

Houston Amendments to The 2012 International Residential Code



Effective ****

Part II — Definitions

**CHAPTER 2
DEFINITIONS**

**SECTION R201
GENERAL**

R201.3 Terms defined in other codes. Where terms are not defined in this code and are defined in the Building Code, Fire Code, Electrical Code, Mechanical Code or Plumbing Code, such terms shall have meanings ascribed to them as in those other codes publications of the International Code Council

**SECTION 202
DEFINITIONS**

BUILDING OFFICIAL. ~~The officer or other designated authority charged with the administration and enforcement of this code~~ jurisdiction's Director of Public Works and Engineering, or a duly authorized representative.

BUILDING THERMAL ENVELOPE. The basement walls, exterior walls, floor, roof and any other building element that enclose conditioned spaces. This boundary also includes the boundary between conditioned space and any exempt or unconditioned space.

CITY CODE. The Code of Ordinances, Houston, Texas.

CONSTRUCTION CODE. The building, energy, electrical, mechanical, plumbing and residential codes identified by ordinance as the City of Houston Construction Code.

ELECTRICAL CODE. The National Electrical Code promulgated by the National Fire Protection Association, as adopted by this jurisdiction, and the City of Houston Electrical Code. See Section 101.4.

INTERNATIONAL BUILDING CODE. The City of Houston Building Code, as adopted by this jurisdiction.

INTERNATIONAL ENERGY CONSERVATION CODE. The City of Houston Residential Energy Code, as adopted by this jurisdiction.

INTERNATIONAL FIRE CODE. The City of Houston Fire Code, as adopted by this jurisdiction.

INTERNATIONAL FUEL GAS CODE. The City of Houston Plumbing Code, as adopted by this jurisdiction.

INTERNATIONAL MECAHANICAL CODE. The City of Houston Mechanical Code, as adopted by this jurisdiction.

INTERNATIONAL PLUMBING CODE. The City of Houston Plumbing Code, as adopted by this jurisdiction.

GRAY WATER. Untreated waste water that has not come into contact with toilet waste, Gray water includes ~~W~~ waste water discharged from lavatories, bathtubs, showers, clothes washers and laundry trays.

PLUMBING FIXTURE. A receptacle or device or appliance that is connected to a water supply system or discharges to a drainage system or both. Such receptacles or devices require a supply of water; or discharge liquid waste or liquid-borne solid waste; or require a supply of water and discharge waste to a drainage system.

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Part III — Building Planning and Construction

**CHAPTER 3
BUILDING PLANNING**

**SECTION R301
DESIGN CRITERIA**

R301.2.1.1 Wind limitations and wind design required. The wind provisions of this code shall not apply to the design of buildings where wind design is required in accordance with Figure R301.2 (4)B or where the basic wind speed from Figure R301.2(4)A equals or exceeds 110 miles per hour (49 m/s).

Exceptions:

1. For concrete construction, the wind provisions of this code shall apply in accordance with the limitations of Sections R404 and R611.
2. For structural insulated panels, the wind provisions of this code shall apply in accordance with the limitations of Section R613.

In regions where wind design is required in accordance with Figure R301.2(4)B or where the basic wind speed shown on Figure R301.2(4)A equals or exceeds 110 miles per hour (49 m/s), the design of buildings for wind loads shall be in accordance with one or more of the following methods:

1. AF&PA Wood Frame Construction Manual (WFCM); or
2. ICC Standard for Residential Construction in High-Wind Regions (ICC 600); or
3. ASCE Minimum Design Loads for Buildings and Other Structures (ASCE 7); or
4. AISI Standard for Cold-Formed Steel Framing Prescriptive Method For One- and Two-Family Dwellings (AISI S230); or
5. International Building Code, or
6. Appendix L - Conventional light frame wood construction for high-wind areas.

The elements of design not addressed by the methods in Items 1 through 5 shall be in accordance with the provisions of this code. When ASCE 7 or the International Building Code is used for the design of the building, the wind speed map and exposure category requirements as specified in ASCE 7 and the International Building Code shall be used.

**TABLE R301.2(1)
CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA**

GROUND SNOW LOAD	WIND DESIGN		SEISMIC DESIGN CATEGORY ^f	SUBJECT TO DAMAGE FROM			WINTER DESIGN TEMP ^o	ICE BARRIER UNDERLAYMENT REQUIRED ^h	FLOOD HAZARDS ^g	AIR FREEZING INDEX ⁱ	MEAN ANNUAL TEMP ^j
	Speed ^d (mph)	Topographic effects ^k		Weathering ^a	Frost line depth ^b	Termite ^c					
<u>0</u>	<u>110</u>	<u>No</u>	<u>A</u>	<u>Negligible</u>	<u>6 inches</u>	<u>Very Heavy</u>	<u>28</u>	<u>No</u>	<u>Reference Ch. 19 of City Code</u>	<u>(≥0-1000)</u>	<u>70</u>

For SI: 1 pound per square foot= 0.0479 kPa, 1 mile per hour= 0.447 m/s.

- a. ~~Weathering may require a higher strength concrete or grade of masonry than necessary to satisfy the structural requirements of this code. The weathering column shall be filled in with the weathering index (i.e., "negligible," "moderate" or "severe") for concrete as determined from the Weathering Probability Map [Figure R301.2(3)]. The grade of masonry units shall be determined from ASTM C 34, C 55, C 62, C 73, C 90, C 129, C 145, C 216 or C 652.~~
- b. ~~The frost line depth may require deeper footings than indicated in Figure R403.1 (1). The jurisdiction shall fill in the frost line depth column with the minimum depth of footing below finish grade.~~
- c. ~~The jurisdiction shall fill in this part of the table to indicate the need for protection depending on whether there has been a history of local subterranean termite damage.~~
- d. ~~The jurisdiction shall fill in this part of the table with the wind speed from the basic wind speed map [Figure R301.2(4)A]. Wind exposure category shall be determined on a site specific basis in accordance with Section R301.2.1.4.~~

- e. ~~The outdoor design dry-bulb temperature shall be selected from the columns of 97-1/2-percent values for winter from Appendix D of the International Plumbing Code. Deviations from the Appendix D temperatures shall be permitted to reflect local climates or local weather experience as determined by the building official.~~
- f. ~~The jurisdiction shall fill in this part of the table with the seismic design category determined from Section R301.2.2.1.~~
- g. ~~The jurisdiction shall fill in this part of the table with (a) the date of the jurisdiction's entry into the National Flood Insurance Program (date of adoption of the first code or ordinance for management of flood hazard areas), (b) the date(s) of the Flood Insurance Study and (c) the panel numbers and dates of all currently effective FIRMs and FDFMs or other flood hazard map adopted by the authority having jurisdiction, as amended.~~
- h. ~~In accordance with Sections R905.2.7.1, R905.4.3.1, R905.5.3.1, R905.6.3.1, R905.7.3.1 and R905.8.3.1, where there has been a history of local damage from the effects of ice damming, the jurisdiction shall fill in this part of the table with "YES." Otherwise, the jurisdiction shall fill in this part of the table with "NO."~~
- i. ~~The jurisdiction shall fill in this part of the table with the 100-year return period air freezing index (BF days) from Figure R403.3(2) or from the 100-year (99-percent) value on the National Climatic Data Center data table "Air Freezing Index USA Method (Base 32°F)" at www.nedc.noaa.gov/fpsf.html.~~
- j. ~~The jurisdiction shall fill in this part of the table with the mean annual temperature from the National Climatic Data Center data table "Air Freezing Index USA Method (Base 32°F)" at www.nedc.noaa.gov/fpsf.html.~~
- k. ~~In accordance with Section R301.2.1.5, where there is local historical data documenting structural damage to buildings due to topographic wind speed up effects, the jurisdiction shall fill in this part of the table with "YES." Otherwise, the jurisdiction shall indicate "NO" in this part of the table.~~

R302.2 Zero lot line separation. Where perpetual, platting, and recorded easements create a non-buildable minimum fire separation distance of at least 10 feet between structures on adjacent properties, the one-hour fire-resistive ratings shall not apply.

R310.1.5 Yards and courts. Yards and courts shall not be less than 3 feet in width.

311.1.1 Yards and courts. The means of egress shall provide a continuous and unobstructed path of egress travel to a public way.

~~**R313.2 One- and two-family dwellings automatic fire systems.** An automatic residential fire sprinkler system shall be installed in one- and two-family dwellings.~~

~~**Exception:** An automatic residential fire sprinkler system shall not be required for additions or alterations to existing buildings that are not already provided with an automatic residential sprinkler system.~~

~~**R313.2.1 Design and installation.** Automatic residential fire sprinkler systems shall be designed and installed in accordance with Section P2904 or NFPA 13D.~~

SECTION R318 PROTECTION AGAINST SUBTERRANEAN TERMITES

~~**R318.1 Subterranean termite control methods.** In areas subject to damage from termites as indicated by Table R301.2(1), methods of protection shall be one of the following methods or a combination of these methods:~~

- ~~1. Chemical termiticide treatment, as provided in Section R318.2.~~
- ~~2. Termite baiting system installed and maintained according to the label.~~
- ~~3. Pressure preservative treated wood in accordance with the provisions of Section R317.1.~~
- ~~4. Naturally durable termite-resistant wood.~~
- ~~5. Physical barriers as provided in Section R318.3 and used in locations as specified in Section R317.1.~~
- ~~6. Cold-formed steel framing in accordance with Sections R505.2.1 and R603.2.1.~~

~~**R318.1.1 Quality mark.** Lumber and plywood required to be pressure preservative treated in accordance with Section R318.1 shall bear the quality mark of an approved inspection agency which maintains continuing supervision, testing and inspection over the quality of the product and which has~~

~~been approved by an accreditation body which complies with the requirements of the American Lumber Standard Committee treated wood program.~~

~~**R318.1.2 Field treatment.** Field cut ends, notches, and drilled holes of pressure preservative treated wood shall be retreated in the field in accordance with AWPA M4.~~

~~**R318.2 Chemical termiticide treatment.** Chemical termiticide treatment shall include soil treatment and/or field applied wood treatment. The concentration, rate of application and method of treatment of the chemical termiticide shall be in strict accordance with the termiticide label.~~

~~**R318.3 Barriers.** Approved physical barriers, such as metal or plastic sheeting or collars specifically designed for termite prevention, shall be installed in a manner to prevent termites from entering the structure. Shields placed on top of an exterior foundation wall are permitted to be used only if in combination with another method of protection.~~

~~**R318.4 Foam plastic protection.** In areas where the probability of termite infestation is "very heavy" as indicated in Figure R301.2(6), extruded and expanded polystyrene, polyisocyanurate and other foam plastics shall not be installed on the exterior face or under interior or exterior foundation walls or slab foundations located below grade. The clearance between foam plastics installed above grade and exposed earth shall be at least 6 inches (152 mm).~~

~~**Exceptions:**~~

- ~~1. Buildings where the structural members of walls, floors, ceilings and roofs are entirely of noncombustible materials or pressure-~~
- ~~2. When in addition to the requirements of Section R318.1, an approved method of protecting the foam plastic and structure from subterranean termite damage is used.~~
- ~~3. On the interior side of basement walls.~~

~~**R319.1 Address numbers.** Building numbering shall be provided in accordance with Article V of Chapter 10 of the City Code. Buildings shall have approved address numbers, building numbers or approved building identification placed in a position that is plainly legible and visible from the street or road fronting the property. These numbers shall contrast with their background. Address numbers shall be Arabic numbers or alphabetical letters. Numbers shall be a minimum of 4 inches (102 mm) high with a minimum stroke width of 1/2 inch (12.7 mm). ~~Where access is by means of a private road and the building address cannot be viewed from the public way, a monument, pole or other sign or means shall be used to identify the structure.~~~~

~~**R321.3 Accessibility.** Elevators or platform lifts that are part of an accessible route required by Chapter 11 of the International Building Code, shall comply with ICC A117.1.~~

SECTION R322 FLOOD-RESISTANT CONSTRUCTION

~~**R322.1 General.** Buildings and structures constructed in whole or in part in flood hazard areas (including A or V Zones) as established in Table R301.2(1) shall be designed and constructed in accordance with the provisions contained in Chapter 19 of the City Code. ~~this section. Buildings and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.~~~~

{EDITOR'S NOTE: DELETE REMAINDER OF SECTION R322}

CHAPTER 4 BUILDING PLANNING

SECTION R301 DESIGN CRITERIA

401.5 Foundation elevation. All new buildings constructed within this jurisdiction shall have the finished floor of the building not less than 12 inches above the nearest sanitary sewer manhole rim of the sewer connected to the building, or, where no sewer is available, the finished floor shall not be less than 4 inches above the crown of the street.

Exception: Buildings located in annexed subdivisions where the following conditions exist:

1. The subdivision was platted and recorded prior to annexation;
2. The sanitary sewer system for the subdivision was installed prior to annexation; and
3. The drainage piping from a building meets the requirements of Section 710 of the *Plumbing Code*.

NOTE: When a greater elevation is required by Chapter 19 of the *City Code*, then Chapter 19 shall govern.

401.5.1 Plans and applications. All construction plans and applications submitted for construction, sewer connections or septic systems shall reflect the elevations of the finished floor of the building and the elevation of the nearest manhole rim of a sanitary sewer connected to the building or crown of the street, whichever is applicable.

401.5.2 Damage risk. All permits for connection shall be issued on the condition that the owner take all the risk of damage that may result from water backing up into the premises from the sewer.

401.5.3 Existing structures. When an existing structure is required to connect with a public or private sewer it shall have the finished floor a minimum of 12 inches above the nearest sanitary sewer manhole rim of a sewer connected to the building.

Exception: Where the public or private sewer is not of sufficient depth, or where structures required to be connected to the sewer cannot meet the minimum requirements of this section and other ordinances, the building official may authorize the issuance of a permit for an alternate method of construction or installation when this will not be detrimental to the health, welfare, and safety of the public.

R404.1.2 Concrete foundation walls. Concrete foundation walls that support light-frame walls shall be designed and constructed in accordance with the provisions of this section, ACI 318, ACI 332 or PCA 100. Concrete foundation walls that support above-grade concrete walls that are within the applicability limits of Section R611. 2 shall be designed and constructed in accordance with the provisions of this section, ACI 318, ACI 332 or PCA 100. Concrete foundation walls that support above-grade concrete walls that are not within the applicability limits of Section R611.2 shall be designed and constructed in accordance with the provisions of ACI 318, ACI 332 or PCA 100.

~~When ACI 318, ACI 332, PCA 100 or the provisions of this section are used to design concrete foundation walls, project drawings, typical details and specifications are not required to bear the seal of the architect or engineer responsible for design, unless otherwise required by the state law of the jurisdiction having authority.~~

CHAPTER 6 TYPES OF CONSTRUCTION

SECTION R611 EXTERIOR CONCRETE WALL CONSTRUCTION

R611.1 General. Exterior concrete walls shall be designed and constructed in accordance with the provisions of this section or in accordance with the provisions of PCA 100 or ACI 318. ~~When PCA 100, ACI 318 or the provisions of this section are used to design concrete walls, project drawings, typical details and specifications are not required to bear the seal of the architect or engineer responsible for design, unless otherwise required by the state law of the jurisdiction having authority.~~

SECTION R613 STRUCTURAL INSULATED PANEL WALL CONSTRUCTION

R613.1 General. Structural insulated panel (SIP) walls shall be designed in accordance with the provisions of this section. ~~When the provisions of this section are used to design structural insulated panel walls, project drawings, typical details and specifications are not required to bear the seal of the architect or engineer responsible for design, unless otherwise required by the state law of the jurisdiction having authority.~~

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CHAPTER 9 ROOF ASSEMBLIES

R902.1 Roofing covering materials. Roofs shall be covered with materials as set forth in Sections 904 and R905. Class I A, B or C roofing shall be installed in areas designated by law as requiring their use or when the edge of the roof is less than 3 feet (914 mm) from a lot line. Classes A, Band C roofing required by this section to be listed shall be tested in accordance with UL 790 or ASTM E 108.

Exceptions:

1. Residential Class A roof assemblies include those with coverings of brick, masonry and exposed concrete roof deck.
2. Class A roof assemblies also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on noncombustible decks.
3. Class A roof assemblies include minimum 16 oz/ft² copper sheets installed over combustible decks.
4. Residential outbuildings.

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Part IV — Energy Conservation

**CHAPTER 11 [RE]
ENERGY EFFICIENCY**

N1101.1 Scope. ~~This chapter~~ The City of Houston Residential Energy Conservation Code regulates the energy efficiency for the design and construction of buildings regulated by this code.

{**EDITORIAL NOTE: DELETE** THE REMAINDER OF THIS CHAPTER IN ITS ENTIRETY.}

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Part V - Mechanical

**CHAPTER 12
MECHANICAL ADMINISTRATION**

1201.1 Scope. The provisions of Chapters 12 through 24 shall regulate the design, installation, maintenance, alteration and inspection of mechanical systems that are permanently installed and used to control environmental conditions within buildings. These chapters shall also regulate those mechanical systems, system components, equipment and appliances specifically addressed in this code. The administrative provisions of the *Mechanical Code* shall govern Chapters 12 through 23 as well as the mechanical provisions of Chapter 24.

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CHAPTER 13

GENERAL MECHANICAL GENERAL MECHANICAL SYSTEM REQUIREMENTS

MI305.1.3 Appliances in attics. Attics containing appliances shall be provided with a pull down stairway with a clear opening not less than 22 inches in width and a load capacity of not less than 350 pounds ~~an opening~~ and a clear and unobstructed passageway large enough to allow removal of the largest appliance, but not less than 30 inches (762 mm) high and ~~22 inches (559 mm)~~ 30 inches (762 mm) wide and not more than 20 feet (6096 mm) long measured along the centerline of the passageway from the opening to the Appliance. The passageway shall have continuous solid flooring in accordance with Chapter 5 not less than 24 inches (610 mm) wide. A level service space at least 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be present along all sides of the appliance where access is required. ~~The clear access opening dimensions shall be a minimum of 20 inches by 30 inches (508 mm by 62 mm), and large enough to allow removal of the largest appliance.~~

Exceptions:

1. The passageway and level service space are not required where the appliance can be serviced and removed through the required opening.
2. Where the passageway is unobstructed and not less than 6 feet (1829 mm) high and 22 inches (559 mm) wide for its entire length, the passageway shall be not more than 50 feet (15 250 mm) long.

MI305.1.4 Appliances under floors. Underfloor spaces containing appliances shall be provided with an unobstructed passageway large enough to remove the largest appliance, but not less than 30 inches (762 mm) high and ~~22 inches (559 mm)~~ 30 inches (762 mm) wide, nor more than 20 feet (6096 mm) long measured along the centerline of the passageway from the opening to the appliance A level service space at least 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be present at the front or service side of the appliance. If the depth of the passageway or the service space exceeds 12 inches (305 mm) below the adjoining grade, the walls of the passageway shall be lined with concrete or masonry extending 4 inches (102 mm) above the adjoining grade in accordance with Chapter 4. The rough-framed access opening dimensions shall be a minimum of ~~22 inches~~ 30 inches (762 mm) by 30 inches (~~559 mm by~~ 762 mm), and large enough to remove the largest appliance.

Exceptions:

1. The passageway is not required where the level service space is present when the access is open, and the appliance can be serviced and removed through the required opening.
2. Where the passageway is unobstructed and not less than 6 feet high (1929 mm) and 22 inches (559 mm) wide for its entire length, the passageway shall not be limited in length.

MI305.1.4.3 Electrical requirements. A luminaire controlled by a switch located at the required passageway opening and a receptacle outlet shall be installed at or near the appliance location in accordance with the Houston Electrical Code. Chapter 39.

CHAPTER 14

HEATING AND COOLING EQUIPMENT AND APPLIANCES

M1401.2 Access. Heating and cooling *equipment* and appliances shall be located with respect to building construction and other *equipment* and appliances to permit maintenance, servicing and replacement. Clearances shall be maintained to permit cleaning of heating and cooling surfaces; replacement of filters, blowers, motors, controls and vent connections; lubrication of moving parts; and adjustments. A level service space at least 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be present along all sides of the appliance where access is required.

Exception: Access shall not be required for ducts, piping, or other components approved for concealment.

MI411.3 Condensate disposal. Condensate from all cooling coils or evaporators shall be conveyed from the drain pan outlet to an approved plumbing fixture or place of disposal area. Such piping shall maintain a minimum horizontal slope in the direction of discharge of not less than 1 unit vertical in 12 units horizontal (1 –percent slope). Condensate shall not discharge into a street, alley or other areas where it would cause a nuisance. Drain pans and coils shall be arranged to allow thorough drainage and access for cleaning. Primary drain piping inside buildings shall be insulated for the first 15 feet horizontally from the drain pan.

CHAPTER 15 EXHAUST SYSTEMS

MI503.2 Duct material. Single-wall ducts serving range hoods shall be constructed of galvanized steel, stainless steel or copper.

Exception: Ducts for domestic kitchen cooking appliances equipped with down-draft exhaust systems shall be permitted to be constructed of schedule 40 PVC pipe and fittings provided that the installation complies with all of the following:

1. The duct is installed under a concrete slab poured on grade;
2. The underfloor trench in which the duct is installed is completely backfilled with sand or gravel;
3. The PVC duct extends not more than 6 inches (152.4 mm) ~~1 inch (25 mm)~~ above the indoor concrete floor surface;
4. The PVC duct extends not more than 12 inches (304.8 mm) ~~1 inch (25 mm)~~ above grade outside of the building; and
5. The PVC ducts are solvent cemented.

SECTION M1508 MAKE UP AIR

M1508.1 Make up air. When a closet is designed for the installation of a clothes dryer, a minimum opening of 100 square inches (1.0645 m²) for makeup air shall be provided in the door or by other approved means.

CHAPTER 16 DUCT SYSTEMS

M1601.1.1 Above-ground duct systems. Above-ground duct systems shall conform to the following:

1. Equipment connected to duct systems shall be designed to limit discharge air temperature to a maximum of 250°F (121°C).
2. Factory-made air ducts shall be constructed of Class 0 or Class 1 materials as designated in Table M1601.1.1(1).
3. Fibrous duct construction shall conform to the SMACNA Fibrous Glass Duct Construction Standards or NAIMA Fibrous Glass Duct Construction Standards.
4. Minimum thickness of metal duct material shall be as listed in Table M1601.1.1(2). Galvanized steel shall conform to ASTM A 653. Metallic ducts shall be fabricated in accordance with SMACNA Duct Construction Standards Metal and Flexible.
5. Use of gypsum products to construct return air ducts or plenums is permitted, provided that the air temperature does not exceed 125°F (52°C) and exposed surfaces are not subject to condensation.
6. Duct systems shall be constructed of materials having a flame spread index not greater than 200.
7. Stud wall cavities and the spaces between solid floor joists to be used as air plenums shall comply with the following conditions:
 - 7.1. These cavities or spaces shall not be used as a plenum for supply air.
 - 7.2. These cavities or spaces shall not be part of a required fire-resistance-rated assembly.
 - 7.3. Stud wall cavities shall not convey air from more than one floor level.
 - 7.4. Stud wall cavities and joist-space plenums shall be isolated from adjacent concealed spaces by tight-fitting fireblocking in accordance with Section R602.8.
 - 7.5. Stud wall cavities in the outside walls of building envelope assemblies shall not be utilized as air plenums.
8. Wood floor joists or trusses that serve dwelling units shall not be located within a return air plenum.

M1601.4.3 Support. Metal ducts shall be supported by 1/2-inch-wide (26 43 mm) 24 18-gage metal straps or 12-gage galvanized wire at intervals not exceeding 10 feet (3048 mm) or other approved means. Nonmetallic ducts shall be supported in accordance with the manufacturer's installation instructions.

M1601.4.9 Flood hazard areas. In flood hazard areas as established by Table R301.2(1), duct systems shall be located or installed in accordance with chapter 19 of the City Code Section R322.1.6.

SECTION M1603 **CENTRAL VACUUM SYSTEMS**

M1603 Central vacuum systems. Ducts used in central vacuum-cleaning systems within a dwelling unit shall be permitted to be of PVC pipe. Penetrations of fire walls, rated floor-ceiling or rated roof-ceiling assemblies shall comply with this code. Copper or ferrous pipes or conduits shall be used to extend through the wall assembly separation between a garage and a dwelling unit for a central vacuum unit.

Part VI-Fuel Gas

CHAPTER 24 FUEL GAS

G2401.1 (101.2) Application. This chapter covers those fuel gas piping systems, fuel-gas appliances and related accessories, venting systems and combustion air configurations most commonly encountered in the construction of one- and two family dwellings and structures regulated by this code.

Coverage of piping systems shall extend from the point of delivery to the outlet of the appliance shutoff valves (see definition of "Point of delivery "). Piping systems requirements shall include design, materials, components, fabrication, assembly, installation, testing, inspection, operation and maintenance. Requirements for gas appliances and related accessories shall include installation, combustion and ventilation air and venting and connections to piping systems.

The omission from this chapter of any material or method of installation provided for in the ~~International Fuel Gas Plumbing Code~~ shall not be construed as prohibiting the use of such material or method of installation. Fuel-gas piping systems, fuel-gas appliances and related accessories, venting systems and combustion air configurations not specifically covered in these chapters shall comply with the applicable provisions of the ~~Construction International Fuel Gas Code~~.

Gaseous hydrogen systems shall be regulated by ~~Chapter 7 of the Fire International Fuel Gas Code~~.

This chapter shall not apply to the following:

1. Liquefied natural gas (LNG) installations.
2. Temporary LP-gas piping for buildings under construction or renovation that is not to become part of the permanent piping system.
3. Except as provided in Section G2412.1.1, gas piping, meters, gas pressure regulators, and other appurtenances used by the serving gas supplier in the distribution of gas, ~~other than undiluted LP gas.~~
4. Portable LP-gas appliances and equipment of all types that is not connected to a fixed fuel piping system.
5. Portable fuel cell appliances that are neither connected to a fixed piping system nor interconnected to a power grid.
6. Installation of hydrogen gas, LP-gas and compressed natural gas (CNG) systems on vehicles.
7. Liquid petroleum gas facilities regulated by the Railroad Commission of Texas pursuant to chapter 113 of the Texas Natural Resources Code.

Note: All fuel oil facilities and piping shall conform to Chapter 34 of the Fire Code.

G2404.7 (301.11) Flood hazard. For structures located in flood hazard areas, the appliance, equipment and system installations regulated by this code shall be located at or above the elevation required by chapter 19 of the City Code, Section R322 for utilities and attendant equipment.

~~**Exception:** The appliance, equipment and system installations regulated by this code are permitted to be located below the elevation required by Section R322 for utilities and attendant equipment provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to such elevation.~~

G2406.2 (303.3) Prohibited locations. Appliances shall not be located in sleeping rooms, bathrooms, toilet rooms, storage closets or surgical rooms, or in a space that opens only into such rooms or spaces, except where the installation complies with one of the following:

1. The appliance is a direct-vent appliance installed in accordance with the conditions of the listing and the manufacturer's instructions.
2. Vented room heaters, wall furnaces, vented decorative appliances, vented gas fireplaces, vented gas fireplace heaters and decorative appliances for installation in vented solid fuel-burning fireplaces are installed in rooms that meet the required volume criteria of Section G2407.5.
3. ~~A single wall mounted unvented room heater is installed in a bathroom and such unvented room heater is equipped as specified in Section G2445.6 and has an input rating not greater than 6,000 Btu/h (1.16 kW). The bathroom shall meet the required volume criteria of Section G2407.5.~~
4. ~~A single wall mounted unvented room heater is installed in a bedroom and such unvented room heater is equipped as specified in Section G2445.6 and has an input rating not greater than 10,000 Btu/h (2.93 kW). The bedroom shall meet the required volume criteria of Section G2407.5.~~
5. The appliance is installed in a room or space that opens only into a bedroom or bathroom, and such room or space is used for no other purpose and is provided with a solid weather-stripped door equipped with an approved self-closing device. All combustion air shall be taken directly from the outdoors in accordance with Section G2407.6.

G2411.1.1 (310.1.1) CSST. Corrugated stainless steel tubing (CSST) gas piping systems shall be bonded to the electrical service grounding electrode system. The bonding jumper shall connect to a metallic pipe or fitting between the point of delivery and the first downstream CSST fitting. The bonding jumper shall be not smaller than 6 AWG copper wire or equivalent. Gas piping systems that contain one or more segments of CSST shall be bonded in accordance with this section. Corrugated stainless steel (CSST) gas piping systems shall be bonded per the manufacturer's installation instructions.

G2412.2 (401.2) Liquefied petroleum gas storage. The storage system for liquefied petroleum gas shall be designed and installed in accordance with the ~~International Fire Code~~, and NFPA 58, and applicable State laws that are administered by the Texas Railroad Commission.

G2413.3 (402.3) Sizing. Gas piping shall be sized in accordance with ~~one of the following:~~ tables G2413.4(1) through G2413.4(20). CSST piping shall be sized according to manufacturer's recommendations and the *Plumbing Code*.

1. ~~Pipe sizing tables or sizing equations in accordance with Section G2413.4.~~
2. ~~The sizing tables included in a listed piping system's manufacturer's installation instructions.~~
3. ~~Other approved engineering methods.~~

G2413.6 (402.6) Maximum design operating pressure. The maximum design operating pressure for piping systems located inside buildings shall not exceed 5 pounds per square inch gauge (psig) (34 kPa gauge) except where one or more of the following conditions are met:

1. ~~The piping system is welded.~~

- ~~2. The piping is located in a ventilated chase or otherwise enclosed for protection against accidental gas accumulation.~~
- ~~3. The piping is a temporary installation for buildings under construction.~~

G2414.10.4 (403.10.4) Metallic fittings. Metallic fittings, including valves, strainers and filters shall comply with the following:

1. Fittings used with steel or wrought -iron pipe shall be steel, brass, bronze, malleable iron, ductile iron or cast iron.
2. Fittings used with copper or brass pipe shall be copper, brass or bronze.
3. Brass or bronze fittings, if exposed to soil, shall have a minimum 80-percent copper content.
4. Cast-iron bushings shall be prohibited.
- ~~4.~~ 5. Special fittings. Fittings such as couplings, proprietary- type joints, saddle tees, gland-type compression fittings, and flared, flareless or compression-type tubing fittings shall be: used within the fitting manufacturer's pressure-temperature recommendations; used within the service conditions anticipated with respect to vibration, fatigue, thermal expansion or contraction; installed or braced to prevent separation of the joint by gas pressure or external physical damage; and shall be approved.

G2415.6 (404.6) Underground penetrations prohibited. Gas piping shall not penetrate building foundation walls at any point below grade. Gas piping shall enter and exit a building at a point above grade and the annular space between the pipe and the wall shall be sealed at the point where it enters the building, and the sleeve shall be vented to the outside of the building.

G2415.11 (404.11) Protection against corrosion. Metallic pipe or tubing exposed to corrosive action, such as soil condition or moisture, shall be protected in an approved manner. Zinc coatings (galvanizing) shall not be deemed adequate protection for gas piping underground. Where dissimilar metals are joined underground, an insulating coupling or fitting shall be used. Piping shall not be laid in contact with cinders.

G2415.12.1 (404.12.1) Individual outside appliances. Individual lines to outside lights, grills or other appliances shall be installed a minimum of 12 inches (304.56 mm) ~~8 inches (203 mm)~~ below finished grade, provided that such installation is approved and is installed in locations not susceptible to physical damage.

G2415.17.1 (404.17.1) Limitations. Plastic pipe shall be installed outdoors underground only, with a minimum depth of 18 inches of cover. Plastic pipe shall not be used within or under any building or slab or be operated at pressures greater than 100 psig (689 kPa) for natural gas or 30 psig (207 kPa) for LP-gas.

Exceptions:

1. Plastic pipe shall be permitted to terminate above ground outside of buildings where installed in premanufactured anodeless risers or service head adapter risers that are installed in accordance with the manufacturer's installation instructions.
2. Plastic pipe shall be permitted to terminate with a wall head adapter within buildings where the plastic pipe is inserted in a piping material for fuel gas use in buildings.

3. Plastic pipe shall be permitted under outdoor patio, walkway and driveway slabs provided that the burial depth complies with Section G2415.10.

SECTION G2417 (406) INSPECTION, TESTING AND PURGING

G2417.1.1 (406.1.1) Inspections. Inspection shall consist of visual examination, during or after manufacture, fabrication, assembly or pressure tests as appropriate. The building official shall make the following inspections and either approve the portion of the work as completed or notify the permit holder that the same fails to comply with this code:

1. Rough Piping Inspection. This inspection shall be made after all gas piping authorized by the permit has been installed and before any such piping has been covered or concealed, or any fixture or appliance has been attached thereto. This inspection shall include a determination that the gas piping size, material, and installation meet the requirements of this code. This inspection shall also include a pressure test. The gas piping shall pass an air pressure test of 25 psi for a period of 15 minutes with no perceptible drop in pressure.

For metal welded piping and for piping carrying gas at pressure in excess of 14 inches (355.6 mm) water column pressure, the test pressure shall not be less than 100 psi (689 kPa) for 30 minutes. These tests shall be made using air, CO, or nitrogen pressure only and shall be made in the presence of the inspector. All necessary apparatus for conducting tests shall be furnished by the permit holder.

2. Final Piping Inspection. This inspection shall be made after all piping authorized by the permit has been installed and after all portions thereof which are to be covered or concealed are so concealed and after all fixtures, appliances, or shutoff valves have been attached thereto, and after the completed system is ready to be put in service. This inspection shall include an air, CO, or nitrogen pressure test at a pressure measured with a manometer or slope gauge for a period of not less than fifteen (15) minutes, with no perceptible drop in pressure. The test pressure shall not be less than twice the pressure that the system will be subjected to when in service. These tests shall be made in the presence of the inspector. All necessary apparatus for conducting tests shall be furnished by the permit holder. A final inspection shall be required for all gas systems that require a permit as defined in the *Plumbing Code*.

For annual gas tests and gas turn-ons, the tests shall be done at the pressure required for the final gas inspection.

G2417.4 (406.4) Test pressure measurement. Test pressure shall be measured with a manometer or with a an approved pressure-measuring device designed and calibrated to read, record, or indicate a pressure loss caused by leakage during the pressure test period. The source of pressure shall be isolated before the pressure tests are made. Mechanical gauges used to measure test pressures shall have a range such that the highest end of the scale is not greater than five times the test pressure.

G2417.4.1 (406.4.1) Test pressure. The test pressure to be used shall be not less than one and one-half times the proposed maximum working pressure, but not less than 3 psig (20 kPa gauge), irrespective of design pressure. Where the test pressure exceeds 125 psig (862 kPa gauge), the test pressure shall not exceed a value that produces a hoop stress in the piping greater than 50 percent of the specified minimum yield strength of the pipe. The following alternative pressure measuring devices are approved:

1. Low Pressure Systems—A low pressure diaphragm gauge with a minimum dial size of 3 ½ inches with a set hand and a pressure range not to exceed 6 psi with 1/10 pound

incrementation. The minimum test pressure shall not be less than 3 psi, and the maximum test pressure to be applied shall not exceed 4 psi.

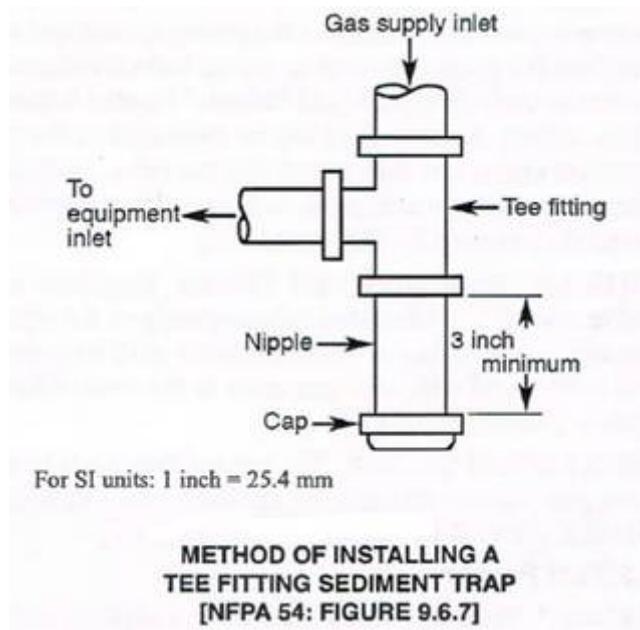
2. Medium Pressure Systems—A diaphragm type pressure gauge with a minimum dial size of 3 ½ inches with a set hand and a pressure range not to exceed 20 psi with 2/10 pound incrementation. The minimum test pressure shall not be less than 10 psi, and the maximum test pressure shall not exceed 12 psi.
3. High Pressure Systems—Gauges for high pressure test shall be as follows:
 - a. Required pressure tests that exceed 10 pounds (69 kPa) but do not exceed 100 pounds (689 kPa) shall be performed with gauges that have 1 pound (6.9 kPa) incrementation or less.
 - b. Required pressure tests that exceed 100 pounds (689 kPa) shall be performed with gauges incremented for 2 percent or less of the required test pressure.
 - c. Test gauges shall have a pressure range not greater than twice the test pressure applied.

G2417.4.2 (406.4.2) Test duration. The test duration shall be not less than ~~40~~ 15 minutes.

G2418.2 (407.2) Design and installation. Piping shall be supported with metal pipe hooks, metal pipe straps, metal bands, metal brackets, metal hangers or building structural components suitable for the size of piping, of adequate strength and quality, and located at intervals so as to prevent or damp out excessive vibration. Piping shall be anchored to prevent undue strains on connected appliances and shall not be supported by other piping or equipment. Pipe hangers and supports shall conform to the requirements of MSS SP-58 and shall be spaced in accordance with Section G2424. Supports, hangers and anchors shall be installed so as not to interfere with the free expansion and contraction of the piping between anchors. All parts of the supporting equipment shall be designed and installed so that they will not be disengaged by movement of the supported piping.

G2419.4 (408.4) Sediment trap. Where a sediment trap is not incorporated as part of the appliance, a sediment trap shall be installed downstream of the appliance shutoff valve as close to the inlet of the appliance as practical. The sediment trap shall be either a tee fitting having a capped nipple ~~of any length installed vertically~~ in the bottom most opening of the tee, as illustrated in Figure G2419.4 or other device approved as an effective sediment trap. Illuminating appliances, ranges, clothes dryers, decorative vented appliances for installation in vented fireplaces, gas fireplaces, and outdoor grills need not be so equipped.

{**EDITORIAL NOTE:** DELETE FIGURE 2419.4 and REPLACE WITH FIGURE 1211.8 OF THE 2012 UNIFORM PLUMBING CODE}



SECTION G2423 (413) CNG GAS-DISPENSING SYSTEMS

G2423.1 (413.1) General. Motor fuel-dispensing facilities for CNG fuel and their operation shall be in accordance with Section 413 of the Fire International Fuel Gas Code.

G2425.8 (501.8) Appliances not required to be vented. The following appliances shall not be required to be vented:

1. Ranges.
2. Built-in domestic cooking units listed and marked for optional venting.
3. Hot plates and laundry stoves.
4. Type 1 clothes dryers (Type 1 clothes dryers shall be exhausted in accordance with the requirements of Section G2439).
5. Refrigerators.
6. Counter appliances.
7. ~~Room heaters listed for unvented use.~~

Where the appliances listed in Items 5 and 6 ~~through 7~~ above are installed so that the aggregate input rating exceeds 20 Btu per hour per cubic foot (207 W/m³) of volume of the room or space in which such appliances are installed, one or more shall be provided with venting systems or other approved means for conveying the vent gases to the outdoor atmosphere so that the aggregate input rating of the remaining unvented appliances does not exceed 20 Btu per hour per cubic foot (207 W /m³). Where the room or space in which the appliance is installed is directly connected to another room or space by a doorway, archway or other opening of comparable size that cannot be closed, the volume of such adjacent room or space shall be permitted to be included in the calculations.

SECTION G2445 (621) UNVENTED ROOM HEATERS

G2445.1 (621.1) General. ~~Unvented room heaters shall be tested in accordance with ANSI Z 21.11.2 and shall be installed in accordance with the conditions of the listing and the manufacturer's installation instructions.~~ **Unvented.** Unvented fuel-burning room heaters and decorative appliances shall be prohibited.

{EDITOR'S NOTE: DELETE REMAINDER OF SECTION G2445}

G2447.2 (623.2) Prohibited location. Cooking appliances designed, tested, listed and labeled for use in commercial occupancies shall only not be installed within dwelling units or within any area where domestic cooking operations occur when in compliance with the ventilation and clearance to combustibles requirements for commercial cooking appliances in the Mechanical Code.

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Part VII - Plumbing

CHAPTER 27 PLUMBING FIXTURES

SECTION P2708 SHOWERS

P2708.1 General. Shower compartments shall have not less than 1024 square inches (0.827 m²) ~~900 square inches (0.6 m²)~~ of interior cross-sectional area. Shower compartments shall be not less than 30 inches (762 mm) in minimum dimension measured from the finished interior dimension of the shower compartment, exclusive of fixture valves, shower heads, soap dishes, and safety grab bars or rails. The minimum required area and dimension shall be measured from the finished interior dimension at a height equal to the top of the threshold and at a point tangent to its centerline and shall be continued to a height of not less than 70 inches (1778 mm) above the shower drain outlet. Hinged shower doors shall open outward. The wall area above built-in tubs having installed shower heads and in shower compartments shall be constructed in accordance with Section R702.4. Such walls shall form a water-tight joint with each other and with either the tub, receptor or shower floor.

Exceptions:

1. Fold-down seats shall be permitted in the shower, provided the required 1024 square inches (0.827 m²) ~~900 square inches (0.6 m²)~~ dimension is maintained when the seat is in the folded-up position.
2. Shower compartments when replacing bathtubs having not less than 25 inches (635 mm) in minimum dimension measured from the finished interior dimension of the compartment provided that the shower compartment has a cross-sectional area of not less than 1,300 square inches (0.838 m²).

P2709.5 Test for shower receptors. Shower receptors shall be tested for water-tightness by filling with water to the level of the rough threshold. The test plug shall be so placed that both upper and under sides of the sub-pan shall be subjected to the test at the point where it is clamped to the drain.

P2717.3 Sink, dishwasher and food grinder. The combined discharge from a sink, dishwasher, and waste grinder is permitted to discharge through a single 1 1/2-inch (38 mm) trap. The discharge pipe from the dishwasher shall be increased to not less than 3 / 4 inch (19 mm) in diameter and shall connect with a wye fitting between the discharge of the food waste grinder and the trap inlet or to the head of the food grinder. The dishwasher waste line shall rise and be securely fastened to the underside of the counter before connecting to the sink tail piece or the food grinder.

CHAPTER 28 WATER HEATERS

P2803.6.1 Requirements for discharge pipe. The discharge piping serving a pressure-relief valve, temperature relief valve or combination valve shall:

1. Not be directly connected to the drainage system.
2. Discharge through an air gap located in the same room as the water heater.
3. Not be smaller than the diameter of the outlet of the valve served and shall discharge full size to the air gap.
4. Serve a single relief device and shall not connect to piping serving any other relief device or equipment.
5. Discharge to the floor, ~~to the pan serving the water heater or storage tank~~, to a waste receptor or to the outdoors.
6. Discharge in a manner that does not cause personal injury or structural damage.
7. Discharge to a termination point that is readily observable by the building occupants.
8. Not be trapped.
9. Be installed to flow by gravity.
10. Not terminate more than 6 inches (152 mm) above the floor or waste receptor.
11. Not have a threaded connection at the end of the piping.
12. Not have valves or tee fittings.
13. Be constructed of those materials listed in Section P2905.5 or materials tested, rated and approved for such use in accordance with ASME A112.4.1.

CHAPTER 29 WATER SUPPLY AND DISTRIBUTION

P2902.5.1 Connections to boilers. The potable supply to the boiler shall be equipped with a reduced pressure principle backflow preventer ~~with an intermediate atmospheric vent complying with ASSE 1012 or CSA B64.3. Where conditioning chemicals are introduced into the system, the potable water connection shall be protected by an air gap or a reduced pressure principle backflow preventer complying with ASSE 1013, CSA B64.4 or AWWA C511.~~

P2902.5.5 Solar systems. The potable water supply to a solar system shall be equipped with a backflow preventer ~~with intermediate atmospheric vent complying with ASSE 1012 or a reduced pressure principle backflow preventer complying with ASSE 1013.~~ Where chemicals are used, the potable water supply shall be protected by a reduced pressure principle backflow preventer.

Exception: Where all solar system piping is a part of the potable water distribution system, in accordance with the requirements of the International Plumbing Code, and all components of the piping system are listed for potable water use, cross-connection protection measures shall not be required.

**TABLE P2903.2
MAXIMUM FLOW RATES AND CONSUMPTION FOR PLUMBING
FIXTURES AND FIXTURE FITTINGS^b**

PLUMBING FIXTURE OR FIXTURE FITTING	PLUMBING FIXTURE OR FIXTURE FITTING
Lavatory faucet	2.2 gpm at 60 psi
Shower head ^a	2.5 gpm at 80 psi
Sink faucet	2.2 gpm at 60 psi
Water closet	<u>1.28</u> 4.6 gallons per flushing cycle

For SI: 1 gallon per minute = 3.785 L/m,
1 pound per square Inch = 6.895 kPa.

- a. A handheld shower spray is also a shower head.
- b. Consumption tolerances shall be determined from referenced standards.

SECTION P2904 DWELLING UNIT FIRE SPRINKLER SYSTEMS

P2904.1 General. The design and installation of residential fire sprinkler systems shall be in accordance with NFPA 13D or Section P2904, which shall be considered equivalent to NFPA 13D. Partial residential sprinkler systems shall be permitted to be installed only in buildings not required to be equipped with a residential sprinkler system. Section P2904 shall apply to stand-alone and multipurpose wet-pipe sprinkler systems that do not include the use of antifreeze. A multipurpose fire sprinkler system shall provide domestic water to both fire sprinklers and plumbing fixtures. A stand-alone sprinkler system shall be separate and independent from the water distribution system. A

~~backflow preventer shall not be required to separate a stand alone sprinkler system from the water distribution system.~~

P2905.8 Joint and connection tightness. Joints and connections in the plumbing system shall be gas tight and water tight for the intended use or required test pressure. No joints shall be permitted under slabs.

P2905.17.2 Plastic pipe or tubing to other piping material. Joints between different types of plastic pipe or between plastic pipe and other piping material shall be made with an approved adapter fitting. Plastic adapter fittings shall be male only.

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CHAPTER 30 SANITARY DRAINAGE

P3001.3 Flood-resistant Installation. In flood hazard areas as established by Chapter 19 of the City Code Table R301.2(4), drainage, waste and vent systems shall be located and installed to prevent infiltration of floodwaters into the systems and discharges from the systems into floodwaters.

P3002.3.1 Drainage. Drainage fittings shall have a smooth interior waterway of the same diameter as the piping served. All fittings shall conform to the type of pipe used. Drainage fittings shall have no ledges, shoulders or reductions which can retard or obstruct drainage flow in the piping. Threaded drainage pipe fittings shall be of the recessed drainage type, cast iron black or galvanized. Drainage fittings shall be designed to maintain one-fourth unit vertical in 12 units horizontal (2-percent slope) grade. This section shall not be applicable to tubular waste fittings used to convey vertical flow upstream of the trap seal liquid level of a fixture trap.

**TABLE P3005.1
FITTINGS FOR CHANGE IN DIRECTION**

TYPE OF FITTING PATTERN	CHANGE IN DIRECTION		
	Horizontal to vertical	Vertical to horizontal	Horizontal to horizontal
Sixteenth bend	X	X	X
Eighth bend	X	X	X
Sixth bend	X	X	X
Quarter bend	X	X ^a	X ^a
Short sweep	X	X ^{a, b}	X ^a
Long sweep	X	X	X
Sanitary tee	X ^c	--	--
Wye	X	X	X
Combination wye and eighth bend	X	X	X

For SI: 1 inch = 25.4 mm.

a. The fittings shall only be permitted for a 2-Inch or smaller fixture drain.

b. Three inches and larger.

c. For a limitation on multiple connection fittings, see Section P3005.1.1.

P3005.4.1 Branch and stack sizing. Branches and stacks shall be sized in accordance with Table P3005.4.1. Below grade drain pipes shall be not less than 2 inches (50 mm) ~~1 1/2 inches (38 mm)~~ in diameter. Drain stacks shall be not smaller than the largest horizontal branch connected.

Exceptions:

1. A 4-inch by 3-inch (102 mm by 76 mm) closet bend or flange.
2. A 4-inch (102 mm) closet bend connected to a 3-inch (76 mm) stack tee shall not be prohibited.

CHAPTER 31 VENTS

SECTION P3114 AIR ADMITTANCE VALVES

P3114.3 Where permitted. Individual vents, ~~branch vents, circuit vents and stack vents~~ shall be permitted to terminate with a connection to an air admittance valve. Individual and branch type air admittance valves shall vent only fixtures that are on the same floor level and connect to a horizontal branch drain.

P3114.4 Location. ~~Individual and branch~~ The air admittance valves shall be located ~~not less than 4 inches (102 mm) above the horizontal branch drain or fixture drain being vented. Stack type air admittance valves shall be located not less than 6 inches (152 mm) above the flood level rim of the highest fixture being vented.~~ The air admittance valve shall be located within the maximum developed length permitted for the vent. The air admittance valve shall be installed not less than 6 inches (152 mm) above insulation materials where installed in attics.

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CHAPTER 32 TRAPS

**TABLE P3201.7
SIZE OF TRAPS AND TRAP ARMS FOR PLUMBING FIXTURES**

PLUMBING FIXTURE	TRAP SIZE MINIMUM (inches)
Bathtub (with or without shower head and/or whirlpool attachments)	2 1½
Bidet	1 ¼
Clothes washer standpipe	2
Dishwasher (on separate trap)	1½
Floor drain	2
Kitchen sink (one or two traps, with or without dishwasher and garbage grinder)	1½
Laundry tub (one or more compartments)	1½
Lavatory	1 ¼
Shower (based on the total flow rate through showerheads and bodysprays) Flow rate: 5.7 gpm and less More than 5.7 gpm up to 12.3 gpm More than 12.3 gpm up to 25.8 gpm More than 25.8 gpm up to 55.6 gpm	1½ 2 3 4
Water closet	3 <u>Note a</u>

For SI: 1 inch= 25.4 mm.

a. ~~Consult fixture standards for trap dimensions of specific bowls.~~

APPENDIX A (IFGS)
SIZING AND CAPACITIES OF GAS PIPING

~~(This Appendix is informative and is not part of the Code. This appendix is an excerpt from the 2012 International Fuel Gas Code, coordinated with the section numbering of the International Residential Code.)~~

{**EDITOR'S NOTE:** ALL OTHER PROVISIONS REMAIN AS SET FORTH IN 2016 IRC.}

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**APPENDIX B (IFGS)
SIZING OF VENTING SYSTEMS SERVING APPLIANCES
EQUIPPED WITH DRAFT HOODS, CATEGORY I
APPLIANCES, AND APPLIANCES LISTED FOR USE WITH
TYPE B VENTS**

~~(This Appendix is informative and is not part of the Code. This appendix is an excerpt from the 2012 International Fuel Gas Code, coordinated with the section numbering of the International Residential Code)~~

{EDITOR'S NOTE: ALL OTHER PROVISIONS REMAIN AS SET FORTH IN 2012 IRC.}

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APPENDIX L PERMIT FEES

{EDITORIAL NOTE: DELETE ENTIRE APPENDIX AND REPLACE WITH THE FOLLOWING.}

CONVENTIONAL LIGHT-FRAME WOOD CONSTRUCTION FOR SINGLE FAMILY RESIDENTIAL CONSTRUCTION IN HIGH- WIND AREAS

SECTION AL101 GENERAL

AL101.1 Scope. This chapter applies to regular-shaped single family residential buildings that are not more than three stories in height and are of conventional light-frame construction.

Exception: Detached carports and garages not exceeding 700 square feet (65 m²) and accessory to Group R-3 Occupancies need only comply with the roof-member-to-wall-tie requirements of Section K103.8.

SECTION AL102 DEFINITION

CORROSION RESISTANT or NONCORROSIVE. Refers to a material having a corrosion resistance equal to or greater than a hot-dipped galvanized coating of 1.5 ounces of zinc per square foot (4 g/m²) of surface area. When an element is required to be corrosion resistant or noncorrosive, all of its parts, such as screws, nails, wire, dowels, bolts, nuts, washers, shims, anchors, ties and attachments, shall also be corrosion resistant or noncorrosive.

SECTION AL103 COMPLETE LOAD PATH AND UPLIFT TIES

AL103.1 General. Blocking, bridging, straps, approved framing anchors or mechanical fasteners shall be installed to provide continuous ties from the roof to the foundation system. Tie straps shall be 1¹/₈-inch (28.6 mm) by 0.036-inch (0.91 mm) (No. 20 gage) sheet steel and shall be corrosion resistant as herein specified. All metal connectors and fasteners used in exposed locations or in areas otherwise subject to corrosion shall be of corrosion-resistant or noncorrosive material. The number of common nails specified is the total required and shall be equally divided on each side of the connection. Nails shall be spaced to avoid splitting of the wood.

Exception: Pre-manufactured connectors that provide equal or greater tie-down capacity may be used, provided that they are installed in compliance with all the manufacturer's specifications.

AL103.2 Wall-to-foundation tie. Exterior walls shall be tied to a continuous foundation system or an elevated foundation system in accordance with Section AL105.

AL103.3 Sills and foundation tie. Foundation plates resting on concrete or masonry foundations shall be bolted to the foundation with not less than 1/2-inch-diameter (13 mm) anchor bolts with 7-inch-

minimum (178 mm) embedment into the foundation and spaced not more than 4 feet (1219 mm) on center.

AL103.4 Floor-to-foundation tie. The lowest-level exterior wall studs shall be connected to the foundation sill plate or an approved elevated foundation system with bent tie straps spaced not more than 32 inches (813 mm) on center. Tie straps shall be nailed with a minimum of 4 ten penny nails.

AL103.5 Wall framing details. The spacing of studs in exterior walls shall be in accordance with Chapter 23. Mechanical fasteners complying with this chapter shall be installed at a maximum of 32 inches (813 mm) on center as required to connect studs to the sole plates, foundation sill plate and top plates of the wall. The fasteners shall be nailed with a minimum of 8 eight penny nails.

Where openings exceed 4 feet (1219 mm) in width, the required tie straps shall be at each edge of the opening and connected to a doubled full-height wall stud. When openings exceed 12 feet (3658 mm) in width, two ties at each connection or a manufactured fastener designed to prevent uplift shall be provided.

AL103.6 Wall sheathing. All exterior walls and required interior main cross-stud partitions shall be sheathed in accordance with Chapter 23.

AL103.7 Floor-to-floor tie. Upper-level exterior wall studs shall be aligned and connected to the wall studs below with tie straps placed a minimum of 32 inches (813 mm) on center and connected with a minimum of 6 eight penny nails per strap.

AL103.8 Roof-members-to-wall tie. Tie straps shall be provided from the side of the roof-framing member to the supporting member below the roof. Tie straps shall be placed at every roof-framing member and connected with a minimum of 8 eight penny nails.

AL103.9 Ridge ties. Opposing common rafters shall be aligned at the ridge and be connected at the rafters with tie straps spaced a maximum of 32 inches (813 mm) on center and connected with 8 eight penny nails.

AL103.10 Gable-end walls. Gable-end wall studs shall be continuous between points of lateral support that are perpendicular to the plane of the wall. Gable-end wall studs shall be attached with approved mechanical fasteners at the top and bottom. Eight 8 penny nails shall be required for each fastener. Fasteners shall be spaced a maximum of 32 inches (813 mm) on center.

SECTION AL104 **ROOFS**

AL104.1 Roof sheathing. Solid roof sheathing shall be applied and shall consist of a minimum 1-inch-thick (25.4 mm) nominal lumber applied diagonally or a minimum 15/32-inch-thick (11.9 mm) wood structural panel or particle board (OSB) or other approved sheathing applied with the long dimension perpendicular to supporting rafters. Sheathing shall be nailed to roof framing in an approved manner. The end joints of wood structural panels or particle board shall be staggered and shall occur over blocking, rafters, or other supports.

AL104.2 Roof covering. Roof coverings shall be approved and shall be installed and fastened in accordance with Chapter 15 and with the manufacturer's instructions.

AL104.3 Roof overhang. The roof eave overhang shall not exceed 3 feet (914 mm) unless an analysis is provided showing that the required resistance is provided to prevent uplift. The roof overhang at gabled ends shall not exceed 2 feet (610 mm) unless an analysis showing that the required resistance to prevent uplift is provided.

SECTION AL105 **ELEVATED FOUNDATION**

AL105.1 General. When approved, elevated foundations supporting not more than one story and meeting the provisions of this section may be used. A foundation investigation may be required by the building official.

AL105.2 Material. All exposed wood-framing members shall be treated wood. All metal connectors and fasteners used in exposed locations shall be corrosion-resistant or noncorrosive steel.

AL105.3 Wood piles. The spacing of wood piles shall not exceed 8 feet (2438 mm) on center. Square piles shall not be less than 10 inches (254 mm) and tapered piles shall have a tip of not less than 8 inches (203 mm). Eight-inch-square (51613 mm²) piles shall have a minimum embedment length of 5 feet (1524 mm) and shall project not more than 8 feet (2438 mm) above undisturbed ground surface. Eight-inch (203 mm) taper piles shall have a minimum embedment length of 6 feet (1828 mm) and shall project not more than 7 feet (2134 mm) above undisturbed ground surface.

AL105.4 Girders. Floor girders shall consist of solid sawn timber, built-up 2-inch-thick (51 mm) lumber, or trusses. Splices shall occur over wood piles. The floor girders shall span in the direction parallel to the potential floodwater and wave action.

AL105.5 Connections. Wood piles may be notched to provide a shelf for supporting the floor girders. The total notching shall not exceed 50 percent of the pile cross section. Approved bolted connections with 1/4-inch (6.4 mm) corrosion-resistant or noncorrosive steel plates and 3/4-inch-diameter (19 mm) bolts shall be provided. Each end of the girder shall be connected to the piles using a minimum of two 3/4-inch-diameter (19 mm) bolts.

APPENDIX M
~~HOME DAY CARE R-3 OCCUPANCY~~

{**EDITOR'S NOTE: REPLACE** APPENDIX M WITH THE FOLLOWING.}

AIRPORT SOUND ATTENUATION REQUIREMENTS

SECTION AM101
GENERAL

AM101.1 Purpose. The purpose of this appendix to set forth sound attenuation specifications for buildings when such sound attenuation is required by Article VI, Chapter 9 of the City Code to achieve an interior sound level of 45dBA.

AM101.2 Applicability. These provisions shall apply under circumstances where an airport land use permit is required under Section 9-381 a (2) or (3) of the City Code, and are in addition to other applicable building standards set forth elsewhere in this code.

AM101.3 Alternate compliance. Alternative means or methods which equal or exceed the standards set forth in these provisions may be used when approved by the building official in accordance with section R104.9 of this code.

SECTION AM201
DEFINITIONS

AM201.1 Definitions. For purposes of these provisions, the following words shall have the meaning shown herein.

SOUND TRANSMISSION CLASS (STC). An integer rating relating to the quality of sound attenuation for building partitions such as walls, ceilings, doors, and windows.

SECTION AM301
WALLS

AM301.1 General. The specific exterior wall assemblies set forth in AM301.2 and AM301.3 shall include the interior finishes set forth therein.

Exception: Exterior wall assemblies or materials that have been tested or listed with a minimum STC rating of 40.

AM301.2 Brick veneer. When exterior walls are constructed using brick veneer, a minimum of ½ inch gypsum drywall shall be applied as the interior finish.

AM301.3 Vinyl or cement sidings. When exterior walls are constructed using vinyl or cement sidings, a minimum of 5/8 inch gypsum drywall shall be applied as the interior finish.

AM301.4 Other assemblies and materials. All other exterior wall assemblies or materials shall have a tested or listed minimum STC rating of 40.

SECTION AM401 **WINDOWS**

AM401.1 Windows. All windows shall have a minimum STC rating of 40 when tested in accordance with ASTM E 90.

AM401.2 Insulation at windows. The cavity between the wood framing and the window frame shall be insulated with fiberglass insulation or foam insulation to the depth of the window frame.

SECTION AM501 **DOORS**

AM501.1 Doors. All exterior doors shall have a minimum STC rating of 40 when tested in accordance with ASTM E 90.

Exception: An exterior door may have a tested or listed STC rating of less than 40 when installed with a storm door which when combined, achieve a minimum tested or listed STC rating of 40.

SECTION AM601 **ROOF/CEILING ASSEMBLIES**

AM601.1 General. Roof/ceiling assemblies shall be constructed in accordance with the requirements of AM601.2 or AM601.3

Exception: Roof/ceiling assemblies or materials that have been tested or listed with a minimum STC rating of 40.

AM601.2 Ceilings with unconditioned attic space above. Ceilings with unconditioned attic space shall be insulated with a minimum of ½ inch gypsum drywall on the interior ceiling side covered with a minimum of 12 inches of blown in fiberglass insulation.

AM601.3 Ceilings without attic space above. Ceilings without attic space above shall be insulated with a minimum of 5/8 inch gypsum drywall on the interior side filled with a minimum of 9 inches of fiberglass batt insulation with a 1 inch air space between the roof sheathing and the fiberglass.

APPENDIX V

VISITABILITY

SECTION AV101

SCOPE

AV101.1 Purpose. This set of standards is intended to provide minimum residential features to allow a mobility-impaired person to visit and use a home by providing:

1. One zero-step entrance at grade-level from the street, a driveway, garage, or an alley connecting to a 36 inch wide door.
2. Doors to kitchens, family rooms, living rooms, dining rooms and hallways on the ground level that are wide enough for wheelchair use.
3. At least one bathroom or half bath on ground level with sufficient room to allow a wheelchair to enter into the bathroom.

Exception: Where the grade-level floor plan does not include habitable rooms.1

AV101.2 Application. Unless compliance is required by another law or regulation outside this code, compliance with this chapter is voluntary. Any owner who desires to comply with this chapter shall so advise the building official when the plans for the residence are filed, so that conformity with this chapter may be considered in the plan review and inspection process.

SECTION AV102

ZERO STEP ENTRANCE

AV102.1 Route. A 36 inch wide accessible route to the residence shall be provided by a smooth uninterrupted surface with slope not to exceed 1:12.

AV102.2 Ramp slope and rise. The least possible slope shall be used for any ramp. The maximum slope of a ramp in new construction shall be 1:12. The maximum rise for any run shall be 30 inches (760mm).

AV102.3 Special technical provisions for ramps. Curb ramps and interior or exterior ramps to be constructed on sites where space limitations prohibit the use of a 1:12 slope or less may have slopes and rises as follows:

1. A slope between 1:10 and 1:12 is allowed for a maximum rise of 6 inches.
2. A slope between 1:8 and 1:10 is allowed for a maximum rise of 3 inches. A slope steeper than 1:8 is not allowed.

SECTION AV103

DOORS

AV103.1 Clear width. One exterior doorway that connects with the zero step entrance, one bathroom doorway, and any kitchen, family room, living room, dining room or hallway doorways on grade-level shall have a minimum clear opening of 32 in (815 mm) with the door open 90 degrees, measured

between the face of the door and the opposite stop. Where the door opens more than 90 degrees the clear opening shall be measured between the stops on both sides.

AV103.2 Thresholds at doorways. Thresholds at doorways shall not exceed 3/4 in (19 mm) in height for exterior sliding doors or 1/2 in (13 mm) for other types of doors. Raised thresholds and floor level changes at accessible doorways shall be beveled with a slope no greater than 1:2.

SECTION V104 **WHEELCHAIR PASSAGE WIDTH**

AV104.1 Wheelchair passage width. The minimum clear width for single grade-level wheelchair passage shall be 32 in (815 mm) at a point not to exceed 24 inches and 36 in (915 mm) continuously (see Fig. 1 and 2).

AV104.2 Changes in level. Changes in level up to 1/4 in (6 mm) may be vertical and without edge treatment (see Fig. 3(a)). Changes in level between 1/4 in and 1/2 in (6 mm and 13 mm) shall be beveled with a slope no greater than 1:2 (see Fig. 3(b)). Changes in level greater than 1/2 in (13 mm) shall be accomplished by means of a ramp that complies with Section AV102.

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