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 18, 1994

(2) Purpose: To amend and adopt the 1994 Uniform Mechanical Code, published by the International Conference of Building Officials (WAC 51-32).

(3) Citation of existing rules affected by this order:
Repealed: ~~WAC 51-22~~ 25
Amended:
Suspended:

(4) Authority for adoption:
Statute: RCW 19.27
Other Authority:

(5 1) **PERMANENT RULE ONLY**
Pursuant to notice filed as WSR 94-16-118 on 8/2/94 (date)
Describe any changes other than editing from proposed to adopted version: None

(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) 6/30/95 *	☐ Later (specify) _____

*(If less than 31 days after filing, specific finding in 5.3 under RCW 34.05.380(3) is required)

NAME (TYPE OR PRINT)
Gene Colin

SIGNATURE

TITLE
Chair

DATE
12/21/94

CODE REVISER USE ONLY

CODE REVISER'S OFFICE
STATE OF WASHINGTON
FILED
DEC 21 1994
TIME: 11:26
WSR 95-01-123

Chapter 51-32 WAC

STATE BUILDING CODE ADOPTION AND AMENDMENT OF THE 1994 EDITION OF THE UNIFORM MECHANICAL CODE

NEW SECTION

WAC 51-32-001 Authority. These rules are adopted under the authority of chapter 19.27 RCW.

NEW SECTION

WAC 51-32-002 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 51-32-003 Uniform Mechanical Code. The 1994 edition of the Uniform Mechanical Code, including Chapter 13, Fuel-Gas Piping, Appendix B, published by the International Conference of Building Officials is hereby adopted by reference with the exceptions noted in this chapter of the Washington Administrative Code.

NEW SECTION

WAC 51-32-004 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 601 or Section 604 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 51-32-005 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 51-32-007 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 51-32-008 Implementation. The Uniform Mechanical Code adopted by chapter 51-32 WAC shall become effective in all counties and cities of this state on June 30, 1995.

NEW SECTION

WAC 51-32-0200 Chapter 2--Definitions.

NEW SECTION

WAC 51-32-0223 Section 223--U.

U.B.C. STANDARDS are those standards published in Volume 3 of the *Uniform Building Code* 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 1,000 Btu/h (4.831 L/W) 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.

UNUSUALLY TIGHT CONSTRUCTION is construction where:

1. 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
2. Weatherstripping on openable windows and doors, and
3. 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, or
4. Buildings built in compliance with the 1986 or later editions of the Washington State Energy Code (WAC 51-11), Northwest Energy Code, or Super Good Cents weatherization standards or equivalent.

NEW SECTION

WAC 51-32-0300 Chapter 3--General requirements for heating, ventilating and cooling.

Part III--Decorative Appliances, Floor Furnaces, Vented Wall Furnaces, Unit Heaters and Room Heaters

NEW SECTION

WAC 51-32-0327 Section 327--Room heaters and unvented decorative gas logs and fireplaces.

327.1 Vented Freestanding. Vented freestanding room heaters shall be installed with clearances from combustible material as set forth in Table 3-A.

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

327.2 Door Swing. Vented freestanding room heaters shall not be located so that a door can swing within less than 12 inches (305

mm) 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.

327.3 Clearance. Vented freestanding room heaters shall be located at least 36 inches (914 mm) below any part of a structure projecting over the heater. This projection shall include doors or windows that could project over the heater.

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

327.5 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 S, Division 5 Occupancies shall comply with requirements of Section 323.1.

327.6 Unvented. Unvented fuel-burning room heaters shall not be installed, used, maintained or permitted to exist in a Group I or R 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 S, Divisions 3, 4 and 5 Occupancies, and Group U Occupancies, and regulated by the Fire Code.

Approved, unvented portable oil-fueled heaters may be used as a supplemental heat source in any Group B, F-2, M, R or U 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.

Approved, unvented decorative gas logs and decorative fireplaces may be installed, used, maintained and permitted to exist in any Group I or R Occupancy, except bathrooms and bedrooms. An unvented decorative gas log is a listed natural or liquefied petroleum gas burning log with an open flame consisting of a metal frame or base supporting simulated logs which is designed so that its primary function lies in the aesthetic effect of the logs and flame. An unvented decorative fireplace is a listed unvented gas log permanently installed in a freestanding enclosure or zero clearance enclosure designed and approved for installation in walls or other building structures. Unvented decorative gas logs and fireplaces shall:

1. Be equipped with an approved oxygen-depletion sensor,
2. Be listed,
3. Not be installed in any room which does not have an alternative primary source of heat,
4. Have free air volume of at least 50 cubic feet (1.4 m^3) for each 1,000 Btu (2.2 mm^2/W) of thermal output,
5. Be permanently installed, and
6. Not be equipped with or connected to any automatic ignition or shut-off device except the oxygen-depletion sensor.

327.7 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 U

Occupancy, provided the installation conforms to all of the following requirements:

1. All portions of the heater are located at least 8 feet (2438 mm) 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 1,000 Btu/h (2.2 mm^2/W) input of the heater or heaters, with a minimum total area of 100 square inches (0.0645 m^2). 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 51-32-0500 Chapter 5--Exhaust systems.

NEW SECTION

WAC 51-32-0504 Section 504--Environmental air ducts.

504.1 Makeup and Exhaust Air Ducts. 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 6. Exhaust ducts shall terminate outside the building and shall be equipped with backdraft dampers. Environmental air ducts which have an alternate function as a part of an approved smoke-control system do not require design as Class I product-conveying ducts.

504.2 Domestic Range Vents. Ducts used for domestic kitchen range ventilation shall be of metal and shall have smooth interior surfaces.

EXCEPTION: Ducts for domestic kitchen downdraft grill-range ventilation installed under a concrete slab floor may be of approved Schedule 40 PVC provided:
1. The under-floor trench in which the duct is installed shall be completely backfilled with sand or gravel.
2. Not more than 1 inch (25 mm) of 6-inch-diameter (152 mm) PVC coupling may protrude above the concrete floor surface.
3. PVC pipe joints shall be solvent cemented to provide an air- and grease-tight duct.
4. The duct shall terminate above grade outside the building and shall be equipped with a backdraft damper.

504.3 Domestic Dryer Vent. Domestic clothes dryer moisture exhaust ducts shall be of metal and shall have smooth interior surfaces.

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.

504.3.1 Moisture exhaust ducts. Moisture exhaust ducts for domestic clothes dryers 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 1-1/4 inch (32 mm) 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.

504.3.2 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 (4267 mm), including two 90-degree elbows. Two feet (610 mm) shall be deducted for each 90-degree elbow in excess of two.

504.4 Commercial Dryer Exhaust Systems. Commercial dryer moisture exhaust ducts shall be installed in accordance with their listing.

504.5 Gypsum Wallboard Ducts. Bathroom and laundry room exhaust ducts may be of gypsum wallboard subject to the limitations of Section 601.1.3.

NEW SECTION

WAC 51-32-0600 Chapter 6--Duct systems.

NEW SECTION

WAC 51-32-0601 Section 601--Scope. Ducts and plenums which are portions of a heating, cooling, absorption or evaporative cooling system shall comply with the requirements of this chapter.

601.1 Material. 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 6-

A, 6-B and 6-C; ...cal ducts complying with t... U.M.C. Standard 6-2 with prior approval; or factory-made air ducts complying with U.M.C. Standard 6-1. 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.

601.1.1 Use of corridor as plenum. 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 1005 of the Building Code.

EXCEPTIONS: 1. Where such air is part of an engineered smoke control system.
2. Corridors conforming to Section 1019.3 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:
3.1 The supply air is 100 percent outside air, and
3.2 The units served by the corridor have conforming ventilation independent of the air supplied to the corridor, and
3.3 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 (9144 mm) on center along the corridor, and
3.4 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.

601.1.2 Use of concealed space as plenum. Concealed building spaces or independent construction within buildings may be used as ducts or plenums.

601.1.3 Gypsum products exposed in ducts. When gypsum products are exposed in ducts or plenums, the air temperature shall be restricted to a range from 50°F. to 125°F. (10°C. to 50°C.) 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 as supply from evaporative coolers, and in other air-handling systems regulated by this chapter when the temperature of the gypsum product will be below the dew point temperature.

See Chapter 8 for limitations on combustion products venting systems extending into or through ducts or plenums.

See Chapter 5 for limitations on environmental air systems exhaust ducts extending into or through ducts or plenums.

601.2 Contamination Prevention. Exhaust ducts under positive pressure and venting systems shall not extend into or pass through ducts or plenums. For appliance vents and chimneys, see Chapter 8.

EXCEPTION: 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.

601.3 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 8-1.

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 meeting the requirements of Section 403.
3. Water evaporation media in an evaporative cooler.
4. Charcoal filters when protected with an approved fire-suppression system.
5. 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:

5.1 Exhibi. ame travel of 5 feet or less, and

5.2 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 6-3.

5.3 Wiring meeting these requirements shall be listed and labeled as plenum cable as required by the Electrical Code.

6. Nonmetallic fire sprinkler piping in plenums shall be listed and shall meet the following requirements:

6.1 Exhibit flame travel of 5 feet (1524 mm) or less, and

6.2 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 6-3.

601.4 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 6-1. 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 6-1 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 6-1.

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

601.5.1 Residential round ducts. Crimp joints for residential round ducts shall have a contact lap of at least 1-1/2 inches (38 mm) and shall be mechanically fastened by means of at least three sheet-metal screws equally spaced around the joint, or an equivalent fastening method.

601.5.2 Residential rectangular ducts. Joints and seams for 0.016-inch (0.41 mm) (No. 28 gage) and 0.013-inch (0.33 mm) (No. 30 gage) residential rectangular ducts shall be as specified in Table 6-A for 0.019-inch (0.48 mm) (No. 26 gage) material.

601.5.3 Rectangular ducts. Joints and seams for rectangular duct systems shall be as specified in Table 6-A.

601.5.4 Oval ducts. Joints and seams for flat oval ducts and round ducts in other than single dwelling units shall be as specified in Table 6-B.

601.5.5 Listed duct. 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.

601.6 Metal. Every duct, plenum or fitting of metal shall comply with Table 6-A or Table 6-B.

EXCEPTIONS: 1. Ducts, plenums and fittings for systems serving single-dwelling units may comply with Table 6-C.
2. Duct systems complying with U.M.C. Standard 6-1.

601.7 Tinned Steel. Existing tinned steel ducts may be used when cooling coils are added to a heating system, provided the first 10 feet (3048 mm) of the duct or plenum measured from the cooling coil discharge are constructed of metal of the gage thickness set forth in Table 6-A, 6-B or 6-C of this chapter or are of approved material and construction. Tinned ducts completely enclosed in inaccessible concealed areas need not be replaced. All accessible ducts shall be insulated to comply with Table 6-D of this chapter. For the purpose of this subsection, ducts shall be considered accessible if the access space is 30 inches (762 mm) or greater in height.

601.8 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 (254 mm) in length.

NEW SECTION

WAC 51-32-0605 Section 605--Dampers in duct systems.

605.1 Smoke Dampers. Smoke dampers complying with recognized standards in Chapter 16, Part III, shall be installed in accordance with approved manufacturer's installation instructions when required by Chapters 7 and 9 of the Building Code. Smoke dampers shall be labeled by an approved agency.

605.2 Fire Dampers. Fire dampers complying with recognized standards in Chapter 16, Part III, shall be installed in accordance with approved manufacturer's installation instructions when required by Chapter 7 of the Building Code. Fire dampers shall have been tested for closure under airflow conditions and shall be labeled for both maximum airflow permitted and direction of flow. When more than one damper is installed at a point in a single air path, the entire airflow shall be assumed to be passing through the smallest damper area. Fire dampers shall be labeled by an approved agency. Only fire dampers labeled for use in dynamic systems shall be installed in heating, ventilation and air-conditioning systems which are intended to operate with fans "on" during a fire; see U.B.C. Section 713.12.

EXCEPTION: Fire dampers need not be installed in air ducts passing through the wall, floor or ceiling separating a Group R, Division 3 Occupancy from a Group U Occupancy, provided such ducts within the Group U Occupancy are constructed of steel having a thickness not less than 0.019 inch (0.48 mm) (No. 26 galvanized sheet gage) and have no openings into the Group U Occupancy.

Ductwork shall be connected to damper sleeves or assemblies in such a way that collapse of the ductwork will not dislodge the damper or impair its proper operation.

605.3 Ceiling Dampers. Ceiling dampers complying with recognized standards in Chapter 16, Part III, shall be installed in accordance with manufacturer's approved installation instructions in the fire-resistive ceiling element of floor-ceiling and roof-ceiling assemblies when required by Chapter 7 of the Building Code. Fire dampers not meeting the temperature limitation of ceiling dampers shall not be used as substitutes. Ceiling dampers shall be labeled by an approved agency.

605.4 Multiple Arrangements. When size requires the use of multiple dampers, the installation shall be framed in an approved manner to ensure that the dampers remain in place.

605.5 Access and Identification. Dampers shall be provided with an approved means of access, large enough to permit inspection and maintenance of the damper and its operating parts. The access shall not impair fire-resistive construction. Access shall not require the use of tools, keys or special knowledge. Access points shall be permanently identified on the exterior by a label with letters not less than 1/2 inch (13 mm) in height reading: SMOKE DAMPER or FIRE DAMPER. Access doors in ducts shall be tightfitting and suitable for the required duct construction.

605.6 Freedom from Interference. Dampers shall be installed in a manner to ensure positive closing or opening as required by function. Interior liners or insulation shall be held back from portions of a damper, its sleeve or an adjoining duct which would interfere with the damper's proper operation. Exterior materials shall be installed so as to avoid interference with the operation or maintenance of external operating devices needed for proper function.

605.7 Temperature Classification of Operating Elements. Fusible links, thermal sensors, and pneumatic or electric operators shall have a temperature rating or classification as required by the Building Code.

NEW SECTION

WAC 51-32-1300 Appendix B, Chapter 13--Fuel-gas piping.

NEW SECTION

WAC 51-32-1312 Section 1312--Material for gas piping.

1312.1 General. Pipe used for the installation, extension, alteration or repair of gas piping shall be standard weight wrought iron or steel (galvanized or black), yellow brass containing not more than 75 percent copper, or internally tinned or equivalently treated copper of iron pipe size. Approved PE pipe may be used in exterior buried piping systems. Corrugated Stainless Steel Tubing (CSST) may be used for gas piping provided that it is part of a system that has been tested and listed to the ANSI/AGA Standard LC-1 and is installed in accordance with the manufacturer's installation instructions.

1312.2 Reused Pipe. Gas pipe shall be new or shall have been used previously for no purpose other than conveying gas; it shall be in good condition, clean and free from internal obstructions. Burred ends shall be reamed to the full bore of the pipe.

1312.3 Fittings. Fittings used in connection with the piping shall be of malleable iron, yellow brass containing not more than 75 percent copper or approved plastic fittings.

1312.4 Valves and Appurtenances. Valves and appurtenances for gas piping shall be of a type designed and approved for use with fuel gas.

NEW SECTION

WAC 51-32-1313 Section 1313--Installation of gas piping.

1313.1 Joints. Joints in the piping system, unless welded, shall be threaded joints having approved standard threads. Threaded joints shall be made with approved pipe joint material, insoluble in fuel gas and applied to the male threads only. Welded joints in a gas-supply system shall be made by a pipeline welder. See Section 1302.

1313.2 Location. Gas piping shall not be installed in or on the ground under any building or structure and exposed gas piping shall be kept at least 6 inches (152 mm) above grade or structure. The term "building or structure" shall include structures such as porches and steps, whether covered or uncovered, breezeways, roofed porte-cocheres, roofed patios, carports, covered walks, covered driveways, and similar structures or appurtenances.

Concealed unprotected gas piping may be installed above grade in approved recesses or channels.

EXCEPTION: When necessary due to structural conditions, approved-type gas piping may be installed in other locations when permission has first been obtained from the building official.

1313.3 Drip Pipes. When water vapor is present in the fuel gas served, accessible-drip pipes shall be provided at points where condensation will collect.

1313.4 Corrosion and Covering Protection. Ferrous gas piping installed underground in exterior locations shall be protected from corrosion by approved coatings or wrapping materials applied in an approved manner. Horizontal metallic piping shall have at least 12 inches (305 mm) of earth cover or equivalent protection. Plastic gas piping shall have at least 18 inches (457 mm) of earth cover or equivalent protection. Risers, including prefabricated risers inserted with plastic pipe, shall be metallic and shall be protected in an approved manner to a point at least 6 inches above grade. When a riser connects to plastic pipe underground the horizontal metallic portion underground shall be at least 30 inches (762 mm) in length before connecting to the plastic service pipe. An approved transition fitting or adaptor shall be used where the plastic joins the metallic riser.

EXCEPTION: Listed one-piece 90-degree transition fittings or risers may have less than 30 inches (762 mm) of horizontal metallic piping.

1313.5 Wrapping. Gas pipe protective coatings shall be approved types, machine applied, conforming to recognized standards. Field wrapping shall provide equivalent protection and is restricted to those fittings, short sections, and where the factory wrap has been damaged or necessarily stripped for threading or welding. Zinc coatings (galvanizing) shall not be deemed adequate protection for gas piping below ground. Ferrous metals exposed in exterior locations shall be protected from corrosion in a manner satisfactory to the building official.

1313.6 Support and Fill. Gas piping shall be adequately supported by metal straps or hooks at intervals not to exceed those shown in Table B13-A. Gas piping installed below grade shall be effectively supported at all points on undisturbed or well-compacted soil or sand.

1313.7 Building Shutoff. Gas piping supplying more than one building on a premises shall be equipped with separate shutoff valves to each building, so arranged that the gas supply can be turned on or off to an individual or separate building. The shutoff valve shall be located outside the building it supplies and shall be readily accessible. Buildings accessory to single-family residences are exempt from the requirements of this section.

1313.8 Unions. Where unions are necessary, right and left nipples and couplings shall be used. Ground-joint unions may be used at exposed fixture, appliance or equipment connections and in exposed exterior locations immediately on the discharge side of a building shutoff valve. Heavy-duty flanged-type unions may be used in special cases, when approved by the building official. Bushings shall not be in concealed locations.

1313.9 Interjections. When air, oxygen or other special supplementary gas under pressure is introduced with the regularly supplied gas, either directly into the gas-piping system or at burners, a device approved by the building officials shall be installed to prevent backflow of the supplemental gas into the gas-piping system. The device shall be located between the source of the supplemental gas and meter and shall be on the gas line leading to the appliance using the special gas. This device may be either a spring-loaded or diaphragm-type check valve and shall be capable of withstanding the pressure imposed on it.

When liquefied petroleum or other standby gas is interconnected with the regular gas-piping system, an approved three-way two-port valve or other adequate safeguard acceptable to the building official shall be installed to prevent backflow into either supply system.

1313.10 Valves. Valves used in connection with gas piping shall be approved types, and shall be accessible.

1313.11 Barbecue or Fireplace Outlets. Gas outlets in a barbecue or fireplace shall be controlled by an approved operating valve located in the same room and outside the fireplace but not more than 4 feet (1219 mm) from the outlets. If piping on the discharge side of the control valve is standard weight brass or galvanized steel, the piping may be embedded in or surrounded by not less than 2 inches (51 mm) of concrete or masonry.

1313.12 Shutoff Valve. An accessible shutoff valve of a type set forth in Section 1313.10 shall be installed in the fuel-supply piping outside of each appliance and ahead of the union connection thereto, and in addition to any valve on the appliance. Shutoff valves shall be within 3 feet (914 mm) of the appliance.

Shutoff valves may be located immediately adjacent to and inside or under an appliance when placed in an accessible and protected location and when such appliance may be removed without removal of the valve.

Shutoff valves may be accessibly located inside wall heaters and wall furnaces listed for recessed installation where necessary maintenance can be performed without removal of the shutoff valve.

1313.13 Tracer for Nonmetallic Buried Piping. An electrically continuous insulated No. 18 [0.040 inch diameter (1 mm)] copper tracer wire or other approved conductor shall be installed with and

attached to underground nonmetallic gas piping and shall terminate above grade at each end.

1313.14 Directional Changes. Changes in direction of gas piping shall be made by use of appropriate fitting, except that polyethylene gas piping and tubing may be bent to a radius not less than 20 times the nominal diameter of the pipe or tube.

1313.15 Corrosion Isolation. Underground ferrous gas piping shall be electrically isolated from the rest of the gas system with approved isolation fittings installed a minimum of 6 inches (153 mm) above grade.