not exceed any of the following limits: 5,000,000 btu input; 5,000 lbs. steam per hour capacity or 1,000 sq. ft. heating surface; and all boilers with manholes on top of boiler except those described in paragraph (1) above ..... 3 feet.

(3) Low pressure boilers which do not exceed the above limits and miniature boilers..... 2 feet. [Part IV, § 12, filed 3/23/60.]

WAC 296-104-260 Inspection of systems--Clearance at front, back and sides. When boilers are replaced or new boilers installed in either existing or new buildings, minimum clearance and ventilation shall be provided as specified below:

(1) Minimum clearance at sides and back between boiler casing and boiler room wall . 1 1/2 feet

(2) Clearance in front and back shall be sufficient for operation, maintenance, and repair.

(3) Permanent means of ventilation shall be required proportionate to the requirements of the fires and room temperature. [Part IV, § 13, filed 3/23/60.]

WAC 296-104-265 Inspection of systems--Low water cut-offs and water feeding devices. All automatically fired steam, vapor, or hot water boilers excepting boilers having a constant attendant who has no other duties while the boiler is in operation, shall be equipped with an automatic low-water cut-off and an automatic water feeding device. These may be incorporated in one body or may be separate devices. Designs embodying a float and float bowl shall have a vertical straight-away valve drain pipe at lowest point in the water equalizing pipe connection by which the bowl and equalizing pipe can be flushed and the device tested. Immersion units shall be designed so that they may be readily tested at frequent intervals. [Part IV, § 14, filed 3/23/60.]

WAC 296-104-270 Inspection of systems--Explosion doors. Explosion doors, if used and if located in setting walls within seven feet of the firing floor or operating platform shall be provided with substantial deflectors to divert the blast. [Part IV, § 15, filed 3/23/60.]

WAC 296-104-285 Unfired pressure vessels in places of public assembly. Unfired pressure vessels in places of public assembly shall be exempt from the rules of this chapter when they do not exceed 1 1/2 cubic feet in volume and have a safety value [valve] setting of 150 psi, or less; or when they are less than 6 inches in diameter, and do not exceed 5 cubic feet in volume regardless of pressure. [Statutory Authority: RCW 70.79.030. 78-03-057 (Order 78-3), § 296-104-285, filed 2/22/78.]

WAC 296-104-300 New installations--Ladders and runways. When the boiler controls, valves, manholes, or casing openings are over ten feet from the fireroom floor, a fireproof runway or platform shall be provided, with handrails, at a convenient level for the purpose of affording safe access to the boiler. When runway or platform is more than twelve feet in extent, at least two means of exit shall be provided, each exit to be remotely located from the other. The provisions of this paragraph are mandatory for power boilers and are recommended for low pressure boilers. [Part V, § 1, filed 3/23/60.]

WAC 296-104-305 New installations--Exits from boiler rooms. Boiler rooms containing a boiler or a combination of boilers of over 2,000 square feet of heating surface shall have two means of exit, each remotely located from the other. Each elevation shall have at least two means of egress, each remotely located from the other. At least one means of exit, in case of a difference in elevation, shall be by ramp or stairway of standard design. [Part V, § 2, filed 3/23/60.]

WAC 296-104-310 New installations--Discharge from safety valves, blow offs and drains. The discharge from safety valves, blow offs and drains shall be located to prevent injury to personnel or property. The discharge from safety valves on boilers of 5,000 pounds of steam per hour capacity of single or multiple units shall be extended outside of building. [Part V, § 3, filed 3/23/60.]

WAC 296-104-315 New installations--Blow off tanks. Blow off tanks, if of metal, shall be designed in accordance with the "National Board Blowoff Equipment" standards, 1973 edition[.] [Statutory Authority: RCW 70.79.030. 78-03-057 (Order 78-3), § 296-104-315, filed 2/22/78; Part V, § 4, filed 3/23/60.]

Reviser's Note: RCW 34.04.058 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 296-104-320 New installations--Underground installations. Where necessary to install a vessel underground, it shall be enclosed in a concrete or masonry pit with removable cover so that inspection of the entire shell and heads of the vessel can be made. [Part V, § 5, filed 3/23/60]

WAC 296-104-325 New installations--Supports. Each boiler or unfired pressure vessel shall be supported by masonry or structural supports of sufficient strength and rigidity to safely support the vessel and its contents. There shall be no excessive vibration in either the vessel or its connecting piping. [Part V, § 6, filed 3/23/60.]

WAC 296-104-330 New installations--Pressure reducing valves. (1) 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 requirement for the full initial pressure. The relief or safety valves shall be located adjoining to or as close as possible to the reducing valve. Proper protection shall be provided to prevent injury or damage caused by the escaping steam from the discharge of relief or safety valves if vented to the atmosphere. The combined discharge capacity of the relief valves shall be such that the pressure rating of the lower pressure piping or equipment shall not be exceeded in case the reducing valve sticks open.

(2) The use of hand-controlled by-passes around reducing valves is permissible. The by-pass if used around a reducing valve shall not be greater in capacity than the reducing valve unless the piping or equipment is adequately protected by relief valves or meets the requirements of the high pressure system. It is mandatory that a pressure gauge as well as a relief valve be installed on the low pressure side of a reducing valve. [Part V, § 7, filed 3/23/60.]

WAC 296-104-400 Existing installations--Stamping of existing boilers and unfired pressure vessels. Each existing boiler and unfired pressure vessel shall be identified by a serial number of the state of Washington. The number will be assigned by the chief inspector and applied by an authorized inspector. The stamping shall be kept free of paint and lagging so that it will be plainly visible and easily read by the inspectors. Stamp shall be as outlined in WAC 296-104-060. [Part VI, § 1, filed 3/23/60.]

WAC 296-104-405 Existing installations--Existing boiler or unfired pressure vessels. The maximum allowable working pressure shall be determined by the following formula:

$$\frac{TS \times t \times E}{R \times FS} = MAWP$$

TS = as given in ASME Code, when material cannot be identified use 55,000 for steel and 45,000 for wrought iron.

t = the thinnest part determined by actual measurement.

E = efficiency of longitudinal joint or ligament, whichever is the least, determined by the rules and formula in the ASME Code.

R = radius of largest course in inches.

FS = The minimum for boilers shall be 5; for reinstalled or second hand boilers, 6; for boilers with longitudinal lap seams, 8 (age limit for such boilers 30 years, may then be used at 15 psi provided they can otherwise pass inspection).

The minimum for unfired pressure vessels shall be 4 when less than 20 years old, 4 1/2 when over 20 years old. [Part VI, § 2, filed 3/23/60.]

WAC 296-104-410 Existing installations--Noncode steel heating boilers. The maximum allowable working pressure for noncode steel heating boilers shall be 15 psi steam. For hot water service the allowable working pressure shall be computed from the formula in WAC 296-104-405, maximum 160 psi. [Part VI, § 3, filed 3/23/60.]

WAC 296-104-415 Existing installations--Noncode cast iron boilers. The maximum allowable working pressure for noncode cast iron boilers shall be 15 psi steam or 30 psi water. [Part VI, § 4, filed 3/23/60.]

WAC 296-104-500 Repairs--Major repairs. Where a major repair is necessary, an inspector shall be called for consultation and advice as to the best method of making such repair: after such repair is made it shall be

subject to the approval of the inspector. Repairs to all boilers, unfired pressure vessels, and their appurtenances shall conform to the rules contained in the national board inspection code wherever they apply. In all cases the material and workmanship shall comply with the rules contained in the appropriate sections of the ASME Code. [Part VII, § 1, filed 3/23/60.]

WAC 296-104-505 Repairs--Repairs by fusion welding. When repairs are to be made wherein fusion welding is to be used, permission shall be obtained from the chief inspector, a deputy inspector, or a special inspector and the welding shall be done in accordance with the rules given in the applicable sections of the ASME Code. [Part VII, § 2, filed 3/23/60.]

WAC 296-104-510 Repairs--Riveted patches. In applying riveted patches the design of the patch and method of installation is subject to approval of the inspector. [Part VII, § 3, filed 3/23/60.]

WAC 296-104-515 Repairs--Safety devices. All boilers and unfired pressure vessels shall be safeguarded by safety valves or safety relief valves as specified in the latest edition of the ASME Code. Rupture discs are acceptable where they apply. Repairing of noncode relief or safety valves shall not be allowed.

The resetting and restamping of safety devices shall be done by a qualified manufacturer or repair shop. Qualification to be by a national board inspector. Resetting while on the boiler or unfired pressure vessel shall be in the presence of an authorized national board inspector. [Part VII, § 4, filed 3/23/60.]

WAC 296-104-520 Repairs--Lap seam crack. The shell or drum of a boiler or unfired pressure vessel in which a lap seam crack is discovered along a longitudinal riveted joint shall be immediately discontinued from use. If the boiler or unfired pressure vessel is not more than 15 years of age, a complete new course of the original thickness may be installed at the discretion of the inspector (and after approval of the chief inspector). Patching is prohibited. By "lap seam crack" is meant the typical crack frequently found in lap seams, extending parallel to the longitudinal joint and located either between or adjacent to rivet holes. [Part VII, § 5, filed 3/23/60.]

WAC 296-104-525 Repairs--Hydrostatic pressure tests. (1) A hydrostatic pressure test, when applied to boilers or unfired pressure vessels of riveted or welded construction, shall not exceed one and one-half times the maximum allowable working pressure. During the hydrostatic pressure test, the safety valve or valves shall be removed or each valve disc shall be held down by a testing clamp and not by applying additional load to the spring with the compression screw. It is suggested that the minimum temperature of the water used to apply a hydrostatic test be not less than 70°F., but the maximum temperature shall not exceed 160°F.

(2) Note: When hydrostatic test is to be applied to existing installations the pressure shall be as follows:

(a) For all cases involving the question of tightness the pressure shall be equal to the release pressure of the safety valve or valves having the highest release setting.

(b) For all cases involving the question of safety, the pressure shall be equal to one and one-half times the maximum allowable working pressure. [Part VII, § 6, filed 3/23/60.]

WAC 296-104-530 Repairs--Air or vapor testing. Testing by air or vapor at pressures in excess of 15 lbs. shall not be undertaken without special permission. [Part VII, § 7, filed 3/23/60.]

WAC 296-104-600 General requirements--Conditions not covered by these rules. (1) In any condition not covered by these rules, the latest edition of the ASME Code for design, construction, and installation shall apply.

(2) Should any section, subsection, sentence, clause, phrase, provision or exemption of these rules be declared unconstitutional or invalid for any reason, such invalidity shall not affect the remaining portion or provisions hereof. [Part VIII, § 1, filed 3/23/60.]

WAC 296-104-700 Inspection fees--Certificate fees--Expenses--Schedules. The following fees shall be paid by, or on behalf of, the owner or user, upon completion of inspection.

The following inspection charges include the certificate fee, when applicable, and apply to inspections made by deputy inspectors employed by the state:

Inspections:

Heating Boilers:	Internal	External
Cast Iron—All Sizes	20.00	20.00
All other boilers less than 500 sq. ft.	20.00	15.00
500 sq. ft. to 2500 sq. ft.	35.00	20.00
Each additional 2500 sq. ft. of total heating surface, or any portion thereof	10.00	5.00

Power Boilers:	Internal	External
Less than 100 sq. ft.	15.00	15.00
100 sq. ft. to less than 500 sq. ft.	20.00	15.00
500 sq. ft. to 2500 sq. ft.	35.00	20.00
Each additional 2500 sq. ft. of total heating surface, or any portion thereof	10.00	5.00

Pressure Vessels:		
Automatic Utility Hot Water Supply Heaters per RCW 70.79.090	10.00	
All other Pressure Vessels Square feet shall be determined by multiplying the length of the shell by its diameter	Internal	External
Less than 15 sq. ft.	15.00	15.00
15 sq. ft. to less than 50 sq. ft.	20.00	15.00
50 sq. ft. to 100 sq. ft.	25.00	20.00
For each additional 100 sq. ft. or any portion thereof	5.00	5.00

Certificate of Inspection fees: The certificate fee is included in the inspection charge when inspected by the state.

For objects inspected by a special inspector employed by an authorized insurance company or user owner, the Inspection Certificate fee shall be $5.00 per object.

Shop Inspections, Field Construction Inspections, Special Inspection Services:

One-half day—Not to exceed 3 hours	65.00
One full day—Not to exceed 6 hours	110.00
In excess of 6 hours on site	35.00 per hour, or any portion thereof

Expenses shall include:
Travel: $7.50 per hour, plus $.15 per mile driven, or $7.50 per hour, plus actual cost of purchased transportation.
Hourly travel charges shall not exceed $75.00 for any 24 hour period.
Hotel and meals: Actual cost.

[Order 77-23, § 296-104-700, filed 11/8/77; Emergency Order 77-22, § 296-104-700, filed 11/8/77.]

Chapter 296-115 WAC
SAFETY REQUIREMENTS FOR PASSENGER VESSELS

WAC

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WAC 296-115-001 Foreword. This chapter is adopted to implement chapter 88.04 RCW as revised in 1979. The purpose of these rules is to set reasonable guidelines and requirements to provide for the safety and health of passengers and crew on board passenger vessels. It is intended that these rules will be at least as effective as the rules adopted by the United States Coast Guard. This chapter is therefore adopted in cooperation with the United States Coast Guard. [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), § 296-115-001, filed 11/13/80.]

WAC 296-115-005 Scope and application. (1) This chapter shall apply to vessels for hire that carry seven or more passengers when the vessels are operated in inland waters within the jurisdiction of the state of Washington. These rules shall not apply to vessels in the navigable waters of the United States subject to the jurisdiction of the United States Coast Guard.

(2) Pursuant to chapter 88.04 RCW, the director of the department of labor and industries shall administer this chapter. The director is authorized to use the services of the marine dock section to administer this chapter.

(3) All rules adopted by the United States Coast Guard pertaining to inland water passenger vessel service and navigation on inland waters shall be directly applicable and administered as a part of this chapter unless they conflict with specific provisions of this chapter or chapter 88.04 RCW.

(4) Special consideration. In applying the provisions of this section, the director may allow departures from the specific requirements when special circumstances or arrangements warrant such departures. (46 CFR 175.25-1) [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), § 296-115-005, filed 11/13/80.]

WAC 296-115-010 Appeal of decisions. (1) Any person aggrieved by a decision of the marine dock section may appeal the decision to the director within twenty working days after receipt of the decision.

(2) The director shall give the chief of the marine dock section notice of the appeal an shall give the chief ten working days to comment in writing. At the discretion of the director, an informal conference may be held with all affected parties invited to participate.

(3) The director shall issue a determining order within twenty working days of the receipt of the appeal or within ten working days following conclusion of an informal conference. [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), § 296-115-010, filed 11/13/80.]

WAC 296-115-015 Definitions applicable to all sections of this chapter.

NOTE: Meaning of words. Unless the context indicates otherwise, words used in this chapter shall have the meaning given in this section.

(1) "Approved" – approved by the director; however, if a provision of this chapter states that approval by an agency or organization other than the department such as Underwriters' Laboratories or the United States Coast Guard is required, then approval by the specified authority shall be accepted.

(2) "Authorized person" – 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.

(3) "Competent person" – one who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt action to eliminate them.

(4) "Confined or enclosed space" – any space having a limited means of egress that is subject to the accumulation of toxic or flammable contaminants or has an oxygen deficient atmosphere. Confined or enclosed spaces include, but are not limited to, storage tanks, process vessels, bins, boilers, ventilation or exhaust ducts, tunnels, pipelines and open top spaces more than four feet in depth, such as pits, tubs, vaults, and vessels.

(5) "Defect" – any characteristic or condition that tends to weaken or reduce the strength of the tool, object, or structure of which it is a part.

(6) "Department" – the department of labor and industries.

(7) "Director" – the director of the department of labor and industries, or his designated representative.

(8) "Employer" – any person, firm, corporation, partnership, business trust, legal representative, or other business entity that operates a passenger vessel for hire in this state and employs one or more employees or contracts with one or more persons, the essence of which is the personal labor of such persons. Any person, partnership, or business entity that has no employees, and is covered by the industrial insurance act shall be considered both an employer and an employee.

(9) "Equipment" – all machinery, devices, tools, facilities, safeguards, and protective construction used with construction operations.

(10) "Hazard" – a condition, potential or inherent, that is likely to cause injury, death, or occupational disease.

(11) "Hazardous substance" – a substance that, because it is explosive, flammable, poisonous, corrosive, oxidizing, irritating, or otherwise harmful, is likely to cause death or injury, including all substances listed on the USCG Hazardous Materials List.

(12) "Inspection" – the examination of vessels by the director or an authorized representative of the director.

(13) "Marine dock section" – the chief and staff of the marine dock section, department of labor and industries.

(14) "Passenger vessel" – a watercraft capable of carrying seven or more passengers for hire and licensed for such service.

(15) "Passenger for hire" – a person (other than master, crew or persons employed) who is carried aboard a vessel for valuable consideration whether directly or indirectly flowing to the owner, charterer, agent or any other person interested in the vessel.

(16) "Port" – left hand side of a vessel as one faces the bow.

(17) "Starboard" – right hand side of a vessel as one faces the bow.

(18) "Steam vessel" – any vessel propelled by machinery.

(19) "Qualified" – one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve problems relating to the subject matter, the work, or the project.

(20) "Safety factor" – 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.

(21) "Safety and health standard" – a standard that 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.

(22) "Shall" – the provision of the standard is mandatory.

(23) "Should" – recommended.

(24) "Substantial" – constructed of such strength, of such material, and of such workmanship, that the object referred to will withstand all normal wear, shock, and usage.

(25) "Standard safeguard" – a device intended to remove a hazard incidental to the machine, appliance, tool, or equipment to which the device is attached.

Standard safeguards shall be constructed of either metal, wood, other suitable material, or a combination of these. The final determination of the sufficiency of any safeguard rests with the director .

(26) "Suitable" – that which fits, or has the qualities or qualifications to meet a given purpose, occasion, condition, function, or circumstance.

(27) "Under way" – a vessel is not at anchor, or made fast to the shore, or aground.

(28) "United States Coast Guard Rules of Navigation" – rules for inland waters, CG 323 and 169 as now adopted or hereafter legally amended by the United States Coast Guard. (46 CFR)

(29) "Working day" – a calendar day, except Saturdays, Sundays, and legal holidays as set forth in RCW 1.16.050, as now or hereafter amended. The 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.

(30) "Workman," "personnel," "man," "person," "employee," and other terms of like meaning, unless the context indicates otherwise – an employee of an employer who is employed in the business of his 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 his personal labor for an employer whether by manual labor or otherwise.

(31) Abbreviations used in this chapter:

(a) "CFR" – Code of Federal Regulations.

(b) "USCG" – United States Coast Guard. [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), § 296-115-015, filed 11/13/80.]

WAC 296-115-025 Vessel inspection and licensing. (1) The department shall inspect all vessels to ensure they are safe and seaworthy at least once each year. The department may also inspect a vessel if requested to do so by the owner, operator, or master of the vessel, and after an explosion, fire, or accident involving the vessel.

(2) The department may inspect a vessel upon receipt of a complaint from any person or, in the discretion of the department, at any other time.

(3) The department shall charge the owner of a vessel a fee for each inspection. This fee shall be determined by the director. (See WAC 296-115-120 for fee schedule.)

(4) After the department has inspected a vessel and it is satisfied the vessel is safe and seaworthy, the department shall issue a certificate of inspection for that vessel.

The certificate shall be valid for one year after the date of inspection.

(5) The certificate shall set forth the date of the inspection, the names of the vessel and the owner, the number of lifeboats and life preservers required, the number of passengers allowed, and any other information the department may by rule require.

(6)(a) If at any time a vessel is found to be not safe or seaworthy, or not in compliance with the provisions of this chapter, the department may refuse to issue a certificate of inspection until the deficiencies have been corrected and may cancel any certificate of inspection currently issued.

(b) The department shall give the owner of the vessel a written statement of the reasons the vessel was found to be unsafe, unseaworthy, or not in compliance with the provisions of this chapter, including a specific reference to the statute or rule with which the vessel did not comply.

(7) An inspector of the department may, upon the presentation of his or her credentials to the owner, master, operator, or agent in charge of a vessel, board the vessel without delay to make an inspection. The inspector shall inform the owner, master, operator, or agent in charge that his or her intent is to inspect the vessel.

(8) During the inspection, the inspector shall have access to all areas of the vessel. The inspector may question privately the owner, master, operator, or agent in charge of the vessel, or any crew member of or passenger on the vessel.

(9) If any person refuses to allow an inspector to board a vessel for an inspection, or refuses to allow access to any areas of the vessel, the department may request a warrant from the superior court for the county in which the vessel is located. The court shall grant the warrant:

(a) If there is evidence that the vessel has sustained a fire or an explosion or has been involved in an accident;

(b) If there is evidence that the vessel is not safe or seaworthy; or

(c) Upon a showing that the inspection furthers a general administrative plan for enforcing the safety requirements of the act.

(10) The owner or master of a vessel shall post the certificate of inspection behind glass in a conspicuous area of the vessel.

(11) No person shall operate a passenger vessel if the vessel does not have a valid certificate of inspection. [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), § 296–115–025, filed 11/13/80.]

WAC 296–115–030 Master's examination and licensing. (1) The registered owner of passenger vessels for hire will be responsible to require a United States Coast Guard operator's license for the master or operator of each vessel. A physical examination will be required.

(2) The department shall penalize any person who acts as a master or operator on a vessel without having first received a United States Coast Guard license, or without having a valid license in his or her possession, or upon a vessel or class of vessels not specified in the license.

(3) The department may recommend suspension or revocation of a license to the United States Coast Guard for intemperance, incompetency, or a negligent, reckless, or willful disregard for duty. [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), § 296–115–030, filed 11/13/80.]

WAC 296–115–035 Specific inspection requirements. (1) Drydocking or hauling out.

Each vessel subject to the provisions in this section shall be drydocked or hauled out at intervals not to exceed sixty months and the underwater hull and appendages, propellers, shafting, stern bearings, rudders, through–hull fittings, sea valves and strainers shall be examined to determine that these items are in satisfactory condition. Refer to 46 CFR 176.15.

(2) At the annual inspection the marine dock inspector shall view the vessel afloat and conduct the following tests and inspections of the hull:

(a) Hull exterior and interior, bulkheads, and weather deck.

(b) Examine and test by operation all watertight closures in the hull, decks,and bulkheads.

(c) Inspect all railings and bulwarks and their attachment to the hull.

(d) Inspect weathertight closures above the weather deck and drainage or water from exposed decks and superstructure. Refer to 46 CFR 176.25–5.

(3) At the annual inspection the marine dock inspector shall examine and test the following items:

(a) Main propulsion machinery.

(b) Engine starting system.

(c) Engine control mechanisms.

(d) Auxiliary machinery.

(e) Fuel systems.

(f) Sea valves and bulkhead closure valves.

(g) Bilge and drainage systems.

(h) Electrical system, including circuit protection. Refer to 46 CFR 176.25–10 and 176.25–15.

(4) Lifesaving and fire extinguishing equipment. At each annual inspection the marine dock inspector shall inspect the life saving and fire extinguishing equipment for serviceability. Refer to 46 CFR 176.25–20 and 176.25–25.

(5) Miscellaneous systems and equipment. At each annual inspection the marine dock inspector shall inspect and test the vessel's steering apparatus, ground tackle, navigation lights, sanitary facilities, pressure vessels, and any other equipment aboard the vessel for serviceability and safety. Refer to 46 CFR 176.25–35, 176.25–40, and 176.25–45. [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), § 296–115–035, filed 11/13/80.]

WAC 296–115–040 Construction and arrangement. (1) Application.

(a) The requirements of this section shall apply to all vessels contracted for construction on or after June 7, 1979.

(b) Vessels constructed before the effective date of this chapter shall be brought into substantial compliance with the requirements of this section. Where deviation exists and strict compliance is impractical, the director may grant a temporary variance to allow a modification or a permanent variance if the intent of subsection (1)(c) of this section is met.

(c) The intent of the regulations in this part is to provide for a sound, seaworthy vessel, reasonably fit for the service it is intended to provide, and to ensure that the materials, scantlings, fastenings, and workmanship meet this intent. Primary consideration shall be given to the provision of a seaworthy hull, protection against fire, means of escape in case of casualty, guards and rails in hazardous places, ventilation of closed spaces, and necessary facilities for passengers and crew.

(2) Hull structure.

(a) In general, compliance with the standards of the United States Coast Guard rules for small passenger vessels or with the standards of a recognized classification society will be considered satisfactory evidence of the structural adequacy of a vessel. Refer to 46 CFR 177.10.

(b) Special consideration will be given by the director to materials or structural requirements not contemplated by the standards of a recognized classification society.

(3) Watertight integrity and subdivision.

(a) All vessels carrying more than forty-nine passengers shall have a collision bulkhead and watertight bulkheads (or sufficient air tankage or other internal flotation) so the vessel will remain afloat (with positive stability) with any one main compartment flooded.

(b) All watertight bulkheads required by this part shall be of substantial construction so as to be able to remain watertight with water to the top of the bulkhead.

(c) Watertight bulkheads shall extend intact to the bulkhead deck. Penetrations shall be kept to a minimum and shall be watertight.

(d) The weather deck on a flush deck vessel shall be watertight and shall not obstruct overboard drainage.

(e) Cockpits shall be watertight except that companionways may be fitted if they are provided with watertight coamings and weathertight doors. Also, ventilation openings may be provided if they are situated as high in the cockpit as possible and the opening height does not exceed two inches.

(f) Cockpits shall be self-bailing. The scuppers installed for this purpose shall be located so as to be effective considering probable list and trim.

(g) Well decks shall be watertight. Freeing ports may be installed if the provisions of 46 CFR 178.30 are followed.

(h) On vessels operating on protected waters, hatches may be weathertight. All hatches shall be provided with covers capable of being secured.

(i) The number of openings in the vessel's sides below the weather deck shall be kept to a minimum.

(j) Any openings in a vessel's sides, such as portlights, shall comply with 46 CFR 178.40.

(4) Stability.

(a) All vessels subject to the provisions of this section shall have a stability test, except that the director may dispense with the requirements for a test if he deems that a test is not required, on the basis of sufficient evidence provided by the owner that the vessel's stability is satisfactory for the service for which it is intended. Refer to 46 CFR 179.05-1.

(b) A letter stating that the vessel has met the stability requirements of this part shall be posted in the pilothouse of each vessel. Refer to 46 CFR 179.20. [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), § 296-115-040, filed 11/13/80.]

WAC 296-115-050 General requirements. (1) Application.

(a) The following rules are applicable to all vessels operated within the scope of this chapter.

(b) Where an existing vessel does not comply with a particular requirement of this section, the director may grant a temporary variance to allow time for modifications to be made.

(c) Where an existing vessel does not exactly comply with a specific requirement contained herein but the degree of protection afforded is judged to be adequate for the service in which the vessel is used, the director may grant a permanent variance.

(2) Lifesaving equipment. Where equipment required by this section is required to be of an approved type, the equipment is required to be approved by the USCG. Refer to 46 CFR 180.05.

(3) Lifesaving equipment required.

(a) All vessels carrying passengers shall carry life floats or buoyant apparatus for all persons on board.

(b) All life floats or buoyant apparatus shall be international orange in color.

(c) In the case of vessels operating not more than one mile from land, the director may permit operation with reduced amounts of life floats or buoyant apparatus, when, in his opinion, it is safe to do so.

(d) Lifeboats, life rafts,dinghies, dories, skiffs, or similar type craft maybe substituted for the required life floats or buoyant apparatus if the substitution is approved by the director.

(e) Life floats, buoyant apparatus, or any authorized substitute shall have the following equipment:

(i) A life line around the sides at least equivalent to 3/8-inch manila, festooned in bights of at least three feet, with s seine float in the center of each bight.

(ii) Two paddles or oars not less than four feet in length.

(iii) A painter of a least thirty feet in length and of at least two-inch manila or the equivalent. Refer to 46 CFR 180.10.

(f) All vessels shall have an approved adult type life preserver for each person carried, with at least ten percent additional of a type suitable for children.

(g) Life preservers shall be stowed in readily accessible places in the upper part of the vessel, and each life preserver shall be marked with the vessel's name. Refer to 46 CFR 180.25.

(h) All vessels shall carry at least one life ring buoy of an approved type with sixty feet of line attached.

(i) The life ring buoy shall be carried in a readily accessible location and shall be capable of being cast loose at any time. Refer to 46 CFR 180.30.

(4) Fire protection.

(a) The general construction of a vessel shall minimize fire hazards. Refer to 46 CFR 177.10–5.

(b) Internal combustion engine exhausts, boiler and galley uptakes, and similar sources of ignition shall be kept clear of and suitably insulated from woodwork or other combustible material.

(c) Lamp, paint, and oil lockers and similar storage areas for flammable or combustible liquids shall be constructed of metal or lined with metal.

(5) Fire protection equipment. Equipment required by this section, when required to be of an approved type, shall be of a type approved by the USCG or other agency acceptable to the director. Refer to 46 CFR 181.05.

(6) Fire pumps.

(a) All vessels carrying more than forty–nine passengers shall carry an approved power fire pump, and all other vessels shall carry an approved hand fire pump. These pumps shall be provided with a suitable suction and discharge hose. These pumps may also serve as bilge pumps.

(b) Vessels required to have a power fire pump shall also have a fire main system, including fire main, hydrants, hose, and nozzles. The fire hose may be a good commercial grade garden hose of not less than 5/8 inch size. Refer to 46 CFR 181.10.

(7) Fixed fire extinguishing system.

(a) All vessels powered by internal combustion engines using gasoline or other fuel having a flashpoint of 110° F or lower, shall have a fixed fire extinguishing system to protect the machinery and fuel tank spaces.

(b) This system shall be an approved type using carbon dioxide and have a capacity sufficient to protect the space.

(c) Controls for the fixed system shall be installed in an accessible location outside the space protected. Refer to 46 CFR 181.20.

(8) Fire axe. All vessels shall have one fire axe located in or near the pilothouse. Refer to 46 CFR 181.35–1.

(9) Portable fire extinguishers.

(a) All vessels shall have a minimum number of portable fire extinguishers of an approved type. The number required shall be determined by the director.

(b) Portable fire extinguishers shall be inspected at least once a month. Extinguishers found defective shall be serviced or replaced.

(c) Portable fire extinguishers shall be serviced at least once a year. The required service shall consist of discharging and recharging foam and dry chemical extinguishers and weighing and inspecting carbon dioxide extinguishers.

(d) Portable fire extinguishers shall be hydrostatically tested at intervals not to exceed those specified in WAC 296–24–59007(4)(c) and table L–3.

(e) Portable fire extinguishers of the vaporizing liquid type such as carbon tetrachloride and other toxic vaporizing liquids are prohibited and shall not be carried on any vessel.

(f) Portable fire extinguishers shall be mounted in brackets or hangers near the space protected. The location shall be marked in a manner satisfactory to the director. Refer to 46 CFR 181.30.

(10) Means of escape.

(a) Except as otherwise provided in this section, all vessels shall be provided with not less than two avenues of escape from all general areas accessible to the passengers or where the crew may be quartered or normally employed. The avenues shall be located so that if one is not available the other may be. At least one of the avenues should be independent of watertight doors.

(b) Where the length of the compartment is less than twelve feet, one vertical means of escape will be acceptable under the following conditions:

(i) There is no source of fire in the space, such as a galley stove or heater and the vertical escape is remote from the engine and fuel tank space; or

(ii) The arrangement is such that the installation of two means of escape does not materially improve the safety of the vessel or those aboard.

(11) Ventilation.

(a) All enclosed spaces within the vessel shall be properly vented or ventilated. Where such openings would endanger the vessel under adverse weather conditions, means shall be provided to close them.

(b) All crew and passenger space shall be adequately ventilated in a manner suitable to the purpose of the space. Refer to 46 CFR 117.20–5.

(12) Crew and passenger accommodations.

(a) Vessels with crew members living aboard shall have suitable accommodations.

(b) Vessels carrying passengers shall have fixed seating for the maximum number of passengers permitted to be carried.

(c) Fixed seating shall be installed with spacing to provide for ready escape in case of fire or other casualty.

(d) Fixed seating shall be installed as follows, except that special consideration may be given by the director if escape over the side can be readily through windows or other openings in the way of the seats:

(i) Aisles not over fifteen feet long shall be not less than twenty–four inches wide.

(ii) Aisles over fifteen feet long shall be not less than thirty inches wide.

(iii) Where seats are in rows the distance from seat front to seat front shall be not less than thirty inches.

(e) Portable or temporary seating may be installed but shall be arranged in general as provided for fixed seating. Refer to 46 CFR 177.25 and 177.30.

(13) Toilet facilities and drinking water.

(a) Vessels shall be provided with toilets and wash basins as specified in WAC 296–24–12007 and 296–24–12009, except that in the case of vessels used exclusively

on short runs of approximately thirty minutes or less, the director may approve other arrangements.

(b) All toilets and wash basins shall be fitted with adequate plumbing. Facilities for men and women shall be in separate compartments, except in the case of vessels carrying forty–nine passengers and less, the director may approve other arrangements.

(c) Potable drinking water shall be provided for all passengers and crew. The provisions of WAC 296–24–12005 shall apply.

(d) Covered trash containers shall be provided in passenger areas. Refer to 46 CFR 177.30–5 and 7.

(14) Rails and guards.

(a) Except as otherwise provided in this section, rails or equivalent protection shall be installed near the periphery of all weather decks accessible to passengers and crews. Where space limitations make deck rails impractical, such as at narrow catwalks in the way of deckhouse sides, hand grabs may be substituted.

(b) Rails shall consist of evenly spaced courses. The spacing shall not be greater than twelve inches except as provided in subdivision (f) of this subsection. The lower rail courses may not be required where all or part of the space below the upper rail course is fitted with a bulwark, chain link fencing, wire mesh or the equivalent.

(c) On passenger decks of vessels engaged in ferry or excursion type operation, rails shall be at least forty–two inches high. The top rail shall be pipe, wire, chain, or wood and shall withstand at least two hundred pounds of side loading. The space below the top rail shall be fitted with bulwarks, chain link fencing, wire mesh, or the equivalent.

(d) On vessels in other than passenger service, the rails shall be not less than thirty–six inches high, except that where vessels are used in special service, the director may approve other arrangements, but in no case less than thirty inches.

(e) Suitable storm rails or hand grabs shall be installed where necessary in all passageways, at deckhouse sides, and at ladders and hatches where passengers or crew might have normal access.

(f) Suitable covers, guards, or rails shall be installed in the way of all exposed and hazardous places such as gears or machinery. (See WAC 296–24–150 for detailed requirements.) Refer to 46 CFR 177.3.

(15) Machinery installation. (Refer to 46 CFR 182.)

(a) Propulsion machinery. (Refer to 46 CFR 182.05.)

(i) Propulsion machinery shall be suitable in type and design for the propulsion requirements of the hull in which it is installed. Installations meeting the requirements of the USCG or other classification society will be considered acceptable to the director.

(ii) Installations using gasoline as a fuel shall meet the requirements of 46 CFR 182.15.

(iii) Installations using diesel fuel shall meet the requirements of 46 CFR 182.20.

(b) Auxiliary machinery and bilge systems. (Refer to 46 CFR 182.10 and 182.25.)

(i) All vessels shall be provided with a suitable bilge pump, piping and valves for removing water from the vessel.

(ii) Vessels carrying more that forty–nine passengers shall have a power operated bilge pump. The source of power shall be independent of the propulsion machinery. Other vessels shall have a hand operated bilge pump, but may have a power operated pump if it is operated by an independent power source.

(c) Steering apparatus and miscellaneous systems. (Refer to 46 CFR 182.30.)

(i) All vessels shall be provided with a suitable steering apparatus.

(ii) All vessels shall be provided with navigation lights and shapes, whistles, fog horns, and fog bells as required by law and regulation.

(iii) All vessels shall be equipped with a suitable number of portable battery lights.

(d) Electrical installations. The electrical installations of all vessels shall be at least equal to 46 CFR 183, or as approved by the director. [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), § 296–115–050, filed 11/13/80.]

WAC 296–115–060 Operations. (1) This section shall apply to all passenger vessel operations within the scope of this chapter.

(2) Notice of casualty. (Refer to 46 CFR 185.15.)

(a) The owner or person in charge of any vessel involved in a marine accident or casualty involving any of the following shall report the incident immediately to the department.

(i) Damage to property in excess of one thousand five hundred dollars.

(ii) Major damage affecting the seaworthiness or safety of the vessel.

(iii) Loss of life or an injury to a person that incapacitates the person for more than seventy–two hours.

(b) The report shall be in writing to the director and upon receipt of the report the director may request an investigation by a marine dock inspector.

(3) Miscellaneous operating requirements. (Refer to 46 CFR 185.20.)

(a) In the case of collision, accident, or other casualty involving a vessel the operator, shall, so far as he can do so without serious danger to his own vessel or persons aboard, render any necessary assistance to other persons affected by the collision, accident, or casualty to save them from danger. He shall also give his name and address and the name of his vessel to any person injured and to the owner of any property damaged.

(b) The person in charge of the vessel shall see that the provisions of the certificate of inspection are strictly adhered to. This shall not be construed as limiting the person in charge from taking any action in an emergency that he deems necessary to help vessels in distress or to prevent loss of life.

(c) Persons operating vessels shall comply with the provisions of the USCG Rules of the Road for Inland Waters. (Refer to USCG Publication 169.)

(d) The operator of a vessel shall test the vessel's steering gear, signaling whistle, controls, and communication system before getting under way for the day's operation.

(e) Vessels using fuel having a flashpoint of 110° F or lower shall not take on fuel when passengers are on board.

(f) All vessels shall enforce "No Smoking" provisions when fueling. Locations on the vessel where flammable or combustible liquids are stored shall be posted "No Smoking."

(g) All vessels shall prepare and post emergency check-off lists in a conspicuous place accessible to crew and passengers, covering the following:

(i) Man overboard.

(ii) Fire.

(h) The persons in charge shall conduct emergency drills to ensure that the crew is familiar with their duties in an emergency.

(i) The carriage of hazardous substances is prohibited on vessels. However, the director may authorize a vessel to carry specific types and quantities of hazardous substances if he deems it necessary.

(j) All areas accessible to passengers or crew shall be kept in a clean and sanitary condition. All walking surfaces shall be free of slipping or tripping hazards and in good repair.

(4) First-aid training. There shall be present or available on all passenger vessels, at all times, a person holding a valid certificate of first-aid training from the Department of Labor and Industries, United States Bureau of Mines, or the American Red Cross, or equivalent training that can be verified by documentary evidence. A valid first-aid certificate is one that is less than three years old.

(5) First-aid equipment. A first-aid kit or first-aid room shall be provided on all passenger vessels. The size and quantity of first-aid supplies or equipment required shall be determined by the number of persons normally dependent upon each kit or equipment. The first-aid kit or supplies shall be in a weatherproof container with individually sealed packages for each type of item. The first-aid station or kit location shall be posted or on the container. [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), § 296-115-060, filed 11/13/80.]

WAC 296-115-070 Rules of navigation. (1) Application. The following rules shall be observed in navigating all steam vessels on the waters within the jurisdiction of the state, excepting the waters which are under the jurisdiction of the United States.

(2) When two steam vessels are meeting, end on, or nearly end on, so as to involve risk of collision, each shall alter her course to starboard, so that each may pass on the port side of the other.

(3) When two steam vessels are crossing so as to involve risk of collision, the vessel that has the other on her own starboard side shall keep out of the way of the other.

(4) When a steam vessel and a sailing vessel are proceeding in such directions as to involve risk of collision, the steam vessel shall keep out of the way of the sailing vessel.

(5) When, by any of these rules, one of two vessels is to keep out of the way, the other shall keep her course and speed.

(6) Every steam vessel, when approaching another steamboat or small boat or vessel of any kind, so as to involve the risk of collision, shall slacken her speed, or if necessary, shall stop and reverse her engine, and every steam vessel shall, when in a fog, go at a moderate speed.

(7) Any steam vessel overtaking another steam vessel shall keep out of the way of the overtaken steam vessel.

(8)(a) When steam vessels are running in the same direction, and the vessel that is astern desires to pass on the starboard hand of the vessel ahead, she shall give one short blast of the steam whistle, as a signal of the desire, and if the vessel ahead answers with one blast, she shall direct her course to starboard; or if she desires to pass on the port side of the vessel ahead, she shall give two short blasts of the steam whistle as a signal of the desire, and if the vessel ahead answers with two blasts, shall direct her course to port. If the vessel ahead does not think it safe for the vessel astern to attempt to pass at that point, she shall immediately signify it by giving several short and rapid blasts of the steam whistle, not less than four, and under no circumstances shall the vessel astern attempt to pass the vessel ahead until they have reached a point where it can be safely done, when the vessel ahead shall signify her willingness by blowing the proper signals. The vessel ahead shall in no case attempt to cross the bow or crowd upon the course of the passing vessel.

(b) Every vessel coming up with another vessel from any direction more than two points abaft her beam, that is, in such a position with reference to the overtaken vessel that at night she would be unable to see either of that vessel's side lights, shall be deemed to be an overtaking vessel; and no subsequent alteration of the bearing between the two vessels shall make the overtaking vessel a crossing vessel within the meaning of the rules in this part, or relieve her of the duty of keeping clear of the overtaken vessel until she is finally past and clear.

(c) As by day the overtaking vessel cannot always know with certainty whether she is forward of or abaft this direction from the other vessel she should, if in doubt, assume that she is an overtaking vessel and keep out of the way.

(9)(a) When two steam vessels are approaching each other at right angles or obliquely so as to involve risk of collision, other than when one steam vessel is overtaking another, the steam vessel that has the other on her own port side shall hold her course and speed; and the steam vessel that has the other on her own starboard side shall keep out of the way of the other by directing her course to starboard so as to cross the stern of the other steam vessel or, if necessary to do so, slacken her speed, stop, or reverse.

(b) If from any cause the conditions covered by this situation prevent immediate compliance with each other's signals, the misunderstanding or objection shall be at once made apparent by blowing the danger signal, and both steam vessels shall be stopped and backed if necessary, until signals for passing with safety are made and understood.

(10) When two steam vessels are approaching each other, and if the courses of the steam vessels are so far on the starboard side of each as not to be considered by the operators as meeting end on, or nearly so, or if the steam vessels are approaching each other, in such manner that passing to the right as in subsection (2) of this section is deemed unsafe by the operator of either steam vessel, the operator first deciding shall give two short and distinct blasts on his steam whistle, which the operator of the other steam vessel shall answer promptly by two blasts of his steam whistle, and they shall pass on the starboard side of each other.

(11) When two steam vessels are approaching each other and the operator of either steam vessel fails to understand the course or intention of the other, whether from the signals being given, answered erroneously, or from other cause, the operator in doubt shall immediately signify it by giving several short and rapid blasts of the whistle, not less than four, and if the vessels have approached within five hundred yards of each other, both shall be immediately slowed to a speed barely sufficient for steerageway until the proper signals are given, answered and understood, or until the boats have passed each other.

(12) When a steam vessel is running in a fog or thick weather the operator shall give a long blast of the whistle at intervals not exceeding one minute.

(13) Distress signals. When a vessel is in distress and requires assistance from other vessels or from the shore the following signal shall be used or displayed by her, either together or separately.

(a) In the daytime — A continuous sounding with any fog-signal apparatus, or firing a gun.

(b) At night — Flames on the vessel as from a burning tar barrel or oil barrel, a continuous sounding with any fog-signal apparatus, or firing a gun.

(14) In construing these provisions, due regard must be had to all the dangers of navigation, and to any special circumstances that may exist, rendering a departure from these provisions necessary to avoid immediate danger.

(15) Every steam vessel that is under sail and not under steam is to be considered a sailing vessel, and every vessel propelled by machinery, whether under sail or not, is to be considered a steam vessel.

(16) All steam vessels shall conform to and obey other rules and regulations prescribed by the United States Coast Guard that are not inconsistent with these rules.

(17) Lights. Every steam vessel, when navigating between sunset and sunrise, shall carry the following lights:

(a) At the foremast head, a bright white light that is visible, on a dark night with a clear atmosphere, for at least two miles; that shows a uniform and unbroken light over an arc of the horizon of twenty points of the compass; and that throws the light ten points on each side of the vessel from right ahead to two points abaft the beam on either side.

(b) On the starboard side a green light that is visible, on a dark night with a clear atmosphere, for at least two miles; that shows a uniform and unbroken light over an arc of the horizon of ten points of the compass; and that throws the light from right ahead to two points abaft the beam on the starboard side.

(c) On the port side a red light that is visible, on a dark night with a clear atmosphere, for at least two miles; that shows a uniform and unbroken light over an arc of the horizon of ten points of the compass; and that throws the light from right ahead to two points abaft the beam on the port side. The green and red lights shall be fitted with inboard screens, projecting at least three feet forward from the lights, to prevent them from being seen across the bow.

(d) A vessel when underway, if not otherwise required by these rules to carry one or more lights visible from aft, shall carry at her stern a white light that shows an unbroken light over an arc of the horizon of twelve points of the compass; that shows the light six points from right aft on each side of the vessel; and that is visible for at least two miles. The light shall be carried as nearly as practicable on the same level as the side lights. [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 operator's license: one hundred dollars per violation to owner of vessel. [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 Fee schedule.

ANNUAL CERTIFICATE OF INSPECTION FEE

Passenger Vessels Up to 30 Ft. Long ------	$ 55.00
Passenger Vessels 30 Ft. Long to 50 Ft. Long	$ 67.50
Passenger Vessels 50 Ft. Long and Over ----	$ 87.50

Additional inspection service when required will be at the rate of $25.00 per hour, plus travel and per diem. [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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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 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 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 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 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 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 79-6), filed 3/4/80. Statutory Authority: RCW 88.16.035.

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 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 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 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 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 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 79-6), filed 3/4/80. Statutory Authority: RCW 88.16.035.

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 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 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 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 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 chairperson, or by any two members of the board, by serving notice, in writing, upon all other members of the board not less than five days prior to the meeting date. 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 shall be in conformance with the provisions of chapter 42.30 RCW. [Statutory Authority: RCW 88.16.035 and 88.16.155. 78-09-057 (Order 78-2, Resolution 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. An emergency meeting may be called by the chairperson, or by any two members of the board without notification whenever an accident of any importance, such as stranding, collision or the like, shall occur to any vessel while utilizing the services of a state licensed pilot, for the purpose of making an investigation into the cause of such accident. The findings of such an emergency meeting shall be submitted to the board for appropriate action at the next regular monthly meeting. [Statutory Authority: RCW 88.16.035 and 88.16.155. 78-09-057 (Order 78-2, Resolution 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 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 six hundred dollars for every year in which they perform any pilotage services. If a licensed pilot does not perform pilotage services during a calendar year, his fee for that year shall be reduced to three 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. 79-11-063 (Order 79-5, Resolution 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 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 296-116-080 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; (c) tug and tow boat assist observation trips; and (d) 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, an applicant must pass a written and oral examination given and graded by the board. The board shall hold examinations at such times as will ensure the maintenance of an efficient and competent pilotage service. 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. The board may, in an emergency, call for an immediate examination of applicants who have an application on file with the board.

(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 an examination fee of one hundred dollars which will be applied to his first year license fee if successful and shall be returned to the applicant if he is unable to sit for the examination; and

(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) dredged channel widths and depths;

(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;

(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) calculation of 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 successful completion of the examination, the board shall determine the number of familiarization trips which the applicant will have to make pursuant to RCW 88.16.090. Familiarization trips are ship movements over specified routes on which the applicant observes the route and the actions of the licensed pilot on board.

(4) After successful completion of familiarization trips, the board shall specifically assess the experience of the applicant with respect to tug and tow boat assists to vessel movements. If necessary, the board shall require that applicants make a certain number of observation trips aboard tug or tow boats prior to entering the training program, if applicable, or prior to being licensed if no training program is required.

(5) After passing the examination, and completing familiarization trips and tug and tow boat assist observations, 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 ten years experience. 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. Applicants shall pilot under such supervision for a minimum period of six months during which they shall have at least one hundred assignments. [Statutory Authority: RCW 88.16.035. 80-03-081 (Order 79-6, Resolution 79-6), § 296-116-080, filed 3/4/80; 79-11-063 (Order 79-5, Resolution 79-5), § 296-116-080, filed 10/18/79; 79-05-023 (Order 79-2, Resolution 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 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. The initial license issued by the board to a pilot applicant shall not authorize such pilot to perform pilotage services on any vessel of a size of 25,000 gross tons or more for the first year that such licensee becomes an active pilot. During the second year of piloting under an initial license the pilot may perform pilotage on vessels in excess of 25,000 gross tons if such pilotage does not include the docking or undocking of the vessel. The initial license shall contain the above limitations and the date of the commencement and expiration of such periods of limitation. [Statutory Authority: RCW 88.16.035. 80-03-081 (Order 79-6, Resolution 79-6), § 296-116-082, filed 3/4/80.]

WAC 296-116-085 Association by-laws. The Puget Sound Pilots Association, together with the Grays Harbor Pilots Association, shall maintain on file with the Commission a current copy of their respective association by-laws 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. [Order 76-12, § 296-116-085, filed 4/22/76.]

WAC 296-116-110 Details and requirements of renewal application. All applications for renewal of licenses shall be submitted in writing to the board at least thirty days prior to the expiration date of the license, and be accompanied by a certified check payable to the state treasurer in the amount of the annual license fee. All applicants for renewal of licenses shall be required to display their currently applicable United States government license with radar endorsement issued by the United States Coast Guard. [Statutory Authority: RCW 88.16.035. 80-03-081 (Order 79-6, Resolution 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 296-116-120 Physical requirements. (1) In order to determine the physical fitness of persons to continue to serve as licensed pilots under the provisions of the pilotage act, all licensed pilots 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. As part of this examination pilots shall have completed on a form provided by the board a detailed report of physical examination. This form shall be prepared by the pilot and the examining physician and

shall be submitted to the board along with a letter from the physician stating whether and under what conditions the pilot is capable of providing pilotage service. The detailed report of physical examination is a confidential record which will be used only by the board and will not be available for public inspection. Such examination shall be obtained at the expense of the licensed pilots from a physician or physicians designated in advance by the board. The secretary of the board shall give each pilot 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.

(2) The physical examination required of all pilots shall demonstrate that he is in all respects physically fit to perform his duties as a pilot. The examination shall assure that one's abilities as a pilot will not be impaired by eyesight, hearing or other bodily function and shall include examination of the pilot's eyes (including tests for color blindness, depth perception, night vision, disease, field of vision and reflexes); ears; heart; blood pressure; blood components; pulse; speech capabilities; history of diseases (including diabetes, cancer, arthritis, arrhythmia, asthma, bronchitis, emphysema, ulcers, alcoholism and other illnesses) and any other type of information which the physician feels is relevant.

(3) In the case of renewal of license as pilot, should the pilot be temporarily physically incapacitated at the time his license is due to be renewed, the commission shall not revoke such license until a further physical examination to be given at the expiration of three months. This procedure shall be carried on until it is evident that the pilot is permanently incapacitated; provided further, that no pilot shall be carried on the inactive list for longer than one year if disabled. Any pilot who is physically incapacitated shall not serve as a pilot during such period of incapacitation. [Statutory Authority: RCW 88.16.035 and 88.16.090(6). 80-16-005 (Resolution 79-5), § 296-116-120, filed 10/23/80. Statutory Authority: RCW 88.16.035. 79-11-063 (Order 79-5, Resolution 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 296-116-130 Period of incapacitation. (1) Any pilot who is physically incapacitated as a pilot for a period of ninety days or more shall not return to service as an active pilot until he has passed a physical examination by a physician designated by the board.

(2) In the event a pilot fails to pass such physical examination, he shall have the right to a further examination by a medical commission composed of the board's physician, a physician selected by the pilot, and a third physician to be selected by these two physicians. [Statutory Authority: RCW 88.16.035. 80-03-081 (Order 79-6, Resolution 79-6), § 296-116-130, filed 3/4/80; Order 2-68, § 296-116-130, filed 11/1/68; § 13, 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 296-116-185 Tariffs, and pilotage rates for the Grays Harbor pilotage district. The following rates shall become effective on April 1, 1980

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 $26.11 per meter (or $7.97 per foot) and the tonnage charge shall be $.0686 per net registered ton. The minimum net registered tonnage charge is $261.00. The charge for an extra vessel (in case of tow) is $163.00.

Boarding Fee:

Per each boarding/deboarding from a boat $50.00

NOTE: The boarding fee is to finance the purchase of the pilot boat "Chehalis". When the boat is fully amortized, the boarding fee will be terminated.

Harbor Shifts:

For each shift from dock to dock, dock to anchorage, anchorage to dock, or anchorage to anchorage	163.00
Delays per hour	43.00
Cancellation charge (pilot only)	65.00
Cancellation charge (pilot boat only)	261.00

Travel Allowance:

Boarding or deboarding a vessel off Grays Harbor entrance	40.00

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 $200 for each day or fraction thereof, and the travel expense incurred.

CLASSIFICATION OF PILOTAGE SERVICE RATE

Bridge Transit:

Charge for each bridge transited 85.00

Miscellaneous:

The balance of amounts due for pilotage rates not paid within 60 days of invoice will be assessed at 1% per month late charge. At least a four hour notice shall be given for an arrival, sailing, or change of ETA or ETD.

[Statutory Authority: RCW 88.16.035. 80-03-081 (Order 79-6, Resolution 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 my 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 licensed 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 or Grays Harbor and Willapa Bay 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 and Willapa Bay 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. 79-11-063 (Order 79-5, Resolution 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 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:

	Yes	No
Is The engine room properly staffed, the engine able to maneuver, and all related equipment in good order?	☐	☐
Are There any defects listed against this ship by the U.S. Coast Guard which would prevent it from arriving or departing?	☐	☐
Is This vessel leaking oil?	☐	☐
Is This vessel experiencing propulsion or maneuvering difficulties?	☐	☐

I have notified the U.S. Coast Guard Captain of the Port of any deficiencies noted above and he has authorized the vessel to proceed.

Master's Signature

PILOT'S REPORT

I, ----------, Puget Sound Pilot, certify that upon boarding the above-named vessel on this date:

1) I requested to see the following certificates:

Certificate	Acceptable	Not Readily Available or Unacceptable
SOLAS Certificate	☐	☐
FMC Certificate of Financial Responsibility	☐	☐

2) I inspected the ship's equipment and conditions listed below and found them to be as indicated:

Equipment	Acceptable	Deficient
VHF Radio, Channels 13, 14	☐	☐
Radar	☐	☐
Gyrocompass	☐	☐
Rudder Angle Indicator	☐	☐
Whistle	☐	☐
Wheelhouse staffed by officer and helmsman, one of whom speaks English	☐	☐
Local, up-to-date charts	☐	☐
Wheelhouse to engine room communications	☐	☐

3) I have informed the Coast Guard Captain of the Port via VTS of any deficiencies noted above.

Pilot's Signature

[Statutory Authority: RCW 88.16.155. 79-11-097 (Order 79-6, Resolution 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 78-2), § 296-116-2051, filed 8/23/78.]

WAC 296-116-300 Pilotage rates for the Puget Sound pilotage district. These rates shall become effective on June 1, 1980.

CLASSIFICATION	RATE
Ship Length overall (LOA) Charges:	per LOA rate schedule in this section
Boarding Fee: Per each boarding/deboarding at the Port Angeles Pilot station. Note: The boarding fee is [to finance the building of the pilot boat Puget Sound and	$20.00

CLASSIFICATION	RATE
the replacement boat for the pilot boat Pilot. When both boats are fully amortized, the boarding fee will be terminated.] for amortization and expenses of pilot boats Juan De Fuca and Puget Sound. $10.50 of the fee shall be for amortization; $9.50 shall be toward expenses. When both boats are amortized the $10.50 portion of the boarding fee shall be terminated.	
Harbor Shift – Live Ship (Seattle Port)	LOA Zone I
Harbor Shift – Live Ship (Other than Seattle Port)	LOA Zone I
Harbor Shift – Dead Ship	Double LOA Zone I
Dead Ship Towing Charge: LOA of tug + LOA of tow + beam of tow	Double LOA Zone
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 $93.00 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 $44.00 per bridge.	
Ships 90' beam and/or over: A charge of $125.00 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 $88.00 per bridge. (The above charges shall not apply to transit of vessels from Shilshole Bay to the limits of Lake Washington.)	
In a case where two pilots are employed for a single vessel waterway or bridge transit, a second pilot charge shall be levied in the amount of a harbor shift only.	
Compass Adjustment	125.00
Radio Direction Finder Calibration	125.00
Launching Vessels	187.00
Trial Trips, 6 hours or less (Minimum $300.00)	50.00 per hr.
Trial Trips, over 6 hours (two pilots)	100.00 per hr.
Shilshole Bay — Salmon Bay	73.00
Salmon Bay — Lake Union	58.00
Lake Union — Lake Washington (plus LOA zone from Webster Point)	73.00
Cancellation Charge	LOA Zone I
Cancellation Charge — Port Angeles (When pilot is ordered and vessel proceeds without stopping for pilot)	LOA Zone I
Docking Delay after Anchoring[:]	50.00
Applicable Harbor Shift rate to apply, plus $50.00 per hour standby. No charge if delay is 60 minutes or less. If the delay is more than 60 minutes, charge is $50.00 for every hour or fraction thereof.	
Sailing Delay	50.00 [per hour]
No charge if delay is 60 minutes or less. If the delay is more than 60 minutes, charge is $50.00 for every hour or fraction thereof.	
Slow–Down — $50.00 per hour for all time in excess of time spent in that particular transit for that speed of advance normal for vessel that is slowed.	50.00 per hour
Super Ships — Additional charge to LOA zone mileage of $0.0310 a gross ton for all gross tonnage in excess of 20,000 gross tons up to 50,000 gross tons. In excess of 50,000 gross tons, the charge shall be [$].0372 per gross ton.	
Delayed Arrival [—] Port Angeles (When pilot is ordered and vessel does not arrive within two hours without notification of change of ETA[.])	50.00 per hour
Transportation to vessels on Puget Sound:	
March Point [–] [or] Anacortes[:]	[$]92.00
Bangor	54.00
Bellingham	101.00
Bremerton	28.00
Cherry Point	112.00
Dupont	54.00
Edmonds	20.00
Everett	33.00

CLASSIFICATION	RATE
Ferndale	111.00
Manchester	42.00
Mukilteo	33.00
Olympia	69.00
Point Wells	20.00
Port Gamble	49.00
Port Townsend (Indian Island[)]	70.00
Semiahmoo (Blaine)	125.00
Tacoma	36.00
Tacoma Smelter	39.00
Winslow	28.00

(a) Interport shifts: Transportation paid to and from both points.

(b) Intraharbor shifts: Transportation to be paid both ways. If intraharbor shift is cancelled on or before scheduled reporting time, transportation paid one way only.

(c) 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.

(d) Any new facilities or other seldom used terminals, not covered above, shall be based on mileage x $1.40 per mile.

Delinquent payment charge: 1% per month after 60 days from first billing.

Non Use 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 I	ZONE II	ZONE III	ZONE IV	ZONE V	ZONE VI
	Intra Harbor	0–30 Miles	31–51 Miles	51–75 Miles	76–100 Miles	101 Miles & Over
Up to 499	88	137	238	357	481	625
450 – 459	90	140	240	362	487	628
460 – 469	92	142	242	368	494	630
470 – 479	95	145	245	375	497	632
480 – 489	97	148	247	381	501	635
490 – 499	100	150	250	388	507	639
500 – 509	103	153	254	394	510	642
510 – 519	105	157	257	400	515	644
520 – 529	107	162	261	403	520	650
530 – 539	110	165	265	406	527	657
540 – 549	112	168	269	410	537	662
550 – 559	115	172	272	415	541	668
560 – 569	119	177	276	419	546	675
570 – 579	122	180	280	421	552	681
580 – 589	126	183	284	424	556	688
590 – 599	132	187	287	426	562	694
600 – 609	137	192	291	428	569	699
610 – 619	144	195	295	432	575	706
620 – 629	151	198	299	434	582	712
630 – 639	159	202	302	436	587	719
640 – 649	166	207	306	439	593	725
650 – 659	175	210	310	441	600	732
660 – 669	180	213	314	443	606	737
670 – 679	185	217	317	450	613	743
680 – 689	190	222	321	456	619	750
690 – 699	195	225	325	463	625	763
700 – 719	205	232	332	469	637	774
720 – 739	215	240	340	475	650	787
740 – 759	225	250	347	481	662	800
760 – 779	235	260	355	487	675	812
780 – 799	245	270	362	494	688	825
800 – 819	255	280	370	500	699	838
820 – 839	265	290	377	507	712	849
840 – 859	275	300	385	512	725	862
860 – 879	285	310	392	525	737	875
880 – 899	295	320	400	538	750	887
900 – 919	305	330	407	550	763	900
920 – 939	315	340	415	562	774	913
940 – 959	325	350	422	575	787	924
960 – 979	335	360	430	587	800	937
980 – 999	345	370	437	600	812	950
1000 & over	355	380	445	613	825	962

[Statutory Authority: RCW 88.16.035. 80-06-084 (Order 80-1, Resolution 80-1), § 296-116-300, filed 5/28/80. Statutory Authority: RCW 88.16.035(4). 79-07-033 (Order 79-4, Resolution 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.]

Reviser's Note: RCW 34.04.058 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 296-116-320 Retirement fund contribution. With respect to $750 per month for a full-time pilot and $375 per month for a half-time pilot retirement fund contributions:

(1) Each active pilot member of the Puget Sound Pilots Association shall make a retirement fund contribution of $750 per month for a full–time pilot and $375 per month for a half–time pilot for retirement purposes which shall be accumulated and payable upon death or retirement only, and shall be deposited in a joint account in the name of the individual pilot and Puget Sound Pilots, in a qualified public depository approved for the purpose by the board: *Provided, however,* The board grants further authority, subject to the following withdrawal limitations, for a portion or all of the retirement fund contributions for pilots on and after July 18, 1975, to be placed into trust programs limited to interest bearing notes, interest bearing accounts, investments, and accumulations of money in short–term money funds, and participation in Bank Pooled Bond Funds. These investments would be for self–employed individuals, so as to qualify said programs under applicable federal laws for deferral of income benefits and other personal advantages. Funds may also be put in fixed income accounts designed to comply with HR–10 Self–Employed Individuals Tax Retirement Act of 1962, as amended by the Employee Retirement Income Security Act of 1974, when such trust plans are submitted to the board for prior approval. Participation in such approved self–employment retirement plans shall be conditioned upon the following:

(a) Once established these plans shall not be terminated except upon the death or retirement of the participating pilot.

(b) Each participating pilot shall issue to the trustee of the self–employment retirement plan signed instructions directing the trustee to give advance notice to the office of the chairperson of the Board of Pilotage Commissioners of any application for distribution or termination of an established self–employment retirement plan. Any pilot, or any person acting on behalf of said pilot's estate, making such an application for distribution or termination at any time other than upon the event of death or retirement of the pilot, shall be directed by the board to withdraw such application.

(c) Should a pilot have not elected retirement prior to age 70 1/2, said pilot shall be permitted to receive a distribution in whatever form he elects, under the provisions of his self–employment retirement plan, thereby complying with the mandatory distribution requirements of the above–mentioned retirement laws, provided that any and all funds so distributed be immediately deposited into a joint account in the name of the individual pilot and Puget Sound Pilots, in a qualified public depository approved for the purpose by the board, and thereafter withdrawn only upon actual death or retirement.

(d) It is to be understood by any pilot electing to direct contributions toward these self–employed plans and trust programs, that such activity is at their own financial choosing and the general approval by the board for such arrangement is not to be taken as any kind of recommendation or positive approval by the board as to these types of programs. This contribution of $750 per month for a full–time pilot and $375 per month for a half–time pilot shall be derived from the pilot's gross revenues.

(2) On quarterly reports required under RCW 88.16-.110, the pilot shall state for the preceding quarter the total retirement fund contribution received, through that quarter and shall itemize all withdrawals or payments from such fund. Further, the pilot shall reflect what portion of his retirement funds, on a quarterly basis, have been diverted into KEOGH approved investment retirement plans.

(3) All persons hereafter licensed by the board to pilot on the waters of Puget Sound under the provisions of the Pilotage Act, chapter 88.16 RCW shall be deemed to have agreed to and be bound by the foregoing.

(4) These regulations have been enacted pursuant to the Board of Pilotage Commissioners' authority to fix rates of pilotage as set forth hereinabove. Failure to comply with any aspect of these regulations controlling the use of the $750 per month for a full–time pilot and $375 per month for a half–time pilot contribution amount granted for retirement purpose shall result in disciplinary action pursuant to RCW 88.16.120 and such violation may be charged as a misdemeanor pursuant to RCW 88.16.150. [Statutory Authority: RCW 88.16.035. 80–03–081 (Order 79–6, Resolution 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.]

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 WAC 296–116–35001), filed 5/6/76.]

Chapter 296-125 WAC
ISSUANCE OF MINOR WORK PERMITS

WAC

296-125-010 Applicability.
296-125-015 Definitions.
296-125-020 Filing of application for permits to employ minors.
296-125-023 Posting.
296-125-027 Hours of work, meals and rest periods for minors.
296-125-030 Prohibited and hazardous employment.
296-125-033 Special restrictions for minors under the age of 16.
296-125-043 Minimum wages for minors.
296-125-050 Recordkeeping.
296-125-055 Revocation of permits.
296-125-060 Variances.

DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

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.

WAC 296-125-010 Applicability. Unless exempted by Washington state or federal law, every employer who employs one or more minor workers on and after the effective date of these regulations must previously have obtained a valid permit to employ minors from the State Division of Industrial Relations, Department of Labor and Industries. [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 purpose of this order:

(1) A "Minor" is a person of either sex who is under the age of 18 years.

(2) "Employ" means to engage, suffer or permit to work.

(3) "Employee" means any minor employed by an employer.

(4) "Employer" means any person, association, partnership, private or public corporation who employs or exercises control over the wages, hours or working conditions of a minor.

(5) "Division" means Industrial Relations Division, Washington State of Department of Labor and Industries. [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 296-125-020 Filing of application for permits to employ minors. Prior to the employment of one or more minors, each employer shall file with the division or its authorized agent an application for a permit to employ minors within a specified work place. When validated by the signature of the Division's Supervisor of Employment Standards, such a permit will authorize the employer to employ any number of minor workers in the specified work place in accordance with the conditions established below. [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 296-125-023 Posting. At least one copy of a valid permit to employ minors must be posted in plain view of all employees within the confines of the work place specified in the permit. [Order 76-15, § 296-125-023, filed 5/17/76.]

WAC 296-125-027 Hours of work, meals and rest periods for minors. (1) Minors under age 16 may not be employed during school hours (except by special permission from school officials as outlined in RCW 28A.27-.010 and 28A.27.090) nor before 7 a.m. nor after 7 p.m. during the school year, nor after 9 p.m. during the summer vacation season.

(2) Minors under age 16 may not be employed more than three hours per day on school days, nor more than 18 hours per week during school weeks.

(3) No minor shall be employed more than eight hours per day nor more than five days in any one week. Minors employed past 8 p.m. in service occupations must be supervised by a responsible adult who is required to be on the premises.

(4) No minor shall be employed on consecutive nights, both of which precede a school day, unless working no later than 9:00 p.m.

(5) No minor shall be employed more than five hours without a meal period of at least 30 minutes.

(6) Every minor employee shall be given a rest period of at least 10 minutes in every 4-hour period of employment, except as otherwise provided in WAC 296-126-092. [Order 76-15, § 296-125-027, filed 5/17/76.]

WAC 296-125-030 Prohibited and hazardous employment. (1) The following employments are prohibited for all minors, unless specifically permitted in the text of the Hazardous Occupations Orders in Nonagricultural Occupations of the child labor provisions of the Federal Fair Labor Standards Act, as now or hereafter amended.

(a) Occupations in or about plants or establishments manufacturing or storing explosives or articles containing explosive components.

(b) Occupations involving regular driving of motor 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, 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 minors have been instructed to use them.

(c) All mining operations.

(d) Logging occupations and occupations in the operation of any sawmill, lath mill, shingle mill, or cooperage–stock mill.

(e) Occupations involving operation of power–driven wood–working machines, power–driven metal–forming punching and shearing machines, power–driven bakery machines, power–driven paper products machines, circular saws, band–saws and guillotine shears, elevators and other power–driven hoisting apparatus.

(f) Occupations involving potential exposure to radioactive substances and to ionizing radiations.

(g) Occupations involving slaughtering, meat–packing or processing and rendering.

(h) Occupations involving wrecking, demolition and shipbreaking operations.

(i) All roofing operations.

(j) Occupations involving excavations.

(k) Occupations involving manufacturing of brick, tile and kindred products.

(2) The following types of work are prohibited for all minors:

(a) Work involving operation of or working in proximity to earth–moving machines, cranes, garbage compactors or other heavy equipment of similar nature.

(b) Work in establishments or work places being picketed during the course of a labor dispute.

(c) Work as a nurses' aide, unless the minor is a student in a bona fide nursing training program or has successfully completed such a program.

(d) Work as a maid or bell–hop in motels or hotels, unless the minor is accompanied by a responsible adult whenever the work requires the minor to enter assigned guest rooms.

(e) Work as a canvasser or peddler from house to house.

(f) Work in shooting galleries, penny arcades, sauna–massage parlors or body painting studios. [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 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 occupation.

(2) In any processing operations (such as 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 work rooms or work places where goods are manufactured, mined or otherwise processed.

(4) In any public messenger service.

(5) In occupations connected with transportation, warehouse and storage, communications and public utilities, or construction. (Office or sales work related to these occupations is permitted if none of the minor's work is performed on the transportation media or construction site.)

(6) In occupations requiring operation or tending of any power–driven machinery or hoisting apparatus.

(7) In the following specific areas of retail, food service or gasoline service station operations:

(a) Work performed in or about boiler or engine rooms.

(b) Maintenance or repair work.

(c) Outside window washing or other work requiring worker to be positioned at higher than ground level.

(d) Cooking and baking.

(e) Operating, setting up, adjusting, cleaning, oiling or repairing power–driven food slicers and grinders, food choppers and cutters and bakery–type mixers.

(f) 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.)

(g) Loading and unloading goods to or from trucks, railroad cars or conveyors. [Order 76–15, § 296–125–033, filed 5/17/76.]

WAC 296–125–043 Minimum wages for minors. (1) Every employer shall pay to each of his or her minor employees not less than one dollar and seventy–five cents per hour, whether computed on an hourly, commission, piecework or other basis, except as may be otherwise provided under this chapter.

(2) These minimum wage 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.

(3) 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. [Order 76–15, § 296–125–043, filed 5/17/76.]

WAC 296–125–050 Recordkeeping. The employer shall be responsible for obtaining and keeping on file 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 birth date; or witnessed statement of parent or guardian.

(2) Personal data relating to the minor, including: name and address and sex.

(3) Description of employment: earliest and latest hours of employment; descriptions of specific meal and rest periods; and complete description of duties.

(4) Parental authorization for employment by signature of parent or guardian on a form provided by the division.

(5) School authorization for employment during any part of the school year, on a form provided by the division.

(6) The employer shall make any or all of the above information available to the division or any of its authorized agents upon request. [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 296-125-055 Revocation of permits. The division or its authorized agent 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. [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.]

WAC 296-125-060 Variances. Variances permitting specific employment of minors in occupations prohibited by these rules may be granted in accordance with procedures outlined in WAC 296-126-130. [Order 76-15, § 296-125-060, filed 5/17/76.]

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.

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 (18) years of age or older.

(5) "Minor" means any person of either sex under eighteen (18) 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 ($1.80) per hour, and effective January 1, 1975, not less than two dollars ($2.00) 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 minor employees wages at a rate of not less than one dollar and sixty cents ($1.60) per hour, and beginning the calendar year of 1975 not less than one dollar and seventy-five cents ($1.75) per hour, whether computed on an hourly, commission, piecework or other basis, except as may be otherwise provided under this chapter.

(2) 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. [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 except that wages for no more than the last seven (7) calendar days may be withheld from the pay period covered for inclusion in the next pay period for bookkeeping purposes. [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 five 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 or days 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. [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 work place, but not worn on duty.

(2) Whenever an employer requires the employees to wear a uniform or other article of wearing apparel of a specific style or color, it must be furnished by the employer. Usual and customary wearing apparel in conformance to a general dress standard need not be

furnished by the employer. [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 (30) 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 (30) 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 (30) 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 similarily [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 pre-season 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 296-126-224 Wearing apparel. Whenever an employer requires the employees to wear a uniform or other article of wearing apparel of a specific style or color, it must be furnished by the employer. Usual and customary wearing apparel in conformance to a general dress standard need not be furnished by the employer. [Statutory Authority: RCW 49.12.091. 78-03-004 (Order 78-1), § 296-126-224, 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.]

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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.

RECORD KEEPING 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 pay-roll 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 pay-roll 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 296-128-015 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 record-keeping offices where such records are customarily maintained and all such records shall be open at any time to inspection and transcription by the director and his duly authorized representative. [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.]

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 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 is 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 authorized 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 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 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 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 approved 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.]

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 or 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 $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 (30) 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 296-132 WAC
PUBLIC EMPLOYEES' COLLECTIVE BARGAINING RULES

WAC

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DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

296-132-070 Supervisor. [Order 70-1, § 296-132-070, filed 3/10/70.] Repealed by Emergency and Permanant Order 70-13, filed 12/1/70, effective 1/1/71.

296-132-075 Rule temporary. [Order 70-1, § 296-132-075, filed 3/10/70.] Repealed by Emergency and Permanant Order 70-13, filed 12/1/70, effective 1/1/71.

296-132-165 Rule Temporary. [Order 70-1, § 296-132-165, filed 3/10/70.] Repealed by Emergency and Permanant Order 70-13, filed 12/1/70, effective 1/1/71.

296-132-300 Unfair labor practice——Who may file. [Order 70-1, § 296-132-300, filed 3/10/70.] See WAC 296-132-301.

296-132-305 Filing of charges. [Order 70-1, § 296-132-305, filed 3/10/70.] See WAC 296-132-306.

296-132-310 Investigation. [Order 70-1, § 296-132-310, filed 3/10/70.] See WAC 296-132-311.

296-132-315 Remedies. [Order 70-1, § 296-132-315, filed 3/10/70.] See WAC 296-132-316.

296-132-320 Rules temporary. [Order 70-1, § 296-132-320, filed 3/10/70.] Repealed by Emergency and Permanant Order 70-13, filed 12/1/70, effective 1/1/71.

WAC 296-132-005 Purpose. These rules are adopted to aid the Department, its authorized agents, and interested parties in proceedings under chapter 41-.56 RCW, as amended, hereinafter referred to as the Act. The Department and its authorized agents may waive any requirements of these rules unless a party show that it would be prejudiced by said waiver. [Order 70-1, § 296-132-005, filed 3/10/70.]

WAC 206-132-010 Policy. The policy of the state being primarily to promote peace in labor relations, nothing in these rules shall be construed to prevent the Department and its authorized agents, consistent with

the intent and purpose of the Act, from using its best efforts to adjust any dispute arising between public employees and public employers. [Order 70-1, § 296-132-010, filed 3/10/70.]

WAC 296-132-015 Construction. These rules shall be liberally construed to effectuate the purposes and provisions of the Act. [Order 70-1, § 296-132-015, filed 3/10/70.]

WAC 296-132-050 General. Any terms used herein that are defined in the Act shall have the meaning set forth therein. [Order 70-1, § 296-132-050, filed 3/10/70.]

WAC 296-132-055 Petitioner. "Petitioner" shall mean any person or body who invites the Department to intervene in an attempt to resolve differences which may arise under the Act. [Order 70-1, § 296-132-055, filed 3/10/70.]

WAC 296-132-060 Authorized agent. "Authorized Agent" of the Department shall mean the director, the supervisor of industrial relations, a labor mediator, or hearing officer specifically authorized by the director to conduct specific proceedings under the Act. Under ordinary circumstances, a labor mediator shall conduct all proceedings under the Act. [Order 70-1, § 296-132-060, filed 3/10/70.]

WAC 296-132-065 Labor organization, lawful organization. In order to qualify as Labor Organization as referred to in RCW 41.56.010, or Lawful Organization as referred to in RCW 41.56.030, an organization: (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) Must have a constitution and/or bylaws which plainly show the purposes of the organization is consistent with the requirements of the Act and is available to all members.

(3) The constitution and/or bylaws must provide:

(a) An approved method of nomination and election of officers in accordance with parliamentary procedure, for terms not to exceed four years.

(b) An approved method of financial record-keeping and a financial audit at least once a year, which is made available to all members.

(c) That at least four regular meetings must be held each year with adequate notice of same to all members.

(d) That a specific minimum number of members must be present to form a quorum before any organization business may be transacted. [Order 70-1, § 296-132-065, filed 3/10/70.]

WAC 296-132-100 Initiation. Application to the Department to resolve disagreement regarding the selection of a bargaining representative shall be by petition on such form or forms as may be provided by the Department and must be accompanied by individual signed and dated authorization cards or letters from at least thirty percent of the employees in the proposed bargaining unit. Any written petition, however, may be accepted by the Department provided it contains substantially the same information required by the Department's forms. [Order 73-26, § 296-132-100, filed 12/10/73; Order 70-1, § 296-132-100, filed 3/10/70.]

WAC 296-132-105 Filing of petition. The petition (application) for certification, decertification, or amendment of certification must be filed either (1) with the Supervisor of Industrial Relations, Department of Labor and Industries, General Administration Building, Olympia, Washington 98504; or (2) in the event the public employer is situated in western Washington, with the west side Labor Mediator, Department of Labor and Industries, 300 West Harrison St., Seattle, Washington 98119, and in the event the public employer is situated in eastern Washington, with the east side Labor Mediator, Department of Labor and Industries, North 1322 Post St., Spokane, Washington 99201. [Order 73-26, § 296-132-105, filed 12/10/73; Order 70-1, § 296-132-105, filed 3/10/70.]

WAC 296-132-110 Contents of petition——General. Petitions shall contain the following: (1) A statement as to whether the petition is filed by a public employee organization, public employee, or a public employer.

(2) The name and address of the public employer. [Order 70-1, § 296-132-110, filed 3/10/70.]

WAC 296-132-115 Contents of petition——Filed by public employees. When filed by a public employee organization, or a public employee, petition for certification or amendment of certification shall, additionally, 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 parties as to the nature and scope of the bargaining unit; and a statement that the petitioner is authorized to represent at least thirty percent of the employees within the claimed bargaining unit.

(2) The names and addresses of any other persons or labor organizations, known to the petitioner, who claim to represent any employees in the alleged appropriate unit, the expiration dates and brief descriptions of the contracts, if any, covering the employees in such unit.

(3) The number of employees in the alleged appropriate unit.

(4) A statement that the employer declines to recognize the petitioner as the representative, or that the public employer is about to recognize another organization as an exclusive bargaining representative.

(5) The name, affiliation, if any, and the address of the petitioner.

(6) Whether a work stoppage or picketing is in progress at the establishment involved and, if so, the approximate number of employees participating, and the date such work stoppage or picketing commenced.

(7) Any other relevant facts. [Order 73-26, § 296-132-115, filed 12/10/73; Order 70-1, § 296-132-115, filed 3/10/70.]

WAC 296-132-120 Contents of petition——Filed by public employer. When filed by a public employer, the petition for certification or amendment of certification shall contain: (1) A brief statement setting forth that one or more individuals or labor organizations has presented to the petitioner a claim to be recognized as the exclusive bargaining representative of all employees in the unit claimed to be appropriate; a description of such unit; the number of employees in the unit; and a statement 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 labor organizations known to the petitioner making such claim for recognition.

(3) A statement whether the petitioner has contracts with any labor organization or other representatives of employees and, if so, their expiration date.

(4) Whether a work stoppage or picketing is in progress at the establishment involved and, if so, the approximate number of employees participating, and the date such work stoppage or picketing commenced.

(5) Any other relevant facts. [Order 73-26, § 296-132-120, filed 12/10/73; Permanant and Emergency Order 70-13, § 296-132-120, filed 12/1/70, effective 1/1/71; Order 70-1, § 296-132-120, filed 3/10/70.]

WAC 296-132-125 Intervention. Any third party having a legitimate interest in any proceedings may file a petition of intervention setting forth facts sufficient to establish such interest and requesting that the Department resolve contested factual matters in its favor. For purposes of third-party intervention, "legitimate interest" means the intervenor must be able to prove it is authorized to represent at least ten percent of the employees within a proposed bargaining unit. An intervening organization's showing of legitimate interest shall be made either prior to, or during the course of any hearing that may be held. Any 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 in any proceedings upon presentation of same. [Order 73-26, § 296-132-125, filed 12/10/73; Order 70-1, § 296-132-125, filed 3/10/70.]

WAC 296-132-130 Initial action. Upon the filing of any petition an authorized agent shall confer with and may hold informal conferences with the known interested parties in an attempt to ascertain the facts. The authorized agent shall encourage the parties to agree upon the appropriate bargaining unit and a suitable method by which representation is to be determined. Whenever the authorized agent shall determine that the parties are unable to agree upon a suitable method or upon the appropriate bargaining unit, but in any event not more than thirty (30) days after the filing of the petition, and he is unable to settle the controversy without hearing, he shall conduct a hearing to resolve such matters and he shall notify the parties of the time and place of such a hearing in writing at least six (6) days, excluding Saturdays, Sundays and legal holidays, in advance thereof. [Order 70-1, § 296-132-130, filed 3/10/70.]

WAC 296-132-135 Petition——Amendments or withdrawal. At any time prior to issuance of a written notice of election or examination of the first authorization card, for the purpose of resolving the issue of representation, a petitioning party may amend or withdraw its petition at the discretion of the authorized agent. [Order 70-1, § 296-132-135, filed 3/10/70.]

WAC 296-132-140 Decertification. Decertification petition must be accompanied by individual, signed and dated statements from at least thirty percent of the employees in the existing bargaining unit to the effect that they no longer wish to be represented by the current bargaining representative. The petition must be timely filed whereupon an election will be conducted by the Department in compliance with RCW 41.56.070 to determine whether or not the employees within the bargaining unit wish to be represented by the bargaining representative. [Order 73-26, § 296-132-140, filed 12/10/73.]

WAC 296-132-145 Severance. Any labor organization may timely file a petition to sever a unit of employees from an existing bargaining unit, accompanied by individual, signed bargaining authorization cards from at least thirty percent of the employees in the proposed bargaining unit. If the petitioned-for unit is found to be appropriate, the Department shall conduct an election in accordance with RCW 41.56.070. In passing upon petitions to sever a unit of employees or departmental units from an existing bargaining unit, the Department shall apply the same principles and standards to all public employers on a case-by-case basis after consideration of the elements set forth in RCW 41.56.060 and all relevant facts, including but not limited to a determination of: (1) whether the proposed unit consists of employees having a unique community of interest seperate from employees in the existing unit;

(2) whether the proposed unit consists of employees having a functionally distinct and separate identity from other employees in the existing unit;

(3) whether a tradition of separate representation exists and, in addition,

(4) whether severance would unduly disrupt the stability of labor relations with the employer. [Order 73-26, § 296-132-145, filed 12/10/73.]

WAC 296-132-150 Determination of nature and scope. Whenever a question arises concerning the determination of an appropriate bargaining unit, it shall be disposed of as provided by RCW 41.56.060. Employees not employed on a regular basis, but subject to call, shall

not be included within any bargaining unit, but part-time regularly employed employees shall be included within an appropriate bargaining unit. [Permanent and Emergency Order 70-13, § 296-132-140, filed 12/1/70, effective 1/1/71; Order 70-1, § 296-132-150, filed 3/10/70.]

WAC 296-132-151 Unit clarification. Whenever a disagreement occurs on whether or not positions are to be included or excluded from the bargaining unit, the public employer or the bargaining representative may petition the department to conduct a representation hearing to resolve the matter. In making this determination the Department shall be guided by the criteria set forth in RCW 41.46.030 and RCW 41.56.060. [Order 73-26, § 296-132-151, filed 12/10/73.]

WAC 296-132-152 Union membership. An employee who has been excluded from a bargaining unit may voluntarily join and remain a member of the labor organization which represents such bargaining unit: Provided, the employee shall not serve on the organization's negotiating committee nor shall the employee be permitted to participate, on behalf of the labor organization, in any matters pertaining to labor relations with the public employer. [Order 73-26, § 296-132-152, filed 12/10/73.]

WAC 296-132-155 Special election. A special election may be conducted to ascertain the wishes of employees as to their disires to be included within or excluded from a specified bargaining unit. Such election shall be conducted by secret ballot. [Order 70-1, § 296-132-155, filed 3/10/70.]

WAC 296-132-160 List of employees. The public employer shall furnish to the Department a current list of all employees in a proposed or agreed-upon bargaining unit. The list of employees must be submitted prior to or as a first order of business of any scheduled hearing. The list of employees and their addresses shall be made available upon request to any organization meeting the requirements of RCW 41.56.070. [Order 73-26, § 296-132-160, filed 12/10/73; Order 70-1, § 296-132-160, filed 3/10/70.]

WAC 296-132-200 Selection of representation method. Once the nature and scope of a bargaining unit have been determined, by agreement or otherwise, the authorized agent shall within thirty (30) days proceed with resolution of the issue of representation. [Order 70-1, § 296-132-200, filed 3/10/70.]

WAC 296-132-205 Two or more organizations. In the event two or more eligible organizations petition to be certified as the exclusive bargaining representative of a bargaining unit, the authorized agent shall resolve the issue of representation by conducting an election in accordance with RCW 41.56.070. [Order 70-1, § 296-132-205, filed 3/10/70.]

WAC 296-132-210 Examination of membership rolls. If, in the opinion of the authorized agent, conducting an election would unnecessarily and unduly delay the bargaining proceedings with little likelihood of altering the determination of representation, he may resolve the issue of representation by examination of authentic organization membership rolls. [Order 70-1, § 296-132-210, filed 3/10/70.]

WAC 296-132-215 Use of authorization cards. If, in the opinion of the authorized agent, conducting an election would unnecessarily and unduly delay the bargaining proceedings with little likelihood of altering the determination of representation, he may resolve the issue of representation by examination of acceptable organization bargaining authorization cards. [Order 70-1, § 296-132-215, filed 3/10/70.]

WAC 296-132-220 Authorization cards——Acceptability. In order to be acceptable as evidence of representation, individual authorization cards must be signed and dated by the employee expressing an intent to be represented by a specific bargaining representative. A card signed and dated by an employee less than sixty (60) days prior to the date on which examination of cards for representation purposes commences shall continue prime facie evidence of continuation of such authorization. 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. In the event cards dated more than sixty (60) days prior to the date such examination commences are necessary to establish evidence of representation, then the authorized agent will certify, as an exclusive bargaining representative, only such organization which evidences representation authority by sixty (60) per centum of the employees of the bargaining unit. [Order 70-1, § 296-132-220, filed 3/10/70.]

WAC 296-132-225 Conduct of election. In the event a representation election is conducted for the purposes of certification, the following rules will apply: (1) Notice of election shall be given to all interest parties, and shall be prominently posted by the employer, no less than six (6) days prior to opening of the polls. Such notice shall contain: the date, hours and place of election; a list of employees eligible to vote; and a description of the bargaining unit. Provided, that any challenge to the composition of a bargaining unit agreed to between the employer and a labor organization must be filed with the Department no less than seventy-two hours before the opening of the polls and must be supported by at least thirty percent of the employees in the unit in order to effect a stay by the Department of the election process.

(2) An 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 is regularly employed within the bargaining unit, either full or part-time, and who is in the employ of the public employer within fourteen (14) days

prior to the date of the issuance of the notice of election and on the date of election.

(3) Each of the interested parties may designate one person as an observer at the polls. Unless otherwise stipulated by the interested parties, observers must be non-supervisory employees of the public employer.

(4) Any observer or the authorized agent, for good cause, may challenge an employee's eligibility to vote. Challenged ballots shall be folded, placed in a sealed envelope with the name of the voter plainly written on the outside. Challenged ballots will not be considered unless they might affect the results of the election, in which case the authorized agent shall investigate and determine the eligibility to vote of the persons whose ballots are challenged. Challenged ballots which are disallowed will be destroyed. Challenged ballots which are allowed will be counted. The names of the persons whose ballots are challenged shall be made a part of the record of the election proceedings.

(5) Ballots may not be tallied until after the posted time for the closing of the polls unless all eligible voters have cast their ballot.

(6) In any election where there are only two choices on the ballot, an organization shall be certified if it receives a majority of the votes cast. [Order 73-26, § 296-132-225, filed 12/10/73; Order 70-1, § 296-132-225, filed 3/10/70.]

WAC 296-132-226 Central filing——Arbitration and fact-finding. In order to establish a central file relating to the determinations of fact-finding and arbitration panels under the provisions of chapter 41.56 RCW, each panel appointed pursuant to the provisions of chapter 59 and chapter 131 of the Laws of 1973 shall provide the director with a true copy of its findings of fact, recommendations and/or decisions. [Order 73-26, § 296-132-226, filed 12/10/73.]

WAC 296-132-250 Certification. Except as specifically otherwise provided in special cases set forth in WAC 296-132-220, the authorized agent will certify, as an exclusive bargaining representative, only an organization which on the date such issue is resolved is authorized to represent a majority of the employees of the bargaining unit. A copy of such certification will be mailed to all interested parties within ten (10) days. [Order 70-1, § 296-132-250, filed 3/10/70.]

WAC 296-132-255 Noncertification. In the event a party seeking certification does not represent a majority of the employees of a bargaining unit, the authorized agent will dismiss any petition seeking such certification and will notify all parties thereof. [Order 70-1, § 296-132-255, filed 3/10/70.]

WAC 296-132-260 Time extensions. By mutual written agreement of the parties, any of the time limits set forth in section 3 and section 4 of chapter 131, Laws of 1973, may be extended. Any such agreed-upon time extension shall not constitute a waiver of either party's rights under the act. [Order 73-26, § 296-132-260, filed 12/10/73.]

WAC 296-132-265 Bypass of steps. The parties, under sections 3 and 4, chapter 131, Laws of 1973, by mutual written agreement may bypass mediation and go directly to fact-finding, or may bypass both mediation and fact-finding and go directly to arbitration, or may bypass fact-finding and go directly to arbitration from mediation. [Order 73-26, § 296-132-265, filed 12/10/73.]

WAC 296-132-301 Unfair labor practices——Who may file. Any public employer or public employee, or any labor organization representing a public employee may file an unfair labor practice charge with the Department of Labor and Industries, alleging one or more of the unfair labor practices set forth in RCW 41.56.140 or 41.56.150. [Order 73-26, § 296-132-301, filed 12/10/73; Permanent and Emergency Order 70-13, § 296-132-301, filed 12/1/70, effective 1/1/71.]

WAC 296-132-302 Unfair labor practice presumed——Change of conditions during bargaining. During the course of collective bargaining between a public employer and a bargaining representative under the authority and procedures of chapter 41.56 RCW and following the expiration of the collective bargaining agreement, an unfair labor practice will be presumed to exist under either RCW 41.56.140, or 41.56.150, if either the public employer or the bargaining representative make any changes in existing wages, hours of employment or other conditions of employment without the consent of the other party, but any such consent shall not prejudice the rights of either party under chapter 41.56 RCW or these rules. [Order 73-26, § 296-132-302, filed 12/10/73.]

WAC 296-132-306 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 public employer.

(2) The name and address of the party or organization filing the charge.

(3) A statement as to the basis of the charge which shall be specific as to facts, names, addresses, dates and places. [Permanent and Emergency Order 70-13, § 296-132-306, filed 12/1/70, effective 1/1/71.]

WAC 296-132-311 Investigation. Upon receipt of an Unfair Labor Practice Charge, the Department shall conduct an investigation to determine whether or not the charges have merit. If it is found that the charges have merit, a complaint shall be issued and a hearing scheduled in accordance with RCW 41.56.170. If it is found that the charges do not have merit, the Unfair Labor Practice Charge shall be dismissed and the principals named in such charge shall be notified in writing of such dismissal and the reasons for the dismissal. [Permanent

and Emergency Order 70-13, § 296-132-311, filed 12/1/70, effective 1/1/71.]

WAC 296-132-316 Remedies. Appropriate remedial orders which may be issued by the Department include, but shall not be limited to: (1) Immediate reinstatement of an employee, with back pay, who has been wrongfully discharged for union activity.

(2) Immediate reinstatement of an employee to his or her former position, wages and schedule if it is shown that discriminatory changes were made because of union activity.

(3) Certification of a bargaining representative regardless of the results of an election if it is shown that unfair practices resulted in the loss of the election provided it can be shown the bargaining representative did represent a majority of unit prior to the commission of the unfair practices.

(4) Failure to certify a bargaining representative regardless of the results of an election if it is shown that unfair practices resulted in gaining enough votes to win the election.

(5) A new election may be ordered where it is shown that unfair practices effected the outcome. [Permanent and Emergency Order 70-13, § 296-132-316, filed 12/1/70, effective 1/1/71.]

WAC 296-132-350 Appeal procedure. Any employer, employee, bargaining representative, labor organization or other person or organization who was a party in a proceeding before an authorized agent and aggrieved by any action taken or decision made by an authorized agent may appeal such action taken or decision to the director of the Department of Labor and Industries by filing a notice of appeal to the director of the Department of Labor and Industries, the authorized agent and all other parties to the proceeding within thirty (30) days of the date such action or decision was taken. Certification of such service shall be filed in the office of the director. The notice of appeal shall suspend such action or decision pending the determination of the appeal by the director unless in the discretion of the director the action or decision of the authorized agent could settle the issue. The director shall review the record and written briefs on appeal filed by the respective parties and may hear oral arguments 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 in superior court pursuant to the Administrative Procedure Act shall be final at the expiration of thirty(30) days from the date of filing of such decision. Provided, that any appeal containing issues related to the findings of a fact-finding panel or the findings, recommendations or conclusions of an arbitration panel rendered under the authority of chapter 131, Laws of 1973, or the findings, recommendations or conclusions of an arbitration panel rendered under the authority of chapter 59, Laws of 1973, will not be subject to review and decision under this section. [Order 73-26, § 296-132-350, filed 12/10/73; Order 70-1, § 296-132-350, filed 3/10/70.]

WAC 296-132-360 Appeal briefs. Appeal briefs shall be filed in the office of the director by the respective parties to the appeal thirty (30) 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, shall be scheduled after the expiration of the time for filing briefs and the notice of any such hearings shall be sent to all parties to the appeal. [Order 73-26, § 296-132-360, filed 12/10/73.]

WAC 296-132-370 Appeal briefs——Contents. An appeal brief 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. No alleged error of the authorized agent will be considered unless the same be definitely pointed out 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) Appellant's brief shall 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 shall 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 authorized agent. [Order 73-26, § 296-132-370, filed 12/10/73.]

WAC 296-132-380 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 or rejected by the authorized agent during the course of the hearing 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 the evidence, matters and things coming before the authorized agent at the hearing, 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 on

payment to the authorized agent of the reasonable cost per page. [Order 73-26, § 296-132-380, filed 12/10/73.]

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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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, 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, 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 non-supervisory 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.

(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, Residing 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 Procedures 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 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 296-150A WAC

RULES AND REGULATIONS FOR FACTORY-BUILT HOUSING AND COMMERCIAL STRUCTURES AND GOVERNOR'S ADVISORY BOARD ADMINISTRATIVE RULES

WAC

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ADMINISTRATION

WAC 296-150A-010 Administration——Authority for factory-built housing and commercial structures code. These rules and regulations are adopted pursuant to the provisions added to chapter 8, Laws of 1965, and to chapter 43.22 RCW, relating to factory-built housing and commercial structures. These provisions provide for the promulgation of standards governing the construction of factory-built housing and commercial structures and the safety of components therein. [Order 77-8, § 296-150A-010, filed 4/29/77; Order 74-15, § 296-150A-010, filed 4/30/74.]

WAC 296-150A-015 Application and scope. The provisions of these rules and regulations are applicable to all factory-built housing and commercial structures, including modular, sectional, industrialized, service cores and components designed or used for industrial, educational, assembly, professional commercial or residential occupancy other than a mobile home or commercial coach and consisting of at least one room or uninspectable at-site component or portion thereof, and which is to

be installed on a building site within the state of Washington after the effective date of these regulations. [Order 77-8, § 296-150A-015, filed 4/29/77; Order 74-15, § 296-150A-015, filed 4/30/74]

WAC 296-150A-020 Department services. The department services include all services performed by the Factory-Built Housing and Commercial Structures Section. These services are separated into two categories, technical and inspection. The technical category includes research, evaluation, consultation and plan examination services. The inspection category includes all types of inspections and investigation services. All department services are provided during the standard eight-hour work day, 8:00 a.m. to 5:00 p.m., Monday through Friday, excluding legal holidays. These services shall not extend beyond the standard work day except by request and subsequent authorization by the department.

For types of department application forms see WAC 296-150A-710. [Order 77-8, § 296-150A-020, filed 4/29/77; Order 74-15, § 296-150A-020, filed 4/30/74.]

WAC 296-150A-025 Conditions of reciprocity. (1) In accordance with the provisions of RCW 43.22.485, the director of the department has examined the statutes, rules and regulations of the state(s) listed in subsection (3) of this section relating to factory-built housing and commercial structures and finds that such statutes, rules and regulations provide standards of construction for factory-built housing and commercial structures equal to those required under the provisions of RCW 43.22.450 through RCW 43.22.490, and further, that such statutes, rules and regulations of the states listed in subsection (3) of this section are enforced by such states.

(2) Upon the effective date of this rule, and subject to the continued equality of standards of construction and enforcement of standards as prevails in this state, and subject to the provisions of a reciprocal agreement, the factory-built housing and commercial structures of the states listed in subsection (3) shall be eligible for the issuance of factory-built housing and commercial structures insignia of approval by the department as provided by RCW 43.22.455.

(3) Reciprocal agreements entered into by the department pursuant to the provisions of RCW 43.22.485 and this rule will be kept on file with the factory-built housing-commercial structures section of the division of building and construction safety inspection services of the department and available for inspection and review during the regular business hours of such office. [Order 77-8, § 296-150A-025, filed 4/29/77; Order 74-15, § 296-150A-025, filed 4/30/74.]

WAC 296-150A-026 Acceptance from out-of-state jurisdictions. When an out-of-state jurisdiction, not covered under reciprocity, pursuant to RCW 43.22.485, accepts the state of Washington Factory-Built Housing and Commercial Structures Insignia of Approval, the Factory-Built Housing and Commercial Structures Section shall require their agreement of acceptance in writing. This agreement shall not be construed to mean that Washington accepts FBH-CS units produced in that jurisdiction. [Order 77-8, § 296-150A-026, filed 4/29/77; Order 74-15, § 296-150A-026, filed 4/30/74.]

WAC 296-150A-027 Educational. Washington State certified educational institutions having an industrial trades curriculum for the educational purpose of manufacturing factory-built housing and commercial structures shall comply with these rules and regulations, except such educational institutions shall be allowed a 50% reduction in fees. [Order 77-8, § 296-150A-027, filed 4/29/77; Order 74-15, § 296-150A-027, filed 4/30/74.]

DEFINITIONS

WAC 296-150A-050 Definitions——General. Definitions contained in the RCW 43.22.450 shall apply to this chapter. Said definitions hereinafter set forth shall apply within this chapter.

All definitions and their derivatives are construed to contain the meaning necessary for the purpose of these rules and regulations. Words used in the masculine gender are inclusive of the neuter and feminine meaning and apply equally in transposition of their use.

"Alteration" or "Conversion" means any change from the approved plans or installation instruction which would effect the structural, mechanical, electrical or plumbing systems of factory-built housing and commercial structures bearing a department insignia of approval and shall include the replacement, addition, modification or removal of any structural member, plumbing, heat-producing or electrical equipment, or installation which may effect such systems as it applies to the manufacturer and/or the first user.

The following shall not constitute alteration or conversion:

(1) Repairs with approved component parts.

(2) Conversion of listed fuel-burning appliances in accordance with the terms of their listing.

(3) Replacement of equipment and appliances in kind.

(4) Adjustment and maintenance of equipment.

"Approved" means conforming to the requirements and obtaining the certification of the Department of Labor and Industries of the state of Washington.

"Audit" means an unannounced inspection to examine and/or adjust a manufacturer's production and compliance control procedures.

"Building Official" means the chief or assistant chief, factory-built housing, commercial structures section, designated by the department to administer and enforce the provisions of these rules and regulations.

"Building Site" means any tract, parcel or subdivision of land upon which factory-built housing and commercial structures is installed or is to be installed.

"Closed Construction" means a factory assembled structure or component which may enclose factory installed mechanical, electrical or plumbing equipment and is not open for visible inspection of the equipment, systems or structure at the site.

"Commercial Coach" see mobile home.

"Commercial Structure" means a structure designed or used for human habitation or human occupancy for industrial, educational, assembly, professional or commercial uses.

"Compliance Control," hereinafter referred to as CC, is the method of controlling the construction, fabrication, assembling and erection where applicable, including storing and use of various materials to insure compliance with the construction codes adopted for the regulation of factory–built housing and commercial structures.

"Component" means the assembly of materials into a building element, or component, for a designated function, such as roof truss, floor, wall or roof panel, plumbing wall, electrical service wall, heat–producing assemblies, or similar assemblies which are not inspectable at the time of installation either in factory–built housing or commercial structures unit or in a unit built on–site.

"Component System" means the utilization of components in the formulation of a composite system, such as a series of wall panels combined in a dimensional configuration enclosing four sides of a building which would constitute a component wall system.

"Componentized Building" means a building of factory assembled components shipped to a site for installation.

"Conventional System" means methods, standards and practices commonly recognized by the construction industry.

"Custom Building" shall mean any one–of–a–kind structure using a system that has not been approved by the department.

"Department" means the Washington State Department of Labor and Industries.

"Design Option (DO)" means a design change from the basic prototype design plan.

"Dwelling Unit" means one or more habitable rooms which are occupied or which are intended or designed to be occupied for residency by one family with facilities for living, bathing, sleeping, cooking and eating.

"Equipment" means all equipment, materials, appliances, devices, fixtures, fittings or accessories installed in the manufacture and assembly of factory–built housing and commercial structures.

"Factory–Built Housing and Commercial Structure," hereinafter referred to as FBH–CS, means any structure, or portion thereof, designed primarily for human habitation or human occupancy other than a mobile home or commercial coach, the structure, or any room, or component of which is either entirely or substantially prefabricated or assembled at a place other than a building site. Factory–built housing and commercial structure may also be called industrialized, manufactured, modular, sectional or sectionalized construction.

"FB–CS" means factory–built commercial structure.

"FB–CC" means factory–built compliance control. An inspection program implemented and maintained under the direction of the factory–built housing–commercial structures section.

"First User" means a person, firm or corporation who initially installs factory–built housing and commercial structures within this state.

"Habitable space" means any space meeting the requirements of the uniform building code designed for sleeping, living, cooking, or dining purposes, excluding such enclosed places as closets, pantries, connecting corridors, unfinished attics, laundries, foyers, storage spaces, cellars, utility rooms and similar spaces.

"IIA–CC" means independent inspection agency–compliance control. An inspection program implemented and maintained by an independent inspection agency in accordance with the agreement entered into with the department and subject to department certification and audit procedures.

"Insignia" means a label, tab stamp or tag issued by the department to indicate compliance with the regulations established for factory–built housing and commercial structures.

"Inspection Agency" is an organization which is:

(1) In the business of inspecting equipment and systems;

(2) Not under the control or jurisdiction of any single manufacturer or supplier for an effected industry;

(3) And will be making available specific information as required by the department;

(4) Approved by the department.

"Install" means to erect, build, fabricate, construct, set in place and/or assemble all elements of factory–built housing and/or commercial structures at a building site; including the process of affixing said unit(s) to the land by means of a foundation, footings, or other methods approved by the local enforcement agency.

"Labeled" means equipment bearing a label of certification of an approved testing agency.

"Local Enforcement Agency", hereinafter called LEA, means any agency of the governing body of any city or county which enforces laws or ordinances governing the construction of buildings.

"LEA–CC" means local enforcement agency compliance control. An inspection program implemented and maintained by a local enforcement agency under department certification and audit procedures.

"Local Enforcement Agency Official" means an official designated by any city, town or county to enforce its structural, plumbing, electrical, mechanical or other building regulations within that jurisdiction for safety to life, health and property.

"Listed" means equipment or materials or structures included in a list published by a listing agency that maintains periodic inspection on current production of listed equipment or materials and whose listing states either that the equipment or material complies with approved standards or has been tested and found suitable for use in a specified manner.

"Listed Manufacturer" means a manufacturer who has submitted applications, plans and fees to the factory–built housing commercial structures section and by such proposes to manufacture pursuant to these rules and regulations.

"Listing Agency" means an agency which is in the business of listing or labeling and which maintains a periodic inspection program on current production of listed models, and which makes available at least an annual published report of such listing in which specific information is included that the product has been tested to nationally approved standards and found safe for use in a specified manner.

"Manufacture" means the process of making, fabricating, constructing, forming or assembling a product from raw, unfinished or semi–finished materials to produce factory–built housing and/or commercial structures as defined in chapter 8, Laws of 1965 and chapter 43.22 RCW.

"M–CC" means manufacturers–compliance control. An inspection program implemented and maintained by the manufacturer under department certification and audit procedures.

"Mobile Home" means a structure designed and built to comply with the department's rules and regulations for mobile homes and commercial coaches.

"Notification to local enforcement agency" means a written communication of work to be completed at the site.

"Open Construction" means a factory–assembled roof, wall or floor panel or component open so that its construction, equipment or systems may be fully inspected at the site.

"Ordinance" means all codes which have been adopted by WAC 296–150A–315 through WAC 296–150A–330, which prescribe items that are not a system of construction, e.g., room sizes (floor plans), light and ventilation, ceiling heights, exiting, and similar items.

"Panel" (See component)

"Prohibited Notice" means the department's official notice that is posted on a building or component stating, that the sale, installation or occupancy is prohibited.

"Prototype" means a specific design of factory–built housing or commercial structure as designated by the manufacturer to be the standard for imitation reproduction.

"Reciprocity" means the exchange of acceptance between two or more states for factory–built housing and commercial structures as produced in the one state and designated for installation in the reciprocating state. Factory–built housing and commercial structures approved by such other state shall be deemed to have been approved by the recipient state subject to the provisions of RCW 43.22.485 and WAC 296–150A–025.

"Relocatable Building" means a permanent structure other than a mobile home designed to be moved from one permanent installation to another as dictated by need.

"Residential" means characteristic of a residence or dwelling containing one or more habitable rooms.

"Residential Building" means any structure designed for dwelling occupancy, containing one or more dwelling units and structures accessory thereto.

"Residential occupancies" shall include those occupancies designated in the uniform building code, 1976 edition.

"Service Core" means a factory–assembled three–dimensional section of a building which may include installed mechanical elements containing mechanical, electrical, plumbing, heating and cooling elements and related systems. These units may contain the kitchen, one or more bathrooms, and a utility room complex. (Sometimes referred to as "wet boxes", "mechanical cores", or "utility cores".)

"Shell House" means factory–built housing and/or commercial structure having incomplete construction to such an extent that it is inspectable at the site as determined by the building official.

"Substantially Prefabricated or Assembled" means that the component module or the major portion of factory–built housing and commercial structure is assembled in such manner that all portions may not be fully inspected without disassembly or destruction of the part.

"System" means a specific part of the construction; structural, plumbing, electrical and mechanical.

"Systems Plan" means a design plan concept that allows interchanging various construction systems.

"Technical Report" means the department's official documentation of plan examination and the approval status for each specific product produced by a manufacturer.

"Technical Service" means research, evaluation, consultation, plan examination, interpretation and clarification by the department of technical data relating to the application of these rules and regulations, but not including inspections.

"Testing Agency" means an organization which is:

(1) In the business of testing equipment and systems;

(2) Qualified and equipped to do testing to approved standards;

(3) Not under the jurisdiction or control of any single manufacturer or supplier for an effected industry;

(4) Making available a published report in which specific information is included stating that the equipment and systems have been tested and found safe for use in a specified manner. [Order 77–8, § 296–150A–050, filed 4/29/77; Order 74–15, § 296–150A–050, filed 4/30/74.]

CODES

WAC 296–150A–315 Construction requirements. The design and fabrication of factory–built housing and commercial structures shall comply with the uniform building code and appendix (1976 edition) and standards, 1976, except as requirements are superseded by state laws. Where reference is made therein to the "building official" it shall mean the chief or assistant chief, factory–built housing–commercial structures section. [Order 77–8, § 296–150A–315, filed 4/29/77; Order 74–15, § 296–150A–315, filed 4/30/74.]

WAC 296-150A-320 Electrical requirements. Electrical equipment and systems in or on factory-built housing and commercial structures shall comply with the requirements of the National Electrical Code, 1975 edition, as published by the National Fire Protection Association as amended by the latest edition of the Rules and Regulations for Installing Electric Wires and Equipment and Administrative Rules as published by the Department under the authority of chapter 19.28 RCW. [Order 77-8, § 296-150A-320, filed 4/29/77; Order 75-5, § 296-150A-320, filed 3/5/75; Order 74-15, § 296-150A-320, filed 4/30/74.]

WAC 296-150A-325 Mechanical requirements. Mechanical equipment and systems in or on factory-built housing and commercial structures shall comply with the requirements of the uniform mechanical code, 1976 edition including chapter 22, appendix B, fuel gas piping, and standards, as published by the international conference of building officials, except as superseded by Washington State law. [Order 77-8, § 296-150A-325, filed 4/29/77; Order 74-15, § 296-150A-325, filed 4/30/74.]

WAC 296-150A-330 Plumbing requirements. All plumbing equipment and systems in or on factory-built housing and commercial structures shall comply with the requirements of the uniform plumbing code, 1976 edition, as published by the international association of plumbing and mechanical officials except as superseded by Washington State law, and provided that nothing in this code shall apply to gas piping, water heaters, or vents for water heaters. [Order 77-8, § 296-150A-330, filed 4/29/77; Order 74-15, § 296-150A-330, filed 4/30/74.]

WAC 296-150A-333 Handicap standards. All FBH-CS shall comply with the Washington State Building Code, RCW 19.27.030(5), rules and regulations establishing standards for making buildings and facilities accessible to and usable by the physically handicapped or elderly persons. [Order 77-8, § 296-150A-333, filed 4/29/77.]

WAC 296-150A-335 Code research and materials evaluation service. The department will provide within staff limitations, services to research codes and evaluate materials when requested. The request shall be in writing and is to describe to what extent the request is to be answered. The fees shall be in accordance with the fee schedule, "Department Services", WAC 296-150-700. [Order 74-15, § 296-150A-335, filed 4/30/74.]

ENFORCEMENT

WAC 296-150A-400 Enforcement and administration——Enforcement. The department shall administer and enforce all the provisions of these rules and regulations. Any officer, agent, or employee of the department is authorized to enter any premises, during working hours or at other reasonable times, where factory-built housing and/or commercial structures are manufactured, leased, sold or offered for sale. He may examine any records pertaining to compliance control and may inspect any such construction, equipment or installations to insure compliance with the provisions of these rules and regulations. When it becomes necessary he may require that a portion or portions of such construction be removed in order that an inspection may be made to determine compliance.

Every manufacturer of factory-built housing and commercial structures subject to the requirements of these rules and regulations shall obtain approval and insignia for each factory-built structure or component. [Order 77-8, § 296-150A-400, filed 4/29/77; Order 74-15, § 296-150A-400, filed 4/30/74.]

WAC 296-150A-405 Equipment and systems. The department may accept for approval such equipment and installations which are listed or labeled by an approved listing agency. Equipment and systems not listed or labeled may be accepted for approval by the department when it determines such equipment and systems are adequate for the protection of health, safety and the general welfare. [Order 74-15, § 296-150A-405, file 4/30/74.]

WAC 296-150A-410 Department disapproval of listed or labeled equipment and systems. Equipment and systems may be disapproved by the department when it determines that such equipment and systems, even though listed or labeled by an approved agency, are not adequate for the protection of health, safety and the general welfare. [Order 74-15, § 296-150A-410, filed 4/30/74.]

WAC 296-150A-415 Alternates and equivalents. (1) The provisions of this chapter are not intended to prevent the use of any material, appliance, system, device, arrangement, or method of construction not specifically prescribed by this chapter, provided any such alternate has been approved.

(2) The department shall approve any such alternate if it finds that the proposed design is satisfactory and that the material, appliance, device, arrangement, method, system, or work offered is at least the equivalent in performance as prescribed by the rules and regulations in quality, strength, effectiveness, fire resistance, durability and safety.

(3) Whenever there is definite evidence that any material, appliance, device, arrangement, system or method of construction does not conform to the provisions or requirements of these regulations, or in order to substantiate claims for alternates, the department may require tests or proof of compliance to be made at the expense of the manufacturer or his agent by an approved agency.

Test methods shall be specified in the standards of the codes listed in the act or by other nationally recognized standards approved by this department. If there are no appropriate test methods specified in the standards listed above, the department shall determine the test procedure.

The department shall consider product recommendations issued by nationally recognized product evaluation services such as the ICBO Research, the IAPMO Research Committee and Underwriters' Laboratories. [Order 74-15, § 296-150A-415, filed 4/30/74.]

WAC 296-150A-417 Prohibited notice. Any FBH-CS structure or component found not to be in compliance with these rules and regulations shall be posted by the department with a notice prohibiting its sale, installation or occupancy. The structure or component shall not be moved from the place where it was posted except by department approval. The removal, destruction or concealment of the notice by any unauthorized person is unlawful. [Order 77-8, § 296-150A-417, filed 4/29/77.]

INSPECTIONS

WAC 296-150A-420 Inspections. All factory-built housing and commercial structures or components bearing the state of Washington insignia are required to be inspected in accordance with an approved compliance control program to assure that the unit has been constructed in accordance with the codes. There shall be no inspections except as a specific exception agreed to by the department prior to the approval of plans, issuance of the technical report and submittal of insignia application. The approved plans and technical report shall be immediately available to the inspector upon arrival at the plant. All regular inspections are by request, either written (forms are available see WAC 296-150A-710) or by telephone.

There are several types of inspections. The following provides a description of each:

(1) IN-PLANT INSPECTIONS: The in-plant inspection normally consists of two basic inspections, (a) and (b):

(a) OK-TO COVER (OK-TC). The OK-TO COVER inspection requires each system constructed to be inspected prior to covering or sealing any portion of the construction.

(b) FINAL (F). The final inspection includes a review of each system of construction and tests of systems where applicable such as plumbing and electrical. The insignia of approval is attached at the satisfactory completion of the final inspection.

(c) REINSPECTION. A reinspection is required when there are numerous and/or major corrections necessitating re-work to a particular system or systems of construction.

(2) OUT-OF-STATE INSPECTION: All out-of-state factory-built housing and commercial structures to be installed in the state of Washington not bearing the department's insignia or not under reciprocity agreements shall be required to obtain department approval.

The department, in order to provide assurance that quality control and code compliance is being maintained, reserves the right to make out-of-state inspections as deemed necessary and fees shall be as set forth in WAC 296-150A-700.

(3) DAMAGE INSPECTION: All FBH-CS arriving at the site of installation in a damaged condition, or damaged during installation, shall be visually reinspected in the field to determine corrective action. Upon completion of all reparation it shall be required to obtain a field reinspection to validate the department's initial approval.

The local enforcement agency shall report any units that have been damaged enroute to the installation site, or have been damaged during installation, so that the department may arrange for a damage inspection of the unit.

(4) INSTALLATION, INSPECTION: In order to complete the installation of the factory-built housing and commercial structures, approval and inspection of said installation by the local enforcement agency having jurisdiction over the construction site may be required.

Whether or not a local enforcement agency approves and inspects the installation, a "hookup inspection" shall be performed by the authority having jurisdiction prior to providing electrical power to the structure. The manufacturer of the unit shall not be required to remedy damages or defects caused by on-site work by others not under his control.

(5) REQUESTED SITE INSPECTION: Upon written request the department will perform advisory at-site installation inspections. A written request is required to have the local enforcement agency official's concurrence either by signature on the requestor's letter or by separate letter. When there is no LEA authority the department shall honor the request accordingly. Fees shall be charged as listed in WAC 296-150A-700.

(6) INCOMPLETE UNIT AT-SITE INSPECTION: Incomplete units requiring an AWC pursuant to WAC 296-150A-606, to be installed within a jurisdiction that does not have a LEA may be inspected by the department at the installation site when completed, to validate the department's insignia of approval.

(7) COMPLAINT INVESTIGATION: Complaints must be submitted to the department in writing. A copy of the complaint shall be sent to the manufacturer for his action and a written response to the department shall be required by the manufacturer within 30 days. The department shall determine the action based upon the reply.

(a) If items are found in violation of the rules and regulations the manufacturer shall pay the cost of inspections.

(b) If items are found to be outside the scope of the rules and regulations the complainant is liable for payment of fees.

(8) CUSTOM BUILDING INSPECTION: All custom (one-of-a-kind) buildings shall be individually inspected in accordance with the in-plant inspection procedure by the department (FB-CC) or certified local enforcement agency (LEA-CC) or certified independent inspection agency (IIA-CC) as authorized by the department.

(9) AUDIT INSPECTION: The department shall conduct unannounced inspections at any manufacturing site to review any and/or all aspects of manufacturer's

production and compliance control procedures. [Order 77-8, § 296-150A-420, filed 4/29/77; Order 74-15, § 296-150A-420, filed 4/30/74.]

WAC 296-150A-423 Compliance control programs (CC). There are four basic compliance control programs available to manufacturers; however, each new listed manufacturer is required to be under the factory-built compliance control program (FB-CC) for a minimum of 30 days or, a representative number of units produced, prior to initiating any other program. The four programs are FB-CC, factory-built (WAC 296-150A-424); LEA-CC, local enforcement agency (WAC 296-150A-425); M-CC, manufacturer (WAC 296-150A-445); and independent inspection agency (WAC 296-150A-450). (See WAC 296-150A-710, department application forms.)

All educational institutions pursuant to WAC 296-150A-027 shall be under the FB-CC program only. [Order 77-8, § 296-150A-423, filed 4/29/77; Order 74-15, § 296-150A-423, filed 4/30/74.]

WAC 296-150A-424 Factory-built——Compliance control (FB-CC). The department implements and maintains the FB-CC inspection program and provides the manufacturer with the inspection services in accordance with the in-plant inspection procedure. [Order 77-8, § 296-150A-424, filed 4/29/77; Order 74-15, § 296-150A-424, filed 4/30/74.]

WAC 296-150A-425 Local enforcement agency——Compliance control (LEA-CC). A local enforcement agency may provide a Washington State manufacturer with inspection services under the LEA-CC certification program in accordance with the in-plant inspection procedure as audited by the department.

The authorization by the department to a LEA will be specific of types of inspections. Electrical inspections shall also be excluded from the delegated responsibilities with the exception of those LEA having previous agreement with the department to perform electrical inspections. [Order 74-15, § 296-150A-425, filed 4/30/74.]

WAC 296-150A-430 Local enforcement agency application. To allow the department to determine the acceptance of a LEA and to authorize the assignment of inspection responsibilities, an application obtainable from the department shall be submitted for the department's review. [Order 74-15, § 296-150A-430, filed 4/30/74.]

WAC 296-150A-435 The local enforcement agency. The local enforcement agency may: (1) Require a set of design plans and specifications for each installation within its jurisdiction.

(2) Require that all permits be obtained before delivery of any unit to a building site.

(3) Require that all FBCS not regulated under WAC 296-150A-015 meet the requirements of WAC 296-150A-315 to 296-150A-330 as determined by location within the fire zones of the local enforcement agency.

(4) Require that all fire-resistive occupancy separations and required fire separation walls, parapet walls and other fire-resistive requirements meet the requirements of WAC 296-150A-315 to 296-150A-330. [Order 74-15, § 296-150A-435, filed 4/30/74.]

WAC 296-150A-440 The local enforcement agency responsibility. (1) The LEA shall not open for inspection any FBH-CS or component bearing an insignia to determine compliance with any codes or ordinances.

(2) Local enforcement agency officials shall not permit the installation of any factory-built housing and commercial structures that do not bear the department's insignia of approval. [Order 77-8, § 296-150A-440, filed 4/29/77; Order 74-15, § 296-150A-440, filed 4/30/74.]

WAC 296-150A-445 Manufacturer compliance control (M-CC). Under the M-CC program, inspection services are provided by the manufacturers in-plant personnel under department certification in accordance with the in-plant inspection procedure as audited by the department. An application, obtainable from the department, shall be submitted for the department's review.

The manufacturer shall come to a written agreement with the department concerning the compliance control procedures which he shall institute in his manufacturing facilities. This shall be documented in manual form which the manufacturer shall submit to the department for approval.

The manual shall include the compliance control procedures of the overall program and administrative procedures as they apply to the inspection functions.

In addition, the company shall designate a legally responsible officer or owner to be responsible for the compliance control program in his plant and who shall maintain records to substantiate that each manufactured unit or component has been inspected in accordance with the approved manual, and complies with the plans and technical report as approved by the department. Such officer or owner may appoint compliance control representative(s), which he has qualified according to the criteria agreed upon by the manufacturer and the department as outlined in the compliance control manual.

The issuance of insignia shall be conditioned on compliance with these regulations by the manufacturer and the findings resulting from the department's audit inspections.

If experience indicates that a manufacturer does not adequately maintain his own compliance control program in accordance with the rules and regulations of the department, the department shall require the manufacturer to revert to the FB-CC program as an interim until resolution is determined.

Approved compliance control manuals shall be evidenced by the department's stamp of approval. An approved copy shall be returned to the manufacturer and made available to the department's authorized representative upon request. Any revision to the manual requires

approval by the department prior to implementation. [Order 74-15, § 296-150A-445, filed 4/30/74.]

WAC 296-150A-450 Independent inspection agency compliance control (IIA-CC). Under the IIA-CC program inspection services are provided by an independent inspection agency as certified by the department in accordance with the in-plant inspection procedure as audited by the department. The IIA certification is subject to the following requirements:

(1) The IIA shall comply with the terms stated in WAC 296-150A-050.

(2) The IIA is to submit a separate application for each manufacturer. Applications are obtainable from the department. [Order 74-15, § 296-150A-450, filed 4/30/74.]

DESIGN PLANS

WAC 296-150A-500 Design plan approval—General. A design plan approval shall be obtained from the department for all production of factory-built housing and commercial structures which are subject to these rules and regulations. (See WAC 296-150A-710) [Order 77-8, § 296-150A-500, filed 4/29/77; Order 74-15, § 296-150A-500, filed 4/30/74.]

WAC 296-150A-505 Design plan approval application. Application to the department for design plan approval shall include:

(1) Completed application on forms obtainable from the department.

(2) Two completed sets of design plans, specifications, engineering and test results (where required).

(3) Design plan fees as required. [Order 74-15, § 296-150A-505, filed 4/30/74.]

WAC 296-150A-506 Design plan types and descriptions. (1) PROTOTYPE PLAN. The prototype plan is basically the module concept of a single width and length and of conventional construction. It allows design options however, the interchange of systems is limited. No singular system can be interchanged with another plan. All design options are required to be listed on the prototype plan application and only those listed options are allowed to be interchanged specific to that plan. Increase or decrease in length or width or change in structural spans will constitute a new prototype.

The prototype plan submittal may include as many design options as desired. Subsequent to the prototype plan approval, DO's may be added at any time by submitting application, plans and fees.

(2) SYSTEMS PLAN. The systems plan is a design concept that includes multiple module widths and lengths, various floor plans, roof loads, wind loads, heating systems, temperature differentials, etc. and provides flexibility to interchange the construction systems within the overall design plan.

The application is to be accompanied with a one hundred dollar ($100.00) deposit which will be credited against the ultimate fee in accordance with WAC 296-150A-700; department services.

(3) COMPONENTS. Components are primarily a performance oriented system of construction that offers a greater degree of interchangeability insofar as its performance limit allows. Products such as stressed skin panels and sandwich panels are an example. Plan examination fees shall be charged on an hourly basis in accordance with WAC 296-150A-700; department services.

(4) DESIGN OPTIONS. The design option constitutes any design change to an approved prototype or systems plan. The change becomes a part thereof to the original plan. Plan examination fees shall be charged on an hourly basis in accordance with WAC 296-150A-700; department services.

Examples of design options for prototype plans are: Floor plans, heating systems, roof live loads, wind loads, over crawl space, over basement and electrical ampacity of service panel.

Examples of prototype plan design changes that are not design options are: Additions or deletions in module lengths and widths, stacked units, duplex units, changes in occupancy groups and changes in structural spans. These types of design changes constitutes a new prototype plan.

Design changes to systems plans are also called design options. They are not limited to the examples described above and may be all inclusive of design changes, except; occupancy group changes (residential to commercial) are not allowed.

(5) CUSTOM BUILDING. The custom building plan submittal is a one-of-a-kind application utilizing a system(s) not currently approved by the department. It does not allow design options.

(6) RESUBMITTALS. A resubmittal applies to all design plans except custom buildings. Subsequent to plan examination and the issuance of the technical report specifying conditional approval, the applicant is required to revise the drawings and resubmit them to the department. The first resubmittal is required within ninety (90) days, the second (if necessary) within sixty (60) days and the third (if necessary) within thirty (30) days. Resubmittals may only contain the required corrections called out in the technical report. If resubmittals incorporate new design options or changes they must be considered as new submittals. [Order 77-15, § 296-150A-506, filed 8/19/77; Order 74-15, § 296-150A-506, filed 4/30/74.]

WAC 296-150A-510 Engineering and test procedures. (1) Where it is necessary to substantiate any structural design or method of construction, calculations engineering and supporting data, signed by a Washington licensed architect or professional engineer, shall be submitted to the department.

(2) The load-bearing capacity of elements or assemblies may be established either by calculations in accordance with generally established principles of engineering design, or by physical tests acceptable to the department. When the composition or configuration of

elements, assemblies or details of structural members are such that calculations of their safe load-carrying capacity, basic structural integrity or fire resistance cannot be accurately determined in accordance with generally established principles of engineering design, such structural properties or fire resistance of such members or assemblies may be established by the results of tests acceptable to the department.

(3) Tests shall be performed by a testing agency, acceptable to the department. Tests shall be directed, witnessed and evaluated by a licensed architect or professional engineer. Test procedures and results shall be reviewed and evaluated by a Washington licensed architect or professional engineer's evaluation of test results and recommendations, accompanied by test reports from the laboratory, shall be submitted to the department.

All test reports shall contain at least the following:

(a) A statement referencing the method-standards to which the test was conducted.

(b) A description of the item tested with drawings.

(c) A description of the test set-up.

(d) A description of the method of test procedure for loading and/or measuring each condition.

(e) All test data with graphs (where applicable) including pertinent observations of the characteristics and behavior of the item tested.

(f) Engineering, where applicable.

(g) Analysis, comments and conclusion. [Order 74-15, § 296-150A-510, filed 4/30/74.]

WAC 296-150A-515 Design plan requirements. (1) DESIGN APPROVAL: Plans submitted to the department for design approval shall be in duplicate and shall indicate every pertinent item necessary for the construction, assembly and installation of the unit. Such design plans shall include all necessary specifications, engineering and/or test results required for a complete evaluation of the design. Design calculations, specifications, engineering data and test results may be submitted separately from the actual drawings.

Design plans shall be drawn to scale and shall be on uniformly sized standard stock drawing sheets. The applicant shall submit prints of these drawings, as original drawings will not be accepted by the department. Specific design information requirements are obtainable from the department.

Each design submittal shall provide information on the cover sheet, or face sheet, to describe the design application, e.g., plan designation, design options, sheet numbers and titles, engineering, and/or test reports and related data. Also, provide space for the following department information: plan number, technical report number and approval date. Plans shall indicate where the department's insignia of approval will be affixed to the unit. All plans having three or more modules shall have a "key" drawing to show the arrangement of the modules.

Specifications, engineering, test reports and similar documents are to be bound. The plans are to note that the respective documents are a part of the submittal.

(2) PROTOTYPE PLANS. The prototype design is to include, but is not limited to, foundation plan, floor plan, elevations, section (transverse and/or longitudinal) and applicable details. Electrical; circuitry (other than lighting and convenience outlets in residential structure, providing there is no exchange of amperage) (and heating), panel schedule, load calculations. Plumbing; drain, waste and vent, and piping schematics. Heating; complete plans and details respective to type of heating system used and is to include a schedule specifying the temperature differentials for which the approval is requested. All design options listed in the plan application are to be included within the design submittal.

(3) SYSTEMS PLANS. A systems submittal will clearly define the structural spacial, ordinance, mechanical and electrical systems utilized in the structure and the limitations of flexibility under the systems. It will be supported by necessary plans, specifications, engineering and test results to fully explain the systems to the satisfaction of the department.

(4) COMPONENTS PLANS. The components plan application submittal shall include all design and engineering information necessary for evaluation of the system's performance and capabilities for its intended use.

(5) CUSTOM BUILDING. The design plan requirements for a custom building are the same as for prototype plan submittal with the exception that the extent of detail may be less. As an example the plumbing schematics and electrical panel schedule may not be required depending on the complexity or magnitude of the design. A plot plan of the installation location as described in WAC 296-150A-605 or descriptive information relative to the building site is required for custom building applications.

(6) DESIGN OPTIONS. Design changes to approved prototype plans may be submitted as a DO by filing application, plans and fees. The plan submittal for design options is to include only the design information relative to those portions that are changed by that option. A complete plan submittal is not required as all other design remains as shown on the original plan submittal.

(7) COMPONENTS REVISIONS. All design changes to approved components plans shall be submitted as a components revision with application, plans and fees.

(8) RESUBMITTALS. Design submittals requiring corrections are to be revised in accordance with the technical report and resubmitted within the required time period to the department for final approval. [Order 77-15, § 296-150A-515, filed 8/19/77; Order 74-15, § 296-150A-515, filed 4/30/74.]

WAC 296-150A-516 Technical report. Each design plan submitted by a manufacturer shall be plan examined to determine code compliance and a technical report shall be issued by the department. The technical report shall contain the manufacturer's name, date, report number, description of the product, documents submitted, listing of items requiring corrections for code compliance, the status and conditions of approval. The

technical report is issued to the manufacturer accompanied with one set of the submitted plans. [Order 74-15, § 296-150A-516, filed 4/30/74.]

WAC 296-150A-520 Live loads. Design for live loading shall be in accordance with the requirements of the uniform building code. Live loading for roofs shall be in accordance with Section 2305(d) SNOW LOADS, but in no case shall be less than twenty-five pounds per square foot. [Order 77-15, § 296-150A-520, filed 8/19/77; Order 74-15, § 296-150A-520, filed 4/30/74.]

WAC 296-150A-521 Plastic DWV piping. Plastic drain-waste-vent piping as specified in chapter 2 of the Uniform Plumbing Code shall be permitted for domestic sewage, as defined in the Uniform Plumbing Code, for residential occupancies groups R not over two (2) stories in height; and commercial structures not over two (2) stories in height or greater than 15,000 square feet excepting laundries, laundromats, cleaners, service stations, repair garages, restaurants, snack bars, hospitals, nursing homes, medical clinics, manufacturing plants, factories, assembly buildings, theatres, schools, or other buildings used for educational purposes, except; whenever it is determined that the DWV system will service only domestic sewage, plastic pipe may be used. [Order 77-15, § 296-150A-521, filed 8/19/77; Order 74-15, § 296-150A-521, filed 4/30/74.]

WAC 296-150A-525 Manufacturing in more than one location. New manufacturers submitting for the first time, having more than one plant location may obtain approval for each facility at the time of filing.

Listed manufacturers intending to produce at a new location or at an additional location shall provide written notice to the Department prior to production. The Department may require separate inspection programs for each location. [Order 74-15, § 296,150A-525, filed 4/30/74.]

WAC 296-150A-530 Out-of-state applicant. All out-of-state manufacturers producing factory-built housing and commercial structures for installation in the State of Washington shall obtain the Department's approval prior to production. Application, plans and fees shall be submitted to the Department and be processed in like manner as for all other applications pursuant to these rules and regulations.

Out-of-state manufacturers producing FBH-CS within states having reciprocity with Washington and having obtained that state's approval pursuant to WAC 296-150A-025 shall be accepted for installation in Washington pursuant to these rules and regulations and the conditions specified under the reciprocal agreement. [Order 77-8, § 296-150A-530, filed 4/29/77; Order 74-15, § 296-150A-530, filed 4/30/74.]

WAC 296-150A-535 Nonconforming application and plans. Should the application submittal not conform to the requirements of these Rules and Regulations, the applicant shall be notified in writing within ten (10) working days of the date they are received by the Department. Should the applicant fail to submit a completely corrected application in accordance with the information supplied by the Department within ninety (90) days of such notice, the application will be deemed abandoned and all fees submitted will be forfeited to the Department. Subsequent submission shall be as for a new application. [Order 74-15, § 296-150A-535, filed 4/30/74.]

WAC 296-150A-540 Manufacturers evidence of Department approval. Approved plans and specifications shall be evidenced by the Department's technical report of plan examination. An approved copy of the design plans and specifications shall be returned and retained at each place of manufacture. [Order 74-15, § 296-150A-540, filed 4/30/74.]

WAC 296-150A-545 Design plan approval expiration. Design plan approvals shall expire twelve (12) months from the date of Department approval.

It shall be the responsibility of the manufacturer to submit application for design plan renewal to the Department. Such application shall be submitted no later that two (2) months prior to the expiration date of the current approval.

Design plans may be renewed by submission of an Application for Plan Approval Renewal. Forms are obtainable from the Department (see WAC 296-150A-710). Applications shall be submitted with the appropriate renewal fees as designated in the fee schedule, WAC 296-150A-700. After expiration date, application for plan approval of any such expired approvals shall be processed as for a new application. Plan approval renewal is permitted only when the plans for the designated design are identical to those on file with the Department, except for required standard changes.

Insignia not assigned to a unit under construction prior to the date of expiration of plan approval are void and shall be returned to the Department. Nothing herein shall be construed to prohibit a manufacturer from submitting for a new plan approval for a plan which has been revoked. [Order 77-15, § 296-150A-545, filed 8/19/77; Order 74-15, § 296-150A-545, filed 4/30/74.]

WAC 296-150A-550 Revocation of approval. Revocation of a plan approval shall occur upon the failure of the manufacturer to comply with the provisions of these Rules and Regulations. [Order 74-15, § 296-150A-550, filed 4/30/74.]

WAC 296-150A-555 Changes to approved plans. (1) Where the manufacturer proposes to change any portion of his submitted design, or the Department's regulations are amended to necessitate such change, he shall be required to submit to the Department detailed design plans and data of such changes for plan examination and approval. Plans shall be accompanied by plan application form, obtainable from the Department, (see

WAC 296-150A-710) and the appropriate plan filing fee pursuant to the fee schedule of these rules and regulations.

(2) Where the manufacturer proposes changes to the compliance control manual three copies of such changes shall be submitted to the Department for approval accompanied by a change fee pursuant to the fee schedule in these rules and regulations. [Order 77-15, § 296-150A-555, filed 8/19/77; Order 74-15, § 296-150A-555, filed 4/30/74.]

WAC 296-150A-560 Transfer of approvals. Where there is a change of ownership of a manufacturing business having the Department's plan approval, or approvals to be utilized by another manufacturer, shall be considered as a new submittal requiring application, (see WAC 296-150A-710) plans, manuals, fees and a notarized statement of release of plans and manuals, signed by officers of each firm. [Order 77-15, § 296-150A-560, filed 8/19/77; Order 74-15, § 296-150A-560, filed 4/30/74.]

WAC 296-150A-565 Change of name or address. In the event of a change in the name or address of any manufacturer the manufacturer shall so notify the Department in writing within ten (10) days. [Order 74-15, § 296-150A-565, filed 4/30/74.]

WAC 296-150A-570 Discontinuance of manufacturer. When a manufacturer discontinues production of any plan carrying the Department's approval, the manufacturer shall immediately advise the Department of the date of such discontinuance and return all insignia allocated for such discontinued production. [Order 74-15, § 296-150A-570, filed 4/30/74.]

WAC 296-150A-575 Existing approvals. When amendment of these rules and regulations requires changes to a currently approved design or compliance control program the Department shall notify the manufacturer of such changes, and shall allow the manufacturer ninety (90) days from the date of such notification, or such additional time as the Department shall deem reasonable, in which to submit revisions for approval. [Order 74-15, § 296-150A-575, filed 4/30/74.]

WAC 296-150A-580 Compliance. Plan approval of each design of factory-built housing and commercial structures shall be contingent upon compliance with the requirements of these rules and regulations. The Department shall conduct inspections at the manufacturing plant to determine compliance with the approved plans. Noncompliance with the rules and regulations may cause revocation or suspension of plan approval and consequent denial of insignia pursuant to RCW 43.22-.490 as determined by the Department. [Order 77-15, § 296-150A-580, filed 8/19/77; Order 74-15, § 296-150A-580, filed 4/30/74.]

WAC 296-150A-585 Contingency. Requested inspections wherein the structure is not ready at the time of request shall constitute a contingency. Other examples include, but are not limited to the following; written corrections that are not completed prior to the next requested inspection and, repetitious written corrections for the same item. Fees shall be charged in accordance with WAC 296-150A-700(7). [Order 77-8, § 296-150A-585, filed 4/29/77.]

WAC 296-150A-590 Field erection. The building official referred to in subsection 5006(d) of the Uniform Building Code, shall be specifically understood to mean the local enforcement agency official which will be responsible for building site installations, except as modified by WAC 296-150A-420(5). [Order 74-15, § 296-150A-590, filed 4/30/74.]

WAC 296-150A-595 Proprietary material. All material submitted by the manufacturer in the form of design plans, engineering data, test results, compliance control manual and other design information relating to their application will be considered as confidential information and will not be released for public scrutiny except when so ordered by a court having jurisdiction. [Order 74-15, § 296-150A-595, filed 4/30/74.]

INSIGNIA

WAC 296-150A-600 Insignia——Insignia required. All factory-built housing and commercial structures or components manufactured separately for sale in Washington shall bear a Department insignia prior to leaving the manufacturing plant. Each insignia shall be assigned and affixed to a specific unit in a visible location as shown on the approved plans.

Assigned insignia are not transferrable and are void when not affixed as assigned. All such voided insignia shall be returned to, or may be confiscated by the Department. The insignia shall remain the property of the Department and may be reappropriated by the Department in the event of violation of the conditions of approval. Insignia shall be required on all units to be installed in the State of Washington.

Assigned insignia affixed in the field shall be under the direction of the Department's authorized agent. [Order 77-8, § 296-150A-600, filed 4/29/77; Order 74-15, § 296-150A-600, filed 4/30/74.]

WAC 296-150A-605 Application for insignia. With or subsequent to plan submittal, the manufacturer shall make application for an insignia for each unit manufactured as required by the previous section. The application shall be submitted to the Department's Seattle Office accompanied by the appropriate insignia fees and must be received prior to inspection.

All units having incomplete systems require the submittal of the notification to local enforcement agency form at the time insignia are applied for (see WAC 296-150A-710).

All insignia applications for other than one and two family dwellings shall be accompanied with a plot plan which shall include the fire zone and need only show the

location of the building on the property with dimensions to the property line and other buildings on the same site.

The exception to the required insignia as described in this section is applicable only to components pursuant to WAC 296-150A-685. [Order 77-15, § 296-150A-605, filed 8/19/77; Order 74-15, § 296-150A-605, filed 4/30/74.]

WAC 296-150A-606 Notification to local enforcement agency. The notification to local enforcement agency is a written communication of work to be completed at the site. The notification shall indicate the items of incompleteness in detail and all other related information as shown on the form. (Forms are available from the Department. See WAC 296-150A-710)

The Department upon receipt of the notification shall complete the latter and transmit it to the respective LEA of that jurisdiction wherein the unit is to be installed.

The manufacturer of the unit shall not be required to remedy damages or defects caused by on-site work by others not under his control. [Order 77-8, § 296-150A-606, filed 4/29/77; Order 74-15, § 296-150A-606, filed 4/30/74.]

WAC 296-150A-610 Alteration or conversion. No alteration or conversion of approved factory-built housing and commercial structure by a manufacturer or first user if applicable shall be allowed prior to site installation.

Any alteration or conversion affecting the structure, plumbing, heat-producing or electrical equipment for installation in a unit which bears or is required to bear an insignia shall void such approval and the insignia shall be returned to or be appropriated by the Department. [Order 77-8, § 296-150A-610, filed 4/29/77; Order 74-15, § 296-150A-610, filed 4/30/74.]

WAC 296-150A-615 Denial of insignia. Should inspection reveal that a manufacturer is not manufacturing units according to plans approved by the Department and such manufacturer, after having been served with a notice setting forth in what respect the provisions of the plan approval have been violated continues to manufacture units in violation of the plan approval applications for new insignia shall be denied and the insignia previously issued for units in violation of the plan approval shall be confiscated. Upon satisfactory proof of compliance such manufacturer may resubmit an Application for Insignia. [Order 74-15, § 296-150A-615, filed 4/30/74.]

WAC 296-150A-620 Insignia removal. In the event that any unit bearing the insignia is found to be in violation of the approved plans and applicable codes, the Department may remove the insignia and shall furnish the owner or his agent with a written statement of such violations.

The owner or his agent shall request an inspection after making corrections to bring the unit into compliance before the Department shall issue a replacement insignia. [Order 77-15, § 296-150A-620, filed 8/19/77; Order 74-15, § 296-150A-620, filed 4/30/74.]

WAC 296-150A-625 Lost or damaged insignia.

(1) When an Insignia of Approval becomes lost or damaged the Department shall be notified immediately in writing by the owner.

(2) All damaged insignia shall be promptly returned. Damaged and lost insignia shall, on payment of the replacement insignia fees as provided in the fee schedule of these rules and regulations, be replaced by the Department. [Order 74-15, § 296-150A-625, filed 4/30/74.]

WAC 296-150A-630 Custom building. Insignia for custom buildings constructed under the requirements of these rules and regulations shall have the Department insignia attached only after final inspection and approval of the construction of the unit. Such insignia shall be attached in the location as indicated on the approved drawings. [Order 74-15, § 296-150A-630, filed 4/30/74.]

WAC 296-150A-640 Unauthorized use. The Department will seek immediate and appropriate legal remedy for the unauthorized use of its insignia. [Order 74-15, § 296-150A-640, filed 4/30/74.]

WAC 296-150A-650 Unit identification. Each unit on the production line is required to have specific identification in the form of a unit serial number to assure continuity of inspections and the affixing of the insignia to the proper unit. [Order 74-15, § 296-150A-650, filed 4/30/74.]

COMPONENTS

WAC 296-150A-675 Components. The components concept constitutes a system or systems of either conventional or unconventional construction.

All manufacturing of components products shall be produced pursuant to these rules and regulations. [Order 74-15, § 296-150A-675, filed 4/30/74.]

WAC 296-150A-680 Components application. (See WAC 296-150A-710) The components application submittal shall include all design and engineering information necessary for evaluation of the system's performance and capabilities for its intended use. Each manufacturer of components products shall be required to submit a compliance control (M-CC) manual in accordance with WAC 296-150A-445. [Order 77-15, § 296-150A-680, filed 8/19/77; Order 74-15, § 296-150A-680, filed 4/30/74.]

WAC 296-150A-685 Components approval. The Department's approval will consist of a letter of authorization with accompanying technical report. Each component shall be identified with an insignia which shall

indicate the Department's approval. The insignia referred to in this section may be in lieu of the insignia prescribed in WAC 296–150A–600, and may be of different design. [Order 74–15, § 296–150A–685, filed 4/30/74.]

WAC 296–150A–690 Components testing. Subsequent to the Department's approval, an authorized Department agent shall conduct periodic unannounced visits at the plant to select at random product samples for testing by a testing agency at the manufacturer's expense. All tests shall be performed in accordance with these rules and regulations, WAC 296–150A–050 and WAC 296–150A–510(3). [Order 74–15, § 296–150A–690, filed 4/30/74.]

WAC 296–150A–695 Components fees and production reports. The fees for components manufacturers shall be based on production quantity, assessed at one percent of the gross dollar volume at the manufacturer's current production cost. Fees and production reports are to be submitted to the Department on a monthly basis. Each components manufacturer shall be required to obtain the services of a certified public accountant to certify the production records and fees as submitted to the Department. The certified public accountant's verification report shall be submitted to the Department at the end of each calendar year. [Order 77–8, § 296–150A–695, filed 4/29/77; Order 74–15, § 296–150A–695, filed 4/30/74.]

FEE SCHEDULE

WAC 296–150A–700 Fee schedule. Fees are nontransferable nor subject to refund.

(1) Filing Fee; Listed Manufacturers	$ 25.00
(2) Reciprocal Fees:	
(a) Filing Fee; Listed Reciprocal Manufacturers	25.00
(b) Insignia, Each commercial structure or dwelling unit	10.00
(3) Department Services:	
(a) Technical & Inspection: Per Man–Hour (Minimum)	20.00
Per Man–Half Hour or Fraction Thereof	10.00
(4) Travel Fees: (Not applicable to routine in–state inspections)	
(a) Surface Travel, Mileage Fee; Per Mile	.15
(b) Surface Travel, Time Fee; Per Mile	.40
(c) Air Travel, Based on Published Air Fare	Cost
(d) Air Travel Time, Hourly Charge in Accordance with Department Services Based on Radius Miles from Seattle, Washington:	
First 400 Miles	2 Hours
Ea. Additional 200 Miles up to 1200 miles	1 Hour
Ea. Additional 400 Miles over 1200 miles	2 Hours

(5) Reimbursables: Reimbursables include, but are not limited to travel fees, car rental, parking lot charges and personnel expenses (per diem) for food and lodging consistent with allowances established by the Central Budget Agency for the State of Washington. Reimbursables do not include technical and inspection services.

(6) Out–of–State Fees: Fees for out–of–state manufacturers shall be the same as for in–state manufacturers plus reimbursables.

(7) Design Plan Fees:

(a) Prototype Plans	
Structural	200.00
Ordinance	50.00
Plumbing	50.00
Electrical	50.00
Heating	50.00
Air Conditioning	50.00
Design Options, Submitted with Prototype, Each	50.00
Annual Renewal; 25% of Initial Plan Fee	25%
(b) Design Options: Alternates: Submitted subsequent to the prototype plan submittal shall be plan examined on an hourly basis per Department services.	20.00/Hr.
(c) Systems Plans	
Deposit Submitted with Application	100.00
Evaluation per Department Services	20.00/Hr.
(d) Custom Building Plan Fees: Ea. 100 sq.ft.	10.00
Minimum Each Plan	60.00
Ea. Additional Issuance:	
Within One Year, 50% of Original Fee	50%
Beyond One Year, 100% of Original Fee	100%
(e) Components Plan Fees & Revisions: Department Services, Per Hour	20.00/Hr.
(f) Components Production Fees (See WAC 296–150A–695)	
(g) Design Resubmittals:	
First Resubmittal, No Charge	NC
Ea. Additional Resubmittal 50% of Initial Fee	50%

(h) Expired or Revoked Plan Fees:	
Same as for New Submittal.....	100%
(i) Transfer of Design Plan Approvals:	
Prototype, Components & Custom	100.00
Building Plans	
(j) Contingency Fee	20.00
(8) Compliance Control Programs:	
(a) Local Enforcement Agency (LEA-CC) Evaluation	N.C.
Annual Renewal	N.C.
(b) Manufacturer (M-CC) and Independent Inspection Agency (IIA-CC):	
Evaluation Program	250.00
Each Resubmittal	100.00
Revisions, Each Page	10.00
Annual Program Renewal	50.00
Transfer of Program Approval ..	125.00
(9) Insignia Fees:	
First Module Per Single Structure.....	100.00
Each Additional Module	10.00
Each Core Unit	50.00
Components, See WAC 296-150A-695	
Notification to Local Enforcement Agency, Each	10.00
Reissuance of Insignia, Each ...	25.00

[Order 77-8, § 296-150A-700, filed 4/29/77; Order 74-15, § 296-150A-700, filed 4/30/74.]

WAC 296-150A-710 Department application forms. Application forms obtainable from the department are listed below by the form title and the department of labor and industries form number.

Request for inspection	LI-623-1
Inspection, plant-field record	LI-623-4
Application for plan approval	LI-623-11
Prototype plan	
Design option	
Systems plan	
Application for design plan renewal ..	LI-623-12
Prototype plan	
Systems plan	
Component plan	
Notification to local enforcement agency	LI-623-13
Application for official insignia of approval.....	LI-623-14
Application for component plan approval.....	LI-623-15
Compliance control program application for certification	LI-623-16
Application for custom plan approval ...	(Letter)

[Order 77-15, § 296-150A-710, filed 8/19/77.]

HEARINGS

WAC 296-150A-800 Hearings——Public hearing. Any public hearing relating to any code, standards, or regulations relating to Chapter 157 or modifications considered for adoption by the Department shall comply with the requirements of the A.P.A. for the State of Washington. [Order 74-15, § 296-150A-800, filed 4/30/74.]

WAC 296-150A-805 Board of appeals. In cases where the interpretation of the applicable code and application of the standards, rules and regulations herein prescribed as in dispute, or in doubt, the Board of Appeals hereinafter provided for shall, upon application of any interested person, firm or corporation, determine the methods of construction, installation and/or material, device, appliances or equipment to be used in the particular case submitted for its decision.

In case any decision under this Chapter is required by a Board of Appeals, the Director of Labor and Industries shall designate and appoint such Board which shall consist of six members who are qualified by experience and training to pass upon matters pertaining to the construction of factory-built housing and commercial structures. Such appointments to be confirmed by the Factory-Built Housing and Commercial Structures Advisory Board. The building official shall be an ex-officio member and shall act as Secretary of the Board. In case of inability of any member appointed to act in any matter, the Director of Labor and Industries shall appoint some other person qualified under this Chapter in the place of such person. A majority of the members of such Board shall constitute a quorum to transact any business or decide any matters submitted to such Board; and decisions and rulings of the Board shall be made by majority vote of the Appeals Board members present. The decision of the Board in all matters submitted to it shall be final, conclusive, and binding on all parties. The Board shall adopt reasonable rules and regulations for conducting its investigations and shall render all decision and findings in writing to the building official with a duplicate copy to the appellant. Each member of the Board shall be paid while in session a per diem of $25.00 and shall receive in addition thereto necessary traveling expenses which per diem and expenses shall be paid out of the deposit required in case of an appeal; or if such deposit be returned to the appellant as herein provided, or be insufficient for that purpose, such per diem and expenses shall be paid out of the budget of the Factory-Built Housing and Commercial Structures Section, upon vouchers approved by the Director of Labor and Industries.

Any person, firm or corporation desiring a ruling or decision of the Board of Appeals on any question of interpretation of the rules, regulations and standards, or proper application of the rules, regulations and standards prescribed by this Chapter shall, in writing, notify the Director of Labor and Industries of such desire and shall accompany the notice with a certified check payable to the Director of Labor and Industries in the sum

of $150.00; such notice shall specify the ruling or interpretation desired and the contention of such person, firm or corporation as to the proper interpretation or application on the question on which a ruling or decision is desired; and in event the Board of Appeals shall determine that the contention of the applicant for decision or ruling was proper, the certified check shall be returned to such applicant; otherwise the same shall be used insofar as necessary in paying the expenses and per diem of the members of the Board of Appeals in connection with such matter; and any portion of said $150.00 not used in paying the per diem and expenses of said Board in said case shall, by the Director of Labor and Industries, be paid into the Factory-Built Housing-Commercial Structures fund. [Order 77-8, § 296-150A-805, filed 4/29/77; Order 74-15, § 296-150A-805, filed 4/30/74.]

GOVERNOR'S ADVISORY BOARD ADMINISTRATIVE RULES

WAC 296-150A-815 Foreward. The Factory-Built Housing-Commercial Structures Law, chapter 43.22 RCW, establishes the Governor appointed Factory-Built Housing and Commercial Structures Advisory Board and fixes its administrative responsibilities. The Advisory Board's principle function is to assist the Director of Labor and Industries in adopting and promulgating reasonable rules and regulations in furtherance of health, safety and property by assuring that all factory-built housing and commercial structures are structurally sound and that the plumbing, heating, electrical and other components thereof are reasonably safe. It is understood that WAC 296-150A-805 contains the procedure for the appointment of a Board of Appeals by the Director of Labor and Industries which may include individual members of the Factory-Built Housing and Commercial Structures Advisory Board. However, the Advisory Board itself will not function as a Board of Appeals nor will it render decisions concerning the application or interpretation of any adopted rules and regulations to any person, firm or corporation engaged in the business of constructing factory-built and commercial structures.

The primary purpose of the following rules is to provide a uniform procedure whereby persons, firms or corporations interested in communicating with the Department of Labor & Industries on any subject matter relative to rules or regulations which should be adopted, amended or repealed for factory-built housing and commercial structures in the State of Washington, or relative to the operation of the Factory-Built Housing-Commercial Structures Section of such department may be heard. [Order 74-15, § 296-150A-815, filed 4/30/74.]

WAC 296-150A-820 Definitions. Whenever used in these rules, the words:

BOARD: shall mean the Washington State Factory-Built Housing and Commercial Structures Advisory Board appointed by the Governor pursuant to our RCW 43.22.475.

DEPARTMENT: shall mean the Department of Labor and Industries of the State of Washington.

DIRECTOR: shall mean the Director of the Department of Labor and Industries.

REGULAR MEETING: shall mean the quarterly meetings heldby the Board on the third Thursday of the first month of each calendar quarter, being January, April, July and October.

SPECIAL MEETING: shall mean any meeting of the Board called by the Chairman thereof or the Director and held at times other than the regular meetings. [Order 74-15, § 296-150A-820, filed 4/30/74.]

WAC 296-150A-825 Officers. The officers shall consist of the Chairman, Vice-Chairman, and Secretary of the Board. The Chairman shall serve a one-year term, and shall have previously served as Vice-Chairman of the Board. In the event that a previous Vice-Chairman is not available to serve as Chairman the rules will be suspended and a special election held to fill the office of Chairman from the membership of the Board. The Building Official shall serve as an ex officio member and shall act as Secretary of the Board. [Order 74-15, § 296-150A-825, filed 4/30/74.]

WAC 296-150A-830 Internal management. The Board shall adopt written rules of procedure for its internal management which shall include "Roberts Rules or Order, revised", copies of which rules of procedure shall be made available to interested persons on written request. [Order 74-15, § 296-150A-830, filed 4/30/74.]

WAC 296-150A-835 Duties. 1. The Board shall study proposed rules and regulations submitted to it by the Director or by the Factory-Built Housing-Commercial Structures Section of the Department and shall make recommendations to the Director concerning their adoption and promulgation.

2. The Board shall further develop and submit for consideration to the Director administrative procedures, organizational plans and rules relating to improving the functions of the Factory-Built Housing-Commercial Structures Section.

3. The Board shall at each regular or special meeting consider any written proposals made by any persons, firms or corporations for new rules or regulations or for amendments to or repeal of existing Factory-Built Housing-Commercial Structures rules or regulations, or for changes in administrative procedures of the Factory-Built Housing-Commercial Structures Section provided such proposals are submitted in writing to the Secretary of the Board at least fifteen (15) days prior to any such meeting so that the same may be properly included on the agenda for such a meeting. [Order 74-15, § 296-150A-835, filed 4/30/74.]

WAC 296-150A-840 Hearings. Any person, firm or corporation desiring to be heard on any subject matter

relative to rules or regulations which should be adopted, amended or repealed for Factory–Built Housing and Commercial Structures construction in the State of Washington, or relative to the operation of the Factory–Built Housing–Commercial Structures Section of such department at any regular meeting of the Board shall present a written request to that effect to the Secretary of the Board at least fifteen (15) days prior to the next regular meeting, setting forth a summary of any and all proposals on which the hearing is requested. [Order 74–15, § 296–150A–840, filed 4/30/74.]

WAC 296–150A–845 Appearance and practice before the board. No person may appear in a representative capacity before the Board other than the following:

1. Attorneys–at–law duly qualified and entitled to practice before the Supreme Court of the State of Washington.

2. Attorneys–at–law duly qualified and entitled to practice before the highest court of record of any other state, if the attorneys–at–law of the State of Washington are permitted to appear in a representative capacity before administrative agencies of such other state, and if not otherwise prohibited by Washington State Law.

3. A bonafide owner, officer, partner, or full–time employee of an individual, firm, association, organization, partnership or corporation who appears for such individual, firm, association, organization, partnership or corporation, or a person (other than an attorney–at–law as provided in sub–paragraph 1 and 2 above) appointed in writing to represent an individual, firm, association, organization, partnership or corporation. [Order 74–15, § 296–150A–845, filed 4/30/74.]

WAC 296–150A–850 Solicitation of business unethical. It shall be unethical for persons acting in a representative capacity before the Board to solicit business by circulars, advertisements, or by personal communication or interviews not warranted by personal relations, provided that such representatives may publish or circulate business cards. It is equally unethical to procure business by solicitors of any kind. [Order 74–15, § 296–150A–850, filed 4/30/74.]

WAC 296–150A–855 Standards of ethical conduct. All persons appearing in proceedings before the Board in a representative capacity shall conform to the standards of ethical conduct required of attorneys before the courts of Washington. If any such person does not conform to such standards, the Board may decline to permit such person to appear in a representative capacity in any proceeding before the Board. [Order 74–15, § 296–150A–855, filed 4/30/74.]

WAC 296–150A–860 Appearance by former employee. No former employee of the Board or member of the Attorney General's staff may at any time after severing his employment with the Board or the Attorney General appear, except with the written permission of the Board in a representative capacity on behalf of other parties in any proceeding wherein he previously took an active part as a representative of the Board. [Order 74–15, § 296–150A–860, filed 4/30/74.]

WAC 296–150A–865 Former employee as expert witness. No former employee of the Board shall at any time after severing his employment with the Board appear, except with the written permission of the Board, as an expert witness on behalf of other parties in any proceeding wherein he previously took an active part in the investigation as representative of the Board. [Order 74–15, § 296–150A–865, filed 4/30/74.]

WAC 296–150A–870 Computation of time. In computing any period of time prescribed or allowed by the Board rules, by order of the Board or by any applicable statute, the day of the act, event, or default after which the designated period of time begins to run is not to be included. The last day of the period so computed is to be included. [Order 74–15, § 296–150A–870, filed 4/30/74.]

WAC 296–150A–875 Administrative procedures act. All proceedings regarding supplemental rules and regulations shall comply, where applicable, with the provisions of the administrative procedures act chapter 34.04 RCW, and any amendments thereto. [Order 74–15, § 296–150A–875, filed 4/30/74.]

Chapter 296–155 WAC
SAFETY STANDARDS FOR CONSTRUCTION WORK

Subchapters

Part A General safety and health provisions.
(WAC 296–155–001 through 296–155–040)

Part B Occupational health and environmental control.
(WAC 296–155–100 through 296–155–170)

Part C Personal protective and life saving equipment.
(WAC 296–155–200 through 296–155–240)

Part D Fire protection and prevention.
(WAC 296–155–250 through 296–155–280)

Part E Signs, signals, and barricades.
(WAC 296–155–300 through 296–155–315)

Part F Material handling, storage, use and disposal.
(WAC 296–155–325 through 296–155–34920)

Part G Tools—Hand and power.
(WAC 296–155–350 through 296–155–375)

Part H Welding and cutting.
(WAC 296–155–400 through 296–155–420)

Part I Electrical.
(WAC 296–155–425 through 296–155–455)

Part J Ladders and scaffolding.
(WAC 296–155–475 through 296–155–48519)

Part K Floor and wall openings and stairways.
(WAC 296–155–500 through 296–155–510)

Part L Cranes, derricks, hoists, elevators, and conveyors.
(WAC 296–155–525 through 296–155–59920)

Part M Motor vehicles, mechanized equipment, and marine operations.
(WAC 296–155–600 through 296–155–630)

Part N Excavation, trenching, and shoring.
(WAC 296–155–650 through 296–155–66505)

Part O Concrete, concrete forms and shoring.
(WAC 296–155–675 through 296–155–695)

Part P Steel erection.
(WAC 296–155–700 through 296–155–720)

Part Q Tunnels and shafts, caissons, cofferdams, and compressed air.
(WAC 296-155-725 through 296-155-74501)
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Reviser's Note: Chapter 296-40 WAC entitled "Safety standards—Construction work," were repealed by Order 74-26, filed May 7, 1974 upon the effective date of this chapter also filed by Order 74-26, on May 7, 1974. The effective date of this order is hereby declared to be June 6, 1974.

Part A
GENERAL SAFETY AND HEALTH PROVISIONS

WAC
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WAC 296-155-001 Foreword. (1) This chapter has been compiled with the purpose of consolidating all Division of Industrial 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 Division of Industrial Safety and Health is incorporating many of the pre-existing construction 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. [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 numerology appearing after the chapter designation appears in either a three digit or a five digit format (e.g. 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), (bb), (cc), 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	(aa) (bb)

[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, 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) When a provision of this chapter conflicts with a provision of any chapter of another vertical safety standard applying to the employers' specific type of work place, the provision of the vertical safety standard of specific application shall prevail. 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. [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 Bureau of Mines, 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. [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 296-155-010 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 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. 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 duly authorized representative, the Supervisor of Safety, Division of Industrial Safety and Health, Department of Labor and Industries, Olympia, Washington. [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.

(1) "Approved" means approved by the Director of the Department of Labor and Industries or his 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.

(2) "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.

(3) "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.

(4) "Confined or enclosed space" means any space having a limited means of egress, which is subject to the accumulation of toxic or flammable contaminants or has an oxygen deficient atmosphere. Confined or enclosed spaces include, but are not limited to, storage tanks, process vessels, bins, boilers, ventilation or exhaust ducts, sewers, underground utility vaults, tunnels, pipelines, and open top spaces more than 4 feet in depth such as pits, tubs, vaults, and vessels.

(5) "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.

(6) "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.

(7) "Department" means the Department of Labor and Industries.

(8) "Designated person" means "authorized person" as defined in subsection (2) of this section.

(9) "Director" means the Director of the Department of Labor and Industries, or his designated representative.

(10) "Division" means the Division of Industrial Safety and Health of the Department.

(11) "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.

(12) "Equipment" means all machinery, devices, tools, facilities, safeguards, and protective construction used in connection with construction operations.

(13) "Hazard" means that condition, potential or inherent, which is likely to cause injury, death, or occupational disease.

(14) "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.

(15) "Maintenance" means the work of keeping a building, machine, roadway, etc., in a state of good repair.

(16) "Part" means a major division, of this chapter, relating to a specific topic or topics and containing various sections, subsections, etc.

(17) "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 his ability to solve or resolve problems relating to the subject matter, the work, or the project.

(18) "Repair" means to restore a building, machine, roadway, etc., to an original state after damage or decay.

(19) "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.

(20) "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.

(21) "Shall" means that the provision(s) of the standard are mandatory.

(22) "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.

(23) "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 Industrial Safety and Health.

(24) "Suitable" means that which fits, or has the qualities or qualifications to meet a given purpose, occasion, condition, function, or circumstance.

(25) "Supervisor" means the Supervisor of the Division of Industrial Safety and Health.

(26) "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.

(27) "Workmen", "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 his 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 his personal labor for an employer whether by manual labor or otherwise.

(28) "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.

(29) Abbreviations used in this chapter:

(a) "ANSI" means American National Standards Institute.

(b) "API" means American Petroleum Institute.

(c) "ASA" means American Standards Association.

(d) "ASAE" means American Society of Agricultural Engineers.

(e) "ASHRE" means American Society of Heating and Refrigeration Engineers.

(f) "ASME" means American Society of Mechanical Engineers.

(g) "ASTM" means American Society of Testing and Materials.

(h) "AWS" means American Welding Society.

(i) "BTU" means British Thermal Unit.

(j) "BTUH" means British Thermal Unit per Hour.

(k) "CFM" means Cubic Feet per Minute.

(l) "CFR" means Code of Federal Register.

(m) "CGA" means Compressed Gas Association.

(n) "CIE" means Commission Internationale de l' Eclairage.

(o) "DOT" means Department of Transportation.

(p) "FRP" means Fiberglass Reinforced Plastic.

(q) "GPM" means Gallons Per Minute.

(r) "ICC" means Interstate Commerce Commission.

(s) "ID" means Inside Diameter.

(t) "LPG" means Liquefied Petroleum Gas.

(30) Additional abbreviations used in this chapter:

(a) "MCA" means Manufacturing Chemist Association.

(b) "NBFU" means National Board of Fire Underwriters.

(c) "NEMA" means National Electrical Manufacturing Association.

(d) "NFPA" means National Fire Protection Association.

(e) "NTP" means Normal Temperature and Pressure.

(f) "OD" means Outside Diameter.

(g) "PSI" means Pounds per Square Inch.

(h) "PSIA" means Pounds per Square Inch Absolute.

(i) "PSIG" means Pounds per Square Inch Gauge.

(j) "RMA" means Rubber Manufacturers Association.

(k) "SAE" means Society of Automotive Engineers.

(l) "TFI" means The Fertilizer Institute.

(m) "TSC" means Trailer Standard Code.

(n) "UL" means Underwriters' Laboratories, Inc.

(o) "USASI" means United States of America Standards Institute.

(p) "USC" means United States Code.

(q) "USCG" means United States Coast Guard.

(r) "WAC" means Washington Administrative Code.

(s) "WISHA" means Washington Industrial Safety and Health Act of 1973. [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 through the Division of Industrial Safety and Health or by statute. Refer to WAC 296-155-100 through 296-155-135 for additional requirements. [Order 74-26, § 296-155-015, filed 5/7/74, effective 6/6/74.]

WAC 296-155-020 Housekeeping. (1) During the course of construction, alteration, or repairs, form and scrap lumber with protruding nails, and all other debris, shall be kept cleared from work areas, passageways, and stairs, in and around buildings or other structures.

(2) Combustible scrap and debris shall be removed at regular intervals during the course of construction. Safe means shall be provided to facilitate such removal.

(3) Containers shall be provided for the collection and separation of waste, trash, oily and used rags, and other refuse. Containers used for garbage and other oily, flammable, or hazardous wastes, such as caustics, acids, harmful dusts, etc., shall be equipped with covers. Garbage and other waste shall be disposed of at frequent and regular intervals. [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) Loose or ragged clothing, scarfs or ties shall not be worn while working around moving machinery.

(5) When it is necessary for employees to work above other employees, those working underneath shall be notified, and when employees are put to work underneath other employees, those working overhead shall be notified.

(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. [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 of his employees a place of employment free from recognized hazards that are causing or likely to cause serious injury or death to his 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 every thing 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 every thing 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 himself, in such employment, or place of employment.

(d) Fail or neglect to do every thing 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. [Order 74-26, § 296-155-040, filed 5/7/74, effective 6/6/74.]

Part B
OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL

WAC

296-155-100 Management's responsibility.
296-155-105 Employee's responsibility.
296-155-110 Accident prevention program.
296-155-115 Safety bulletin board.
296-155-120 First-aid training and certification.
296-155-125 First-aid kit.
296-155-130 First-aid station.
296-155-135 First-aid room.
296-155-140 Sanitation.
296-155-145 Occupational noise exposure.
296-155-150 Ionizing radiation.
296-155-155 Nonionizing radiation.
296-155-160 Gases, vapors, fumes, dusts, and mists.
296-155-165 Illumination.
296-155-170 Ventilation.

WAC 296-155-100 Management's responsibility. (1) It shall be the responsibility of management to establish and supervise:

(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.

(d) A system for reporting and recording accidents that will fulfill requirements of chapter 296-27 WAC.

(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)(a) All employees required to enter into confined or enclosed spaces shall be instructed as to the nature of the hazards involved, the necessary precautions to be taken, and in the use of protective and emergency equipment required. The employer shall comply with any specific regulations that apply to work in dangerous or potentially dangerous areas.

(b) For purposes of subdivision (a) of this subdivision, "confined or enclosed space" means any space having a limited means of egress, which is subject to the accumulation of toxic or flammable contaminants or has an oxygen deficient atmosphere. Confined or enclosed spaces include, but are not limited to, storage tanks, process vessels, bins, boilers, ventilation or exhaust ducts, sewers, underground utility vaults, tunnels, pipelines, and open top spaces more than 4 feet in depth such as pits, tubs, vaults, and vessels. [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) An accident prevention program, wherein there is equitable management-employee participation, shall be established in all establishments, industrial plants, or operations.

(2) It shall be the responsibility of the employer to initiate and maintain such accident prevention programs as may be necessary to comply with this part. The Division may be contacted for assistance in initiating and maintaining an effective accident prevention program.

(3) All accident prevention programs shall be tailored to the needs of the particular operation.

(4) Employer and employee representatives, as elected, delegated or appointed, shall attend and actively

take part in frequent and regular safety committee meetings.

(5) Accident prevention programs shall provide for employer–employee safety meetings and frequent and regular safety inspections of jobsites, materials, equipment, and operating procedures.

(6) Frequency of safety meetings and safety inspections shall be determined by the employer.

(7) Safety inspections shall be administered by competent personnel as designated by the employer.

(8) A record of safety activities, such as inspections and meetings, shall be maintained by the employer for a period covering the previous twelve months and shall be made available, upon request, to non–compliance representatives of the Department. [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. The purpose of this section is to assure that all employees of this state can be afforded quick and effective first–aid attention in the event that an injury occurs on the job. The means of achieving this purpose is to assure the presence of personnel trained in first–aid procedures at or near those places where employees are working. Compliance with the provisions of this section may require the presence of more than one first–aid trained person.

(1) From the Revised Code of Washington (RCW 51.36.030) "Every employer . . . shall cooperate with the department in training one or more employees in first aid to the injured."

(2) There shall be present or available at all work sites, at all times, a person or persons holding a valid certificate of first aid training from the Department of Labor and Industries, U.S. Bureau of Mines, the American Red Cross, or equivalent training that can be verified by documentary evidence. (A valid first aid certificate is one which is less than three years old.)

(3) Compliance with the requirements of subsection (2) of this section may be achieved as follows:

(a) All foremen, supervisors, or persons in direct charge of crews working in physically dispersed operations, shall have a valid first–aid certificate; provided: that if the duties or work of the foreman, supervisor or person in direct charge of a crew, is absent from the crew, another person holding a valid first–aid certificate shall be present. For the purposes of this section, a crew shall mean a group of two or more employees working at a work site separate and remote from the main office or fixed work place (such as occurs in construction, logging, etc.)

(b) In fixed establishments, all foremen, supervisors, or persons in direct charge of a group or groups of employees shall have a valid first–aid certificate; provided: that in fixed establishments where the foreman, supervisor, or person in charge has duties which require his absence from the work site of the group, another person holding a valid first–aid certificate shall be present or available to the group.

NOTE: In emergencies, foremen will be permitted to work up to 30 days without having the required certificate, providing an employee in the crew or another foreman in the immediate work area has the necessary certificate.

(c) In fixed establishments organized into distinct departments or equivalent organizational units such as department stores, large company offices, etc., a person or persons holding the valid first–aid certificate shall be available at all times employees are working within that department.

(d) In small businesses, offices or similar types of fixed workplaces, compliance with the requirements of subsection (2) of this section may be achieved by having a number of such small businesses, offices, etc., combined into a single unit for the purpose of assuring the continued presence or availability of a person or persons holding a valid first–aid training certificate.

A plan for combining a number of small businesses etc., into such a group shall be submitted to the Safety Education Section of the Division of Industrial Safety and Health for approval. That section is also available for assisting employers who wish to develop such a plan. Criteria for approval by the Division include:

(i) The businesses within the group must not be widely dispersed;

(ii) The person or persons holding the first–aid certificates, their usual places of work, their work phone numbers, and other appropriate information shall be posted in each establishment which is a member of the group, in a place which can reasonably be expected to give notice to employees of that establishment:

(iii) First–aid kits must be available as required by WAC 296–24–065, of the General Safety and Health Standards.

(7) Those employers who believe that establishments for which they are responsible are proximate enough to a fixed location of professional medical services, such as a hospital, clinic, etc. and wish to be exempted from the requirements of this section, may apply to the department for a variance from these provisions according to RCW 49.17.080, 49.17.090, and the General Safety and Health Standards WAC 296–24–010.

(8) Industrial first–aid course instructors will, upon request, be furnished by the Division of Industrial Safety and Health, Department of Labor and Industries.

(9) A basic first–aid course recognized by the Division of Industrial Safety and Health, Department of Labor and Industries requires instruction involving student participation in exercises involving the following:

Bleeding control and bandaging.

Practical methods of artificial respiration, including mouth to mouth and mouth to nose resuscitation.
Closed Chest Massage.
Burns, scalds.
Sunstroke, heat exhaustion.
Frostbite, freezing.
Strains, sprains, hernias.
Fractures, dislocations.
Proper transportation of injured.
Bites, stings.

Subjects covering specific health hazards likely to be encountered by co-workers of first-aid students enrolled in the course. [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 Division of Industrial Safety and Health, 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 first-aid kit.

(4) All crew vehicles used for transporting workers shall be equipped with not less than a ten package 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 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 or [of] 15 oz. cotton cloth or its equivalent.

**First-aid kits shall be maintained at the ten (10), sixteen (16), twenty-four (24) or thirty-six (36) 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, the phone numbers of available doctors, hospitals, and ambulance services within the district of the worksite.

(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 (2) wool blankets or two (2) fire retardent blankets, capable of supporting 250 pounds each, and a stretcher shall be available in addition to first-aid kits. [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 located as close as practicable to the highest concentration of personnel.

(2) First-aid stations shall be well marked and available to personnel during all working hours.

(3) One person holding a valid first-aid certificate shall be responsible for the proper use and maintenance of the first-aid station.

(4) 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.

(5) When required by the Department, the station shall be equipped with two wool blankets, or two fire retardent blankets capable of supporting 250 pounds each, and a stretcher in addition to first-aid kits.

(6) 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. [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 oftener as conditions require.

(2) Nonpotable Water. (a) Outlets for nonpotable water such as water for industrial or firefighting 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 and a system furnishing nonpotable water.

(3) Toilets at Construction Jobsites. (a) Toilets shall be provided for employees according to the following table:

TABLE B-1

Number of Employees	Minimum Number of Facilities
1 – 20	1 toilet seat and 1 urinal
21 – 60	2 toilet seats and 2 urinals
61 – 70	3 toilet seats and 3 urinals
71 – 120	4 toilet seats and 4 urinals
121 – 150	5 toilet seats and 5 urinals
151 – 180	
Over 180	1 toilet seat and 1 urinal for each additional 40 employee or any fraction thereof.

NOTE: The prime contractor shall ensure the above toilet requirements are met.

(b) Under temporary field conditions not covered by subdivision (c) or (d) of this subsection, provisions shall be made to assure not less than one toilet facility is available.

(c) Job sites, not provided with a sanitary sewer, shall be provided with one of the following toilet facilities unless prohibited by local codes:

(i) Privies (where their use will not contaminate ground or surface water), for specifications refer to the General Safety and Health Standards, WAC 296-24-13003;

(ii) Caustic chemical toilets, for specifications refer to the General Safety and Health Standards WAC 296-24-13005;

(iii) Recirculating toilets, for specifications refer to the General Safety and Health Standards WAC 296-24-13011;

(iv) Combustion toilets, for specifications refer to the General Safety and Health Standards WAC 296-24-13009;

(v) Non caustic chemical toilets, the following specifications shall pertain:

(A) A non-caustic chemical toilet shall be a self-contained unit equipped with a waste receiving chemical holding container.

(B) Rooms, buildings, or shelters housing non-caustic chemical toilets shall be of sound construction and easy to clean, and shall provide shelter and privacy. The toilet rooms shall be ventilated to the outside and adequately lighted, and all openings into the toilet room shall be covered with 16-mesh screen.

(C) Non-caustic chemical toilets shall be serviced on a regular schedule. Servicing shall include the use of a disinfectant for cleaning urinal and seat, removing waste from container, recharging container with an odor controlling chemical and installing an adequate supply of toilet tissue.

(D) Service must 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.

(E) Toilets shall be furnished on every third floor of multi-story worksites and shall be furnished to be within 200 feet horizontally of all employees.

(F) Portable containers for high-rise, tunnel or other non-accessible work areas. A complete unit, i.e. seats and urinal with waste container should conform to regular unit standards except an enclosure is not required where an adequate shield or enclosure is provided in which the unit may be placed. The unit shall be returned to a convenient location on ground level in order to be serviced by a servicing company.

(G) Waste containers shall be fabricated from impervious materials, e.g. plastic, steel, fiberglass or their equal. Containers shall be water tight and capable of containing the chemical waste in a sanitary manner and 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 regular schedule for servicing.

(H) Removal of waste shall be handled in a clean and sanitary manner by means of a vacuum hose and received by a leakproof tank truck. All valves on the tank shall be leak-proof.

(I) Provisions shall be made so service trucks have a clear approach and convenient access to the toilets which are to be serviced.

(J) Disposal of waste from tank trucks must 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 district shall provide sewage disposal locations and facilities which are adequate and convenient for duly authorized toilet service organizations.

(d) The requirements of this section for sanitation facilities shall not apply to mobile crews having transportation readily available to nearby toilet facilities.

(4) 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.

(5) Temporary Sleeping Quarters. When temporary sleeping quarters are provided, they shall be heated, ventilated, and lighted.

(6) Washing Facilities. The employer shall provide adequate washing facilities for employees engaged in the application of paints, coating, herbicides, or insecticides, or in other operations where contaminants may be harmful to the employees. Such facilities shall be in near proximity to the worksite and shall be so equipped as to enable employees to remove such substances. [Order 74-26, § 296-155-140, filed 5/7/74, effective 6/6/74.]

WAC 296-155-145 Occupational noise exposure. (1) Employees shall be protected against the effects of exposure to noise which exceeds the permissible noise exposure shown in Table 7 of this section.

(2) Threshold Limit Values. These threshold limit values refer to sound pressure levels that represent conditions under which it is believed that nearly all workers may be repeatedly exposed without adverse effect on their ability to hear and understand normal speech. The medical profession has defined hearing impairment as an average hearing threshold level in excess of 25 decibels (ANSI S3.6-1969) at 500, 1000, and 2000 Hz, and the limits which are given have been established to prevent a hearing loss in excess of this value. These values shall be used as a standard in the control of noise exposure.

TABLE 7

Permissible Noise Exposures

DURATION PER DAY HOURS	SOUND LEVEL DBA**
8	90
6	92
4	95
3	97
2	100
1-1/2	102
1	105
3/4	107
1/2	110
1/4	115*

*Ceiling Value: No exposure in excess of 115 dBA.

**Sound level in decibels as measured on a standard sound level meter operating on the A-weighting network with slow meter response.

(3) Continuous or Intermittent. The sound level shall be determined by a sound level meter, meeting the standards of the American National Standards Institute and operating on the A–weighting network with slow meter response. Duration of exposure shall not *exceed that shown in Table 7.*

These values apply to total time of exposure per working day regardless of whether this is one continuous exposure or a number of short–term exposures but does not apply to impact or impulsive type of noises.

(4) Intermittent Exposure. When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect shall be considered, rather than the individual effect of each. If the sum of the following fractions:

$$\frac{C_1}{T_1} + \frac{C_2}{T_2} + \ldots + \frac{C_n}{T_n}$$

exceeds unity, then, the mixed exposure shall be considered to exceed the threshold limit value, C1 indicates the total time of exposure at a specified noise level, and T1 indicates the total time of exposure permitted at that level. Noise exposures of less than 90 dBA do not enter into the above calculations.

(5) Impulsive or Impact Noise. Impulsive or impact noise shall be those variations in noise levels which involve maxima at intervals greater than one (1) second. Where the intervals are less than (1) second, it shall be considered continuous. All impact and impulsive noise measurements should be made on the C–weighting network of a sound level meter in conjunction with an impact noise analyzer or oscilloscope. Exposure to impulsive or impact noise should not exceed 140 decibels peak sound pressure level (ceiling value).

(6) When employees are subjected to sound exceeding those listed in Table 7, feasible administrative or engineering controls shall be utilized. If such controls fail to reduce sound levels within the levels of Table 7, personal protective equipment shall be provided and used to reduce sound levels within the levels of the table. Insert–type ear protectors shall be initially fitted by a person trained in this procedure.

(7) In all cases where the sound levels exceed the values shown in Table 7 of this section, it is recommended that employees whose duties may subject them to these potentially harmful noise levels be provided with an audiometric examination at the time of employment and at reasonable intervals thereafter not exceeding an 18–month period.

(8) Employees employed in areas where the sound level is above the level deemed to be safe should cooperate in an audiometric testing program. Employees shall be informed of the test results by an authorized person. [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 Atomic Energy 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 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 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 potential exposure to direct or reflected laser light greater than 0.005 watts (5 milliwatts) exists, shall be provided with antilaser eye protection devices specified in Part C of this Chapter.

(4) Areas in which 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 label to indicate maximum output.

(10) Employees shall not be exposed to light intensities in excess of:

(a) Direct staring: 1 micro–watt per square centimeter;

(b) Incidental observing: 1 milliwatt per square centimeter;

(c) Diffused reflected light: 2 1/2 watts per square centimeter.

(11) Laser unit in operation shall be set up above the heads of the employees, when possible.

(12) Employees shall not be exposed to microwave power densities in excess of 10 milliwatts per square centimeter. [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 (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 hygenist or other technically qualified person. Whenever respirators are used, their use shall comply with WAC 296-155-220.

(3) Subsections (1) and (2) of this section do not apply to the exposure of employees to airborne asbestos dust. Whenever any employee is exposed to airborne asbestos dust, the requirements of the General Occupational Health Standards, WAC 296-62-07517 shall apply. [Order 74-26, § 296-155-160, filed 5/7/74, effective 6/6/74.]

WAC 296-155-165 Illumination. (1) General. Construction areas, ramps, runways, corridors, offices, shops, and storage areas shall be lighted to not less than the minimum illumination intensities listed in Table B-3 while any work is in progress:

TABLE B-3

MINIMUM ILLUMINATION INTENSITIES IN FOOT-CANDLES

Foot-Candles	Area or operation
5	General construction area lighting.
3	General construction area, concrete placement, excavation and waste areas, accessways, active storage areas, loading platforms, refueling, and field maintenance areas.
5	Indoors: warehouses, corridors, hallways, and exitways.
5	Tunnels, shafts, and general underground work areas: (Exception: minimum of 10 foot-candles is required at tunnel and shaft heading during drilling, mucking, and scaling. Bureau of Mines approved cap lights shall be acceptable for use in the tunnel heading.)
10	General construction plant and shops (e.g., batch plants, screening plants, mechanical and electrical equipment rooms, carpenter shops, rigging lofts and active storerooms, barracks or living quarters, locker or dressing rooms, mess halls, and indoor toilets and workrooms.)
30	First aid rooms, infirmaries, and offices.

(2) Other Areas. For areas or operations not covered above, refer to the General Occupational Health Standards, WAC 296-62-09003, for recommended values of illumination. [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.]

Part C
PERSONAL PROTECTIVE AND LIFE SAVING EQUIPMENT

WAC

296-155-200 General requirements.
296-155-201 Definitions applicable to this chapter.
296-155-205 Head protection.
296-155-210 Hearing protection.
296-155-212 Foot protection.
296-155-215 Eye and Face protection.
296-155-220 Respiratory protection.
296-155-225 Safety belts, lifelines, and lanyards.
296-155-230 Safety nets.
296-155-235 Working Over or adjacent to water.
296-155-240 Sterilization of protective equipment.

WAC 296-155-200 General Requirements. (1) Application. (a) Protective equipment, including personal protective equipment for eyes, face, head, 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 safe practice and procedures, peculiar to particular industries and plants, relating to protective equipment and procedures when engaged in construction work in such plants.

(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 similar 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.

(c) Cranial and facial hair shall be completely confined or cut short.

(5) Employees, whose duties are regularly performed in areas and under circumstances when they are exposed to the danger of moving vehicles, shall wear work vests of highly visible materials, or equivalent distinguishing apparel.

NOTE: For additional Personal Protective and Life Saving Equipment requirements, refer to the General Safety and Health Standards, WAC 296-24-075 through WAC 296-24-092.

[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) "Contaminant" means any material which by reason of its action upon, within, or to a person is likely to cause physical harm.

(2) "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.

(3) "Lifeline" means a rope, suitable for supporting one person, to which a lanyard or safety belt (or harness) is attached.

(4) "O.D." means optical density and refers to the light refractive characteristics of a lens.

(5) "Radiant energy" means energy that travels outward in all directions from its source.

(6) "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. [Order 76-6, § 296-155-201, filed 3/1/76.]

WAC 296-155-205 Head protection. (1) Employees working in areas where there is a possible danger of head injury from impact, or from falling or flying objects, or from electrical shock and burns, shall be protected by protective helmets.

(a) Helmets 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) Helmets 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) Caps with metal buttons or metal visors shall not be worn around electrical hazards. [Order 74-26, § 296-155-205, filed 5/7/74, effective 6/6/74.]

WAC 296-155-210 Hearing protection. (1) Wherever it is not feasible to reduce the noise levels or duration of exposures to those specified in Table B-2, Permissible Noise Exposures, in WAC 296-155-145, protective devices for hearing conservation shall be used.

(2) Protective devices for hearing conservation inserted in the ear shall be fitted individually by competent persons.

(3) Plain cotton is not an acceptable protective device. [Order 74-26, § 296-155-210, filed 5/7/74, effective 6/6/74.]

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) 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 round timbers. [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.

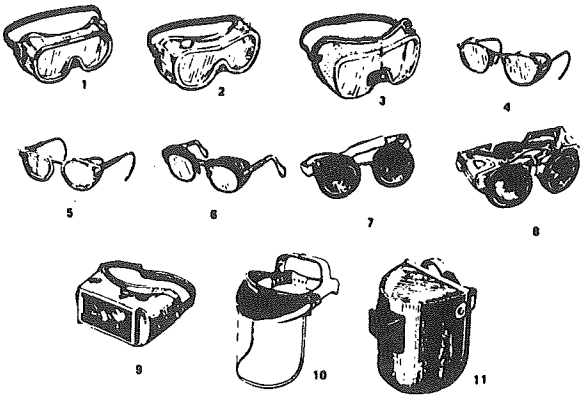


TABLE C-1

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

*Non-side 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 TECTORS:	HAZARDS	RECOMMENDED PRO- Underscored Numbers Signify Preferred Protection
ACETYLENE-BURNING ACETYLENE-CUTTING ACETYLENE-WELDING	SPARKS, HARMFUL RAYS, MOLTEN METAL, FLYING PARTICLES	7, 8, 9
CHEMICAL HANDLING	SPLASH, ACID BURNS, FUMES	2, 10 (For severe exposure add 10 over 2)
CHIPPING	FLYING PARTICLES	1, 3, 4, 5, 6, 7A, 8A
ELECTRIC (ARC) WELDING	SPARKS, INTENSE RAYS, MOLTEN METAL	9, 11 (11 in combination with 4, 5, 6, in tinted lenses, advisable)

APPLICATIONS

OPERATION TECTORS:	HAZARDS	RECOMMENDED PRO- Underscored Numbers Signify Preferred Protection
FURNACE OPERATIONS	GLARE, HEAT, MOLTEN METAL	7, 8, 9 (For severe exposure add 10)
GRINDING–LIGHT	FLYING PARTICLES	1, 3, 4, 5, 6, 10
GRINDING–HEAVY	FLYING PARTICLES	1, 3, 7A, 8A (For severe exposure add 10)
LABORATORY	CHEMICAL SPLASH, GLASS BREAKAGE	2 (10 when in combination with 4, 5, 6)
MACHINING	FLYING PARTICLES	1, 3, 4, 5, 6, 10
MOLTEN METALS	HEAT, GLARE, SPARKS, SPLASH	7, 8 (10 in combination with 4, 5, 6, in tinted lenses)
SPOT WELDING	FLYING PARTICLES, SPARKS	1, 3, 4, 5, 6, 10

(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 exposure to laser beams in excess of 5 milliwatts of power 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	
CW maximum power density (watts/cm^2)	Optical density (Q.D.)	Attenuation factor
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. [Order 74–26, § 296–155–215, filed 5/7/74, effective 6/6/74.]

WAC 296–155–220 Respiratory protection. (1) General. (a) 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.

(b) Respiratory protective devices shall be approved by the U.S. Bureau of Mines or acceptable to the Department of Labor and Industries or the U.S. Department of Labor for the specific contaminant to which the employee is exposed.

(2) Respirator Selection. (a) The chemical and physical properties of the contaminant, as well as the toxicity and concentration of the hazardous material, shall be considered in selecting the proper respirators.

(b) The nature and extent of the hazard, work requirements, and conditions, as well as the limitations and characteristics of the available respirators, shall also be factors considered in making the proper selection.

(c) The following table lists the types of respirators required for protection in dangerous atmospheres:

TABLE C-4
SELECTION OF RESPIRATORS

Hazard	Respirator (See Note)
Oxygen deficiency	Self–contained breathing apparatus. Hose mask with blower. Combination air–line respirator with auxiliary self–contained air supply or an air storage receiver with alarm.
Gas and vapor contaminants immediately dangerous to life and health.	Self–contained breathing apparatus. Hose mask with blower. Air–purifying, full facepiece respirator with chemical canister (gas mask). Self–rescue mouthpiece respirator (for escape only). Combination airline respirator with auxiliary self–contained air supply or an air–storage receiver with alarm.
Not immediately dangerous to life and health.	Air–line respirator. Hose mask without blower. Air–purifying, half–mask or mouth–piece respirator with chemical cartridge.
Particulate contaminants immediately dangerous to life and health.	Self–contained breathing apparatus. Hose mask with blower. Air–purifying, full facepiece respirator with appropriate filter. Self–rescue mouthpiece respirator (for escape only). Combination air–line respirator with auxiliary self–contained air supply or an air–storage receiver with alarm.
Not immediately dangerous to life and health.	Air–purifying, half–mask or mouthpiece respirator with filter pad or cartridge. Air–line respirator. Air–line abrasive–blasting respirator. Hose–mask without blower.
Combination gas, vapor, and particulate contaminants immediately dangerous to life and health.	Self–contained breathing apparatus. Hose mask with blower. Air–purifying, full facepiece respirator with chemical canister and appropriate filter (gas mask with filter). Self–rescue mouthpiece respirator (for escape only). Combination air–line respirator with auxiliary self–contained air supply or an air–storage receiver with alarm.
Not immediately dangerous to life and health.	Air–line respirator. Hose mask without blower. Air–purifying, half–mask or mouth–piece respirator with chemical cartridge and appropriate filter.

NOTE: For the purpose of this part, "immediately dangerous to life and health" is defined as a condition that either poses an immediate threat to life and health or an immediate threat of severe exposure to contaminants, such as radioactive materials, which are likely to have adverse delayed effects on health.

(3) Selection, Issuance, Use and Care of Respirators. (a) Employees required to use respiratory protective equipment for use in atmospheres immediately dangerous to life shall be thoroughly trained in its use. Employees required to use other types of respiratory protective equipment shall be instructed in the use and limitations of such equipment.

(b) Respiratory protective equipment shall be inspected regularly and maintained in good condition. Gas mask canisters and chemical cartridges shall be replaced as necessary so as to provide complete protection. Mechanical filters shall be cleaned or replaced as necessary so as to avoid undue resistance to breathing.

(c) Respiratory protective equipment which has been previously used shall be cleaned and disinfected before it

is issued by the employer to another employee. Emergency rescue equipment shall be cleaned and disinfected immediately after each use. [Order 74-26, § 296-155-220, filed 5/7/74, effective 6/6/74.]

WAC 296-155-225 Safety belts, lifelines, and lanyards.

NOTE: When temporary floors, staging, ladders, scaffolds or safety nets are provided, structural steel erectors (connectors) need not wear safety belts when the use of safety belts may provide an additional hazard. Follow-up steel erectors such as "bolters," "riveters," etc., are not exempt from this provision and must wear safety belts and lanyards and be tied off at all times, except when provided with a safety net.

(1) Where workers are employed 25 feet or more above the floor, ground, or water surface, and it is impracticable to provide temporary floors, staging, ladders, or scaffolds, safety nets or safety belts and life lines shall be provided and used.

(2) Lifelines, safety belts, and lanyards shall be used only for employee safeguarding. Any lifeline, safety belt, or lanyard actually subjected to in-service loading, as distinguished from static load testing, shall be immediately removed from service and shall not be used again for employee safeguarding.

(3) Lifelines shall be secured to an anchorage or structural member capable of supporting a minimum dead weight of 5,400 pounds, and shall extend below the operation a sufficient distance to permit a safe landing.

(4) 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 5,400 pounds, shall be used.

(5) Safety belt lanyard shall be a minimum of 1/2-inch nylon, or equivalent, with a maximum length to provide for a fall of no greater than 6 feet. The rope shall have a nominal breaking strength of 5,400 pounds.

(6) All safety belt and lanyard hardware shall be drop forged or pressed steel, cadmium plated in accordance with type 1, Class B plating specified in Federal Specification QQ-P-416. Surface shall be smooth and free of sharp edges.

(7) 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.

(8) No employee shall enter a gas main, sewer, sewer flue, duct, tunnel, or other similar place without first notifying the foreman of his intention to do so. He shall wear a safety belt with lifeline attached, when conditions require it, the line being held by a fellow worker stationed at the opening through which he enters. In such cases signals shall be agreed upon, and failure of the worker to respond to a signal shall be sufficient cause for immediate investigation. [Order 76-29, § 296-155-225, filed 9/30/76; Order 74-26, § 296-155-225, filed 5/7/74, effective 6/6/74.]

WAC 296-155-230 Safety nets. (1) Safety nets shall be provided when workplaces are more than 25 feet above the ground or water surface, or other surface where the use of ladders, scaffolds, catch platforms, temporary floors, safety lines, or safety belts are impractical.

(2) Where safety net protection is required by this Part, operations shall not be undertaken until the net is in place and has been tested. The manufacturer's current certification of testing shall satisfy the requirements of this subsection.

(3) (a) Nets shall extend 8 feet beyond the edge of the work surface where employees are exposed and shall be installed as close under the work surface as practical but in no case more than 25 feet below such work surface. Nets shall be hung with sufficient clearance to prevent user's contact with the surfaces or structures below. Such clearances shall be determined by impact load testing.

(b) It is intended that only one level of nets be required for bridge construction.

(4) The mesh size of nets shall not exceed 6 inches by 6 inches. All new nets shall meet accepted performance standards of 17,500 foot-pounds minimum impact resistance as determined and certified by the manufacturers, and shall bear a label of proof test. Edge ropes shall provide a minimum breaking strength of 5,000 pounds.

(5) Forged steel safety hooks or shackles shall be used to fasten the net to its supports.

(6) Connections between net panels shall develop the full strength of the net. [Order 74-26, § 296-155-230, 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 him to a risk of drowning, he 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. [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 D
FIRE PROTECTION AND PREVENTION

WAC

296-155-250 Definitions applicable to this part.
296-155-260 Fire protection.
296-155-265 Fire prevention.
296-155-270 Flammable and combustible liquids.
296-155-275 Liquefied petroleum gas (LP-Gas).
296-155-280 Temporary heating devices.

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 Bureau of Mines or U.S. 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 flash-arresting screen, spring-closing lid and spout cover and so designed that it will safely relieve internal pressure when subjected to fire exposure.

(13) "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). [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 he shall provide for firefighting equipment as specified in this Part. As fire hazards occur, there shall be no delay in providing necessary equipment.

(b) Access to all available firefighting equipment shall be maintained at all times.

(c) All firefighting equipment, provided by the employer, shall be conspicuously located.

(d) All firefighting 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 firefighting 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 firefighting 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 Firefighting 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-1972 and the General Safety and Health Standards, WAC 296-24-59007.

(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.

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 firefighting 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 Firefighting 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 practicable.

(b) Fire cutoffs shall be retained in buildings undergoing alterations or demolition until operations necessitate their removal. [Order 76-6, § 296-155-260, filed 3/1/76; Order 74-26, § 296-155-260, filed 5/7/74, effective 6/6/74.]

WAC 296-155-265 Fire prevention. (1) Ingition Hazards. (a) Electrical wiring and equipment for light, heat, or power purposes shall be installed in compliance with the requirements of the National Electrical Code, NFPA 70-1971; ANSI C1-1971 (Rev. of 1968), and the requirements of Part I of this chapter.

(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. [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 (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.

(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. 80-1970, 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 296-155-455.

(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 mechanical 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 (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–feet 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.

(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. 385–1971.

(c) The dispensing hose shall be an approved type.

(d) The dispensing nozzle shall be an approved automatic–closing type without a latch–open device.

(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 motors of all 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. [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 impracticable, containers and equipment shall be permitted to be used inside of buildings or structures in accordance with subdivisions (b) through (k) of this subsection.

(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 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 deter-mined by listing by a nationally recognized testing agency. The hose length shall be as short as practicable. Hoses shall be long enough to permit compliance with spacing provisions of subdivisions (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. [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 50 parts per million (0.005 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 30 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. [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.
296-155-301 Table E-1.
296-155-305 Signaling.
296-155-310 Barricades.
296-155-315 Definitions applicable to this part.

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 boarders; 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.

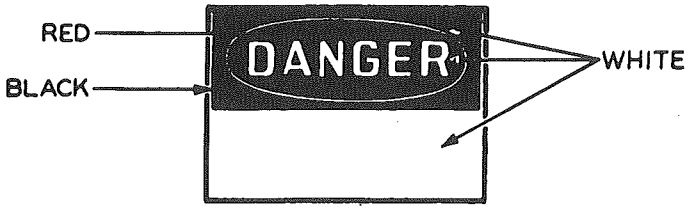


FIGURE E-1

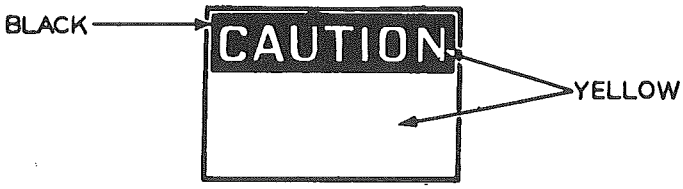


FIGURE E-2

(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 (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 American National Standards Institute D6.1-1971, Manual on Uniform Traffic Control Devices for Streets and Highways as amended by the Washington State Department of Highways (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) Z35.1-1968, 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 Z35.1-1968 and Z35.2-1968 with respect to rules not specifically prescribed in this Part.

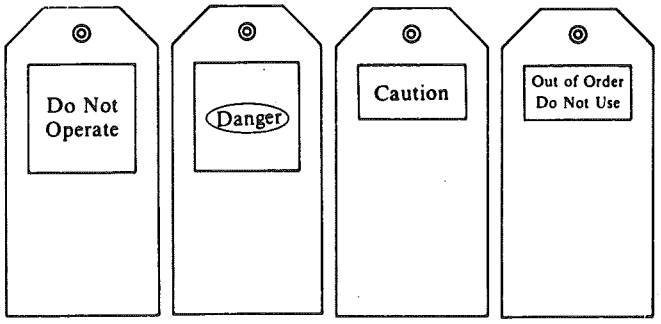


TABLE E-1

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 tag–White letters on black background

Basic Stock (Background)	Safety Colors (Ink)	Copy Specification (Letters)
White	Red	Do Not Operate
White	Black and Red	Danger
Yellow	Black	Caution
White	Black	Out of Order–Do Not Use

[Order 74-26, § 296-155-300, filed 5/7/74, effective 6/6/74.]

WAC 296-155-305 Signaling. (1) Flagman. (a) When operations are such that signs, signals, and barricades do not provide the necessary protection on or adjacent to a highway or street, flagmen or other appropriate traffic controls shall be provided.

(b) Signaling directions by flagmen shall conform to American National Standards Institute D6.1-1971, Manual on Uniform Traffic Control Devices for Streets and Highways, as amended by the Washington State Department of Highways. (M24-01 (HT)).

(c) Hand signaling by flagmen shall be by use of sign paddles at least 18 inches in diameter with series "C" letters at least 6 inches high. When hand signaling is done in periods of darkness, the sign paddles must be reflectorized or illuminated as required by ANSI D6.1-1971, 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 D6.1-1971.

(d) Flagmen shall wear a red or orange warning garment while flagging. Warning garments worn at night shall be of reflectorized material.

(e) Flagmen shall complete a Washington State approved flagging course, or the equivalent, prior to being assigned duties as a flagman.

NOTE: Personnel that have not completed a flagging course may be assigned duties as flagmen only during emergencies when a sudden, generally unexpected, set of circumstances demands immediate attention.

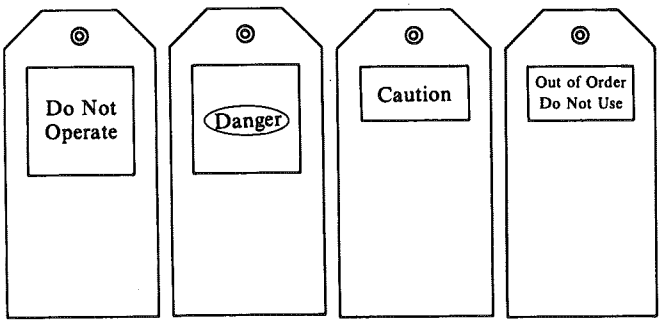


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Basic Stock (Background)	Safety Colors (Ink)	Copy Specification (Letters)
White	Red	Do Not Operate
White	Black and Red	Danger
Yellow	Black	Caution
White	Black	Out of Order–Do Not Use

[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 D6.1-1971, Manual on Uniform Traffic Control Devices for Streets and Highways, as amended by the Washington State Department of Highways, (M24-01 (HT)), relating to barricades. [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 flagmen, 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. [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.
296-155-330 Rigging equipment for material handling.
296-155-335 Disposal of waste materials.
296-155-34901 Table F-1.
296-155-34902 Table F-2.
296-155-34903 Table F-3.
296-155-34904 Table F-4.
296-155-34905 Table F-5.
296-155-34906 Table F-6.
296-155-34907 Table F-7.
296-155-34908 Table F-8.
296-155-34909 Table F-9.
296-155-34910 Table F-10.
296-155-34911 Table F-11.
296-155-34912 Table F-12.
296-155-34913 Table F-13.
296-155-34914 Table F-14.
296-155-34915 Table F-15.
296-155-34916 Table F-16.
296-155-34917 Table F-17.
296-155-34918 Table F-18.
296-155-34919 Table F-19.
296-155-34920 Table F-20.

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) 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.

(b) Employees required to work on stored material in silos, hoppers, tanks, and similar storage areas shall be equipped with lifelines and safety belts meeting the requirements of WAC 296-155-225, Part C.

(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 goggles and tight neck and arm bands.

(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 grounds. 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 (4) feet high and spacing strips shall be placed between each bundle.

(j) Sand, Gravel and Crushed Stone. Stock piles shall be frequently inspected to prevent their becoming unsafe by continued adding to or withdrawing from the stock.

(i) If material becomes frozen, it shall not be removed in a manner that would produce an overhang. [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.

(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, for such units as modular panels, prefabricated structures and similar materials, shall be marked to indicate the safe working loads and shall be proof-tested prior to use to 125 percent of their rated load.

(2) Alloy steel chains.

(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) Eyes in wire rope bridles, slings or bull wires shall not be formed by wire rope clips or knots.

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

(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 1/6 of 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) Cable 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: 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 through holes in the floor without the use of chutes, the area onto which the material is dropped shall be completely 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. [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 Horizontal Angle[2] 60 degree	45 degree 45 degree	60 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

TABLE F-1: PART 1--Double Slings

Chain Size, Inches	Single Branch Sling - 90 degrees Loading	Double Sling Vertical Angle[1] 30 degree Horizontal Angle[2] 60 degree	45 degree 45 degree	60 degree 30 degree
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 Horizontal Angle[(2)] 60 degree	45 degree 45 degree	60 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 Dia. (Inches)	Constr.	Rated Capacities, Tons (2,000 lb) Vertical HT	Vertical MS	Vertical S	Choker HT	Choker MS	Choker S	Vertical Basket* HT	Vertical Basket* MS	Vertical Basket* 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 Dia. (Inches)	Constr.	Rated Capacities, Tons (2,000 lb) Vertical HT	Vertical MS	Vertical S	Choker HT	Choker MS	Choker S	Vertical Basket* HT	Vertical Basket* MS	Vertical Basket* 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		Vertical		Choker		Basket Vertical to 30 degrees*	
(inches)	Constr.	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

TABLE F-6——cont.

Component Ropes		Rated Capacities, Tons (2,000 lb)					
Diameter		Vertical		Choker		Basket Vertical to 30 degrees*	
(inches)	Constr.	8-Part	6-Part	8-Part	6-Part	8-Part	6-Part
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) 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	0.85	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 Dia. (Inches)	Rope Constr.	Rated Capacities, Tons (2,000 lb) 3-Leg Bridle Slings Vert 30 degree Horz 60 degree HT	Vert 30 degree Horz 60 degree MS	45 degree Angle HT	45 degree Angle MS	Vert 60 degree Horz 30 degree HT	Vert 60 degree Horz 30 degree MS
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 Dia. (Inches)	Rope Constr.	Rated Capacities, Tons (2,000 lb) 2-Leg Bridle Slings Vert 30 degree Horz 60 degree HT	Vert 30 degree Horz 60 degree MS	45 degree Angle HT	45 degree Angle MS	Vert 60 degree Horz 30 degree HT	Vert 60 degree Horz 30 degree 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

TABLE F-8: PART 1——2-Leg Bridle Slings

Rope Dia. (Inches)	Rope Constr.	Rated Capacities, Tons (2,000 lb) 2-Leg Bridle Slings Vert 30 degree Horz 60 degree HT	Vert 30 degree Horz 60 degree MS	45 degree Angle HT	45 degree Angle MS	Vert 60 degree Horz 30 degree HT	Vert 60 degree Horz 30 degree MS
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 Dia. (Inches)	Rope Constr.	Rated Capacities, Tons (2,000 lb) 3-Leg Bridle Sling Vert 30 degree Horz 60 degree HT	Vert 30 degree Horz 60 degree MS	45 degree Angle HT	45 degree Angle MS	Vert 60 degree Horz 30 degree HT	Vert 60 degree Horz 30 degree 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 & 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 Dia. (Inches)	Rope Constr.	Rated Capacities, Tons (2,000 lb) 2-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	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

TABLE F-9: PART 2——3-Leg Bridle Slings

Rope Dia. (Inches)	Rope Constr.	Rated Capacities, Tons (2,000 lb) 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 Rope Dia. (Inches)	Rope Constr.	Rated Capacities, Tons (2,000 lb) 2-Leg Bridle Slings Vert 30 degree Horz 60 degree 8-Part	6-Part	45 degree Angle 8-Part	6-Part	Vert 60 degree Horz 30 degree 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
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-10: PART 2——3-Leg Bridle Slings

Component Rope Dia. (Inches)	Rope Constr.	Rated Capacities, Tons (2,000 lb) 3-Leg Bridle Slings Vert 30 degree Horz 60 degree 8-Part	6-Part	45 degree Angle 8-Part	6-Part	Vert 60 degree Horz 30 degree 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

TABLE F-10: PART 2——3-Leg Bridle Slings

Component Rope Dia. (Inches)	Constr.	Rated Capacities, Tons (2,000 lb) 3-Leg Bridle Slings Vert 30 degree Horz 60 degree 8-Part	6-Part	45 degree Angle 8-Part	6-Part	Vert 60 degree Horz 30 degree 8-Part	6-Part
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 Dia. (inches)	Constr.	RATED CAPACITIES, TONS (2,000 lb) Vertical	Choker	Vertical Basket*
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
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.

[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 Dia. (inches)	Constr.	RATED CAPACITIES, TONS (2,000 lb) 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
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
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.

[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
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.

[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

TABLE F-14——cont.

CABLE BODY		RATED CAPACITIES, TONS (2,000 lb)		
				
Dia. (inches)	Constr.	Vertical	Choker	Vertical Basket*
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
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
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.

[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

ROPE Diameter Nominal in Inches	Nominal weight per 100 ft in Pounds	Minimum Breaking Strength in Pounds	RATED CAPACITY IN POUNDS (Safety Factor = 5)					
			EYE AND EYE SLING					
					BASKET HITCH			
					Angle of Rope to Horizontal			
					90 deg	60 deg	45 deg	30 deg
			Vertical Hitch	Choker 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

TABLE F-15: PART 1——Eye and Eye Sling

ROPE Diameter Nominal in Inches	Nominal weight per 100 ft in Pounds	Minimum Breaking Strength in Pounds	RATED CAPACITY IN POUNDS (Safety Factor = 5) EYE AND EYE SLING Vertical Hitch	Choker Hitch	BASKET HITCH Angle of Rope to Horizontal 90 deg	60 deg	45 deg	30 deg
					Angle of Rope to Vertical 0 deg	30 deg	45 deg	60 deg
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

ROPE Diameter Nominal in Inches	Nominal weight per 100 ft in Pounds	Minimum Breaking Strength in Pounds	RATED CAPACITY IN POUNDS (Safety Factor = 5) ENDLESS SLING Vertical Hitch	Choker Hitch	BASKET HITCH Angle of Rope to Horizontal 90 deg	60 deg	45 deg	30 deg
					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
13/16	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

ROPE Diameter Nominal in Inches	Nominal weight per 100 ft in Pounds	Minimum Breaking Strength in Pounds	RATED CAPACITY IN POUNDS (Safety Factor = 9) EYE AND EYE SLING Vertical Hitch	Choker Hitch	BASKET HITCH Angle of Rope to Horizontal 90 deg	60 deg	45 deg	30 deg
					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

ROPE Diameter Nominal in Inches	Nominal weight per 100 ft in Pounds	Minimum Breaking Strength in Pounds	RATED CAPACITY IN POUNDS (Safety Factor = 9) ENDLESS SLING Vertical Hitch	Choker Hitch	BASKET HITCH Angle of Rope to Horizontal 90 deg	60 deg	45 deg	30 deg
					Angle of Rope to Vertical 0 deg	30 deg	45 deg	60 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

TABLE F-16: PART 2——Endless Sling

ROPE Diameter Nominal in Inches	Nominal weight per 100 ft in Pounds	Minimum Breaking Strength in Pounds	RATED CAPACITY IN POUNDS (Safety Factor = 9) ENDLESS SLING					
					BASKET HITCH			
					Angle of Rope to Horizontal			
					90 deg	60 deg	45 deg	30 deg
			Vertical Hitch	Choker Hitch	Angle of Rope to Vertical 0 deg	30 deg	45 deg	60 deg
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

ROPE Diameter Nominal in Inches	Nominal weight per 100 ft in Pounds	Minimum Breaking Strength in Pounds	RATED CAPACITY IN POUNDS (Safety Factor = 9) EYE AND EYE SLING					
					BASKET HITCH			
					Angle of Rope to Horizontal			
					90 deg	60 deg	45 deg	30 deg
			Vertical Hitch	Choker Hitch	Angle of Rope to Vertical 0 deg	30 deg	45 deg	60 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
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

ROPE Diameter Nominal in Inches	Nominal weight per 100 ft in Pounds	Minimum Breaking Strength in Pounds	RATED CAPACITY IN POUNDS (Safety Factor = 9) ENDLESS SLING					
					BASKET HITCH			
					Angle of Rope to Horizontal			
					90 deg	60 deg	45 deg	30 deg
			Vertical Hitch	Choker Hitch	Angle of Rope to Vertical 0 deg	30 deg	45 deg	60 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

POLYPROPYLENE ROPE SLINGS

TABLE F-18: PART 1——Eye and Eye Sling

ROPE Diameter Nominal in Inches	Nominal weight per 100 ft in Pounds	Minimum Breaking Strength in Pounds	RATED CAPACITY IN POUNDS (Safety Factor = 6) EYE AND EYE SLING					
					BASKET HITCH			
					Angle of Rope to Horizontal			
					90 deg	60 deg	45 deg	30 deg
			Vertical Hitch	Choker 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

TABLE F-18: PART 1——Eye and Eye Sling

ROPE Diameter Nominal in Inches	Nominal weight per 100 ft in Pounds	Minimum Breaking Strength in Pounds	RATED CAPACITY IN POUNDS (Safety Factor = 6) EYE AND EYE SLING Vertical Hitch	Choker Hitch	BASKET HITCH Angle of Rope to Horizontal 90 deg	60 deg	45 deg	30 deg
					Angle of Rope to Vertical 0 deg	30 deg	45 deg	60 deg
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

ROPE Diameter Nominal in Inches	Nominal weight per 100 ft in Pounds	Minimum Breaking Strength in Pounds	RATED CAPACITY IN POUNDS (Safety Factor = 6) ENDLESS SLING Vertical Hitch	Choker Hitch	BASKET HITCH Angle of Rope to Horizontal 90 deg	60 deg	45 deg	30 deg
					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 5/8	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	Other material	
1/2	3	4	3
5/8	3	4	3 1/4
3/4	4	5	4 1/2
7/8	4	5	5 1/4
1	5	6	6
1 1/8	6	6	6 3/4
1 1/4	6	7	7 1/2
1 3/8	7	7	8 1/4
1 1/2	7	8	9

[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.
296-155-355 Hand tools.

296–155–360 Power–operated hand tools.
296–155–365 Abrasive wheels and tools.
296–155–370 Woodworking tools.
296–155–375 Jacks——Lever and ratchet, screw, and hydraulic.

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) Combination "axe–hammers", with handles exceeding 16 inches in length, shall not be used to drive nails or spikes.

(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. [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 shall be secured to the hose or whip by some positive means to prevent the tool 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 30 p.s.i. requirement does not apply for concrete form, mill scale and similar cleaning purposes.

(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.

(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.

(5) Powder-Actuated Tools. (a) Only employees who have been trained in the operation of the particular tool in use, and certified in accordance with WAC 296-24-662 through 296-24-66225, shall be allowed to operate a powder-actuated tool.

(b) The tool shall be tested each day before loading to see that safety devices are in proper working condition. The method of testing shall be in accordance with the manufacturer's recommended procedure.

(c) Any tool found not in proper working order, or that develops a defect during use, shall be immediately removed from service and not used until properly repaired.

(d) Personal protective equipment shall be in accordance with Part C of this chapter.

(e) Tools shall not be loaded until just prior to the intended firing time. Neither loaded nor empty tools are to be pointed at any employees. Hands shall be kept clear of the open barrel end.

(f) Loaded tools shall not be left unattended.

(g) Fasteners shall not be driven into very hard or brittle materials including, but not limited to, cast iron, glazed tile, surface-hardened steel, glass block, live rock, face brick, or hollow tile.

(h) Driving into materials easily penetrated shall be avoided unless such materials are backed by a substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the other side.

(i) No fastener shall be driven into a spalled area caused by an unsatisfactory fastening.

(j) Tools shall not be used in an explosive or flammable atmosphere.

(k) All tools shall be used with the correct shield, guard, or attachment recommended by the manufacturer.

(l) Powder-actuated tools used by employees shall meet all other applicable requirements of American National Standards Institute, A10.3-1970, Safety Requirements for Explosive-Actuated Fastening Tools.

(m) In addition to subdivisions (a) through (l) of this subsection, WAC 296-24-662 through 296-24-66225, Safety Requirements for Explosive-Actuated Fastening Tools, shall apply. [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 296-155-365 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. Grinding machines shall be equipped with safety guards in conformance with the requirements of American National Standards Institute, B7.1-1970, Safety Code for the Use, Care and Protection of Abrasive Wheels.

(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 kept at a distance not to exceed one-eighth inch from the surface of the wheel.

(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, B7.1-1970, Safety Code for the Use, Care, and Protection of Abrasive Wheels. All other portable abrasive wheels used for external grinding, shall be provided with safety guards (protection hoods) meeting the requirements of subdivision (e) of this subsection except as follows:

(i) When the work location makes it impossible, a wheel equipped with safety flanges, as described in subdivision (f) of this subsection, shall be used.

(ii) When wheels 2 inches or less in diameter which are securely mounted on the end of a steel mandrel are used.

(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, B7.1–1970, Safety Code for the Use, Care and Protection of Abrasive Wheels. [Order 74–26, § 296–155–365, filed 5/7/74, effective 6/6/74.]

WAC 296–155–370 Woodworking tools. (1) Speeds. The operating speed shall be etched or otherwise permanently marked on all circular saws over 20 inches in diameter or operating at over 10,000 peripheral feet per minute. Any saw so marked shall not be operated at a speed other than that marked on the blade. When a marked saw is retensioned for a different speed, the marking shall be corrected to show the new 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) All woodworking tools and machinery shall meet other applicable requirements of American National Standards Institute, 01.1–1971, Safety Code for Woodworking Machinery.

(a) 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.

(b) 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.

(c) A push stick or similar device shall be used for pushing short material through power saws.

(4) Personal Protective Equipment. All personal protective equipment required for use shall conform to Part C of this chapter. [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. (1) General Requirements. (a) The manufacturer's rated capacity shall be legibly marked on all jacks and this capacity shall not be exceeded.

(b) All jacks shall have a positive stop to prevent over–travel.

(c) Specially designed jacks constructed for specific purposes shall meet the approval of the division of Industrial Safety and Health before being placed in service.

(d) Control parts shall be so designed that the operator will not be subjected to hazard.

(2) Lift Slab Construction. (a) Hydraulic jacks used in lift slab construction shall have a safety device which will cause the jacks to support the load in any position in the event the jack malfunctions.

(b) If lift slabs are automatically controlled, a device shall be installed which will stop the operation when the 1/2–inch leveling tolerance is exceeded.

(3) 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. [Order 74–26, § 296–155–375, filed 5/7/74, effective 6/6/74.]

Part H
WELDING AND CUTTING

WAC
296–155–400 Gas welding and cutting.
296–155–405 Arc welding and cutting.
296–155–410 Fire prevention.
296–155–415 Ventilation and protection in welding, cutting, and heating.
296–155–420 Welding, cutting, and heating in way of preservative coatings.

WAC 296–155–400 Gas welding and cutting. (1) Transporting, Moving, and Storing Compressed Gas Cylinders. 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.

(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.

(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. 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.

(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, Z49.1-1967, Safety in Welding and Cutting, shall apply. [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 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 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 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.

(e) Other requirements, as outlined in Article 630, National Electrical Code, NFPA 70–1971; ANSI CI–1971 (Rev. of 1968), Electric Welders, shall be followed when applicable.

(5) Shielding. Whenever practicable, 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. [Order 74–26, § 296–155–405, filed 5/7/74, effective 6/6/74.]

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 toxity, 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 fuels 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

296-155-425 Definitions applicable to this part.
296-155-430 General requirements.
296-155-435 Grounding and bonding.
296-155-440 Equipment installation and maintenance.
296-155-450 Battery rooms and battery charging.
296-155-455 Hazardous locations.

WAC 296-155-425 Definitions applicable to this part. (1) The definition of "approved" as set forth in WAC 296-155-012(1) shall apply.

(2) "Bonding jumper" means a conductor to assure the required electrical conductivity between metal parts required to be electrically connected.

(3) "Branch circuits" mean 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.)

(4) "Circuit breaker" means a device designed to open and close a circuit by manual means, and to open the circuit automatically on a predetermined overload of current, without injury to itself when properly applied within its rating.

(5) "Exposed" (as applied to live parts) means that a live part can be inadvertently touched or approached nearer than a safe distance by a person. This term applies to parts not suitably guarded, isolated, or insulated.

(6) "Ground" means a conducting connection, whether intentional or accidental, between an electrical circuit or equipment and earth, or to some conducting body which serves in place of the earth.

(7) "Grounded" means connected to earth or to some conducting body which serves in place of the earth.

(8) "Hazard" means to include casualty, fire, and shock when applicable.

(9) "Isolated" means not readily accessible to personnel unless special means of access are used.

(10) "Raceway" means any channel for loosely holding wires or cables in interior work which is designed expressly and used solely for this purpose. Raceways may be of metal, wood, or insulating material, and the term includes wood and metal moldings consisting of a backing and capping, and also metal ducts into which wires are to be pulled.

(11) "Shock hazard" means 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.

(12) "Weatherproof" means so constructed or protected that exposure to the weather shall not interfere with successful operation. [Order 74-26, § 296-155-425, filed 5/7/74, effective 6/6/74.]

WAC 296-155-430 General requirements. (1) All electrical work, installations, and wire capacities shall be in accordance with pertinent provisions of the National Electrical Code, NFPA 70-1971; ANSI C1-1971 (Rev. of 1968), and the National Electrical Safety Code, National Bureau of Standards, Part 4 (ANSI C2.4) unless otherwise provided by standards of this chapter.

(2) Applicability. The standards of this part apply only to electrical installations used on the jobsite, both temporary and permanent.

(3) Protection of Employees. (a) No employer shall permit an employee to work in such proximity to any part of an electric power circuit that he may contact the same in the course of his work unless the employee is protected against electric shock by deenergizing the circuit and grounding it or by guarding it by effective insulation or other equally effective means.

(b) Before work is begun the employer shall ascertain by inquiry or direct observation, or by instruments, whether any part of an 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 therewith. The employer shall post and maintain proper warning signs where such circuit exists. He shall advise his employees of the location of such lines, the hazards involved and the protective measures to be taken.

(4) Passageways and Open Spaces. Suitable barriers or other means 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.

(5) Workspace Around Equipment. Sufficient space shall be provided and maintained in the area of electrical equipment to permit ready and safe operation and maintenance of such equipment. When parts are exposed, the minimum clearance for the workspace shall be not less than 6 1/4 feet high, nor less than a radius of 3 feet wide, and there shall be clearance sufficient to permit at least a 90° opening of all doors or hinged panels. All working clearances shall be maintained in accordance with Article 110-16, National Electrical Code, NFPA 70-1971; ANSI C1-1971 (Rev. of 1968).

(6) 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, as specified in National Electric Code, NFPA 70-1971; ANSI C1-1971 (Rev. of 1968), Article 310.

(7) Lockout and Tagging of Circuits. (a) Equipment or circuits that are deenergized shall be rendered inoperative and have tags attached at all points where such equipment or circuits can be energized.

(b) Controls that are to be deactivated during the course of work on energized or deenergized equipment or circuits shall be tagged.

(c) Tags shall be placed to identify plainly the equipment or circuits being worked on.

(8) Ground–Fault Protection. (a) Notwithstanding the provisions of subsections (1) through (7) of this section, the requirement in section 210–7 of the 1971 National Electric Code (NFPA 70–1971; ANSI C1–1971) that all 15– and 20–ampere receptacle outlets on single–phase circuits for construction sites have approved ground–fault circuit protection for personnel does not apply. In lieu thereof, the employer shall use either ground–fault circuit interrupters as specified in subsection (8)(b) of this section or an assured equipment grounding conductor program as specified in subsection (8)(c) of this section, to protect employees on construction sites. These requirements are in addition to any other requirements for equipment grounding conductors.

(b) Ground–fault circuit interrupters. All 120–volt, single–phase, 15– 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.

(c) 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 permanent wiring 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:

(i) 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.

(ii) The employer shall designate one or more competent persons (as defined in WAC 296–155–012(3)) to implement the program.

(iii) 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 indication of possible internal damage. Equipment found damaged or defective may not be used until repaired.

(iv) 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– and plug–connected equipment required to be grounded:

(A) All equipment grounding conductors shall be tested for continuity and shall be electrically continuous.

(B) 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.

(v) All required tests shall be performed:

(A) Before first use;

(B) Before equipment is returned to service following any repairs;

(C) 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

(D) 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.

(vi) The employer may not make available or permit the use by employees of any equipment which has not met the requirements of subsection (8)(c) of this section.

(vii) Tests performed as required in this subsection shall be recorded. This test record shall identify each receptacle, cord set, and cord– 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. [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.]

WAC 296–155–435 Grounding and bonding. (1) Portable and/or Cord and Plug–Connected Equipment. (a) The noncurrent–carrying metal parts of portable and/or plug–connected equipment shall be grounded.

(b) Portable tools and appliances protected by an approved system of double insulation, or its equivalent, need not be grounded. Where such an approved system is employed, the equipment shall be distinctively marked.

(2) Fixed Equipment. Exposed noncurrent–carrying metal parts of fixed electrical equipment, including motors, generators, frames and tracks of electrically operated cranes, electrically driven machinery, etc., shall be grounded.

(3) 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.

(4) Ground Resistance. Driven rod electrodes shall, where practicable, have a resistance to ground not to exceed 25 ohms. Where the resistance is not as low as 25

ohms, two or more electrodes connected in parallel shall be used.

(5) Testing of Grounds. Grounding circuits shall be checked to ensure that the circuit between the ground and the grounded power conductor has a resistance which is low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.

(6) Extension Cords. Extension cords used with portable electric tools and appliances shall be of three-wire type.

(7) Bonding. (a) Conductors used for bonding and grounding stationary and moveable equipment shall be of ample size to carry the anticipated current.

(b) 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.

(8) Temporary Wiring. All temporary wiring shall be effectively grounded in accordance with the national Electrical Code, NFPA No. 70-1971 or ANSI C1-1971.

(9) Construction Site. Precautions shall be taken to make any necessary open wiring inaccessible to unauthorized personnel.

(10) Temporary Lighting. (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 shall have insulation equal to that of the cable.

(c) Working spaces, walkways, and similar locations shall be kept clear of cords so as not to create a hazard to employees.

(d) Portable electric lighting used in moist and/or other hazardous locations, as for example, drums, tanks, and vessels shall be operated at a maximum of 12 volts. [Order 74-26, § 296-155-435, filed 5/7/74, effective 6/6/74.]

WAC 296-155-440 Equipment installation and maintenance. (1) Flexible Cable and Cords. (a) 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.

(b) Where different voltages, frequencies, or types of current (a.c. or d.c.) are to be supplied by portable cords, receptacles shall be of such design that attachment plugs used on such circuits are not interchangeable.

(c) 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.

(d) Attachment plugs for use in work areas shall be so constructed that they will endure rough use and be equipped with a suitable cord grip to prevent strain on the terminal screws.

(e) Flexible cord shall be used only in continuous lengths without splice, except suitable molded or vulcanized splices may be used where properly made, and the insulation shall be equal to the cable being spliced and wire connections soldered.

(f) Trailing cables shall be protected from damage.

(g) Splices in trailing cable shall be mechanically strong components and insulated to retain the mechanical and dielectric strength of the original cable.

(h) Cable passing through work areas shall be covered or elevated to protect it from damage which would create a hazard to employees.

(i) Handlamps of the portable type shall be of the molded composition or other type approved for the purpose. Brass-shell, paper-lined lampholders shall not be used. Handlamps shall be equipped with a handle and a substantial guard over the bulb and attached to the lampholder or the handle.

(j) Worn or frayed electric cables shall not be used.

(k) Extension cords shall be protected against accidental damage as may be caused by traffic, sharp corners, or projections and pinching in doors or elsewhere.

(l) Extension cords shall not be fastened with staples, hung from nails, or suspended by wire.

(2) Overcurrent Protection. (a) Overcurrent protection shall be provided by fuses or circuit breakers for each feeder and branch circuit, and shall be based on the current-carrying capacity of the conductors supplied and the power load being used.

(b) No overcurrent device shall be placed in any permanently grounded conductor, except where the overcurrent device simultaneously opens all conductors of the circuit or for motor running protection.

(c) When fuses are installed or removed with one or both terminals energized, special tools insulated for the voltage shall be used.

(3) Switches, Circuit Breakers, and Disconnecting Means. (a) Each disconnecting means for motors and appliances, and each service feeder or branch circuit at the point where it originates, shall be legibly marked to indicate its purpose unless located and arranged so the purpose is evident.

(b) Disconnecting means shall be located or shielded so that employees will not be injured.

(c) Boxes for disconnecting means shall be securely and rigidly fastened to the surface upon which they are mounted and fitted with covers.

(d) Boxes and disconnecting means installed in damp or wet locations shall be waterproof to the extent that water does not enter or accumulate.

(4) Transformers. (a) Energized transformers and other related electrically energized equipment over 150

volts to ground shall be protected so as to prevent accidental contact with any person. Protection shall be provided by individual integrated housing or by an enclosure, such as an electrical substation fence, which accommodates a group of such equipment. Metallic enclosures shall be grounded.

(b) Access to energized equipment covered by subdivision (a) of this subsection shall be secured by lock or other fasteners requiring the use of tools to open them.

(c) Signs indicating danger and prohibiting unauthorized access shall be conspicuously displayed on the housing or other enclosure around the equipment.

(d) Transformers mounted on utility poles at a height of more than 12 feet from the ground are exempt from the requirements of this subsection.

(5) Welding and Cutting Equipment. Welding and cutting equipment shall meet the requirements specified in Parts D and H of this chapter. [Order 74-26, § 296-155-440, filed 5/7/74, effective 6/6/74.]

WAC 296-155-450 Battery rooms and battery charging. (1) General Requirements. (a) Batteries of the nonseal type shall be located in enclosures with outside vents or in well ventilated rooms, so arranged 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 to prevent the accumulation of an explosive type mixture.

(c) Racks and trays shall be substantial and treated to be resistant to the electrolyte.

(d) Floors shall be of acid resistant construction or be protected from acid accumulations.

(e) Face shields, aprons, and rubber gloves shall be worn by workers handling acids or batteries.

(f) Facilities for quick drenching of the eyes and body shall be provided within 25 feet of the work area for emergency use.

(g) Facilities shall be provided for flushing and neutralizing spilled electrolyte, for fire protection, for protecting charging apparatus from damage by trucks, and for adequate ventilation for dispersal of fumes from gassing batteries.

(2) Charging. (a) Battery charging installations shall be located in areas designated for that purpose.

(b) When charging batteries, the vent caps shall be kept in place to avoid electrolyte spray. Care shall be taken to assure that vent caps are functioning. [Order 74-26, § 296-155-450, filed 5/7/74, effective 6/6/74.]

WAC 296-155-455 Hazardous locations. (1) General. For the purpose of this section, hazardous locations are defined as follows:

(a) Class I Locations——Class I Locations are those in which flammable gases or vapors are or may be present in quantities sufficient to produce explosive or ignitable mixtures.

(b) Class II Locations——Class II Locations are those which are hazardous because of the presence of combustible dust.

(c) Class III Locations——Class III Locations are those which 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 air in quantities sufficient to produce ignitable mixtures.

(d) See the National Electrical Code, NFPA 70-1971; ANSI C1-1971 (Rev. of 1968) for further definition of divisions 1 and 2 for each class.

(2) 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.

(3) Equipment approved for a specific hazardous location shall not be installed or intermixed with equipment approved for another specific hazardous location.

(4) Employer shall ensure that all wiring components and utilization equipment are maintained as vapor, dust, or fiber tight as contemplated by their approvals. There shall be no loose or missing screws, gaskets, threaded connections, or other impairments to this tight condition. [Order 74-26, § 296-155-455, filed 5/7/74, effective 6/6/74.]

Part J
LADDERS AND SCAFFOLDING

WAC

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WAC 296-155-475 Definitions. (1) "Ladders" (a) "Cleats" means ladder crosspieces of rectangular cross section placed on edge on which a person may step in ascending or descending.

(b) "Single cleat ladder" means one which consists of a pair of side rails, usually parallel, but with flared side rails permissible, connected together with cleats that are joined to the side rails at regular intervals.

(c) "Double cleat ladder" means one that is similar to a single cleat ladder, but is wider, with an additional center rail which will allow for two-way traffic for workers in ascending and descending.

(2) "Scaffolding" (a) "Bearer" means a horizontal member of a scaffold upon which the platform rests and which may be supported by ledgers.

(b) "Boatswain's chair" means a seat supported by slings attached to a suspended rope, designed to accommodate one employee in a sitting position.

(c) "Brace" means a tie that holds one scaffold member in a fixed position with respect to another member.

(d) "Bricklayers' square scaffold" means a scaffold composed of framed wood squares which support a platform, limited to light and medium duty.

(e) "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.

(f) "Carpenters' bracket scaffold" means a scaffold consisting of wood or metal brackets supporting a platform.

(g) "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.)

(h) "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.

(i) "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.

(j) "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.

(k) "Standard Guardrail" means a rail that will be 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 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.

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.

(l) "Heavy duty scaffold" means a scaffold designed and constructed to carry a working load not to exceed 75 pounds per square foot.

(m) "Horse scaffold" means a scaffold for light or medium duty, composed of horses supporting a work platform.

(n) "Interior hung scaffold" means a scaffold suspended from the ceiling or roof structure.

(o) "Ladder jack scaffold" means a light duty scaffold supported by brackets attached to ladders.

(p) "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.

(q) "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.

(r) "Light duty scaffold" means a scaffold designed and constructed to carry a working load not to exceed 25 pounds per square foot.

(s) "Manually propelled mobile scaffold" means a portable rolling scaffold supported by casters.

(t) "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.

(u) "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.

(v) "Medium duty scaffold" means a scaffold designed and constructed to carry a working load not to exceed 50 pounds per square foot.

(3) Additional definitions for "Scaffolding":

(a) "Midrail" means a rail approximately midway between the guardrail and platform, secured to the uprights erected along the exposed sides and ends of platforms.

(b) "Needle beam scaffold" means a light duty scaffold consisting of needle beams supporting a platform.

(c) "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.

(d) "Plasters–Lathers Scaffold" means a tubular welded scaffold erected for, and used primarily by, the plasterer and lather trades.

(e) "Putlog" means a scaffold member upon which the platform rests.

(f) "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.

(g) "Runner" means the lengthwise horizontal bracing or bearing members or both.

(h) "Scaffold" means any temporary elevated platform and its supporting structure used for supporting workers or materials, or both.

(i) "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.

(j) "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.

(k) "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.

(l) "Suspended Scaffold" means a scaffold supported from above, the platform of which is supported at more than two (2) 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.

(m) "Toeboard" means a standard toeboard and 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.

(n) "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.

(o) "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.

(p) "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.

(q) "Window jack scaffold" means a scaffold, the platform of which is supported by a bracket or jack which projects through a window opening.

(r) "Working load" means the load imposed by persons, materials, and equipment. [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 296-155-480 Ladders. (1) General requirements.

(a) All applicable rules for design, construction, maintenance, operation, testing, and use of ladders contained in WAC 296-24-780 through 296-24-81013 of the General Safety and Health Standards shall be complied with.

(b) Except where either permanent or temporary stairways or suitable ramps or runways are provided, ladders described in this Part shall be used to give safe access to all elevations.

(c) 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.

(d) Manufactured portable wood ladders provided by the employer shall be in accordance with the provisions of the American National Standards Institute, A14.1-1968, Safety Code for Portable Wood Ladders.

(e) 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 American National Standards Institute, A14.2-1972, Safety Code for Portable Metal Ladders.

(f) Fixed ladders shall be in accordance with the provisions of the American National Standards Institute, A14.3-1956, Safety Code for Fixed Ladders.

(g) Feet of portable ladders shall be placed on a substantial base, and the area around the top and bottom of the ladder shall be kept clear.

(h) Portable ladders shall be used at such a pitch that the horizontal distance from the top support to the foot of the ladder is about one-quarter of the working length of the ladder (the length along the ladder between the foot and the top support). Ladders shall not be used in a horizontal position as platforms, runways, or scaffolds.

(i) Ladders shall not be placed in passageways, doorways, driveways, or any location where they may be displaced by activities being conducted on any other work, unless protected by barricades or guards.

(j) The side rails shall extend not less than 36 inches above the landing. When this is not practical, grab rails, which provide a secure grip for an employee moving to or from the point of access, shall be installed.

(k) Portable straight ladders in use shall be tied, blocked, equipped with safety shoes or otherwise secured to prevent their being displaced.

(l) Portable metal ladders shall not be used for electrical work or where they may contact electrical conductors.

(m) Unless otherwise stated, all lumber sizes shall be nominal.

(n) When working from a ladder over 25 feet from the ground or floor, the ladder shall be secured at both top and bottom.

(o) No type of work shall be performed on a ladder over 25 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.

(p) Work, such as sandblasting or spray painting, that requires wearing eye protection, respirators, and handling of pressure equipment, shall be limited to not over 30 feet from the ground or floor while working on a ladder.

(2) Job-made ladders.

(a) Job-made ladders shall be constructed for intended use.

(b) If a ladder is to provide the only means of access or exit from a working area for twenty–five or more employees, or simultaneous two–way traffic is expected, a double cleat ladder shall be installed.

(c) Double cleat ladders shall not exceed 24 feet in length.

(d) Single cleat ladders shall not exceed 30 feet in length between supports (base and top landing). If ladders are to connect different landings, or if the length required exceeds this maximum length, two or more separate ladders shall be used, offset with a platform between each ladder. Guardrails and toeboards shall be erected on the exposed sides of the platforms.

(e) The width of single cleat ladders shall be at least 15 inches, but not more than 20 inches between rails at the top.

(f) It is preferable that side rails be continuous. If splicing is necessary to attain the required length however, the splice must develop the full strength of a continuous side rail of the same length.

(g) 2–inch by 4–inch lumber shall be used for side rails of single cleat ladders up to 16 feet long; 3–inch by 6–inch lumber, or the equivalent, shall be used for single cleat ladders from 16 to 30 feet in length.

(h) 2–inch by 4–inch lumber shall be used for side and middle rails of double cleat ladders up to 12 feet in length; 2–inch by 6–inch lumber for double cleat ladders from 12 to 24 feet in length.

(i) 1–inch by 4–inch lumber shall be used for cleats of single and double cleat ladders.

(j) Cleats shall be inset into the edges of the side rails one–half 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 other fasteners of equivalent strength. Cleats shall be uniformly spaced, 12 inches top–to–top.

(k) Side rails shall be parallel or flared top to bottom by not more than one–quarter of an inch for each 2 feet of ladder.

(l) Wood side rails of ladders having cleats shall be not less than 1–1/2 inches thick and 3–1/2 inches deep (2 inches by 4 inches nominal) when made of Group 2 or Group 3 woods (see Table J–18). Wood side rails of Group 4 wood (See Table J–18) may be used in the same cross–section of dimensions for cleat ladders up to 20 feet in length. [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 296–155–48090 Table J–18.

TABLE J–18

AVERAGE DENSITIES OF VARIOUS SPECIES
OF
WOOD FOR USE IN LADDERS

Species	Density (lbs/ft)
GROUP 1	
White ash	41
Beech	43
Birch	44
Rock elm	43
Hickory	50
Locust	47
Hard maple	42
Red maple	36
Red oak	43
White oak	46
Pecan	46
Persimmon	50
GROUP 2	
Douglas fir (coast region)	34
Western larch	38
Southern yellow pine	37
GROUP 3	
Red alder	28
Oregon ash	38
Pumpkin ash	37
Alaska cedar	31
Port Orford cedar	30
Cucumber	34
Cypress	32
Soft elm	36
Douglas fir (Rocky Mountain type)	30
Noble fir	27
Gum	34
West Coast hemlock	30
Magnolia	35
Oregon maple	34
Norway pine	31
Poplar	28
Redwood	25
Eastern spruce	28
Sitka spruce	28
Sycamore	35
Tamarack	37
Tupelo	35
GROUP 4	
Aspen	27
Basswood	25
Buckeye	25
Butternut	27
Incense cedar	25
Western red cedar	23
Black cottonwood	24
White fir	26
Hackberry	37
Eastern hemlock	28

Species	Density (lbs/ft)
Holly	39
Soft maple	33
Lodgepole pine	29
Idaho white pine	28
Northern white pine	25
Ponderosa pine	28
Sugar pine	26

[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).]

WAC 296-155-485 Scaffolding. (1) General requirements.

(a) All applicable rules for design, construction, maintenance, operation, testing, and use of scaffolds contained in chapter 296-24 WAC, "General Safety and Health Standards", shall apply within the construction industry. (See WAC 296-24-825 through 296-24-84013.)

(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) 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. The guardrail shall not be more than 18 inches from the edge of the outside platform plank on the outside face (opposite the building wall or structure) except on plasterer's and lather's scaffolds as permitted by WAC 296-155-485(18)(l). On the inside face (next to building or structure) the scaffold shall be as close to the building or structure as possible, but in no case shall the platform planks be more than 18 inches from the building or structure unless a standard guardrail is provided on the inside face of the scaffold. 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) All planking or platforms shall be overlapped (minimum 12 inches), or secured from movement and 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) No welding, burning, riveting, or open flame work shall be performed on any staging suspended by means of fiber or synthetic rope. 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 (12) and (24) 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.

(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 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 it shall be constructed and erected in accordance with such design.

(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.

(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.

(h) Bearers shall be installed transversely between posts and shall be securely coupled to the posts bearing on the runner coupler. When coupled directly to the runners, the coupler must be kept as close to the posts as possible.

(i) Bearers shall be at least 4 inches but not more than 12 inches longer than the post spacing or runner spacing.

(j) Cross bracing shall be installed across the width of the scaffold at least every third set of posts horizontally and every fourth runner vertically. Such bracing shall extend diagonally from the inner and outer runners upward to the next outer and inner runners.

(k) Longitudinal diagonal bracing on the inner and outer rows of poles shall be installed at approximately a 45° angle from near the base of the first outer post upward to the extreme top of the scaffold. Where the longitudinal length of the scaffold permits, such bracing shall be duplicated beginning at every fifth post. In a similar manner, longitudinal diagonal bracing shall also

be installed from the last post extending back and upward toward the first post. Where conditions preclude the attachment of this bracing to the posts, it may be attached to the runners.

(l) 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) Tubular welded frame scaffolds.

(a) Metal tubular frame scaffolds, including accessories such as braces, brackets, trusses, screw legs, ladders, etc., shall be designed, constructed, and erected to safely support four times the maximum rated load.

(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, square, and rigid. All brace connections shall be made secure.

(d) Scaffold 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 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 other equivalent suitable means.

(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) Drawings and specifications for all frame scaffolds over 125 feet in height above the base plates shall be designed by a registered professional engineer.

(5) Manually propelled mobile scaffolds.

(a) When freestanding mobile scaffold towers are used, the height shall not exceed four times the minimum base dimension.

(b) Casters shall be properly designed for strength and dimensions to support four times the maximum intended load. All casters shall be provided with a positive locking device to hold the scaffold in position.

(c) Scaffolds shall be properly braced by cross bracing and horizontal bracing conforming with subsection (4)(c) of this section.

(d) Platforms shall be tightly planked for the full width of the scaffold except for necessary entrance opening. Platforms shall be secured in place.

(e) A ladder or stairway shall be provided for proper access and exit and shall be affixed or built into the scaffold and so located that when in use it will not have a tendency to tip the scaffold. A landing platform must be provided at intervals not to exceed 35 feet.

(f) The force necessary to move the mobile scaffold shall be applied near or as close to the base as practicable and provision shall be made to stabilize the tower during movement from one location to another. Scaffolds shall only be moved on level floors, free of obstructions and openings.

(g) The employer shall not allow employees to ride on manually propelled scaffolds unless the following conditions exist:

(i) The floor or surface is within 3° of level, and free from pits, holes, or obstructions;

(ii) The minimum dimension of the scaffold base when ready for rolling, is at least one-half of the height. Outriggers, if used, shall be installed on both sides of staging;

(iii) The wheels are equipped with rubber or similar resilient tires;

(iv) All tools and materials are secured or removed from the platform before the mobile scaffold is moved.

(h) Scaffolds in use by any persons shall rest upon a suitable footing and shall stand plumb. The casters or wheels shall be locked to prevent any movement.

(i) Mobile scaffolds constructed of metal members shall also conform to applicable provisions of subsections (2), (3), and (4) of this section, depending on the material of which they are constructed.

(6) Elevating and rotating work platforms. Applicable requirements of American National Standards Institute A92.2-1969, Vehicle Mounted Elevating and Rotating Work Platforms, shall be complied with for such equipment, as required by the provisions of WAC 296-155-580.

(7) Outrigger scaffolds.

(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 anchorage point, 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 securely anchored 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 by 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.

(d) Planking shall be laid tight and shall extend to within 3 inches of the building wall. Planking shall be secured to the beams.

(8) 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 and at least four turns of wire rope shall at all times remain on the drum. 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.

(9) (Swinging scaffolds) two–point suspension.

(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 mild steel, or other equivalent materials, 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. Tiebacks of 3/4–inch manila rope, or the equivalent, shall 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.

(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 safety life belt 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 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 safety belt shall be tied off to a substantial member of the scaffold itself or to a horizontal lifeline substantially 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 in the near proximity to the suspension droplines to prevent unnecessary side impact. The safety dropline shall also have a 6 to 1 safety factor.

(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 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 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.

(10) 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 (9)(j), 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.

(11) 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 then comply with subsection (9) of this section.

(g) The supporting cable shall be vertical for its entire length, and the basket shall not be swayed nor the cable fixed to any intermediate points to change the original path of travel.

(h) Suspension methods shall conform to applicable provisions of subsections (8) and (9) 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.

(12) Boatswain's chairs.

(a) The chair seat shall not be less than 12 x 24 inches, and 1–inch thickness. The seat shall be reinforced on the underside by cleats securely fastened to prevent the board from splitting.

(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 safety belt and lifeline in accordance with WAC 296–155–225. 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.

(13) 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.

(14) 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.

(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.

(15) 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.

(16) 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 safety belt and lifeline in accordance with WAC 296–155–225.

(17) Plasterers', decorators', and large area scaffolds.

(a) Plasterers', 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.

(18) Plasterers' and lathers' tubular welded frame scaffolds.

(a) Plasterers' and lathers' scaffolds shall be erected in accordance with requirements of this section.

(b) 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.

(c) No scaffold shall be erected, moved, dismantled, or altered except under the supervision of competent persons.

(d) Scaffolds, including accessories such as braces, brackets, trusses, screw legs, ladders, etc., shall be designed, constructed, and erected to safely support four times the maximum rated loads.

(e) Spacing of panels or frames shall be consistent with the loads imposed.

(f) The frames shall be placed one on top of the other with coupling or stacking pins to provide proper vertical alinement of the legs.

(g) Where uplift may occur, panels shall be locked together vertically by pins or other equivalent suitable means.

(h) 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.

(i) The outside face (opposite the building wall) of the scaffold shall be fully cross braced with a horizontal continuous guardrail attached to the lower cross brace lock pins. (See Figure J–1.)

(j) The inside face (next to building wall) of the scaffold shall have a continuous horizontal brace attached to the upper cross brace lock pins.

(k) The outrigger plank shall be no more than 18 inches from the finished wall.

(l) The scaffold platform shall be planked to leave no more than a 22–inch maximum opening between the outside plank and the outside vertical member of the scaffold frame. (See Figure J–2.)

NOTE: The scaffold frame may be utilized to travel from one working level to another working level, provided the scaffold is of the type typified in Figure J–2.

(m) Any scaffold over three frames high shall have a standard inside ladder installed.

(n) All end runs shall be provided with a standard top rail and mid rail.

(o) All outside ends of turns shall be provided with a standard top rail and mid rail or with a cross brace and horizontal rail at the bottom of the cross brace.

(p) If no wall or studs are present on the building side of any scaffold over ten feet high, safety belts shall be used.

(19) 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.

(20) 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 heavy–duty ladders and shall be designed and constructed in accordance with American National Standards Institute A14.1–1968, Safety Code for Portable Wood Ladders, and A14.2–1968, 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. The span between supports for wood shall not exceed 8 feet. Platform width shall be not less than 18 inches.

(f) Not more than two employees shall occupy any given 8 feet of any ladder jack scaffold at any one time.

(21) 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 safety belts 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.

(22) Roofing brackets.

(a) Roofing brackets shall be constructed to fit the pitch of the roof.

(b) 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.

(c) A catch platform shall be installed below the working area of roofs more than 16 feet from the ground to eaves with a slope greater than 4 inches in 12 inches without a parapet. In width, the platform shall extend 2 feet beyond the protection of the eaves and shall be provided with a guardrail, midrail, and toeboard. This provision shall not apply where employees engaged in work

upon such roofs are protected by a safety belt attached to a lifeline.

(23) Crawling boards or chicken ladders.

(a) Crawling boards shall be not less than 10 inches wide and 1 inch thick, having cleats 1 x 1 1/2 inches. The cleats shall be equal in length to the width of the board and spaced at equal intervals not to exceed 24 inches. Nails shall be driven through and clinched on the underside. 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.

(24) 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. 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 and lifeline, in accordance with WAC 296–155–225.

(25) 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.

(26) Pump jack scaffolds.

(a) Pump jack scaffolds shall:

(i) Not carry a working load exceeding 500 pounds; and

(ii) Be capable of supporting without failure at least four times the maximum intended load.

(iii) The manufactured components shall not be 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.

(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 safety belts 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.

(27) 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.

(28) 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.

(29) Ladder supported scaffolds.

(a) Box scaffolds.

(i) A step ladder scaffold, trestle scaffold, or an extension trestle scaffold shall be composed of two or more step ladders, or trestle ladders, or trestle, or extension trestle placed in line and supporting the platform in the interval or intervals, or in paralleled lines supporting stringers in the interval or intervals, upon which are supported kick plank platforms, not exceeding one platform to each bay. Such scaffolds are also known as "box scaffolds."

(ii) The number of persons working on each bay shall not exceed three at any one time.

(b) Step ladder scaffolds.

(i) Platforms more than 8 feet above the floor level shall not be supported on step ladders.

(ii) Platforms shall not be supported on the top step of a step ladder unless it is provided with stops at least one inch high at each side to prevent the plank from slipping off.

(c) Trestle ladder scaffolds.

(i) Platforms more than 16 feet above the floor level shall not be supported on trestle ladders.

(ii) The top of the trestle ladder shall be at least three steps above the level of the scaffold platform.

(iii) Where an extension trestle ladder is used to support a scaffold platform the maximum height of the platform shall be 20 feet above the floor level and the point of support on the extension section shall not be more than 6 feet above the apex of the base section.

(d) Extension trestle scaffolds.

(i) Platforms supported on extension trestles shall not be more than 16 feet above the floor level.

(ii) Ladders shall be provided for access to extension trestle scaffolds. Workers shall not climb up or down on the extension trestle.

(iii) It shall be the individual responsibility of the supervisor and of each worker to make sure that all clamps and fastenings on the extension trestle are secure before employees are allowed to work on the scaffold.

(30) 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 planks 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.

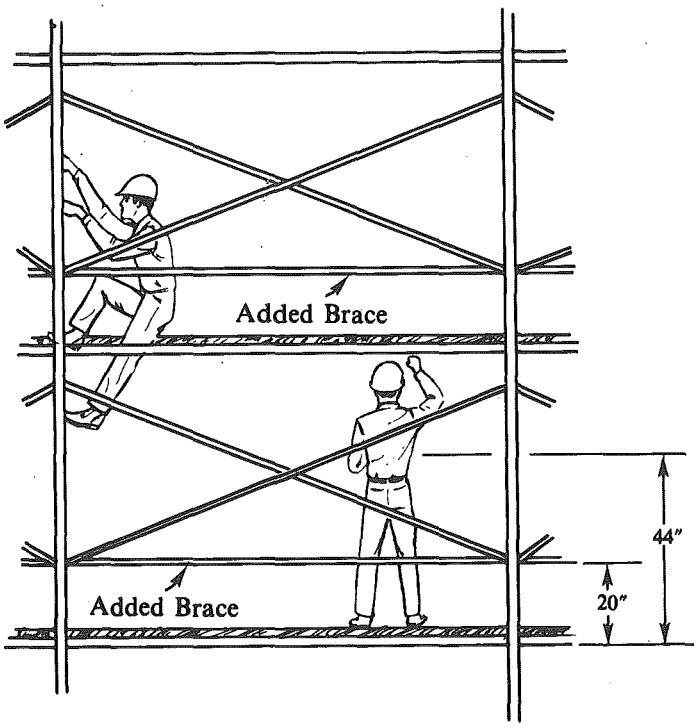
(31) Scaffold platforms supported by catenary or stretch cables.

(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, 49.17.150, 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 296-155-48501 Figure J-1.



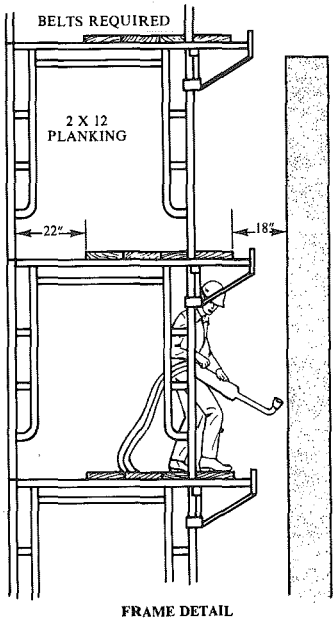
BACK BRACE DETAIL

FIGURE J-1

Welded Tubular Scaffold
Plasters–Lathers

[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.]

WAC 296-155-48502 Figure J-2.



FRAME DETAIL

FIGURE J-2

WELDED TUBULAR SCAFFOLD
PLASTERS - LATHERS

[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.]

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	25	50
Permissible span (ft.)	10	8	6	8	6

[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.	9 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.

TABLE J-2——cont.

	Maximum height of scaffold	
	20 ft.	60 ft.
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	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-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.

TABLE J-5——cont.

	Maximum height of scaffold	
	20 ft.	60 ft.
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 SCAFFOLD 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 COUPLE 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 (traverse)	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. (minimum)	4 in. (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
Reinforcing strip (mimimum)	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	Dimensions
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.
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.]

Part K
FLOOR AND WALL OPENINGS AND STAIRWAYS

WAC

296-155-500 Definitions applicable to this part.
296-155-505 Guardrails, handrails, and covers.
296-155-510 Stairways.

WAC 296-155-500 Definitions applicable to this part. (1) "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.

(2) "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.

(3) "Handrail" means a single bar or pipe supported on brackets from a wall or partition, as on a stairway or ramp, to furnish persons with a handhold in case of tripping.

(4) "Nose, nosing" means that portion of a tread projecting beyond the face of the riser immediately below.

(5) "Platform" means a working space for persons, elevated above the surrounding floor or ground, such as a balcony or platform for the operation of machinery and equipment.

(6) "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.

(7) "Rise" means the vertical distance from the top of a tread to the top of the next higher tread.

(8) "Stair platform" means an extended step or landing breaking a continuous run of stairs.

(9) "Stair railing" means a vertical barrier erected along exposed sides of a stairway to prevent falls of persons.

(10) "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.

(11) "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.

(12) "Standard strength and construction" means any construction of railings, covers, or other guards that meets the requirements of this Part.

(13) "Toe board" 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.

(14) "Tread width" means the horizontal distance from front to back of tread, including nosing, when used.

(15) "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. [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 shall apply to temporary or emergency conditions where there is danger of employees or materials falling through floor, roof, or wall openings, or from stairways or runways.

(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 subsection (6) 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 man 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 freguently, 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, it shall be guarded by a fixed standard railing on all exposed sides or a cover capable of sustaining the weight of a 200-pound person.

(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) Temporary floor openings shall have standard railings.

(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.

(i) 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.

(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 (6)(g)(ii) of this section.

(b) An extension platform, outside a wall opening, onto which materials can be hoisted for handling shall have side rails or equivalent guards of standard specifications. 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 subdivision (a) of this subsection shall apply, except that a toe board is not required.

(4) Guarding of Open-Sided Floors, Platforms, and Runways. (a) Every open-sided floor or platform 6 feet or more above adjacent floor or ground level shall be guarded by a standard railing, or the equivalent, as specified in (6)(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 (6) of this section, on all open sides, 4 feet or more above 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.

(5) Stairway Railings and Guards. (a) Every flight of stairs having four or more risers shall be equipped with standard stair railings or standard handrails as specified below, the width of the stair to be measured clear of all obstructions except handrails:

(i) On stairways less than 44 inches wide having both sides enclosed, at least one handrail, preferably on the right side descending;

(ii) On stairways less than 44 inches wide having one side open, at least one stair railing on the open side;

(iii) On stairways less than 44 inches wide having both sides open, one stair railing on each side;

(iv) On stairways more than 44 inches wide but less than 88 inches wide, one handrail on each enclosed side and one stair railing on each open side;

(v) On stairways 88 or more inches wide, one handrail on each enclosed side, one stair railing on each open side, and one intermediate stair railing located approximately midway of the width.

(b) Winding stairs shall be equipped with a handrail offset to prevent walking on all portions of the treads having width less than 6 inches.

(6) 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 toprail 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, with posts 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) A stair railing shall be of construction similar to a standard railing, but the vertical height shall be not more than 34 inches nor less than 30 inches from upper surface to top rail to surface of tread in line with face of riser at forward edge of tread.

(c) (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.

(d) (i) A standard handrail shall be of construction similar to a standard railing except that it is mounted on a wall or partition, and does not include an intermediate rail. It shall have a smooth surface along the top and both sides of the handrail. The handrail shall have an adequate handhold for any one grasping it to avoid falling. Ends of the handrail shall be constructed so as not to constitute a projection hazard.

(ii) The height of handrails shall be not more than 34 inches nor less than 30 inches from upper surface of handrail to surface of tread, in line with face of riser or to surface of ramp.

(iii) All handrails and railings shall be provided with a clearance of approximately 3 inches between the handrail or railing and any other object.

(e) 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) The floor opening cover shall be capable of supporting the maximum intended load and so installed as to prevent accidental displacement.

(f) Skylight openings that create a falling hazard shall be guarded with a standard railing, or covered in accordance with (e)(ii) of this subsection.

(g) 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. [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 296–155–510 Stairways. (1) On all structures, two or more floors in height, stairways, ladders, or ramps shall be provided for employees during the construction period.

(2) Stairway railing and guardrails shall meet the requirements of WAC 296–155–505(5) and (6).

(3) All parts of stairways shall be free of hazardous projections, such as protruding nails.

(4) Debris, and other loose materials, shall not be allowed on or under stairways.

(5) Slippery conditions on stairways shall be eliminated as soon as possible after they occur.

(6) Permanent steel or other metal stairways, and landings with hollow pan–type treads that are to be filled with concrete or other materials, when used during construction, shall be filled to the level of the nosing with solid material. The requirement shall not apply during the period of actual construction of the stairways themselves.

(7) Wooden treads for temporary service shall be full width.

(8) Metal landings shall be secured in place before filling.

(9) Temporary stairs shall have a landing not less than 30 inches in the direction of travel at every 12 feet of vertical rise.

(10) Stairs shall be installed at angles to the horizontal of between 30° and 50°.

(11) Rise height and tread width shall be uniform throughout any flight of stairs including any foundation structure used as one or more treads of the stairs.

(12) All stairs shall be lighted in accordance with Part B of this chapter.

(13) Spiral stairways shall not be permitted except for special limited usage and secondary access situations where it is not practical to provide a conventional stairway. [Order 74-26, § 296-155-510, filed 5/7/74, effective 6/6/74.]

Part L
CRANES, DERRICKS, HOISTS, ELEVATORS, AND CONVEYORS

WAC

296-155-525 Cranes and derricks.
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WAC 296-155-525 Cranes and derricks. (1) 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, special hazard warnings, or instruction, shall be conspicuously posted on all equipment. Instructions or warnings shall be visible to the operator while he is at his 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.

NOTE: When decals, illustrating hand signals, are available from the Division or otherwise, they should be posted at the operator's station.

(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) 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 one-sixty-fourth inch for diameters up to and including five-sixteenths inch, one-thirty-second inch for diameters three-eighths inch to and including one-half inch, three-sixty-fourths inch for diameters nine-sixteenths inch 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.

(vi) Wire rope safety factors shall be in accordance with American National Standards Institute B 30.5-1968 or SAE J959-1966.

(g) The foot block of every derrick shall be securely supported and firmly secured against movement in any direction. Proper shores shall be placed against the foot blocks of the derrick to take the pull of the hoisting engine.

(h) Derricks shall be operated only by authorized personnel.

(i) The top of the mast on guy derricks shall be steadied by not less than six (6) guy cables equally spaced.

(j) On guy derricks, eyes shall be formed in the guys at the masthead end by bending back the ends of the cables and clamping the ends with at least three (3) clamps.

(k) 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.

(l) Care shall be taken to guard against injury to workers, or damage to scaffolds or buildings, from swinging loads.

(m) When "dead men" are used as anchors, the cable shall be so attached that the concentrated load will not cause a shear stress on the "dead men".

(n) On stiff leg derricks where the boom is longer than the mast, care shall be taken to see that the goose–necks are fitted to the stiff legs in a manner so that there will be no undue friction on the gudgeon pin.

(o) A collar shall be placed on the gudgeon pin above the goose–neck, and a hole drilled through the collar and the gudgeon pin, through which a steel bolt shall be passed to hold the collar in position; the steel bolt shall be of sufficient size to prevent the goose–neck from shearing it off when the loaded boom is swung against the stiff leg.

(p) Double sets of bolts shall be used to fasten back legs of a stiff leg derrick.

(q) Particular attention shall be given to the weighting and anchoring of stiff leg derricks.

(r) The operator shall avoid carrying loads over people.

(s) 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.

(t) Only authorized personnel shall make sling hitches on loads.

(u) Workers shall not be allowed to ride on loads handled by derricks.

(v) 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.

(w) Bell, whistle, electric or visual signals shall be provided in connection with all hoists and cableways where an operator is stationed at the power device. Hoist signaling devices shall be so located as to minimize the possibility of signaling accidentally and located so that they cannot be operated by a person standing on hoist or bucket.

(x) 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 the American National Standards Institute, B 15.1–1958 Rev., Safety Code for Mechanical Power Transmission Apparatus.

(y) A minimum distance of thirty (30) 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.

(z) All exhaust pipes shall be guarded or insulated where contact by employees, in the performance of normal duties, is possible.

(2) 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 windows in cabs shall be of safety glass, or equivalent, that introduces no visible distortion that will interfere with the safe operation of the machine.

(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 conforming to American National Standards Institute, B30.5–1968.

(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 de–energized 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 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 de–energized 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.

(3) 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 B30.5–1968, Safety Code for Crawler, Locomotive and Truck Cranes.

(4) Tower Cranes. (a) Tower Cranes shall be erected 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 signalman so stationed where he can observe the boom and/or counterweight movement, and the object with which it may contact to warn the operator(s) of imminent danger.

(iii) A secondary means of positive communications shall be established as a back–up for possible direct voice communication failure.

NOTE: 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) Prior to initial use, all newly erected or altered cranes shall be tested with the design rated load to insure compliance with this standard, including the following functions:

(i) Hoisting and lowering;
(ii) Trolley travel;
(iii) Swing motion;
(iv) Limit, locking and safety devices;
(v) Crane travel where applicable; and
(vi) Foundation and erection.

NOTE: Tower cranes erected on a new foundation shall be tested in accordance with ANSI B30.3–1975 Chapter 3–1.

(A) The test shall consit of suspending a load of not less than 100% of the rated capacity for five (5) 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.

(B) 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 he may be using. 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. The chart shall be visible and readable to the operator while he is in his 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 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) 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) Operators shall not occupy cabs of remotely-controlled stations during repositioning operations.

(o) An approved and safe means shall be provided for access to operator's cab and machinery platform.

(p) When necessary for inspection or maintenance purposes, ladders, walkways with railing or other devices shall be provided.

(q) 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.

(r) 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.

(s) All electrical equipment shall be properly grounded and protection shall be provided against lightning.

(t) When the operator is actually operating the crane, he shall remain in a stationary position.

(u) 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.

(v) 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.

(w) 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.

(x) 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.

(y) 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.

(z) 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.

(5) 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 NOTE under 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 safety belts and lanyards attached to crane or to lifelines in conformance with Part C 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.

(6) 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 B30.2.0–1967, Safety Code for Overhead and Gantry Cranes.

(7) 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 B30.6–1969, Safety Code for Derricks.

(8) 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.

(9) 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.

He 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 brackets 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. [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 296–155–530 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) Rated load capacities, recommended operating speeds, and special hazard warning or instructions shall be posted on cars and platforms.

(c) 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.

(d) Hoisting ropes shall be installed in accordance with the wire rope manufacturer's recommendations.

(e) The installation of live booms on hoists is prohibited.

(f) The use of endless belt–type man lifts on construction shall be prohibited.

(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 quipped 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) 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.

(b) Towers inside of structures shall be enclosed on all four sides throughout the full height.

(c) 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.

(d) 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.

(e) Cars shall be permanently enclosed on all sides and the top, except sides used for entrance and exit, which have car gates or doors.

(f) 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.

(g) 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.

(h) Doors or gates shall be provided with electric contacts which do not allow movement of the hoist when door or gate is open.

(i) 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.

(j) 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.

(k) 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.

(l) Safeties shall be capable of stopping and holding the car and rated load when traveling at governor tripping speed.

(m) Cars shall be provided with a capacity and data plate secured in a conspicuous place on the car or crosshead.

(n) Internal combustion engines shall not be permitted for direct drive.

(o) Normal and final terminal stopping devices shall be provided.

(p) An emergency stop switch shall be provided in the car and marked "Stop."

(q) 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

(r) 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.

(s) 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.

(t) 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–eights 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.

(u)(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 296–90 WAC, Safety Requirements for Cantilever Hoists and chapter 296–100 WAC, Safety Requirements for Material Hoists.

[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) General Requirements. (a) Means for stopping the motor or engine shall be provided at the operator's station. Conveyor systems shall be equipped with an audible warning signal to be sounded immediately before starting up the conveyor.

(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.

(c) 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.

(d) Screw conveyors shall be guarded to prevent employee contact with turning flights.

(e) Where a conveyor passes over work areas, aisles, or thoroughfares, suitable guards shall be provided to protect employees required to work below the conveyors.

(f) All crossovers, aisles, and passageways shall be conspicuously marked by suitable signs, as required by Part E of this Chapter.

(g) Conveyors shall be locked out or otherwise rendered inoperable, and tagged out with a "Do Not Operate" tag, during repairs and when operation is hazardous to employees performing maintenance work.

(h) All conveyors in use shall meet the applicable requirements for design, construction, inspection, testing, maintenance, and operation, as prescribed in the ANSI B20.1–1957, Safety Code for Conveyors, Cableways, and Related Equipment. [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 (1/2) 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 (1 1/2) 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 (4) 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 he starts 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. [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 (1/5) 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 (3) 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 (2) 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 cable clip shall be installed to secure the dead end of the rope to the main part of the rope. The clip shall be installed in accordance with WAC 296-155-330(3)(g). [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 unprogramed 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 signalman during the period of loading and unloading. This signalman 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. [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.

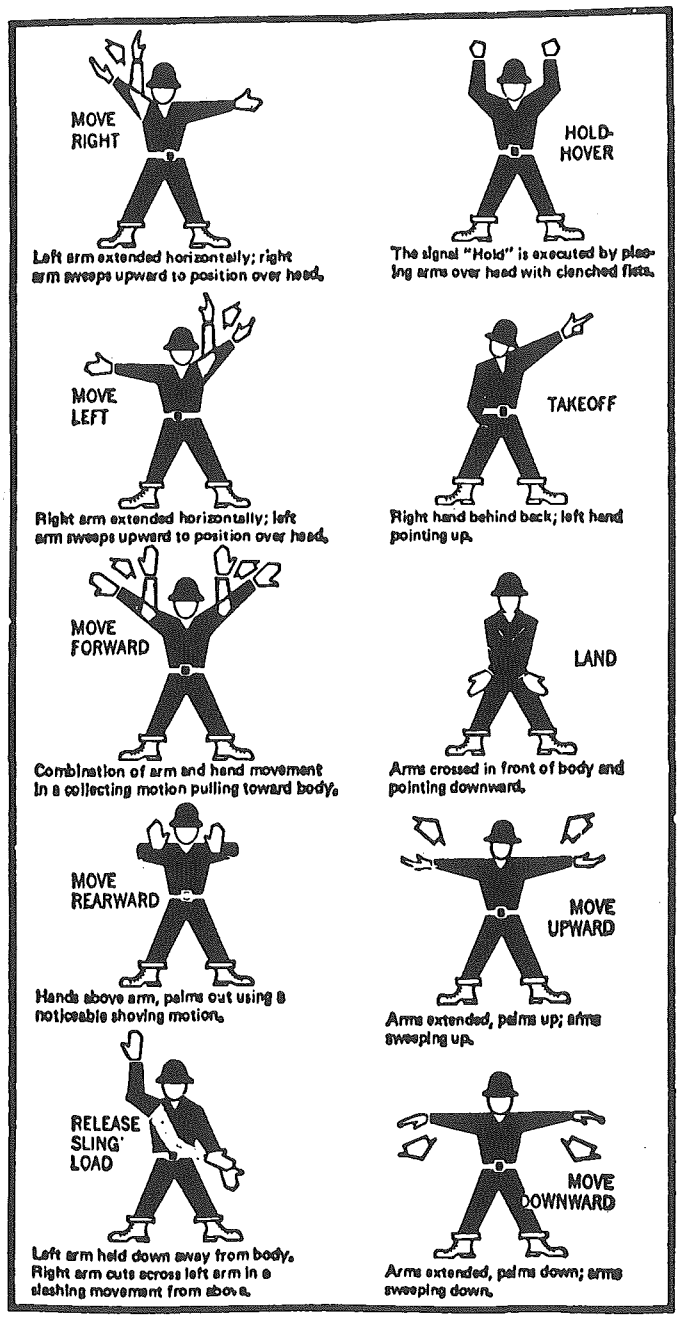


Figure L-1

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 296-155-580 Aerial lifts. (1) General Requirements. (a) Unless otherwise provided in this section, aerial lifts acquired for use on or after the effective date of this section shall be designed and constructed in conformance with the applicable requirements of the American National Standard for "Vehicle Mounted Elevating and Rotating Work Platforms," ANSI A92.2-1969, including appendix. Aerial lifts acquired before the effective date of this section, which do not meet the requirements of ANSI A92.2-1969, may not be used after January 1,1976, unless they shall have been modified so as to conform with the applicable design and construction requirements of ANSI A92.2-1969. Aerial lifts include the following types of vehicle-mounted aerial devices used to elevate personnel to jobsites above ground: (i) Extensible boom platforms; (ii) aerial ladders, (iii) articulating boom platforms, (iv) vertical towers, and (v) a combination of any of the above. Aerial equipment may be made of metal, wood, fiberglass reinforced plastic (FRP), or other material; may be powered or manually operated; and are deemed to be aerial lifts whether or not they are capable of rotating about a substantially vertical axis.

(b) Aerial lifts may be "field modified" for uses other than those intended by the manufacturer provided the modification has been certified in writing by the manufacturer or by any other equivalent entity, such as a nationally recognized testing laboratory, to be in conformity with all applicable provisions of ANSI A92.2-1969 and this section and to be at least as safe as the equipment was before modification.

(2) Specific Requirements. (a) Ladder Trucks and Tower Trucks. Aerial ladders shall be secured in the lower traveling position by a locking device on top of the truck cab or truck framework, and the manually operated device at the base of the ladder before the truck is moved for highway travel.

(b) Extensible and Articulating Boom Platforms. (i) Lift controls shall be tested each day prior to use to determine the such controls are in safe working condition.

(ii) Only authorized persons shall operate an aerial lift.

(iii) Belting off to an adjacent pole, structure, or equipment while working from an aerial lift shall not be permitted.

(iv) Employees shall always stand firmly on the floor of the basket, and shall not sit or climb on the edge of the basket or use planks, ladders, or other devices for a work position.

(v) A body belt shall be worn and a lanyard attached to the boom or basket when working from an aerial lift.

(vi) Boom and basket load limits specified by the manufacturer shall not be exceeded.

(vii) The brakes shall be set and when outriggers are used, they shall be positioned on pads or a solid surface. Wheel chocks shall be installed before using an aerial lift on an incline, provided they can be safely installed.

(viii) An aerial lift truck shall not be moved when the boom is elevated in a working position with persons in the basket, except for equipment which is specifically designed for this type of operation in accordance with the provisions of subdivisions (a) and (b) of subsection (1) of this section.

(ix) Articulating boom and extensible boom platforms, primarily designed as personnel carriers, shall have both platform (upper) and lower controls. Upper controls shall be in or beside the platform within easy reach of the operator. Lower controls shall provide for

over-riding the upper controls. Controls shall be plainly marked as to their function. Lower level controls shall not be operated unless permission has been obtained from the employee in the lift, except in case of emergency.

(x) Climbers shall not be worn while performing work from an aerial lift.

(xi) The insulated portion of an aerial lift shall not be altered in any manner that might reduce its insulating value.

(xii) Before moving an aerial lift for travel, the boom(s) shall be inspected to see that it is properly cradled and outriggers are in stowed position except as provided in item (viii) of this subdivision.

(c) Electrical Tests. All electrical tests shall conform to the requirements of ANSI A92.2-1969 section 5. However, equivalent d.c. voltage tests may be used in lieu of the a.c. voltage specified in A92.2-1969; d.c. voltage tests which are approved by the equipment manufacturer or equivalent entity shall be considered an equivalent test for the purpose of this subdivision.

(d) Bursting Safety Factor. The provisions of the American National Standards Institute standard ANSI A92.2-1969, section 4.9 Bursting Safety Factor shall apply to all critical hydraulic and pneumatic components. Critical components are those in which a failure would result in a free fall or free rotation of the boom. All noncritical components shall have bursting safety factor of at least 2 to 1.

(e) Welding Standards. All welding shall conform to the following standards as applicable:

(i) Standard Qualification Procedure, AWS B3.0-41.

(ii) Recommended Practices for Automotive Welding Design, AWS D8.4-61.

(iii) Standard Qualification of Welding Procedures and Welders for Piping and Tubing, AWS D10.9-69.

(iv) Specifications for Welding Highway and Railway Bridges, AWS D2.0-69. [Order 74-26, § 296-155-580, filed 5/7/74, effective 6/6/74.]

WAC 296-155-59901 Table 1.

TABLE 1

STANDARD 6 x 7 WIRE ROPE[1]

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

TABLE 1——cont.

Diameter	Approximate Weight Per Foot	Breaking Strength in Tons of 2,000 Pounds		
		Improved Plow Steel	Plow Steel	Mild Plow Steel
Inches	Pounds			
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

[1] 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.

[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 ROPE[1]

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	...

[1] 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.

[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 ROPE[1]

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

[1] 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.

[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 ROPE[1]

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

TABLE 4——cont.

Diameter	Approximate Weight Per Foot	Breaking Strength in Tons of 2,000 Pounds	
		Improved Plow Steel	Plow Steel
Inches	Pounds		
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	19400	449.0	390.0

[1] 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.

[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
	Pounds	Pounds	Pounds	Pounds
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
	Pounds	Pounds	Pounds	Pounds
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	...
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 ROPE[1]

DIAMETER		Approximate Weight Per Foot	Breaking Strength in Tons of 2,000 Pounds	
Before Serving	After Serving		Plow Steel	Mild Plow Steel
Inches	Inches	Pounds		
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

TABLE 7——cont.

DIAMETER		Approximate Weight Per Foot	Breaking Strength in Tons of 2,000 Pounds	
Before Serving	After Serving		Plow Steel	Mild Plow Steel
Inches	Inches	Pounds		
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	...	...

[1] 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.

[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
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
1	1.38	32.8	28.5
1-1/16	1.56	36.9	32.1

TABLE 10——cont.

DIAMETER	Approximate Weight Per Foot	Breaking Strength in Tons of 2,000 Pounds	
		Galvanized Improved Plow Steel	Galvanized Plow Steel
Inches	Pounds		
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 ROPE[1]

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
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	...

[1] For these ropes when galvanized, deduct 10 percent form 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 ROPE[1]

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	...

TABLE 13——cont.

DIAMETER	Approximate	Breaking Strength in Tons of 2,000 Pounds	
Inches	Pounds		
2-1/2	11.20	269.0	...
2-3/4	13.60	321.0	...

[1] For 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 Weight Per Foot	Breaking Strength in Tons of 2,000 Pounds	
		Improved Plow Steel	Plow Steel
Inches	Pounds		
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
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 ROPE[1]

DIAMETER	Approximate Weight Per Foot	Breaking Strength in Tons of 2,000 Pounds	
		Plow Steel	Iron
Inches	Pounds		
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

TABLE 15——cont.

DIAMETER	Approximate Weight Per Foot	Breaking Strength in Tons of 2,000 Pounds	
		Plow Steel	Iron
Inches	Pounds		
9/16	.35	6.53	2.90
5/8	.43	8.04	3.57

[1] For 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
Inches		Pounds		
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

TABLE 17——cont.

Width and Thickness	Number of Ropes	Approximate Weight Per Foot	Breaking Strength in Tons of 2,000 Pounds	
			Plow Steel	Mild Plow Steel
Inches		Pounds		
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 Weigh 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	Approximate Weight Per Foot	BREAKING STRENGTH		
		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
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.
296-155-605 Equipment.
296-155-610 Motor vehicles.
296-155-615 Material handling equipment.
296-155-620 Pile driving equipment.
296-155-625 Site clearing.
296-155-630 Marine operations and equipment.

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 typing 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 (2) 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 (20) 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) "Pre-test 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) A safety tire rack, cage, or equivalent protection shall be provided and used when inflating, mounting, or dismounting tires installed on split rims, or rims equipped with locking rings or similar devices.

(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)(f) 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.

(2) Specific Requirements. (Reserved). [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 are those vehicles that operate within an off-highway jobsite, not open to public traffic. 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)(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.

(c) All vehicles shall be equipped with an adequate audible warning device at the operator's station and in an operable condition.

(d) No employer shall use any motor vehicle equipment having an obstructed view to the rear unless:

(i) The vehicle has a reverse signal alarm audible above the surrounding noise level or:

(ii) The vehicle is backed up only when an observer signals that it is safe to do so.

(e) 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.

(f) 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.

(g) Tools and material shall be secured to prevent movement when transported in the same compartment with employees.

(h) Vehicles used to transport employees shall have seats firmly secured and adequate for the number of employees to be carried.

(i) 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.

(j) 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.

(k) 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.

(l) Trip handles for tailgates of dump trucks shall be so arranged that, in dumping, the operator will be in the clear.

(m) 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.

(n) 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, etc., where such equipment is necessary. [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 earth-moving 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 Dozers	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. (i) 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, compacters, 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.

(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 learning to operate tractors, shall not be allowed on tractors during working hours.

(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). (a) Industrial trucks shall meet the requirements of WAC 296-155-605 and the following:

(i) 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 counter-weights are provided by the manufacturer, corresponding alternate rated capacities also shall be clearly shown on the vehicle. These ratings shall not be exceeded.

(ii) 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.

(iii) 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.

(iv) 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.

(v) All high lift rider industrial trucks shall be equipped with overhead gurards which meet the configuration and structural requirements as defined in paragraph 421 of American National Standards Institute B56.1-1969, Safety Standards for Powered Industrial Trucks.

(vi) 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 B56.1-1969, Safety Standards for Powered Industrial Trucks. [Order 74-26, § 296-155-615, filed 5/7/74, effective 6/6/74.]

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 worker may engage his safety belt 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 signalmen. The driver operator or drum person shall receive signals from no others, except when loftsman is above. The hammer shall not be lowered except on the loftsman'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 winchmen shall accept signals only from the designated signalmen.

(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. [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" shall mean 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.

(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 flagman 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.

(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 that he is not 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 (2) 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, he shall be contacted by another person at reasonable intervals not to exceed fifteen (15) minutes unless such practice can be established to be impractical.

(ii) This does not apply to operators of motor vehicles, watchmen 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. [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. (a) 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 he 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] [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 Definitions applicable to this part.
296–155–655 General protection requirements.
296–155–660 Specific excavation requirements.
296–155–665 Specific trenching requirements.
296–155–66501 Table N–1.
296–155–66502 Table N–2.
296–155–66503 Table N–3.
296–155–66504 Table N–4.
296–155–66505 Table N–5.

WAC 296–155–650 Definitions applicable to this part. (1) "Accepted engineering requirements (or practices)" means those requirements or practices which are compatible with standards required by a registered architect, a registered professional engineer, or other duly licensed or recognized authority.

(2) "Angle of repose" means the greatest angle above the horizontal plane at which a material will lie without sliding.

(3) "Bank" means a mass of soil rising above a digging level.

(4) "Belled excavation" means a part of a shaft or footing excavation, usually near the bottom and bell–shaped; i.e., an enlargement of the cross section above.

(5) "Braces (trench)" means the horizontal members of the shoring system whose ends bear against the uprights or stringers.

(6) "Cofferdam" means a watertight chamber used to exclude water or other fluid or semi–fluid material during excavation for foundations and the construction of subsurface structures.

(7) "Equipment" means ladders, scaffolds, ramps, runways, railings, barricades, sheet piling, shoring, bracing and any such safeguards, protective construction and devices used in affording protection to the workers engaged in excavating work.

(8) "Excavation" means any manmade cavity or depression in the earth's surface, including its sides, walls, or faces, formed by earth removal and producing unsupported earth conditions by reasons of the excavation. If installed forms or similar structures reduce the depth–to–width relationship, an excavation may become a trench.

(9) "Faces" See (15) of this section.

(10) "Hard compact soil" means all earth materials not classified as running or unstable.

(11) "Kickouts" means accidental release or failure of a shore or brace.

(12) "Ramp" means an inclined runway.

(13) "Runway" means any planked–over walkway or drive constructed and maintained as a passageway for workers or rolling equipment.

(14) "Sheet pile" means a pile, or sheeting, that may form one of a continuous interlocking line, or a row of timber, concrete, or steel piles, driven in close contact to provide a tight wall to resist the lateral pressure of water, adjacent earth, or other materials.

(15) "Sides", "Walls". or "Faces" means the vertical or inclined earth surfaces formed as a result of excavation work.

(16) "Slope" means the angle with the horizontal at which a particular earth material will stand indefinitely without movement.

(17) "Stringers" (wales) means the horizontal members of a shoring system whose sides bear against the uprights or earth.

(18) "Structural construction" means any activity or process required in the actual construction of any type of structure, pipeline or conduit exclusive of the excavation.

(19) "Trench" means a narrow excavation made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench is not greater than 15 feet.

(20) "Trench jack" means screw or hydraulic type jacks used as cross bracing in a trench shoring system.

(21) "Trench shield" means a shoring system composed of steel plates and bracing, welded or bolted together, which support the walls of a trench from the ground level to the trench bottom and which can be moved along as work progresses.

(22) "Unstable soil" means earth material, other than running that because of its nature or the influence of related conditions, cannot be depended upon to remain in place without extra support, such as would be furnished by a system of shoring.

(23) "Uprights" means the vertical members of a shoring system.

(24) "Wales" See subsection (17) of this section.

(25) "Walls" See subsection (15) of this section. [Order 74–26, § 296–155–650, filed 5/7/74, effective 6/6/74.]

WAC 296–155–655 General protection requirements. (1) This Part on "excavation work" is intended to provide for the protection of all employees during all excavation work in connection with all construction work relating thereto, such as trenches, underpinning, shoring and bracing, and in connection with the construction of footings, foundations, retaining walls and other construction work below ground level.

(2) Any safety device or equipment needed in connection with excavation work shall be inspected, erected, and maintained in a safe condition, for the duration of the operation, by the owner, contractor, or person in direct charge and authority.

(3) Federal or state codes, rules, regulations and ordinances governing any and all phases of excavation work shall be observed at all times.

(4) Walkways, runways, and sidewalks shall be kept clear of excavated material or other obstructions and no sidewalks shall be undermined unless shored to carry a minimum live load of one hundred and twenty–five (125) pounds per square foot.

(5) If planks are used for raised walkways, runways, or sidewalks, they shall be laid parallel to the length of the walk and fastened together against displacement.

(6) Planks shall be uniform in thickness and all exposed ends shall be provided with beveled cleats to prevent tripping.

(7) Raised walkways, runways, and sidewalks shall be provided with plank steps on strong stringers. Ramps, used in lieu of steps, shall be provided with cleats to insure a safe walking surface.

(8) All employees shall be protected with personal protective equipment for the protection of the head, eyes, respiratory organs, hands, feet, and other parts of the body as set forth in Part C of this chapter.

(9) Employees exposed to vehicular traffic shall wear warning vests marked with or made of reflectorized or high visibility material.

(10) Employees subjected to hazardous dusts, gases, vapors, fumes, mists, or atmospheres deficient in oxygen, shall be protected with approved respiratory protection as set forth in Part B of this chapter.

(11) No person shall be permitted under loads handled by power shovels, derricks, or hoists. To avoid any injury from spillage; employees, including the driver, unless he is protected adequately by the cab, shall be required to stand away from any vehicle being loaded.

(12) Inspections of excavations shall be made prior to each work shift by a competent person. If evidence of possible cave–ins or slides is apparent, all work in the excavation shall cease until the necessary precautions have been taken to safeguard the employees. [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 296–155–660 Specific excavation requirements. (1) Prior to opening an excavation, effort shall be made to determine whether underground installations; i.e., sewer, telephone, water, fuel, electric lines, etc., will be encountered, and if so, where such underground installations are located. When the excavation approaches the estimated location of such an installation, the exact location shall be determined, and when it is uncovered, proper supports shall be provided for the existing installation. Utility companies shall be contacted and advised of proposed work prior to the start of actual excavation.

(2) Trees, boulders, and other surface encumbrances, located so as to create a hazard to employees involved in excavation work or in the vicinity thereof at any time during operations, shall be removed or made safe before excavating is begun.

(3) The walls and faces of all excavations in which employees are exposed to danger from moving ground shall be guarded by a shoring system, sloping of the ground, or some other equivalent means.

(4) Excavations shall be inspected by a competent person after every rainstorm or other hazard–increasing occurrence, and the protection against slides and cave–ins shall be increased if necessary.

(5) The determination of the angle of repose and design of the supporting system shall be based on careful evaluation of pertinent factors such as: Depth of cut; possible variation in water content of the material while the excavation is open; anticipated changes in materials from exposure to air, sun, water, or freezing; loading imposed by structures, equipment, overlying material, or stored material; and vibration from equipment, blasting, traffic or other sources.

(6) Supporting systems; i.e., piling, cribbing, shoring, etc., shall be designed by a qualified person and meet accepted engineering requirements. When tie rods are used to restrain the top of sheeting or other retaining systems, the rods shall be securely anchored well back of the angle of repose. When tight sheeting or sheet piling is used, full loading due to ground water table shall be assumed, unless prevented by weep holes or drains or other means. Additional stringers, ties, and bracing shall be provided to allow for any necessary temporary removal of individual supports.

(7) All slopes shall be excavated to at least the angle of repose except for areas where solid rock allows for line drilling or presplitting. (Refer to Tables N–1 and N–5.)

(8) The angle of repose shall be flattened when an excavation has water conditions, silty materials, loose boulders, and areas where erosion, deep frost action, and slide planes appear.

(9)(a) In excavations which employees may be required to enter, excavated or other material shall be effectively stored and retained at least 2–feet or more from the edge of the excavation.

(b) As an alternative to the clearance prescribed in (a) of this subsection, the employer may use effective barriers or other effective retaining devices in lieu thereof in order to prevent excavated or other materials from falling into the excavation.

(10) Sides, slopes, and faces of all excavations shall meet accepted engineering requirements by scaling, benching, barricading, rock bolting, wire meshing, or other equally effective means. Special attention shall be given to slopes which may be adversely affected by weather or moisture content.

(11) Support systems shall be planned and designed by a qualified person when excavation is in excess of 20 feet in depth, adjacent to structures or improvements, or subject to vibration or ground water.

(12) Materials used for sheeting, sheet piling, cribbing, bracing, shoring, and underpinning shall be in good serviceable condition, and timbers shall be sound, free from large or loose knots, and of proper dimensions.

(13) Special precautions shall be taken in sloping or shoring the sides of excavations adjacent to a previously backfilled excavation or a fill, particularly when the separation is less than the depth of the excavation. Particular attention also shall be paid to joints and seams of material comprising a face and the slope of such seams and joints.

(14) The sides of every excavation four (4) feet or more in depth, shall be supported by substantial sheet piling and bracing, or other effective means, or the sides of the excavation sloped to the angle of repose of the material being excavated. (In accordance with Tables N–1, N–2, N–3, N–4 and N–5.)

(15) Temporary sheet piling which has been installed to permit the construction of a retaining wall shall not be removed until such wall has acquired its full strength.

(16) Where workers are employed adjacent to an excavation on work other than that directly connected with the excavation, protection shall be provided for such workers as well as the workers in the excavation.

(17) Except in hard rock, excavations below the level of the base of footing of any foundation or retaining wall shall not be permitted, unless the wall is underpinned and all other precautions taken to insure the stability of the adjacent walls for the protection of employees involved in excavation work or in the vicinity thereof.

(18) If the stability of adjoining buildings or walls is endangered by excavations, shoring, bracing, or underpinning shall be provided as necessary to insure their safety. Such shoring, bracing, or underpinning shall be inspected daily or more often, as conditions warrant, by a competent person and the protection effectively maintained.

(19) Diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering an excavation and to provide adequate drainage of the area adjacent to the excavation. If necessary, pumps shall be used to minimize water from accumulating in the excavation.

(20) If it is necessary to place or operate power shovels, derricks, trucks, materials, or other heavy objects on a level above and near an excavation, the side of the excavation shall be sheet–piled, shored, or braced as necessary to resist the extra pressure due to such superimposed loads.

(21) Blasting and the use of explosives shall be performed in accordance with chapter 296–52 WAC.

(22) When mobile equipment is utilized or allowed adjacent to excavations, substantial stop logs or barricades shall be installed, except excavating and backfill equipment used during actual excavating or backfill operations.

(23) 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.

(24) Dust conditions shall be kept to a minimum by the use of water, salt, calcium chloride, oil, or other means.

(25)(a) In locations where oxygen deficiency or gaseous conditions are possible, air in the excavation shall be tested. Controls, as set forth in Parts B and C of this chapter, shall be established to assure acceptable atmospheric conditions. When flammable gases are present, adequate ventilation shall be provided and sources of ignition shall be eliminated. Attended emergency rescue equipment, such as breathing apparatus, a safety harness and line, basket stretcher, etc., shall be readily available where adverse atmospheric conditions may exist or develop in an excavation. During these conditions a competent top person shall be in constant attendance.

(b) During the conditions stated in item (a) above, the top person shall maintain voice or visual contact with the person in the excavation. It shall be the employer's responsibility to ensure that a top person remains in constant attention until such time as the aforementioned condition no longer exists.

(26) Where employees or equipment are required or permitted to cross over excavations, walkways or bridges with standard guardrails shall be provided.

(27) Where ramps are used for employees or equipment, they shall be designed and constructed by qualified persons in accordance with accepted engineering requirements.

(28) All ladders used on excavation operations shall be in accordance with the requirements of this chapter.

(29) Ramps or runways used for vehicles shall have a width of not less than four feet wider than the vehicle used and provided with timber guards not less than eight inches by eight inches, placed parallel to and secured to the sides of the runway as a protection to trucks.

(30) All ramps and runways shall receive frequent inspection, and shall be maintained in a safe and serviceable condition.

(31) Workers shall be instructed to stay off ramps and runways when trucks are passing over them.

(32) When ramps and runways are formed on hard ground without the use of planking, all ruts and holes shall be filled in, humps leveled off and the runway made as smooth as possible.

(33) Blocks used for pulling trucks up ramps shall be well anchored. [Order 76-29, § 296-155-660, filed 9/30/76; Order 74-26, § 296-155-660, filed 5/7/74, effective 6/6/74.]

WAC 296-155-665 Specific trenching requirements. (1) As trench construction is a hazardous operation, particular attention shall be given to the protection of the worker, the protection to be governed by the nature of the ground.

(2) No one person shall be allowed to work alone in a trench over four feet in depth unless there is a top person in constant attendance.

(3) Except in solid rock and shale, the sides of all trenches, including embankments, 4 feet or more in depth and 6 feet or more in length, shall be shored, sheeted, braced, sloped or otherwise supported by means of sufficient strength to protect the employees working within them. (See Tables N-1, N-2, N-3, N-4 and N-5.) Trenches less than 4 feet in depth and 6 feet or more in length, shall also be effectively protected when the ground indicates that hazardous ground movement is possible. (See Tables N-1, N-2, N-3, N-4 and N-5.)

(4) When the sloping to the angle of repose does not extend to the bottom of the trench, shoring shall be required to support the vertical part of the trench. The shoring shall extend above the bottom of the slope a minimum of 12 inches to prevent material from sliding into the trench.

(5) The surface of the slope shall be cleaned of boulders, stumps, or other hard masses of earth [on the angle of repose slope] to eliminate the danger of [their] [any such materials] sliding or rolling into the trench.

(6) In hard or compact soil, when the outside diameter of the pipe to be laid is 6 feet or larger, the sides of the trench can be vertical at the bottom 4 feet of the trench, providing a 4 foot bench is provided immediately above the vertical portion, and the remaining portion of the trench above the bench is sloped to the angle of repose. (See Table N-4.)

(7) Materials used for sheeting and sheet piling, bracing, shoring, and underpinning, shall be in good serviceable condition, and timbers used shall be sound and free from large or loose knots, and shall be designed and installed so as to provide adequate personnel protection to the bottom of the excavation.

(8) Additional precautions by way of shoring and bracing shall be taken to prevent slides or cave-ins when excavations or trenches are made in locations adjacent to backfilled excavations, or where excavations are subjected to vibrations from railroad or highway traffic, the operation of machinery, or any other source.

(9) Where a mechanical digger is used, the bracing shall be placed as close as possible to the lower end of the boom.

(10) When trenches are undercut, they shall be shored as necessary to safely support the overhanging material.

(11) If for any reason prior to, during or subsequent to the placement of the trench bracing system, voids should form in the sides or face of excavation, such voids shall be promptly filled with compacted material or blocking, as required to distribute the load uniformly onto the bracing system.

(12) If a trench is cut alongside an existing structure and the footings of the structure are nearer to the trench than the plane of repose for the soil, they shall be underpinned or the side wall of the trench rigidly supported.

(13) Excavations made in ledge rock or compact shale shall not require bracing or shoring but shall be inspected by a competent representative of the employer before each shift of work, at which time all loose, shattered or disintegrated rock shall be removed from sides and face of excavation.

(14) Excavated material and superimposed loads shall not be placed nearer than two feet to the sides of the trench, unless bracing has been designed and installed to withstand the load.

(15) Employees entering bell-bottom pier holes shall be protected by the installation of a removable-type casing of sufficient strength to resist shifting of the surrounding earth. Such temporary protection shall be provided for the full depth of that part of each pier hole which is above the bell.

(16) A means of emergency egress shall be decided prior to personnel entering bell-bottom pier holes. Employees expected to enter bell-bottom pier holes shall be instructed as to the hazards of their respective jobs, and in the means of emergency egress.

NOTE: Example of protection: A lifeline, suitable for instant rescue and securely fastened to a shoulder harness, may be worn by each employee entering the shafts. This lifeline could be individually manned and separate from any line used to remove materials excavated from the bell footing.

(17)(a) Minimum requirements for trench timbering shall be in accordance with Table N-3.

(b) Braces and diagonal shores in a wood shoring system shall not be subjected to compressive stress in excess of values given by the following formula:

$$s = 1300 - \frac{20L}{D}$$

$$\text{Maximum ratio } \frac{L}{D} = 50$$

Where:

L = Length, unsupported, in inches.
D = Least side of the timber in inches.
S = Allowable stress in pounds per square inch of cross-section.

(18) When employees are required to be in trenches 4 feet deep or more, an adequate means of exit, such as a ladder or steps, shall be provided and located so as to require no more than 25 feet of lateral travel.

(19) Bracing or shoring of trenches shall be carried along with the excavation.

(20) Cross braces or trench jacks shall be placed in true horizontal position, be spaced vertically, and be secured to prevent sliding, falling, or kickouts.

(21) Portable trench boxes or sliding trench shields may be used for the protection of personnel in lieu of a shoring system or sloping. Where such trench boxes or shields are used, they shall be designed, constructed, and maintained in a manner which will provide protection equal to or greater than the sheeting or shoring required for the trench.

(22) Backfilling and removal of trench supports shall progress together from the bottom of the trench. Jacks or braces shall be released slowly and, in unstable soil, ropes shall be used to pull out the jacks or braces from above after employees have cleared the trench.

(23) Signalman shall be employed to direct trucks when backfilling.

(24) The construction of temporary shoring work shall be done, or supervised, by a competent person, who shall make frequent inspections and issue instructions for its removal.

(25) Workers shall be instructed to immediately report any signs or indications of weakness of shoring or bracing.

(26) Trenching Machines (Ladder and Rotary Type).
(a) Trenching machine operators shall not get on or off machine while in operation.

(b) Workers shall not work at sloping top of ditch near bucket line.

(c) Excavated material shall be conveyed to pile not closer than within 2 feet of edge of trench.

(d) Trucks hauling excavated material away from trenching machine shall not approach closer to the edge of trench than the trench depth from the surface of ground.

(e) Where side cutters are installed it will be mandatory that persons stay clear of bucket line. [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.]

Reviser's Note: RCW 34.04.058 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 296-155-66501 Table N-1.

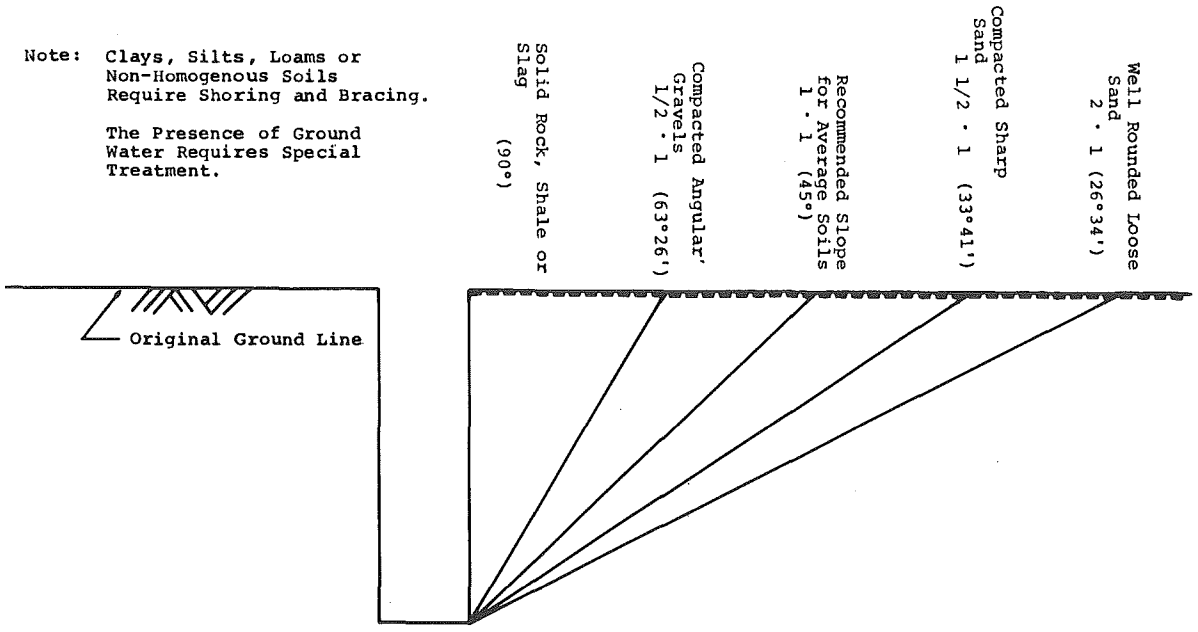


TABLE N-1
MINIMUM ANGLE OF REPOSE
For Sloping of Sides of Excavation and/or Trenches

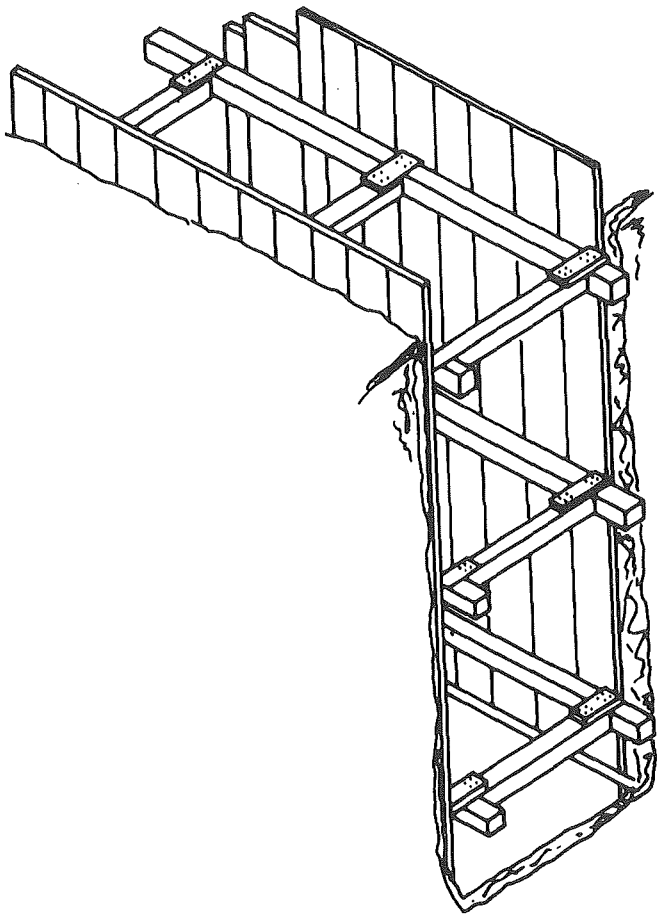
NOTE: Clays, Silts, Loams or Non-Homogenous Soils Require Shoring and Bracing.

The Presence of Ground Water Requires Special Treatment.

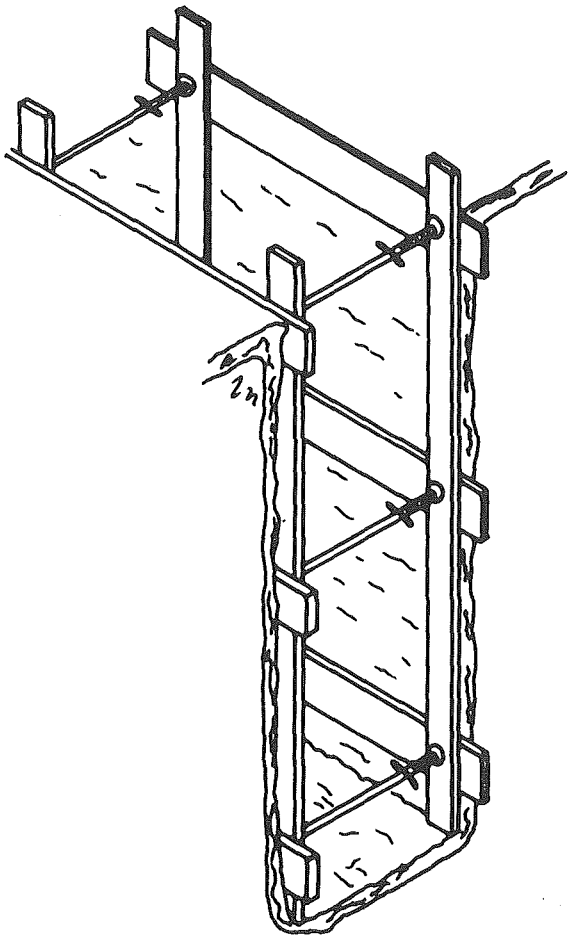
[Order 76-29, Table N-1 (codified as WAC 296-155-66501), filed 9/30/76; Order 74-26, § 296-155-665 (part), Table N-1, filed 5/7/74, effective 6/6/74.]

WAC 296-155-66502 Table N-2.

TABLE N-2
TYPICAL SHORING EXAMPLES



Tight Sheeting Soft Soil



Trench Shoring Hard Soil

[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.]

WAC 296-155-66503 Table N-3.

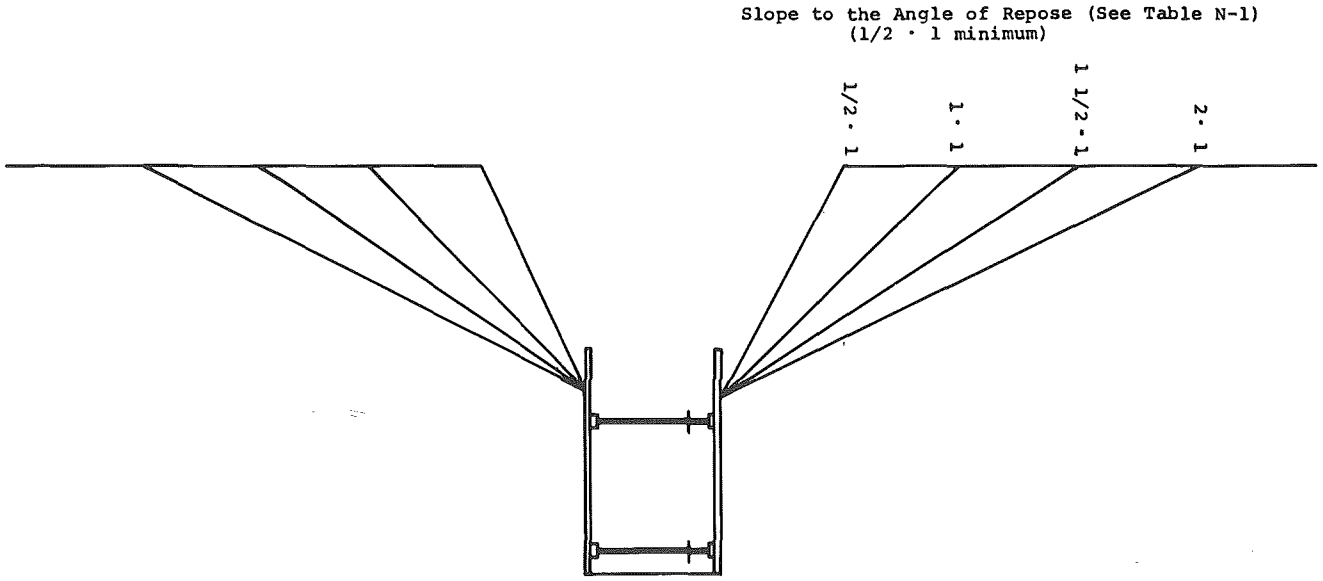


TABLE N-3
EXAMPLE: COMBINATION SHORING AND SLOPING

[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.]

WAC 296-155-66504 Table N-4.

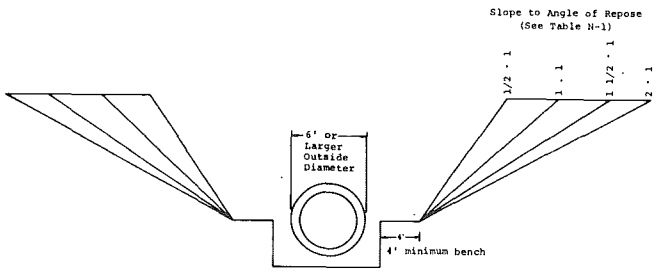


TABLE N-4
BENCHING PROVISIONS FOR LAYING PIPE OF 6 FOOT OUTSIDE DIAMETER OR LARGER

[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.]

WAC 296-155-66505 Table N-5.

TABLE N-5
TRENCH SHORING MINIMUM REQUIREMENTS
TABLE N-5--Part I

Depth of trench & Kind or condition of earth	Size and spacing of members			
	Uprights		Stringers	
	Minimum dimension	Maximum spacing	Min. dim.	Max. sp.
Feet	Inches	Feet	In.	Ft.
4 to 10				
Hard, compact	3x4 or 2x6	6		
Likely to crack	3x4 or 2x6	3	4x6	4
Soft, sandy, or filled	3x4 or 2x6	Close sheeting	4x6	4
Hydrostatic pressure	3x4 or 2x6	Close sheeting	6x8	4
10 to 15				
Hard	3x4 or 2x6	4	4x6	4
Likely to crack	3x4 or 2x6	2	4x6	4
Soft, sandy, or filled	3x4 or 2x6	Close sheeting	4x6	4
Hydrostatic pressure	3x6	Close sheeting	8x10	4
15 to 20		Close		
All kinds or conditions	3x6	sheeting	4x12	4
Over 20		Close		
All kinds or conditions	3x6	sheeting	6x8	4

TABLE N-5--Part II

Depth of trench & Kind or condition of earth	Size and spacing of members						
	Cross braces[1]						
	Width of trench					Maximum spacing	
	Up to 3 ft.	3-6 ft.	6-9 ft.	9-12 ft.	12-15 ft.	Vert.	Hori.
Feet	In.	In.	In.	In.	In.	Ft.	Ft.
4 to 10							
Hard, compact	2x6	4x4	4x6	6x6	6x8	4	6
Likely to crack	2x6	4x4	4x6	6x6	6x8	4	6
Soft, sandy, or filled	4x4	4x6	6x6	6x8	8x8	4	6
Hydrostatic pressure	4x4	4x6	6x6	6x8	8x8	4	6
10 to 15							
Hard	4x4	4x6	6x6	6x8	8x8	4	6
Likely to crack	4x4	4x6	6x6	6x8	8x8	4	6
Soft, sandy, or filled	4x6	6x6	6x8	8x8	8x10	4	6
Hydrostatic pressure	4x6	6x6	6x8	8x8	8x10	4	6
15 to 20							
All kinds or conditions	4x12.	6x8	8x8	8x10	10x10	4	6
Over 20							
All kinds or conditions	4x12	8x8	8x10	10x10	10x12	4	6

[1] Trench jacks may be used in lieu of, or in combination with, cross braces. Shoring is not necessarily required in solid rock, hard shale, or hard slag. Where desirable, steel sheet piling and bracing of equal strength may be substituted for wood.

[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.]

Part O

CONCRETE, CONCRETE FORMS AND SHORING

WAC

296-155-675 Definitions applicable to this part.
296-155-680 General provisions.
296-155-685 Safe walking surfaces on concrete structural members.
296-155-690 Forms and shoring.
296-155-695 Tilt-up type construction.

WAC 296-155-675 Definitions applicable to this part. (1) "Bull float" means a tool used to spread out and smooth the concrete.

(2) "Formwork" or "falsework" means the total system of support for freshly placed concrete, including the mold or sheathing which contacts the concrete as well as all supporting members, hardware, and necessary bracing.

(3) "Guy" means a line that steadies a high piece or structure by pulling against an off-center load.

(4) "Shore" means a supporting member that resists a compressive force imposed by a load.

(5) "Vertical slip forms" means forms which are jacked vertically and continuously during placing of the concrete. [Order 74-26, § 296-155-675, filed 5/7/74, effective 6/6/74.]

WAC 296-155-680 General provisions. (1) General. All equipment and materials 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) Reinforcing Steel. (a) Employees working more than 6 feet above any adjacent working surfaces, placing and tying reinforcing steel in walls, piers, columns, etc., shall use a safety belt, or equivalent device, in accordance with Part C of this chapter.

(b) Employees shall not be permitted to work above vertically protruding reinforcing steel unless it has been protected to eliminate the hazard of impalement.

(c) Guying: Reinforcing steel for walls, piers, columns, and similar vertical structures shall be guyed and supported to prevent collapse.

(d) Wire mesh rolls: Wire mesh rolls shall be secured at each end to prevent dangerous recoiling action.

(3) Bulk Concrete Handling. Bulk storage bins, containers, or silos shall have conical or tapered bottoms with mechanical or pneumatic means of starting the flow of material.

(4) Concrete Placement. (a) Concrete Mixers. Concrete mixers equipped with 1-yard or larger loading skips shall be equipped with a mechanical device to clear the skip of material.

(b) Guardrails. Mixers of 1-yard capacity or greater shall be equipped with protective guardrails installed on each side of the skip.

(c) Bull Floats. Handles on bull floats, used where they may 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.

(d) Powered 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 operator removes his hands from the equipment handles.

(e) Concrete Buggies. Handles of buggies shall not extend beyond the wheels on either side of the buggy.

NOTE: Installation of knuckle guards on buggy handles is recommended.

(f) Pumpcrete Systems. (i) 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.

(ii) 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 he is at his control station.

(iii) Discharge pipes shall be provided with pipe supports designed for 100 percent overload.

(iv) The hose used to carry concrete in such systems shall be provided with positive fail-safe joint connectors to prevent separation of sections when pressurized.

(v) 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.

(vi) 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 condition. Any deficiencies shall be repaired, or defective parts replaced, before continued use.

(vii) A thorough, annual inspection of the equipment, including X-ray of booms, 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 annual inspections for each pumpcrete system.

(viii) All welding shall conform to ASW B3.0-41 Standard Qualification Procedure; AWS D8.4-61 Recommended Practices for Automotive Welding Design; or AWS D10.9-69 Standard Qualification of Welding Procedures and Welders for Piping and Tubing.

(ix) Booms shall not be used for operations other than that for which they are designed.

(g) Concrete Buckets. (i) Concrete buckets equipped with hydraulic or pneumatically operated gates shall have positive safety latches or similar safety devices installed to prevent aggregate and loose material from accumulating on the top and sides of the bucket.

(ii) 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.

(h) When discharging on a slope, the wheels of ready-mix trucks shall be blocked and the brakes set to prevent movement.

(i) 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 42 inches with turnouts. Runways to have standard railings. Where motor driven concrete buggies are used, a minimum 4" x 4" wheel guard shall be securely fastened to outside edge of runways.

(j) Nozzlemen applying a cement, sand, and water mixture through a pneumatic hose shall be required to wear protective head and face equipment, as prescribed in Part C of this chapter.

(5) Vertical Shoring. (a) General Requirements. (i) When temporary storage of reinforcing rods, material, or equipment on top of formwork becomes necessary, these areas shall be strengthened to meet the intended loads.

(ii) The sills for shoring shall be sound, rigid, and capable of carrying the maximum intended load without settlement or displacement.

(iii) All shoring equipment shall be inspected prior to erection to determine that it is as specified in the shoring layout. Any equipment found to be damaged shall not be used for shoring.

(iv) Erected shoring equipment shall be inspected immediately prior to, during, and immediately after the placement of concrete. Any shoring equipment that is found to be damaged or weakened shall be immediately reinforced or reshored.

(v) Reshoring shall be provided when necessary to safely support slabs and beams after stripping, or where such members are subjected to superimposed loads due to construction work done.

(b) Tubular Welded Frame Shoring. (i) Metal tubular frames used for shoring shall not be loaded beyond the safe working load recommended by the manufacturer.

(ii) 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.

(iii) 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.

(iv) Devices for attaching the external lateral stability bracing shall be securely fastened to the legs of the shoring frames.

(v) All baseplates, shore heads, extension devices, or adjustment screws shall be in firm contact with the footing sill and the form. [Order 74-26, § 296-155-680, filed 5/7/74, effective 6/6/74.]

WAC 296-155-685 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" shall mean all protruding metal attachments to structural members.

[Order 74-26, § 296-155-685, filed 5/7/74, effective 6/6/74.]

WAC 296-155-690 Forms and shoring. (1) General Provisions. (a) Formwork and shoring shall be designed, erected, supported, braced, and maintained so that it will safely support all vertical and lateral loads that may be imposed upon it during placement of concrete.

(b) Drawings or plans showing the jack layout, formwork, shoring, working decks, and scaffolding, shall be available at the jobsite.

(c) Stripped forms and shoring shall be removed and stockpiled promptly after stripping, in all areas in which persons are required to work or pass. Protruding nails, wire ties, and other form accessories not necessary to subsequent work shall be pulled, cut, or other means taken to eliminate the hazard.

(d) Imposition of any construction loads on the partially completed structure shall not be permitted unless such loading has been considered in the design and approved by the engineer–architect.

(2) Vertical Slip Forms. (a) The steel rods or pipe on which the jacks climb or by which the forms are lifted shall be specifically designed for the purpose. Such rods shall be adequately braced where not encased in concrete.

(b) Jacks and vertical supports shall be positioned in such a manner that the vertical loads are distributed equally and do not exceed the capacity of the jacks.

(c) The jacks or other lifting devices shall be provided with mechanical dogs or other automatic holding devices to provide protection in case of failure of the power supply or the lifting mechanism.

(d) Lifting shall proceed steadily and uniformly and shall not exceed the predetermined safe rate of lift.

(e) Lateral and diagonal bracing of the forms shall be provided to prevent excessive distortion of the structure during the jacking operation.

(f) During jacking operations, the form structure shall be maintained in line and plumb.

(g) All vertical lift forms shall be provided with scaffolding or work platforms completely encircling the area of placement.

(3) Tube and Coupler Shoring. (a) Couplers (clamps) shall not be used if they are deformed, broken, or have defective or missing threads on bolts, or other defects.

(b) 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.

(c) 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 shall be checked.

(d) 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.

(4) Single Post Shores. (a) For stability, single post shores shall be horizontally braced in both the longitudinal and transverse directions, and diagonal bracing shall also be installed. Such bracing shall be installed as the shores are being erected.

(b) All baseplates or shore heads of single post shores shall be in firm contact with the footing sill and the form materials.

(c) Whenever single post shores are used in more than one tier, the layout shall be designed and inspected by a structural engineer.

(d) When formwork is at an angle, or sloping, or when the surface shored from is sloping, the shoring shall be designed for such loading.

(e) Adjustment of single post shores to raise formwork shall not be made after concrete is in place.

(f) 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.

(g) All timber and adjusting devices to be used for adjustable timber single post shores shall be inspected before erection.

(h) Timber shall not be used if it is split, cut, has sections removed, is rotted, or is otherwise structurally damaged.

(i) Adjusting devices shall not be used if heavily rusted, bent, dented, rewelded, or having broken weldments or other defects.

(j) All nails used to secure bracing or adjustable timber single post shores shall be driven home and the point of the nail bent over if possible. [Order 74–26, § 296–155–690, filed 5/7/74, effective 6/6/74.]

WAC 296–155–695 Tilt–up type construction. (1) It shall be the responsibility of the contractor to use accessories which are designed to be compatible and to use lifting eyes, inserts, bolts and other accessories for which yield strength, breaking strength, safe lifting capacities, shear strength, resistance against pull–out and safe working loads are known.

NOTE: The services of a design engineer or accessory vendor may prove to be very valuable and beneficial to any contractor when performing tilt–up type construction. The amount, size and placement of reinforcement steel in the panels should follow the suggested practice outlined in the latest edition of the American Concrete Institute Code.

(2) Prior to commencing the pouring of the panels of a tilt–up type construction job, a set of plans or job specifications, including lifting procedures, shall be drawn up. These plans shall be at the job site and made available to any representative of the Department upon request. 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. The plans or specifications shall contain the following information:

(a) The type, size and location of all lifting inserts.

(b) The type, size and location of all brace inserts or fittings for guy wires in each panel and floor or support.

(c) The size of braces or guys to be used.

(d) The compression strength which concrete panels must attain prior to being lifted.

(3) The following criteria 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 (1 1/2) to resist any normal stresses to which they

may be subjected, including normal high wind velocity pressures for the area.

(b) Floor braces used to secure panel sections shall be placed at an angle of not less than 45° or more than 60° from horizontal when physically possible to install in this manner.

(c) The bracing on all panel sections shall be installed in such a manner as to prevent the panel from accidentally rotating.

(d) 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.

NOTE: Guy wires, when properly installed, may be used in lieu of stiff leg braces.

(e) 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.

(f) Inserts to be installed for lifting sections of a panel shall be designed mechanically to maintain a safety factor of 3.

(g) The compression strength of the concrete shall be such that when the proper type, size and amount of inserts are properly installed a minimum safety factor of 2 will be maintained.

(4) Lifting hardware such as spreader bars, slings, shackles, etc., shall be designed for a safety factor of not less than 5 and shall not be used whenever the safety factor is reduced below 4.

(5) Lifting bolts or other lifting devices which have been bent, worn, or are defective shall be discarded.

(6) The upper and lower sections of telescoping type braces shall be secured by high tensile steel pin(s) or bolt(s) which provide adequate shear strength and which will positively secure against accidental removal.

(7) Manufactured products shall not be altered in a manner which would reduce the safe working load to less than its original value.

(8) Inserts shall be positioned so that bolts, or lifting devices, when inserted, will be perpendicular to the face on which they are placed.

(9) 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.

(10) 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.

(11) Tilt-up panels shall not be set when there is a possibility that wind velocity would create a hazardous condition.

(12) A qualified signalman shall be designated and shall consult with the crane operator on lifting procedures prior to making the pick. The signalman shall be located in such a position during the pick of the panel that he can observe both the crane operator and the employees working in the immediate area.

(13) During the lifting process, workers shall keep clear of the under side of the panel.

(14) Persons not involved in the lifting process shall be kept clear of the hazardous area near where panels are being raised, moved or placed.

(15) If braces must be removed temporarily during construction, other effective and suitable means shall be provided to safely support the panel during the interim period.

(16) Each panel shall be properly braced or otherwise secured prior to removal of the hoisting equipment.

(17) Short panels or sections not otherwise supported by floor, footings, columns or other structure, shall be properly shored. [Order 74-26, § 296-155-695, filed 5/7/74, effective 6/6/74.]

Part P
STEEL ERECTION

WAC

296-155-700 General requirements.
296-155-705 Flooring requirements.
296-155-710 Structural steel assembly.
296-155-715 Bolting, riveting, fitting-up, and plumbing-up.
296-155-720 Safe walking surfaces on structural members.

WAC 296-155-700 General requirements. (1) Erection gangs on structural steel erection shall work under the direction of experienced foremen.

(2) Workers shall not ride on steel being hoisted, nor slide down ropes or cables.

(3) Cable slings shall be used when lifting loads. Care shall be taken to avoid sharp bends by using wood or similar type padding between cable and load.

(4) If float scaffolds are used during steel erection, they shall be used in accordance with WAC 296-155-485(24).

(5) Employees shall be provided with safety belts in accordance with WAC 296-155-225 when they are working on float scaffolds.

(6) On extremely hazardous jobs where ordinary precautions would prove impracticable, nets shall be provided when necessary in the opinion of the Supervisor. Contracting authorities shall specify in contract when it has been determined that nets are required.

(7) The use of safety belts, lanyards and lifelines in steel erection shall be in accordance with WAC 296-155-225. [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 two stories or 25 feet. The nets shall be hung with sufficient clearance to prevent contacts with the surface of structures below.

(iii) Floor periphery – safety railing. A safety railing of 1/2–inch wire rope or equivalent shall be installed, between 36 and 42 inches high, around the periphery 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 30 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.

(iii) When gathering and stacking temporary floor planks, from the last panel, the employees assigned to such work shall be protected by safety belts with safety lines attached to a catenary line or other substantial anchorage.

(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. [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 slacking 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 WAC 296-155-225 when they are working on float scaffolds. [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. Structual 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", shall mean all protruding metal attachments to structural members.

[Order 74-26, § 296-155-720, filed 5/7/74, effective 6/6/74.]

Part Q
TUNNELS AND SHAFTS, CAISSONS, COFFERDAMS, AND COMPRESSED AIR

WAC

296-155-725 Definitions applicable to this part.
296-155-730 Tunnels and shafts.
296-155-735 Caissons.
296-155-740 Cofferdams.
296-155-745 Compressed air.
296-155-74501 Appendix A——Decompression tables.

WAC 296-155-725 Definitions applicable to this part. (1) "Bulkhead" means an airtight structure separating the working chamber from free air or from another chamber under a lesser pressure than the working pressure.

(2) "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.

(3) "Cofferdam" means a watertight barricade or enclosure erected, sunk, driven or otherwise fabricated to permit the performance of work where hydrostatic pressure exists.

(4) "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.

(5) "Emergency locks" means a lock designed to hold and permit the quick passage of an entire shift of employees.

(6) "High air" means air pressure used to supply power to pneumatic tools and devices.

(7) "Low air" means air supplied to pressurize working chambers and locks.

(8) "Man lock" means a chamber through which persons pass from one air pressure environment into another.

(9) "Materials lock" means a chamber through which materials and equipment pass from one air pressure environment into another.

(10) "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.

(11) "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.

(12) "Pressure" means a force acting on a unit area. Usually shown as pounds per square inch. (p.s.i.)

(13) "Absolute pressure" (p.s.i.a.) means the sum of the atmospheric pressure and gauge pressure (p.s.i.g.)

(14) "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.

(15) "Gauge pressure" (p.s.i.g.) means pressure measured by a gauge and indicating the pressure exceeding atmospheric.

(16) "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.

(17) "Special decompression chamber" means a chamber to provide greater comfort for employees when the total decompression time exceeds 75 minutes.

(18) "Working chamber" means the space or compartment under air pressure in which the work is being done. [Order 74-26, § 296-155-725, filed 5/7/74, effective 6/6/74.]

WAC 296-155-730 Tunnels and shafts. (1) General. (a) The specific requirements of this Part Q, Tunnels, Shafts, Caissons, Cofferdams, and Compressed Air, shall be complied with as well as the applicable provisions of all other Parts of this Chapter and chapter 296-36 WAC "Safety Standards for Compressed Air Work".

(b) Safe means of access shall be provided and maintained to all working places.

(c) When ladders and stairways are provided in shafts and steep inclines, they shall meet the requirements of Parts J and K of this Chapter.

(d) Access to unattended underground openings shall be restricted by gates or doors. Unused chutes, manways, or other openings shall be tightly covered, bulkheaded, or fenced off, and posted. Conduits, trenches, and manholes shall meet the requirements of Parts K and N of this Chapter.

(e) Subsidence areas that present hazards shall be fenced and posted.

(f) Each operation shall have a check–in and check–out system that will provide positive identification of every employee underground. An accurate record and location of the employees shall be kept on the surface.

(2) Emergency Provisions. (a) Evacuation plans and procedures shall be developed and made known to the employees.

(b) Emergency hoisting facilities shall be readily available at shafts more than 50 feet in depth, unless hoisting facilities are provided that are independent of electrical power failures. A boatswain's chair shall meet the requirements of Part J of this Chapter.

(c) Bureau of Mines approved self–rescuers shall be available near the advancing face to equip each face employee. Such equipment shall be on the haulage equipment and in other areas where employees might be trapped by smoke or gas, and shall be maintained in good condition.

(d) Telephone or other signal communication shall be provided between the work face and the tunnel portal, and such systems shall be independent of the tunnel power supply.

(3) Air Quality and Ventilation. (a) Air Quality and Quantity. (i) Instruments shall be provided to test the atmosphere quantitatively for carbon monoxide, nitrogen dioxide, flammable or toxic gases, dusts, mists, and fumes that occur in the tunnel or shaft. Tests shall be conducted as frequently as necessary to assure that the required quality and quantity of air is maintained. A record of all tests shall be maintained and be kept available.

(ii) Field–type oxygen analyzers, or other suitable devices, shall be used to test for oxygen deficiency.

(iii) 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 excursions referred to in items (iv) and (v) of this subdivision, if such employee wears a respiratory protective device approved by the Bureau of Mines as protection against the particular hazards involved.

(iv) The exposure to airborne contaminants of an employee working in a tunnel or shaft shall not exceed the threshold limit values adopted by the American Conference of Governmental Industrial Hygienists, as set forth and explained in the 1970 edition of "Threshold Limit Values of Airborne Contaminants." (See Chapter 296-62 WAC, The General Occupational Health Standards.)

(v) Employees shall be withdrawn from areas in which there is a concentration of an airborne contaminant which exceeds the threshold limit value listed for that contaminant.

(vi) Atmospheres in all active areas shall contain at least 20 percent oxygen.

(b) Ventilation. (i) Tunnels shall be provided with mechanically induced primary ventilation in all work areas. The direction of airflow shall be reversible.

(ii) Ventilation doors, not operated mechanically, shall be designed and installed so that they are self–closing and will remain closed regardless of the direction of the air movement.

(iii) When there has been a failure of ventilation, and ventilation has been restored in a reasonable time, all places where flammable gas may have accumulated shall be examined by a competent person and determined to be free of flammable gas before power is restored and work resumed.

(iv) When the main fan or fans have been shut down with all employees out of the adit, tunnel or shaft, no employee, other than those qualified to examine the adit, tunnel or shaft, or other authorized employee, shall go underground until the fans have been started, the work areas examined for gas and other hazards, and declared safe.

(v) The supply of fresh air shall not be less than 200 cubic feet per minute for each employee underground.

The linear velocity of the air flow in the tunnel bore shall not be less than 30 feet per minute in those tunnels where blasting or rock drilling is conducted or where there are other conditions that are likely to produce dusts, fumes, vapors, or gases in harmful quantities.

(vi) If 1.5 percent or higher concentration of flammable gas is detected in air returning from an underground working place or places, the employees shall be withdrawn and the power cut off to the portion of the area endangered by such flammable gas until the concentration of such gas is reduced to 1 percent or less.

(vii) Internal combustion engines other than mobile diesel shall not be used underground. Mobile diesel-powered equipment used underground shall be certified by the Bureau of Mines, U.S. Department of the Interior according to the Bureau of Mines publication "Mechanical Equipment for mines——tests for permissibility and suitability, Part 32, Mobile Diesel Power Equipment for Non-Coal Mines, Schedule 24" of March 23, 1965.

(viii) Application shall be made to the Mining Section, Division of Industrial Safety and Health, 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 Division of Industrial Safety and Health 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 75 CFM per horsepower based on the maximum brake horsepower of the engines.

(E) Air measurements shall be made at least once weekly 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[a]
Next to equipment	Carbon Monoxide	.005%	50 ppm
General atmosphere	Carbon Monoxide	.005%	50 ppm
General atmosphere	Nitrogen Dioxide	.0005%	5 ppm
General atmosphere	Aldehydes	.0002%	2 ppm

[a] Parts of vapor or gas per million parts of contaminated air by volume at 25° C and 760 mm Hg. pressure.

(4) Illumination. (a) Sufficient lighting shall be provided, in accordance with the requirements of Table B-3 of Part B of this chapter, to permit safe operations at the face as well as in the general tunnel or shaft area and at the employees' workplace.

(5) Fire Prevention and Control. (a) General. (i) The requirements for fire prevention and protection specified in Part D of this Chapter shall be complied with in all tunnel and shaft operations.

(ii) Signs warning against smoking and open flames shall be posted so that they can be readily seen in areas or places where fire or explosion hazards exist.

(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.

(iv) Not more than a 1 day's supply of diesel fuel shall be stored underground.

(v) Gasoline or liquefied petroleum gases shall not be taken, stored, or used underground.

(vi) Oil, grease, or fuel stored underground shall be kept in tightly sealed containers in fire-resistant areas, at safe distances from explosives magazines, electrical installations, and shaft stations.

(vii) Air that has passed through underground oil or fuel-storage areas shall not be used to ventilate working areas.

(viii) Approved fire-resistant hydraulic fluids shall be used in hydraulically actuated underground machinery and equipment.

(ix) Fires shall not be built underground.

(x) Noncombustible barriers shall be installed below welding or burning operations in or over a shaft or raise.

(xi) Fire extinguishers or equivalent protection shall be provided at the head and tail pulleys or underground belt conveyors and at 300-foot intervals along the belt line.

(xii) At tunnel operations, employing 25 or more employees at one time underground at least two rescue crews (10 employees divided between shifts) shall be trained annually in rescue procedures, in the use, care, and limitations of oxygen breathing apparatus, and the use and maintenance of firefighting equipment. Not less than one rescue crew (5 employees) shall be trained in smaller operations.

(6) Personal Protective Equipment. Protective clothing or equipment shall be worn as specified in Parts B and C of this Chapter.

(7) Noise. (a) Permissible noise exposures shall conform to those specified in Part B of this Chapter.

(8) Ground Support. (a) Tunnel Portal Area. Portals shall be protected and supported where loose soil or rock or fractured material is encountered.

(b) Tunnel Area. (i) The employer shall examine and test the roof, face, and walls of the work area at the start of each shift and frequently thereafter.

(ii) Loose ground shall be taken down or supported. Ground conditions along haulage ways and travelways shall be examined periodically and scaled or supported as necessary.

(iii) Torque meters and torque wrenches shall be available at tunnels where rock bolts are used for ground support. Frequent tests shall be made to determine if bolts meet the required torque. The test frequency shall be determined by rock conditions and distance from vibration sources.

(iv) Damaged or dislodged tunnel supports, whether steel sets or timber, shall be repaired and replaced. New

supports shall be installed whenever possible before removing the damaged supports.

(v) All sets, including horseshoe–shaped or arched rib steel sets, shall be designed and installed so that the bottoms will have required anchorage to prevent pressures from pushing them inward into the excavation. Lateral bracing shall be provided between sets to further stabilize the support.

(c) Shafts. (i) Small diameter shafts, which employees are required to enter, shall be provided with a steel casing, concrete pipe, timber, or other material of required strength to support the surrounding earth.

(ii) The casing and bracing shall be provided the full depth of the shaft, or at least 5 feet into solid rock if possible, and shall extend at least 1 foot above ground level.

(iii) All wells or shafts over 5 feet in depth shall be retained with lagging, spiling, or casing.

(iv) In shafts, the employer shall inspect the walls, ladders, timbers, blocking, and wedges of the last set to determine if they have loosened following blasting operations. Where found unsafe, corrections shall be made before shift operations are started.

(v) Safety belts shall be worn on skips and platforms used in shafts by crews when the skip or cage does not occlude the opening to within 1 foot of the sides of the shaft, unless guardrails or cages are provided.

(9) Drilling. (a) Equipment that is to be used during a shift shall be inspected each shift by a competent person. Equipment defects affecting safety shall be corrected before the equipment is used.

(b) The drilling area shall be inspected for hazards before starting the drilling operations.

(c) Employees shall not be allowed on a drill mast while the drill bit is in operation.

(d) When a drill is being moved from one drilling area to another, drill steel, tools, and other equipment shall be secured, and the mast placed in a safe position.

(e) Receptacles or racks shall be provided for drill steel stored on jumbos.

(f) Before drilling cycle is started, warning shall be given to persons working below jumbo decks.

(g) Drills on columns shall be anchored firmly before drilling is started and shall be retightened frequently thereafter.

(h) The employer shall provide mechanical means for lifting drills, roof bolts, mine straps, and other unwieldly heavy material to the top decks of jumbos over 10 feet in height.

(i) The employer shall provide stair access to jumbo decks wide enough to accommodate two persons if the deck is over 10 feet in height.

(j) On jumbo decks over 10 feet in height, guardrails which are removable (pipe in sockets with chain handrail), or equal, shall be provided on all sides and back platforms.

(k) Scaling bars shall be in good condition at all times, and blunted and severely worn bars shall not be used.

(l) When jumbos are being moved, riders will not be allowed on the jumbo unless they are assisting the driver.

(m) 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. Lifters shall not be drilled through blasted rock (muck) or water.

(n) Air lines that are buried in the invert shall be identified by signs, posted nearby, warning all personnel.

(10) Blasting. All blasting and explosives–handling operations shall be conducted in compliance with Part T of this Chapter.

(11) Haulage. (a) Equipment that is to be used during a shift shall be inspected by a competent person each shift. Equipment defects affecting safety shall be corrected before the equipment is used.

(b) Powered mobile equipment shall be provided with adequate brakes.

(c) Powered mobile haulage equipment shall be provided with audible warning devices. Lights shall be provided at both ends.

(d) Cab windows shall be of safety glass, or equivalent, in good condition, and shall be kept clean.

(e) Adequate backstops or brakes shall be installed on inclined conveyor drive units to prevent conveyors from running in reverse and creating a hazard to employees.

(f) No employee shall be permitted to ride a power–driven chain, belt, or bucket conveyor, unless the conveyor is specifically designed for transportation of employees.

(g) The employer shall not permit employees to ride in dippers, shovel buckets, forks, clamshells, or in the beds of dump trucks, or on haulage equipment not specifically designed or adapted for the transportation of employees.

(h) Electrically powered mobile equipment shall not be left unattended unless the master switch is in the off position, all operating controls are in the neutral position, and the brakes are set, or other equivalent precautions are taken against rolling.

(i) When dumping cars by hand, the car dumps shall be provided with tie–down or bumper blocks to prevent cars from over–turning.

(j) Rocker–bottom or bottom–dump cars shall be equipped with positive locking devices.

(k) Equipment which is to be hauled shall be so loaded and protected as to prevent sliding or spillage.

(l) Parked railcars shall be blocked securely.

(m) Berms, bumper blocks, safety hooks, or similar means shall be provided to prevent overtravel and overturning at dumping locations.

(n) Where necessary, bumper blocks, or the equivalent, shall be provided at all track dead ends.

(o) Supplies, materials, and tools, other than small handtools, shall not be transported with employees in mantrip cars.

(12) Electrical Equipment. (a) Electrical equipment shall conform to the requirements of Part I of this Chapter.

(b) Powerlines shall be well separated or insulated from waterlines, telephone lines, and airlines.

(c) Oil-filled transformers shall not be used underground unless they are located in a fire-resistant enclosure and surrounded by a dike to contain the contents of the transformers in event of a rupture.

(13) Hoisting. (a) Hoisting machines, either powered or hand operated, shall be worm-geared or powered both ways. The design must be such that when the power is stopped, the load cannot move.

(b) Controls for powered hoists shall be of the deadman type with a nonlocking switch or control.

(c) A device to shut off the power shall be installed ahead of the operating control.

(d) Hand-operated release mechanisms, which can permit the load to descend faster than the speed rating, shall not be used.

(e) Hoist machines with cast metal parts shall not be used.

(f) Every hoist shall be tested with twice the maximum load before being put into operation, and annually thereafter.

(g) All anchorages of hoists shall be inspected at the beginning of each shift.

(h) An enclosed covered metal cage shall be used to raise and lower persons in the shaft. The cage shall be designed with a safety factor of 4 and shall be load-tested prior to use. The exterior of the cage shall be free of projections or sharp corners. Only closed shackles shall be used in the cage rigging.

(i) If the cage is equipped with a door, a positive locking device shall be installed to prevent the door from opening accidentally while the cage is being lowered or raised while hoisting or lowering employees. [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 air-pressure 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.

(6) Cofferdams located close to navigable shipping channels shall be protected from vessels in transit, where possible. [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 his 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. He shall be available at all times while work is in progress in order to provide medical supervision of employees employed in compressed air work. He shall himself be physically qualified and be willing to enter a pressurized environment.

(b) No employee shall be permitted to enter a compressed air environment until he has been examined by the physician and reported by him 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, he shall not resume work until he is re-examined by the physician, and his physical condition reported, as provided in this subsection, to be such as to permit him 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, he shall be re-examined by the physician to determine if he is 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 him. 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 representatives, and a copy thereof shall be forwarded to the Division 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;

(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. (a) Effective and reliable means of communication, such as bells, whistles, or telephones, shall be maintained at all times between all the following locations;

(i) The working chamber face;

(ii) The working chamber side of the man lock near the door;

(iii) The interior of the man lock;

(iv) Lock attendant's station;

(v) The compressor plant;

(vi) The first-aid station;

(vii) The emergency lock (if one is required); and

(viii) 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 he 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. He 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 availabe 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- 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 the National Electrical Code, ANSI C1-1971 (Rev. of 1968) 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) Firefighting 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. [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 men 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	Working period hours										
p.s.i.g.	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. From	To	Time in stage Minutes Min/Pound	Pressure reduction rate	Total time decompress Minutes
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	
		2	4	0	4	1.00	6
	7	1	14	4	2	0.20	
		2	4	0	14	3.50	16
	8	1	14	4	2	0.20	
		2	4	0	14	3.50	16
	Over 8 .	1	14	4	2	0.20	
		2	4	0	30	7.50	32
16	1/2 ...	1	16	4	3	0.20	
		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	
		2	4	0	4	1.00	7
	2	1	16	4	3	0.20	
		2	4	0	4	1.00	7
	3	1	16	4	3	0.20	
		2	4	0	4	1.00	7
	4	1	14	4	3	0.20	
		2	4	0	4	1.00	7
	5	1	14	4		0.20	7
		2	4	0	4	3.50	17
	6	1	14	4	3	0.20	
		2	4	0	30	7.50	33
	7	1	14	4	3	0.20	
		2	4	0	45	11.25	48
	8	1	14	4	3	0.20	
		2	4	0	45	11.25	48
	Over 8 .	1	14	4	3	0.20	
		2	4	0	60	15.00	63
18	1/2 ...	1	18	4	3	0.20	
		2	4	0	4	1.00	7
	1	1	18	4	3	0.20	
		2	4	0	4	1.00	7
	1 1/2..	1	18	4	3	0.20	
		2	4	0	4	1.00	7
	2	1	18	4	3	0.20	
		2	4	0	5	1.25	8
	3	1	18	4	3	0.20	
		2	4	0	8	2.00	11
	4	1	18	4	3	0.20	
		2	4	0	14	3.50	17
	5	1	18	4	3	0.20	
		2	4	0	45	11.25	48
	6	1	18	4	3	0.20	
		2	4	0	60	15.00	63
	7	1	18	4	3	0.20	
		2	4	0	60	15.00	63

DECOMPRESSION TABLE NO. 2——cont.

Working chamber pressure P.s.i.g.	Working period Hours	Stage No.	Decompression data: Pressure reduction P.s.i.g. From	To	Time in stage Minutes Min/Pound	Pressure reduction rate	Total time decompress Minutes
	8	1	18	4	3	0.20	
		2	4	0	70	17.50	73
	Over 8 .	1	18	4	3	0.20	
		2	4	0	84	21.00	87
20	1/2 ...	1	20	4	3	0.20	
		2	4	0	4	1.00	7
	1	1	20	4	3	0.20	
		2	4	0	4	1.00	7
	1 1/2 ..	1	20	4	3	0.20	
		2	4	0	5	1.25	8
	2	1	20	4	3	0.20	
		2	4	0	12	3.00	15
	3	1	20	4	3	0.20	
		2	4	0	12	3.00	15
	4	1	20	4	3	0.20	
		2	4	0	40	10.00	43
	5	1	20	4	3	0.20	
		2	4	0	60	15.00	63
	6	1	20	4	3	0.20	
		2	4	0	70	17.50	73
	7	1	20	4	3	0.20	
		2	4	0	80	20.00	83
	8	1	20	4	3	0.20	
		2	4	0	100	25.00	103
	Over 8 .	1	20	4	3	0.20	
		2	4	0	110	27.50	113
22	1/2 ...	1	22	6	3	0.20	
		2	6	0	6	1.00	9
	1	1	22	6	3	0.20	
		2	6	0	6	1.00	9
	1 1/2 ..	1	22	6	3	0.20	
		2	6	0	13	2.20	16
	2	1	22	6	3	0.20	
		2	6	0	21	3.50	24
	3	1	22	6	3	0.20	
		2	6	0	35	5.85	38
	4	1	22	6	3	0.20	
		2	6	0	65	10.83	68
	5	1	22	6	3	0.20	
		2	6	0	90	15.00	93
	6	1	22	6	3	0.20	
		2	6	0	100	16.67	103
	7	1	22	6	3	0.20	
		2	6	0	110	18.35	113
	8	1	22	6	3	0.20	
		2	6	0	125	20.80	128
	Over 8 .	1	22	6	3	0.20	
		2	6	0	130	21.70	133
24	1/2 ...	1	24	8	3	0.20	
		2	8	4	4	1.00	
		3	4	0	4	1.00	11
	1	1	24	8	3	0.20	
		2	8	4	4	1.00	
		3	4	0	5	1.25	12
	1 1/2 ..	1	24	8	3	0.20	
		2	8	4	4	1.00	
		3	4	0	16	4.00	23
	2	1	24	8	3	0.20	
		2	8	4	4	1.00	
		3	4	0	20	5.00	27
	3	1	24	8	3	0.20	
		2	8	4	4	1.00	
		3	4	0	45	11.25	52
	4	1	24	8	3	0.20	
		2	8	4	4	1.00	
		3	4	0	85	21.25	92

DECOMPRESSION TABLE NO. 2——cont.

Working chamber pressure P.s.i.g.	Working period Hours	Stage No.	Decompression data: Pressure reduction P.s.i.g. From	To	Time in stage Minutes Min/Pound	Pressure reduction rate	Total time decompress Minutes
	5	1	24	8	3	0.20	
		2	8	4	4	1.00	
		3	4	0	110	27.50	117
	6	1	24	8	3	0.20	
		2	8	4	4	1.00	
		3	4	0	115	28.80	122
	7	1	24	8	3	0.20	
		2	8	4	4	1.00	
		3	4	0	120	30.00	127
	8	1	24	8	3	0.20	
		2	8	4	4	1.00	
		3	4	0	130	32.50	137
	Over 8 .	1	24	8	3	0.20	
		2	8	4	8	2.00	
		3	4	0	140	35.00	151
26	1/2 ...	1	26	10	3	0.20	
		2	10	4	6	1.00	
		3	4	0	4	1.00	13
	1	1	26	10	3	0.20	
		2	10	4	6	1.00	
		3	4	0	5	1.25	14
	1 1/2 ..	1	26	10	3	0.20	
		2	10	4	6	1.00	
		3	4	0	20	5.00	29
	2	1	26	10	3	0.20	
		2	10	4	6	1.00	
		3	4	0	25	6.25	34
	3	1	26	10	3	0.20	
		2	10	4	6	1.00	
		3	4	0	60	15.00	69
	4	1	26	10	3	0.20	
		2	10	4	6	1.00	
		3	4	0	95	23.75	104
	5	1	26	10	3	0.20	
		2	10	4	8	1.33	
		3	4	0	115	28.80	126
	6	1	26	10	3	0.20	
		2	10	4	8	1.33	
		3	4	0	130	32.50	141
	7	1	26	10	3	0.20	
		2	10	4	9	1.50	
		3	4	0	130	32.50	142
	8	1	26	10	3	0.20	
		2	10	4	9	1.50	
		3	4	0	130	32.50	142
	Over 8 .	1	26	10	3	0.20	
		2	10	4	30	5.00	
		3	4	0	130	32.50	163
28	1/2 ...	1	28	12	3	0.20	
		2	12	4	8	1.00	
		3	4	0	4	1.00	15
	1	1	28	12	3	0.20	
		2	12	4	8	1.00	
		3	4	0	12	3.00	23
	1 1/2 ..	1	28	12	3	0.20	
		2	12	4	8	1.00	
		3	4	0	20	5.00	31
	2	1	28	12	3	0.20	
		2	12	4	8	1.00	
		3	4	0	30	7.50	41
	3	1	28	12	3	0.20	
		2	12	4	10	1.25	
		3	4	0	85	21.20	98
	4	1	28	12	3	0.20	
		2	12	4	14	1.75	
		3	4	0	110	27.50	127

DECOMPRESSION TABLE NO. 2——cont.

Working chamber pressure P.s.i.g.	Working period Hours	Stage No.	Decompression data: Pressure reduction P.s.i.g. From	To	Time in stage Minutes Min/Pound	Pressure reduction rate	Total time decompress Minutes
	5	1	28	12	3	0.20	
		2	12	4	20	2.50	
		3	4	0	120	30.00	143
	6	1	28	12	3	0.20	
		2	12	4	20	2.50	
		3	4	0	130	32.50	153
	7	1	28	12	3	0.20	
		2	12	4	20	2.50	
		3	4	0	130	32.50	153
	8	1	28	12	3	0.20	
		2	12	4	32	4.00	
		3	4	0	130	32.50	165
	Over 8	1	28	12	3	0.20	
		2	12	4	50	6.25	
		3	4	0	130	32.50	183
30	1/2	1	30	14	3	0.20	
		2	14	4	10	1.00	
		3	4	0	4	1.00	17
	1	1	30	14	3	0.20	
		2	14	4	10	1.00	
		3	4	0	15	3.75	28
	1 1/2	1	30	14	3	0.20	
		2	14	4	10	1.00	
		3	4	0	25	6.25	38
	2	1	30	14	3	0.20	
		2	14	4	14	1.40	
		3	4	0	45	11.25	62
	3	1	30	14	3	0.20	
		2	14	4	17	1.70	
		3	4	0	85	21.20	105
	4	1	30	14	3	0.20	
		2	14	4	30	3.00	
		3	4	0	110	27.50	143
	5	1	30	14	3	0.20	
		2	14	4	35	3.50	
		3	4	0	130	32.50	165
	6	1	30	14	3	0.20	
		2	14	4	35	3.50	
		3	4	0	130	32.50	168
	7	1	30	14	3	0.20	
		2	14	4	45	4.50	
		3	4	0	130	32.50	178
	8	1	30	14	3	0.20	
		2	14	4	55	5.50	
		3	4	0	130	32.50	188
	Over 8	1	30	14	3	0.20	
		2	14	4	71	7.10	
		3	4	0	130	32.50	204
32	1/2	1	32	16	3	0.20	
		2	16	4	12	1.00	
		3	4	0	4	1.00	19
	1	1	32	16	3	0.20	
		2	16	4	12	1.00	
		3	4	0	20	5.00	35
	1 1/2	1	32	16	3	0.20	
		2	16	4	15	1.25	
		3	4	0	25	6.25	43
	2	1	32	16	3	0.20	
		2	16	4	22	1.83	
		3	4	0	60	15.00	85
	3	1	32	16	3	0.20	
		2	16	4	28	2.33	
		3	4	0	95	23.75	126
	4	1	32	16	3	0.20	
		2	16	4	40	3.33	
		3	4	0	120	30.00	163

DECOMPRESSION TABLE NO. 2——cont.

Working chamber pressure P.s.i.g.	Working period Hours	Stage No.	Decompression data: Pressure reduction P.s.i.g. From	To	Time in stage Minutes Min/Pound	Pressure reduction rate	Total time decompress Minutes
	5	1	32	16	3	0.20	
		2	16	4	45	3.75	
		3	4	0	130	32.50	178
	6	1	32	16	3	0.20	
		2	16	4	60	5.00	
		3	4	0	130	32.50	193
	7	1	32	16	3	0.20	
		2	16	4	70	5.83	
		3	4	0	130	32.50	203
	8	1	32	16	3	0.20	
		2	16	4	80	6.67	
		3	4	0	130	32.50	213
	Over 8	1	32	16	3	0.20	
		2	16	4	93	7.75	
		3	4	0	130	32.50	226
34	1/2	1	34	18	3	0.20	
		2	18	4	14	1.00	
		3	4	0	4	1.00	21
	1	1	34	18	3	0.20	
		2	18	4	14	1.00	
		3	4	0	22	5.50	39
	1 1/2	1	34	18	3	0.20	
		2	18	4	25	1.80	
		3	4	0	30	7.50	58
	2	1	34	18	3	0.20	
		2	18	4	35	2.50	
		3	4	0	60	15.00	98
	3	1	34	18	3	0.20	
		2	18	4	43	3.10	
		3	4	0	105	26.25	151
	4	1	34	18	3	0.20	
		2	18	4	55	3.93	
		3	4	0	120	30.00	178
	5	1	34	18	3	0.20	
		2	18	4	62	4.43	
		3	4	0	130	32.50	195
	6	1	34	18	3	0.20	
		2	18	4	85	6.07	
		3	4	0	130	32.50	218
	7	1	34	18	3	0.20	
		2	18	4	90	6.43	
		3	4	0	130	32.50	223
	8	1	34	18	3	0.20	
		2	18	4	100	7.15	
		3	4	0	130	32.50	233
	Over 8	1	34	18	3	0.20	
		2	18	4	115	8.23	
		3	4	0	130	32.50	248
36	1/2	1	36	20	3	0.20	
		2	20	4	16	1.00	
		3	4	0	5	1.25	24
	1	1	36	20	3	0.20	
		2	20	4	16	1.00	
		3	4	0	25	6.25	44
	1 1/2	1	36	20	3	0.20	
		2	20	4	30	1.88	
		3	4	0	30	7.50	63
	2	1	36	20	3	0.20	
		2	20	4	40	2.50	
		3	4	0	70	17.50	113
	3	1	36	20	3	0.20	
		2	20	4	52	3.25	
		3	4	0	115	28.75	170
	4	1	36	20	3	0.20	
		2	20	4	65	4.06	
		3	4	0	130	32.50	198

DECOMPRESSION TABLE NO. 2——cont.

Working chamber pressure P.s.i.g.	Working period Hours	Stage No.	Decompression data: Pressure reduction P.s.i.g. From	To	Time in stage Minutes Min/Pound	Pressure reduction rate	Total time decompress Minutes
	5	1	36	20	3	0.20	
		2	20	4	90	5.63	
		3	4	0	130	32.50	223
	6	1	36	20	3	0.20	
		2	20	4	100	6.25	
		3	4	0	130	32.50	233
	7	1	36	20	3	0.20	
		2	20	4	110	6.88	
		3	4	0	130	32.50	243
	8	1	36	20	3	0.20	
		2	20	4	120	7.50	
		3	4	0	130	32.50	253
	Over 8 .	1	36	20	3	0.20	
		2	20	4	140	8.75	
		3	4	0	130	32.50	273
38	1/2 ...	1	38	22	3	0.20	
		2	22	6	16	1.00	
		3	6	0	9	1.50	28
	1	1	38	22	3	0.20	
		2	22	6	16	1.00	
		3	6	0	30	5.00	49
	1 1/2 ..	1	38	22	3	0.20	
		2	22	6	20	1.25	
		3	6	0	50	8.34	73
	2	1	38	22	3	0.20	
		2	22	6	30	1.88	
		3	6	0	95	15.83	128
	3	1	38	22	3	0.20	
		2	22	6	35	2.19	
		3	6	0	140	23.35	178
	4	1	38	22	3	0.20	
		2	22	6	50	3.12	
		3	6	0	150	25.00	203
	5	1	38	22	3	0.20	
		2	22	6	55	3.44	
		3	6	0	165	27.50	223
	6	1	28	22	3	0.20	
		2	22	6	70	4.38	
		3	6	0	165	27.50	238
	7	1	38	22	3	0.20	
		2	22	6	85	5.32	
		3	6	0	165	27.50	253
	8	1	38	22	3	0.20	
		2	22	6	95	5.93	
		3	6	0	165	27.50	263
	Over 8 .	1	38	22	3	0.20	
		2	22	6	110	6.88	
		3	6	0	165	27.50	278
40	1/2 ...	1	40	24	3	0.20	
		2	24	8	16	1.00	
		3	8	4	4	1.00	
		4	4	0	8	2.00	31
	1	1	40	24	3	0.20	
		2	24	8	16	1.00	
		3	8	4	5	1.25	
		4	4	0	25	6.25	49
	1 1/2 ..	1	40	24	3	0.20	
		2	24	8	16	1.00	
		3	8	4	20	5.00	
		4	4	0	45	11.25	84
	2	1	40	24	3	0.20	
		2	24	8	25	1.56	
		3	8	4	20	5.00	
		4	4	0	95	23.75	143

DECOMPRESSION TABLE NO. 2——cont.

Working chamber pressure P.s.i.g.	Working period Hours	Stage No.	Decompression data: Pressure reduction P.s.i.g. From	To	Time in stage Minutes Min/Pound	Pressure reduction rate	Total time decompress Minutes
	3	1	40	24	3	0.20	
		2	24	8	30	1.88	
		3	8	4	30	7.50	
		4	4	0	120	30.00	183
	4	1	40	24	3	0.20	
		2	24	8	45	2.81	
		3	8	4	35	8.75	
		4	4	0	130	32.50	213
	5	1	40	24	3	0.20	
		2	24	8	47	2.94	
		3	8	4	53	13.25	
		4	4	0	130	32.50	233
	6	1	40	24	3	0.20	
		2	24	8	55	3.44	
		3	8	4	60	15.00	
		4	4	0	130	32.50	248
	7	1	40	24	3	0.20	
		2	24	8	65	4.06	
		3	8	4	60	15.00	
		4	4	0	130	32.50	258
	8	1	40	24	3	0.20	
		2	24	8	75	4.70	
		3	8	4	60	15.00	
		4	4	0	130	32.50	268
	Over 8 .	1	40	24	3	0.20	
		2	24	8	95	5.93	
		3	8	4	60	15.00	
		4	4	0	130	32.50	288
42	1/2 ...	1	42	26	3	0.20	
		2	26	10	16	1.00	
		3	10	4	6	1.00	
		4	4	0	12	3.00	37
	1	1	42	26	3	0.20	
		2	26	10	16	1.00	
		3	10	4	12	2.00	
		4	4	0	25	6.25	56
	1 1/2 ..	1	42	26	3	0.20	
		2	26	10	16	1.00	
		3	10	4	23	3.83	
		4	4	0	60	15.00	102
	2	1	42	26	3	0.20	
		2	26	10	16	1.00	
		3	10	4	30	5.00	
		4	4	0	95	23.75	144
	3	1	42	26	3	0.20	
		2	26	10	16	1.00	
		3	10	4	50	8.34	
		4	4	0	120	30.00	189
	4	1	42	26	3	0.20	
		2	26	10	17	1.06	
		3	10	4	65	10.83	
		4	4	0	130	32.50	215
	5	1	42	26	3	0.20	
		2	26	10	27	1.69	
		3	10	4	85	14.18	
		4	4	0	130	32.50	245
	6	1	42	26	3	0.20	
		2	26	10	27	1.69	
		3	10	4	100	16.67	
		4	4	0	130	32.50	260
	7	1	42	26	3	0.20	
		2	26	10	30	1.88	
		3	10	4	100	16.67	
		4	4	0	130	32.50	263

DECOMPRESSION TABLE NO. 2——cont.

Working chamber pressure P.s.i.g.	Working period Hours	Stage No.	Decompression data: Pressure reduction P.s.i.g. From	To	Time in stage Minutes Min/Pound	Pressure reduction rate	Total time decompress Minutes
	8	1	42	26	3	0.20	
		2	26	10	35	2.19	
		3	10	4	100	16.67	
		4	4	0	130	32.50	268
	Over 8 .	1	42	26	3	0.20	
		2	26	10	60	3.75	
		3	10	4	100	16.67	
		4	4	0	130	32.50	293
44	1/2 ...	1	44	28	3	0.20	
		2	28	12	16	1.00	
		3	12	4	8	1.00	
		4	4	0	16	4.00	43
	1	1	44	28	3	0.20	
		2	28	12	16	1.00	
		3	12	4	20	2.50	
		4	4	0	25	6.25	64
	1 1/2 ..	1	44	28	3	0.20	
		2	28	12	16	1.00	
		3	12	4	27	3.38	
		4	4	0	72	18.00	118
	2	1	44	28	3	0.20	
		2	28	12	16	1.00	
		3	12	4	40	5.00	
		4	4	0	95	23.75	154
	3	1	44	28	3	0.20	
		2	28	12	16	1.00	
		3	12	4	60	7.50	
		4	4	0	120	30.00	199
	4	1	44	28	3	0.20	
		2	28	12	16	1.00	
		3	12	4	85	10.62	
		4	4	0	130	32.50	234
	5	1	44	28	3	0.20	
		2	28	12	16	1.00	
		3	12	4	105	13.13	
		4	4	0	130	32.50	254
	6	1	44	28	3	0.20	
		2	28	12	16	1.00	
		3	12	4	115	14.38	
		4	4	0	130	32.50	264
	7	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
	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

DECOMPRESSION TABLE NO. 2——cont.

Working chamber pressure P.s.i.g.	Working period Hours	Stage No.	Decompression data: Pressure reduction P.s.i.g. From	To	Time in stage Minutes Min/Pound	Pressure reduction rate	Total time decompress Minutes
	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

[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

296-155-750 Masonry construction.
296-155-755 Roofing, insulating and waterproofing.
296-155-760 Concrete finishing.
296-155-765 Rock crushing, gravel washing, and hot mix plants.
296-155-770 Moving of structures.

WAC 296-155-750 Masonry construction. (1) Employees engaged in cutting or chipping shall wear suitable eye protection in accordance with WAC 296-155-215.

(2) All brick saws shall be equipped with mechanical means of exhausting dust into a cyclone type receptacle or be exhausted away from operator to a safe distance to provide a dust free place of work for operator and other workers, or provided with water on saw for dust control. Operator shall wear goggles.

(3) The top half of all brick saws shall be guarded with a hood extending over both sides of saw down to the arbor.

(4) Persons charged with operation of derricks used for stone setting shall be qualified in that type of work.

(5) Stone shall be set directly on the wall by the derrick.

(6) 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.

(7) Stone cutters shall wear goggles while trimming stone or cutting holes.

(8) Pins shall be tested for security before stone is hoisted.

(9) Hoisting cables shall be protected from chafing and wearing over corners.

(10) Where construction work is in progress above workers, a catch platform shall be erected to protect the persons working below. One completed floor shall be maintained between workers and steel or concrete work above. [Order 74-26, § 296-155-750, filed 5/7/74, effective 6/6/74.]

WAC 296-155-755 Roofing, insulating and waterproofing. (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 (5/8) 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 non-conductive 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 296-155-760 Concrete finishing. (1) Scaffolding for use of cement finishers shall comply with all applicable sections 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 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) Goggles shall be worn by workers engaged in grinding, chipping or sacking concrete. [Order 74-26, § 296-155-760, 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 steam 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 and covered with sand.

(18) Mixer operator shall use approved respirator and goggles.

(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. [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 non–steering 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.
296–155–780 Stairs, passageways, and ladders.
296–155–785 Chutes.
296–155–790 Removal of materials through floor openings.
296–155–795 Removal of walls, masonry sections, and chimneys.

296–155–800 Manual removal of floors.
296–155–805 Removal of walls, floors, and material with equipment.
296–155–810 Catch platforms.
296–155–815 Storage.
296–155–820 Removal of steel construction.
296–155–825 Mechanical demolition.
296–155–830 Selective demolition by explosives.

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 the condition of the framing, floors, and walls, and 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 controlled, 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 also be determined if any type of hazardous chemicals, gases, explosives, flammable materials, or similarly dangerous substances have been used in any pipes, tanks, or other equipment on the property. When the presence of any such substances is apparent or suspected, testing and purging shall be performed and the hazard eliminated before demolition is started.

(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 36 and 42 inches.

(12) When debris is dropped through holes in the floor without the use of chutes, the area onto which the material is dropped shall be completely 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.

(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) Workmen shall not be permitted to carry on a demolition operation which will expose men 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 8 feet. All such canopies shall be at least 2 feet wider than the building entrances or openings (1 foot wider on each side thereof), and shall be capable of sustaining a load of 150 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. [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 men 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. [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 WAC 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 workmen 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 workmen when necessary to enable them to reach any point without walking upon exposed beams.

(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. [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 (70) 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 (3) stories below the story from which the exterior walls are being removed, until the demolition has progressed to within three (3) stories of the ground level.

(3) Catch platforms shall not be less than five (5) 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 (125) 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 be conducted in accordance with applicable sections of Part T of this chapter. [Order 74-26, § 296-155-830, filed 5/7/74, effective 6/6/74.]

Part T
BLASTING AND THE USE OF EXPLOSIVES

WAC

296-155-850 Definitions applicable to this part.
296-155-855 General provisions.
296-155-860 Blaster qualifications.
296-155-865 Surface transportation of explosives.
296-155-870 Underground transportation of explosives.
296-155-875 Storage of explosives and blasting agents.
296-155-880 Loading of explosives or blasting agents.
296-155-885 Initiation of explosive charges——Electric blasting.

296-155-890 Use of safety fuse.
296-155-895 Use of detonating cord.
296-155-900 Firing the blast.
296-155-905 Inspection after blasting.
296-155-910 Misfires.
296-155-915 Underwater blasting.
296-155-920 Blasting in excavation work under compressed air.

WAC 296-155-850 Definitions applicable to this part. (1) "American Table of Distances" (also known as Quantity Distance Tables) means American Table of Distances for Storage of Explosives as revised and approved by the Institute of the Makers of Explosives, June 5, 1964.

(2) "Approved storage facility" means a facility for the storage of explosive materials conforming to the requirements of this Part and covered by a license or permit issued under authority of the Department of Labor and Industries.

(3) "Blast area" means the area in which explosives loading and blasting operations are being conducted.

(4) "Blaster" means the person or persons authorized to use explosives for blasting purposes and meeting the qualifications contained in WAC 296-155-860 of this Part.

(5) "Blasting agent" means any material or mixture consisting of a fuel and oxidizer used for blasting, but not classified as an explosive and in which none of the ingredients is classified as an explosive provided the finished (mixed) product cannot be detonated with a No. 8 test blasting cap when confined. A common blasting agent presently in use is a mixture of ammonium nitrate (NH_4NO_3) and carbonaceous combustibles, such as fuel oil or coal, and may either be procured, premixed and packaged from explosives companies or mixed in the field.

(6) "Blasting cap" means a metallic tube closed at one end, containing a charge of one or more detonating compounds, and designed for and capable of detonation from the sparks or flame from a safety fuse inserted and crimped into the open end.

(7) "Block holing" means the breaking of boulders by firing a charge of explosives that has been loaded in a drill hole.

(8) "Conveyance" means any unit for transporting explosives or blasting agents, including but not limited to trucks, trailers, rail cars, barges, and vessels.

(9) "Detonating cord" means a flexible cord containing a center core of high explosives which when detonated, will have sufficient strength to detonate other cap-sensitive explosives with which it is in contact.

(10) "Detonator" means blasting caps, electric blasting caps, delay electric blasting caps, and nonelectric delay blasting caps.

(11) "Electric blasting cap" means a blasting cap designed for and capable of detonation by means of an electric current.

(12) "Electric blasting circuitry" means (a) Bus wire. An expendable wire, used in parallel or series, in parallel circuits, to which are connected the leg wires of electric blasting caps.

(b) Connecting wire. An insulated expendable wire used between electric blasting caps and the leading wires or between the bus wire and the leading wires.

(c) Leading wire. An insulated wire used between the electric power source and the electric blasting cap circuit.

(d) Permanent blasting wire. A permanently mounted insulated wire used between the electric power source and the electric blasting cap circuit.

(13) "Electric delay blasting caps" means caps designed to detonate at a predetermined period of time after energy is applied to the ignition system.

(14) "Explosives" means (a) Any chemical compound, mixture, or device, the primary or common purpose of which is to function by explosion; that is, with substantially instantaneous release of gas and heat, unless such compound, mixture or device is otherwise specifically classified by the U.S. Department of Transportation.

(b) All material which is classified as Class A, Class B, and Class C explosives by the U.S. Department of Transportation.

(c) Classification of explosives by the U.S. Department of Transportation is as follows:

Class A Explosives. Possessing detonating hazard, such as dynamite, nitroglycerin, picric acid, lead azide, fulminate of mercury, black powder, blasting caps, and detonating primers.

Class B Explosives. Possessing flammable hazard, such as propellant explosives, including some smokeless propellants.

Class C Explosives. Include certain types of manufactured articles which contain Class A or Class B explosives, or both, as components, but in restricted quantities.

(15) "Fuse lighters" means special devices for the purpose of igniting safety fuse.

(16) "Magazine" means any building or structure, other than an explosives manufacturing building, used for the storage of explosives.

(17) "Misfire" means an explosive charge which failed to detonate.

(18) "Mud-capping" (sometimes known as bulldozing, adobe blasting, or dobying) means the blasting of boulders by placing a quantity of explosives against a rock, boulder, or other object without confining the explosives in a drill hole.

(19) "Nonelectric delay blasting cap" means a blasting cap with an integral delay element in conjunction with and capable of being detonated by a detonation impulse or signal from miniaturized detonating cord.

(20) "Primary blasting" means the blasting operation by which the original rock formation is dislodged from its natural location.

(21) "Primer" means a cartridge or container of explosives into which a detonator or detonating cord is inserted or attached.

(22) "Safety fuse" means a flexible cord containing an internal burning medium by which fire is conveyed at a continuous and uniform rate for the purpose of firing blasting caps.

(23) "Secondary blasting" means the reduction of oversize material by the use of explosives to the dimension required for handling, including mudcapping and blockholing.

(24) "Stemming" means a suitable inert incombustible material or device used to confine or separate explosives in a drill hole, or to cover explosives in mudcapping.

(25) "Springing" means the creation of a pocket in the bottom of a drill hole by the use of a moderate quantity of explosives in order that larger quantities or explosives may be inserted therein.

(26) "Water gels, or slurry explosives" means a wide variety of materials used for blasting. They all contain substantial proportions of water and high proportions of ammonium nitrate, some of which is in solution in the water. Two broad classes of water gels are: (a) Those which are sensitized by a material classed as an explosive, such as TNT or smokeless powder, and (b) those which contain no ingredient classified as an explosive; these are sensitized with metals such as aluminum or with other fuels. Water gels may be premixed at an explosives plant or mixed at the site immediately before delivery into the bore hole. [Order 74-26, § 296-155-850, filed 5/7/74, effective 6/6/74.]

WAC 296-155-855 General provisions. (1) The employer shall permit only authorized and qualified persons to handle and use explosives.

(2) Smoking, firearms, matches, open flame lamps, and other fires, flame or heat producing devices and sparks shall be prohibited in or near explosive magazines or while explosives are being handled, transported or used.

(3) No person shall be allowed to handle or use explosives while under the influence of intoxicating liquors, narcotics, or other dangerous drugs.

(4) All explosives shall be accounted for at all times. Explosives not being used shall be kept in a locked magazine, unavailable to persons not authorized to handle them. The employer shall maintain an inventory and use record of all explosives. Appropriate authorities shall be notified of any loss, theft, or unauthorized entry into a magazine.

(5) No explosives or blasting agents shall be abandoned.

(6) No fire shall be fought where the fire is in imminent danger of contact with explosives. All employees shall be removed to a safe area and the fire area guarded against intruders.

(7) Original containers, or Class II magazines, shall be used for taking detonators and other explosives from storage magazines to the blasting area.

(8) When blasting is done in congested areas or in proximity to a structure, railway, or highway, or any other installation that may be damaged, the blaster shall take special precautions in the loading, delaying, initiation, and confinement of each blast with mats or other methods so as to control the throw of fragments, and thus prevent bodily injury to employees.

(9) Employees authorized to prepare explosive charges or conduct blasting operations shall use every reasonable precaution including, but not limited to, visual and audible warning signals, flags, or barricades, to ensure employee safety.

(10) Insofar as possible, blasting operations above ground shall be conducted between sunup and sundown.

(11) Due precautions shall be taken to prevent accidental discharge of electric blasting caps from current induced by radar, radio transmitters, lightning, adjacent powerlines, dust storms, or other sources of extraneous electricity. These precautions shall include:

(a) Detonators shall be short-circuited in holes which have been primed and shunted until wired into the blasting circuit.

(b) The suspension of all blasting operations and removal of persons from the blasting area during the approach and progress of an electric storm;

(c) The posting of signs, warning against the use of mobile radio transmitters, on all roads shall be in accordance with applicable provisions of the American National Standards Institute D6.1-1971, Manual on Uniform Traffic Control Devices for Streets and Highways, as amended by Washington State Department of Highways Manual M24-01 (HT).

(d) Ensuring that mobile radio transmitters which are less than 100 feet away from electric blasting caps, when the caps are in other than original containers, shall be de-energized and effectively locked;

(e) Compliance with the recommendations of The Institute of the Makers of Explosives (IME) with regard to blasting in the vicinity of radio transmitters as stipulated in Radio Frequency Energy——A Potential Hazard in the Use of Electric Blasting Caps, IME Publication No. 20, March 1971.

(f) When electric blasting caps are being used in blasting operations in the proximity of fixed radio transmitters, the following table of distances must be observed, unless it is determined by designated test procedures that there is not sufficient radio frequency energy present to create a hazard. The test procedure shall be to attach a No. 47 Radio Pilot Lamp in place of the cap in the blasting circuit progressively as the circuit is connected, starting with the initial hole. In the event the lamp glows, the length of the wires connecting the circuit shall be altered by adding or cutting off wire until the lamp does not glow. A radio frequency field strength meter may be used in lieu of the test lamp.

Power	Watts	Distance (Feet)
5	25	100
25	50	150
50	100	220
100	250	350
250	500	450
500	1,000	650
1,000	2,500	1,000
2,500	5,000	1,500
5,000	10,000	2,200
10,000	25,000	3,500
25,000	50,000	5,000
50,000	100,000	7,000

(12) Empty boxes and paper and fiber packing materials, which have previously contained high explosives, shall not be used again for any purpose, but shall be destroyed by burning at an approved location.

(13) Should cartridges or packages of explosives show signs of discoloration or deterioration, the manufacturer or the Department shall be notified. Such explosives must be carefully set aside and must not be used.

(14) Nitro base explosives shall not be used more than fifteen (15) months after the date of manufacture.

NOTE: In removing explosives from a magazine the oldest should be used first.

(15) No package of explosives shall at any time be opened within fifty (50) feet of any storage magazine.

(16) An explosive container shall be opened only with non-sparking tools.

(17) Explosives shall always be handled with extreme care and all unnecessary handling avoided.

(18) Explosives shall not be handled near open flames, sparks or electric circuits.

(19) Delivery and issue of explosives shall only be made by and to authorized persons and into authorized magazines or approved temporary storage or handling areas.

(20) Blasting operations in the proximity of overhead power lines, communication lines, utility services, or other services and structures shall not be carried on until the operators and/or owners have been notified and measures for safe control have been taken.

(21) The use of black powder shall be prohibited.

(22) All loading and firing shall be directed and supervised by licensed persons thoroughly experienced in this field.

(23) All blasts shall be fired electrically with an electric blasting machine or properly designed electric power source, except as provided in WAC 296-155-905(1) and (20).

NOTE: In addition to the requirements of Part T of this chapter, chapter 296-52 WAC, "Safety Standards for the Possession and Handling of Explosives" and chapter 70.74 RCW "Washington State Explosives Act" shall apply. Should requirements of the two chapters differ, the most stringent standard shall prevail.

[Order 74-26, § 296-155-855, filed 5/7/74, effective 6/6/74.]

WAC 296-155-860 Blaster qualifications. (1) A blaster shall be able to understand and give written and oral orders.

(2) A blaster shall be in good physical condition and not be addicted to narcotics, intoxicants, or similar types of drugs.

(3) A blaster shall be qualified by reason of training, knowledge, or experience, in the field of transporting, storing, handling, and use of explosives, and have a working knowledge of State and local laws and regulations which pertain to explosives.

(4) Blasters shall be required to furnish satisfactory evidence of competency in handling explosives and performing in a safe manner the type of blasting that will be required.

(5) The blaster shall be knowledgeable and competent in the use of each type of blasting method used.

NOTE: Refer to chapter 296-52 WAC for additional qualification requirements.

[Order 74-26, § 296-155-860, filed 5/7/74, effective 6/6/74.]

WAC 296-155-865 Surface transportation of explosives. (1) Transportation of explosives shall meet the provisions of Department of Transportation regulations.

(2) Motor vehicles or conveyances transporting explosives shall only be driven by, and be in the charge of, a licensed driver who is physically fit. He shall be familiar with the local, State, and Federal regulation governing the transportation of explosives.

(3) No person shall smoke, or carry matches or any other flame-producing device, nor shall firearms or loaded cartridges be carried while in or near a motor vehicle or conveyance transporting explosives.

(4) Explosives, blasting agents, and blasting supplies shall not be transported with other materials or cargoes. Blasting caps (including electric) shall not be transported in the same vehicle compartment with other explosives.

(5) Vehicles used for transporting explosives shall be strong enough to carry the load without difficulty, and shall be in good mechanical condition.

(6) When explosives are transported by a vehicle with an open body, a Class II magazine or original manufacturer's container shall be securely mounted on the bed to contain the cargo.

(7) All vehicles used for the transportation of explosives shall have tight floors and any explosed [exposed] spark-producing metal on the inside of the body shall be covered with wood, or other nonsparking material, to prevent contact with containers of explosives.

(8) Every motor vehicle or conveyance used for transporting explosives shall be marked or placarded on both sides, the front, and the rear with the word "Explosives" in red letters, not less than 4 inches in height, on white background. In addition to such marking or placarding, the motor vehicle or conveyance may display, in such a manner that it will be readily visible from all directions, a red flag 18 inches by 30 inches, with the word "Explosives" painted, stamped, or sewed thereon, in white letters, at least 6 inches in height.

(9) Workmen or equipment shall not be transported in a vehicle when hauling explosives.

(10) Each vehicle used for transportation of explosives shall be equipped with a fully charged fire extinguisher, in good condition. An Underwriters Laboratory-approved extinguisher of not less than 10-ABC rating will meet the minimum requirement. The driver shall be trained in the use of the extinguisher on his vehicle.

(11) Motor vehicles or conveyances carrying explosives, blasting agents, or blasting supplies, shall not be taken inside a garage or shop for repairs or servicing.

(12) No motor vehicle transporting explosives shall be left unattended. [Order 74-26, § 296-155-865, filed 5/7/74, effective 6/6/74.]

WAC 296-155-870 Underground transportation of explosives. (1) All explosives or blasting agents in transit underground shall be taken to the place of use or storage without delay.

(2) The quantity of explosives or blasting agents taken to an underground loading area shall not exceed the amount estimated to be necessary for the blast.

(3) Explosives in transit shall not be left unattended.

(4) The hoist operator shall be notified before explosives or blasting agents are transported in a shaft conveyance.

(5) Trucks used for the transportation of explosives underground shall have the electrical system checked weekly to detect any failures which may constitute an electrical hazard. A written record of such inspections shall be kept on file for the duration of the job.

(6) The installation of auxiliary lights on truck beds, which are powered by the truck's electrical system, shall be prohibited.

(7) Explosives and blasting agents shall be hoisted, lowered, or conveyed in a powder car. No other materials, supplies, or equipment shall be transported in the same conveyance at the same time.

(8) No one, except the operator, his helper, and the powderman, shall be permitted to ride on a conveyance transporting explosives and blasting agents.

(9) No person shall ride in any shaft conveyance transporting explosives and blasting agents.

(10) No explosives or blasting agents shall be transported on any locomotive. At least two car lengths shall separate the locomotive from the powder car.

(11) No explosives or blasting agents shall be transported on a man haul trip.

(12) The car or conveyance containing explosives or blasting agents shall be pulled, not pushed, whenever possible.

(13) The powder car or conveyance especially built for the purpose of transporting explosives or blasting agents shall bear a reflectorized sign on each side with the word "Explosives" in letters, not less than 4 inches in height; upon a background of sharply contrasting color.

(14) Compartments for transporting detonators and explosives in the same car or conveyance shall be physically separated by a distance of 24 inches or by a solid partition at least 6 inches thick.

(15) Detonators and other explosives shall not be transported at the same time in any shaft conveyance.

(16) Explosives, blasting agents, or blasting supplies shall not be transported with other materials.

(17) Explosives or blasting agents, not in original containers, shall be placed in a suitable container when transported manually.

(18) Detonators, primers, and other explosives shall be carried in separate containers when transported manually. [Order 74-26, § 296-155-875, filed 5/7/74, effective 6/6/74.]

WAC 296-155-875 Storage of explosives and blasting agents. (1) Explosives and related materials shall be stored in approved facilities required under the applicable provisions of the Internal Revenue Service regulations, Commerce in Explosives.

(2) Every person engaged in the business of keeping or storing of explosives shall make application annually for license to the Department.

(3) Blasting caps, electric blasting caps, detonating primers, and primed cartridges shall not be stored in the same magazine with other explosives or blasting agents.

(4) Smoking and open flames shall not be permitted within 50 feet of explosives and detonator storage magazine.

(5) No explosives or blasting agents shall be permanently stored in any underground operation until the operation has been developed to the point where at least two modes of exit have been provided.

(6) Permanent underground storage magazines shall be at least 300 feet from any shaft, adit, or active underground working area.

(7) Permanent underground magazines containing detonators shall not be located closer than 100 feet to any magazine containing other explosives or blasting agents.

(8) Magazines of the first class shall consist of those containing explosives in amounts exceeding fifty (50) pounds and in unopened original containers. They shall be known as permanent magazines and may be either stationary or portable.

(9) Permanent magazines shall be of an approved type such as a building type, an igloo or army type, or a tunnel or dugout type. Walls of building type shall be substantially constructed and shall meet the following standards or be constructed of other materials in a manner which will be the equivalent thereof:

(a) Solid construction, not less than six (6) inches in thickness of materials such as concrete, masonry, brick or wood; or

(b) Filled construction, such as concrete blocks, weak concrete (1 part cement to 7-10 parts sand in mortar), or cement mortar or exterior and interior wooden walls not less than four (4) inches apart with the space between filled with sand, weak concrete or cement mortar, and the exterior walls covered with sheet metal or other fire-resistant material; or

(c) Lined construction, such as metal plate not lighter than fourteen (14) gauge, lined with some non-conductive material such as weak concrete, cement mortar brick, or screened sand, not less than four (4) inches in thickness, or with hardwood not less than two (2) inches in thickness, or with soft wood not less than three (3) inches in thickness.

(10) The same standards shall govern the construction of any artificial enclosing wall or tunnel or dugout type magazines on or exposed to the surface of the ground.

(11) The same standards shall govern the construction of portable type magazines, except the walls shall not be less than four (4) inches thick.

(12) Foundations of building type magazines shall be enclosed in such a way as to prevent the entrance of persons, sparks and firebrands. Vents of foundations shall be protected with metal screening or otherwise constructed to prevent the entrance of persons, sparks or firebrands.

(13) Roofs of building type magazines shall be constructed to resist theft and shall be covered with sheet metal or other fire–resistant material.

(14) Ceilings of building type magazines shall be not less than two (2) inches in thickness with a sand cover six (6) inches deep.

(15) Doors of magazines shall be constructed of 3/8 inch steel plate lined with a two (2) inch thickness of wood or of a thinner steel plate with a thicker lining of wood, at the rate of one (1) additional inch of wood for each one–eighth (1/8) inch decrease in the thickness of the steel plate, or of wooden walls at least four (4) inches apart and filled with sand, weak mortar or concrete, or of wood not less than six (6) inches in thickness; the exterior of wood surfaces to be covered with sheet metal or other fire–resistant material.

(16) Doors shall be provided with hinges, hasps and staples attached by welding rivets or bolts with washers and nuts on the inside of the magazine and installed in such a manner that fastenings cannot be removed when magazine is locked.

(17) Doors shall be equipped with locks such as padlocks, mortise or three point locks. Padlocks shall be the equivalent of five tumbler jar proof locks. Where padlocks are used, a steel hood shall be welded, riveted or bolted over the lock in such a manner that the lock can be removed only by use of a key.

(18) The doors of such magazines shall remain closed and locked at all times except when necessarily opened for the purpose of storing explosives therein or removing therefrom.

(19) All magazines except black powder magazines shall be provided with adequate ventilation but shall have no openings except for entrance and ventilation. All vents shall be screened in such a manner as to prevent the entrance of persons, sparks or fire through the same.

(20) All exposed interior surfaces of walls and floor of all magazines shall be of non–sparking material.

(21) Magazines shall not be heated.

(22) Magazines shall be kept clean, dry and free from all rubbish. They shall not be used as storerooms for anything other than explosives.

(23) The surface of all ground within a distance of twenty–five (25) feet from any magazine shall be kept clear of all inflammable material.

(24) The premises on which a first class magazine is located shall be conspicuously marked with signs containing the words "EXPLOSIVES——KEEP OFF" in letters at least three (3) inches high. Such signs shall warn any person approaching the magazine of the presence of explosives, but shall be so located that a bullet passing directly through the face of the sign will not strike the magazine.

(25) Magazines of the second class (box type magazines) shall be constructed of two (2) inch wood covered with sheet metal or other fire–resistant material. Doors or lids shall be provided with hinges, hasps and staples attached by welds, rivets, or bolts fitted with washers and nut on the interior of the magazine. They shall be equipped with one lock equivalent to a five (5) tumbler jar proof lock. They shall not contain more than (50) pounds of explosives. They shall be kept closed and locked at all times except when explosives are being placed therein or removed there from. They shall have warning signs similar to first class magazines.

(26) Blasting shall not be done in the vicinity of a magazine containing explosives.

(27) Magazines in which explosives are kept or stored must be located at such distances from the nearest building, railroad or highway as indicated in chapter 70.74 RCW. [Order 74–26, § 296–155–875, filed 5/7/74, effective 6/6/74.]

WAC 296–155–880 Loading of explosives or blasting agents. (1) Procedures that permit safe and efficient loading shall be established before loading is started.

(2) All drill holes shall be sufficiently large to admit freely the insertion of the cartridges of explosives.

(3) Tamping shall be done only with wood rods or plastic tamping poles without exposed metal parts, but nonsparking metal connectors may be used for jointed poles. Violent tamping shall be avoided. The primer shall never be tamped.

(4) All explosives packed in cartridges when used in bore holes shall be loaded in the original cartridge without peeling the wrapper.

(5) No holes shall be loaded except those to be fired in the next round of blasting. After loading, all remaining explosives and detonators shall be immediately returned to an authorized magazine.

(6) Drilling shall not be started until all remaining butts of old holes are examined for unexploded charges, and if any are found, they shall be refired before work proceeds.

(7) When a charge of explosives has been exploded in a bore hole to enlarge or "spring" it, an interval of at least two (2) hours must be allowed to pass before an additional charge of explosives can be loaded into the hole.

NOTE: Where it is necessary to clear obstacles for the moving of equipment there may be an exception made to this rule provided the sprung hole is thoroughly wet down with water before it is loaded.

(8) No person shall be allowed to deepen drill holes which have contained explosives or blasting agents.

(9) No explosives or blasting agents shall be left unattended at the blast site.

(10) Loaders shall not load, store or use explosives closer than the length of the steel being used for drilling

and in no event nearer than ten feet of drilling operations.

(11) Machines and all tools not used for loading explosives into bore holes shall be removed from the immediate location of holes before explosives are delivered. Equipment shall not be operated within 50 feet of loaded holes.

(12) No activity of any nature other than that which is required for loading holes with explosives shall be permitted in the blast area.

(13) Powerlines and portable electric cables for equipment being used shall be kept a safe distance from explosives or blasting agents being loaded into drill holes. Cables in the proximity of the blast area shall be deenergized and locked out by the blaster.

(14) Holes shall be checked prior to loading to determine depth and conditions. Where a hole has been loaded with explosives but the explosives have failed to detonate, there shall be no drilling within 50 feet of the hole.

(15) When the water table is above the bottom of the lowest drill hole, no hole shall be loaded until all holes are properly sprung and ready for loading.

(16) When loading a long line of holes with more than one loading crew, the crews shall be separated by practical distance consistent with efficient operation and supervision of crews.

(17) No explosive shall be loaded or used underground in the presence of combustible gases or combustible dusts.

(18) No explosives other than those in Fume Class 1, as set forth by the Institute of Makers of Explosives, shall be used; however, explosives complying with the requirements of Fume Class 2 and Fume Class 3 may be used if adequate ventilation has been provided.

(19) All blast holes in open work shall be stemmed to the collar or to a point which will confine the charge.

(20) Warning signs, indicating a blast area, shall be maintained at all approaches to the blast area. The warning sign lettering shall not be less than 4 inches in height on a contrasting background.

(21) A bore hole shall never be sprung when it is adjacent to or near a hole that is loaded. Flashlight batteries shall not be used for springing holes.

(22) Drill holes which have been sprung or chambered, and which are not water-filled, shall be allowed to cool before explosives are loaded.

(23) No loaded holes shall be left unattended or unprotected.

(24) The blaster shall keep an accurate, up-to-date record of explosives, blasting agents, and blasting supplies used in a blast and shall keep an accurate running inventory of all explosives and blasting agents stored on the operation. [Order 74-26, § 296-155-880, filed 5/7/74, effective 6/6/74.]

WAC 296-155-885 Initiation of explosive charges——Electric blasting. (1) Electric blasting caps shall not be used where sources of extraneous electricity make the use of electric blasting caps dangerous. Blasting cap leg wires shall be kept short-circuited (shunted) until they are connected into the circuit for firing.

(2) Before adopting any system of electrical firing, the blaster shall conduct a thorough survey for extraneous currents, and all dangerous currents shall be eliminated before any holes are loaded.

(3) In any single blast using electric blasting caps, all caps shall be of the same style or function, and of the same manufacture.

(4) Electric blasting shall be carried out by using blasting circuits or power circuits in accordance with the electric blasting cap manufacturer's recommendations, or an approved contractor or his designated representative.

(5) When firing a circuit of electric blasting caps, care shall be exercised to ensure that an adequate quantity of delivered current is available, in accordance with the manufacturer's recommendations.

(6) Connecting wires and lead wires shall be insulated single solid wires of sufficient current-carrying capacity, and shall not be less than twenty (20) gauge (American Wire gauge) solid core insulated wire.

(7) Bus wires shall be solid single wires of sufficient current-carrying capacity, and shall be not less than fourteen (14) gauge (American Wire gauge) solid core insulated wire.

(8) The ends of lead wires which are to be connected to a firing device shall be shorted by twisting them together or otherwise connecting them before they are connected to the leg wires or connecting wires, and they shall be kept in the possession of the man who is doing the loading until loading is completed and the leg wires attached. Lead wires shall not be attached to the firing device until the blaster is ready to fire the shot and must be attached by the blaster himself.

(9) The ends of the leg wires on electric detonators shall be shorted in a similar manner and not separated until all holes are loaded and the loader is ready to connect the leg wires to the connecting wires or lead wires.

(10) When firing electrically, the insulation on all firing lines shall be adequate and in good condition.

(11) A power circuit used for firing electric blasting caps shall not be grounded.

(12) In underground operations when firing from a power circuit, a safety switch shall be placed at intervals in the permanent firing line. This switch shall be made so it can be locked only in the "Off" position and shall be provided with a short-circuiting arrangement of the firing lines to the cap circuit.

(13) In underground operations there shall be a "lightning" gap of at least 5 feet in the firing system ahead of the main firing switch; that is, between this switch and the source of power. This gap shall be bridged by a flexible jumper cord just before firing the blast.

(14) When firing from a power circuit, the firing switch shall be locked in the open or "Off" position at all times, except when firing. It shall be so designed that the firing lines to the cap circuit are automatically

short-circuited when the switch is in the "Off" position. Keys to this switch shall be entrusted only to the blaster.

(15) Blasting machines shall be in good condition and the efficiency of the machine shall be tested periodically to make certain that it can deliver power at its rated capacity.

(16) When firing with blasting machines, the connections shall be made as recommended by the manufacturer of the electric blasting caps used.

(17) The number of electric blasting caps connected to a blasting machine shall not be in excess of its rated capacity. Furthermore, in primary blasting, a series circuit shall contain no more caps than the limits recommended by the manufacturer of the electric blasting caps in use.

(18) The blaster shall be in charge of the blasting machines, and no other person shall connect the leading wires to the machine.

(19) Blasters, when testing circuits to charged holes, shall use only blasting galvanometers equipped with a silver chloride cell especially designed for this purpose.

(20) Whenever the possibility exists that a leading line or blasting wire might be thrown over a live powerline by the force of an explosion, care shall be taken to see that the total length of wires are kept too short to hit the lines, or that the wires are securely anchored to the ground. If neither of these requirements can be satisfied, a nonelectric system shall be used.

(21) In electrical firing, only the man making leading wire connections shall fire the shot. All connections shall be made from the bore hole back to the source of firing current, and the leading wires shall remain shorted and not be connected to the blasting machine or other source of current until the charge is to be fired.

(22) After firing an electric blast from a blasting machine, the leading wires shall be immediately disconnected from the machine and short-circuited. [Order 74-26, § 296-155-885, filed 5/7/74, effective 6/6/74.]

WAC 296-155-890 Use of safety fuse. (1) Safety fuse shall only be used where sources of extraneous electricity make the use of electric blasting caps dangerous. The use of a fuse that has been hammered or injured in any way shall be forbidden.

(2) The hanging of fuse on nails or other projections which will cause a sharp bend to be formed in the fuse is prohibited.

(3) Before capping safety fuse, a short length shall be cut from the end of the supply reel so as to assure a fresh cut end in each blasting cap.

(4) Only a cap crimper of approved design shall be used for attaching blasting caps to safety fuse. Crimpers shall be kept in good repair and accessible for use.

(5) No unused cap or short capped fuse shall be placed in any hole to be blasted; such unused detonators shall be removed from the working place and destroyed.

(6) No fuse shall be capped, or primers made up, in any magazine or near any possible source of ignition.

(7) Capping of fuse and making of primers shall only be done in a place selected for this purpose and at least one hundred (100) feet distant from any storage magazine.

(8) No one shall be permitted to carry detonators or primers of any kind on his person.

(9) Fuse must be cut long enough to reach beyond the collar of the bore hole and in no case less than three (3) feet long except that a fuse not less than thirty (30) inches long may be used for choker shots where not more than one (1) stick or cartridge of explosives is used.

(10) At least two men shall be present when multiple cap and fuse blasting is done by hand lighting methods.

(11) Not more than 12 fuses shall be lighted by each blaster when hand lighting devices are used. However, when two or more safety fuses in a group are lighted as one by means of igniter cord, or other similar fuse-lighting devices, they may be considered as one fuse.

(12) The so-called "drop fuse" method of dropping or pushing a primer or any explosive with a lighted fuse attached is prohibited.

(13) Cap and fuse shall not be used for firing mudcap charges unless charges are separated sufficiently to prevent one charge from dislodging other shots in the blast.

(14) When blasting with safety fuses, consideration shall be given to the length and burning rate of the fuse. Sufficient time, with a margin of safety, shall always be provided for the blaster to reach a place of safety.

(15) For use in wet places the joint between the cap and fuse shall be waterproofed with a compound prepared for this purpose.

(16) Blasting caps shall not be removed from the original container except as they are used for capping fuses.

(17) In making up primers only non-sparking skewers shall be used for punching the hole in the cartridge to insert the capped fuse.

(18) Only sufficient primers or capped fuse for one day's use shall be made up at one time. They shall be stored in a box type magazine in which no other explosives are stored.

(19) Any loose cartridges of explosives, detonators, primers and capped fuse unused at the end of the shift shall be returned to their respective magazines and locked up. [Order 76-29, § 296-155-890, filed 9/30/76; Order 74-26, § 296-155-890, filed 5/7/74, effective 6/6/74.]

WAC 296-155-895 Use of detonating cord. (1) Care shall be taken to select a detonating cord consistent with the type and physical condition of the bore hole and stemming and the type of explosives used.

(2) Detonating cord shall be handled and used with the same respect and care given other explosives.

(3) The line of detonating cord extending out of a bore hole or from a charge shall be cut from the supply spool before loading the remainder of the bore hole or placing additional charges.

(4) Detonating cord shall be handled and used with care to avoid damaging or severing the cord during and after loading and hooking-up.

(5) Detonating cord connections shall be competent and positive in accordance with approved and recommended methods. Knot-type or other cord-to-cord connections shall be made only with detonating cord in which the explosive core is dry.

(6) All detonating cord trunklines and branchlines shall be free of loops, sharp kinks, or angles that direct the cord back toward the oncoming line of detonation.

(7) All detonating cord connections shall be inspected before firing the blast.

(8) When detonating cord millisecond-delay connectors or short-interval-delay electric blasting caps are used with detonating cord, the practice shall conform strictly to the manufacturer's recommendations.

(9) When connecting a blasting cap or an electric blasting cap to detonating cord, the cap shall be taped or otherwise attached securely along the side or the end of the detonating cord, with the end of the cap containing the explosive charge pointed in the direction in which the detonation is to proceed.

(10) Detonators for firing the trunkline shall not be brought to the loading area nor attached to the detonating cord until everything else is in readiness for the blast. [Order 74-26, § 296-155-895, filed 5/7/74, effective 6/6/74.]

WAC 296-155-900 Firing the blast. (1) A code of blasting signals equivalent to Table T-1 shall be posted on one or more conspicuous places at the operation, and all employees shall be required to familiarize themselves with the code and conform to it. Danger signs shall be placed at suitable locations.

(2) Before a blast is fired, a loud warning signal shall be given by the blaster in charge, who has made certain that all surplus explosives are in a safe place and all employees, vehicles, and equipment are at a safe distance, or under sufficient cover.

(3) Flagmen shall be safely stationed on highways which pass through the danger zone so as to stop traffic during blasting operations.

(4) It shall be the duty of the blaster to fix the time of blasting.

(5) Before firing an underground blast, warning shall be given, and all possible entries into the blasting area, and any entrances to any working place where a drift, raise, or other opening is about to hole through, shall be carefully guarded. The blaster shall make sure that all employees are out of the blast area before firing a blast.

Table T-1

WARNING SIGNAL	A 1-minute series of long blasts 5 minutes prior to blast signal.
BLAST SIGNAL	A series of short blasts 1 minute prior to the shot.
ALL CLEAR SIGNAL	A prolonged blast following the inspection of blast area.

[Order 74-26, § 296-155-900, filed 5/7/74, effective 6/6/74.]

WAC 296-155-905 Inspection after blasting. (1) Immediately after the blast has been fired, the firing line shall be disconnected from the blasting machine, or where power switches are used, they shall be locked open or in the off position.

(2) Sufficient time shall be allowed, not less than 15 minutes in tunnels, for the smoke and fumes to leave the blasted area before returning to the shot. An inspection of the area and the surrounding rubble shall be made by the blaster to determine if all charges have been exploded before employees are allowed to return to the operation, and in tunnels, after the muck pile has been wetted down. [Order 74-26. § 296-155-905, filed 5/7/74, effective 6/6/74.]

WAC 296-155-910 Misfires. (1) If a misfire is found, the blaster shall provide proper safeguards for excluding all employees from the danger zone.

(2) No other work shall be done except that necessary to remove the hazard of the misfire and only those employees necessary to do the work shall remain in the danger zone.

(3) No attempt shall be made to extract explosives from any charged or misfired hole; a new primer shall be put in and the hole reblasted. If refiring of the misfired hole presents a hazard, the explosives may be removed by washing out with water or, where the misfire is under water, blown out with air.

(4) If there are any misfires while using cap and fuse, all employees shall remain away from the charge for at least 8 hours. Misfires shall be handled under the direction of the person in charge of the blasting. All wires shall be carefully traced and a search made for unexploded charges.

(5) No drilling, digging, or picking shall be permitted until all missed holes have been detonated or the authorized representative has approved that work can proceed. [Order 74-26, § 296-155-910, filed 5/7/74, effective 6/6/74.]

WAC 296-155-915 Underwater blasting. (1) A blaster shall conduct all blasting operations, and no shot shall be fired without his approval.

(2) Loading tubes and casings of dissimilar metals shall not be used because of possible electric transient currents from galvanic action of the metals and water.

(3) Only water-resistant blasting caps and detonating cords shall be used for all marine blasting. Loading shall be done through a nonsparking metal loading tube when tube is necessary.

(4) No blast shall be fired while any vessel under way is closer than 1,500 feet to the blasting area. Those on board vessels or craft moored or anchored within 1,500 feet shall be notified before a blast is fired.

(5) No blast shall be fired while any swimming or diving operations are in progress in the vicinity of the blasting area. If such operations are in progress, signals

and arrangements shall be agreed upon to assure that no blast shall be fired while any persons is in the water.

(6) Blasting flags shall be displayed.

(7) The storage and handling of explosives aboard vessels used in underwater blasting operations shall be according to provisions outlined herein on handling and storing explosives.

(8) When more than one charge is placed under water, a float device shall be attached to an element of each charge in such manner that it will be released by the firing. Misfires shall be handled in accordance with the requirements of WAC 296-155-910. [Order 74-26, § 296-155-915, filed 5/7/74, effective 6/6/74.]

WAC 296-155-920 Blasting in excavation work under compressed air. (1) Detonators and explosives shall not be stored or kept in tunnels, shafts, or caissons. Detonators and explosives for each round shall be taken directly from the magazines to the blasting zone and immediately loaded. Detonators and explosives left over after loading a round shall be removed from the working chamber before the connecting wires are connected up.

(2) When detonators or explosives are brought into an air lock, no employee except the powderman, blaster, lock tender and the employees necessary for carrying, shall be permitted to enter the air lock. No other material, supplies, or equipment shall be locked through with the explosives.

(3) Detonators and explosives shall be taken separately into pressure working chambers.

(4) The blaster or powderman shall be responsible for the receipt, unloading, storage, and on-site transportation of explosives and detonators.

(5) All metal pipes, rails, air locks, and steel tunnel lining shall be electrically bonded together and grounded at or near the portal or shaft, and such pipes and rails shall be cross-bonded together at not less than 1,000-foot intervals throughout the length of the tunnel. In addition, each low air supply pipe shall be grounded at its delivery end.

(6) The explosives suitable for use in wet holes shall be water-resistant and shall be Fume Class 1.

(7) When tunnel excavation in rock face is approaching mixed face, and when tunnel excavation is in mixed face, blasting shall be performed with light charges and with light burden on each hole. Advance drilling shall be performed as tunnel excavation in rock face approaches mixed face, to determine the general nature and extent of rock cover and the remaining distance ahead to soft ground as excavation advances. [Order 74-26, § 296-155-920, 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.

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.

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 Setpember 1, 1972, shall be equipped with rollover protective structures which meet the minimum performance standards prescribed in WAC 296-155-955 and WAC 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 no later than the dates listed below:

(i) Machines manufactured on or after January 1, 1972, shall be fitted no later than April 1, 1973.

(ii) Machines manufactured between July 1, 1971, and December 31, 1971, shall be fitted no later than July 1, 1973.

(iii) Machines manufactured between July 1, 1970, and June 30, 1971, shall be fitted no later than January 1, 1974.

(iv) Machines manufactured between July 1, 1969, and June 30, 1970, shall be fitted no later than July 1, 1974.

(v) 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 WAC 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). [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 offcenter, the load shall be applied on the offcenter 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.) absorbed 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 (6)(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).

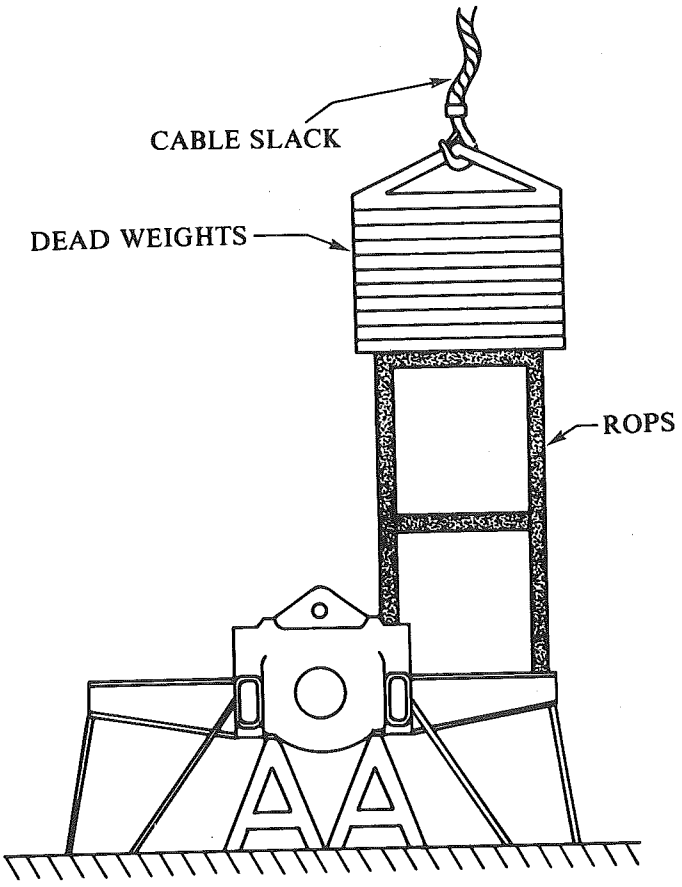


FIGURE V–1

Vertical loading setup for all types of equipment described in WAC 296–155–955(1).

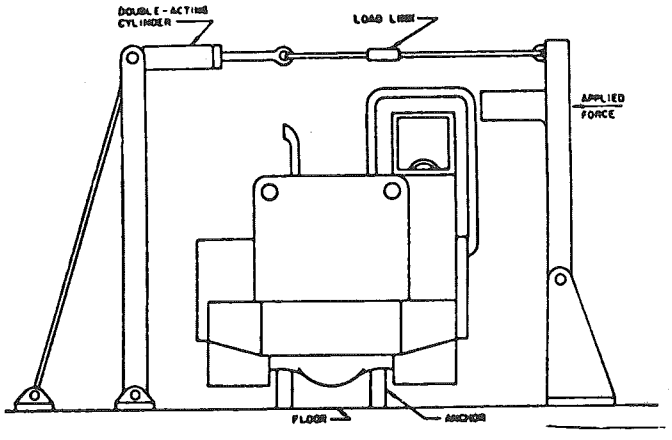


FIGURE V–2

Test setup for rubber–tired self–propelled scrapers.

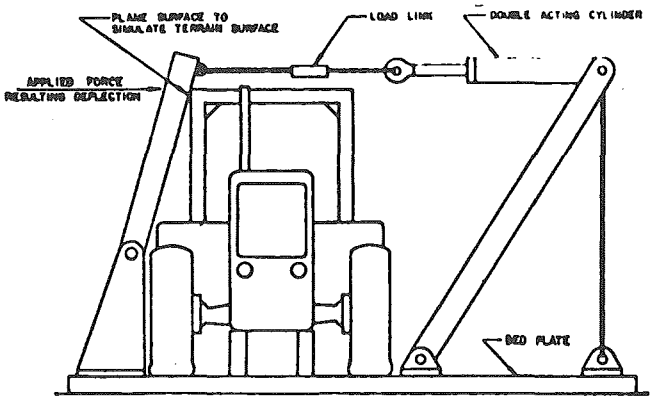


FIGURE V-3

Test setup for rubber-tired front-end loaders, rubber-tired dozers, and motor graders.

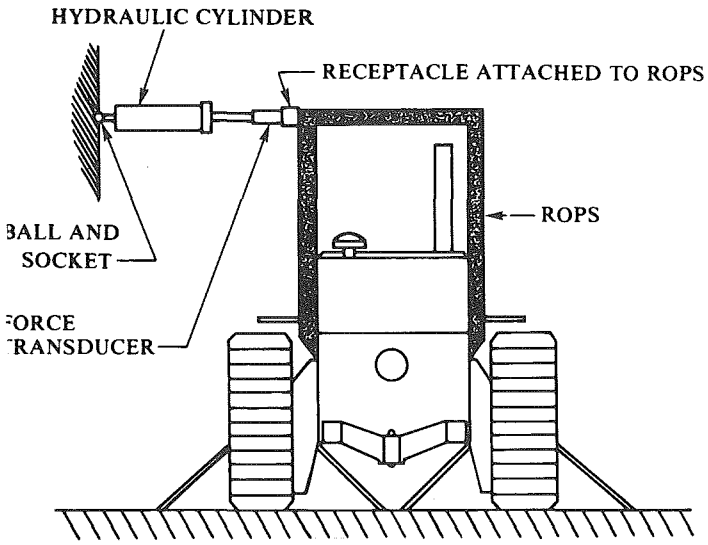


FIGURE V-4

Side-loading setup for crawler tractors and crawler loaders.

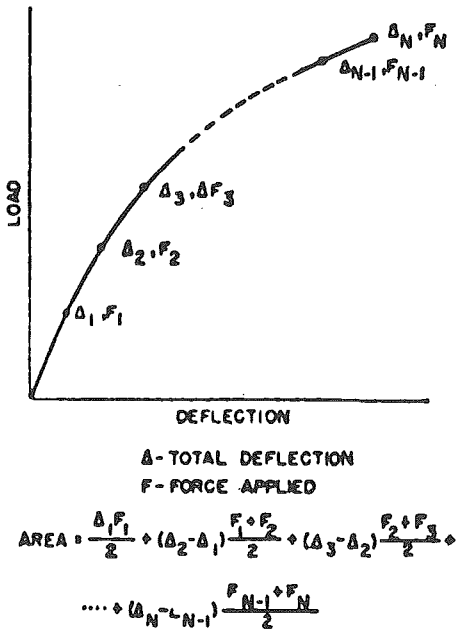


FIGURE V-5

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 verus 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 (lb.); energy (U) is measured as inch-pounds).

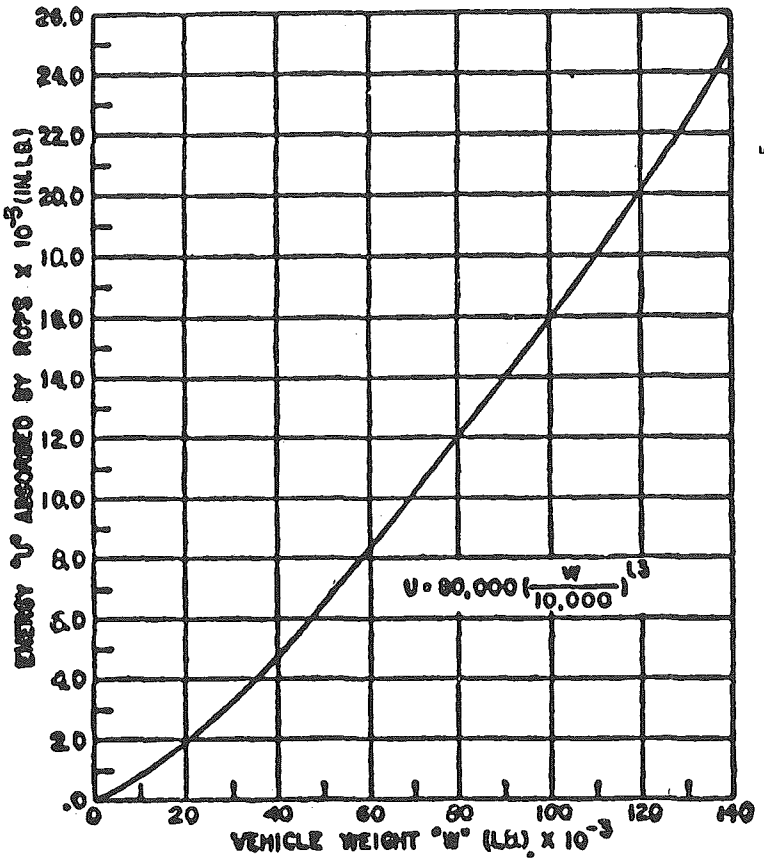


FIGURE V-6

Energy absorbed versus vehicle weight.

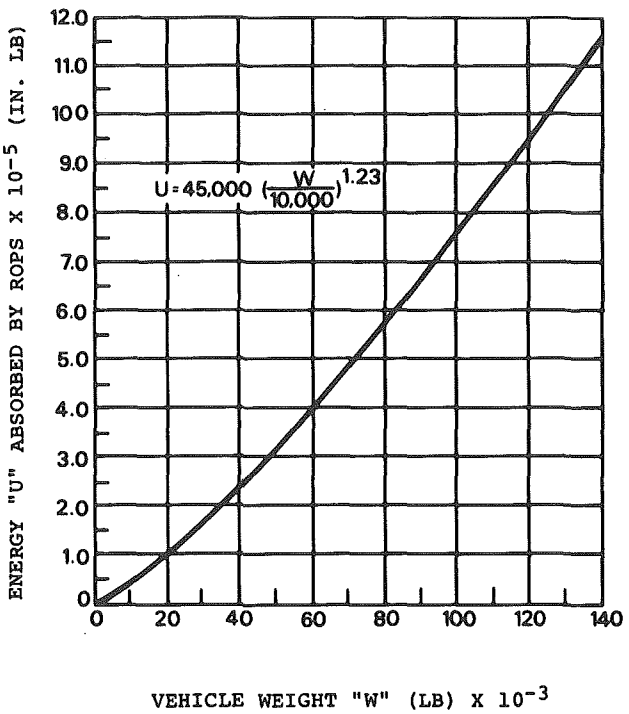


FIGURE V-7

Energy absorbed versus vehicle weight.

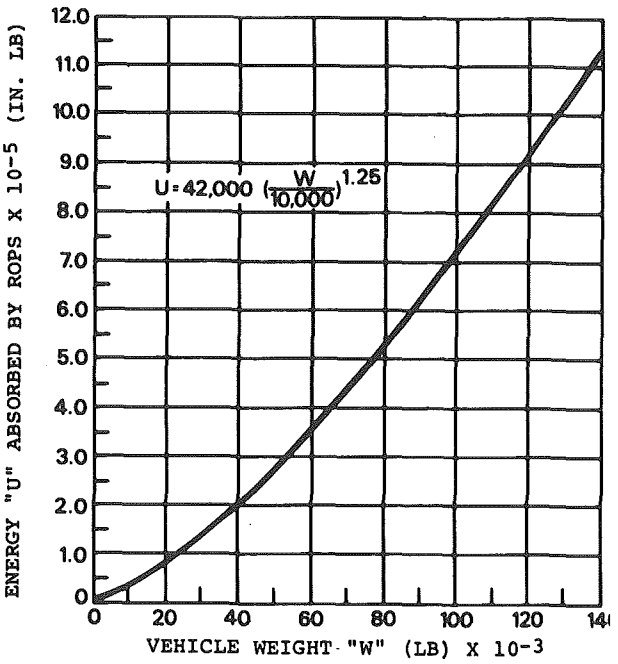


FIGURE V-8

Energy absorbed versus vehicle weight.

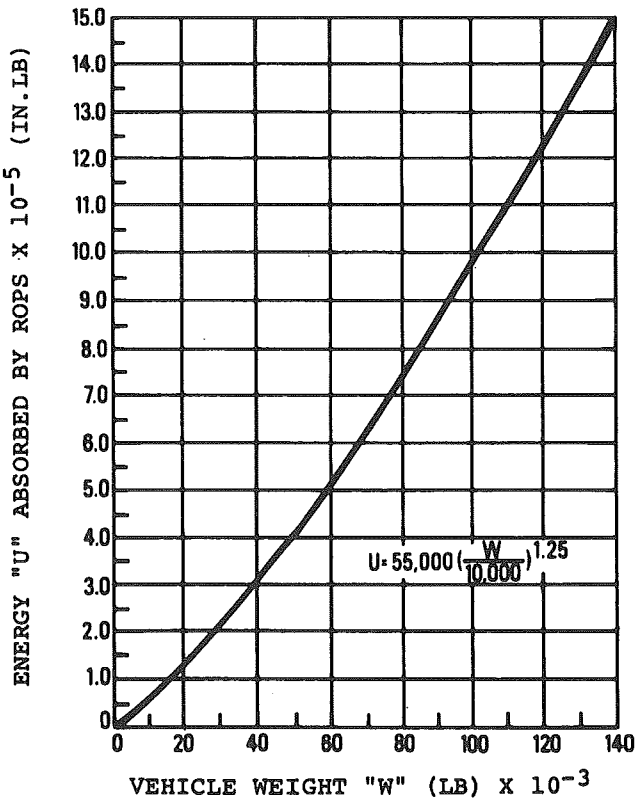


FIGURE V-9

Energy absorbed versus vehicle weight.

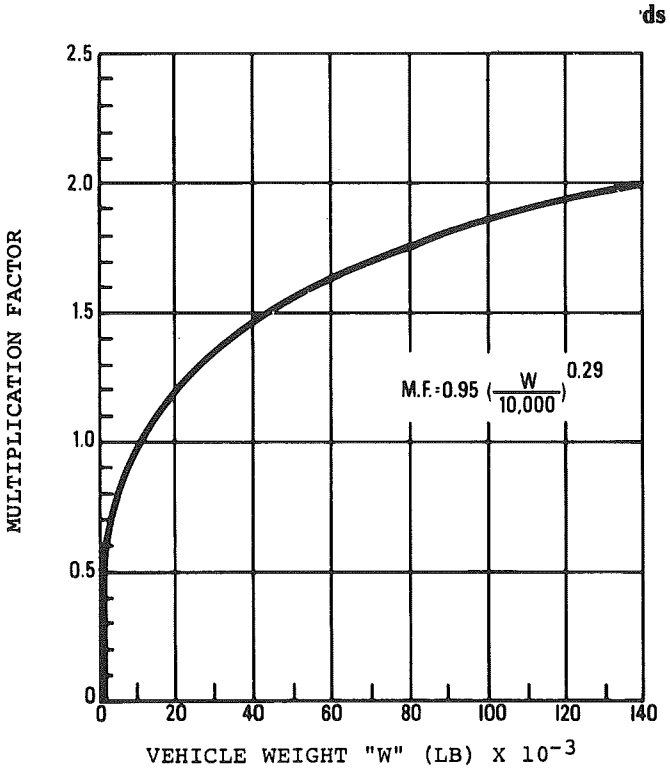


FIGURE V-10

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.

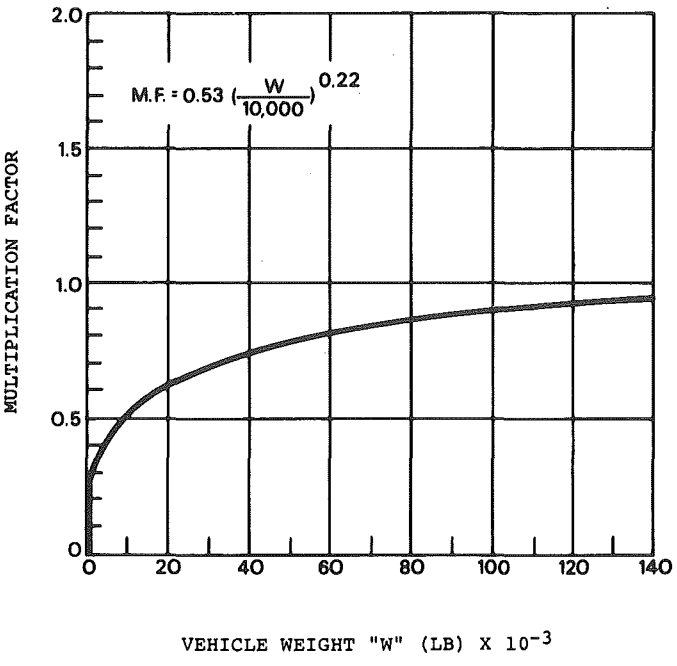


FIGURE V-11

Minimum horizontal load factor for rubber-tired loaders and dozers.

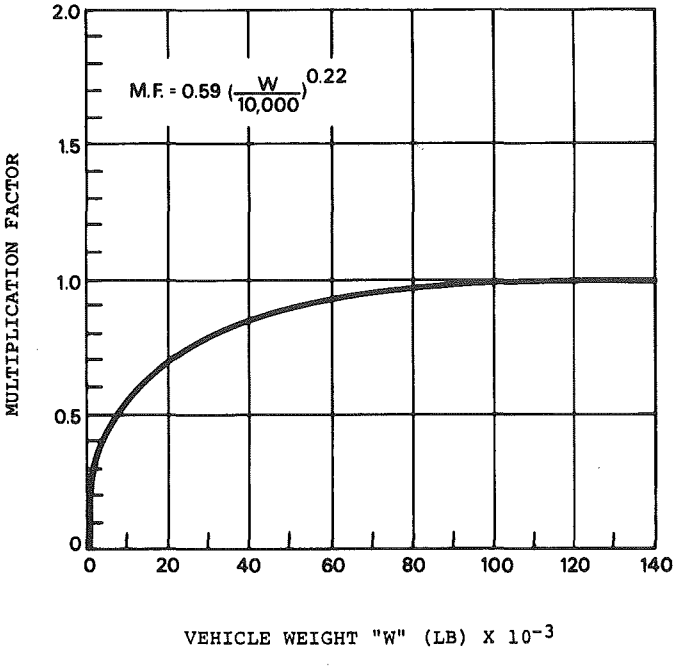


FIGURE V-12

Minimum horizontal load factor for crawler tractors and crawler-type loaders.

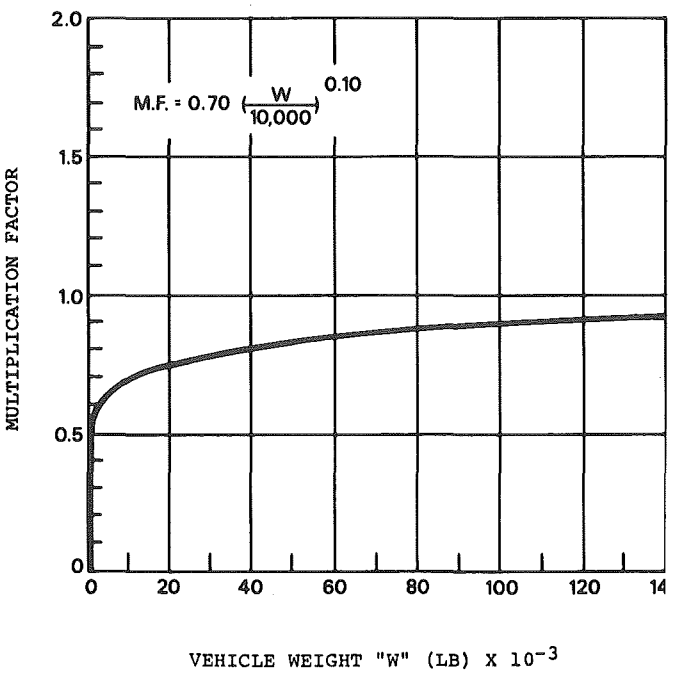


FIGURE V-13

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 Division of Industrial Safety and Health of the Department

of Labor and Industries. [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 constructions. (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 x 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_u = Strain energy absorbed by the frame, ft.-lb. (m. - kg) area under L_m-D_m curve.

FER = Factor of energy ratio, FER = E_u/E_{is}; also = E_u/E_{ir}.

P_b = Maximum observed force in mounting connection under static load, L, lb. (kg.).

FSB = Design margin for mounting connection FSB = $(P_u/P_b)-1$.

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).

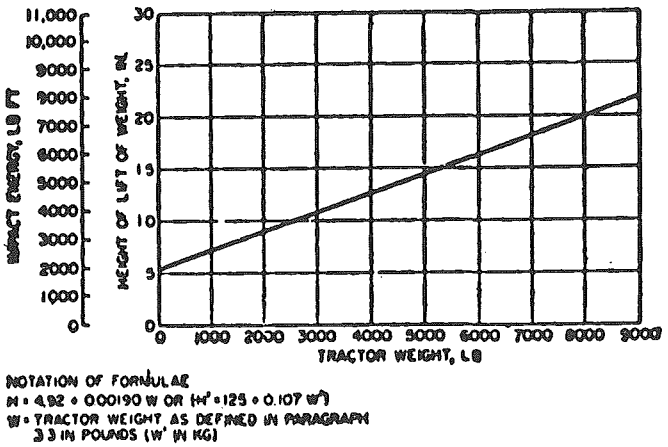


FIGURE V-14

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 WAC 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.

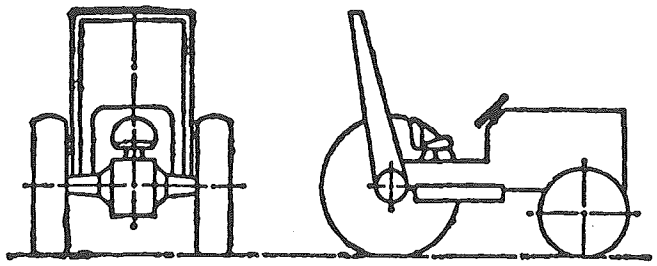


FIGURE V–15

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° ± 2° 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.

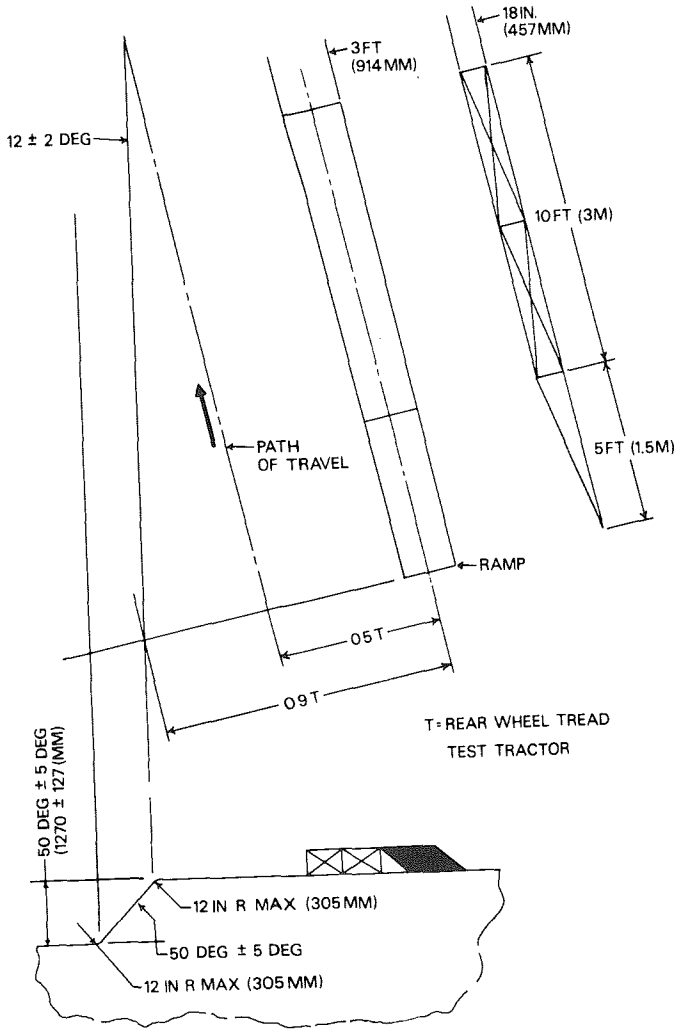


FIGURE V-16

(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.

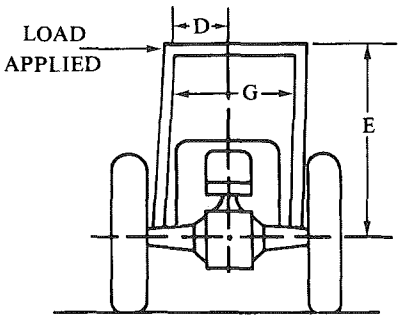
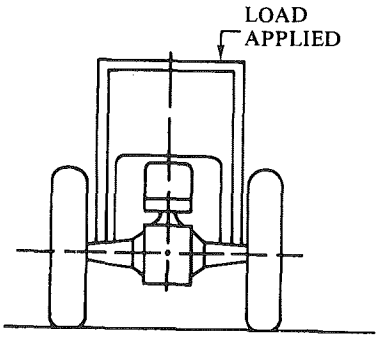


FIGURE V-17

Side load application



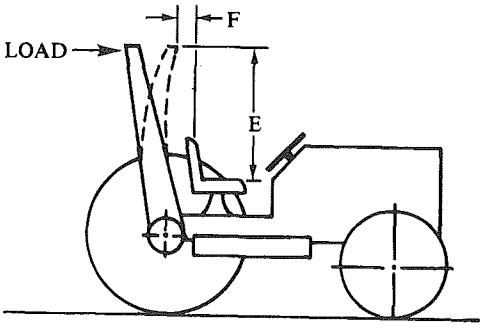


FIGURE V-18

Rear load application.

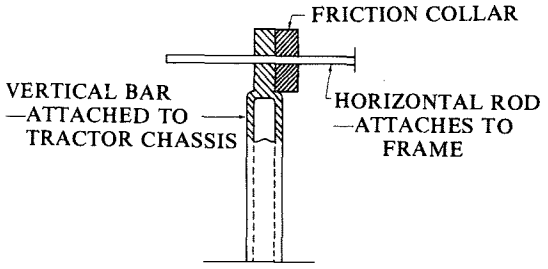


FIGURE V-19

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_{is}) 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 than be determined.

(iv) E_{is}, FER and FSB shall be calculated.

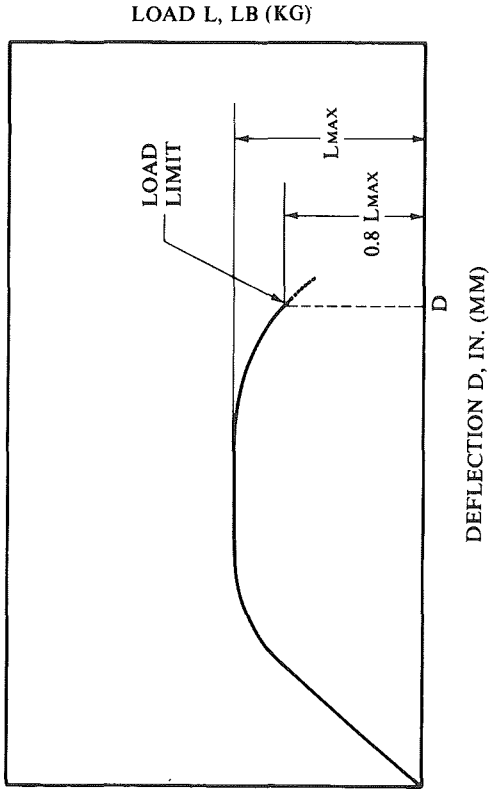


FIGURE V–20

Typical L–D diagram.

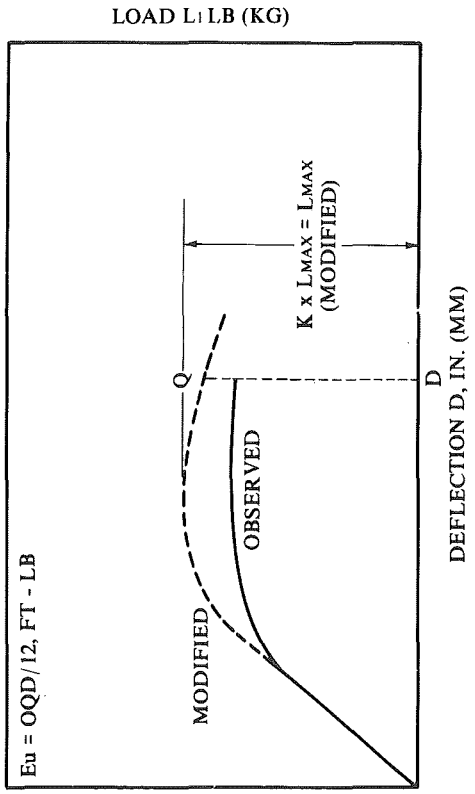


FIGURE V–21

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.)

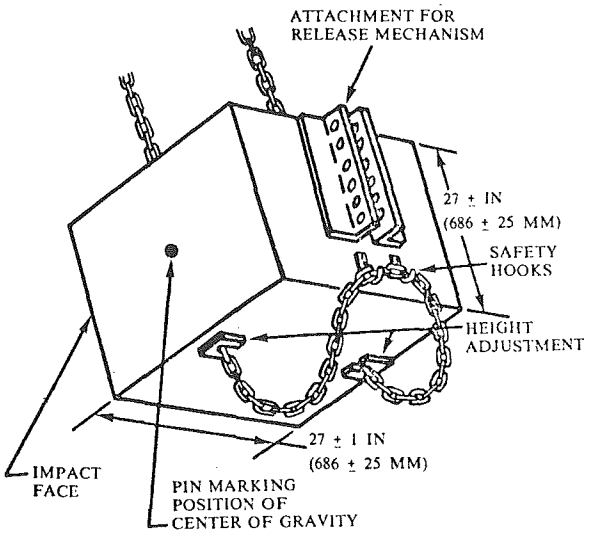


FIGURE V-22

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.)

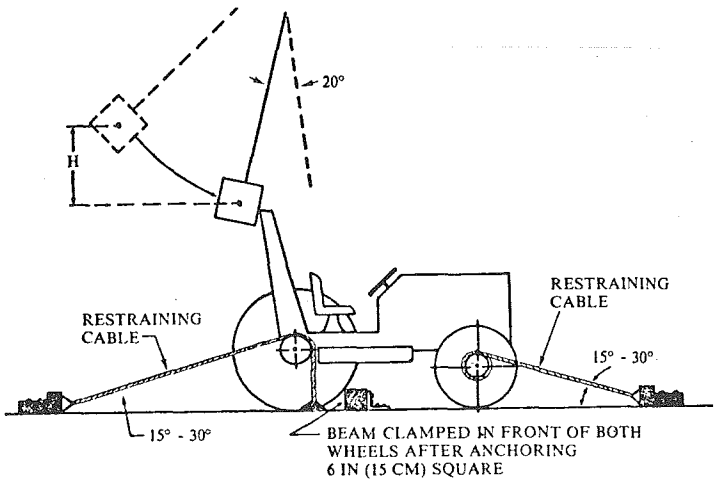


FIGURE V-23

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.)

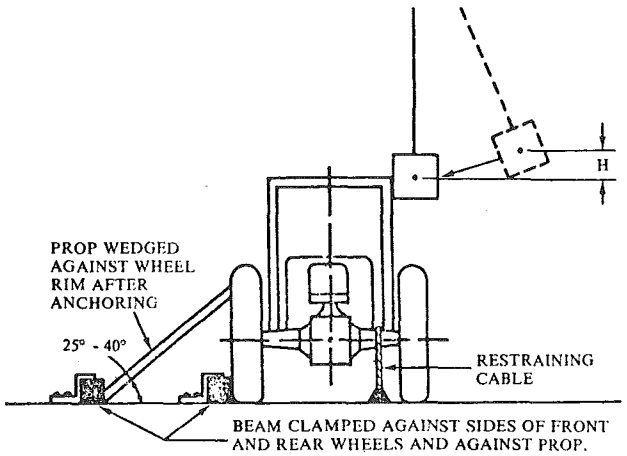


FIGURE V-24

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.

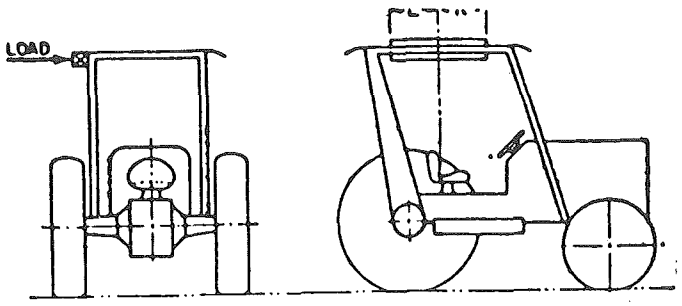


FIGURE V–25

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.

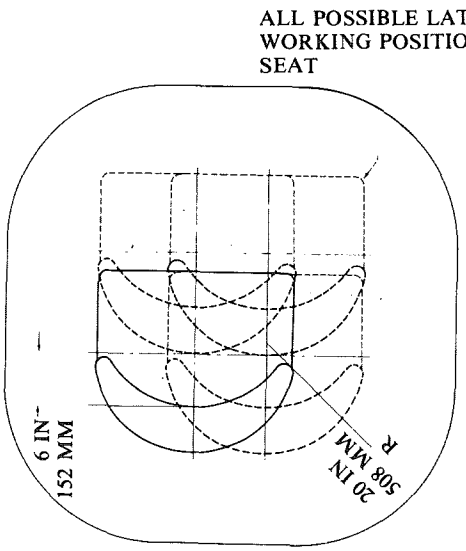


FIGURE V-26

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.).

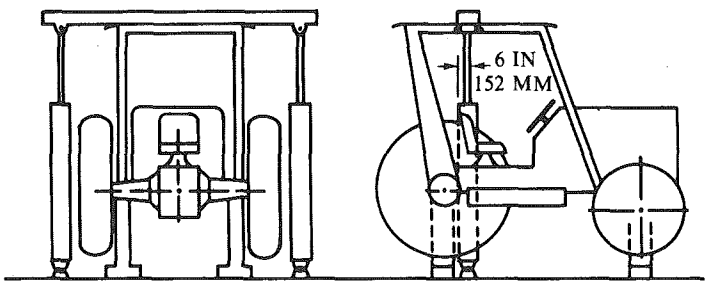


FIGURE V-27

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.

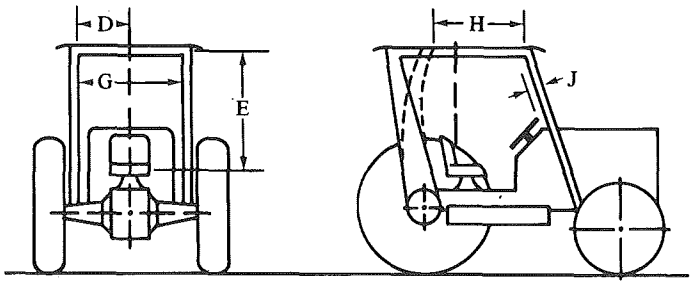


FIGURE V-28

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

296-200-010 Certificate of registration——Initial application.
296-200-020 Re-registration, renewal and reinstatement.
296-200-030 Security and insurance requirements.

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 296-200-010 Certificate of registration——Initial application. A certificate of registration shall be valid for one year and shall terminate at midnight on the day of expiration of the certificate of registration which was assigned to the applicant. The annual fee shall be

$15.00. Re-registration (renewal) shall be accomplished annually on or before the day of expiration of the certificate of registration. [Order 74-16, § 296-200-010, filed 5/6/74. Formerly chapter 308-27 WAC.]

WAC 296-200-020 Re-registration, renewal and reinstatement. (1) The Department shall send a renewal notice at least 45 days before the expiration date of each registrant's certificate, to the last recorded address of the registrant. If the certificate of registration is not renewed on or before the due date, such certificate shall be automatically suspended.

(2) License renewals shall be valid for one year.

(3) Renewal of a certificate of registration must be accompanied by the required fee. Additionally, a new certificate of insurance is required if the expiration date of the policy is being extended to cover the renewal period.

(4) Changes in the business operation structure of a registered contractor (such as individual proprietor to a partnership, changes in partnerships, individual or partnerships to a corporation) shall require new registration under that business structure. The period of registration shall be processed in the same manner as an initial application. New surety and insurance documentation must be presented in accordance with WAC 296-200-030 (1 through 7).

(5) Contractors who desire to have their registration and insurance expire at their fiscal year end for accounting purposes, may re-register as of their fiscal year end by filing a new application, filing fee and certificate of insurance covering the full registration period, and a letter requesting the new registration to coincide with his fiscal year end. Contractors may also request a changed expiration date by filing a written request explaining why refusal of the Department will create an undue hardship. If the Department agrees with such request, the Contractor shall re-register as provided above. [Order 74-16, § 296-200-020, filed 5/6/74. Formerly chapter 308-27 WAC.]

WAC 296-200-030 Security and insurance requirements. (1) Each applicant for registration shall file with the Department, Contractor's Registration Section, a surety bond or savings account assignment or a cash deposit in lieu thereof in the amount as specified by chapter 18.27 RCW.

(2) Evidence of required surety shall be submitted on forms approved by the Department and shall be for a period of time not less than the entire period of registration.

(3) Savings account assignment shall be made on the forms provided by the Department.

(4) Certificate of insurance, as required by chapter 18.27 RCW, shall:

(a) Be in form required by the Department

(b) Provide evidence of coverage for a period of time not less than the entire period of registration.

(5) Surety bond, savings assignments and certificate of insurance shall identify the individual, partnership or corporation in exactly the same manner in which the applicant records this information on the application for registration.

(6) The Department will cause due release of state interest in any savings assignment or return any cash deposit or other negotiable security which the registrant may have given to satisfy the registration requirements, one year from the date of expiration of the certificate of registration: *Provided*, There are no court judgments or otherwise disposed of summons and complaints against such security deposits.

(7) All applications received shall be accompanied by the surety bond, savings account assignment or cash deposit, certificate of insurance and the $15.00 fee, all to be acceptable to the Department. [Order 74-16, § 296-200-030, filed 5/6/74. Formerly chapter 308-27 WAC.]

Chapter 296-301 WAC
SAFETY STANDARDS FOR THE TEXTILE INDUSTRY

WAC

296-301-010 Textiles——Application requirements.
296-301-015 Definitions applicable to this chapter.
296-301-020 General safety requirements.
296-301-025 Openers and pickers.
296-301-030 Cotton cards.
296-301-035 Garnett machines.
296-301-040 Spinning mules.
296-301-045 Slashers——Scope and application.
296-301-04501 Cylinder dryers.
296-301-04503 Enclosed hot air dryers.
296-301-050 Warpers.
296-301-055 Drawing frames, slubbers, roving parts, cotton combers, ring spinning frames, twisters.
296-301-060 Gill boxes.
296-301-065 Heavy draw boxes, finishers, and speeders used in worsted drawing.
296-301-070 Silver and ribbon lappers (cotton).
296-301-075 Looms.
296-301-080 Shearing machines.
296-301-085 Continuous bleach range (cotton and rayon).
296-301-090 Kiers.
296-301-095 Gray and white bins.
296-301-100 Mercerizing range (piece goods).
296-301-105 Tenter frames.
296-301-110 Dyeing jigs.
296-301-115 Padders——Nip guards.
296-301-120 Drying cans.
296-301-125 Ironer.
296-301-130 Extractors.
296-301-135 Nip guards.
296-301-140 Sanforizing and palmer machine.
296-301-145 Rope washers.
296-301-150 Laundry washer tumbler or shaker.
296-301-155 Printing machine (roller type).
296-301-160 Calenders.
296-301-165 Rotary staple cutters.
296-301-170 Clothing folding machine.
296-301-175 Hand bailing machine.
296-301-180 Roll bench.
296-301-185 Cuttle or swing folder (overhead type).
296-301-190 Color-mixing room.
296-301-195 Open tanks and vats for mixing and storage of hot or corrosive liquids.
296-301-200 Dye kettles and vats.
296-301-205 Acid carboys.
296-301-210 Handling caustic soda and caustic potash.
296-301-215 First aid.
296-301-220 Personal protective equipment.

296-301-225 Workroom ventilation.

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 than [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 non-volatile 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 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 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 chapter 296-24 WAC and chapter 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. [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.

(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 amd 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 then 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, Emulisifers, 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) Sheeting 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 Frutana 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 than 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) Liquified 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 softheads 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 preventilation 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 preventilation 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 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

296-303-010 Laundry machinery and operations——Scope and application.
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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 WAC and chapter 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 gage, 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 6 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.

(2) Exhaust or Ventilating Fans. Each exhaust or ventilating fan within 7 feet of the floor or working platform shall be completely covered with wire mesh of not less than No. 16 gage, and with openings that will reject a ball one-half inch in diameter.

(3) Steam Pipes. (a) All steam pipes that are within 7 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. [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.

(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 gage, 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. 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. [Order 74-18, § 296-303-040, filed 5/6/74.]

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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. [Order 74-18, § 296-303-040, filed 5/6/74.]

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WAC 296-304-010 Scope and application. (1) The Provisions and Standards of the General Safety and Health Standards, chapter 296-24 WAC, and such other codes and standards as are promulgated by the Division of Industrial Safety and Health 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 chapter 296-24 WAC are applicable to all ship repairing, shipbuilding, and shipbreaking 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. [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.

(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 ship repairman or other person engaged in ship repair 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)(a) For Ship Repairing, "Related Employments" means any employments performed as an incident to or in conjunction with ship repair work, including, but not restricted to, inspection, testing and employment as a watchman.

(b) For Shipbuilding, "Related Employment" means any employments performed as an incident to or in conjunction with shipbuilding work, including, but not restricted to inspection, testing trials and employment as a watchman.

(c) For Shipbreaking, "Related Employments" means any employments performed as an incident to or in conjunction with shipbreaking work, including, but not restricted to, inspection, survey 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 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.

(15) "Confined space" means any space having a limited means of egress which is subject to the accumulation of toxic or flammable contaminants or an oxygen deficient atmosphere. Confined spaces include, but are not limited to storage tanks, process vessels, bins, boilers, ventilation or exhaust ducts, sewers, underground utility vaults, tunnels, pipelines and open top spaces more than 4 feet in depth, such as pits, tubes, vaults and vessels.

(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 LD_{50} 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. [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 296-304-020 Explosive and other dangerous atmospheres——Scope and application. All sections of this chapter which include WAC 296-304-020 in the section number apply to Explosive and Other Dangerous Atmospheres.

(1) WAC 296-304-02003 to WAC 296-304-02009 applies to Ship Repairing and Shipbreaking.

(2) WAC 296-304-02011 applies to Ship Repairing. [Order 74-25, § 296-304-020, filed 5/7/74.]

WAC 296-304-02001 Competent person. (1) Designation. (a) For the purposes of these standards, one or more competent persons shall be designated by the employer in accordance with the applicable requirements of this section unless the requirements of this section are always carried out by a National Fire Protection Association Certified Marine Chemist.

(2) Criteria. The following criteria shall guide the employer in designating employees as competent persons:

(a) Ability to understand the meaning of designations on certificates and of any qualifications relating thereto and to carry out any instructions, either written or oral, left by the National Fire Protection Association Certified Marine Chemist or person authorized by the U.S. Coast Guard referred to in WAC 296-304-02007.

(b) Ability to use and interpret the readings of an oxygen indicator and a combustible gas indicator. The

ability to use and interpret the readings of a carbon monoxide indicator and a carbon dioxide indicator, if the operations involve such hazardous gases.

(c) Familiarity with an understanding of WAC 296-304-02001 through WAC 296-304-04013 and WAC 296-304-080 through WAC 296-304-08011.

(i) Familiarity with the structure and knowledge of the location and designation of spaces of the types of vessels on which breaking work is [done] dones.

(d) Familiarity with the structure and knowledge of the location and designation of spaces of the types of vessels on which repair work is done.

(e) Capability to perform the tests and inspections required by these standards and to write the required logs.

(3) Logging of Inspections and Tests. (a) When tests and inspections, required to be performed by a competent person by any provisions of these standards, are made, a record of the locations, operations performed and date, time, and results of the tests and any instructions resulting therefrom shall be recorded. A separate form shall be used for each vessel on which tests and inspections are made.

(b) This record shall be available for inspection in the immediate vicinity of the affected operations while they are in progress. This record or copy thereof shall be kept on file for a period of at least three months from the date of the completion of the job.

(c) A copy of any certificate issued in accordance with WAC 296-304-02007 and of any instructions issued by the National Fire Protection Association Certified Marine Chemist shall be kept on file with the log for a period of at least 3 months from the date of the completion of the job. The certificate and instructions issued by the person doing the fumigation referred to in WAC 296-304-02003(2)(a)(ii) shall also be kept on file for a period of at least 3 months from the date of the completion of the job.

(4) Application. The provisions of WAC 296-304-02001 are intended to apply in their entirety to employers engaged in general shipbreaking, shipbuilding and ship repair work. They do not apply to employers whose work involves situations to which WAC 296-304-02001 through WAC 296-304-04013 are not applicable, such as general cleaning work in which flammable and toxic atmospheres are not involved. Any employer whose work involves only certain portions of said sections, such as work on small craft in boat yards where only combustible gas indicator tests are necessary for fuel tank leaks or when using flammable paints below decks, may designate persons as competent on the basis of the applicable portion of the criteria set forth in (2) of this section. [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 before entering. (1) Flammable Atmospheres and Residues. (a) Before employees are initially permitted to enter any of the ship's spaces designated in (1) and (2) of this section, the atmosphere within the space to be entered shall be tested by a competent person to determine the concentration of flammable vapors or gases within the space.

(i) Cargo spaces or other spaces containing or having last contained combustible or flammable liquids or gases in bulk.

(ii) Spaces immediately adjacent to those described in (1) of this section.

(b) If the tests indicate that the atmosphere in the space to be entered contains a concentration of flammable vapor or gas greater than 10 percent of the lower explosive limit, the space shall be ventilated to reduce the concentration below 10 percent of the lower explosive limit before men are permitted to enter.

(c) If the atmosphere in the space to be entered is found to contain a concentration of flammable vapor or gas below the level immediately dangerous to life as defined in WAC 296-304-09003(2)(a), but above the threshold limit value, employees shall be protected in accordance with the requirements of WAC 296-304-09003(1), and (3), (4), or (5), which ever is applicable.

(2) Toxic Atmospheres and Residues. (a) Before employees are initially permitted to enter any of the ship's spaces designated in (1), (2) and (3) of this section, the atmosphere in the space to be entered shall be tested for toxic atmospheric contaminants, and the space inspected for the presence of toxic or corrosive residues by a Marine Chemist, Industrial Hygienist or other person qualified to make these tests and inspections.

(i) Cargo spaces or other spaces containing or having last contained bulk liquids, gases, or solids of a toxic, corrosive, or irritant nature.

(ii) Spaces which have been fumigated.

(iii) Spaces immediately adjacent to those described in (1) and (2) of this section.

(b) If the tests indicate that the atmosphere in the space to be entered contains a concentration of toxic contaminants above the level which is immediately dangerous to life, the space shall be ventilated to reduce the concentration below the level immediately dangerous to life as defined in WAC 296-304-09003(2)(a).

(c) If the atmosphere in the space to be entered is found to contain a concentration of toxic contaminants below the level immediately dangerous to life as defined in WAC 296-304-02003(2)(a), but above the threshold limit value, employees shall be protected in accordance with the requirements of WAC 296-304-09003(1), and (3), (4), or (5), whichever is applicable.

(d) The person qualified to make the tests and inspections referred to in (1)(a) of this section shall make a record of the tests, inspections and instructions pertaining to (1)(c) and (2)(b) and (c) of this section, which shall be available for inspection and kept on file in accordance with WAC 296-304-02001(3)(b).

(3) Oxygen Deficient Atmospheres. (a) Before employees are initially permitted to enter any of the ship's spaces designated in (1) through (3) of this section, the atmosphere in the spaces to be entered shall be tested by a competent person with an oxygen indicator or other suitable device to ensure that it contains at least 16.5 percent oxygen.

(i) Spaces in which the tests required by (1) and (2) of this section indicate that no flammable or toxic contaminants are present in the atmosphere.

(ii) Compartments which have been sealed.

(iii) Spaces which have been coated and closed up.

(iv) Nonventilated compartments which have been freshly painted.

(v) Cargo spaces containing cargoes or residues of cargoes which absorb oxygen, such as scrap iron, fresh fruit and molasses, and various vegetable drying oils in bulk.

(b) If the tests indicate that the atmosphere in the space to be entered contains less than 16.5 percent oxygen, the space shall be ventilated until tests indicate an oxygen content above this level.

(4) Exceptions. In emergencies and in cases of work of brief duration necessary to accomplish the ventilation required or to start operations, work may be performed in atmospheres containing concentrations of flammable contaminants above the upper explosive limit or otherwise immediately dangerous to life, provided employees are protected in accordance with the requirements of WAC 296-304-09003(1) and (2). [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) Employees shall be permitted to perform manual cleaning to remove residue materials, scale, and debris or to perform other cold work in spaces described in WAC 296-304-02003(1)(a)(i) and (ii) and (2)(a)(i) through (iii) before they have been certified as gas free only under the following conditions:

(a) Liquid residues of flammable and toxic materials shall be removed from the spaces as thoroughly as practicable before employees start actual cleaning operations in these spaces. Drippings and spills of these materials on deck or elsewhere alongside the vessel shall be cleaned up as the work progresses. Special care shall be taken to prevent the spilling or the draining of these materials into the water surrounding the vessel.

(b) Continuous natural or mechanical ventilation shall be provided to keep the concentration of flammable vapors below ten (10) percent of the lower explosive limit in all parts of the space, provided that if, because of the high volatility of the residues, a uniform concentration of less than ten (10) percent of the lower explosive limit cannot be achieved, sufficient exhaust ventilation shall be provided to reduce the concentration to or below that level in the major portions of the compartment.

(c) Tests shall be made by a competent person prior to commencement of cold work and with sufficient frequency thereafter, in accordance with temperature, volatility of the residues and other existing conditions in and about the spaces, to ensure that the concentration stated in (1)(b) of this section is not exceeded.

(d) Cold work only shall be permitted.

(e) Tests shall be made by a competent person to ensure that the exhaust vapors from these spaces are not accumulating in other areas within or around the vessel, marine railway, dry-dock, graving dock, or under the pier where sources of ignition may be present. Should such accumulations be found, any sources of ignition within the affected area shall be removed or extinguished.

(2) Only approved explosion-proof, self-contained, battery-fed, portable lamps shall be used in spaces described in WAC 296-304-02007(1) before the spaces have been certified as "Safe for Men". Battery-fed, portable lamps bearing the approval of the Underwriters' Laboratories for use in Class I, Group D atmospheres, or approved as permissible by the U.S. Bureau of Mines, and such lamps listed by the U.S. Coast Guard as approved for such use are deemed to meet the requirements of this paragraph.

(3) Signs shall be posted on the open deck adjacent to the access to spaces described in WAC 296-304-02007(1) prohibiting smoking and the use of open flames.

(4) 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.

(5) 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.

(6) In spaces described in WAC 296-304-02009(1) which have been certified "Safe for Men", either battery lamps or 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, provided the lights are mounted to the space openings from the exterior, or suspended within the space with the cables so led as to protect them from injury.

(7) In spaces certified "Safe for Fire" nonexplosion proof lights may be used. [Order 74-25, § 296-304-02005, filed 5/7/74.]

WAC 296-304-02007 Certification before hot work is begun. (1) Employees shall not be permitted to engage in hot work or the use of powder actuated fastening tools in or on the following spaces, boundaries or pipe lines until a certificate setting forth that the hot work can be done in safety is issued. Such certificate shall be acceptable only if issued by a Marine Chemist certificated by the National Fire Protection Association, except that a certificate issued by another person authorized by the U.S. Coast Guard pursuant to the provisions of 46 CFR 35.01-1(c)(1) for tank vessels, 46 CRF 71.60-1(c)(1) for passenger vessels, and 46 CFR 91.50-1(c)(1) for cargo and miscellaneous vessels is acceptable for a particular inspection:

(a) On tank vessels. (i) Within or on the boundaries of cargo tanks which have been used to carry combustible or flammable liquids and gases in bulk, or within spaces adjacent to such cargo tanks.

(ii) Within or on the boundaries of fuel tanks.

(iii) On pipe lines, heating coils, pumps, fittings, or other appurtenances connected to such cargo or fuel tanks.

(b) On dry cargo, miscellaneous and passenger vessels. (i) Within or on the boundaries of cargo tanks

which have been used to carry combustible or flammable liquids and gases in bulk.

(ii) Within spaces adjacent to cargo tanks which have been used to carry flammable gases, or liquids with a flash point below 150°F., except where the distance between such cargo tanks and the work to be performed is not less than twenty-five (25) feet.

(iii) Within or on the boundaries of fuel tanks.

(iv) On pipe lines, heating coils, pumps, fittings, or other appurtenances connected to such cargo or fuel tanks.

(2) In dry cargo holds for which a Marine Chemist's certificate is not required by (1)(b)(ii) of this section, hot work may be performed only after a competent person has carefully examined the hold and found it to be free of flammable liquids, gases, and vapors. If flammable liquids, gases, or vapors are found, hot work shall not be performed within the space until the flammable liquids, gases, or vapors have been removed and a test indicates that the space is safe for fire.

(3) Before hot work is performed in engine room and boiler room spaces of any vessel for which a Marine Chemist's certificate is not required by the provision of (1) or in fuel tank and engine compartments of boats, the bilges shall be inspected and tested by a competent person to ensure that they are free of flammable liquids, gases, and vapors. If flammable liquids, gases, or vapors are found, hot work shall not be performed within the space until the flammable liquids, gases, or vapors have been removed and a test indicates that the space is safe for fire.

(4) Hot work in the open. Before hot work is performed from open decks or in tanks or compartments from which the overhead has been completely removed, on the boundaries of cargo spaces or other spaces containing or having last contained combustible or flammable liquids or gases in bulk, the following steps shall be taken:

(a) Tests shall be made by a competent person to determine the concentration of flammable vapors in these spaces. The permissible level of concentration of flammable vapors shall not exceed ten (10) percent of the lower explosive limit in all parts of the spaces.

(b) When the tests indicate that a space contains a concentration of flammable vapors above the permissible concentration, the space shall be inerted with a nonflammable gas or with water, or sufficient ventilation shall be provided to reduce the concentration below the permissible level.

(c) When the bottom of a space contains flammable residues, it shall be flooded with water to cover all parts of the space to a depth of at least one (1) foot unless the space is inerted. [Order 76-7, § 296-304-02007, filed 3/1/76; Order 74-25, § 296-304-02007, filed 5/7/74.]

WAC 296-304-02009 Maintaining gas free conditions. The following rules shall apply in maintaining gas free conditions:

(1) Pipe lines which may convey hazardous substances into the spaces certified "Safe For Men——Safe For Fire" shall be disconnected or blanked off, or other positive means shall be used to prevent discharge of hazardous substances from entering the space. Manholes and other closures which were secured when tests were made shall remain secured. If such manholes or other closures are opened or any manipulation of valves takes place which tends to alter existing conditions, work in the affected spaces or areas shall be stopped and not resumed until such time as the area has been retested and again certified "Safe For Men——Safe For Fire" in accordance with the requirements of WAC 296-304-02007(1).

(2) Before hot work is commenced on the weather deck over spaces which, under these regulations, are not required to be gas freed or inerted, all valves, closures and vents, except those which are vented up masts, connecting with non-gas free tanks or compartments below, shall be closed. Valves, closures and vents shall not be opened until hot work is completed unless the hot work is stopped and the work location posted as unsafe for fire. The latter notice shall not be removed nor hot work resumed until the area is again made safe.

(3) The employer shall inform masters and chief engineers of vessels of the provisions of this section and shall confirm that they are aware of their responsibilities for seeing that their crews understand and obey all warning signs, tags, and the limitations stated on the marine chemist's certificates.

(4) When conditions in a tank are such that there is a possibility of hazardous vapor being released from residues or other sources after a marine chemist's certificate has been issued, a competent person shall make tests to assure that the gas-free condition is maintained irrespective of whether hot work is being performed in the tank. When the competent person finds that atmospheric conditions have altered, work shall be stopped and a new marine chemist's certificate in accordance with the requirements of WAC 296-304-02007(1) shall be obtained before work is resumed.

(5) Before hot work is begun on any metal covered with preservative coatings the requirements of WAC 296-304-04005 shall be met. [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. (1) Except as provided in WAC 296-304-02011(3), all tanks, compartments, or spaces which have been certified "Safe For Men—Not Safe For Fire", or "Not Safe For Men—Not Safe For Fire" shall be plainly and conspicuously marked with paint or signs indicating that no hot work shall be performed on such tanks, compartments, or spaces or in the vicinity thereof.

(2) Except as provided in WAC 296-304-02011(3), all tanks, compartments or spaces which have been inerted with gas or certified "Not Safe For Men—Safe For Fire" shall be plainly and conspicuously marked with paint or signs indicating that the tank, compartment or space contains a gas which will not support life or is hazardous to employees.

(3) The warning marks or signs required by WAC 296-304-02011(1), need not be posted on individual tanks, compartments or spaces if the entire vessel has been certified "Safe For Men—Not Safe For Fire", "Not Safe For Men—Not Safe For Fire", or if the entire vessel has been inerted or certified "Not Safe for Men—Safe For Fire", and if a sign to this effect is conspicuously posted at the gangway and at all other means of access to the vessel. [Order 74-25, § 296-304-02011, filed 5/7/74.]

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 WAC 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 WAC 296-304-09003(1) and (3) 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. [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 alkalies, 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 WAC 296-304-09003(1) and (4).

(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 WAC 296-304-09003(1). 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 WAC 296-304-09003(1) and (4)(b)(iv).

(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. House 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 WAC 296-304-09003(1).

(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 WAC 296-304-09003(1) and (4).

(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 WAC 296-304-09003(1) and (4).

(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. [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 WAC 296-304-09003(1).

(ii) In tanks or compartments, employees continuously exposed to such spraying shall be protected by air line respirators in accordance with the requirements of WAC 296-304-09003(1). Where mechanical ventilation is provided, employees shall be protected by respirators in accordance with the requirements of WAC 296-304-09003(1) and (3).

(iii) In large and well ventilated areas, employees exposed to such spraying shall be protected by respirators in accordance with the requirements of WAC 296-304-09003(1) and (5).

(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 WAC 296-304-09003(1) and (3).

(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 (10) 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 (10) percent of the lower explosive limit, painting shall be stopped and the compartment shall be evacuated until the concentration again falls below ten (10) 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 (10) 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 non-sparking 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 non-sparking.

(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 (50) 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 non-sparking, 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 WAC 296-304-09003(1) 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 WAC 296-304-09003(1) and (5).

(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 WAC 296-304-09003(1) and (5) and by suitable protective clothing. [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 (10) 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 (50) 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 WAC 296-304-09003(1), 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 WAC 296-304-09003(1).

(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(1) and (4)(b)(4), 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 WAC 296-304-09003(1).

(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 (200) 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. [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 WAC 296-304-09003(1).

(b) In the open air employees shall be protected by a filter type respirator in accordance with the requirements of WAC 296-304-09003(1) and (4).

(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. [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 non-flammable 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 (200) 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 (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 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 be [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 (4).

(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 a 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 of 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 by 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 non-collapsible 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 parellel 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 turn table 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 mid rail. 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 mid rails 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.

(l) 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 mid rail. 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 mid rail. 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 non–current–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 non–gas free spaces, protable 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 (5).

(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. [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(19), 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 (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 (2) of this section shall be recorded either on U.S. 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. (i) 10353 Federal Building, 450 Golden Gate Avenue, Box 36017, San Francisco, Calif. 94102.

(ii) OSHA, U.S. Dept. of Labor, Federal Office Building, 909 First Avenue, Seattle, Washington 98174 (Alaska, Arizona, California, Hawaii, Idaho, Nevada, Oregon, and Washington).

(b) A completed form shall be preserved and available for inspection for a period of 3 months from the date of the completion of the job.

(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 (1) of this section and those hazards for which specific precautions are required in WAC 296-304-020 through WAC 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.

(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. [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 (10) 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 WAC 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 (5) 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 (5) 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 (5) 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 (5) 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 wieght 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 (18) years of age shall be employed in occupations involving the operation of any power-driven hoisting appartus or assiting 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 2x6	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 (in 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	Heighth 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.	10.	9.0	8.5	7.8	6.8
6x37 CLASSIFACATION						
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	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

Rope Dia. Inches	SINGLE LEG					
	Vertical			Choker		
	A	B	C	A	B	C
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.

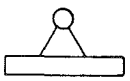
(A) – Socket or Swaged Terminal attachment.
(B) – Mechanical Sleeve attachment.
(C) – Hand Tucked Splice attachment.

TABLE G-5

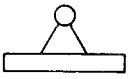
RATED CAPACITIES FOR IMPROVED PLOW STEEL, FIBER CORE, WIRE ROPE SLINGS
(In tons of 2000 pounds)

[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 colum. The table as codified has been divided into two tables covering the "TWO - LEG BRIDLE OR BASKET HITCH" for 6x19 Classifcation 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.]

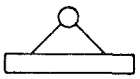
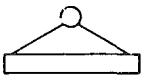
TWO - LEG BRIDLE OR BASKET HITCH
[TABLE G-5: Part 1--Vertical and 60° Positions]

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.

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
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	Number of Clips: Other material	Minimum spacing (inches)
*			
1/2	3	4	3
5/8	3	4	3 3/4
3/4	4	5	4 1/2
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 (Non–ferrous) 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 WAC 296-24-66201 through WAC 296-24-66225. [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 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. (1) General. (a) All respiratory protective equipment required by these regulations shall carry the U.S. Bureau of Mines approval for the use for which it is intended. Respiratory protective equipment shall be used only for the purpose intended and no modifications of the equipment shall be made.

(b) Respiratory protective equipment shall be inspected regularly and maintained in good condition. Gas mask canisters and chemical cartridges shall be replaced as necessary so as to provide complete protection. Mechanical filters shall be cleaned or replaced as necessary so as to avoid undue resistance to breathing.

(c) Respiratory protective equipment which has been previously used shall be cleaned and disinfected before it is issued by the employer to another employee. Emergency rescue equipment shall be cleaned and disinfected immediately after each use.

(d) Employees required to use respiratory protective equipment approved for use in atmospheres immediately dangerous to life shall be thoroughly trained in its use. Employees required to use other types of respiratory protective equipment shall be instructed in the use and limitations of such equipment.

(e) When an air line respirator is used, the air line shall be fitted with a pressure regulating valve and a filter which will remove oil, water, and rust particles. The air intake shall be from a source which is free from all contaminants, such as the exhaust from internal combustion engines.

(f) In all cases when an employee is stationed outside a compartment, tank or space as a tender or safety man for men working inside in an atmosphere immediately dangerous to life, the tender shall have immediately available for emergency use respiratory protective equipment equivalent to that required for the men in the compartment. When a tender is stationed outside a compartment for men working inside in an atmosphere not immediately dangerous to life, the tender shall wear respiratory protective equipment equivalent to that required for the men in the compartment if he is exposed for prolonged periods to the same concentration of atmospheric contaminants.

(2) Protection in Atmospheres Immediately Dangerous to Life. (a) Atmospheres immediately dangerous to life are those which contain less than 16.5 percent oxygen, or which by reason of the high toxicity of the contaminant, as in fumigation, or high concentration of the contaminant, as with carbon dioxide, would endanger the life of a person breathing them for even a short period of time.

(b) In atmospheres immediately dangerous to life the only approved types of respiratory protective equipment are the following:

(i) Self-contained breathing apparatus, in which the wearer carries with him a supply of oxygen, air, or an oxygen generating material.

(ii) Hose mask with blower, in which a hand or motor operated blower supplies air at high volume and low pressure through a large diameter hose through which the wearer can draw air in case the blower fails.

(iii) If there is known to be more than 16.5 percent oxygen and less than 2 percent gas by volume, a gas mask equipped with a canister approved for the particular type gas involved.

NOTE: A gas mask offers absolutely no protection in an atmosphere deficient in oxygen.

(c) Work in atmospheres immediately dangerous to life shall be performed only in an emergency, as when rescueing a man who has been overcome or when shutting off a source of contamination that cannot otherwise be controlled. When an employee enters such an atmosphere he shall be provided with and use an adequate, attended life line.

(d) In the vicinity of each vessel in which there is a danger of employees being exposed to an atmosphere

immediately dangerous to life the employer shall have on hand and ready for use respiratory protective equipment approved for such use. When such equipment is required, one or more persons shall be thoroughly trained in the use of the equipment.

(3) Protection Against Gaseous Contaminants Not Immediately Dangerous to Life. (a) Gaseous contaminants not immediately dangerous to life are gases present in concentrations that could be breathed for a short period without endangering the life of a person breathing them, but which might produce discomfort and possible injury after a prolonged single exposure or repeated short exposures.

(b) When employees are exposed to a gaseous contaminated atmosphere not immediately dangerous to life, they shall be protected by respiratory protective equipment approved for use in the type and concentration of the gaseous contaminant as follows:

(i) In high or unknown concentrations, a hose mask or an air line respirator. The use of either a hose mask or an air line respirator in lower concentrations is permissible.

(ii) In concentrations of ammonia of less than 3 percent, or of other gases less than 2 percent, by volume, a canister type gas mask equipped with the proper type of canister. Different canisters are approved for specific use against the following gases or groups of gases: acid gases, hydrocyanic acid gas, chlorine gas, organic vapors, ammonia gas, carbon monoxide, or combination of the above.

(iii) In low concentrations (less than 0.1 percent by volume), a chemical cartridge respirator equipped with the type of cartridge approved for use against the particular gases or groups of gases listed in (ii) of this section.

(4) Protection Against Particulate Contaminants not Immediately Dangerous to Life. (a) When employees are exposed to unsafe concentrations of particulate contaminants, such as dusts and fumes, mists and fogs or combinations of solids and liquids, they shall be protected by either air line or filter respirators, except as otherwise provided in the regulations of this part.

(b) Filter respirators shall be equipped with the proper type of filter. Different filters are approved for specific protection against groups of contaminants, as follows:

(i) Pneumoconiosis–producing dust and nuisance dust filters which provide respiratory protection against pneumoconiosis–producing dusts, such as aluminum, cellulose, cement, charcoal, coal, coke, flour, gypsum, iron ore, limestone and wood.

(ii) Toxic dust filters which provide respiratory protection against toxic dusts that are not significantly more toxic than lead, such as arsenic, cadmium, chromium, lead, manganese, selenium, vanadium, and their compounds.

(iii) Mist filters which provide respiratory protection against pneumoconiosis–producing mists, chromic acid mists, and nuisance mists.

(iv) Fume filters which provide respiratory protection against fumes (solid dispersoids or particulate matter formed by the condensation of vapors, such as those from heated metals and other substances).

(v) Filters which provide respiratory protection against combinations of two or more of the contaminants described in (i) through (iv) of this section.

(5) Protection Against Combinations of Gaseous and Particulate Contaminants Not Immediately Dangerous to Life. (a) When employees are exposed to combinations of gaseous and particulate contaminants not immediately dangerous to life, as in spray painting, they shall be protected by respiratory protective equipment approved for use in the type and concentration of the contaminants, as follows:

(i) In high or unknown concentrations, a hose mask or an air line respirator. The use of either a hose mask or an air line respirator is permissible in lower concentrations.

(ii) In concentrations of gaseous contaminants of less than 2 percent by volume, a canister type gas mask with a combination canister approved for the particular type of gaseous contaminant as specified in (3)(b) of this section and a filter for the particular type of particulate contaminant as specified in (4)(a) of this section.

(iii) In low concentrations of gaseous contaminants (less than 0.1 percent by volume) a respirator equipped with the type of cartridge and filter as specified in (ii) of this section. [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 American 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 WAC 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 WAC 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 contract 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 WAC 296-304-07013. They provide procedures and standards governing accreditation of persons by the Department of Labor and Industries, for the purpose of certificating 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 WAC 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 WAC 296-304-18003 and WAC 296-304-190 through WAC 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 tone 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 bases;

(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 WAC 296-304-15005, WAC 296-304-160 through WAC 296-304-16025, and WAC 296-304-170 through WAC 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 WAC 296-304-15001(8), the requirements set forth in WAC 296-304-160 through WAC 296-304-16025 and WAC 296-304-170 through WAC 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 WAC 296-304-15005, WAC 296-304-160 through WAC 296-304-16025 and WAC 296-304-170 through WAC 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 WAC 296-304-16025 and WAC 296-304-170 through WAC 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 WAC 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, WAC 296-304-16005(1) and WAC 296-304-16013.

(b) The heat treatment required by WAC 296-304-16007 and WAC 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 WAC 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 WAC 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 WAC 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 vangs, 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 296-204-16009 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 WAC 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 WAC 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 accidently 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 295-304-16025 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 WAC 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 WAC 296-304-17023 with respect to unit proof tests and examinations shall not apply and the applicable requirements of WAC 296-304-200 through WAC 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 WAC 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 WAC 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.

Article of gear	Proof 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.

[1]The 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, WAC 296–304–17011(3), or WAC 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 certificating 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, WAC 296-304-14003, WAC 296-304-14005, WAC 296-304-14009, WAC 296-304-14011 and WAC 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 WAC 296-304-20025 shall be strictly observed: Provided, however, That in cases of practical 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 WAC 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 WAC 296-304-15003 shall govern, to the extent applicable, persons accredited under WAC 296-304-180 through WAC 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 WAC 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.

[1]The 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 WAC 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.

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 206-304-20009 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. [Order 74-25, § 296-304-20015, filed 5/7/74.]

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 205-304-20023(1).

(iii) Information specified in WAC 206-304-20025(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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WAC 296-305-001 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 of 1973 (chapter 49.17 RCW), following extensive research and pursuant to the recommendations of an advisory committee made up of representatives of fire fighting personnel and their employers.

The purpose of this chapter is to assist employers and employees in the reduction of work related injuries and illness. In addition to providing an enforceable set of safety and health standards for the fire protection service, 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 workplaces reasonably attainable under the conditions to which employees are or will be exposed. [Order 77-20, § 296-305-001, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-003 Effective date. Unless a particular provision of this chapter specifies otherwise, the effective date of chapter 296-305 WAC, shall be [Order 77-20, § 296-305-003, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77.]

Reviser's note: The effective date of this chapter as filed by Emergency Order 77-24 is 12/17/77.

WAC 296-305-005 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): Provided, That any other provision of this chapter notwithstanding, those fire fighters that are not fully paid are excluded from the requirements of this chapter.

(2) The provisions of this chapter apply to all work places where fire fighters are employed, including the fire combat scene. Although enforcement of applicable standards will result from provable violations of these standards which occur 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) The provisions of this chapter shall be supplemented by the provisions of the safety and health standards of the Department of Labor and Industries, chapters 296-24 and 296-62 WAC. In the event of conflict between any provisions of this chapter and any provision of either of the two chapters last cited, the provisions of this chapter shall apply. The requirements of this chapter should be reviewed by the appropriate labor-management committee at least every two years. [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.]

WAC 296-305-007 Definitions. Unless the context indicates otherwise, words used in this chapter shall have the meaning given in this section.

(1) Aerial ladder: A ladder mounted on top of an apparatus, hydraulic or pneumatic controlled.

(2) Aerial platform: A device consisting of two or more booms or sections with a passenger carrying platform assembly.

(3) Aerial tower: Telescopic elevating platform or water tower assembly usually with a ladder on top of the section.

(4) Ancillary clothing: Outer garments auxiliary or supplemental to other protective clothing provided for fire fighters.

(5) ANSI: American National Standards Institute.

(6) Apparatus: A mobile piece of fire fighting equipment such as pumper, aerial, tanker, etc.

(7) Approved: 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 judgement.

(8) Bag mask: A hand operated device consisting of a bellows type bag and a face piece used to administer artificial respiration to an individual.

(9) Beacon: A flashing or rotating light.

(10) Chief: An employer representative responsible for the fire department's operation.

(11) City service apparatus: An all purpose apparatus which carries ground ladders as well as forceable entry tools, salvage and overhaul equipment, and fire fighters.

(12) Combat scene: The site where the suppression of a fire or emergency exists.

(13) dBA: A measure of noise level expressed as decibles measured on the "A" scale.

(14) Deck pipe: A permanently mounted device which delivers a large stream of water.

(15) Department: Department of Labor and Industries.

(16) Director of fire department: The chief or principle administrator of the fire department.

(17) 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.

(18) Employee: An employee of an employer who is employed in the business of his 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 his personal labor for an employer under this chapter whether by way of manual labor or otherwise.

(19) 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.

(20) Employer representative: A fire department officer authorized by the chief or director to act in his behalf.

(21) Engine (pumper): A piece of apparatus equipped with hose and a pump for the purpose of supplying water under pressure through hose lines.

(22) Explosion proof: 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 a surrounding flammable atmosphere will not be ignited thereby.

(23) Fastest means available: The (nearest-closest) telephone, portable radio, mobile radio, telephone/radio dispatcher or any other mode of mechanical communication.

(24) Fire combat training: Training received by fire fighters on the drill ground, drill tower, or industrial site to maintain the fire fighter's proficiency.

(25) Fire fighter: An officer or any employee who by virtue of his position in a fire department has a duty to engage in the fighting and extinguishment of fires.

(26) Fire retardant: A material to reduce, stop or prevent the flame spread.

(27) Foot stand, ladder: Devices attached to inside of beams of ladders that when folded down, provide foot space.

(28) Fly: Extendable sections of ground or aerial ladders.

(29) 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.

(30) Hose bed: Portion of fire apparatus where hose is stored.

(31) Host tower: A vertical enclosure where hose is hung to dry.

(32) 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.

(33) Jack, ground: Heavy jacks attached to frame of chassis of the aerial–equipped apparatus to provide stability when the aerial portion of the apparatus is used.

(34) Ladder company: The fire company manning an aerial ladder truck and especially trained in ladder work, ventilation, rescue, forcible entry, salvage and related tasks.

(35) Ladder pipe: A heavy stream nozzle attached to an aerial ladder usually supplied by a 3–inch hose from a Siamese intake at ground level.

(36) Life line: Length of rope to which employees and employer representatives are secured when in extremely hazardous areas.

(37) Life line gun: A gun designed to shoot a rope line, for rescue, to persons in distress such as in water, canyons, on cliffs and buildings, etc.

(38) Life net: A rescue item, commonly carried on ladder trucks, consisting of heavy canvas supported by a folding metal frame and springs and containing a pad to soften impact.

(39) 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.

(40) 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.

(41) Manned station: A fire station continuously occupied by fire fighters on scheduled work shifts. The manned station may also serve as headquarters for volunteers.

(42) MESA: Mining Enforcement and Safety Administration.

(43) Monitor: A portable device which delivers a large stream of water.

(44) NFPA: National Fire Protection Association.

(45) NIOSH: National Institute of Occupational Safety and Health.

(46) Nondestructive testing: A test to determine the characteristics or properties of a material or substance that does not involve its destruction or deterioration.

(47) Nonskid: The surface treatment that lessens the tendency of a foreign substance to reduce the coefficient of friction between opposing surfaces.

(48) Overhauling: That portion of fire extinguishment involving discovery of hidden fires or smoldering material.

(49) 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.

(50) 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.

(51) Platform: The portion of a telescoping or articulating boom used as an elevated working surface.

(52) Pole hole: An opening in a floor through which a pole passes and employees slide to get from one floor to another.

(53) Pompier ladder: Ladder constructed with a single spar to which a hook is attached on one end and rungs attached to the spar.

(54) Prefire training: The training of fire fighters in recognizing sources and locations of potential fires and the method of fire combat to be used.

(55) Probable fatality: An injury which by the doctor's diagnosis could lead to death.

(56) Pumper (engine): An apparatus equipped with hose and a pump for the purpose of supplying water under pressure through hose lines.

(57) Qualified: One who by possession of a recognized degree, certificate or professional standing, or who by extensive knowledge, training or experience has successfully demonstrated his ability to solve or resolve problems related to the subject matter, the work or the project.

(58) 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.

(a) Respirators (Closed circuit): Those types of respirators which retain exhaled air in the system and recondition such air for breathing again.

(b) Respirators (Open circuit): Those types of respirators which exhaust exhaled air to the outside of the mask into the ambient air.

(c) Respirators (Demand): Those types of respirators whose input air to the mask is started when a negative pressure is generated by inhalation.

(d) 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.

(59) Responding: The act of answering an emergency call or other alarm.

(60) Safe and healthful working environment: The work surroundings of an employee with minimum exposure to unsafe acts and/or unsafe conditions.

(61) 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.

(62) Safety officer: Employer representative as defined by chief of fire department.

(63) 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.

(64) Shall: Means mandatory.

(65) Should: Means recommended.

(66) Siamese: A hose appliance having two or more female inlets with one male outlet.

(67) Signalman: A person so positioned that he can direct an activity, such as apparatus entering or leaving a fire station, where the operator's vision is obstructed or obscured.

(68) Station (Fire station): Structure in which fire service apparatus and/or personnel are housed.

(69) Tailboard: Standing space at rear of an engine or pumper apparatus where fire fighters ride.

(70) Tillerman: Rear driver of tractor–trailer aerial ladder.

(71) Turnout clothing: Outer garments worn by fire fighters for personal protection consisting of helmet, gloves, coat and pants with vapor and thermal barrier liners, and boots.

(72) Turntable: The rotating surface located at the base of an aerial ladder, or boom, on aerial apparatus.

(73) Unmanned station: A station serving as headquarters for volunteer fire fighters which may or may not be attended by a chief or other officials responsible for directing the company's activities.

(74) Wheel blocks (Chocks): A block or wedge placed under a wheel to prevent motion.

(75) Work environment: The surrounding conditions, influences or forces to which an employee is exposed while working.

(76) Work place: 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. [Order 77–20, § 296–305–007, filed 10/18/77 and Emergency Order 77–24, filed 11/17/77, effective 12/17/77.]

WAC 296–305–010 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 authorized representative may, pursuant to this section, RCW 49.17.080 and/or RCW 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 permit for variance shall be conspicuously posted on the premises and shall remain posted during the time it is in effect. All requests for variances from safety and health standards included in this or any other chapter of Title 296 WAC, shall be made in writing to the Director of the Department of Labor and Industries at Olympia, Washington, or his duly authorized representative, the Assistant Director, Division of Industrial Safety and Health, Department of Labor and Industries, Olympia, Washington. Variance application forms may be obtained from the department upon request. [Order 77–20, § 296–305–010, filed 10/18/77 and Emergency Order 77–24, filed 11/17/77, effective 12/17/77.]

WAC 296–305–015 Injury and illness report 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 behalf, to report the injury or illness to the employer before the end of his duty period or not later than 24 hours.

EXCEPTION: In the event that symptoms of an occupational injury or illness are not apparent at the time of the accident, the employee shall report the symptoms to his employer within 48 hours after becoming aware of the injury or illness.

(b) Whenever an injury occurs to a fire fighter or other employee while on duty and the injury results in a fatality, or probable fatality, the employer shall report the accident to the Division of Industrial Safety and Health by the fastest means available.

(2) Record keeping – written reports; all fire service employers shall maintain records and reports.

(3) An annual summary of the statistics tabulated in items (1)(b), and (2) above shall be maintained by the Department of Labor and Industries. [Order 77–20, § 296–305–015, filed 10/18/77 and Emergency Order 77–24, filed 11/17/77, effective 12/17/77.]

WAC 296–305–017 Accident investigation. (1) The affected employer, or his representative, shall assist the department in any investigation of accidents involving fire fighters or other employees of that employer.

(2) When a fatality occurs to a fire fighter while on duty, the equipment involved shall not be moved until investigated by the authority having jurisdiction except where removal is essential in preventing further accidents or is essential in the continuance of emergency action. [Order 77–20, § 296–305–017, filed 10/18/77 and Emergency Order 77–24, filed 11/17/77, effective 12/17/77.]

WAC 296–305–020 Accident prevention programs. (1) The employers of fully manned fire departments shall establish safety programs with the following elements:

(a) The program shall have an assigned safety officer who is responsible for the following:

(i) Plan and direct all safety activities, work closely with the safety committee, and devise corrective measures to prevent accidents.

(ii) Be responsible for safety training of all employees.

(iii) Assist the safety committee in developing the agenda for the meeting.

(iv) See that safety recommendations are completed.

(v) Attend safety committee meetings and contribute accident prevention information and material. Where possible, assistants shall be appointed from other shifts or battalions to attend safety committee meetings.

(vi) Maintain records of accidents, injuries, inspections and other fire department safety activities.

NOTE: Clerical employees shall participate in the program proportionate to their degree of hazard exposure as prescribed by the safety officer.

(b) Safety committee. Each department shall have a safety committee comprised of equal employee–employer representation.

(i) The frequency of the safety committee meetings shall be determined by the employer, but shall not be less than one hour per calendar quarter.

(ii) Minutes of safety committee meetings shall be taken and transmitted to the fire department's director or his designee.

(c) Employee safety meetings. (i) The programs shall include safety meetings, scheduled to involve all fire fighters. Different meetings may be scheduled for the fire fighters on different shifts.

(ii) The frequency of employee safety meetings shall be determined by the employer, but shall not be less than one hour per month.

(iii) Employee submitted written suggestions or complaints shall be considered. Action taken by committee shall be transmitted in writing to affected employee.

(iv) Minutes of the safety meetings shall be taken and maintained in a file for that purpose.

(v) The requirements of this subsection may be met by integrating the safety meeting into a regular training program.

(d) Inspections of manned fire stations shall be made at least monthly and records maintained to insure that stations are reasonably free of recognizable physical hazards. These inspections shall also include powered portable equipment, portable fire extinguishers, utility straps and life lines.

(2) Employers operating from unmanned or volunteer fire stations shall develop accident prevention programs that include recording injuries, scheduled safety meetings, facility and equipment inspections and a system for implementing safety recommendations from employees. These activities may be combined and performed on a schedule consistent with the other activities of the fire department. [Order 77–20, § 296–305–020, filed 10/18/77 and Emergency Order 77–24, filed 11/17/77, effective 12/17/77.]

WAC 296–305–025 Employer's responsibility. (1) It shall be the responsibility of the employer to establish and supervise:

(a) A safe and healthful working environment, as it applies to non combat conditions or to combat conditions at the fire scene after 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.

(2) The employer 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) Alcoholic beverages shall not be allowed in station houses, except at those times when station houses are used as community centers.

(4) Controlled substances shall not be allowed in station houses, with the exception of those used by the profession to be administered to patients or medication prescribed by a physician, unless such prescribed medication would impair the performance of the individual.

(5) A bulletin board or posting area exclusively for safety and large enough to display the required safety poster (form–WISHA–1) and other safety education material shall be provided. A bulletin board of "white background" and "green trim" is recommended. [Order 77–20, § 296–305–025, filed 10/18/77 and Emergency Order 77–24, filed 11/17/77, effective 12/17/77.]

WAC 296–305–030 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 own actions and conduct in the course of his 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 and protective equipment.

(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 and other employees shall not report to work under the influence of alcohol or controlled substances, with the exception of medications prescribed by a physician. These prescribed medications must not impair the performance of the individual. [Order 77–20, § 296–305–030, filed 10/18/77 and Emergency Order 77–24, filed 11/17/77, effective 12/17/77.]

WAC 296–305–035 Safe place standards. (1) Every employer shall furnish and require the use of appropriate safety devices and safeguards. All firefighting 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 lives and safety 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. [Order 77–20, § 296–305–035, filed

10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-040 First-aid training and certification. (1) All fire fighters, except directors of fire departments and the directors' designated personnel, shall have first-aid training as evidenced by a current, valid first-aid card as issued by an organization approved by the director of the Department of Labor and Industries or by documented evidence of equivalent training. New fire fighters shall have such first-aid training within 90 days of the date of their employment or enroll for training within 30 days of the date of their employment.

(2) First-aid training and certification for other employees and directors of fire departments shall conform to the requirements of WAC 296-24-060. [Order 77-20, § 296-305-040, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-045 First-aid kits. (1) There shall be present at each fire scene or other emergency response location, a first-aid kit of packaged supplies, including at least the following items:

1 - Bag-mask or equivalent
2 - Rolls of 3" bandages
4 - Combination pads
4 - Packaged 4" x 4" dressings
3 - Rolls of 1" adhesive tape
1 - Eye dressing (1 per package)

(2) All station houses while manned by employees shall maintain a first-aid kit of packaged supplies containing at least the following items:

4 each - 4" Bandage compresses
4 each - 2" Bandage compresses
5 each - Triangular bandages
2 each - Gauze dressings
2 each - Wire splints or equivalent
1 pair - Bandage shears
1 pair - Tweezers
1 package - Assorted adhesive bandages
1 package - Eye dressing (1 per package)

[Order 77-20, § 296-305-045, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-060 Personal protective equipment and clothing. (1) Employer provided protective equipment for eyes, face, head and extremities, protective clothing and respiratory devices shall be used and maintained as required by this section.

(2) Employee owned equipment. Where fire fighters provide their own protective equipment and clothing, the employer shall be responsible to assure its adequacy, including proper maintenance and sanitation of such equipment.

(3) Personal protective equipment and clothing shall be of a type approved by NIOSH, MESA, or as required by this section.

(4) Every fire fighter when working upon fire extinguishment on the emergency fire ground or training fire, shall wear a complete set of equipment and clothing, except where the wearing of such equipment and clothing will cause undue hardship in instances such as may occur when combating grass or wildland fires. Provided, clothing worn in place of full turnouts shall comply with the following performance standard:

(a) Ancillary clothing. (i) Flame resistance: When tested in accordance with Federal Test 191, Method 5903.2 "Flame Resistance of Cloth, Vertical" (standard small scale test), the test results shall not exceed the following limits:

(A) 2.0 seconds after flame
(B) 4.0 seconds after glow
(C) 6.0 inches average char length or 4.0 inches

Ignition of the material shall not produce any melting and dripping of molten or flaming material. It is specifically required that upon exposure to flaming ignition or intense heat, the material will not adhere to the skin of the wearer so as to cause serious skin burns.

Exception: Ancillary clothing of 100% wool, with a weight of at least 14 ounces per lineal yard of 54-inch width shall be considered to be flame resistant.

(ii) Laundering: Garments shall be capable of withstanding not less than 50 washings or 25 dry cleanings with no significant changes in fire retardancy.

(iii) A label must be permanently attached, and shall attest that the fabric has been tested and meets the requirements of this section. The label shall include:

(A) Lot number
(B) The name and number of the specified test
(C) The date of the successful test.

(b) all turnout clothing placed into service after the effective date of these regulations shall meet the requirements set forth in this standard.

(c) Ancillary clothing placed into service after the effective date of these regulations shall meet the requirements set forth in this standard. Ancillary clothing currently in use may be worn until 18 months following the effective date of these regulations.

(d) The use of ancillary clothing does not exclude each employee from having a full set of turnouts. A written policy and procedure specifying the conditions under which less than a complete set of personal protective equipment and clothing can be worn, shall be established by each employer and distributed to both fully paid and volunteer firemen.

(5) Written procedures with regard to repair, maintenance and servicing shall be established for the conservation of personal protective equipment. This provision applies to the fire fighter's personally owned equipment as well as to the employer owned equipment.

(6) Fire fighters shall wear the personal protective clothing and equipment designated for the task. [Order 77-20, § 296-305-060, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06001 Eye and face protection. Eye and face protection worn by fire fighters at the fire ground shall comply with the following regulations.

(1) General requirements. Eye and face protection shall be required where there is a reasonable probability of injury that can be prevented by such protection.

(a) Employers shall make conveniently available a type of protector suitable for the work to be performed, and employees shall use such protectors. 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.

(b) Suitable eye protectors shall be provided where machines or operations present the hazard of flying objects, glare, liquids, injurious radiation, or a combination of these hazards.

(c) 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:

(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) 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.

(e) Issue and use. Protectors are a personal item and should be for the individual and exclusive use of the person to whom they are issued. If circumstances require reissue, the protectors shall be thoroughly cleaned and disinfected.

(2) Face shields. (a) Face shields shall accommodate any of the following styles of windows:

(i) Clear transparent.

(ii) Colored transparent.

(iii) Wire screen.

(iv) Combination of plastic and wire screen.

(b) Plastic windows shall be not less than 0.040 inch nominal thickness.

(c) Clear or colored plastic materials used in windows shall be of an optical grade.

(d) Disinfection. When a person is assigned protective equipment, it is recommended that this equipment be cleaned and disinfected regularly.

(3) Styles and functions of eye protectors. (a) Eyecup goggles shall comprise two basic types as follows:

(i) Cup–Type goggles designed to be worn by individuals who do not wear corrective spectacles.

(ii) Cover–Cup–Type goggles designed to fit over corrective spectacles.

(b) Spectacles of metal, plastic, and combination metal and plastic. (i) Safety spectacles require special frames. Therefore combinations of street–wear frames with safety lenses meeting this standard are definitely not in compliance.

(ii) Spectacles shall consist of two lenses in a frame which supports the lenses around their entire periphery, of suitable size and shape for the purpose intended, connected by a nose bridge, and retained on the face by temples or other suitable means.

(iii) Plastic frames or side shields shall be of the slowburning type.

(iv) Marking. These frames shall be designed for industrial exposure and shall bear a trademark identifying the manufacturer on both fronts and temples. The frame front shall carry a designation of the eye size and bridge size (where applicable). Temples will be marked as to the overall length or fitting value.

(v) Frame and lens sizes. Spectacle frame and lenses shall be of identical shape and configuration and of such dimensions to assure support of the lens by the lens frame around its entire periphery.

(vi) Plano lenses shall be flat or 6.00 diopter curve, and corrective lenses are to be as specified on the individual prescription.

(vii) Temples. Temples may be of the cable or spatula type as specified, and shall be of such design as to permit adjustment and fit comfortably and securely on the wearer.

(4) Goggles, flexible, or cushioned fitting. (a) Goggles shall consist of a wholly flexible frame, forming a lens holder, or with separable 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.

(i) Materials used shall be chemical–resistant, nontoxic, nonirritating and slow–burning.

(ii) There shall be a positive means of support on the face, such as an adjustable headband of suitable material or other suitable means of support to retain the frame comfortably and snugly in place in front of the eyes.

(iii) Where chemical goggles are ventilated, the openings shall be such as to render the goggles splashproof.

(iv) Frames shall bear a trademark or name identifying the manufacturer.

(v) Each separate lens shall be distinctly marked in a manner by which the manufacturer may be identified.

(vi) To prolong the life of eye protectors, they shall be placed in suitable cases or containers between periods of use. [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 Hearing protection. (1) Fire fighters shall be protected from the effects of noise exposures which exceed the noise levels deemed to be safe as defined by the General Occupational Health Standards adopted by the Washington State Department of Labor and Industries, chapter 296–62 WAC.

(2) When fire fighters on the fire scene are subject to sound levels for time periods exceeding those shown in this subsection's table, personal protective equipment shall be provided and used.

ALLOWABLE TIME-NOISE LEVEL TABLE

Duration In Hours	Sound Level **dBA
8	90
6	92
4	95
3	97
2	100
1-1/2	102
1	105
3/4	107
1/2	110
1/4	115*

*Ceiling value: No exposure in excess of 115 dBA.

**Sound level in decibles as measured on a standard level Meter operating on the A weighting network with slow meter respond.

NOTE:

EXAMPLES OF TYPICAL NOISE EXPOSURES

	Gas Pumper dBA	Diesel Pumper dBA
Rear discharge closed at 150 lbs. at 1300 RPM	95	95
Rear discharge open 125 lbs. at 1500 RPM	97	94
Engine exhaust side	104 - 107	105
20 ft. behind apparatus	92	86
Idle	70	78

Jumper statistics compiled by University of Washington and Sand Point Naval Air Station in Seattle on October 30, 1973.

[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 Hand protection. Any gloves purchased after the effective date of these standards shall meet the following criteria:

(1) Fire fighters' gloves shall be of a five finger design with wool or equivalent insulation covered by rough leather or equivalent material and shall be capable of insulating to the extent that a five minute exposure to 212°F (100°C) would not elevate the internal temperature above 140°F (60°C).

(2) Fire fighting gloves shall fit snugly around the wrist and extend 1-1/2 to 3 inches above the wrist. They shall not have a gauntlet which would allow sparks or embers to remain trapped by wearer's wrist.

(3) Fire fighters engaged in activities creating hazardous exposures to electricity shall wear approved hand protection.

(a) Electrical rubber gloves guaranteed by the manufacturer to pass a minimum dielectric test of 10,000 volts shall be worn.

(b) Rubber gloves shall be numbered and records kept for test purposes.

(c) Rubber gloves shall be tested once every three months.

(d) Protector gloves must be worn at all times over electrical rubber gloves.

(e) Electrical rubber gloves, when not in use, shall be carried in a suitable bag provided and designed for that purpose.

(f) When electrical rubber gloves are transported on apparatus, a compartment or box shall be used to store the gloves. No other equipment shall be placed in this compartment or box. [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 Foot protection. (1) Fire fighters' footwear when worn under fire combat conditions shall meet the following criteria:

(a) Puncture resistant and rust-resistant midsole.

(b) Safety toe able to withstand ANSI classification Z41.1-1967/Revised 1975.

(c) Reinforced ladder shank in turnout boots.

(d) Sole shall provide nonskid protection.

(e) Hip high boots shall have heat resistant knee protection or equivalent in addition to above requirements. Hip high boots may be worn with ancillary clothing in lieu of turnout pants.

(2) All employers shall comply with criteria of this section within three years of the effective date of this chapter.

(3) Fire fighters' boots may be resoled but the boot upon resoling shall meet the requirements as set forth in this section. [Order 77-20, § 296-305-06007, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06009 Body protection. (1) Fire fighters turnout coats and pants shall comply with the following criteria:

(a) Trapezoidal tearing, American Society for Testing and Materials D 2263, requirements 29 pounds.

(b) Abrasion resistance, 5-minute accelerator weight loss, American Association of Textile Chemists and Colorists 93-1970, requirements 5%.

(c) 500° aging 5-minutes, tear strength retention, A.S.T.M.D. 2262, requirements 75%.

(d) Water absorption, federal test method standard 191, method 5,500, requirements 28%.

(e) Fabric weight, 7.5 ounces per square yard.

(f) Shrinkage and laundering, AATCC method 96 Test IV E, 3% maximum shrinkage.

(g) Turnout coat and pant shells shall have provisions for securely attaching the liners. The liners shall consist of an inner thermal barrier with an outer vapor barrier.

(h) Coat length shall be not less than mid-thigh.

(i) Reflective striping shall be fire retardant.

(j) Within 18 months of the effective date, turnout coats and pants shall be provided with two-inch wide strips or retroreflective fabric sewn on the outside at the following locations:

(i) Present turnouts with reflective strips shall be exempted from this provision until replaced.

(ii) Around lower portion of each pant leg.

(iii) Around lower portion of each sleeve.

(iv) Around the bottom of coat.

(v) Vertical strip on the coat storm flap.

(vi) Across the back at the shoulder yoke.

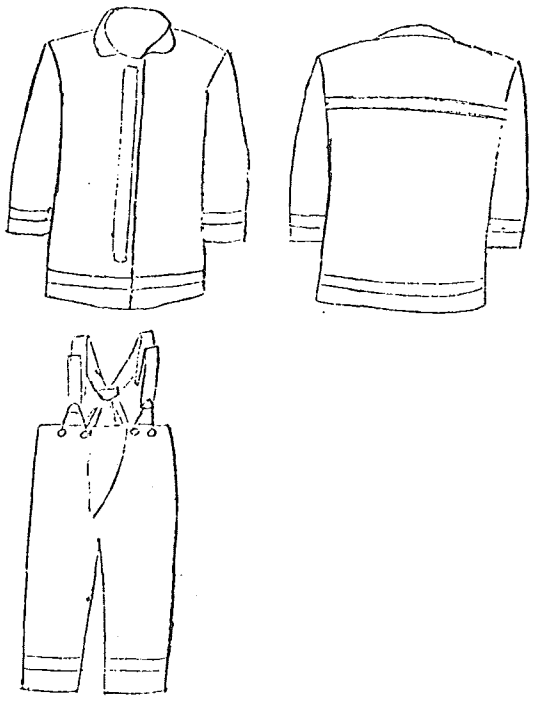
(k) When turnouts are purchased, following the effective date of this chapter, all reflective strips shall be three inches wide.

(l) The collar shall be the same material as the body of the coat.

(m) Pants shall be constructed of the same material as the coat.

(n) Bunking coat snap openings shall face toward body.

(2) With the exception of subdivision (l)(j), all employers shall be in compliance with the requirements of this section within five years of the effective date of this chapter.



[Order 77-20, § 296-305-06009, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06011 Head protection. (1) Aluminum or metal helmets shall not be worn by fire fighters.

(2) Fire fighter's helmets shall conform to the following criteria:

(a) Helmets shall withstand a 2,200 volt dielectric test.

(b) Helmets shall be fire retardant.

(c) Helmets shall withstand a heat range of 0° F to 300° F for three minutes without deterioration of the performance requirements in this subsection.

(d) Helmets shall meet or exceed NIOSH-HSM-99-72-86, January 1975, for impact.

(e) Helmets shall be of a light color with attached chin strap. Black colored helmets purchased prior to the effective date of this section may remain in service providing that bands of reflective tape are applied liberally to the exterior until replaced.

(f) Care, maintenance and alteration of helmets shall conform to the manufacturer's recommendations.

(g) Use, care, alterations and maintenance instructions for protective headgear shall be supplied for each helmet.

(h) Before using strong detergents, solvents, petroleum products, etc., to clean helmets, the helmet manufacturer shall be consulted for his recommendation.

(i) Before helmets are painted, the helmet manufacturer shall be consulted to determine which paint is compatible to the helmet material.

(j) Employers shall comply with the requirements of this section within three years of the effective date of this chapter. [Order 77-20, § 296-305-06011, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-063 Respiratory equipment--General. (1) Approved self-contained respiratory equipment shall be available and used by all employees who enter into hazardous atmospheres. Filter cannister masks are not approved.

(2) Respiratory protection equipment used in fire combat situations shall be classified as self-contained pressure demand type and shall have a minimum of one-half hour nominal service life.

(3) In structural or confined space fires at least one person trained in the use of self-contained breathing equipment and equipped with such equipment shall remain free of the contaminated area in order to afford rescue potential for exposed, disabled fire fighters. [Order 77-20, § 296-305-063, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06301 Respiratory equipment effective dates. (1) All respirators purchased after the effective date of this chapter shall be of the "pressure demand" type.

(2) "Demand" types of respirators purchased prior to the effective date of this chapter and relying on negative mask pressure to activate air entry may be used for a period of eight years after the effective date of this chapter, but following that period shall be prohibited unless modified to the "pressure demand" type. The "demand" type respirator shall not be used by any fire fighter whose facial characteristics are such that a "leak-proof" seal cannot be obtained.

(3) Three years following the effective date of this chapter, all respirators using compressed air shall have an audible warning device which will activate when the air pressure drops below 20% of the rated capacity. [Order 77-20, § 296-305-06301, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06303 Respiratory equipment approvals. (1) Self-contained respiratory equipment shall be approved by the National Institute for Occupational Safety and Health (NIOSH) and/or Mining Enforcement and Safety Administration (MESA).

(2) Oxygen for use in respirator systems shall meet the requirements of the United States Pharmacopoeia for Medical or Breathing Oxygen and shall not be used in any type of respiratory equipment that previously used compressed air.

(3) Air for use in respirator systems shall meet or exceed the specifications for Grade D breathing air as described in Compressed Gas Association Commodity Specification G-7.1-1975.

(4) Breathing gas containers shall be approved and identified as specified by Federal Specification BB-A-1034a, June 21, 1968, Air-Compressed for Breathing Purposes or by Interim Federal Specification GG-B-00675b, April 27, 1965, Breath Apparatus - Self-Contained and by compliance with ANSI Z48.1-1954, American National Standard Method of Marking Portable Compressed Gas Containers to Identify the Material Contained.

(5) Compressed air used for respiration shall be of high purity. Breathing air shall meet at least the requirements of the specification for Grade D breathing air as described in Compressed Gas Association Commodity Specification G-7.1-1975. Compressed oxygen shall not be used in supplied-air respirators. [Order 77-20, § 296-305-06303, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06305 Respiratory equipment inspection. (1) The inspection procedures for respiratory equipment shall be formalized by written directions for inspection steps and time schedules. The procedure shall be made available to fire fighters.

(2) The inspection programs for employers with fully manned fire stations shall include the following:

(a) Employers shall have respiratory equipment inspected daily, weekly and after each use.

(b) Daily inspections of hose connections, hose, condition of the face piece, head bands, harness components and gauges shall be conducted.

(c) Weekly inspections shall include all daily checks and the following:

(i) Inspection shall determine if the regulator and warning devices function properly.

(ii) Equipment shall be donned and checked for complete operation.

(iii) Face piece shall be cleaned as part of the weekly inspection.

(d) After each actual use, inspection shall include all daily and weekly inspections and the following:

(i) All supply cylinders on equipment shall be inspected to ensure they are charged to a minimum of 75% of the manufacturer's recommendation.

(ii) The exhalation valve and speaking diaphragm shall be inspected.

(e) All damaged parts that affect the safe use disclosed by the daily, weekly or after-use inspections shall be replaced before equipment is returned to service.

(f) All inspection in this section shall be recorded on a form provided for each unit of respiratory equipment, to include dates and findings.

(3) The inspection programs for employers operating from unmanned fire stations (volunteer) shall cover the same inspection requirements as those for the manned fire stations but the employer shall be responsible for developing a schedule compatible with his operations. [Order 77-20, § 296-305-06305, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06307 Respiratory equipment testing. (1) Testing of respiratory equipment under this section shall be done only by a qualified technician.

(2) Cylinders shall be tested every five years as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR Part 178) dated October 1, 1972. The exception to the five year interval would be the ten year period between tests allowed for D.O.T. approved cylinders identified with a star marking. [Order 77-20, § 296-305-06307, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06309 Respiratory equipment maintenance and repair. (1) The employer shall be responsible for the establishment of a program of respiratory maintenance and repair to ensure respiratory equipment retains its original effectiveness.

(2) Maintenance and repair of respiratory equipment shall be done only by a qualified technician.

(3) No attempt shall be made to replace respirator components or to make adjustments or repairs beyond the manufacturer's recommendations.

(4) Self-contained respirators shall be completely overhauled every five years and worn or deteriorated parts replaced as needed or as recommended by the manufacturer of the equipment.

(5) Respiratory shall be stored in a protected, convenient, clean location free from the direct rays of the sun. [Order 77-20, § 296-305-06309, filed 10/18/77 and

Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06311 Respiratory equipment training. (1) The employer shall be responsible for securing respiratory use training for all fire fighters who may be required to use such equipment. The training shall address the same subjects as those covered by the Washington State Fire Service Training Program and shall involve at least the same number of training hours.

(2) Each fire fighter, after having completed such training, shall at least quarterly practice each step-by-step procedure in putting on the respirator and preparing it for entry into hazardous atmospheres.

(3) Written, standard-operating procedures governing the use of each specific type of respiratory equipment in use shall be made available to each fire fighter before that fire fighter shall be qualified to use that respirator. [Order 77-20, § 296-305-06311, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

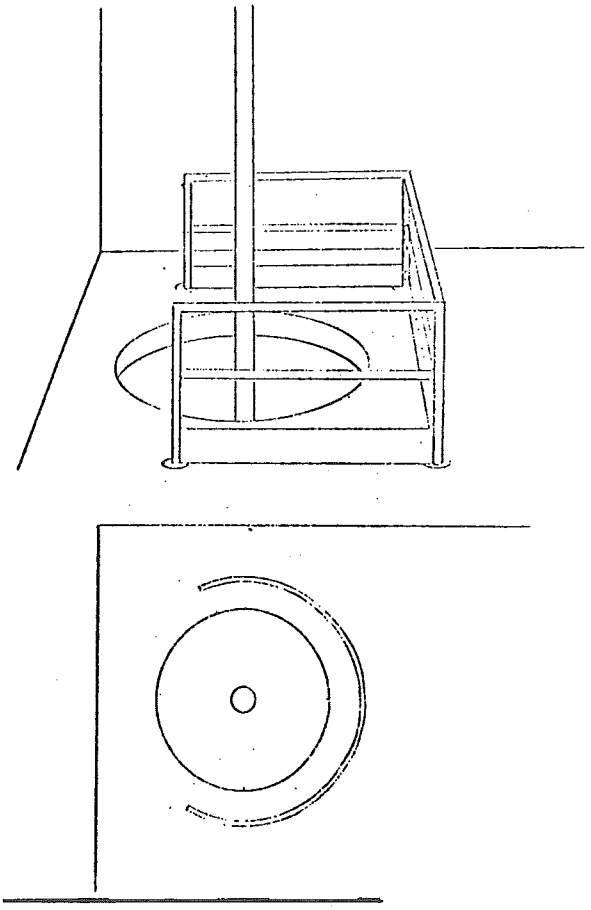
WAC 296-305-065 Requirements for fire stations. All of WAC 296-305-065 pertains to fire stations as defined in WAC 296-305-007. [Order 77-20, § 296-305-065, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06501 General requirements. (1) Every manned fire station shall be equipped with an approved emergency lighting system that will light dormatories, hallways and apparatus bay areas in case of electrical power failure. This provision shall be complied with within five years of effective date of this chapter.

(2) 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, etc.

(3) Stations and administrative offices shall comply with the requirements of WAC 296-62-09003, Lighting and Illumination of the Washington State General Occupational Health Standards.

(4) Where sliding poles are used the pole hole shall be guarded in such a manner as to prevent an employee or employer from walking directly into the pole hole.



(5) To absorb the shock of sliding employees, the bottom of all slide poles shall have a 3-foot diameter cushioned rubber mat, or its equivalent. The aforementioned shall be complied with within one year of the effective date of this chapter.

(6) Nothing shall be stored or placed at the bottom of a pole hole for a radius of 3-feet from the pole. Doors shall not protrude within three feet of the pole.

(7) The requirements of WAC 296-24-145 shall be followed when employees are engaged in window washing operations.

(8) When charging batteries the vent caps shall be kept in place to avoid electrolyte spray. Care shall be taken to assure that vent caps are functioning.

(9) Smoking shall be prohibited in the battery charging area. [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 Sanitation. (1) Toilet Facilities.

(a) General. (i) Except as otherwise indicated in this section, toilet rooms separate for each sex shall be provided in all places of employment in accordance with table B-1 of this section. The number of facilities to be provided for each sex shall be based on the number of

employees of that sex for whom the facilities are furnished. Where toilet rooms will be occupied by no more than 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. Where such single–occupancy rooms have more than one toilet facility, only one such facility in each toilet room shall be counted for the purpose of table B–1.

TABLE B–1

Number of employees on duty:	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

(A) Where toilet facilities will not be used by women, urinals may be provided instead of water closets and in such cases shall not be reduced to less than 2/3 of the minimum specified.

(ii) The requirements of item (i) of this subdivision do not apply to mobile crews or to normally unattended work locations so long as employees working at these locations have transportation immediately available to nearby toilet facilities which meet the other requirements of this section.

(iii) The sewage disposal method shall not endanger the health of employees.

(iv) When persons other than employees are permitted the use of toilet facilities on the premise, the number of such facilities shall be appropriately increased in accordance with table B–1 of this section in determining the minimum number of toilet facilities required.

(v) Toilet paper with holder shall be provided for every water closet.

(vi) Covered receptacles shall be kept in all toilet rooms used by women.

(vii) For each three required toilet facilities at least one lavatory shall be located either in the toilet room or adjacent thereto. Where only one or two toilet facilities are provided at least one lavatory so located shall be provided.

(b) Construction of toilet rooms. (i) Each water closet shall occupy a separate compartment with a door and walls or partitions between fixtures sufficiently high to assure privacy.

(ii) In all toilet rooms installed on or after July 1, 1978, the floor and sidewalls, including the angle formed by the floor and sidewalls, and excluding doorways and entrances, shall be watertight. The sidewalls shall be watertight to a height of at least 5 inches.

(iii) The floors, walls, ceilings, partitions, and doors of all toilet rooms shall be of a finish that can be easily cleaned. In installations made on or after July 1, 1978, cove bases shall be provided to facilitate cleaning.

(c) Construction and installation of toilet facilities.

(i) Every water carriage toilet facility shall be set entirely free and open from all enclosing structures and shall be so installed that the space around the facility can be easily cleaned. This provision does not prohibit the use of wall–hung–type water closets or urinals.

(ii) Every water closet shall have a hinged seat made of substantial material having a nonabsorbent finish. Seats installed or replaced after June 1, 1978, shall be of the open front type.

(2) Drinking Water. (a) A common drinking cup and other common utensils are prohibited.

(b) Drinking fountain surfaces which become wet during fountain operation shall be constructed of materials impervious to water and not subject to oxidation. The nozzle of the fountain shall be at an angle and so located to prevent the return of water in the jet or bowl to the nozzle orifice. A guard shall be provided over the nozzle to prevent contact with the nozzle by the mouth or nose of persons using the drinking fountain. The drain from the bowl of the fountain shall not have a direct physical connection with a waste pipe, unless it is trapped.

(3) Washing Facilities. (a) General. Facilities for maintaining personal cleanliness shall be provided. These shall be convenient for the employees for whom they are provided and shall be maintained in a sanitary condition.

(b) Lavatories. (i) Lavatories shall be made available in accordance with the following table.

	Number of employees on duty	Minimum number of lavatory fixtures
Nonfire–fighting personnel.	1 to 15	1
	16 to 35	2
	36 to 60	3
	61 to 90	4
Firefighters	1 to 100	1 fixture for each 10 employees

NOTE: In a multiple–use lavatory, 24 lineal inches of wash sink or 20 inches of a circular basin, when provided with water outlets for each space, shall be considered equivalent to one lavatory.

(ii) Each lavatory shall be provided with hot and cold running water, or tepid running water.

(iii) Hand soap or similar cleansing agents shall be provided.

(iv) Individual hand towels or sections thereof, of cloth or paper, warm air blowers or clean individual sections of continuous cloth toweling, convenient to the lavatories, shall be provided.

(v) Receptacles shall be provided for disposal of used towels.

(c) Showers. (i) Except as otherwise indicated in this section, shower rooms separate for each sex shall be provided in manned stations. The number of facilities to be provided for each sex shall be based on the number of

employees of that sex for whom the facilities are furnished. Where shower rooms will be occupied by no more than one person at a time and can be locked from the inside, separate shower rooms for each sex need not be provided.

(ii) One shower shall be provided for each 10 employees of each sex, or numerical fraction thereof, who are required to shower during the same shift.

(iii) Body soap or other appropriate cleansing agents convenient to the showers shall be provided as specified in this section.

(iv) Showers shall be provided with hot and cold water feeding a common discharge line.

(v) Shower floors shall be equipped with rubber mats or nonskid material.

(vi) Light switches and electrical appliances in the shower area shall be of the approved type for wet locations and shall not be located where they can be contacted by employees standing directly in water. [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 Dormitories. (1) Every manned fire station dormitory shall be provided with approved detectors of products of combustion other than heat conforming to Uniform Building Code Standard 43-6, mounted on the ceiling or wall at a point centrally located in the corridor or area giving access to rooms used for sleeping purposes. Where sleeping rooms are on an upper level, the detector shall be placed at the center of the ceiling directly above the stairway and at the top of the pole openings. All detectors shall be located within 12 inches of the ceiling. Care shall be exercised to insure that the installation will not interfere with the operating characteristics of the detector. When activated, the detector shall provide an alarm.

(2) Smoking shall not be allowed in dormitories after fire fighters turn-in.

(3) Dormitories for fire stations designed after the effective date of this chapter shall be located in such a position that vehicular traffic adjacent to the station house does not present a hazard.

(4) The employer shall establish and implement a schedule for the cleaning of bedding. [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 Apparatus area. (1) Three feet of clearance shall be maintained around apparatus parked within the station where the station's width permits.

(2) Stations built after effective date of this chapter 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 all tripping hazards. The drying of hose on the apparatus floor shall not be considered a tripping hazard.

(4) No class I or II flammable liquids shall be used for cleaning purposes to remove grease or dirt from apparatus.

(5) Exhaust fumes from diesel or gasoline apparatus shall be emitted to the outside air. Ventilation provided by fully opened apparatus bay doors shall be considered adequate. [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 Refueling areas. (1) For all fire stations which are constructed after the effective date of this chapter, gasoline and diesel fuel pumps, if installed, shall be in accordance with the provisions of the Uniform Fire Code-1973.

(2) Dispensing of Class 1 liquids shall be as required in the 1973 Uniform Fire Code.

(3) Fuel tanks shall not be filled while the engine is running, except during fire ground operations. Spillage should be avoided.

(4) Spillage of oil or fuel shall be carefully washed away or completely evaporated and the fuel tank cap replaced before restarting engine.

(5) Fueling areas shall be posted - "NO SMOKING-STOP YOUR MOTOR." [Order 77-20, § 296-305-06509, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

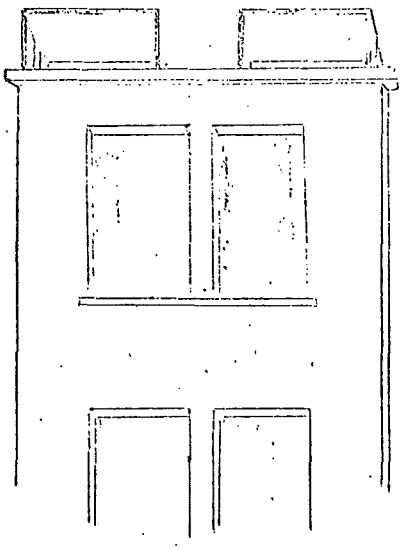
WAC 296-305-06511 Hose drying towers. (1) The floor openings on hose tower platforms shall be equipped with a 42-inch guardrail with midrail and shall be capable of withstanding a force of 250 pounds applied in any direction at any point on the top rail.

(2) The toeboard requirements for elevated work platforms in hose drying towers shall not apply unless hand tools or objects other than hoses are carried onto the platforms.

(3) The requirements for offset ladder platforms and ladder cage guards, when ladders extend beyond 30 feet, shall apply to hose drying towers.

(4) Ropes used to hoist hose in the hose towers shall have a breaking strength of 3,000 pounds for a safe load strength of 600 pounds (5 to 1 safety factor). [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 Drill towers. (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.



[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 Fire station equipment and tools. (1) Equipment and tools in maintenance and hobby shops shall be guarded as required by the guarding provisions of chapter 296-24 WAC.

(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.

(3) Abrasive wheels and grinders. (a) All abrasive wheels and grinders, shall be guarded as required by WAC 296-24-18003.

(b) Abrasive wheel machinery guards shall meet the design specifications of the American National Standard Safety Code for the Use, Care and Protection of Abrasive Wheels, ANSI B7.1-1970. This requirement does not apply to natural sandstone wheels, or metal, wooden, cloth or paper discs having a layer of abrasive on the surface.

(c) Before it is mounted on the spindle, each abrasive wheel shall be given a "ring test" by the user. This test is performed by setting the unmounted wheel upright on a clean, hard floor and tapping it on the upper side with a light, nonmetallic instrument (such as screwdriver handle). A clear ringing tone indicates an undamaged wheel. A damaged, cracked wheel will emit a "dead" sound and shall be replaced.

(d) Grinding wheels shall fit freely on the spindle and remain free under all grinding conditions. The wheel hole shall be sufficiently larger than the spindle diameter to assure safety clearance under all conditions of operating heat and pressure.

(e) Before mounting, the user shall check the maximum operating speed marked on the wheel, and shall make certain that spindle speed does not exceed this maximum.

(f) All contact surfaces of wheels, blotters and flanges shall be flat and free of foreign matter.

(g) When a bushing is used in the wheel hole, it shall not exceed the width of the wheel and shall not contact the flanges.

(h) 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.

(i) Goggles or face shields shall be used when grinding.

(j) Abrasive and composition blades shall be stored and protected against exposure to fuel and oil. [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 Stair and landing protection. (1) Stairway railings and handrails. Every flight of stairs having four or more risers shall be equipped with standard stair railings or standard handrails as follows:

(a) On stairways less than 44-inches wide having both sides enclosed, at least one handrail, preferably on the right side descending.

(b) On stairways less than 44-inches wide having one side open, at least one stair railing on open side.

(c) On stairways less than 44-inches wide having both sides open, one stair railing on each side.

(d) On stairways more than 44-inches wide but less than 88-inches wide, one handrail on each enclosed side and one stair railing on each open side.

(e) On stairways 88 or more inches wide, one handrail on each enclosed side, one stair railing on each open side, and one intermediate stair railing located approximately midway of the width.

(2) A standard guard railing shall consist of top rail, intermediate rail, and posts, and shall have a vertical height of 36 to 42 inches from upper surface of top rail to floor, platform, runway, or ramp level. The top rail shall be smooth-surfaced throughout the length of the railing. The intermediate rail shall be approximately 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.

(3) 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.

(4) A stair railing shall be of construction similar to a standard railing but the vertical height shall be not more than 34 inches nor less than 30 inches from upper surface of top rail to surface of tread in line with face of riser at forward edge of tread.

(5) The provisions of this section shall be effective 18 months following the adoption of this chapter. [Order 77-20, § 296-305-06517, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-070 Automotive fire apparatus. All of WAC 296-305-070 pertains to fire apparatus as defined in WAC 296-305-007. [Order 77-20, § 296-305-070, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-07001 Design and construction. (1) All fire apparatus with the exception of specialized equipment, shall conform to the minimum safety standards contained in N.F.P.A. Booklet No. 1901.

(2) Fire apparatus, purchased after effective date of code, weighing 10,000 pounds or more shall conform with the following 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 purchasing used fire apparatus or used military equipment shall not be required to bring them under a more stringent code than the one in force at the time the apparatus was manufactured. The exception to this rule would be seat belts and communication systems between the tailboard and driver compartment as stipulated in WAC 296-305-07003(2), 296-305-07007(1), 296-305-105(5)(a) and (b), and 296-305-110(4).

(4) Where practicable for the intended application and use, new apparatus purchased after the effective date of this chapter shall have covered crew cabs.

(5) Fire apparatus tailboards and steps leading to the cab shall have a nonskid rough surface.

(6) Shields shall be provided for individuals who ride the side of city service apparatus to protect them from flying debris and weather. All employers shall be in compliance with this section within two years after effective date of this chapter.

(7) Exhaust systems shall be installed and maintained in proper condition, and shall be so designed as to eliminate the exposure of the fire fighter to the exhaust gases and fumes.

(8) Spinner knobs shall not be attached to steering handwheels of fire apparatus.

(9) 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.

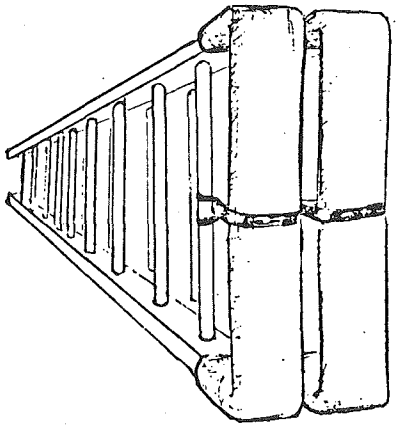
(10) The height of the apparatus from the ground to the top of the beacon or highest point of apparatus shall be clearly labeled in a place where it can be easily and clearly read by the driver while operating the apparatus. [Order 77-20, § 296-305-07001, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-07003 Automotive fire apparatus equipment. (1) Vehicles used to transport fire fighter and employer representatives shall have compartments for carrying sharp tools, saws, chisels, axes, etc., or if carried on the outside of the apparatus, sharp points and edges shall be covered to prevent injury to fire fighters and employer representatives.

(2) All apparatus shall have a least pelvic seat belts for all fire fighters assigned a seated position. Provision of this section shall be complied with within one year after the effective date of this chapter.

(3) Each fire apparatus shall carry a chemical safety slide rule, or its equivalent, available from the National Safety Council.

(4) Ladders stowed on the sides of apparatus, which protrude into a passage area of a fire station, shall have guards over the butt ends. This guard can be in the form of a short piece of 2-1/2 inch hose.



[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 Apparatus operational rules. (1) Each employer of fully manned stations shall establish a written policy and procedure whereby the apparatus has a scheduled daily maintenance check. Each employer of an unmanned or volunteer station 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 his supervisor.

(3) Fire fighting apparatus shall be brought to a full stop when employees are required to step from the apparatus.

(4) Fire fighters shall ride in crew cabs when available.

(5) Fire fighters shall not be in the apparatus hose bed while hose is being run out from the bed.

(6) Headlights should be on at all times when the apparatus is traveling streets, or responding.

(7) Whenever an apparatus is parked at a fire scene, wheel blocks shall be utilized.

(8) Apparatus responding to alarms shall meet specifications in RCW 46.61.035, relating to operations of authorized emergency vehicles.

(9) All operators of emergency vehicles shall be trained in the operation of their assigned apparatus before they are designated as drivers of such apparatus. The training program shall be established by each fire department.

(10) Stunt driving and horseplay shall not be allowed. [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 Apparatus operation communications. (1) When fire fighters are required to ride on the tailboard, or in tiller's seat, an electrical signal or voice communication system shall be installed within one year of the effective date of this chapter between tailboard and driver compartment. The following set of signals shall be used for communication between the driver and a tillerman, or between the driver and fire fighters riding the tailboard:

(a) One long buzz means stop;

(b) Two buzzes means forward;

(c) Three buzzes means reverse.

Before any of the above functions are undertaken, with the exception of stopping, the same appropriate signal must be received from the tailboard. Example: If driver is responding to an alarm before starting out, two beeps on the horn will be sounded. Driver will not advance, however, until the same signal is sounded from the tailboard or tillerman.

(2) When using hand signals, these signals are as follows:

STOP

Hold hands to the side, shoulder high, exposing palms to 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.



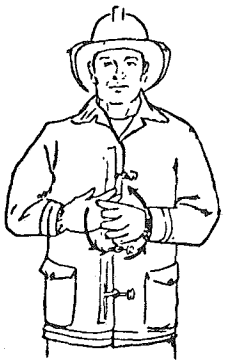
RIGHT OR LEFT

Point in the desired direction with one hand and motion in a circular "Come On" gesture with the other at chest level. At night, direct a flashlight beam at the hand pointing in the desired direction.



AHEAD OR BACK UP

Hold hands 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.



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 his apparatus toward same. Close hands as the distance narrows to a point where the signalman indicates immediate STOP. Always allow enough for driver's reaction time. At night, indicate in the same manner with a flashlight in the upper hand and beam directed at the palm of the other. On STOP, cover the flashlight beam with the hands.



[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 Maintenance and repair. (1) If at any time, a fire apparatus is found to be in an unsafe condition, it shall be reported to the supervising officer on duty and, if in his opinion, 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.

(2) All repairs made to fire department apparatus shall only be made by personnel authorized by the employer.

(3) Tires on fire service apparatus shall be changed when the tread depth reaches 4/32 of an inch, measured in any two major tread grooves at three locations equally spaced around the circumference of the tire. [Order 77-20, § 296-305-07009, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-075 Fire service equipment. (1) Before using portable equipment, the user shall inspect it to determine to his satisfaction that it is operable.

(2) When equipment develops a defect which would result in a hazard to the fire fighter, it shall immediately cease to be used.

(3) Nylon utility straps or straps of equivalent strength should be used instead of hose belts.

(4) The utility strap shall be of 1 inch nylon, or equivalent belting, with a 4-inch overlap and sewn with polyester thread and shall measure at least 51 inches outside circumference.

(5) The load capacity of each portable jack shall be stenciled on each portable jack and shall not be exceeded.

(6) The instruction plate on portable jacks shall be maintained in a legible condition.

(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 Compressed Gas Association Pamphlet G-1-1966.

(11) Fiber rope that has been subjected to injurious chemicals or excessive heat shall not be used for load carrying purposes.

(12) In using formed-charge, explosive devices for forceable entry or ventilation, prescribed safety measures as stipulated by the manufacturer shall be followed.

(13) Each employer using formed-charge, explosive devices shall establish and use a procedure by which employees and the general public are notified and protected when explosive devices are to be fired.

(14) Formed-charge, explosive devices shall not be used in an explosive or flammable atmosphere.

(15) A storage container shall be furnished for the formed-charge device and the container labeled "EXPLOSIVE."

(a) The shipping container shall suffice as a storage container when labeled "EXPLOSIVE."

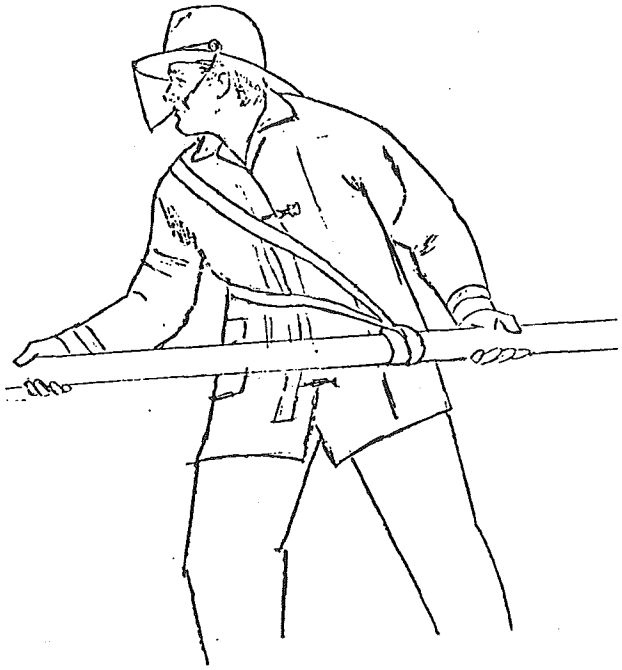
(16) A storage box or container equipped with a lid or cover shall be provided for the storage of explosive-actuated life-line guns and accessories. When not in use the box shall be kept closed. A loaded life-line gun shall not be placed in the storage box.

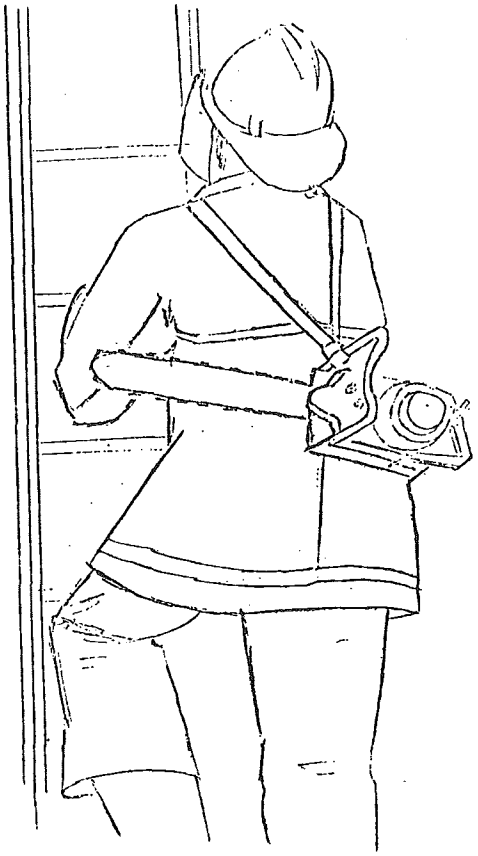
(17) Instruction books, cleaning kits and hand tools needed for maintenance or breakdown purposes shall be kept in the life-line-gun storage box.

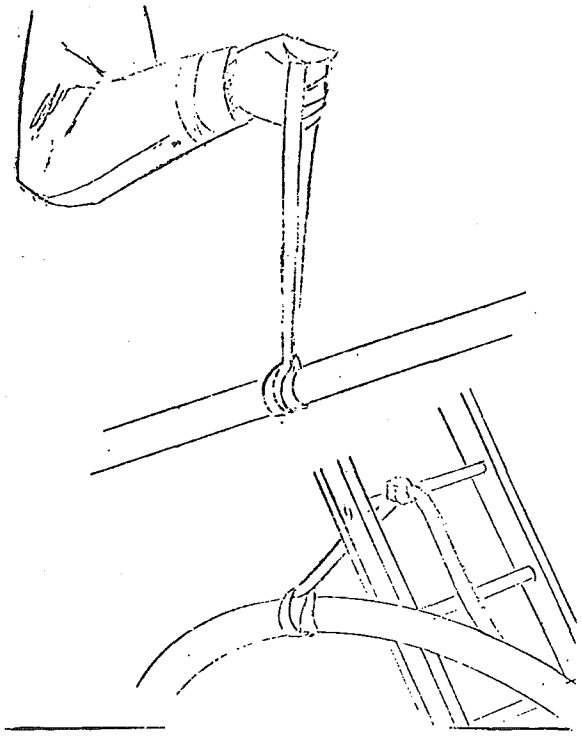
(18) The words "Explosive Tool" shall be conspicuously printed on the top of the storage box.

(19) Portable abrasive saws shall have the upper half of the abrasive wheel guarded.

(20) Abrasive blades shall be protected from contact with oil, water, and liquids when stored.







[Order 77-20, § 296-305-075, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-080 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 160 pounds from the highest point to be used above the net. The test weight object may consist of two tightly tied rolls of 2-1/2 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 8 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.

(h) Provisions of this section shall be complied with, within 5 years of effective date of this chapter.

(3) Life belts shall be capable of withstanding a dead weight test of 350 pounds. The connection between the weight and the safety harness shall be the waist band of the safety harness. Life belts and safety harnesses shall be tested semi-annually.

(4) Testing of fiber rope can be accomplished by suspending a weight of approximately 350 pounds or by three average size people (150 to 200 pounds) hanging on the free end of the line to be used.

(5) Life lines and safety lines shall be tested not less than semi-annually by the method described in subsection (4).

(6) The interior lay of all fiber ropes shall be inspected for deterioration on a regularly scheduled basis.

(a) Ropes shall be inspected for frayed, worn, cut or burned fibers.

(b) The inside of fiber ropes shall be checked for wear or deterioration by twisting against the lay of the strands causing them to spread open.

(c) Graying or powdering of the rope's core indicates rotting. When this condition is observed, rope shall be immediately removed from service.

(7) The method of testing a life line gun shall be in accordance with the manufacturer's recommended procedure. [Order 77-20, § 296-305-080, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-085 Fire combat training. (1) Each employer shall establish and follow a policy and procedure for drills and training so that fire fighters can remain proficient in the use of the fire department's equipment.

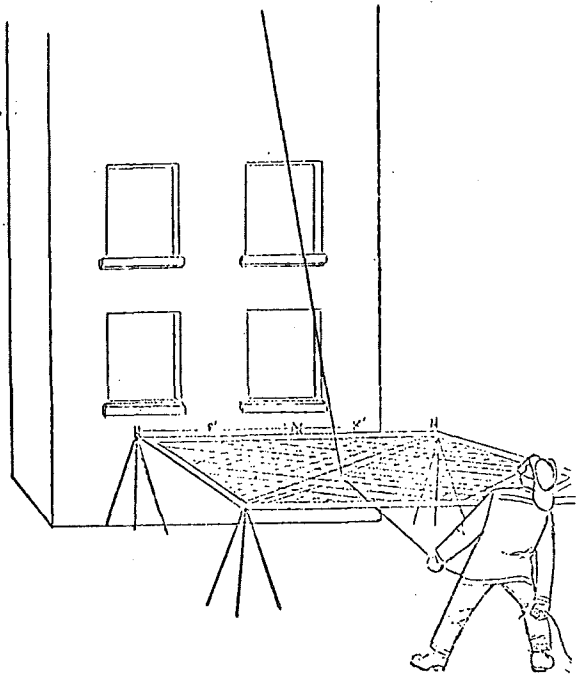
(2) Live fire training activities shall be conducted under the direction of the Fire Department Training Officer or by State Fire Service certified instructors who are qualified experts for fighting the specific type of fire.

(3) Gloves, helmets, boots or safety toe shoes shall be worn while training with ladders, appliances or hose.

(4) When fire fighters are engaged in training above the ten foot level at a drill tower where use of life lines, pompier ladders or similar activities are to be undertaken, a safety net shall be erected.

(5) When fire fighters are sliding the life line, the life line shall pass through the center of the net and shall be attended by a fire fighter.

(6) During wet training exercises, only fire hose meeting the 250 pound annual test shall be used.



[Order 77-20, § 296-305-085, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-090 Fire combat. (1) Special procedures to be used in the case of fires involving known hazardous materials shall be prepared in advance and made available to all fire fighters. This provision shall be complied with within 18 months of effective date of this chapter.

(2) Each fire department shall develop a set of tactical operating procedures to be used as guidelines for fire fighting operations including operating procedures for the use of safety lines.

(3) Every fire department shall possess a means for identifying the specific hazards associated with fires involving hazardous materials.

(4) In cases where radioactive material is involved either through accidents, contamination or other related problems, the nearest Atomic Energy Commission Field Inspection Unit or the Hanford Atomic Works shall be notified for information or help in disposing of the problem.

(5) When opening or closing hydrants, fire fighters shall stand at the rear of the hydrant whenever possible.

(6) The absence of a fire fighter on the fire ground shall be immediately reported to an officer in charge on the fire ground who will then cause additional search or rescue operations.

(7) A life line gun shall be used according to the instructions along with the correct shield, guard, or attachment as recommended by the manufacturer.

(a) Life line guns shall not be loaded until just prior to the intended firing time.

(b) Neither loaded nor empty life line guns are to be pointed at any individual.

(c) A loaded life line gun shall not be left unattended.

(8) Traffic cones or other traffic control devices shall be utilized when vehicular traffic hazards exist at the fire scene.

(9) Scuba diving operations shall comply with the provisions of WISHA Commercial Diving Operations.

(10) Portable generators for temporary lighting at fire scenes shall be grounded, where practicable.

(11) Temporary cords to light fixtures shall be strung overhead where practical or against the walls of the room so as not to cause a tripping accident. [Order 77-20, § 296-305-090, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-095 Fire overhaul. (1) Prior to overhaul, buildings shall be surveyed for possible safety hazards. Fire fighters shall be informed of hazards observed during survey.

(2) Once a fire involving a building which has been previously marked as unsafe by city, county or state inspectors has been extinguished, the overhaul operations shall be held to a minimum, as determined by the commanding officer. [Order 77-20, § 296-305-095, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-100 Ladders. This section establishes the minimum requirements for the construction, care and use of the common types of ladders used in fire combat. Attic ladders, whether constructed of wood, metal or fiberglass shall be excluded from this section.

(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. 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. Such hooks shall be properly finished to eliminate sharp edges and points.

(2) Portable roof ladders shall be provided with folding type hooks of sufficient strength to support a direct load of 500 pounds.

(3) Staypoles or tormenters shall be furnished on all extension ladders extending over 36 feet. Staypole or tormenters spikes shall not project beyond the end of the ladder when nested.

(4) 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.

(5) All ladders regardless of type must be inspected thoroughly after each use. Records shall be kept of the inspections and repairs.

(6) The following wooden ladder components shall be visually inspected:

(a) Rungs for looseness, wear, slivers, checks or cracks, dry rot, paint and varnish.

(b) Beams for slivers, checks or cracks, dry rot, condition of varnish or paint, warping and tie rods and beam bolts.

(c) Heal plates for defects in metal parts, dullness and cracked parts.

(d) Halyards for dry rot, weak spots and frayed or worn spots.

(e) Pulleys and locks for breakage, wear, lubrication and check springs.

(f) Bolts (tie and beam) for tightness and burrs or sharp edges.

(7) 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) Halyards for the same defects listed for wood ladder halyards and cable halyards, for fraying or breaking.

(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) Portable ladder testing and inspecting shall follow the recommendations of the National Fire Code, 1976, Vol. 11, chapter 8, pages 1931-18 through 1931-29. [Order 77-20, § 296-305-100, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-105 Aerial ladders. (1) When operating aerial ladders, the manufacturer's suggested procedure shall be followed and the number of fire fighters permitted on aerial ladders shall be in accordance with the manufacturer's instructions.

(2) The upper fly section of the ladders shall be designed to have nonskid protection on the rungs.

(3) Aerial ladders shall be used according to the requirements of the following:

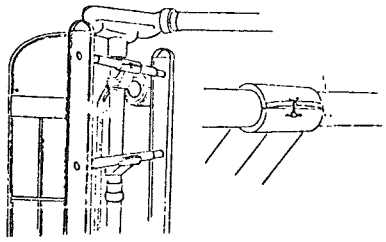
(a) Aerial ladders shall not knowingly be positioned under dangerous cornices or other loose overhanging objects that may endanger fire fighters and fire fighters working on or climbing the ladder, except where rescue operations are essential.

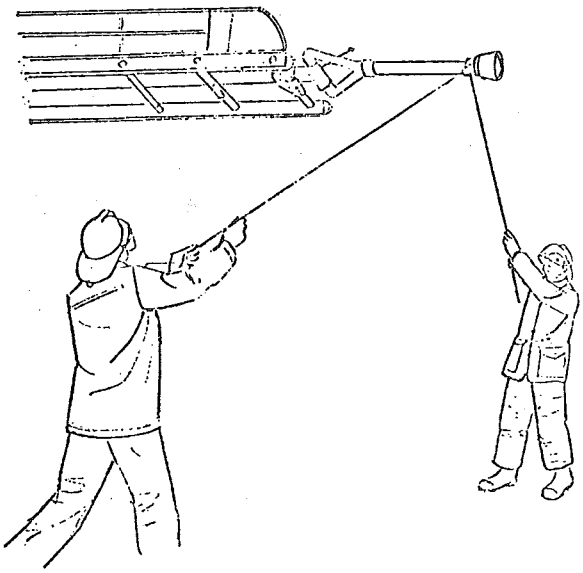
(b) The tip of the aerial ladder shall not be forcefully extended against a solid structure.

(c) Aerial ladders shall not be extended or retracted while fire fighters are climbing the ladder.

(d) 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.

(e) Ladder pipes, when in use, shall be secured to the aerial in such a manner so that the ladder pipe cannot be accidentally dislodged while in operation.





(4) The following shall regulate the design and use of the operating turntable:

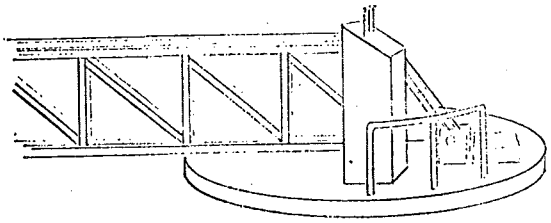
(a) Turntable controls and valves for rotating, extending, or elevating the aerial ladder shall be clearly and distinctly marked as to function.

(b) Aerial controls shall be spring loaded and have a safety catch so that the controls will return to the neutral position if the operator were incapacitated.

(c) The operator of the aerial shall be provided with a nonskid surface on the turntable surface.

(d) The aerial operator shall remain at the turntable whenever fire fighters are working on the aerial except when used as a ground ladder.

(e) A railing of approximately 44–inches in height and not less than 36–inches in length shall be installed on the turntable in back of the operator's position; this shall become effective within one year of adoption of this code.



(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; this shall become effective within one year of adoption of this code.

(5) The following shall regulate the communication systems on the aerial ladders and on the automotive fire apparatus:

(a) A two–way voice communication system shall be provided between the top fly of the ladder and the lower control station; this shall become effective within one year of adoption of this code.

(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 WAC 296–305–07007(1) is received from the tillerman and shall become effective within one year of adoption of this code.

(6) Cables, pulleys, rails and rungs of aerial ladders shall be inspected for wear and tightness on a monthly basis.

(a) Pulleys on the aerial with cracks or pieces broken out of rims shall be replaced.

(b) Cables showing evidence of damage or wear shall be replaced.

(c) Rungs or rails that have been subjected to unusual impact shall be tested before usage.

(7) The automotive fire apparatus used in conjunction with aerial ladders shall be designed and used according to the following:

(a) The apparatus engine shall be able to be started from the main control panel in the event the engine dies.

(b) Ground jacks or outriggers shall be used when the aerial ladder is in operation.

(c) Ground plates shall be used under the outriggers or jacks anytime apparatus is not on a concrete paved street or alley.

(d) Hand, airbrakes and spring brakes for fifth wheel shall be set whenever aerial ladder is in operation.

(e) In addition to ground jack supports and outriggers, wheel blocks shall be used whenever the aerial is in operation.

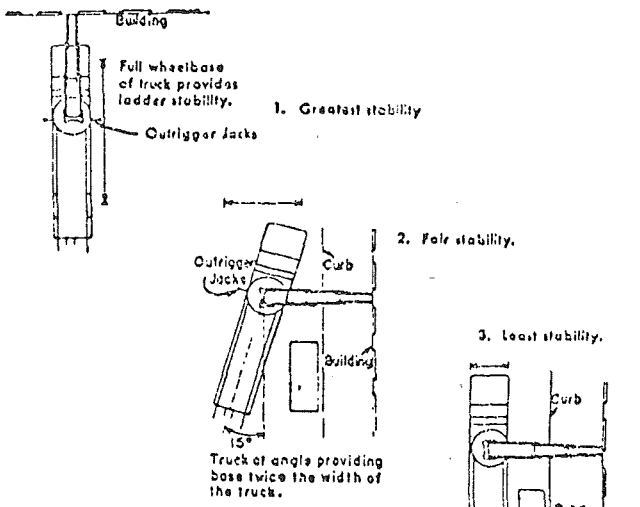
(f) The frame of the ladder truck shall be nondestructively tested whenever the apparatus has been in an accident which could indicate structural damage in the turntable area and boom.

(g) Sand shall be put under jacks, outriggers and wheels when operating on ice or snow.

(8) Testing metal aerial ladders shall follow the recommendations of the National Fire Code 1976, Vol. 16, chapter 2, pages 1904–6 through 1904–16.

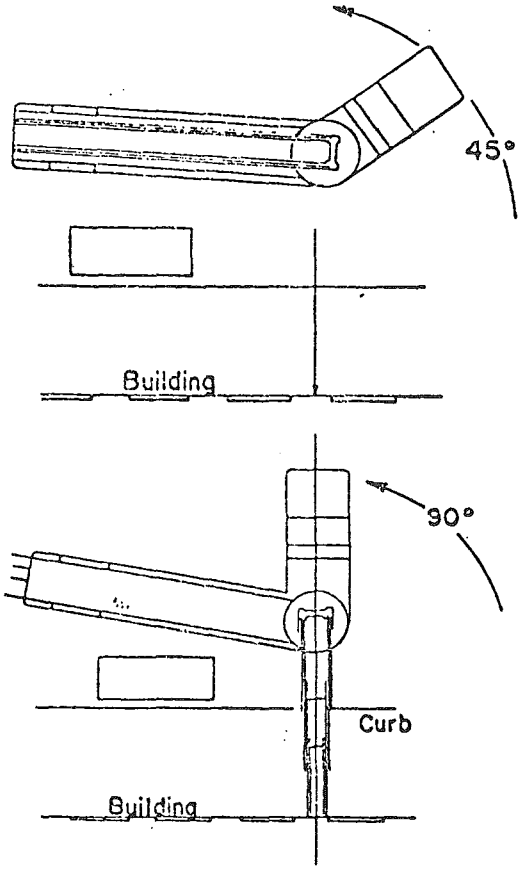
(9) Fire apparatus metal aerial ladders shall be positioned for the greatest stability feasible at the fire scene.

(10) The minimum size for wheel chocks shall be approximately 7–inches high, 8–inches wide and 15–inches long. It is suggested they be made of a metal alloy.



Aerial ladder operators and officers should be familiar with these relative degrees of stability obtained by spotting the truck.

Ladder raised at right angle to truck without outrigger jacks provides minimum stability.

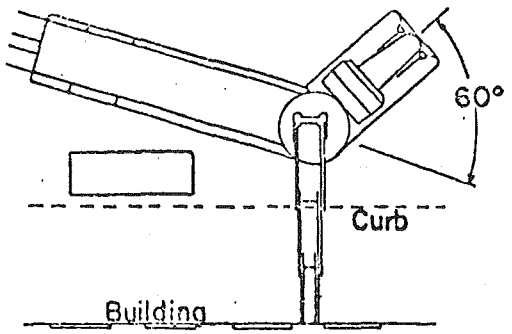


Setting tractor-trailer aerial for maximum stability:

1. Approach until turntable is opposite desired objective. Then cut tractor slightly toward center of street.

2. Cut tractor wheels sharply and back up. This will push turntable slightly toward building and align tractor with point to which the ladder is to be raised.

A similar evolution can be used where the ladder is to be raised in line with the trailer where it is necessary to head in toward a building. On some trucks a warning signal is provided to guard against jackknifing in excess of 90° which is considered poor practice and may result in danger to the apparatus.



Where width of street does not permit placing the tractor at right angles to the trailer or in line with the ladder, a 60° jackknifing should provide excellent stability without unduly blocking the street. A ladder raised away from the V formed by the truck has greater stability than a ladder raised into the V.

[Order 77-20, § 296-305-105, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-110 Elevated platforms. (1) Elevated platform systems shall meet the design requirements of this section.

(a) The platform shall have a minimum floor area of 14 square feet and shall be provided with a guardrailing between 42 and 45-inches high on all sides. The railing shall be constructed so that there is no opening below it greater than 24-inches. There shall be two gates below the top railing, each of which shall be provided with suitable safety latches. A kick plate not less than 4-inches high shall be provided around the floor of the platform. Drain openings shall be provided to prevent water accumulation on the platform. A heat-protective shield shall be provided on the platform for the protection of the operator.

(b) 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) The basic structural elements of the hydraulic or articulating boom shall have a safety factor of three.

(d) 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) The requirements related to the controlling of elevated platforms are addressed in this subsection.

(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. During deactivation of the platform controls, the lower controls shall remain operable.

(b) 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;

(v) Control instructions;

(vi) This plate shall be clearly visible to the operator at the lower control position.

(c) There shall be an operator at the lower controls at all times while the fire fighter is in the bucket.

(d) 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 platform.

(3) The requirements for testing elevated platforms and related equipment are outlined in this subsection.

(a) Annually the apparatus and platform shall be tested by the steps outlined in the following items:

(i) The apparatus shall be placed on solid level ground, brakes set, wheels chocked, and outriggers set to stabilize the apparatus.

(ii) The platform shall be placed in the manufacturers suggested strongest point three feet above the ground (measure from ground to center of platform's bottom).

(iii) Once in the aforementioned position, sand bags or a suitable substitute will be placed on the platform until the load totals 1–1/2 times its rated capacity, and maintained there for five minutes.

(iv) Upon completion of the five minutes, a measurement will again be taken from the ground to center of platform bottom. If the measurement measures a difference of more than two inches, the apparatus shall be taken out of service and repaired and retested until able to do so.

(v) Using the same static load of 1–1/2 the rated capacity, the apparatus will be operated through its entire range of motion. Failure to pass the test requires that the apparatus be placed out of service until it can be repaired and can properly complete the test.

(vi) The apparatus will be placed on a slope of 5 degrees and 1–1/2 times its rated capacity in weight will be placed in the basket. The 5 degree slope will be downward in the direction most likely to cause the apparatus to overturn and the basket will be operated through its entire range of motion.

(b) The boom section as well as the support section of the apparatus which supports the turntable shall be nondestructively tested every five years. Defects detected by testing shall be corrected.

(c) Elevated platform testing shall follow the recommendations of the National Fire Code 1976, Vol. 16, chapter 3, pages 1904–17 through 1904–29.

(d) Fire apparatus elevated platforms shall be positioned for the greatest stability feasible at the fire scene.

(4) Communications. (a) A two–way voice communication system shall be provided between the platform and the lower control station.

(5) The automotive apparatus used in conjunction with elevated platforms shall be used in accordance with the following subdivisions:

(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.

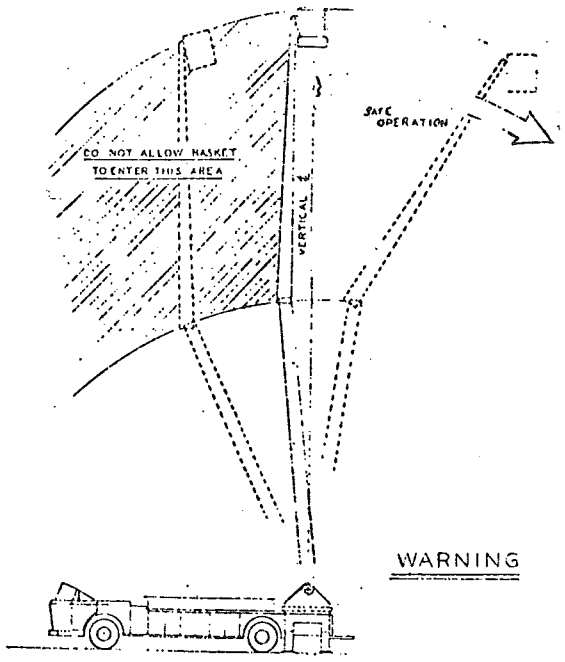
(c) Wheel blocks shall also be used when the platform is in operation unless the type of apparatus is one whose wheels lift off the ground when the jacks or outriggers are engaged.

(d) Ground plates shall be used under the outriggers or jacks any time apparatus is not on a concrete paved street or alley.

(e) Sand shall be put under jacks, outriggers and wheels when operating on ice or snow.

(6) Appliances mounted on elevated platforms.

(a) Platform mounted monitors shall be operated in accordance with the manufacturer's instructions.



RESTRICTED OPERATION ZONE

[Order 77-20, § 296-305-110, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-115 Electrical. (1) Temporary lights shall be equipped with 20 ampere capacity electric cords with connections and insulation maintained in safe condition.

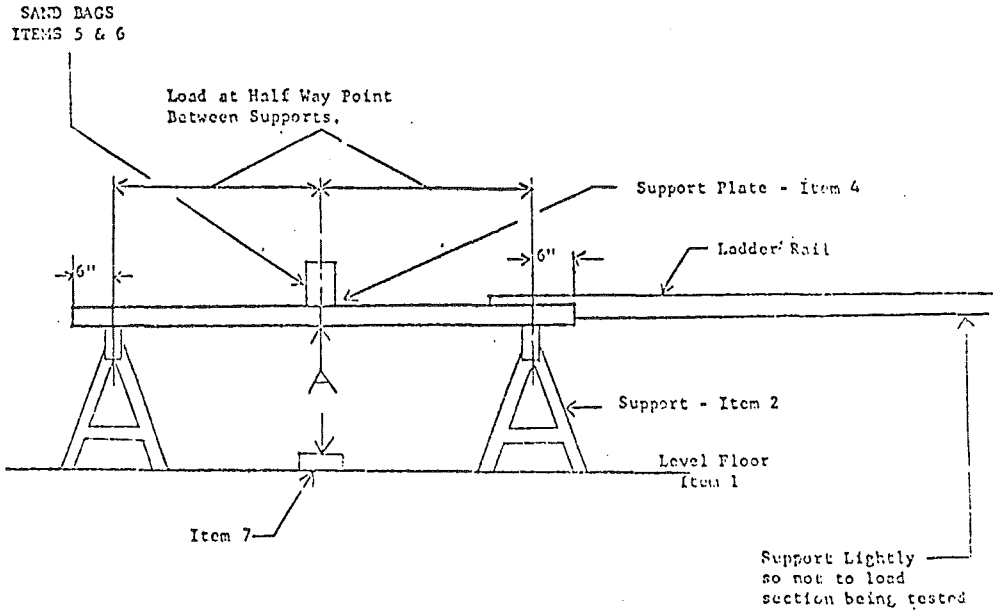
(2) Temporary lights shall be equipped with guards to prevent accidental contact with the bulb, except that guards are not required when the construction of the reflector is such that the bulb is deeply recessed.

(3) Portable type hand lamps shall be of the molded composition or other type approved for the purpose.

(4) Hand lamps shall be equipped with a handle and a substantial guard over the bulb and attached to the lampholder or the handle. [Order 77-20, § 296-305-115, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-9901 Testing extension ladders--Figure 14.

TESTING EXTENSION LADDERS



[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.]

WAC 296-305-9902 Testing extension ladders--Figure 15.

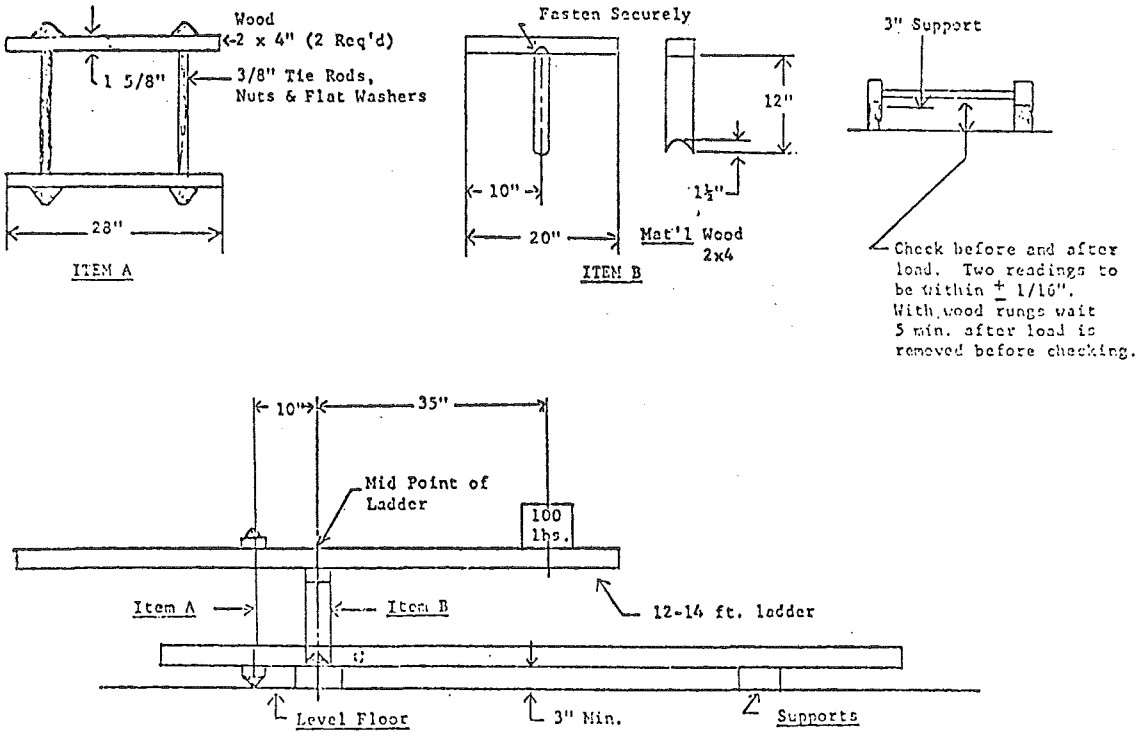
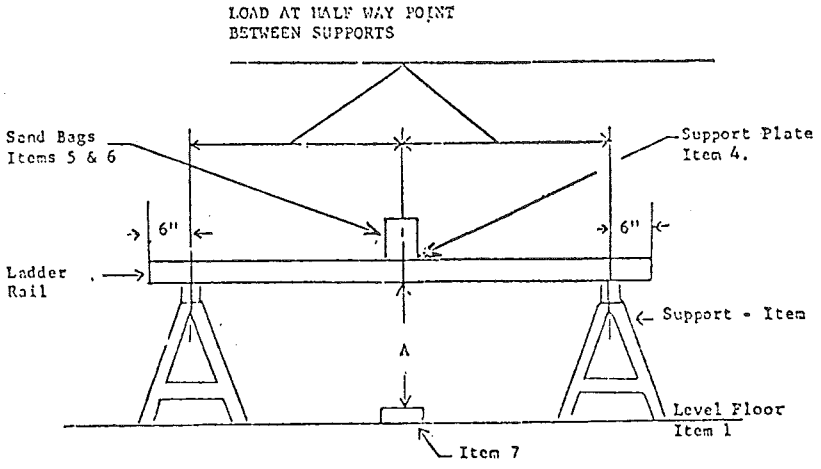


Figure 15

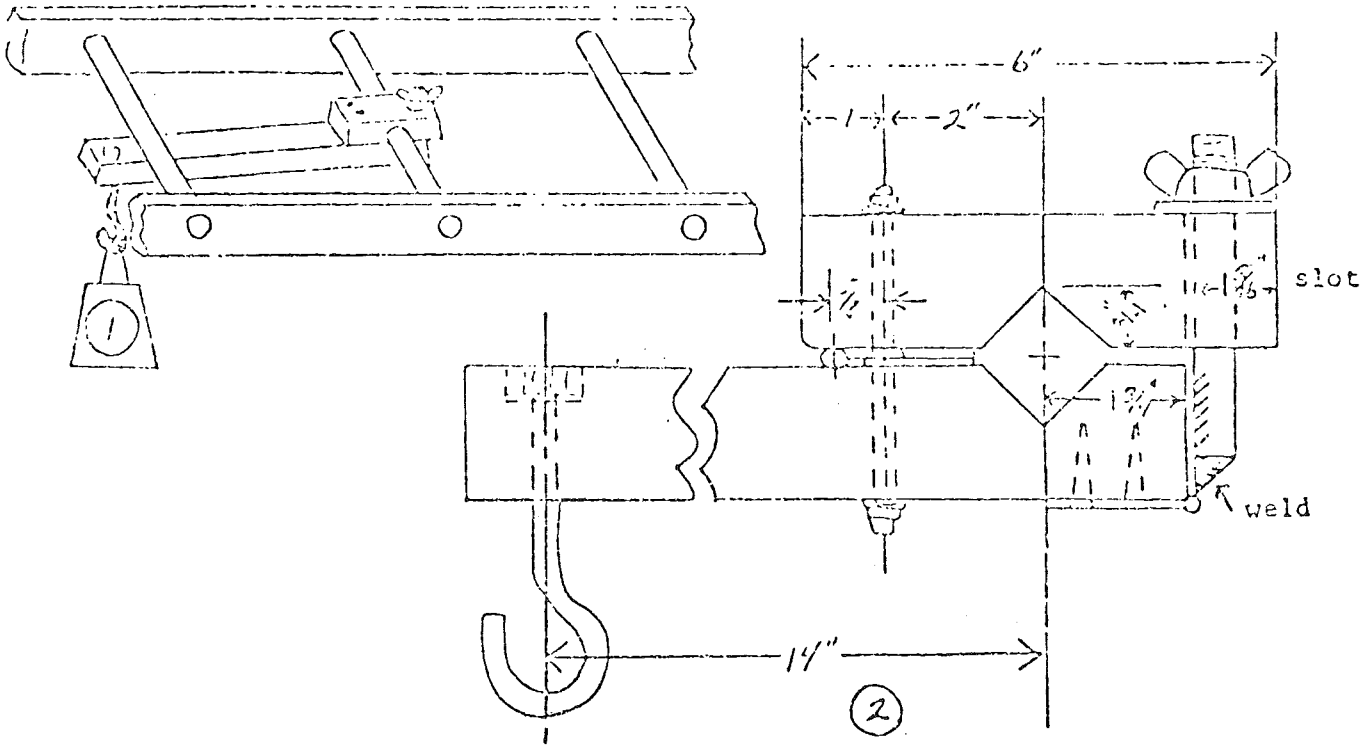
[Order 77-20, Illustration (codified as WAC 296-305-9902), filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-9903 Testing extension ladders--Illustration.



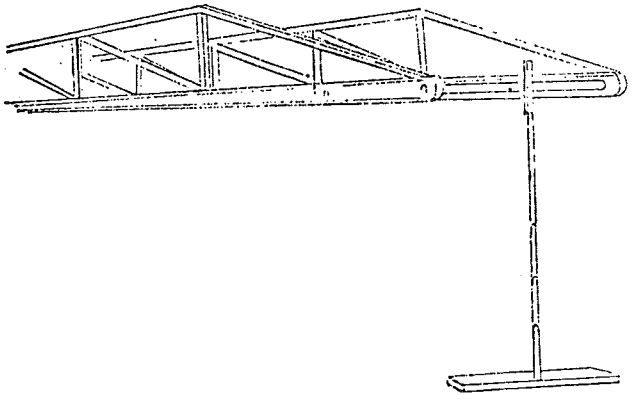
[Order 77-20, Illustration (codified as WAC 296-305-9903), filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-9904 Testing extension ladders--Illustration.



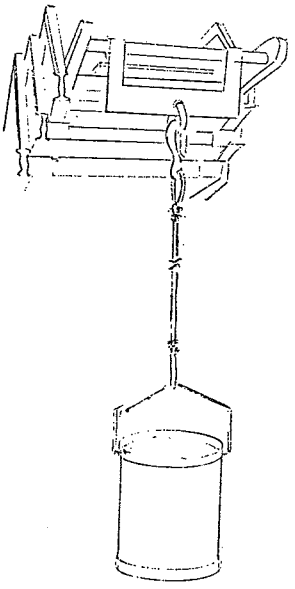
[Order 77-20, Illustration (codified as WAC 296-305-9904), filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 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.]

WAC 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.]

Chapter 296-306 WAC
SAFETY STANDARDS FOR AGRICULTURAL CODE

WAC

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296-306-165 General requirements for all agricultural equipment.
296-306-170 Auger conveying equipment.
296-306-175 Farm field equipment guarding.
296-306-180 Farmstead equipment.
296-306-200 Roll-over protective structures (ROPS) for tractors used in agricultural operations.

ADDENDUM FOR R.O.P.S. DESIGN AND TESTING CRITERIA

296-306-250 Protective frames for wheel type agricultural tractors—Test procedures and performance requirements—Purpose.
296-306-25003 Types of tests.
296-306-25005 Description.
296-306-25007 Test procedures.
296-306-25009 Performance requirements.
296-306-25013 Protective enclosures for wheel type agricultural tractors—Test procedures and performance requirements—Purpose.
296-306-25017 Types of tests.
296-306-25019 Description.
296-306-25021 Test procedures.
296-306-25023 Performance requirements.
296-306-25095 Exhibit B—Figures C-1 thru C-16.
296-306-260 Rollover protective structures (ROPS) for material handling equipment.
296-306-26001 Minimum performance criteria for rollover protective structures for designated scrapers, loaders, dozers, graders, and crawler tractors.
296-306-265 Protective frame (ROPS) test procedures and performance requirements for wheel-type agricultural and industrial tractors used in agriculture.
296-306-270 Overhead protection for operators of agricultural and industrial tractors.
296-306-27095 Exhibit B—Figures V-1 through V-28.
296-306-275 Seatbelts.

WAC 296-306-005 Foreword. This Agricultural Standard was promulgated in accordance with the applicable requirements as outlined in the Washington State Administrative Procedure Act (chapter 34.04 RCW) and other applicable statutes. Notices were distributed as required and a public hearing was conducted on January 16, 1975, at Yakima, Washington. [Order 75-2, § 296-306-005, filed 1/24/75.]

WAC 296-306-010 Purpose and scope. (1) The standards in this chapter apply to all agricultural operations with one or more employees, when such employees are covered by the Washington Industrial Safety and Health Act (WISHA).

(2) In the event that the provisions of this chapter conflict with the provisions contained in any other chapter of Title 296 WAC, this chapter shall prevail. Sections of other chapters 296-24 WAC apply only when specifically referenced in this chapter.

(3) When employees are assigned to perform tasks other than those directly related to agricultural operations, the proper chapter of Title 296 WAC shall apply.

(4) The air contaminant standards contained in WAC 296-62-073 through 296-62-07345 and 296-62-075 do not apply to chapter 296-306 WAC, Safety Standards for Agricultural Code.

NOTE: Such assignments may involve logging, mining, sawmills, etc., when the products of such activities are removed from the farm site for commercial distribution.

[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.]

WAC 296-306-015 Variance procedures. (1) In the event some requirements of this agricultural safety standard become impractical under certain conditions, the Director of the Department of Labor and Industries may permit a variation from the requirements if the employer provides *equal protection* by other means and complies with the other requirements of chapter 296-350 WAC, Variances.

(2) The written application must certify that the employer has properly notified his employees of his application for a variance. Proper notice to employees shall mean that a copy of the written application has been posted in a place or places reasonably accessible to all employees. In addition, a copy of the application shall be mailed to the authorized representative of such employees, if any. The notice shall advise employees and their representatives of their right to request the Director to conduct a hearing on the variance application. All the above notices to employees must be made prior to the

date the employer makes written application to the Director.

NOTE: An employer who wishes to apply for a permanent or temporary variance shall make a request in writing to the Engineering Section, Department of Labor and Industries, Division of Industrial Safety and Health, P.O. Box 207, Olympia, Washington, 98504. The Engineering Section will respond by furnishing application forms along with the instructions necessary to meet the intent of the law. A copy of chapter 296-350 WAC, Variances will be included if specifically requested.

[Order 75-2, § 296-306-015, filed 1/24/75.]

WAC 296-306-020 Serious injury reporting. (1) The employer or someone in his behalf shall notify the nearest office of the Department of Labor and Industries within 24 hours of the date of an accident which causes a fatal or possibly fatal injury, an accident which involves acute exposures to pesticides or herbicides or an accident which causes injury requiring hospitalization of any employees.

(2) When any investigator from the Department's Division of Safety and Health arrives, the farm employer shall assign to assist in the investigation any persons the investigator deems necessary.

(3) When a fatality occurs, equipment involved in the accident shall not be moved until after a representative from the Division of Industrial Safety and Health has completed an investigation unless the equipment must be moved to prevent additional accidents, or to remove the victim. [Order 75-2, § 296-306-020, filed 1/24/75.]

WAC 296-306-025 Management's responsibility. (1) It shall be the responsibility of management to maintain and supervise:

(a) A safe and healthful working environment.

(b) An accident prevention program as required by these standards.

(c) A system for reporting and recording accidents that will fulfill statistical requirements of the Department of Labor and Industries. (See chapter 296-27 WAC).

(d) Safety education and training programs.

(e) Temporary Labor Camps, as prescribed in WAC 296-24-125 through 296-24-12523, and shall comply with these rules and regulations.

(2) It shall be the responsibility of management to furnish potable water to employees as follows:

(a) Portable drinking water dispensers shall be designed, constructed, and serviced so that sanitary conditions are maintained, capable of being closed, and equipped with a tap.

(b) Ice in contact with drinking water shall be made of potable water and maintained in a sanitary condition.

(c) Open containers such as barrels, pails, or tanks for drinking water where the water must be dipped or poured are prohibited, whether or not they are fitted with a cover.

(d) A common drinking cup and other common utensils are prohibited.

(e) Where single service cups (used but once) are supplied, a sanitary container for the unused cups and a receptacle for disposing of the used cups shall be provided.

(f) Outlets for nonpotable water, such as water for industrial, firefighting or irrigation purposes, shall be posted or otherwise marked in a manner that will indicate clearly the water is unsafe and not to be used for drinking; cooking; washing of the person; washing of food, cooking and eating utensils, or food preparation and processing premises; personal service rooms, or for washing clothes.

(g) Construction of nonpotable water systems or systems carrying any other nonpotable substances shall be such to prevent backflow or backsiphonage into a potable water system. Nonpotable water may be used for cleaning work premises other than food processing and preparation premises and personal service rooms: *Provided*, That the nonpotable water does not contain concentrations of chemicals, fecal coliform, or other substances which could create unsanitary conditions or be harmful to employees.

(h) Employees shall not be permitted to drink from irrigation ditches, creeks or rivers. Potable water shall meet the requirements of the United States Public Health Service Drinking Water Standards, published in 42 CFR part 72, or water which is approved for drinking purposes by the state or local authority having jurisdiction.

NOTE: Drinking water should be made available within 200 feet of any location where employees are regularly engaged in work.

[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.]

WAC 296-306-030 Employee's responsibility. (1) Employees shall cooperate with the employer and other employees in efforts to eliminate accidents.

(2) Employees shall be informed of and observe all safe practices.

(3) Employees shall notify the employer of unsafe conditions of equipment or work places.

(4) Employees shall use all required safety devices and protective equipment.

(5) Employees shall not willfully damage personal protective equipment.

(6) Each employee shall promptly report any job-related injury or illness to his or her immediate supervisor, regardless of the degree of severity.

(7) Employees shall not engage in any activity unrelated to work that may cause injury to other employees during the course of performing work assignments.

(8) Employees shall attend any required training and/or orientation programs designed to increase their competency in occupational safety and health.

(9) Employees shall not report to work under the influence of alcohol or controlled substances. Alcohol or controlled substances shall not be brought on the work site. [Order 75–2, § 296–306–030, filed 1/24/75.]

WAC 296-306-035 Accident prevention program. (1) The agricultural employer shall instruct all employees in safe working practices. Such instruction shall be tailored to the types of hazards to which the employees will be exposed.

(2) The agricultural employer or a delegated representative shall schedule and take part in monthly safety meetings with year–round employee(s), or representatives they may select.

(3) The employer shall conduct weekly inspections of job sites, materials, equipment and operating procedures. Findings from such inspections shall be discussed at safety meetings.

NOTE: Employers should consider the advantage of having an employee representative participate in such inspections.

(4) A record of safety meetings and inspections shall be kept by the employer. This record shall be made available to personnel of the Department of Labor and Industries upon request.

(5) Agricultural employers shall give appropriate safety instruction to seasonal employees and temporary crews at the beginning of employment. [Order 75–2, § 296–306–035, filed 1/24/75.]

WAC 296-306-040 Safety bulletin board. (1) A bulletin board or posting area large enough to display the required safety poster (Form WISHA–1) and other safety education material shall be provided.

(2) The bulletin board shall be positioned so as to be readily visible and located in a place where employees gather during some part of the work day (i.e., 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, the employer shall 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 shall apply to variance application, denials or grants and to any other notice affecting the employee's rights under WISHA.

(4) Posting shall be in appropriate language, Spanish, etc. [Order 75–2, § 296–306–040, filed 1/24/75.]

WAC 296-306-045 First–aid training and certification. (1) One or more persons qualified to render first–aid shall be assigned to each farm or crew during working hours. "Qualified" means that the person holds a current certificate of first–aid training from the Department of Labor and Industries, the United States Bureau of Mines, the American Red Cross or other course of training with equivalent content and hours. A "current certificate" must be no more than three years old.

(2) The above requirement will be met if the farm operator or the spouse of the farm operator holds a current first–aid certificate and is available.

(3) The above requirements shall not apply to employees whose duties require them to be working alone at isolated work stations. However, they shall be checked at intervals by some method agreed upon by the employer and the employee. [Order 75–2, § 296–306–045, filed 1/24/75.]

WAC 296-306-050 First–aid kit. (1) All employers covered by WISHA shall furnish first–aid kits as required by the Division of Safety and Health, Department of Labor and Industries.

(2) First–aid supplies shall be readily accessible and provided for persons working alone at isolated stations.

NOTE: A ten–package kit shall contain 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: Items may be added at employer's option.

(3) First–aid kit sizes and numbers shall be 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)	First–aid Station – 136 package kit plus Stretcher and 2 blankets

NOTE: Kits may be carried in any motor vehicle when such vehicle is used near the crew. Such vehicles may be considered stations when so identified and when the driver is trained in first–aid.

(4) Items used from first–aid kits shall be replaced before the next shift. Kits shall be checked at least weekly for unauthorized removal of items. [Order 75–2, § 296–306–050, filed 1/24/75.]

WAC 296-306-055 Safe place standards. (1) Each employer shall furnish to each of his employees a place

of employment free from recognized controllable hazards likely to cause serious injury or death to his employees.

(2) Every employer shall furnish and require the use of any safety devices and safeguards that are needed to control recognized hazards. All agricultural methods, operations, and processes shall be so designed as to promote the safety and health of employees.

(3) No employer shall require any employee to engage in any duty or enter any place which is not safe.

(4) No person 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.

(5) Intoxicating beverages or narcotics shall not be permitted or used in or around work sites. Workers under the influence of alcohol or narcotics shall not be permitted on the work site. This rule shall not apply to persons taking prescription drugs and/or narcotics as directed by a physician providing such use does not endanger the worker or others. [Order 75-2, § 296-306-055, filed 1/24/75.]

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 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) Every item of personal protective equipment shall be designed and constructed in such a way that it will be safe to use for the work being done, and reasonably comfortable to wear.

(4) 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.

(5) The employer shall provide a suitable respirator to any employee whose work must be done in air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays or vapors. Respirators shall meet the standards established by the U.S. Department of Agriculture or the U.S. Department of Interior, Bureau of Mines. NOTE: The Bureau of Mines is the agency responsible for testing and approving pesticide respirators.

(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.

(7) At least five gallons of water shall be supplied for emergency while using pesticides or herbicides. [Order 75-2, § 296-306-060, filed 1/24/75.]

WAC 296-306-065 Materials handling and storage. (1) Where mechanical handling equipment is used, safe clearances of three feet shall be allowed for aisles, through doorways and wherever turns or passage must be made. Aisles and passageways shall be kept clear and in good repair, with no obstructions that could create hazards.

(2) Bags, bales, boxes and other containers stored in tiers shall be made secure against sliding or collapse.

(3) Storage areas shall be kept free from any accumulation of materials that could cause tripping, fire or explosion.

(4) Workers shall be instructed in proper lifting or moving techniques and methods. Mechanical devices or assistance in lifting shall be used when moving heavy objects.

(5) When removing materials from piles on horizontal surfaces, the face of the pile shall be removed in a manner that will prevent overhangs. [Order 75-2, § 296-306-065, filed 1/24/75.]

WAC 296-306-070 Farm shops. Farm shops shall be exempt from these standards when the following conditions are met: (1) When the shop equipment is used solely by the owner or others not covered by WISHA.

(2) When employees are not permitted in the shop while shop equipment is being operated. [Order 75-2, § 296-306-070, filed 1/24/75.]

WAC 296-306-075 Bench grinders. (1) The safety guard required on bench grinders 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.

NOTE: This requirement does not apply to natural sandstone wheels, or metal, wooden, cloth or paper discs having a layer of abrasive on the surface.

(2) Work rests 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 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.

(3) Goggles or face shields shall be used when grinding. [Order 75-2, § 296-306-075, filed 1/24/75.]

WAC 296-306-080 Guarding of hand-held portable power tools. (1) "Dead Man" Controls. Each hand-held, power-driven tool shall be provided with 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) Grounding. Electrical grounding requirements for portable machinery shall conform to the requirements of this section.

(a) The frames and all exposed, noncurrent-carrying metal parts of portable electric machinery operated at more than 90 volts to ground shall be grounded. Other portable motors driving electric tools which are held in the hand while being operated shall be grounded if they operate at more than 90 volts to ground. The ground shall be provided through use of a separate ground wire and polarized plug and receptacle.

(b) Double insulated tools which are designed and used in accordance with the requirements of Article 250-45 of the National Electrical Code (1971 Edition) are exempted from the above grounding requirement in (a).

(3) Portable Belt Sanding Machines. Belt sanding machines shall be provided with guards at each nip point where the sanding belt runs onto a pulley. These guards shall effectively prevent the hands or fingers of the operator from coming in contact with the nip points.

(4) All portable, power-driven 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 covering position. Pruning and chain saws are exempt from this requirement.

(5) Cracked Saws. All cracked saws shall be removed from service. [Order 75-2, § 296-306-080, filed 1/24/75.]

WAC 296-306-085 Fire protection and ignition sources. (1) Portable fire extinguishers shall be constructed, tested, maintained and used in accordance with the recommendations specified by the National Fire Protection Association's No. 10A-1970.

NOTE: The supplier of the extinguisher or local fire official can furnish this information.

(2) Fire extinguishing equipment suitable for use for the type or types of fire which could be expected in an area shall be provided and shall be available at all times. (See attached diagram, page 8-1).

(3) Each person who is expected to use fire extinguishing equipment shall be instructed as to its proper use.

(4) Employees shall be instructed on procedures to be followed in case of fire.

(5) Areas where fire or explosion hazards exist shall be posted with NO SMOKING or other suitable signs which warn of such hazards.

(6) Vaporizing type extinguishers shall not be used. [Order 75-2, § 296-306-085, filed 1/24/75.]

WAC 296-306-090 Storage and handling of anhydrous ammonia. (1) Any agricultural employer or employee who transports or applies anhydrous ammonia shall obtain and comply with the anhydrous ammonia safety rules (WAC 296-24-51019 through 296-24-51021). These may be obtained from the Department of Labor and Industries, Division of Industrial Safety and Health.

(2) Gloves and goggles and/or a face shield shall be used by all employees while working on or with charged anhydrous ammonia equipment.

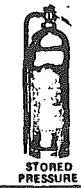
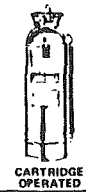
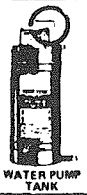
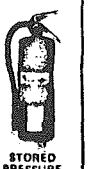
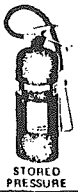
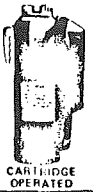
(3) Equipment shall be inspected before each day's work. Conditions that would contribute to accidental leakage shall be corrected.

(4) Hose end-valves must be in a closed position when not in use to prevent accidental discharge in case the main valve is opened.

(5) Five gallons or more of clean water must be provided on the equipment.

(6) Relief and vapor valves shall be positioned to discharge away from operator's working position.

KNOW YOUR FIRE EXTINGUISHERS

	WATER TYPE				FOAM	CARBON DIOXIDE	DRY CHEMICAL			
							SODIUM OR POTASSIUM BICARBONATE		MULTI-PURPOSE ABC	
	 STORED PRESSURE	 CARTRIDGE OPERATED	 WATER PUMP TANK	 SODA ACID	 FOAM	 CO2	 CARTRIDGE OPERATED	 STORED PRESSURE	 STORED PRESSURE	 CARTRIDGE OPERATED
CLASS A FIRES — ORDINARY COMBUSTIBLES — WOOD, PAPER, TRASH HAVING GLOWING EMBERS	YES	YES	YES	YES	YES	NO (BUT WILL CONTROL SMALL SURFACE FIRES)	NO (BUT WILL CONTROL SMALL SURFACE FIRES)	NO (BUT WILL CONTROL SMALL SURFACE FIRES)	YES	YES
CLASS B FIRES — FLAMMABLE LIQUIDS — FLAMMABLE LIQUIDS, GASOLINE, OIL, PAINTS, GREASE, ETC.	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES
CLASS C FIRES — ELECTRICAL EQUIPMENT	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES
CLASS D FIRES — COMBUSTIBLE METALS	SPECIAL EXTINGUISHING AGENTS APPROVED BY RECOGNIZED TESTING LABORATORIES									
METHOD OF OPERATION	PULL PIN-SQUEEZE HANDLE	TURN UPSIDE DOWN AND BUMP	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 ADD 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

[Order 75-2, § 296-306-090, filed 1/24/75.]

Reviser's note: The above Department of Labor and Industries chart on special extinguishing agents approved by recognized testing laboratories is set forth as filed in the office of the Code Reviser.

It is available for inspection in the Code Reviser's office as well as the Department of Labor and Industries.

WAC 296-306-095 Elevated walkways and platforms. (1) Elevated walkways, platforms and open-sided floors over 48 inches in height shall be guarded by safety railings. Such railings shall have a top rail approximately 42 inches from the floor and a midrail between the top rail and the working surface. Guard rails shall be strong enough to withstand at least 200 pounds side thrust against the top rail.

(2) Railings may be omitted from particular sections of open-sided floors, platforms or walkways where guard rails impair operations.

(3) Toeboards shall be required on platforms with railing where objects falling from the platform could create a hazard to persons below. [Order 75-2, § 296-306-095, filed 1/24/75.]

WAC 296-306-100 Handrails. (1) Each fixed stairway with four or more risers, used by employees, shall be equipped with a handrail.

(2) Handrails shall be mounted from 30 to 34 inches above the tread.

(3) Handrails shall be strong enough to withstand a load of at least 200 pounds applied in any direction. [Order 75-2, § 296-306-100, filed 1/24/75.]

WAC 296-306-105 Orchard ladders. (1) Orchard ladders shall be maintained in good condition at all times. Joints between steps and side rails shall be tight. All hardware and fittings shall be securely attached, and the movable parts shall operate freely, without binding or undue play.

(2) Ladders shall be inspected prior to being used. Those ladders which have developed defects shall be withdrawn from service for repair or discard.

(3) Rungs shall be kept reasonably free of any substance which would make them hazardous.

(4) Proper instruction in the use of orchard ladders shall be given each employee at the beginning of employment. [Order 75-2, § 296-306-105, filed 1/24/75.]

WAC 296-306-110 Job-made ladders. (1) A job-made ladder is one built by the employer or his employees.

(2) One-by-four-inch nominal lumber, or stronger, shall be used for cleats.

(3) Cleats shall be inset into the edges of side rails to a depth of one–half inch, or filler blocks shall be used on the rails between the cleats.

(4) Each cleat shall be fastened to each rail with three 8d common wire nails or other fasteners of equal strength.

(5) Cleats shall be uniformly spaced at a distance of approximately 12 inches from the top of one cleat to the top of the next.

(6) Side rails shall be continuous, unless splices used develop the full strength of a continuous rail of equal length. [Order 75–2, § 296–306–110, filed 1/24/75.]

WAC 296–306–115 Bins, bunkers, hoppers, tanks, pits and trenches. (1) No employee shall enter any bin, bunker, hopper or similar area when there is a danger that loose materials (such as chips, sand, grain, gravel, sawdust, etc.) may collapse around the worker, unless the worker wears a safety belt with a lifeline attached and is attended by a helper.

(2) When employees are required to work in a trench or a pit 4 feet or more in depth, the trench or the pit shall be shored or shall be sloped to the angle of repose as shown in the following table:

Solid rock, shale or cemented sand and gravel–Vertical – (90°)
Compacted gravels – 1/2:1 – (63°)
Average soils – 1:1 – (45°)
Compacted sharp sand – 1–1/2:1 – (34°)
Rounded, loose sand or gravel – 2:1 – (27°)
Clay, silt, loam – shoring required

NOTE: Silage pits are exempt from this section.

[Order 75–2, § 296–306–115, filed 1/24/75.]

WAC 296–306–120 Aerial manlift equipment. (1) Safety factor test data on working or structural components submitted by the manufacturer, by a competent testing laboratory, by a registered engineering firm or a registered engineer shall be acceptable evidence that the manlift meets minimum safety requirements. If, however, through use, a reasonable doubt arises as to whether or not this equipment will meet the above requirements, the Division of Industrial Safety and Health may require that appropriate tests be conducted and may order any corrections indicated.

(2) Working brake systems shall be on all aerial manlifts.

(3) Automatic restrictive orifices shall be installed in the hydraulic systems of aerial manlifts to the boom in position in case any part of the hydraulic pressure system should fail.

(4) Controls shall be guarded by partial enclosures in order to minimize the chances of accidental contact.

(5) The manufacturer's recommended maximum load limit shall be posted at a conspicuous place near the controls and shall be kept in a legible condition.

(6) The manufacturer's instructional manual, if any, shall be used to establish the proper operational sequences and maintenance procedures. If such a manual does not exist, the employer shall develop the necessary instructions. The instructions shall be available for reference by operators.

(7) A daily visual inspection and the tests in accordance with the manufacturer's recommendations shall be made by the assigned operator.

(8) Only workers qualified by reason of training or experience shall be permitted to operate aerial manlifts.

(9) Defective aerial manlift equipment shall be reported to the employer or his designated representative as soon as identified. The use of defective equipment is prohibited when the defect may cause an accident.

(10) When moving to and from the job site, the basket of the manlift shall be in the low position.

(11) Unsafe practices, including but not limited to, sitting or standing on the basket edge, standing on material placed across the basket, or working from a ladder set inside the basket, are prohibited.

(a) The basket shall not be rested on a fixed object in such a way that the weight of the boom is supported by the basket.

(b) The employee or any part of agricultural aerial man–lift equipment shall not come within a radius of ten feet from energized high voltage conductors, or into any part of the zone any distance above such a radius. [Order 75–2, § 296–306–120, filed 1/24/75.]

WAC 296–306–125 Gas welding and cutting. Transporting, moving and storing compressed gas cylinders. (1) 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.

(2) Except for short periods of time while being moved, compressed gas cylinders shall be maintained in an upright position and secured against accidental upset by being chained or strapped to stationary objects or by being placed in secured positions on cylinder trucks or racks.

(3) Oxygen cylinders in storage shall be separated from fuel–gas cylinders or combustible materials (especially oil or grease), by a minimum distance of 20 feet. [Order 75–2, § 296–306–125, filed 1/24/75.]

WAC 296–306–130 Welding. (1) Welding hose couplings shall be of the type that cannot be unlocked or disconnected by means of a straight pull without rotary motion.

(2) Welding hoses and cables shall not be placed in passageways unless provisions are made to protect them from damage from vehicles and to prevent them from becoming tripping hazards. Welding machines or gas cylinders shall be placed no nearer than four feet from either side of ladder or stair landings. In the event cables or hoses are placed on stairs, they shall be secured to the hand rails. [Order 75–2, § 296–306–130, filed 1/24/75.]

WAC 296–306–135 Arc welding and cutting. Manual electrode holders. (1) Only manual electrode holders which are specifically designed for arc welding and cutting, and capable of safely handling the maximum rated current required by the electrodes, shall be used.

(2) 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.

(3) 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. [Order 75–2, § 296–306–135, filed 1/24/75.]

WAC 296–306–140 Welding areas protected. Areas in which welding is being done shall be screened or barricaded to protect persons from flash burns, when practical and adequate ventilation provided. If the welding process cannot be isolated, all persons who may be exposed to the hazard of arc flash shall wear goggles or glasses with side shields that have tinted lenses. [Order 75–2, § 296–306–140, filed 1/24/75.]

WAC 296–306–145 Electrical. General requirements.

(1) Main Disconnects. To avoid accidental starts of machinery during maintenance or clean–up, the main disconnect(s) of machines shall first be locked out or disconnected from the power source.

NOTE: (Temporary) All 15– and 20– ampere receptacle outlets on single–phase circuits may have approved ground–fault circuit protection.

EXCEPTION: For branch–circuit extensions only in existing installations which do not have a grounding conductor in the branch–circuit, the grounding conductor of a grounding–type receptacle outlet may be grounded to a metal cold–water pipe near the equipment.

(2) Electric wire fences shall be controlled by a U.L. approved control box which regulates both voltage and amperage.

(3) Whenever work is performed near outside energized electrical conductors, employees and equipment shall be kept at least ten feet away from such conductors.

NOTE: Special precautionary instructions shall be given to employees handling portable metal irrigation pipe near energized circuits.

(4) After October 25, 1976, the following additional rules shall apply for electrical power sources:

(a) All circuit protection devices, including those which are an integral part of a motor, shall be of the manual reset type, except where:

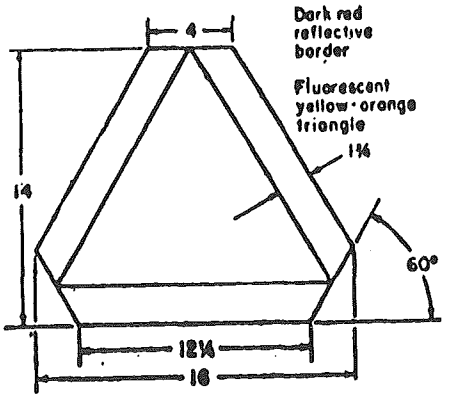
(i) The employer can establish that because of the nature of the operation, distances involved, and the amount of time normally spent by employees in the area of the affected equipment, use of the manual reset device would be infeasible;

(ii) There is an electrical disconnect switch available to the employee within 15 feet of the equipment upon which maintenance or service is being performed; and

(iii) A sign is prominently posted near each hazardous component which 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. [Order 76–28, § 296–306–145, filed 9/28/76; Order 75–2, § 296–306–145, filed 1/24/75.]

WAC 296–306–150 Slow–moving vehicles. Farm tractors, farm equipment and implements of husbandry, when used on public roads are required by state law to have lamps, reflectors and a SLOW–MOVING emblem. At any time one–half hour after sunset to one–half hour before sunrise, slow moving vehicles must be equipped with necessary lights and reflectors.

(1) Slow–moving vehicle emblem. This emblem (see the following figure) consists of a fluorescent yellow–orange triangle with a dark red reflective border. The yellow–orange fluorescent triangle is a highly visible color for daylight exposure. The reflective border defines the shape of the fluorescent color in daylight and creates a hollow red triangle in the path of motor vehicle headlights at night. The emblem is intended as a unique identification for, and it shall be used only on, vehicles which by design move slowly (25 M.P.H. or less) on the public roads.



[Order 75–2, § 296–306–150, filed 1/24/75.]

WAC 296–306–155 General requirements for maintenance of farm motor vehicles and equipment. (1) Before any person performs service or repair work under hydraulic or mechanical raised dump truck beds, blades, discs, etc., that raised portion of the equipment shall be manually pinned or blocked to prevent falling.

(2) Inflation of Tires. Unmounted split–rim wheels shall be placed in a safety cage or other safety device which will prevent a split–rim from striking the worker if it should dislodge while the tire is being inflated.

(3) If a motor vehicle or other farm equipment is in an unsafe condition to operate, the operator shall report the suspected condition immediately to the person in charge. If any defect would make the vehicle or equipment unsafe to operate under existing conditions, the vehicle or equipment shall be removed from service by the person in charge and repaired before being used.

(4) Vehicles shall not be driven at speeds which exceed that which is safe under existing conditions.

(5) Motors shall be shut off prior to refueling. Care shall be taken to prevent fuel from spilling on hot parts. [Order 75-2, § 296-306-155, filed 1/24/75.]

WAC 296-306-160 Vehicles. Motor vehicles shall be maintained in good mechanical condition at all times.

(1) Under no circumstances shall workers ride on fenders or running boards of vehicles.

(2) No worker shall ride in or on any vehicle with his legs hanging over the end or sides. A safety bar shall be placed across the rear opening of all crew trucks which are not equipped with tail gates.

(3) Vehicles used to transport workers shall be equipped with a means of preventing tools or materials from striking employees in the event of sudden starts, stops or turns.

(4) Explosives or highly inflammable and/or toxic materials shall not be carried in or on any vehicle while it is used to transport workers.

(5) Exhaust systems shall be installed and maintained in proper condition, and shall be designed to eliminate the exposure of the workers to exhaust gases and fumes.

(6) All vehicles which are specifically used for transporting agricultural workers shall be equipped with first-aid equipment as specified in WAC 296-306-050, including two blankets and an approved fire extinguisher.

NOTE: When more than one vehicle is located at a station, one equipped vehicle shall meet the intent of this section.

(7) No heating units in which there are open flames or catalytic action shall be used in vehicles transporting crews. [Order 75-2, § 296-306-160, filed 1/24/75.]

WAC 296-306-165 General requirements for all agricultural equipment. (1) Definitions.

(a) "Agricultural equipment" means equipment used in production or handling of agricultural products.

(b) "Agricultural field equipment" means tractors, self-propelled implements, implements and combinations thereof used in agricultural operations.

(c) "Agricultural tractor" means a two- or four-wheel drive type vehicle, or track vehicle, of more than 20 engine horsepower, designed to furnish the power to pull, carry, propel, or drive implements that are designed for agriculture. All self-propelled implements are excluded.

(d) "Augers" means screw conveyors and related accessories designed primarily for conveying agricultural materials on farms.

(e) "Constant-running drives" means those drives which continue to rotate when the engine is running. (With all clutches disengaged).

(f) "Farm field equipment" means tractors or implements, including self-propelled implements, or any combination thereof used in agricultural operations.

(g) "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.

(h) "Guarding by location" means a component may be considered guarded by location when, because of its location, it does not present a hazard during operation or maintenance. A component seven feet or more above a working surface is considered guarded by location.

(i) "Ground-drive equipment" means equipment using power supplied by its pulled wheels to move gears, chains, sprockets, belts, pulleys, augers, tines, etc.

(j) "Low profile tractor" means a wheeled tractor possessing the following characteristics:

(i) The front wheel spacing is equal to the rear wheel spacing, as measured from the centerline of each right wheel to the centerline of the corresponding left wheel; or rear wheel spacing may be increased to gain stability, but in no instance shall the front wheel spacing be less than shown in Table I.

TABLE I

Horsepower	Minimum Span
20 - 30	48 Inches
31 - 40	50 Inches
41 - 50	52 Inches
51 - 60	54 Inches
61 - 70	56 Inches
71 and Over	60 Inches

(ii) The clearance from the bottom of the tractor chassis to the ground does not exceed 18 inches.

(iii) The highest point of the hood does not exceed 60 inches, and

(iv) The tractor is designed so that the operator straddles the transmission when seated.

(k) A "guard" or "shield" is a barrier which insures that no part of an employee may come into contact with a hazard created by a moving machinery part.

(l) "Power take-off shafts" are the shafts and knuckles between the tractor, or other power source, and the first gear set, pulley, sprocket, or other components on power takeoff shaft driven equipment.

(2) Immediate priority shall be given to guarding of power take-off drives on all tractors and equipment. These must be guarded no later than January 1, 1976.

(3) All other power transmission components must be guarded on all equipment manufactured on or after January 1, 1976.

(4) If unguarded power transmission components on older field equipment show evidence that they were once guarded, the guards shall be replaced by January 1, 1976.

(5) The manufacturer's instruction manual, if published by the manufacturer and currently available, shall be the source of information for the safe operation and maintenance of field equipment.

(6) Operating instructions. At the time of initial assignment and at least annually thereafter, the employer shall instruct every employee in the safe operation and

servicing of all covered equipment with which he is or will be involved, including at least the following safe operating practices:

(a) Keep all guards in place when the machine is in operation;

(b) Passengers, other than persons required for instruction or machine operation shall not be permitted to ride on equipment unless a passenger seat or other protective device is provided.

(c) Stop engine, disconnect the power source, and wait for all machine movement to stop before servicing, adjusting, cleaning, or unclogging the equipment, except where the machine must be running to be properly serviced or maintained, in which case the employer shall instruct employees as to all steps and procedures which are necessary to safely service or maintain the equipment;

(d) Make sure everyone is clear of machinery before starting the engine, engaging power, or operating the machine;

(e) Lock out electrical power before performing maintenance or service on farmstead equipment.

(7) Methods of guarding. Except as otherwise provided in this chapter, each employer shall protect employees from coming into contact with moving machinery parts as follows:

(a) Through the installation and use of a guard or shield or guarding by location;

(b) Whenever a guard or shield or guarding by location is infeasible, by using a guardrail or fence.

(8) Strength and design of guards. (a) Where guards are used to provide the protection required by this section, they shall be designed and located to prevent inadvertent contact with the hazard being guarded.

(b) Unless otherwise specified, each guard and its supports shall be capable of withstanding the force that a 250 pound individual, leaning on or falling against the guard, would exert upon that guard.

(c) Guards shall be free from burrs, sharp edges, and sharp corners, and shall be securely fastened to the equipment or building.

(9) Guarding by railings. Guardrails or fences shall be capable of preventing employees from inadvertently entering the hazardous area.

(10) Servicing and maintenance. (a) Whenever a moving machinery part presents a hazard during servicing or maintenance, the engine shall be stopped, the power source disconnected, and all machine movement stopped before servicing or maintenance is performed, except where the employer can establish that:

(i) The equipment must be running to be properly serviced or maintained;

(ii) The equipment cannot be serviced or maintained while a guard or guards are in place; and

(iii) The servicing or maintenance is safely performed.

(11) Shields, guards and access doors that will prevent accidental contact with rotating machine parts on constant-running drives shall be in place when the machine is running. This requirement shall not apply to combines where such guards could create fire hazards.

(12) A guard or shield on stationary equipment shall be provided at the mesh point or pinch point where the chain or belt contacts the sprocket or pulley. Revolving shafts shall be guarded by a standard safeguard unless guarded by location. Shafts that protrude less than one-half the outside diameter of the shaft are exempt from this section.

(13) Projections, such as exposed bolts, keys, or set screws on sprockets, sheaves or pulleys on stationary equipment shall be shielded unless guarded by location. [Order 76-28, § 296-306-165, filed 9/28/76; Order 75-2, § 296-306-165, filed 1/24/75.]

WAC 296-306-170 Auger conveying equipment. (1) Scope. This section applies only to farm augers as defined in WAC 296-306-165(1)(e).

(2) General Specifications. (a) All shields and guards shall conform to WAC 296-306-165(13).

(b) Power take off shaft guards shall conform to WAC 296-306-165(8).

(3) Specifications. (a) Each sweep auger shall have its top half shielded by a guard. No opening in such guard shall exceed 4 3/4 inches in length or width.

(b) The exposed auger at the hopper and the intake shall be guarded or otherwise designed to provide a deterrent from accidental contact with the rotating inlet area and extend a minimum of 2 1/2 inches above and below the exposed auger. Openings in the guard, for the free flow of material, shall not exceed 4 3/4 inches in length or width and shall be of sufficient strength to support a concentrated weight of 250 pounds at mid span.

(c) The hand raising winch shall be provided with a control which will hold the auger at any angle of inclination, and respond only to handle actuation. It shall not be necessary to disengage such control to lower the auger. The force required on the handle to raise or lower the auger manually shall not exceed 50 pounds.

(d) The wire rope lifting pulleys shall be grooved to fit the wire rope with which they are used.

(e) In order to avoid separation, a positive restraint shall be provided between the auger tube and the under-carriage lifting arm. Stops that restrict the maximum raised angle and minimum lowered angle shall be provided.

(f) Wire ropes (cables) shall be rust resistant and selected for the design load and service intended.

(g) Service and operation instructions provided the equipment operator shall include those basic practices for safe operation and servicing.

(4) All augers shall be covered or guarded when exposed to contact.

(5) Equipment manufactured after October 25, 1976, shall be guarded in compliance with the following specification:

(a) Sweep arm material gathering mechanisms used on the top surface of materials within silo structures shall be guarded. The lower or leading edge of the guard shall be located 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 shall be parallel to, and extend the fullest practical length of the material gathering mechanism.

(b) Exposed auger flighting on portable grain augers shall be guarded with either grating type guards or solid baffle style covers as follows:

(i) The largest dimensions or openings in grating type guards through which materials are required to flow shall be 4 3/4 inches. The area of each opening shall be no larger than 10 square inches. The opening shall be located no closer to the rotating flighting than 2 1/2 inches.

(ii) Slotted openings in solid baffle style covers shall be no wider than 1 1/2 inches, or closer than 3 1/2 inches to the exposed flighting. [Order 76-28, § 296-306-170, filed 9/28/76; Order 75-2, § 296-306-170, filed 1/24/75.]

WAC 296-306-175 Farm field equipment guarding. (1) Power takeoff guarding.

(a) All power takeoff shafts, including rear, mid- or side-mounted shafts, shall be guarded either by a master shield, as provided in item (1)(b) of this subdivision, or by other protective guarding.

(b) All tractors shall be equipped with an agricultural tractor master shield on the rear power takeoff except where removal of the tractor master shield is permitted by item (1)(c) of this subdivision. The master shield shall have sufficient strength to prevent permanent deformation of the shield when a 250 pound operator mounts or dismounts the tractor using the shield as a step.

(c) Power takeoff driven equipment shall be guarded to prevent employee contact with positively driven rotating members of the power drive system. Where power takeoff driven equipment is of a design requiring removal of the tractor master shield, the equipment shall also include protection from that portion of the tractor power takeoff shaft which protrudes from the tractor.

(d) Signs shall be placed at prominent locations on tractors and power takeoff driven equipment specifying that power drive system safety shields must be kept in place.

(2) Other power transmission components. (a) The mesh or nip-points of all power driven gears, belts, chains, sheaves, pulleys, sprockets and idlers shall be guarded.

(b) All revolving shafts, including projections such as bolts, keys or set screws, shall be guarded, except smooth shaft ends protruding less than one-half the outside diameter of the shaft and its locking means.

(c) Ground driven components shall be guarded in accordance with items (2)(i)[(2)(a)] and (2)(ii)[(2)(b)] of this subdivision if any employee may be exposed to them while the drives are in motion.

(3) Functional components, such as snapping or husking rolls, straw spreaders and choppers, cutterbars, flail rotors, rotary beaters, mixing augers, feed rolls, conveying augers, rotary tillers, and similar units which must be exposed for proper function shall be shielded to a degree consistent with the intended function and operator's vision of the component.

(4) Access to moving parts. Where removal of a guard or access door will expose an employee to any component which continues to rotate after the power is disengaged, the employer shall provide, in the immediate area, the following:

(a) A safety sign warning the employee to: (i) Look and listen for evidence of rotation; and

(ii) Not remove the guard or access door until all components have stopped; and

(iii) On equipment manufactured after October 25, 1976, a readily visible or audible warning of rotation.

(5) 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 shall be provided on the equipment.

(6) A slip-resistant means or material shall be provided on the operator's steps and platform to minimize the possibility of feet slipping.

(7) Ground-drive equipment shall be shielded or guarded as specified in WAC 296-306-165(12) if operators are exposed to drives while they are in motion. [Order 76-28, § 296-306-175, filed 9/28/76.]

WAC 296-306-180 Farmstead equipment. (1) Power takeoff guarding. (a) All power takeoff shafts, including rear, mid- or side-mounted shafts, shall be guarded either by a master shield as provided in WAC 296-306-175(1)(b) or other protective guarding.

(b) Power takeoff driven equipment shall be guarded to prevent employee contact with positively driven rotating members of the power drive system. Where power takeoff driven equipment is of a design requiring removal of the tractor master shield, the equipment shall also include protection from that portion of the tractor power takeoff shaft which protrudes from the tractor.

(c) Signs shall be placed at prominent locations on power takeoff driven equipment specifying that power drive system safety shields must be kept in place.

(2) Other power transmission components. (a) The mesh or nip-points of all power driven gears, belts, chains, sheaves, pulleys, sprockets and idlers shall be guarded.

(b) All revolving shafts, including projections such as bolts, keys, or set screws, shall be guarded, with the exception of:

(i) 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; and

(ii) Smooth shaft ends protruding less than one-half the outside diameter of the shaft and its locking means.

(3) Functional components, such as snapping or husking rolls, straw spreaders and choppers, cutterbars, flail rotors, rotary beaters, mixing augers, feed rolls, conveying augers, rotary tillers and similar units, which must be exposed for proper function shall be shielded to a degree consistent with the intended function and operator's vision of the component.

(4) Access to moving parts. (a) Guards, shields and access doors shall be in place when the equipment is in operation.

(b) Where removal of a guard or access door will expose an employee to any component which continues to rotate after the power is disengaged, the employer shall provide, in the immediate area, the following:

(i) A safety sign warning the employee to:

(A) Look and listen for evidence of rotation; and

(B) Not remove the guard or access door until all components have stopped; and

(C) On equipment manufactured after October 25, 1976, a readily visible or audible warning of rotation. [Order 76-28, § 296-306-180, filed 9/28/76.]

WAC 296-306-200 Roll-over protective structures (ROPS) for tractors used in agricultural operations. (1) Scope. Agricultural tractors manufactured after October 25, 1976, shall meet the requirements in this section.

(2) Roll-over protective structure. A roll-over protective structure (ROPS) shall be provided by the employer for each tractor operated by an employee. Except as provided in subsection (6) of this section, ROPS used on wheel-type tractors shall meet the test and performance requirements of WAC 296-306-250 through 296-306-25023 and ROPS used on track-type tractors shall meet the test and performance requirements of WAC 296-306-260 through 296-306-270. (See ROPS Design and Testing Criteria Addendum.)

(3) Seatbelts. (a) Where ROPS are required by this section, the employer shall:

(i) Provide each tractor with a seatbelt which meets the requirements of this subsection;

(ii) Require that each employee uses such seatbelt while the tractor is moving; and

(iii) Require that each employee tightens the seatbelt sufficiently to confine the employee to the protected area provided by the ROPS.

(b) Each seatbelt shall meet the requirements set forth in Society of Automotive Engineers Standard SAE J4C, 1965 Motor Vehicle Seat Belt Assemblies,* except as noted hereafter:

(i) Where a suspended seat is used, the seatbelt shall be fastened to the movable portion of the seat to accommodate a ride motion of the operator.

(ii) The seatbelt anchorage shall be capable of withstanding tensile loading as required by WAC 296-306-275 through 296-306-275(2)(c).

(iii) The seatbelt webbing material shall have a resistance to acids, alkalis, mildew, aging, moisture and sunlight equal to or better than that of untreated polyester fiber.

(4) Protection from spillage. Batteries, fuel tanks, oil reservoirs and coolant systems shall be constructed and located or sealed to assure that spillage will not occur which may come in contact with the operator in the event of an upset.

(5) Protection from sharp surfaces. All sharp edges and corners at the operator's station shall be designed to minimize operator injury in the event of an upset.

(6) Exempted uses. Items (2) and (3) of this section do not apply to the following uses:

(a) "Low profile" tractors while they are used in orchards, vineyards or hop yards where the vertical clearance requirements would substantially interfere with normal operations, and while their use in incidental to the work performed therein.

(b) "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, and while their use is incidental to the work performed therein.

(c) Tractors while used with mounted equipment which is incompatible with ROPS (e.g. cornpickers, cotton strippers, vegetable pickers and fruit harvesters.)

(d) Track-type agricultural tractors whose overall width (as measured between the outside edges of the tracks) is at least three times the height of their rated center of gravity, and whose rated maximum speed in either forward or reverse is not greater than 7-miles per hour, when used only for tillage or harvesting operations and while their use is incidental thereto, and which:

(i) Does not involve operating on slopes in excess of 40 degrees from horizontal, and

(ii) Does not involve operating on piled crop products or residue, as for example, silage in stacks or pits, and

(iii) Does not involve operating in close proximity to irrigation ditches, streams or other excavations more than two feet deep which contain slopes of more than 40 degrees from horizontal.

(7) Remounting. Where ROPS are removed for any reason, they shall be remounted so as to meet the requirements of this subsection.

(8) Labeling. Each ROPS shall have a label, permanently affixed to the structure, which 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.

(9) Operating instructions. Every employee who operates an agricultural tractor shall be informed of the operating practices contained in Exhibit A of this section and of any other practices dictated by the work environment. Such information shall be provided at the time of initial assignment and at least annually thereafter.

*Copies may be obtained from the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.

EXHIBIT A

EMPLOYEE OPERATING INSTRUCTIONS

1. Securely fasten your seat belt if the tractor has a ROPS.
2. Where possible, avoid operating the tractor near ditches, embankments and holes.
3. Reduce speed when turning, crossing slopes and on rough, slick or muddy surfaces.
4. Stay off slopes too steep for safe operation.

5. Watch where you are going, especially at row ends, on roads and around trees.
6. Passengers, other than persons required for instruction or machine operation, shall not be permitted to ride on equipment unless a passenger seat or other protective device is provided.
7. Operate the tractor smoothly—no jerky turns, starts, or stops.
8. Hitch only to the drawbar and hitch points recommended by tractor manufacturers.
9. When tractor is stopped, set brakes securely and use park lock if available.

NOTE: See Number LI-414-28.

[Order 76-28, § 296-306-200, filed 9/28/76.]

ADDENDUM FOR R.O.P.S. DESIGN AND TESTING CRITERIA

WAC 296-306-250 Protective frames for wheel type agricultural tractors--Test procedures and performance requirements--Purpose. The purpose of this section is to establish the test and performance requirements for a protective frame designed for wheel-type agricultural tractors to minimize the frequency and severity of operator injury resulting from accidental upsets. General requirements for the protection of operators are specified in WAC 296-306-200. [Order 76-28, § 296-306-250, filed 9/28/76.]

WAC 296-306-25003 Types of tests. All protective frames for wheel type agricultural tractors shall be of a model which has been tested as follows:

(1) Laboratory test. A laboratory energy absorption test, either static or dynamic, under repeatable and controlled loading, to permit analysis of the protective frame for compliance with the performance requirements of this standard.

(2) Field upset test. A field upset test under controlled conditions, both to the side and rear, to verify effectiveness of the protective system under actual dynamic conditions. Such test may be omitted where:

(a) The analysis of the protective frame static energy absorption test results indicates that both FERis and FERir (as defined in WAC 296-306-25007(2)(b), exceed 1.15; or

(b) The analysis of the protective frame dynamic energy absorption test results indicate that the frame can withstand an impact of 15 percent greater than the impact it is required to withstand for the tractor weight as shown in Figure C-7 [WAC 296-306-25095]. [Order 76-28, § 296-306-25003, filed 9/28/76.]

WAC 296-306-25005 Description. (1) Protective frame. A protective frame is a structure comprised of uprights mounted to the tractor, extending above the operator's seat. A typical 2-post frame is shown in Figure C-1. (Figures C-1 through C-16 are contained in Exhibit B [WAC 296-306-25095].)

(2) Overhead weather shield. If an overhead weather shield is available for attachment to the protective frame, it may be in place during tests provided it does not contribute to the strength of the protective frame.

(3) Overhead falling object protection. If an overhead falling object protection device is available for attachment to the protective frame, it may be in place during tests provided it does not contribute to the strength of the protective frame. [Order 76-28, § 296-306-25005, filed 9/28/76.]

WAC 296-306-25007 Test procedures. (1) General. (a) The tractor weight used shall be that of the heaviest tractor model on which the protective frame is to be used.

(b) Each test required under this section shall be performed on a new protective frame. Mounting connections of the same design shall be used during each such test.

(c) Instantaneous deflection shall be measured and recorded for each segment of the test. See WAC 296-306-25009(1)(a) for permissible deflection.

(d) Seat reference point (SRP) in Fig. C-3) is that point where the vertical line that is tangent to the most forward point at the longitudinal seat centerline of the seat back, and the horizontal line that is tangent to the highest point of the seat cushion intersect in the longitudinal seat section. The seat reference point shall be determined with the seat unloaded and adjusted to the highest and most rearward position provided for seated operation of the tractor.

(e) Where the centerline of the seat is off the longitudinal center, the frame loading shall be on the side with the least space between the centerline of seat and the protective frame.

(f) Low temperature characteristics of the protective frame or its material shall be demonstrated as specified in WAC 296-306-25009(1)(b).

(g) Rear input energy tests (static, dynamic, or field upset) need not be performed on frames mounted to tractors having 4 driven wheels and more than one-half their unballasted weight on the front wheels.

(h) Accuracy table:

Measurements	Accuracy
Deflection of frame, inches (millimeters)	± 5 percent of deflection measured.
Vehicle weight, pounds (kilograms)	± 5 percent of the weight measured.
Force applied to frame, pounds force (newtons)	± 5 percent of force measured.
Dimensions of critical zone, inches (millimeters)	± 0.5 inch (12.5 millimeters).

(2) Static test procedure. (a) The following test conditions shall be met:

(i) The laboratory mounting base shall be the tractor chassis for which the protective frame is designed, or its equivalent.

(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 Fig. C-2 and C-3.

(iii) If the protective frame is of a one or two upright design, mounting connections shall be instrumented with the necessary equipment to record the required force to be used in subsection (2)(c)(v) and (x) of this section. Instrumentation shall be placed on mounting connections before installation load is applied.

(b) The following definitions shall apply:

W = Tractor weight includes the protective frame or enclosure, all fuels, and other components required for normal use of the tractor. Ballast shall be added as necessary to achieve a minimum total weight of 110 pounds (50.0 kg.) per maximum power takeoff horsepower at the rated engine speed or the maximum gross vehicle weight specified by the manufacturer, whichever is the greatest. Front end weight shall be at least 25 percent of the tractor test weight. In case power takeoff horsepower is not available, 95 percent of net engine flywheel horsepower shall be used.

Eis = Energy input to be absorbed during side loading in ft–lb (E'is in m–kg.).

Eis = 723 + 0.4 W (E'is = 100 + 0.12 W').

Eir = Energy input to be absorbed during rear loading in ft–lb (E'ir in m–kg.).

Eir = 0.47 W (E'ir = 0.14 W').

L = Static load, lbf [pounds force], (N) [newtons].

D = Deflection under L, in. (mm).

L–D = Static load–deflection diagram.

Lmax = Maximum observed static load.

Load Limit = Point on a continuous L–D curve where observed static load in 0.8 Lmax on down slope of curve (refer to Fig. C–5).

Eu = Strain energy absorbed by the frame, ft–lb (m–kg). Area under L–D curve.

FER = Factor of energy ratio.

$$FERis = \frac{Eu}{Eis}$$

$$FERir = \frac{Eu}{Eir}$$

Pb = Maximum observed force in mounting connection under static load, L lbf(N).

Pu = Ultimate force capacity of mounting connection, lbf(N).

FSB = Design margin for mounting connection.

$$FSB = \frac{Pu}{Pb}$$

(c) The test procedures shall be as follows:

(i) Apply the rear load in accordance with Fig. C–3 and record L and D simultaneously. Rear load application shall be uniformly distributed on the frame over an area perpendicular to the direction of load application, no greater than 160 square inches (1032 sq. cm.) in size, with the largest dimension no greater than 27 inches (686 mm). The load shall be applied to the upper extremity of the frame at the point which is midway between the center of the frame and the inside of the frame upright. If no structural cross member exists at the rear of the frame, a substitute test beam which does not add strength to the frame may be utilized to complete this test procedure. The test shall be stopped when:

(A) The strain energy absorbed by the frame is equal to or greater than the required input energy Eir or;

(B) Deflection of the frame exceeds the allowable deflection (see WAC 296–306–25009(1)(a)), or

(C) Frame load limit (see Figure C–5) occurs before the allowable deflection is reached in rear load.

(ii) Using data obtained in subsection (2)(c)(i) of this section, construct the L–D diagram as shown typically in Fig. C–5.

(iii) Calculate Eir.

(iv) Calculate FERir.

(v) Calculate FSB where required by subsection (2)(a)(iii) of this section.

(vi) Apply the side load tests on the same frame and record L and D simultaneously. Side load application shall be at the upper extremity of the frame at a 90 degree angle to the center line of the vehicle. The side load shall be applied to the longitudinal side farthest from the point of rear load application. Apply side load L as shown in Fig. C–2. The test shall be stopped when:

(A) The strain energy absorbed by the frame is equal to or greater than the required input energy Eis or;

(B) Deflection of the frame exceeds the allowable deflection (see WAC 296–306–25009(1)(a)) or;

(C) Frame load limit (see Figure C–5) occurs before the allowable deflection is reached in side load.

(vii) Using data obtained in subsection (2)(c)(vi) of this section, construct the L–D diagram as shown typically in Fig. C–5.

(viii) Calculate Eis.

(ix) Calculate FERis.

(x) Calculate FSB where required by subsection (2)(a)(iii) of this section.

(3) Dynamic test procedure. (a) The following test conditions shall be met:

(i) The protective frame and tractor shall be tested at the weight as defined in WAC 296–306–25007(2)(b).

(ii) The dynamic loading shall be accomplished by use of a 4410 lb. (2000 KG) weight acting as a pendulum. The impact face of the weight shall be 27 ± 1 inch by 27 ± 1 inch (686 ± 25 mm by 686 ± 25 mm) and shall be constructed so that its center of gravity is within 1 inch (25.4 mm) of its geometric center. The weight shall be suspended from a pivot point 18 to 22 feet (5.5–6.7 m) above the point of impact on the frame and shall be conveniently and safely adjustable for height (see Fig. C–6).

(iii) For each phase of testing, the tractor shall be restrained from moving when the dynamic load is applied. The restraining members shall have strength no less than, and elasticity no greater than, that of 0.50 inches (12.7 mm) steel cable. Points of attachment of restraining members shall be located an appropriate distance behind the rear axle and in front of the front axle to provide a 15 to 30 degree angle between a restraining cable and the horizontal. For the impact from the rear, the restraining cable shall be located in the plane in which the center of gravity of the pendulum will swing, or alternatively, two sets of symetrically located cables may be used at lateral locations on the tractor. For impact from the side, restraining cables shall be used as shown in Figures C–8 and C–9.

(iv) 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. The tires shall have no liquid ballast and shall be inflated to the maximum operating pressure recommended by the manufacturer. With specified tire inflation, the restraining cable shall be tightened to provide tire deflection of 6 to 8 percent of nominal tire section width. After the vehicle is properly restrained, a wooden beam no less than 6 x 6 inches (150 x 150 mm) cross section 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 base so that it is held tightly against the wheel rim during impact. The length of this beam shall be chosen so that it is at an angle of 25 to 40 degrees to the horizontal when it is positioned against the wheel rim. It shall have a length 20 to 25 times its depth and a width 2 to 3 times its depth. (see Figs. C–8 and C–9).

(v) Means shall be provided for indicating the maximum instantaneous deflection along the line of impact. A simple friction device is illustrated in Fig. C–4.

(vi) No repairs or adjustments shall be made during the test.

(vii) If any cables, props, or blocking shift or break during the test, the test shall be repeated.

(b) H = Vertical height of center of gravity of 4410 pounds (2000 kg) weight in inches (H' in mm). The weight shall be pulled back so that the height of its center of gravity above the point of impact is:

$$H = 4.92 + 0.00190\ W \text{ or } H' = 125 + 0.170\ W'.$$

(Fig. C–7).

(c) The test procedures shall be as follows:

(i) The frame shall be evaluated by imposing dynamic loading from the rear followed by a load to the side on the same frame. The pendulum swinging from the height determined by subsection (3)(b) of this section shall be used to impose the dynamic load. The position of the pendulum shall be so selected that the initial point of impact on the frame is in line with the arc of travel of the center of gravity of the pendulum. Where a quick release mechanism is used, it shall not influence the attitude of the block.

(ii) Impact at rear: The tractor shall be properly restrained in accordance with subsection (3)(a)(iii) and (3)(a)(iv) of this section. The tractor shall be positioned with respect to the pivot point of the pendulum so that the pendulum is 20 degrees from the vertical prior to impact as shown in Fig. C–8. The impact shall be applied to the upper extremity of the frame at the point which is midway between the center line of the frame and the inside of the frame upright. If no structural cross member exists at the rear of the frame, a substitute test beam which does not add to the strength of the frame may be utilized to complete the procedure.

(iii) Impact at side: The blocking and restraining shall conform to subsection (3)(a)(iii) and (3)(a)(iv) of this section. The point of impact shall be at the upper extremity of the frame at a point most likely to hit the ground first and at a 90 degree angle to the center line of the vehicle as shown in Fig. C–9. The side impact shall be applied to the longitudinal side farthest from the point of rear impact.

(4) Field upset test procedure. (a) The following test conditions shall be met:

(i) The tractor shall be tested at the weight as defined in WAC 296–306–25007(2)(b).

(ii) The test shall be conducted on a dry, firm soil bank. The soil in the impact area shall have an average cone index in the 0 to 6 inch (0 to 152 mm) layer of not less than 150. Cone index shall be determined in accordance with American Society of Agricultural Engineers Recommendation ASAE R313.1, Soil Cone Penetrometer (1971).* The path of vehicle travel shall be 12 ± 2 degrees to the top edge of the bank.

(iii) An 18 inch (457 mm) high ramp as described in Fig. C–10 shall be used to assist in upsetting the vehicle to the side.

(iv) 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 use.

(b) Field upsets shall be induced to the rear and side.

(i) Rear upset shall be induced by engine power with the tractor operating in a gear to obtain 3 to 5 miles per hour (4.8 to 8.0 km per hour) at maximum governed engine rpm by driving forward directly up a minimum slope of 60° ± 5° as shown in Fig. C–11 or by an alternative equivalent means. The engine clutch may be used to aid in inducing the upset.

(ii) To induce side upset, the tractor shall be driven under its own power along the specified path of travel at a minimum speed of 10 miles per hour (16 km per hour), or at maximum vehicle speed if under 10 miles per hour (16 km per hour), and over the ramp as described in subsection (4)(a)(iii) of this section. [Order 76–28, § 296–306–25007, filed 9/28/76.]

Reviser's note: Exhibit B, Figures C–1 through C–16, is codified as WAC 296–306–25095.

WAC 296–306–25009 Performance requirements. (1) General requirements. (a) The frame, overhead weather shield, fenders, or other parts in the operator area may be deformed in these tests but shall not shatter or leave sharp edges exposed to the operator, or encroach on the dimensions shown in Figs. C–2 and C–3 [WAC 296–306–25095] as follows:

d = 2 inch (51 mm) inside of frame upright to vertical center line of seat.

e = 30 inch (762 mm) at the longitudinal centerline.

f = Not greater than 4 inches (102 mm) to rear edge of crossbar, measured forward of the seat reference point (SRP).

g = 24 inch (610 mm) minimum.

m = Not greater than 12 inch (305 mm) measured from SRP to forward edge of crossbar.

(b) The protective structure and connecting fasteners must pass the static or dynamic tests described in subsection (2), (3) or (4) of this section at a metal temperature of 0 degrees fahrenheit or below, or exhibit Charpy V-notch impact strengths as follows:

10 mm x 10 mm specimen: 8 ft.-lb at -20° F.
10 mm x 7.5 mm specimen: 7 ft.-lb at -20° F.
10 mm x 5 mm specimen: 5.5 ft.-lb at -20° F.
10 mm x 2.5 mm specimen: 4 ft.-lb at -20° F.

Specimens shall be longitudinal and taken from flat stock, tubular, or structural sections before forming or welding for use in the frame. Specimens from tubular or structural sections shall be taken from the middle of the side of greatest dimension, not to include welds.

(2) Static test performance requirements. In addition to meeting the requirements of WAC 296-306-25009(1) in both side and rear loads, FERis and FERir shall be greater than 1, and where the ROPS contains 1 or 2 upright frames only, FSB shall be greater than 1.3.

(3) Dynamic test performance requirements. The structural requirements will be met where the dimensions in WAC 296-306-25009(1) are adhered to in both side and rear loads.

(4) Field upset test performance requirements. The requirements of WAC 296-306-25009(1) shall be met in both side and rear upsets. [Order 76-28, § 296-306-25009, filed 9/28/76.]

WAC 296-306-25013 Protective enclosures for wheel type agricultural tractors--Test procedures and performance requirements--Purpose. The purpose of this section is to establish the test and performance requirements for a protective enclosure designed for wheel-type agricultural tractors to minimize the frequency and severity of operator injury resulting from accidental upset. General requirements for the protection of operators are specified in WAC 296-306-200. [Order 76-28, § 296-306-25013, filed 9/28/76.]

WAC 296-306-25017 Types of tests. All protective enclosures for wheel type agricultural tractors shall be of a model which has been tested as follows:

(1) Laboratory test. A laboratory energy absorption test, either static or dynamic, under repeatable and controlled loading to permit analysis of the protective enclosure for compliance with the performance requirements of this standard.

(2) Field upset test. A field upset test under controlled conditions, both to the side and rear, to verify effectiveness of the protective system under actual dynamic conditions. This test may be omitted where:

(a) The analysis of the protective frame static energy absorption test results indicate that both FERis and FERir (as defined in WAC 296-306-25021(2)(b) exceed 1.15, or

(b) The analysis of the protective frame dynamic energy absorption test results indicate that the frame can withstand an impact 15 percent greater than the impact it is required to withstand for the tractor weight as shown in Fig. C-7 [WAC 296-306-25095]. [Order 76-28, § 296-306-25017, filed 9/28/76.]

WAC 296-306-25019 Description. A protective enclosure is a structure comprising a frame and/or enclosure mounted to the tractor. A typical enclosure is shown in Figure C-12 [WAC 296-306-25095]. [Order 76-28, § 296-306-25019, filed 9/28/76.]

WAC 296-306-25021 Test procedures. (1) General.

(a) The tractor weight used shall be that of the heaviest tractor model on which the protective enclosure is to be used.

(b) Each test required under this section shall be performed on a protective enclosure with new structural members. Mounting connections of the same design shall be used during each test.

(c) Instantaneous deflection shall be measured and recorded for each segment of the test. See WAC 296-306-25023(1)(a) for permissible deflection.

(d) Seat reference point (SRP) in Fig. C-14) is that point where the vertical line that is tangent to the most forward point at the longitudinal seat centerline of the seat back, and the horizontal line that is tangent to the highest point of the seat cushion intersect in the longitudinal seat section. The seat reference point shall be determined with the seat unloaded and adjusted to the highest and most rearward position provided for seated operations of the tractor.

(e) Where the centerline of the seat is off the longitudinal center, the protective enclosure loading shall be on the side with least space between the centerline of the seat and the protective enclosure.

(f) Low temperature characteristics of the protective enclosure or its material shall be demonstrated as specified in WAC 296-306-25023(1)(b).

(g) Rear input energy tests (static, dynamic, or field upset) need not be performed on enclosures mounted to tractors having 4 driven wheels and more than one-half their unballasted weight on the front wheels.

(h) Accuracy table:

Measurements	Accuracy
Deflection of enclosure, inches (millimeters)	± 5 percent of deflection measured.
Vehicle weight, pounds (kilograms)	± 5 percent of the weight measured.
Force applied to frame, pounds force (newtons)	± 5 percent of force measured.
Dimensions of critical zone, inches (millimeters)	± 0.5 inch (12.5 millimeters).

(i) Where movable or normally removable portions of the enclosure add to structural strength, they shall be placed in configurations that contribute least to the structural strength during the test.

(2) Static test procedure. (a) The following test conditions shall be met:

(i) The laboratory mounting base shall be the tractor chassis for which the protective enclosure is designed or its equivalent.

(ii) The protective enclosure shall be instrumented with the necessary equipment to obtain the required load deflection data at the locations and directions as specified in Figs. C–13 and C–14.

(b) The following definitions shall apply:

W = Tractor weight (see WAC 296–306–25007(2)(b) in lb.(W' in kg.).
Eis = Energy input to be absorbed during side loading in ft–lb(E'is in m–kg.).
Eis = 723 + 0.4W (E'is = 100 + 0.12 W').
Eir = Energy input to be absorbed during rear loading in ft–lb(E'ir in m–kg.).
Eir = 0.47 W(E'ir = 0.14W').
L = Static load, lbf(N).
D = Deflection under L, in.(mm).
L–D = Static load–deflection diagram.
Lmax = Maximum observed static load.
Load Limit = Point on a continuous L–D curve where observed static load is 0.8 Lmax on down slope of curve (refer to Fig. C–5).
Eu = Strain energy absorbed by the frame, ft–lb (m–kg). Area under L–D curve.
FER = Factor of energy ratio.

$$FERis = \frac{Eu}{Eis}$$

$$FERir = \frac{Eu}{Eir}$$

(c) The test procedures shall be as follows:

(i) When the protective frame structures are not an integral part of the enclosure, the direction and point of load application for both side and rear shall be the same as specified in WAC 296–306–25007(2).

(ii) When the protective frame structures are an integral part of the enclosure, apply the rear load in accordance with Fig. C–14 and record L and D simultaneously. Rear load application shall be uniformly distributed on the frame structure over an area perpendicular to the load application, no greater than 160 square inches (1032 sq. cm.) in size with a largest dimension no greater than 27 inches (686 mm). The load shall be applied to the upper extremity of the structure at the point which is midway between the centerline of the protective enclosure and the inside of the protective structure. If no structural cross member exists at the rear of the enclosure, a substitute test beam which does not add strength to the structure may be utilized to complete this test procedure. The test shall be stopped when:

(A) The strain energy absorbed by the structure is equal to or greater than the required input Energy Eir or;

(B) Deflection of the structure exceeds the allowable deflection, (see WAC 296–306–25023(1)(a)) or;

(C) The structure load limit (see Fig. C–5) occurs before the allowable deflection is reached in rear load.

(iii) Using data obtained in subsection (2)(c)(ii) of this section, construct the L–D diagram for rear loads as shown typically in Fig. C–5.

(iv) Calculate Eir.

(v) Calculate FERir.

(vi) When the protective frame structures are an integral part of the enclosure, apply the side load in accordance with Fig. C–13 and record L and D simultaneously. Static side load application shall be uniformly distributed on the frame over an area perpendicular to the direction of load application, and no greater than 160 square inches (1032 sq. cm.) in size, with a largest dimension no greater than 27 inches (686 mm). Side load application shall be at a 90 degree angle to the center line of the vehicle. The center of side load application shall be located between a point "k", 24 inches (610 mm) forward; and point "1", 12 inches (305 mm) rearward of the seat reference point to best utilize the structural strength (see Fig. C–13). This side load shall be applied to the longitudinal side farthest from the point of rear load application. The test shall be stopped when:

(A) The strain energy absorbed by the structure is equal to or greater than the required input energy Eis; or

(B) Deflection of the structure exceeds the allowable deflection (see WAC 296–306–25023(1)(a));or

(C) The structure load limit (see Figure C–5) occurs before the allowable deflection is reached in side load.

(vii) Using data obtained in subsection (2)(c)(vi) of this section construct the L–D diagram for side load as shown typically in Fig. C–5.

(viii) Calculate Eis.

(ix) Calculate FERis.

(3) Dynamic test procedure. (a) The following test conditions shall be met:

(i) The protective enclosure and tractor shall be tested at the weight defined in WAC 296–306–25007(2)(b).

(ii) The dynamic loading shall be accomplished by use of a 4410 pound (2000 kg) weight acting as a pendulum. The impact face of the weight shall be 27 ± 1 inch by 27 ± 1 inch (686 ± 25 mm by 686 ± 25 mm) and shall be constructed so that its center of gravity is within 1 inch (25.4 mm) of its geometric center. The weight shall be suspended from a pivot point 18 to 22 feet (5.5 – 6.7 m) above the point of impact on the enclosure and shall be conveniently and safely adjustable for height. (see Fig. C–6).

(iii) For each phase of testing, the tractor shall be restrained from moving when the dynamic load is applied. The restraining members shall have strength no less than, and elasticity no greater than that of 0.50 inches (12.7 mm) steel cable. Points of attachment of restraining members shall be located an appropriate distance behind the rear axle and in front of the front axle to provide a 15 to 30 degree angle between the restraining cable and the horizontal. For the impact form the rear, the restraining cables shall be located in the plane in which the center of gravity of the pendulum will swing, or alternatively, two sets of symmetrically located cables may be used at lateral locations on the tractor. For the impact from the side, restraining cables shall be used as shown in Figures C–15 and C–16.

(iv) 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. The tires shall have no liquid ballast and shall be inflated to the maximum operating pressure recommended by the manufacturer. With specified tire inflation, the restraining cable shall

be tightened to provide tire deflection of 6 to 8 percent of nominal tire section width. After the vehicle is properly restrained, a wooden beam no smaller than 6 x 6 inches (150 x 150 mm) cross-section 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 base so that it is held tightly against the wheel rim during impact. The length of this beam shall be chosen so that it is at an angle of 25 to 40 degrees to the horizontal when it is positioned against the wheel rim. It shall have a length of 20 to 25 times its depth and width 2 to 3 times its depth. (see Fig. C-15 and C-16.)

(v) Means shall be provided for indicating the maximum instantaneous deflection along the line of impact. A simple friction device is illustrated in Fig. C-4.

(vi) No repair or adjustments shall be made during the test.

(vii) If any cables, props, or blocking shift or break during the test, the test shall be repeated.

(b) H = Vertical height of center of gravity of 4410 pounds (2000 kg) weight in inches (H' in mm). The weight shall be pulled back so that the height of its center of gravity above the point of impact is: H = 4.92 + 0.00190 W or (H' = 125 + 0.107 W'). (Fig. C-7).

(c) The test procedures shall be as follows:

(i) The enclosure structure shall be evaluated by imposing dynamic loading from the rear followed by a load to the side on the same enclosure structure. The pendulum swinging from the height determined by subsection (3)(b) of this section shall be used to impose the dynamic load. The position of the pendulum shall be so selected that the initial point of impact on the protective structure is in line with the arc of travel of the center of gravity of the pendulum. Where a quick release mechanism is used, it shall not influence the attitude of the block.

(ii) Impact at rear: The tractor shall be properly restrained in accordance with subsections (3)(a)(iii) and (3)(a)(iv) of this section. The tractor shall be positioned with respect to the pivot point of the pendulum so that the pendulum is 20 degrees from the vertical prior to impact as shown in Fig. C-15. The impact shall be applied to the upper extremity of the enclosure structure at the point which is midway between the center line of the enclosure structure and the inside of the protective structure. If no structural cross member exists at the rear of the enclosure structure, a substitute test beam which does not add to the strength of the structure may be utilized to complete the test procedure.

(iii) Impact at side: The blocking and restraining shall conform to subsections (3)(a)(iii) and (3)(a)(iv) of this section. The center point of impact shall be at the upper extremity of the enclosure at a 90° angle to the centerline of the vehicle and located between a point "k", 24 inches (610 mm) forward, and a point "l", 12 inches (305 mm) rearward of the seat reference point, to best utilize the structural strength. (see Fig. C-13) The side impact shall be applied to the longitudinal side farthest from the point of rear impact.

(4) Field upset test procedure. (a) The following test conditions shall be met:

(i) The tractor shall be tested at the weight as defined in WAC 296-306-25007(2)(b).

(ii) The test shall be conducted on a dry, firm soil bank. The soil in the impact area shall have an average cone index in the 0 to 6 inch (0 to 152 mm) layer of not less than 150. Cone index shall be determined in accordance with American Society of Agricultural Engineers Recommendation ASAE R313.1, Soil Cone Penetrometer (1971).* The path of vehicle travel shall be 12 ± 2 degrees to the top edge of bank.

(iii) An 18 inch (457 mm) high ramp as described in Fig. C-10 shall be used to assist in upsetting the vehicle to the side.

(iv) 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.

(b) Field upsets shall be induced to the rear and side.

(i) Rear upset shall be induced by engine power with the tractor operating in a gear to obtain 3 to 5 Miles Per Hour (4.8 to 8.0 km per hour) at maximum governed engine rpm by driving forward directly up a minimum slope of 60° ± 5° as shown in Fig. C-11 or by an alternate equivalent means. The engine clutch may be used to aid in inducing the upset.

(ii) To induce side upset, the tractor shall be driven under its own power along the specified path of travel at a minimum speed of 10 miles per hour (16 km per hour), or at maximum vehicle speed if under 10 miles per hour (16 km per hour), and over the ramp as described in subsection (4)(a)(iii) of this section.

*Copies may be obtained from American Society of Agricultural Engineers, 2950 Nils Road, St. Joseph, Michigan 49085.

[Order 76-28, § 296-306-25021, filed 9/28/76.]

Reviser's note: Exhibit B, Figures C-1 through C-16, is codified as WAC 296-306-25095.

WAC 296-306-25023 Performance requirements. (1) General requirements. (a) The protective enclosure structural members or other parts in the operator area may be deformed in these tests but shall not shatter or leave sharp edges exposed to the operator. They shall not encroach on a transverse plane passing through points d and f within the projected area defined by dimensions d, e and g or on the dimensions shown in Figs. C-13 and C-14 [WAC 296-306-25095] as follows:

d = 2 in. (51 mm) inside of protective structure to vertical centerline of seat.
e = 30 in (762 mm) at the longitudinal centerline.
f = Not greater than 4 in. (102 mm) measured forward of the seat reference point (SRP) at the longitudinal centerline as shown in Fig. C-14 [WAC 296-306-25095].
g = 24 in. (610 mm) minimum.
h = 17.5 in. (445 mm) minimum.

i = 2.0 in. (51 mm) measured from outer periphery of steering wheel.

(b) The protective structure and connecting fasteners must pass the static or dynamic tests described in subsections (2), (3) or (4) of this section at a metal temperature of 0 degrees fahrenheit or below, or exhibit Charpy V-notch impact strengths as follows:

10 mm x 10 mm specimen: 8 ft.-lb at -20° F.
10 mm x 7.5 mm specimen: 7 ft.-lb at -20° F.
10 mm x 5 mm specimen: 5.5 ft.-lb at -20° F.
10 mm x 2.5 mm specimen: 4 ft.-lb at -20° F.

Specimens shall be longitudinal and taken from flat stock, tubular, or structural sections before forming or welding for use in the protective enclosure. Specimens from tubular or structural sections shall be taken from the middle of the side of greatest dimension, not to include welds.

(c) Glazing shall conform to the requirements contained in Society of Automotive Engineers Standard SAE J674, Safety Glazing Materials (1963). *

(d) Two or more operator exits shall be provided and positioned to avoid the possibility of both being blocked by the same accident.

(2) Static test performance requirements. In addition to meeting the requirements of subsection (1) of this section in both side and rear loads, FERis and FERir shall be greater than 1.

(3) Dynamic test performance requirements. The structural requirements will be met where the dimensions in subsection (1) of this section are adhered to in both side and rear loads.

(4) Field upset test performance requirements. The requirements of subsection (1) of this section shall be met in both side and rear upsets.

*Copies may be obtained from the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, Pa. 15096.

[Order 76-28, § 296-306-25023, filed 9/28/76.]

WAC 296-306-25095 Exhibit B--Figures C-1 thru C-16.

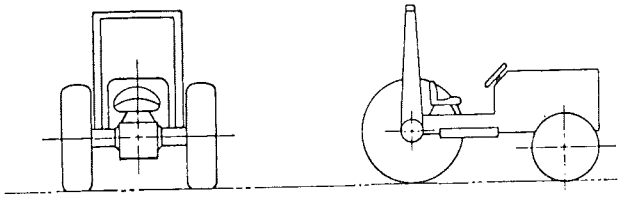


Figure C-1. Tractor with Typical Protective Frame.

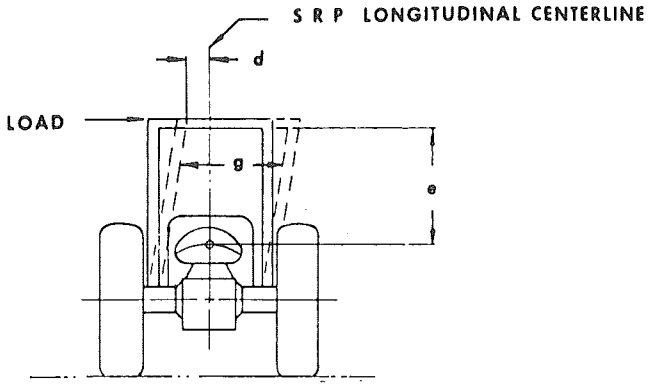


Figure C-2. Side Load Application.

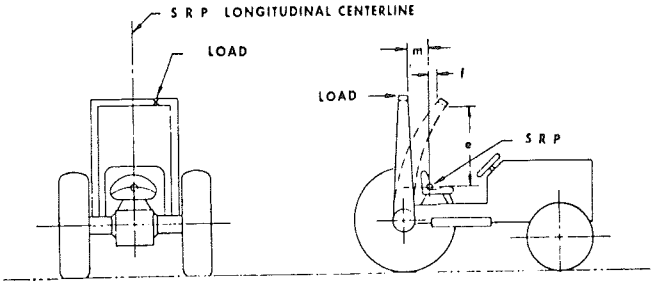


Figure C-3. Rear Load Application.

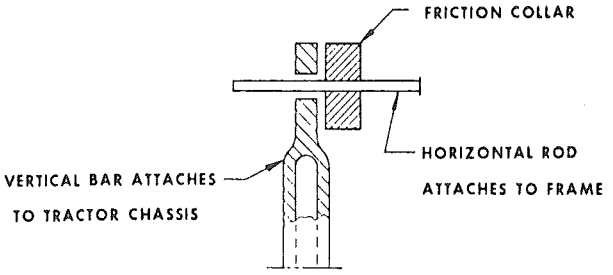


Figure C-4. Typical Method of Measuring Deflection.

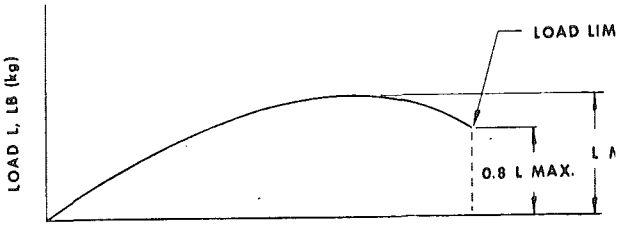


Figure C-5. Typical L-D Diagram.

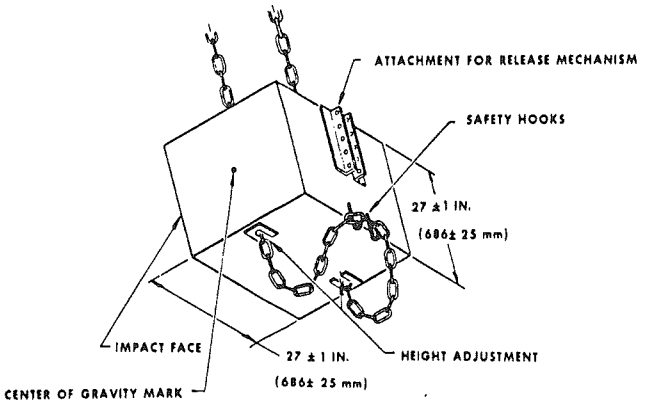


Figure C–6. Pendulum.

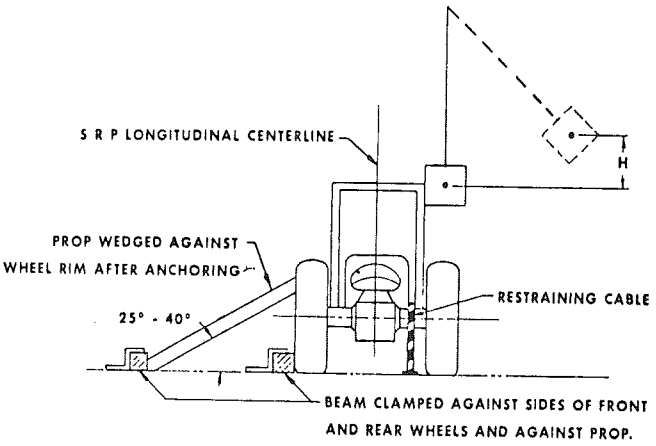


Figure C–9. Side Impact Application.

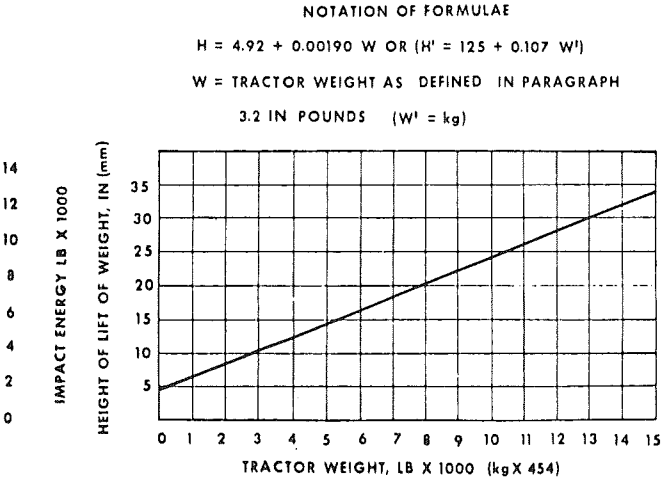


Figure C–7.
Impact Energy and Corresponding Lift Height of 4410 lb (2000 kg) Weight.

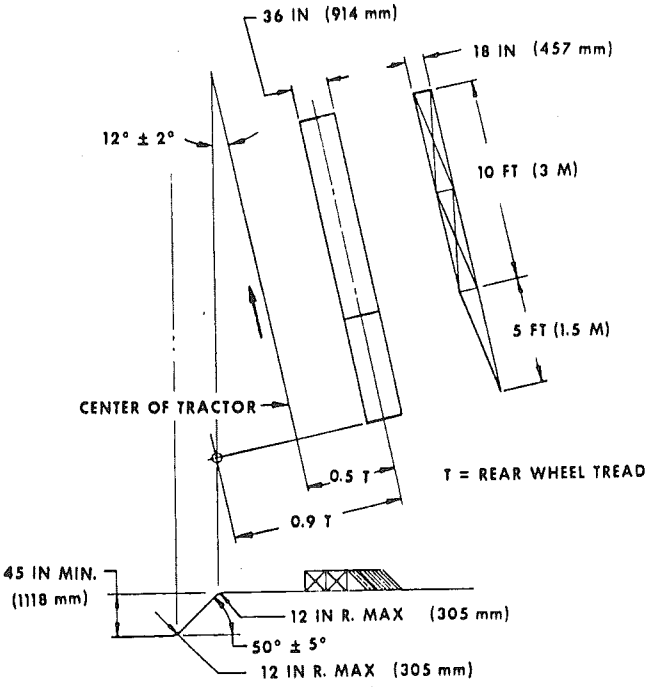


Figure C–10. Side Overturn Bank and Ramp.

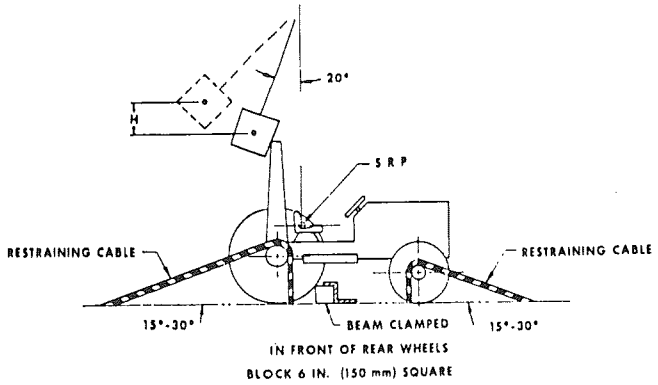


Figure C–8. Rear Impact Application.

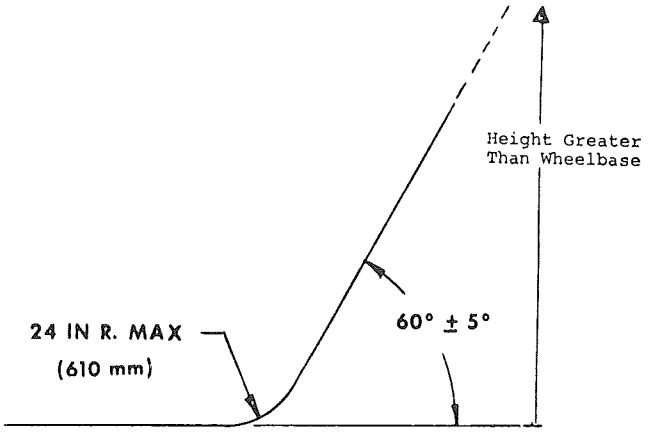


Figure C–11. Typical Rear Overturn Bank.

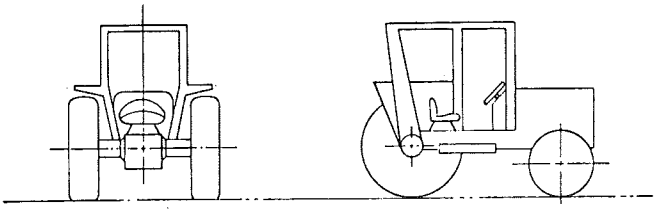


Figure C–12. Tractor with Typical Protective Enclosure.

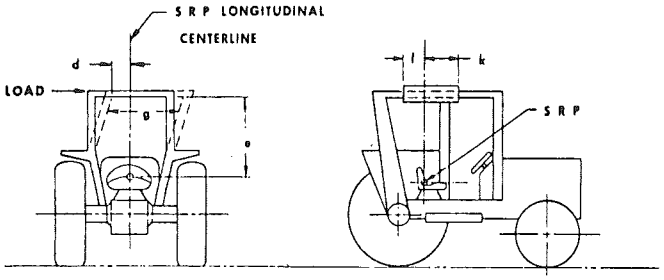


Figure C–13. Side Load Application.

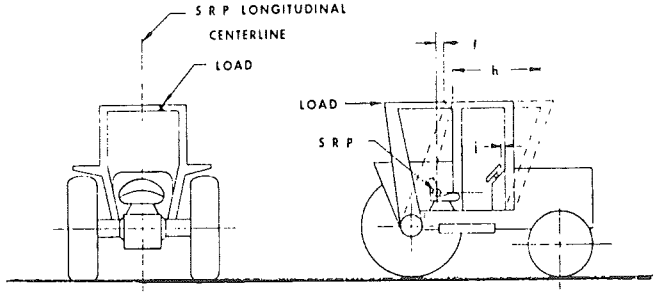


Figure C–14. Rear Load Application.

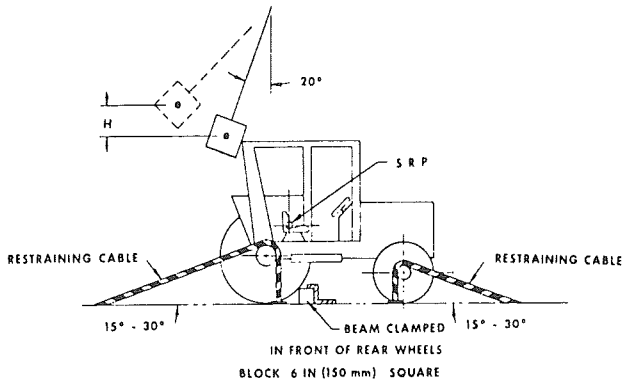


Figure C–15. Rear Impact Application.

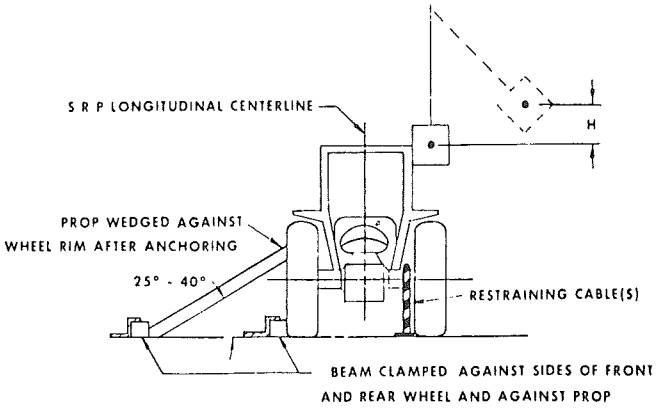


Figure C–16. Side Impact Application.

[Order 76–28, Exhibit B (codified as WAC 296–306–25095), filed 9/28/76.]

WAC 296–306–260 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 agricultural work. This requirement does not apply to side–boom pipelaying tractors.

(2) Material handling machinery described in subsection (1) of this section and manufactured on or after October 25, 1976, shall be equipped with rollover protective structures which meet the minimum performance standards prescribed in WAC 296–306–260 and 296–306–265, as applicable.

(3) Rollover protective structures and supporting attachment shall meet the minimum performance criteria detailed in WAC 296–306–260 and 296–306–265, 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.

(a) 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.

(b) 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. [Order 76-28, § 296-306-260, filed 9/28/76.]

WAC 296-306-26001 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.

(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 offcenter, the load shall be applied on the offcenter 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.) absorbed 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 (6)(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).

(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 (lb.); energy (U) is measured as inch–pounds).

(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.

(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 Division of Industrial Safety and Health of the Department of Labor and Industries. [Order 76–28, § 296–306–26001, filed 9/28/76.]

Reviser's note: Exhibit B, Figures V–1 through V–28, is codified as WAC 296–306–27095.

WAC 296–306–265 Protective frame (ROPS) test procedures and performance requirements for wheel–type agricultural and industrial tractors used in agriculture. (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 agriculture 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, 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 296–306–260), 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:

Eis = Energy input to be absorbed during side loading. Eis = 723 + 0.4 W ft.–lb. (E'is = 100 + 0.12 W',m.–kg).

Eir = Energy input to be absorbed during rear loading. Eir = 0.47 W ft. – lb. (E'ir = 0.14 W', m. – kg).

W = Tractor weight as prescribed in WAC 296–306–265(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.

Lm–Dm = 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 x 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.

Lmax = Maximum observed static load.

Load Limit = Point on L–D curve where observed static load is 0.8 Lmax (refer to Figure V–19).

Eu = Strain energy absorbed by the frame, ft.–lb. (m. – kg) area under Lm–Dm curve.

FER = Factor of energy ratio, FER = Eu/Eis; also = Eu/Eir.

Pb = Maximum observed force in mounting connection under static load, L, lb. (kg.).

FSB = Design margin for mounting connection FSB = (Pu/Pb)–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).

(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 296-306-260 and 296-306-270 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.

(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 296-306-270.

(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 used in agriculture work and to wheel-type industrial tractors used in construction type 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 Procudure——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 296-306-26001(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° ± 2° 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.

(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 Figure V–17, V–18, and V–19.

(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 (Eis) 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 Lm–Dm diagram shall be constructed according to item (ii) of this subdivision and according to Figure V–21. The strain energy absorbed by the frame (Eu) shall than [then] be determined.

(iv) Eis, FER, and FSB shall be calculated.

(v) The test procedure shall be repeated on the same frame utilizing L (rear input; see Figure V–19) and Eir. 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).

(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).

(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.)

(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 296-306-26001(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 76-28, § 296-306-265, filed 9/28/76.]

Reviser's note: Exhibit B, Figures V-1 through V-28, is codified as WAC 296-306-27095.

WAC 296-306-270 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 296-306-26001 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 agriculture work. See WAC 296-306-265(1) and (3).

(c) 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.

(2) Overhead Protection. When overhead protection is installed on wheel-type agricultural or industrial tractors used in agriculture 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 296-306-265(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 296-306-265 (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.

(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 sperical 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.

(5) Crush Test Procedures. (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 296–306–265 (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 296–306–265 (6)(a). The maximum width of the beam illustrated in Figure V–27 shall be 6 in. (152 mm.).

(6) Performance Requirements. (a) General. The performance requirements set forth in WAC 296–306–265(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.

(ii) In addition to the dimensions set forth in WAC 296–306–265(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 76–28, § 296–306–270, filed 9/28/76.]

Reviser's note: Exhibit B, Figures V–1 through V–28, is codified as WAC 296–306–27095.

WAC 296–306–27095 Exhibit B––Figures V–1 through V–28.

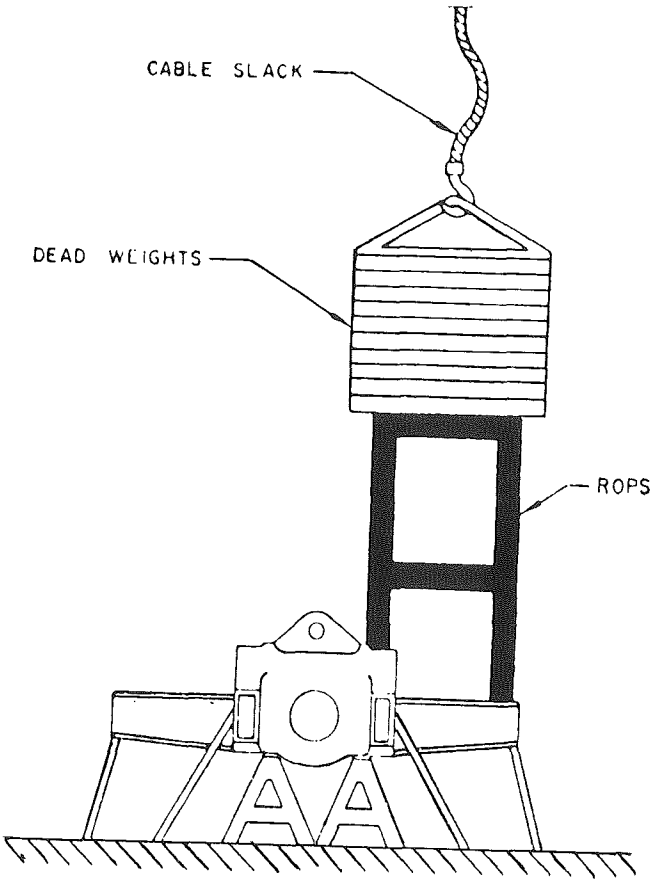


Figure V–1
Vertical loading setup for all types of equipment described in

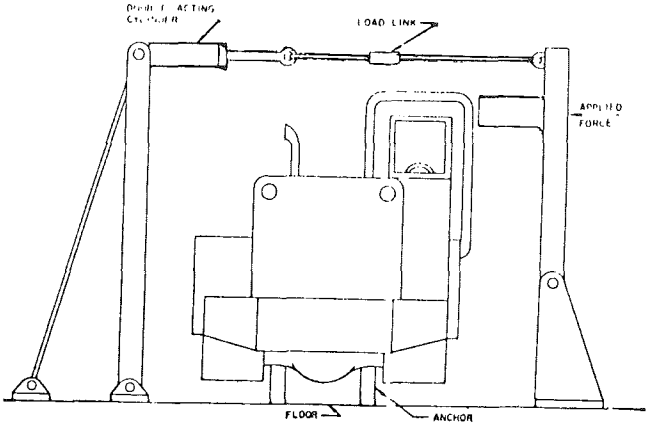


Figure V–2
Test setup for rubber–tired self–propelled scrapers.

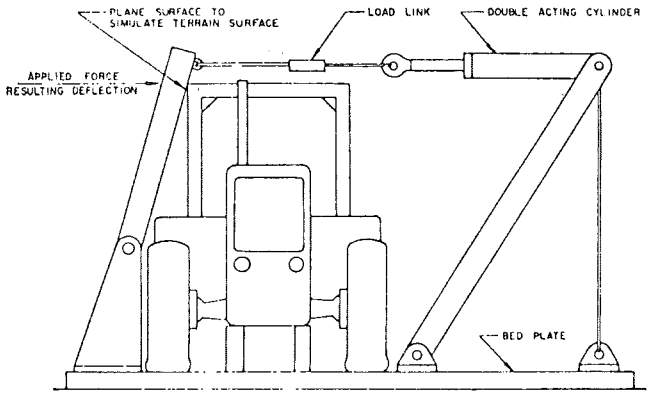


Figure V–3
Test setup for rubber–tired front–end loaders, rubber–tired dozens, and motor graders.

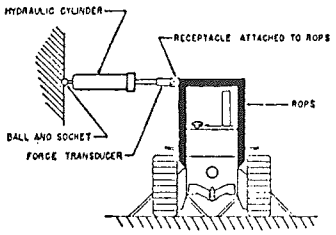
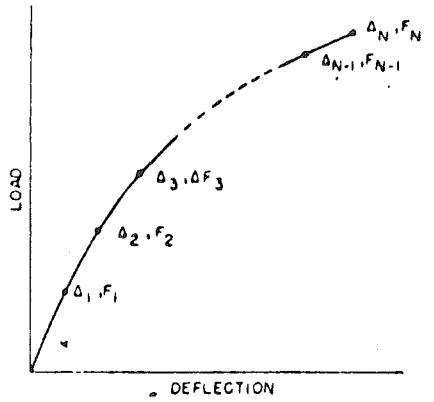


Figure V–4
Side–loading setup for crawler tractors and crawler loaders.



Δ - TOTAL DEFLECTION
F - FORCE APPLIED

$$\text{AREA} = \frac{\Delta_1 F_1}{2} + (\Delta_2 - \Delta_1)\frac{F_1 + F_2}{2} + (\Delta_3 - \Delta_2)\frac{F_2 + F_3}{2} + \cdots + (\Delta_N - \Delta_{N-1})\frac{F_{N-1} + F_N}{2}$$

Figure V–5
Determination of energy area under force deflection curve.

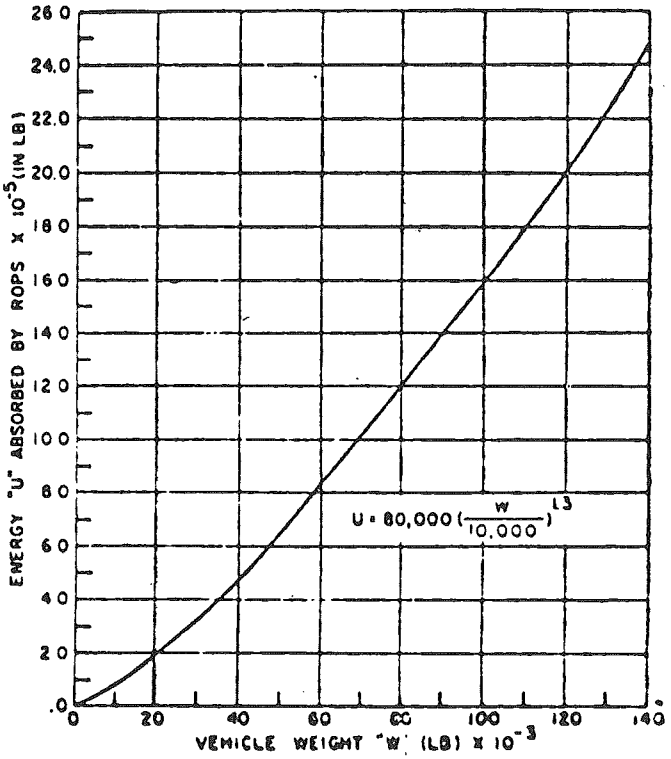


Figure V–6
Energy absorbed versus vehicle weight.

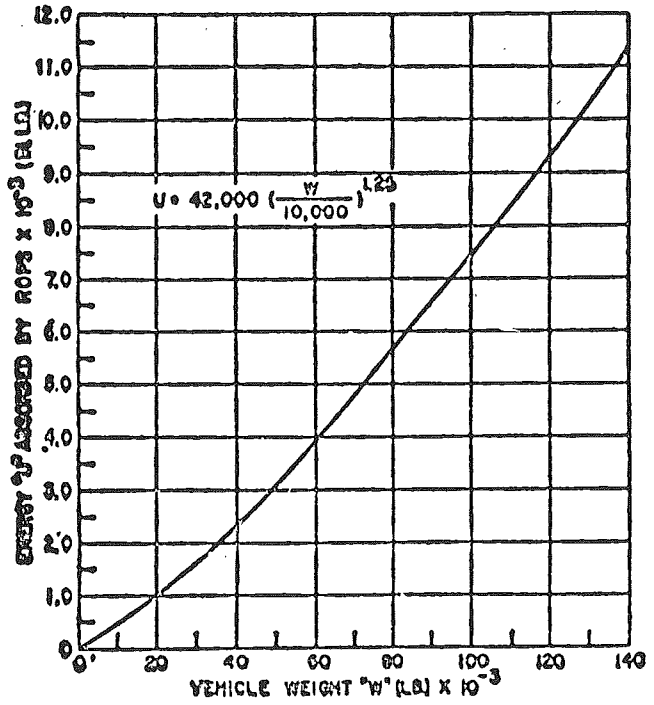


Figure V–7
Energy absorbed versus vehicle weight.

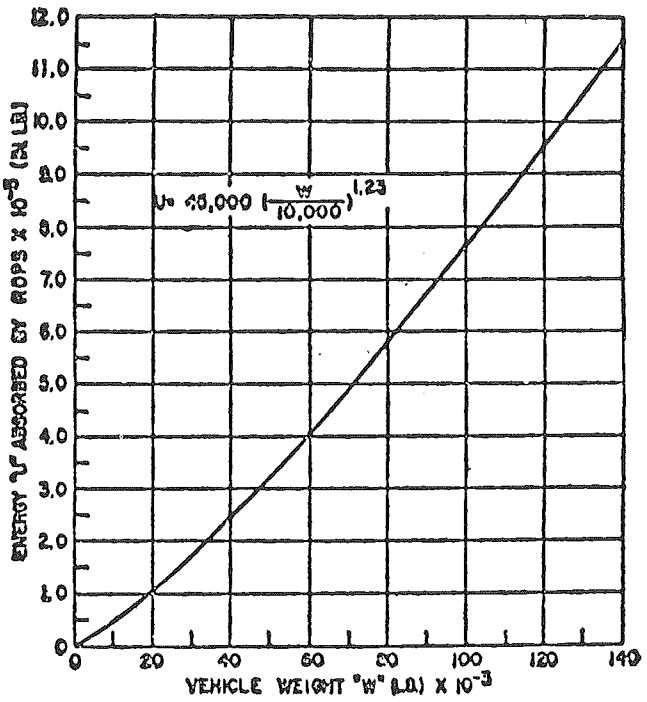


Figure V–8
Energy absorbed versus vehicle weight.

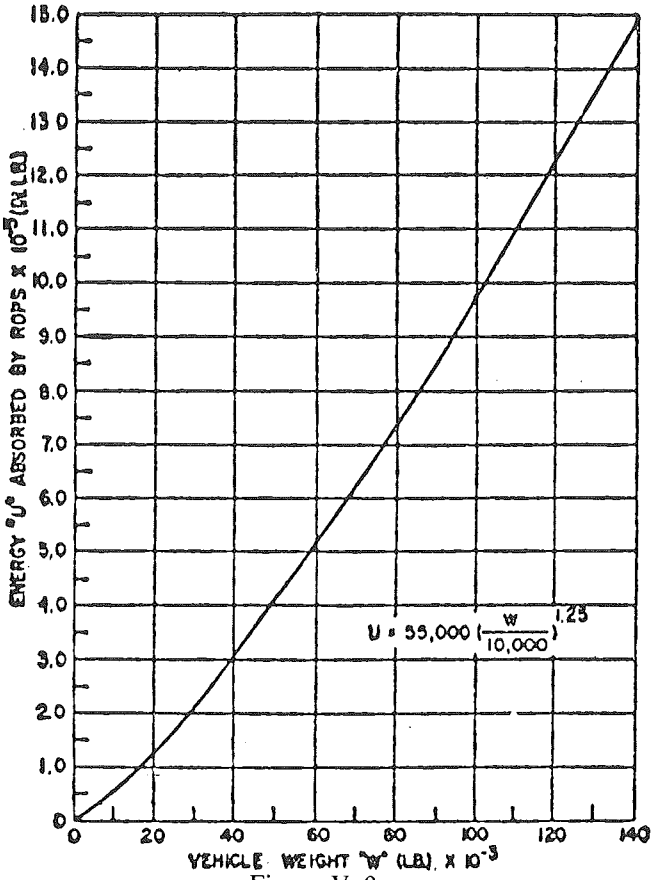


Figure V–9
Energy absorbed versus vehicle weight.

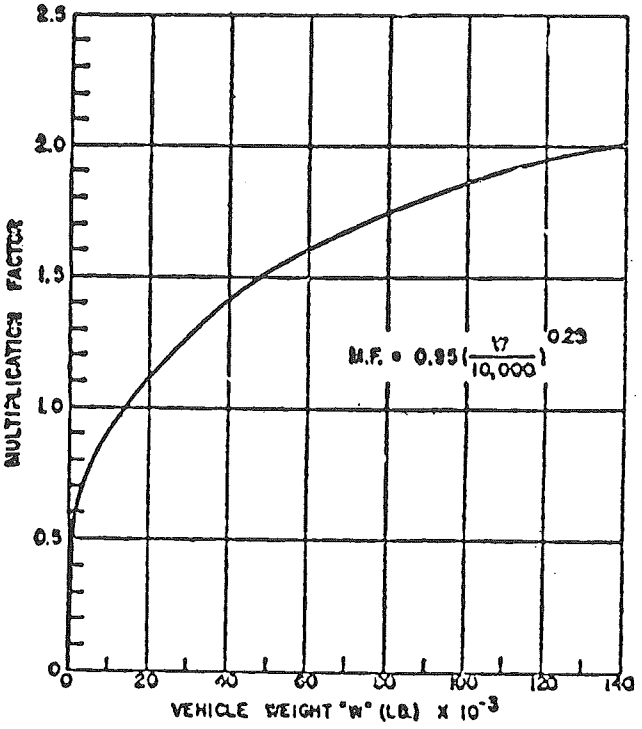


Figure V–10
Minimum horizontal load factor for self–propelled scapers.

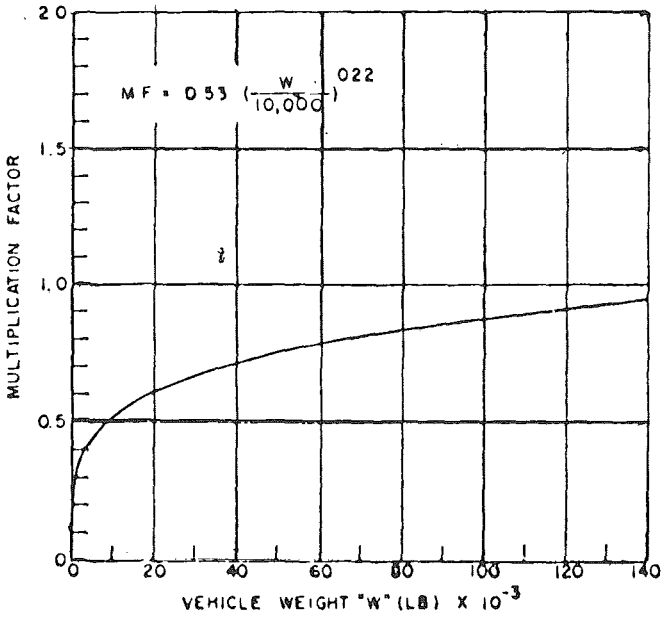


Figure V–11
Minimum horizontal load factor for rubber–tired loaders and dozers.

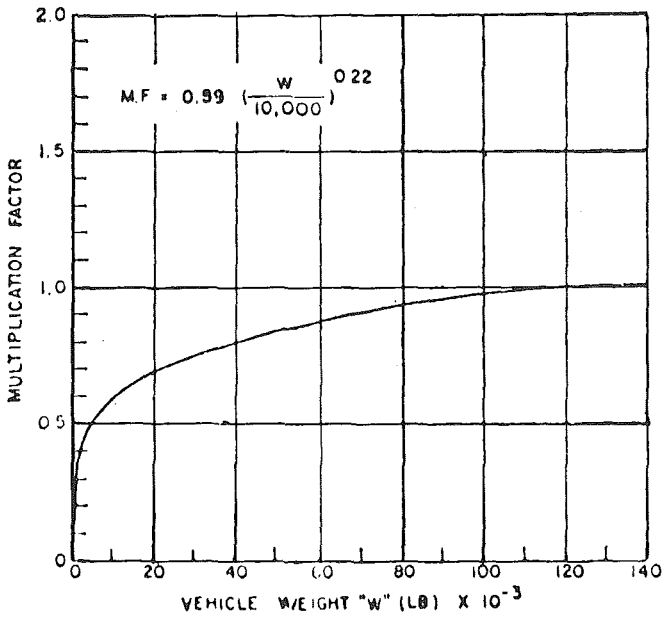


Figure V–12
Minimum horizontal load factor for crawler tractors and crawler–type loaders.

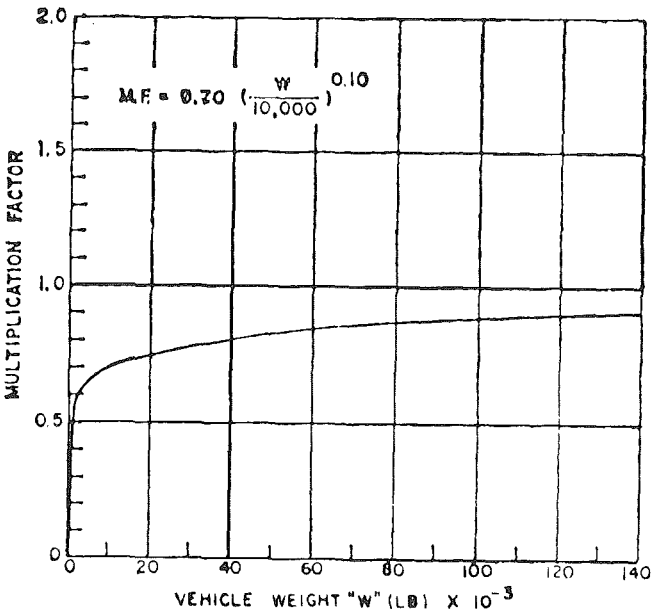


Figure V–13
Minimum horizontal load factor for motor graders.

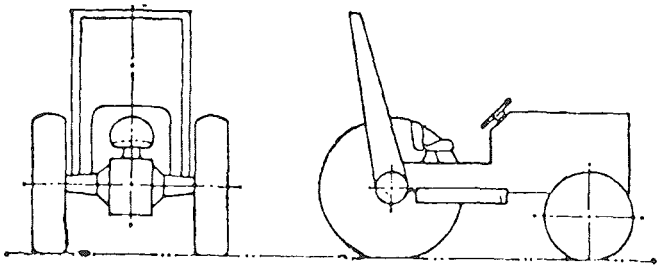


Figure V–14
Impact energy and corresponding lift height of 4,410 lb. (2,000 kg.) weight.

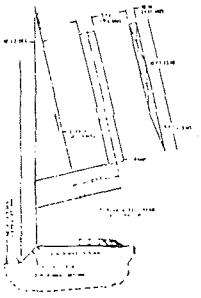


Figure V–15
Typical frame configuration.

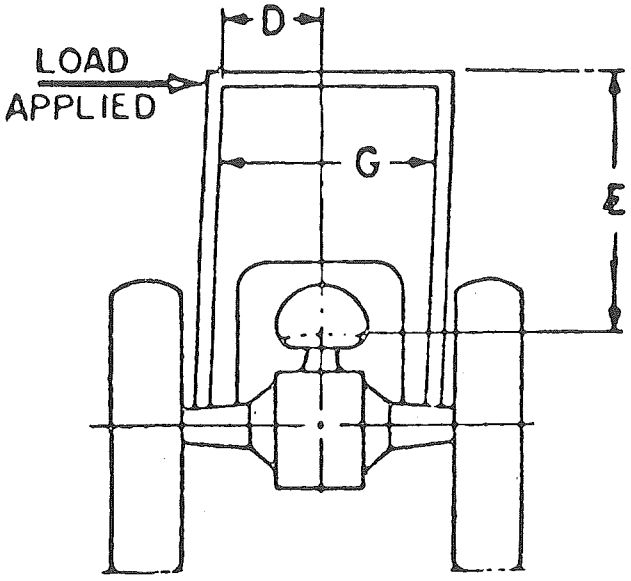


Figure V–16

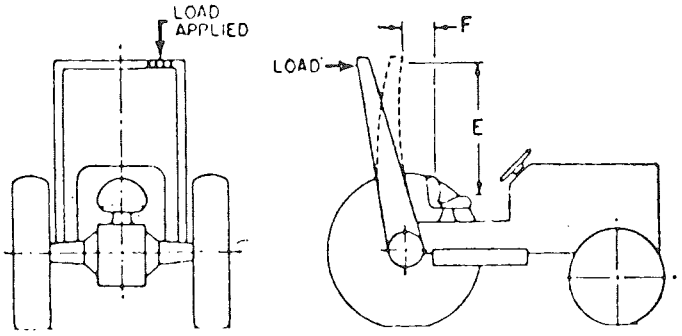


Figure V–17
Side load application.

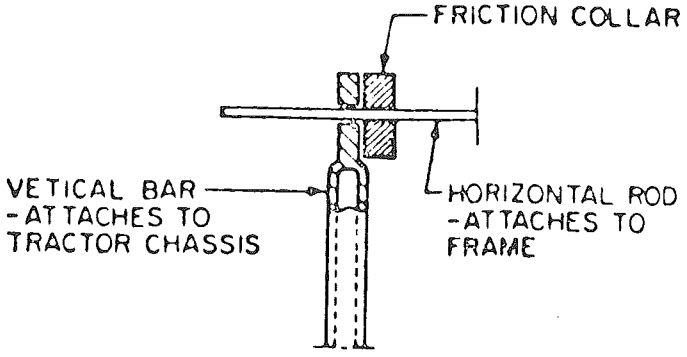


Figure V–18
Rear load application.

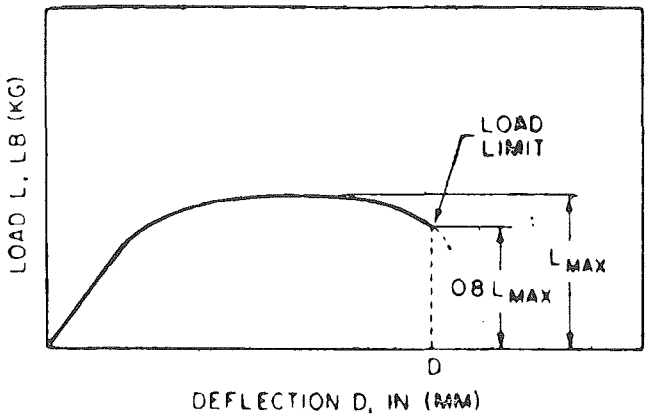


Figure V–19
Method of measuring instantaneous deflection.

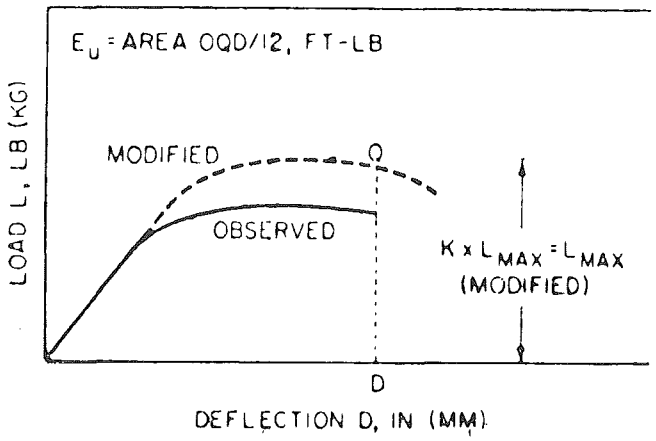


Figure V–20
Typical L–D diagram.

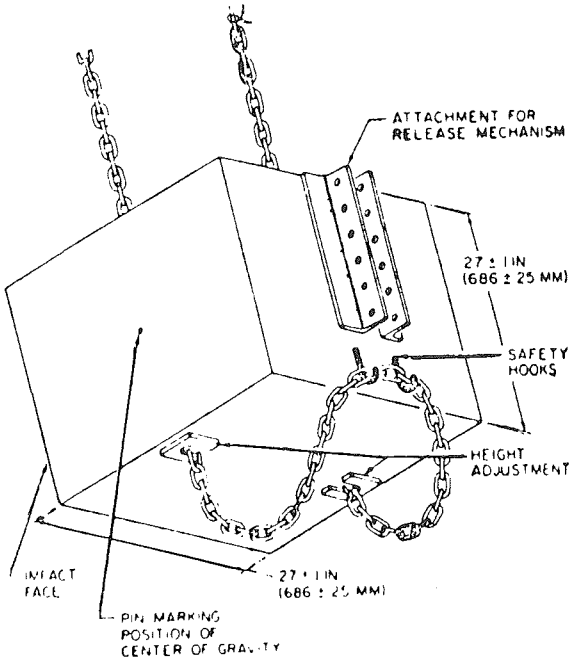


Figure V–21
Typical Modified L_m–D_m diagram.

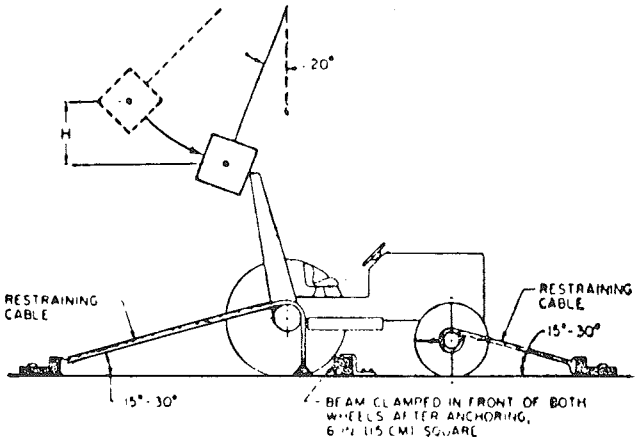


Figure V–22
Pendulum.

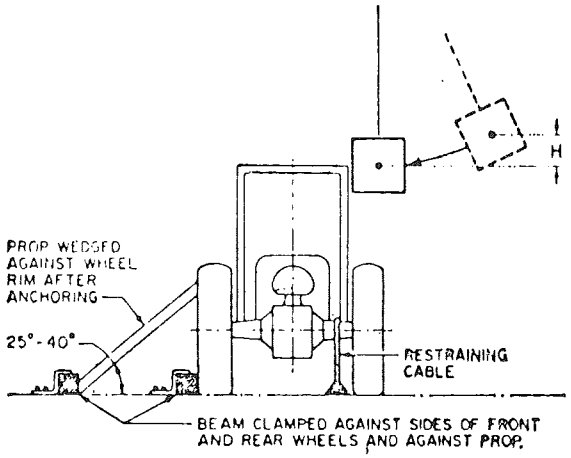


Figure V–23
Method of impact from rear.

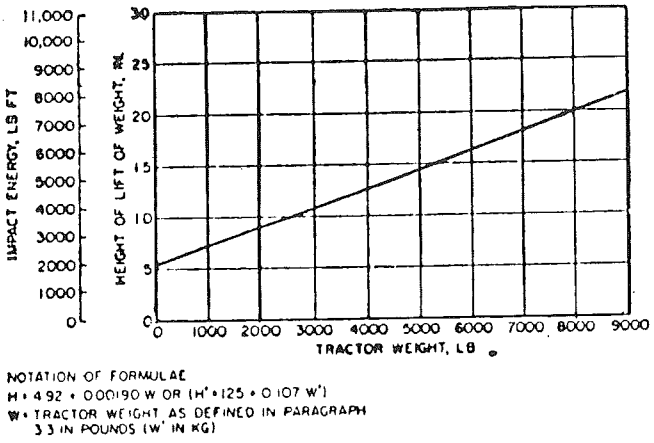


Figure V–24
Method of impact from side.

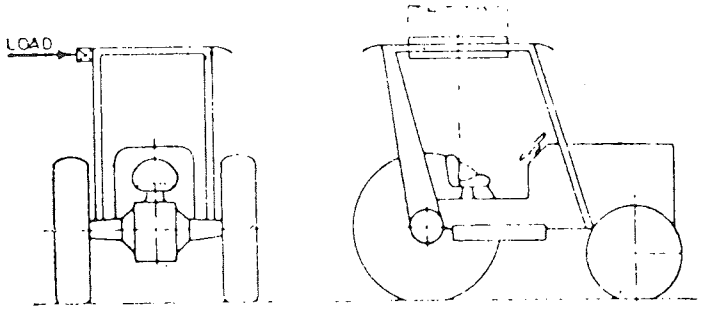


Figure V–25
Location for side load.

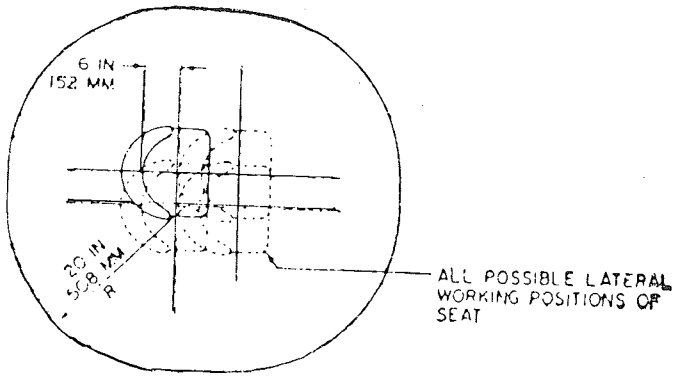


Figure V–26
Zone of protection for drop test.

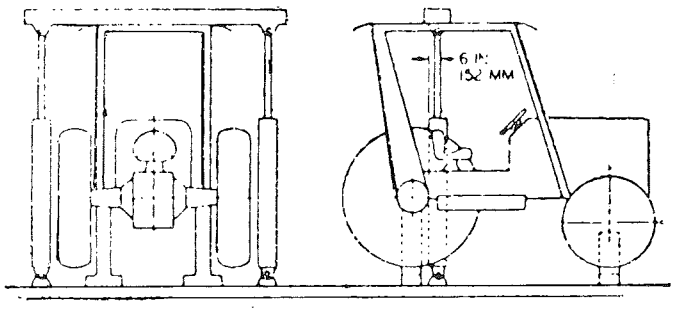


Figure V–27
Method of load application for crush test.

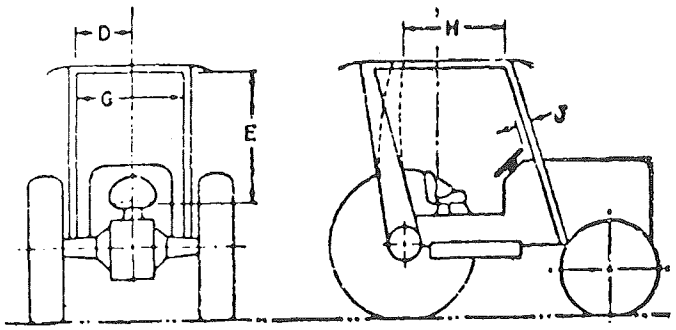


Figure V-28
Protected zone during crush and drop tests.

[Order 76-28, Exhibit B (codified as WAC 296-306-27095), filed 9/28/76.]

WAC 296-306-275 Seatbelts. (1) Where ROPS are required by this standard, the employer shall:

(a) Provide each tractor with a seatbelt which meets the requirements of this subsection;

(b) Require that each employee uses such seatbelt while the tractor is moving; and

(c) Require that each employee tightens the seatbelt sufficiently to confine the employee to the protected area provided by the ROPS.

(2) Each seatbelt shall meet the requirements set forth in Society of Automotive Engineers Standard SAE J4C, 1965 Motor Vehicle Seat Belt Assemblies, except as noted hereafter:

(a) Where a suspended seat is used, the seatbelt shall be fastened to the movable portion of the seat to accommodate a ride motion of the operator.

(b) The seatbelt anchorage shall be capable of withstanding a static tensile load of 1,000 pounds (453.6 kg) at 45 degrees to the horizontal equally divided between the anchorages. The seat mounting shall be capable of withstanding this load plus a load equal to four times the weight of all applicable seat components applied at 45 degrees to the horizontal in a forward and upward direction. In addition, the seat mounting shall be capable of withstanding a 500 pound (226.8 kg) belt load plus two times the weight of all applicable seat components both applied at 45 degrees to the horizontal in an upward and rearward direction. Floor and seat deformation is acceptable provided there is not structural failure or release of the seat adjusted mechanism or other locking device.

(c) The seatbelt webbing material shall have a resistance to acids, alkalis, mildew, aging, moisture and sunlight equal to or better than that of untreated polyester fiber. [Order 76-28, § 296-306-275, filed 9/28/76.]

Chapter 296-350 WAC
REASSUMPTION OF JURISDICTION PURSUANT TO RCW 49.17.140

WAC

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296-350-030 Notice of appeal—Filing and service.
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296-350-060 Notices of reassumption of jurisdiction and informal conferences—Service—Posting record.
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296-350-35025 Extension of abatement date(s)—Application—Contents.
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296-350-35050 Extension of abatement date(s)—Notice of hearing.
296-350-35055 Extension of abatement date(s)—Hearings.
296-350-35060 Extension of abatement date(s)—Decision and order.
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296-350-450 Complaints by employees or their representatives.
296-350-460 Complaints—Inspection not warranted—Informal review.
296-350-470 Citation not issued following complaint.
296-350-500 Citation and notice—Copy to employee representative.
296-350-990 Appendix A—Form LI 418-23—Application for copies of citations and notices.

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 Industrial Safety and Health of the Department, or his 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 Industrial Safety and Health of the Department. [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 Industrial Safety and Health, 814 E. 4th Avenue, Olympia, Washington 98504. [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 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 knowledge, information and belief there is good ground to support it. A notice of appeal may be signed by the party or by his authorized representative. [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 fifteen working days 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. [Order 76-6, § 296-350-050, filed 3/1/76; Order 75-14, § 296-350-350 (codified § 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 Industrial Safety and Health 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 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 men 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. [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. 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 fifteen working days of the determination to reassume jurisdiction over the subject matter of the appeal. Corrective notices issued following reassumption of jurisdiction shall be fowarded by certified mail or personal delivery or service. [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 296-350-200 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 RCW 49.17.090. Also included are rules on procedures to be followed by the Director or his authorized representatives following the receipt of such an application for an order granting a variance. [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 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 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. [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 discretion, the Director or his 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. [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 Industrial Safety and Health, Department of Labor and Industries, Olympia, Washington; 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 attorney or other authorized representative. [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, or class of employers, 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 Supervisor of Industrial Safety and Health, P.O. Box 207, Olympia, Washington 98504.

(2) Contents. An application filed pursuant to subsection (1) of this section shall include:

(a) The name(s) and address(es) of the applicant or applicants;

(b) The address(es) of the place or places of employment involved;

(c) A specification of the standard or portion thereof from which the applicant(s) seek(s) a variance; to include a reference to the appropriate code section or sections;

(d) A representation by the applicant(s) supported by representations from a qualified person or persons having firsthand knowledge of the facts represented, that he (they) is (are) unable to comply with the standard(s) or portion(s) thereof by its effective date and a detailed statement of the reasons therefor;

(e) A statement of the steps the applicant(s) has (have) 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(s) expect(s) to be able to comply with the standard and of what steps he (they) has (have) taken and will take, with specific dates where appropriate, to come into compliance with the standard;

(g) A statement of the facts the applicant(s) would show to establish that:

(i) The applicant(s) is (are) 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 (they) is (are) taking all available steps to safeguard his employees against the hazards covered by the standard; and

(iii) He (they) has (have) 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(s) has (have) informed his (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. [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, or class of employers, 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 Industrial Safety and Health, P.O. Box 207, Olympia, Washington, 98504.

(2) Contents. An application filed pursuant to subsection (1) of this section shall include:

(a) The name(s) and address(es) of the applicant or applicants;

(b) The address(es) of the place or places of employment involved;

(c) A specification of the standard or portion thereof from which the applicant(s) seek(s) 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 or applicants;

(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(s) has (have) informed his/her (their) 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: 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 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(s) for the order and other parties. It shall be a condition of the order that the employer(s) shall give notice thereof to affected employees by the same means to be used to inform them of an application for a variance. [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 Industrial Safety and Health that a hearing be held on the application for a temporary or permanent variance.

(2) The employer applicant(s) or his/her (their) representative may request of the Assistant Director of Industrial Safety and Health 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 RCW 49.17.090) and subsections (1) and (2) of this section shall be in writing, signed by the applicant(s), and must be received by the Assistant Director of Industrial Safety and Health 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 WAC 296-350-250(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 personnel of the staff of the Division of Industrial Safety and Health 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: 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 control, the Director after affording an opportunity for a hearing shall issue an order affirming or modifying the abatement requirements in such citation." [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 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: 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 (5) 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 personnel of the staff of the Division of Industrial Safety and Health 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 and chapter 296-08 WAC relating to practice and procedure in contested cases, as now or hereafter amended, 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: 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, WISHERS No. 1) to be furnished by the Division of Industrial Safety and Health, 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(7).

(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(7).

(6) Copies of the Act, all regulations published in this chapter and all applicable standards shall be available at all regional offices of the Division of Industrial Safety and Health, Department of Labor and Industries. If an employer has obtained copies of these materials, he shall make them available upon request to any employee or his authorized representative on the same day the request is made, or at the earliest time mutually convenient to the employee or his 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 RCW 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 RCW 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 RCW 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(7).

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 the violation(s) has been abated, or for three working days, whichever is longer.

(c) 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. [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 Industrial Safety and Health 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 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 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 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." [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 of Industrial Safety and Health requesting such review. Upon the request of the complaining party, the Assistant Director of Industrial Safety and Health 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 of Industrial Safety and Health 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 of Industrial Safety and Health 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: 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 of Industrial Safety and Health, or his/her designee, shall affirm the determination, order a re-inspection, or issue a citation if he/she believes that the inspection disclosed a violation.

(3) The Assistant Director of Industrial Safety and Health 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: 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 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 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 LI-418-23, a facsimile of which constitutes Appendix A of this section, with the Division of Industrial Safety and Health, Department of Labor and Industries, Olympia, Washington 98504.

(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: 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 LI 418-23--Application for copies of citations and notices.

APPENDIX A

APPLICATION FOR COPIES OF CITATIONS and NOTICES
ISSUED PURSUANT TO THE WASHINGTON INDUSTRIAL SAFETY AND HEALTH ACT

DIVISION OF INDUSTRIAL SAFETY AND HEALTH
P.O. BOX 207, Olympia, Wa 98504
DEPARTMENT OF LABOR AND INDUSTRIES

1) Name and address of employer having employees who are represented by the applicant:

2) Name and address of applicant to which copies of CITATIONS and NOTICES should be sent:

3) Applicant is an employee representative by virtue of (see WAC 296-350-500 reproduced below) (check the appropriate category):
(3)(a) _____ (3)(b) _____ (3)(c) _____

4) How long does applicant desire to receive copies of CITATIONS and NOTICES? (Unless a longer time is requested, application will be granted for not longer than one year.) _____

For Departmental use only

Application received _____
Application granted by _____
Date application granted _____
Applicant notified _____
Expiration date _____
Comment

CERTIFICATION: I hereby certify under penalty of perjury that the above entries are true to the best of my knowledge.

(Signed) _____

Position _____

Date _____

(1) If employee representative is such by virtue of WAC 296-350-500, evidence of that capacity, such as a letter indicating the number of employees and signed by at least one-half of them, as specified in WAC 296-27-400(2)(c), must accompany this application.

(2) The director or his authorized representative may deny this application if he finds that more than one employee representative has applied or if the applicant does not qualify as an employee representative.

(3) WAC 296-350-500 "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 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. [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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296-360-160 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 industrial safety and health.

(2) "Division" – the division of industrial safety and health of the department of labor and industries. [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.]

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, but the complaint must be in writing.

(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, 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. 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. [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 complaint shall generally be accepted. [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 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: 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 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: 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 modification 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 safety 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: 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

296-400-010 Examination fee and notification.
296-400-020 Plumbers with license or practicing the plumbing trade at effective date of the act.
296-400-030 Issuing of permits.
296-400-050 Meetings of Governor's Advisory Board.

DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

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 296-400-010 Examination fee and notification. The cost of administering the examination will be $15. The Department shall certify the results within thirty days after the examination and shall notify the applicant whether he has passed or failed. Any applicant who has failed the examination may, after thirty days from day of notification petition the Department to retake the examination upon payment of an additional $15

examination fee. [Order 73-20, § 296-400-010, filed 10/29/73.]

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 permits. (1) One out-of-state temporary permit (see section 9) will be issued prior to examination of the applicant for a period of ninety days or less.

(2) One temporary permit may be issued prior to examination to any applicant for a period of ninety days or less, subject to the approval of the department.

This permit shall be surrendered to the person conducting the examination at the time the applicant appears for said examination. If the applicant with a temporary permit does not appear for his examination upon written, certified notification, he will forfeit the fee for examination and certification: *Provided*, That extenuating circumstances deemed sufficient by the director will be considered in excusing the applicant for failure to appear for the examination. [Order 74-13, § 296-400-030, filed 4/15/74; Order 73-20, § 296-400-030, filed 10/29/73.]

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, 1974, at 300 West Harrison, Seattle, Washington. [Order 73-20, § 296-400-050, filed 10/29/73.]

Chapter 296-401 WAC
CERTIFICATION OF COMPETENCY FOR JOURNEYMAN ELECTRICIANS

WAC

296-401-010 Examination and fees.
296-401-020 Electricians with licenses or practicing the electrical trade at effective date of the act.
296-401-030 Issuing of permits.
296-401-050 Meetings of governor's advisory board.
296-401-060 Specialty certificates.
296-401-070 Eligibility for specialty examination.
296-401-080 Eligibility for journeyman's examination.
296-401-090 Status of person who has failed an examination for a journeyman certificate of competency.
296-401-100 Computation of years of employment.
296-401-110 Previous experience credit.
296-401-120 Electrical trainee certificates.
296-401-130 Annual renewal of electrical journeyman, specialty, and trainee certificates.
296-401-140 Supervision of trainees in the electrical trades.
296-401-150 Penalties for false statements or material misrepresentation.
296-401-160 Enforcement.
296-401-170 Hearing procedure.
296-401-180 Examination subjects for specialty's and journeyman's certificates of competency.

DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

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.

WAC 296-401-010 Examination and fees. The department shall certify the results within thirty days after the examination and shall notify the applicant whether he has passed or failed. Any applicant who has failed the examination may, after thirty days from date of notification, petition the department to retake the examination upon payment of an additional $15 examination fee. [Order 73-21, § 296-401-010, filed 11/5/73.]

WAC 296-401-020 Electricians with licenses or practicing the electrical trade at effective date of the act. Any application for certification under RCW 18.37.070 of this act must be received by the department prior to December 14, 1973. As defined in RCW 18.37.040 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. [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 permits. (1) One out-of-state temporary permit (see section 8) will be issued prior to examination of the applicant for a period of ninety days or less.

(2) One temporary permit may be issued prior to examination to any applicant for a period of ninety days or less, subject to the approval of the department.

This permit shall be surrendered to the person conducting the examination at the time the applicant appears for said examination. If the applicant with a temporary permit does not appear for his examination upon written, certified notification, he will forfeit the fee for examination and certification: *Provided*, That extenuating circumstances deemed sufficient by the director will be considered in excusing the applicant for failure to appear for the examination. [Order 74-12, § 296-401-030, filed 4/15/74; Order 73-21, § 296-401-030, filed 11/5/73.]

WAC 296-401-050 Meetings of governor's advisory board. The governor's advisory board meetings will be regularly scheduled quarterly starting the second Thursday of January, 1974, commencing at 10:00 a.m. at 300 West Harrison, Seattle, Washington, Room 412. [Order 73-21, § 296-401-050, 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. The holder of a residential certificate is limited to wiring one and two-family dwellings, or multi-family dwellings that do not exceed three floors above grade. All wiring shall be in nonmetallic sheathed cable, except service and feeder wiring.

(2) Domestic appliances. 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.

(3) Pump and irrigation. 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.

(4) Limited energy system. 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.

(5) Signs. The holder is limited to placing and connecting signs and outline lighting and their electrical supply, controls, and associated circuit extensions. [Statutory Authority: RCW 18.37.130. 80-02-052 (Order 80-1), § 296-401-060, filed 1/16/80.]

WAC 296-401-070 Eligibility for specialty examination. A person holding an electrical trainee certificate who has:

(1) Been employed under the direct supervision of a journeyman electrician for four years, or who has completed a four year apprenticeship program in electrical construction that is registered with the state apprenticeship council or the Federal Bureau of Apprenticeship and Training, shall be eligible to take the examination for any of the specialty certificates of competency listed in WAC 296-401-060; or

(2) Been employed for two years under the direct supervision of a journeyman or specialty electrician working in one of the specialties listed in WAC 296-401-060 shall be eligible to take the examination for the specialty in which he or she has been trained. [Statutory Authority: RCW 18.37.130. 80-02-052 (Order 80-1), § 296-401-070, filed 1/16/80.]

WAC 296-401-080 Eligibility for journeyman's examination. A person holding an electrical trainee certificate who has been employed under the direct supervision of a journeyman electrician for four years, or who has completed a four year apprenticeship program in electrical construction that is registered with the state apprenticeship council or the Federal Bureau of Apprenticeship and Training, or who is a graduate of a trade school program in electrical construction that was established during 1946, shall be eligible to take the examination for a journeyman's certificate of competency. A person who has had two years of schooling under the conditions provided in RCW 18.37.040 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's certificate of competency. [Statutory Authority: RCW 18.37.130. 80-02-052 (Order 80-1), § 296-401-080, filed 1/16/80.]

WAC 296-401-090 Status of person who has failed an examination for a journeyman certificate of competency. (1) A person who fails an examination for a journeyman's certificate of competency may take a 90 day refresher course.

(2) A person taking a refresher course shall have the status of a fourth year trainee and may work with supervision.

(3) If any person refuses to take the refresher course, or finishes the refresher course and again fails the examination, that person shall have the status of a fourth year trainee; however, that person may not work without supervision until he or she passes an examination for a journeyman or specialty certificate of competency. [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. (1) For the purposes of RCW 18.37.040, 1800 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 electrical industry for the previous year and the number of hours worked for each employer.

(3) A person who has completed a four year apprenticeship program in electrical construction 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.

(4) A person who has completed a two year apprenticeship program in an electrical specialty that is registered with the state apprenticeship council or the Federal Bureau of Apprenticeship and Training shall be considered to have completed 3600 hours (two years) of employment. [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 trainee certificates. (1) The department shall issue separate electrical trainee certificates for the first, second, third, and fourth years

of training. If a person has less than 1800 hours of employment in electrical construction, the department shall give the individual a first year certificate; if more than 1799 but less than 3600 hours a second year certificate; if more than 3599 but less than 5400 hours, a third year certificate; and if more than 5399 hours a fourth year certificate.

(2) A holder of an electrical trainee certificate may apply for the next year's certificate whenever he or she has sufficient hours of employment.

(3) A holder of an electrical trainee 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 commission for vocational education. [Statutory Authority: RCW 18.37.130. 80-02-052 (Order 80-1), § 296-401-120, filed 1/16/80.]

WAC 296-401-130 Annual renewal of electrical journeyman, specialty, and trainee certificates. (1) (a) Each holder of a journeyman's or specialty electrician's certificate of competency must renew his or her certificate on or before July 1 each year. A fee of fifteen dollars is required upon renewal.

(b) A person who does not renew his or her certificate by July 1 must apply for and retake the examination for the specialty or journeyman electrician's certificate of competency. An application for renewal that is not received by July 1 shall be considered an application to take the examination.

(2) Each holder of an electrical trainee certificate must renew his or her certificate annually on or before the date the certificate was issued, regardless of the number of hours the holder worked that year. A fee of five dollars is required upon renewal. [Statutory Authority: RCW 18.37.130. 80-02-052 (Order 80-1), § 296-401-130, filed 1/16/80.]

WAC 296-401-140 Supervision of trainees in the electrical trades. A person possessing a training certificate (trainee) shall be under the direct supervision of a supervising electrician as defined in RCW 18.37.020. The supervising electrician shall be working on the same job site and within the immediate working proximity of the trainee. The supervising electrician must assign and examine the trainee's electrical work to see that it conforms to the applicable electrical codes. [Statutory Authority: RCW 18.37.130. 80-02-052 (Order 80-1), § 296-401-140, filed 1/16/80.]

WAC 296-401-150 Penalties for false statements or material misrepresentation. All applications required under chapter 18.37 RCW and the annual statement of hours of employment required under RCW 18.37.020, 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 18.37.150 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 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 18.37 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.

(2) The compliance officer 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 specialty certificate of competency.

(3) If the compliance officer determines that an employer or employee has violated chapters 18.37 RCW or 296-401 WAC, the department shall issue a notice of violation that describes the reason the employer or employee has violated chapters 18.37 RCW or 296-401 WAC and prescribes a time for abatement of the violation.

(4) If the employer or employee has not abated the violation within the time prescribed in the notice of violation issued pursuant to subsection (3), the department may:

(a) Inform the electrical inspection section and the electrical utility that the electrical worker or workers on the job site are in violation of chapters 18.37 RCW or 296-401 WAC pursuant to the authority granted in RCW 18.27.150 [RCW 18.37.150]. The electrical inspection section shall prohibit the connection of electrical service and the utility shall not connect the electrical service until the department is satisfied that the electrical work complies with chapters 18.37 RCW and 296-401 WAC.

(b) Ask the attorney general to begin an action to collect the civil penalties provided for in RCW 18.37-.150; and

(c) Issue a cease and desist order that forbids future conduct that is similar to the violation. The order shall take effect immediately when it is received by the employer or employee to whom it is directed.

(5) The employer or employee to whom a cease and desist order is directed may request a hearing pursuant to WAC 296-401-170; however, the request shall not stay the effect of the 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 18.37.130. 80-02-052 (Order 80-1), § 296-401-160, filed 1/16/80.]

WAC 296-401-170 Hearing procedure. An employer or employee to whom a cease and desist order is directed; a person who is aggrieved by the department's denial of a trainee, journeyman, or specialty certificate, or the opportunity 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 hearing within 10 days from receipt of the cease and desist order, the denial, or the reduction of hours. The department shall appoint a person to preside over the hearing. The appeal shall be held in conformance with the requirements of the Administrative Procedure Act, chapter 34.04 RCW. [Statutory Authority: RCW 18.37.130. 80-02-052 (Order 80-1), § 296-401-170, filed 1/16/80.]

WAC 296-401-180 Examination subjects for specialty's and journeyman's certificates of competency. The following subjects are among those that may be included in the examination for 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 THESE ITEMS:

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 & Feeders; Electrical Symbols; Elevation Views Plans 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 400 volts; 480/277 Volts; Three-Phase Delta; Distribution

SPECIALTY RESIDENTIAL ELECTRICIAN EXAMINATIONS MAY BE BASED ON THESE ITEMS:

AC – Meters
Blueprints – Residential Plans; Floor Plans; Service and Feeders
Calculations
Circuits – Series; Parallel; Combination; Basic; Outside Branch
Conductor – Voltage Drop (line loss); Grounded; Aluminum
Conduit – Wiring Methods
Electrical Units
First Aid
Fuses
General Lighting
Grounding of Conductors
Insulation of Wire
Ladder Safety
Mathematics – Figuring Percentage
Ohm's Law
Overcurrent Protection
Resistance of Wire
Services
Sizes of Building Wire
Three-Wire System
Tolls[Tools]
Transformer – Ratios; Single-Phase

[Statutory Authority: RCW 18.37.130. 80-02-052 (Order 80-1), § 296-401-180, filed 1/16/80.]