



RULE-MAKING ORDER
(RCW 34.05.360)

CR-103 (10/1/89)

Agency: State Building Code Council

Permanent Rule
 Emergency Rule

(1) Date of adoption: November 8, 1991

(2) Purpose:
To adopt by reference the 1991 edition of the Uniform Mechanical Code with amendments as Chapter 51-22 WAC.

(3) Citation of existing rules affected by this order:
Repealed:
Amended:
Suspended:

(4) Authority for adoption: RCW 19.27.074, 19.27.031, 19.27A.070 through 19.27A.100
Statute: Chapters 19.27 and 19.27A RCW
Other Authority:

(5.1) **PERMANENT RULE ONLY**
Pursuant to notice filed as WSR 91-16-114 on August 7, 1991 (date).
Describe any changes other than editing from proposed to adopted version:

(5.2) **EMERGENCY RULE ONLY**
Pursuant to RCW 34.05.350 the agency for good cause finds:
 (a) That immediate adoption, amendment, or repeal of a rule is necessary for the preservation of the public health, safety, or general welfare, and that observing the time requirements of notice and opportunity to comment upon adoption of a permanent rule would be contrary to the public interest.
 (b) That state or federal law or federal rule or a federal deadline for state receipt of federal funds requires immediate adoption of a rule.

Reasons for this finding:

(5.3) Any other findings required by other provisions of law as precondition to adoption or effectiveness of rule?
 Yes No If yes, explain:

(6) Effective date of rule:
Permanent Rules **Emergency Rules**
 31 days after filing Immediately
 Other (specify) July 1, 1992 Later (specify) _____
*(If less than 31 days after filing, specific finding in 5.3 under RCW 34.05.380(3) is required)

CODE REVISER USE ONLY

CODE REVISER'S OFFICE
STATE OF WASHINGTON
FILED

DEC 13 1991

TIME 10:23 ALL
MM

WSR 92-01-065

NAME (TYPE OR PRINT)
Gene J. Colin
SIGNATURE

TITLE
Chair
DATE
11/8/91

Chapter 51-22 WAC

STATE BUILDING CODE ADOPTION AND AMENDMENT OF THE 1991 EDITION OF THE
UNIFORM MECHANICAL CODENEW SECTION

WAC 51-22-001 AUTHORITY. These rules are adopted under the authority of chapter 19.27 RCW.

NEW SECTION

WAC 51-22-002 PURPOSE. The purpose of these rules is to implement the provisions of chapter 19.27 RCW, which provides that the state building code council shall maintain the State Building Code in a status which is consistent with the purpose as set forth in RCW 19.27.020. In maintaining the codes the council shall regularly review updated versions of the codes adopted under the act, and other pertinent information, and shall amend the codes as deemed appropriate by the council.

NEW SECTION

WAC 51-22-003 UNIFORM MECHANICAL CODE. The 1991 edition of the Uniform Mechanical Code, including Chapter 22, Fuel Gas Piping, Appendix B, published by the International Conference of Building Officials and the International Association of Plumbing and Mechanical Officials is hereby adopted by reference with the exceptions noted in this WAC.

NEW SECTION

WAC 51-22-004 CONFLICT BETWEEN UNIFORM MECHANICAL CODE AND STATE ENERGY CODE CHAPTER 51-11 WAC. In the case of conflict between the duct sealing or insulation requirements of section 1002 or section 1005 of this code and the duct sealing or insulation requirements of Chapter 51-11 WAC, the Washington State Energy Code, or where applicable, a local jurisdiction's energy code, the provisions of such energy codes shall govern.

NEW SECTION

WAC 51-22-005 CONFLICT BETWEEN UNIFORM MECHANICAL CODE AND STATE VENTILATION AND INDOOR AIR QUALITY CODE CHAPTER 51-13 WAC. In the case of conflict between the Group R ventilation requirements of this code and the Group R ventilation requirements of Chapter 51-13 WAC, the Washington State Ventilation and Indoor Air Quality Code, the provisions of the ventilation and indoor air quality code shall govern.

NEW SECTION

WAC 51-22-007 EXCEPTIONS. The exceptions and amendments to the Uniform Mechanical Code contained in the provisions of chapter 19.27 RCW shall apply in case of conflict with any of the provisions of these rules.

NEW SECTION

WAC 51-22-008 IMPLEMENTATION. The Uniform Mechanical Code adopted by chapter 51-22 WAC shall become effective in all counties and cities of this state on July 1, 1992, unless local amendments have been approved by the state building code council.

NEW SECTION

WAC 51-22-0400 CHAPTER 4 DEFINITIONS AND ABBREVIATIONS.

NEW SECTION

WAC 51-22-0423 U. Section 423. U.B.C. standards is the Uniform Building Code Standards promulgated by the International Conference of Building Officials, as adopted by this jurisdiction.

UNCONFINED SPACE is a room or space having a volume equal to at least 50 cubic feet per 1000 Btu/h of the aggregate input rating of all fuel-burning appliances installed in that space. Rooms communicating directly with the space in which the appliances are installed, through openings not furnished with doors, are considered a part of the unconfined space.

UNIT HEATER is a heating appliance designed for nonresidential space heating and equipped with an integral means for circulation of air.

UNIT REFRIGERATION SYSTEM is a refrigerating unit not to exceed three-horsepower rating and which has been factory assembled and tested prior to its installation. Such unit shall not be connected to any ductwork. The unit shall be a complete one-unit package without remote parts.

UNUSUALLY TIGHT CONSTRUCTION is construction where:

(a) Walls and ceilings exposed to the outside atmosphere have a continuous water vapor retarder with a rating of one perm or less with any openings gasketed or sealed, and

(b) Weatherstripping on openable windows and doors, and

(c) Caulking or sealants are applied to areas such as joints around window and door frames, between sole plates and floors, between wall-ceiling joints, between wall panels and at penetrations for plumbing, electrical and gas lines and at other openings, and

(d) Any building built using the 1986 or 1991 Washington State Energy Code, 1986 or 1990 Northwest Energy Code, or Super Good Cents weatherization standards or equivalent.

NEW SECTION

WAC 51-22-0500 CHAPTER 5 EQUIPMENT--GENERAL.

NEW SECTION

WAC 51-22-0504 INSTALLATION. Section 504. (a) Listed Appliances. Except as otherwise provided in the code, the installation of appliances regulated by this code shall conform to the conditions of listing. The appliance installer shall leave the manufacturer's installation and operating instructions attached to the appliance. Clearances of listed appliances from combustible materials shall be as specified in the listing or on the rating plate.

(b) Room Large in Comparison to Size of Equipment. Central heating furnaces not listed for closet or alcove installation shall be installed in a room or space having a volume at least 12 times the total volume of the furnace; central heating boilers not listed for closet or alcove installation shall be installed in a room or space having a volume 16 times the volume of the boiler. If the ceiling height of the room or space is greater than 8 feet, the volume shall be calculated on the basis of 8-foot height.

(c) Unlisted Appliances. Unlisted appliances shall be installed with the standard clearances from combustible construction specified in Table No. 5-A. Unlisted appliances may have the standard clearances of Table No. 5-A reduced by employing the forms of protection specified in Table No. 5-B. Forms of protection specified in Table No. 5-B may be utilized to reduce clearances to combustible construction for all applicable appliances.

(d) Anchorage of Appliances. Appliances designed to be fixed in position shall be securely fastened in place. Supports for appliances shall be designed and constructed to sustain vertical and horizontal loads within the stress limitations specified in the Building Code. All floor supported mechanical equipment and fixed appliances shall be anchored to the structure to resist displacement vertically and on both horizontal axis due to seismic motion. Suspended mechanical equipment and appliances shall have rigid vertical hangers and be braced in both horizontal directions. Connections by pipes or ducts which are or contain nonrigid elements, are not of inherent sufficient strength, or which are not themselves adequately anchored shall not be acceptable as equipment or appliance anchors. Approved, factory-fabricated isolation cushions and dampers are permitted between supports or braces and the equipment housing. In no case shall flues or vents be used to support or restrain equipment or appliances.

(e) Identification of Equipment. When more than one heating, cooling, ventilating or refrigerating system is installed on the roof of a building or within the building, it shall be permanently identified as to the area or space served by the equipment.

(f) LPG Appliances. Liquefied petroleum gas-burning appliances shall not be installed in a pit, basement or similar location where heavier-than-air gas might collect. Appliances so fueled shall not be installed in an above-grade under-floor space or basement unless such location is provided with an approved means for removal of unburned gas.

NEW SECTION

WAC 51-22-0800 CHAPTER 8 VENTED DECORATIVE APPLIANCES, FLOOR FURNACES, VENTED WALL FURNACES, UNIT HEATERS AND ROOM HEATERS.

NEW SECTION

WAC 51-22-0807 ROOM HEATERS. Section 807. (a) Vented Freestanding. Vented freestanding room heaters shall be installed with clearances from combustible material as set forth in Table No. 5-A.

EXCEPTION: Heaters listed for reduced clearances may be installed at the clearances specified on the required manufacturer's label.

Vented freestanding room heaters shall not be located so that a door can swing within less than 12 inches of a warm-air outlet of the heater, measured at right angles to the outlet. Doorstops or door closers shall not be installed to obtain such clearance.

Vented freestanding room heaters shall be located at least 36 inches below any part of a structure projecting over the heater. This projection shall include doors or windows that could project over the heater.

Vented freestanding room heaters shall be safely and securely installed to prevent accidental displacement.

(b) Vented Overhead. Vented overhead room heaters shall be safely and securely supported with hangers and brackets of noncombustible material and shall be installed with clearances from combustible material as specified on the required manufacturer's label.

EXCEPTION: Installation of overhead heaters in aircraft storage or servicing areas of Group B, Division 3 Occupancies shall comply with the requirements of Section 802.

(c) Unvented. Unvented fuel-burning room heaters shall not be installed, used, maintained or permitted to exist in a Group I Occupancy nor shall an unvented heater be installed in any building, whether as a new or as a replacement installation, unless permitted by this section. This subsection shall not apply to portable oil-fired unvented heating appliances used as supplemental heating in Group B and M Occupancies and regulated by the Fire Code.

Approved, unvented portable oil-fueled heaters may be used as a supplemental heat source in any Group M, R, B-2, or B-4 Occupancy provided that such heaters shall not be located in any sleeping room or bathroom, and shall comply with RCW 19.27A.080, 19.27A.090, 19.27A.100, 19.27A.110, and 19.27A.120.

(d) Overhead Radiant Heaters. Listed or approved unvented overhead room heaters may be installed in Group A, Division 2, 2.1, 3, or 4; Groups B, H, Division 4; Group H, Division 5, or Group M Occupancy, provided the installation conforms to all of the following requirements:

1. All portions of the heater are located at least 8 feet above the floor.

2. At least two unobstructed permanent openings are provided to the room or space containing such heaters. These openings shall open directly to the outside of the building through the floor, roof or wall. The minimum combined total area of these openings shall be at least 1 square inch for each 1000 Btu/h input of the heater or heaters, with a minimum total area of 100 square inches. One half of the required openings shall be above the heater or heaters and one half shall be located below the heater or heaters.

EXCEPTION: When approved by the building official, provisions may be made to exhaust the products of combustion to the exterior by mechanical means.

3. Heaters shall be safely and securely supported with hangers and brackets of noncombustible material and installed with clearances from combustible material as specified on the required manufacturer's label.

NEW SECTION

WAC 51-22-1000 CHAPTER 10 DUCTS.

NEW SECTION

WAC 51-22-1002 MATERIAL. Section 1002. (a) General. Supply air, return air and outside air for heating, cooling or evaporative cooling systems shall be conducted through duct systems constructed of metal as set forth in Tables Nos. 10-A, 10-B and 10-C; metal ducts complying with U.M.C. Standard No. 10-2 with prior approval; or factory-made air ducts complying with U.M.C. Standard No. 10-1. Ducts, plenums and fittings may be constructed of concrete, clay, ceramics or other approved nonmetallic materials when installed in the ground or in a concrete slab, provided the joints are tightly sealed.

Corridors shall not be used to convey air to or from rooms if the corridor is required to be of fire-resistive construction by Section 3305 (g) of the U.B.C.

- EXCEPTIONS:
1. Where such air is part of an engineered smoke control system.
 2. Corridors conforming to Section 3320 (c) of the Uniform Building Code in Group I Occupancies.
 3. Corridors serving residential occupancies may be supplied without specific mechanical exhaust subject to the following:
 - A. The supply air is 100% outside air, and
 - B. The units served by the corridor have conforming ventilation independent of the air supplied to the corridor, and
 - C. For other than high-rise buildings, the supply fan will automatically shut off upon activation of corridor smoke detectors which shall be spaced at no more than 30 feet on center along the corridor, or
 - D. For high-rise buildings, corridor smoke detector activation will close required smoke/fire dampers at the supply inlet to the corridor at the floor receiving the alarm.

Concealed building spaces or independent construction within buildings may be used as ducts or plenums.

When gypsum products are exposed in ducts or plenums, the air temperature shall be restricted to a range from 50°F. to 125°F. and moisture content shall be controlled so that the material is not adversely affected. For the purpose of this Section, gypsum products shall not be exposed in ducts serving the direct exhaust from evaporative coolers, and in other air-handling systems regulated by this chapter where the design engineer determines that the temperature of the gypsum product will be below the dew point temperature under normal operating conditions.

See Section 904 for limitations on combustion products venting systems extending into or through duct or plenums.

See Section 1104 for limitations on environmental air systems exhaust ducts extending into or through ducts or plenums.

(b) Combustibles within Ducts or Plenums. Materials exposed within ducts or plenums shall have a flame-spread index of not more than 25 and a smoke-developed rating of not more than 50 when tested in accordance with the test for Surface Burning Characteristics of Building Materials, U.B.C. Standard No. 42-1.

- EXCEPTIONS:
1. Return-air and outside-air ducts, plenums or concealed spaces which serve a dwelling unit may be of combustible construction.

2. Air filters serving a dwelling unit.
3. Air filters listed by an approved testing agency as complying with reference standards included in Appendix C.
4. Air filters used as water evaporation medium in an evaporative cooler.
5. Charcoal filters when protected with an approved fire suppression system.
6. Electrical wiring in plenums shall comply with the Electrical Code. Flame propagation and smoke production characteristics of exposed electric cables installed in concealed space used as air plenums shall:
 - A. Exhibit a flame travel of 5 feet or less, and
 - B. Produce smoke having an average optical density not greater than 0.15 and having a peak optical density of 0.5 or less when tested in accordance with U.M.C. Standard No. 10-3.
 - C. Wiring meeting these requirements shall be listed and labeled as plenum cable as required by the Electrical Code.
7. Nonmetallic fire sprinkler piping in plenums shall be listed and shall meet the following requirements:
 - A. Exhibit flame travel of 5 feet or less, and
 - B. Produce smoke having an average optical density not greater than 0.15 and having a peak optical density of 0.5 or less when tested in accordance with U.M.C. Standard No. 10-3.

(b) **Factory-made Air Ducts.** Factory-made air ducts shall be approved for the use intended or shall conform to the requirements of U.M.C. Standard No. 10-1. Each portion of a factory-made air duct system shall be identified by the manufacturer with a label or other suitable identification indicating compliance with U.M.C. Standard No. 10-1 and its class designation. These ducts shall be listed and shall be installed in accordance with the terms of their listing, and the requirements of U.M.C. Standard No. 10-5.

(c) **Joints and Seams of Ducts.** Joints of duct systems shall be made substantially airtight by means of tapes, mastics, gasketing or other means.

Crimp joints for residential round ducts shall have a contact lap of at least 1 1/2 inch and shall be mechanically fastened by means of at least three sheet-metal screws equally spaced around the joint, or an equivalent fastening method.

Joints and seams for 0.016-inch (No. 28 gage) and 0.013-inch (No. 30 gage) residential rectangular ducts shall be as specified in Table No. 10-A for 0.019-inch (No. 26 gage) material.

Joints and seams for rectangular duct systems shall be as specified in Table No. 10-A.

Joints and seams for flat oval ducts and round ducts in other than single dwelling units shall be as specified in Table No. 10-B.

Joints and seams and all reinforcements for factory-made air ducts and plenums shall meet with the conditions of prior approval in accordance with the installation instructions that shall accompany the product.

(d) **Metal.** Every duct, plenum or fitting of metal shall comply with Table No. 10-A or Table No. 10-B.

EXCEPTIONS:

1. Ducts, plenums and fittings for systems serving single dwelling units may comply with Table No. 10-C.
2. Duct systems complying with U.M.C. Standard No. 10-1.

(e) **Tin.** Existing tin ducts may be used when cooling coils are added to a heating system, provided the first 10 feet of the duct or plenum measured from the cooling coil discharge are constructed of metal of the gage thickness set forth in Table No. 10-A, No. 10-B or No. 10-C of this chapter or are of approved material and construction. Tin ducts completely enclosed in inaccessible concealed areas need not

be replaced. All accessible ducts shall be insulated to comply with Table No. 10-D of this chapter. For the purpose of this subsection, ducts shall be considered accessible where the access space is 30 inches or greater in height.

(f) Vibration Isolators. Vibration isolators installed between mechanical equipment and metal ducts (or casings) shall be made of an approved material and shall not exceed 10 inches in length.

NEW SECTION

WAC 51-22-1100 CHAPTER 11 VENTILATION SYSTEMS AND PRODUCT-CONVEYING SYSTEMS.

NEW SECTION

WAC 51-22-1104 ENVIRONMENTAL AIR DUCTS. Section 1104. Environmental air ducts not regulated by other provisions of this code shall comply with this section. Ducts shall be substantially airtight and shall comply with the provisions of Chapter 10. Exhaust ducts shall terminate outside the building and shall be equipped with back-draft dampers. Environmental air ducts which have an alternate function as a part of an approved smoke-control system do not require design as Class 1 product-conveying ducts.

Ducts used for domestic kitchen range ventilation and domestic clothes dryers shall be of metal and shall have smooth interior surfaces. Commercial dryer exhaust ducts shall be installed in accordance with their listing. For additional requirements for domestic dryer exhaust systems, see Section 1903.

EXCEPTION: Approved flexible duct connectors not more than 6 feet in length may be used in connection with domestic dryer exhausts. Flexible duct connectors shall not be concealed within construction.

Bathroom and laundry room exhaust ducts may be of gypsum wall-board subject to the limitations of Section 1002 (a).

When gypsum products are exposed in ducts and plenums, the air temperature shall be restricted to a range from 50°F to 125°F and moisture content shall be controlled so that the material is not adversely affected. For the purpose of this Section, gypsum products shall not be exposed in ducts serving exhaust from public showers, swimming pools, jacuzzi rooms and in other air-handling systems where the design engineer determines that the temperature of the gypsum product will be below the dew point temperature under normal operating conditions.

Exhaust ducts shall not extend into or through ducts or plenums.

EXCEPTIONS Exhaust ducts conveying environmental air may pass through a duct or plenum provided that:

1. The duct is maintained under sufficient negative pressure to prevent leakage of the exhaust air to the surrounding duct or plenum; or
2. If maintained under a positive pressure with respect to the surrounding duct or plenum, the exhaust duct will be sealed to prevent leakage; or
3. The surrounding air stream is an exhaust air stream not intended for recirculation to the building and cross contamination of the two air streams will not create a hazardous condition.

NEW SECTION

WAC 51-22-1500 CHAPTER 15 MECHANICAL REFRIGERATING EQUIPMENT.

NEW SECTION

WAC 51-22-1508 REFRIGERATION MACHINERY ROOM VENTILATION. Section 1508. Refrigeration machinery rooms shall be provided with means of ventilation to the outside of the building. Such ventilation shall also incorporate provisions for emergency ventilation. The two requirements may be combined in one system, conforming to the following requirements:

1. An emergency exhaust system serving no other area and having the capacity to provide a complete change of air in such room at least once every five minutes and discharge to the outside of the building at a location not less than 20 feet from any exterior door, window or any operable opening in any building. Provisions shall be made for makeup air to replace that being exhausted. Each exhaust ventilation system shall be controlled by a readily accessible emergency ventilation switch located within 2 feet of the switch specified in Section 1509, and the switch shall be labeled to comply with Section 1519. Operating status indicator shall be provided at the switch and at the fire control center.

2. A mechanical ventilation system or gravity ventilation openings to the outside of the building shall be sized in accordance with Table No. 15-B based on accumulated horsepower in the rooms with refrigeration units and shall operate continuously.

Gravity openings shall be so installed that approximately one-half of the required area is located within 12 inches of the ceiling and one-half of the required area is located within 12 inches of the floor of the room. Every portion of the lower opening shall be horizontal or slope downward from the opening in the refrigeration machinery room to the exterior of the building at or above the adjacent ground level.

Equipment and components located in a refrigeration machinery room shall be protected from freezing or other low temperature damage.

3. Where gravity ventilation is not provided, operation of the mechanical ventilation shall occur anytime the space is occupied, or operations or maintenance personnel are present.

NEW SECTION

WAC 51-22-1900 CHAPTER 19 MISCELLANEOUS HEAT-PRODUCING APPLIANCES.

NEW SECTION

WAC 51-22-1903 CLOTHES DRYERS. Section 1903. (a) Moisture Exhaust Ducts. Moisture exhaust ducts shall terminate on the outside of the building and shall be equipped with a back-draft damper. Screens shall not be installed at the duct termination. Ducts for exhausting clothes dryers shall not be connected or installed with sheet metal screws or other fasteners which will obstruct the flow. Clothes dryer moisture-exhaust ducts shall not be connected to a gas vent connector, gas vent or chimney. Clothes dryer moisture-exhaust

ducts shall not extend into or through ducts or plenums. Clothes dryer exhaust ducts shall be protected by a steel plate or clip not less than 1/16 inch (1.59 mm) in thickness and of sufficient width to fully protect the duct. Plates or clips shall be placed on the finish face of all framing members which the clothes dryer exhaust duct passes through when there is less than one-and-one-quarter inch (1 1/4") of framing material between the duct and the finish face. Plates or clips shall also be placed where nails or screws from finish or other work are likely to penetrate the clothes dryer exhaust duct.

(b) Length Limitation. Unless otherwise permitted or required by the dryer manufacturer's installation instructions and approved by the building official, domestic dryer moisture-exhaust ducts shall not exceed a total combined horizontal and vertical length of 14 feet, including two 90-degree elbows. Two feet shall be deducted for each 90-degree elbow in excess of two.

(c) Domestic Clothes Dryers. When a compartment or space for a domestic clothes dryer is provided, a minimum 4-inch-diameter moisture-exhaust duct of approved material shall be installed in accordance with this section and Section 1104.

(d) Commercial Clothes Dryers. The installation of commercial clothes dryer exhaust ducts shall comply with the appliance manufacturer's installation instructions.