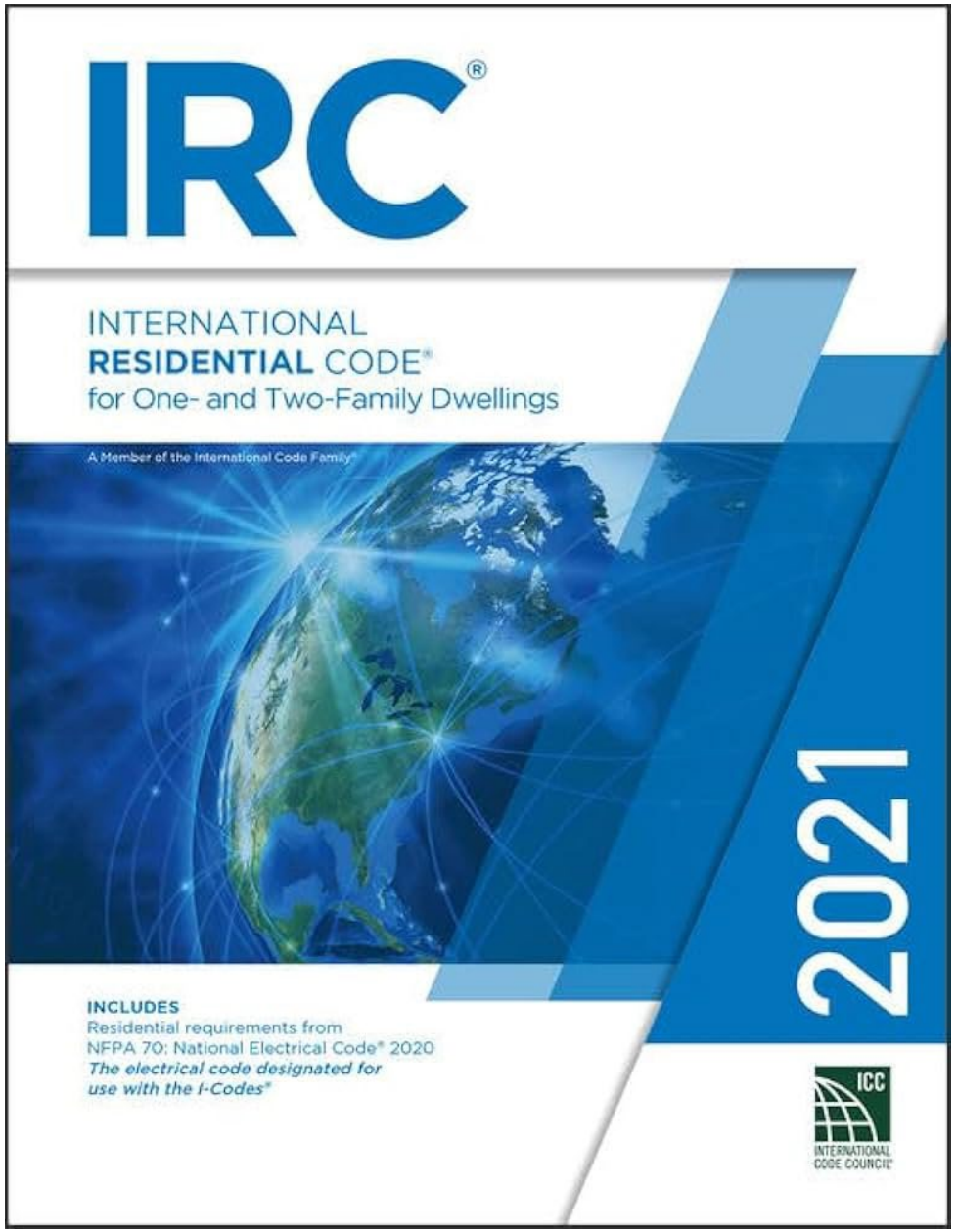
HOUSTON
PUBLIC WORKS

HOUSTON CONSTRUCTION CODE MODERNIZATION

SIGNIFICANT CODE CHANGES & HIGHLIGHTS OF THE 2015 TO 2018 AND 2018 TO 2021 INTERNATIONAL RESIDENTIAL CODE (IRC)



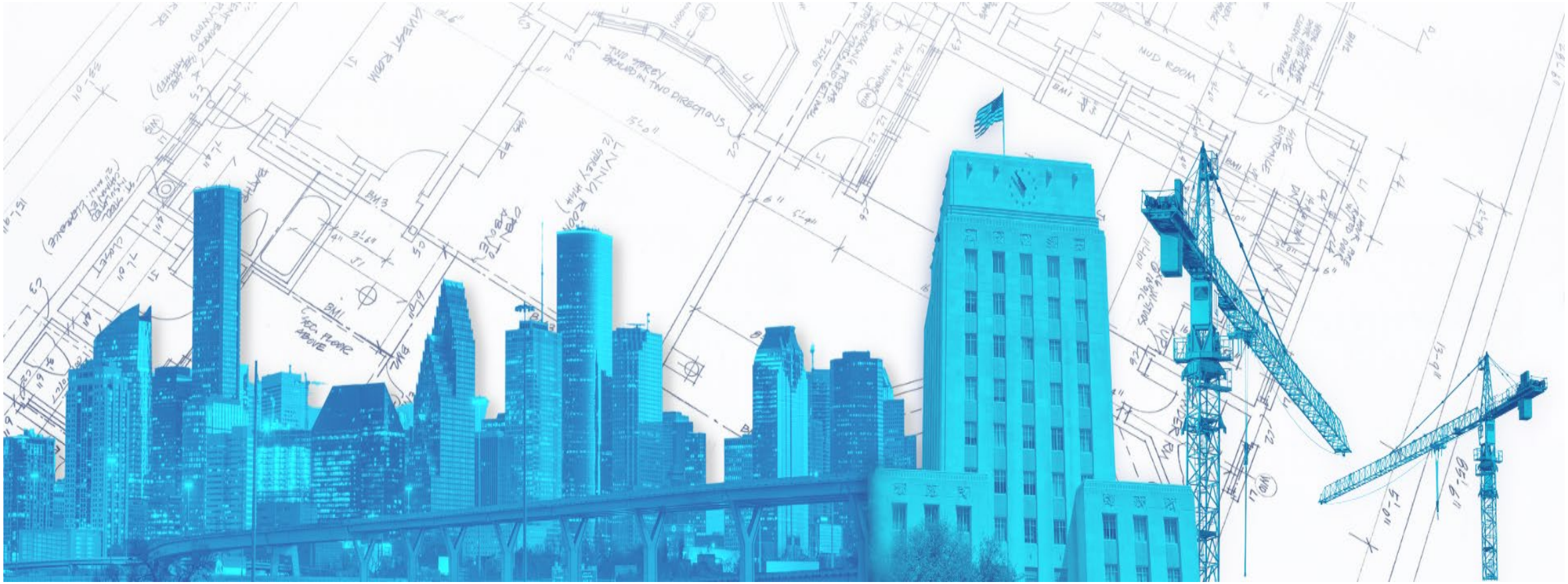
2021 INTERNATIONAL RESIDENTIAL CODE

Significant changes to base code requirements from 2015 to 2018 and 2018 to 2021

Changes and updates to City of Houston amendments

HOUSTON PUBLIC WORKS

IRC CHAPTER 1 SCOPE AND ADMINISTRATION



2018 IRC – SIGNIFICANT CHANGES

Code Section

Scope

R101.2

IRC Changes:

Changes to Section 101.2

- **All instances where the International Building Code (IBC) permits construction under the IRC are now listed in the exception to the scope of the IRC. Allows for the additional permits to be constructed with the IRC where a residential sprinkler system is provided in accordance with Section P2904. New facilities include:**

3. **A care facility with five or fewer persons receiving custodial care within a dwelling unit.**

4. **A care facility with five or fewer persons receiving medical care within a dwelling unit.**

5. **A care facility for five or fewer persons receiving care that are within a single-family dwelling.**

Christian Delbert/Shutterstock.com

Bed and breakfast

2021 IRC – SIGNIFICANT CHANGES

Code Section

Applicability

R102

IRC Changes:

R102.5 City of Houston has adopted and made part of the code Appendices A, B, C, H, K, L, M, Q, T, U, and V.

R102.8 New section pointing to Chapter 57 of the Fire Code regarding requirements for flammable and combustible liquids.

R102.9 Part VIII-Electrical (Chapters 34-43) of the 2021 Residential Code have not been adopted by the City of Houston. All electrical work and licensing shall comply with the Electrical Code.

2021 IRC – SIGNIFICANT CHANGES

Code Section

Duties and Powers of the Building Official

R104

IRC Changes:

City of Houston added a new Section R104.12 which allows Building Officials to order work stopped in the same manner provided in Section 115 of the Building Code.

City of Houston has removed the following Flood Hazard Area Sections in their entirety.

- **R104.10.1**
- **R105.3.1.1**
- **R106.1.4**

2018 IRC – SIGNIFICANT CHANGES

Code Section

Alternative Materials and Methods of Construction

R104.11

IRC Changes:

The building official shall have the authority to approve alternative material upon application of the owner or owner's authorized agent.

Specifies that the materials or methods shall be not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability, and safety.

Mona Makela/Shutterstock.com

A new house constructed of alternative materials

2018 IRC – SIGNIFICANT CHANGES

Code Section

Definitions

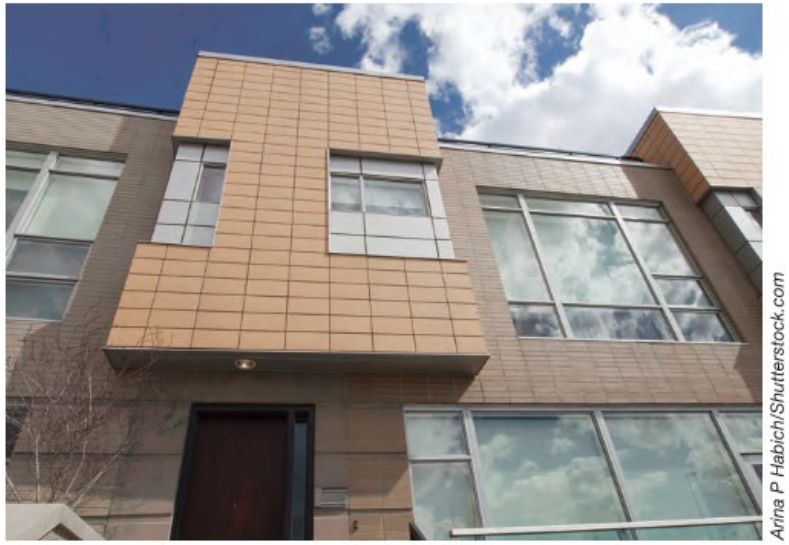
R105.1, R110.1, and R202

IRC Changes:

A definition for "Change of Occupancy" has been added and the requirement for a certificate of occupancy when there is a change of occupancy or use has been clarified.

New definition for Change of Occupancy.

- **A change in the use of a building or a portion of a building that involves a change in the application of the requirements of this code.**



Arina P Habich/Shutterstock.com

Converting a townhouse from a dwelling unit to a live/work unit is considered a change of use

2021 IRC – SIGNIFICANT CHANGES

Code Section

Work Exempt from Permit

R105.2

IRC Changes:

City of Houston has modified the list of work exempted from permit:

- **Building Item 1: The floor area limit for one story accessory structures has been reduced from 200 SF to 120 SF.**
- **Building Item 2: Height limit of fences not requiring permit increased to 8 ft from 7 ft with an added provision that they are not constructed of masonry or concrete, and that are not electrically energized.**
- **Building Item 5: Clarification for sidewalks and driveways specifying those that are not covered under the provisions of the Infrastructure Design Manual.**

2021 IRC – SIGNIFICANT CHANGES

Code Section

Fees

R108

IRC Changes:

City of Houston has modified R108 to provide the structural building permit fees for new one- and two-family residential dwellings and townhouses and their detached accessory structures. Tables R108.3.1(1) and R108.3.1(2) have been added that provide a fee schedule.

2021 IRC – SIGNIFICANT CHANGES

Code Section

Certificate of Compliance

R110

IRC Changes:

City of Houston has provided a new exception to R110.1

- **A certificate of compliance is not required for a Group U occupancy accessory to a single-family dwelling or townhouse not containing hazardous materials exceeding the maximum allowable quantities identified in Section 307 of the Building Code.**

R110.3 modified with new item to be included in the certificate of compliance:

- **The use and occupancy of the building.**
- **The type of construction as defined by Chapter 6 of the Building Code.**

2021 IRC – SIGNIFICANT CHANGES

Code Section

Violations

R113

IRC Changes:

City of Houston has added a new Section R113.4.1 which provides the penalty requirements for when no specific penalty is otherwise provided in this code.

2021 IRC – SIGNIFICANT CHANGES

Code Section

Private Plan Review And Inspection Services

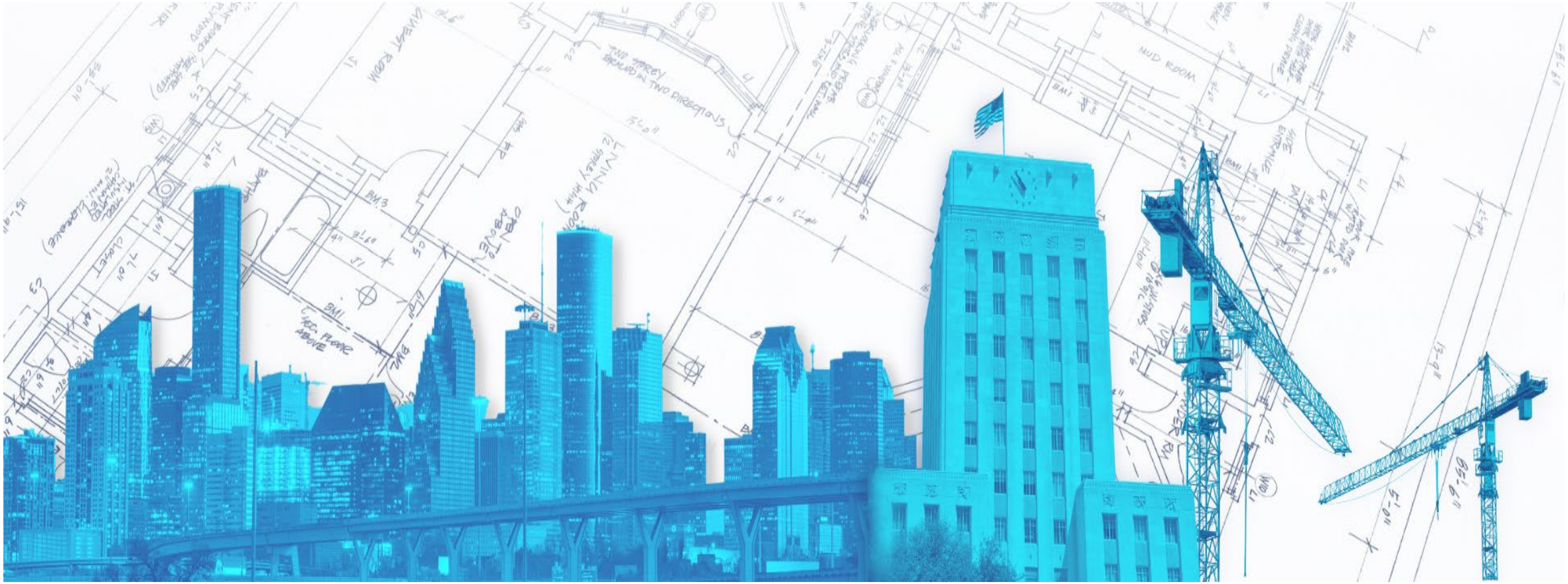
R115

IRC Changes:

City of Houston has added a new Section R115 detailing the establishment of a private plan review and inspection program.

HOUSTON PUBLIC WORKS

IRC CHAPTER 2 DEFINITIONS



2018 IRC – SIGNIFICANT CHANGES

Code Section

Definitions

R202

IRC Changes:

New definition for ‘Access’ and ‘ready access’.

- **Definitions apply to equipment and devices that must be reached for replacement or service.**

Modification to other definitions to include new definitions

- **Cleanout**
- **Supply fitting**

2018 IRC – SIGNIFICANT CHANGES

Code Section

Definitions

R202

IRC Changes:

New definition for ‘Crawl Space’

- **Defines a crawl space as an underfloor space that is not a basement.**

2018 IRC – SIGNIFICANT CHANGES

Code Section

Definitions

R202

IRC Changes:

New definitions to differentiate ‘carbon monoxide alarm’ and ‘carbon monoxide detector’

- **Clarifies that the alarm will alert occupants by means of an audible signal and the detector is a device that will transmit a signal to a connected fire alarm control unit.**

Carbon monoxide alarm

2018 IRC – SIGNIFICANT CHANGES

Code Section

Definitions

R202

IRC Changes:

Clarification of the definition of ‘fenestration’

- **General term for vertical fenestration and skylights and sloped glazing**

New definition for ‘vertical fenestration’

- **Certain doors and windows installed at less than 15° from vertical**

Clarification of the definition of ‘skylights and sloped glazing’

- **Glass or other glazing material installed at a slope of 15° (previously 30 °) or more**

Skylights

2021 IRC – SIGNIFICANT CHANGES

Code Section

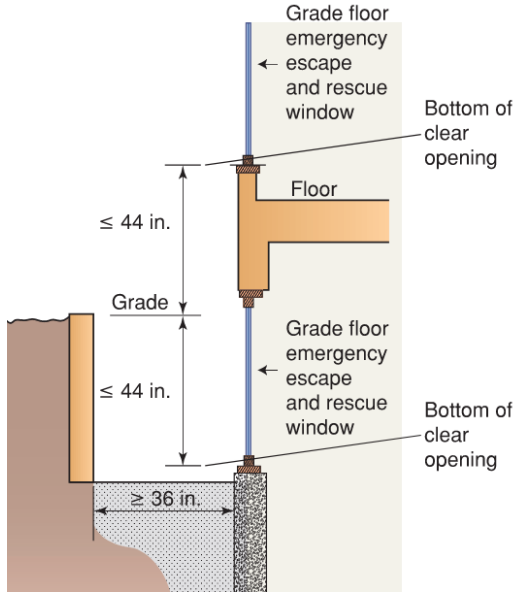
Definitions

R202

IRC Changes:

Revised definition for Grade Floor Emergency Escape And Rescue Opening.

- **An emergency escape and rescue opening located such that the bottom of the clear opening is not more than 44 inches above or below the finished ground level adjacent to the opening.**



2018 IRC – SIGNIFICANT CHANGES

Code Section

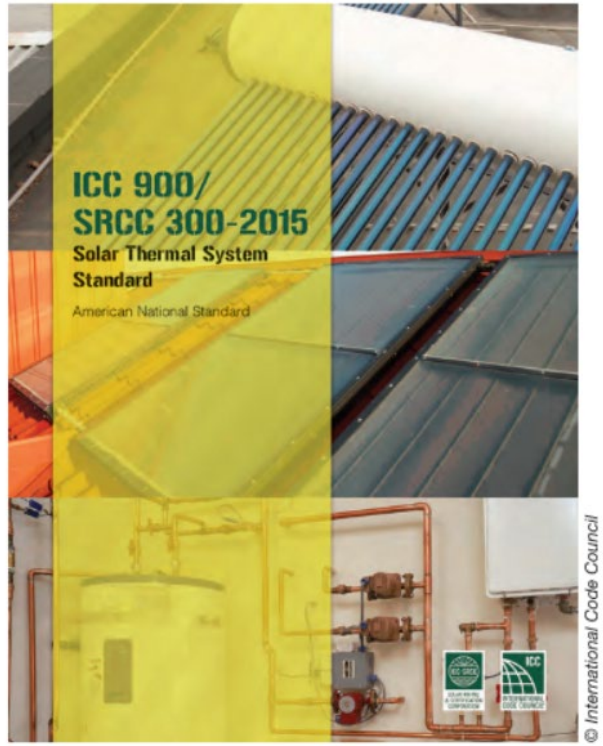
Definitions

R202

IRC Changes:

New definitions related to solar energy systems for clarification in the related provisions in chapters 3 and 9.
New definitions for:

- **Solar energy system**
- **Solar thermal collector**
- **Solar thermal system**



New defined terms for solar thermal systems and collectors are from ICC 900/SRCC 300

2021 IRC – SIGNIFICANT CHANGES

Code Section

Definitions

R202

IRC Changes:

New definition for Storm Shelter.

- **A building, structure or portion thereof, constructed in accordance with ICC 500 and designated for use during a severe windstorm event, such as a hurricane or tornado.**

2021 IRC – SIGNIFICANT CHANGES

Code Section

Definitions

R202

IRC Changes:

Revised definition for Townhouse.

- **A building that contains three or more attached townhouse units.**

New definition for Townhouse Unit

- **A single-family dwelling unit in a townhouse that extends from foundation to roof and that has a yard or public way on not less than two sides.**

2021 IRC – SIGNIFICANT CHANGES

Code Section

Definitions

R202

IRC Changes:

New definition for Live/Work Unit.

- **A dwelling unit or sleeping unit in which a significant portion of the space includes a nonresidential use that is operated by the tenant.**

New definition for Sleeping Unit.

- **A single unit that provides rooms or spaces for one or more persons, includes permanent provisions for sleeping and can include provisions for living, eating and either sanitation or kitchen facilities but not both. Such rooms and spaces that are also part of a dwelling unit are not sleeping units.**

2021 IRC – SIGNIFICANT CHANGES

Code Section

Definitions

R202

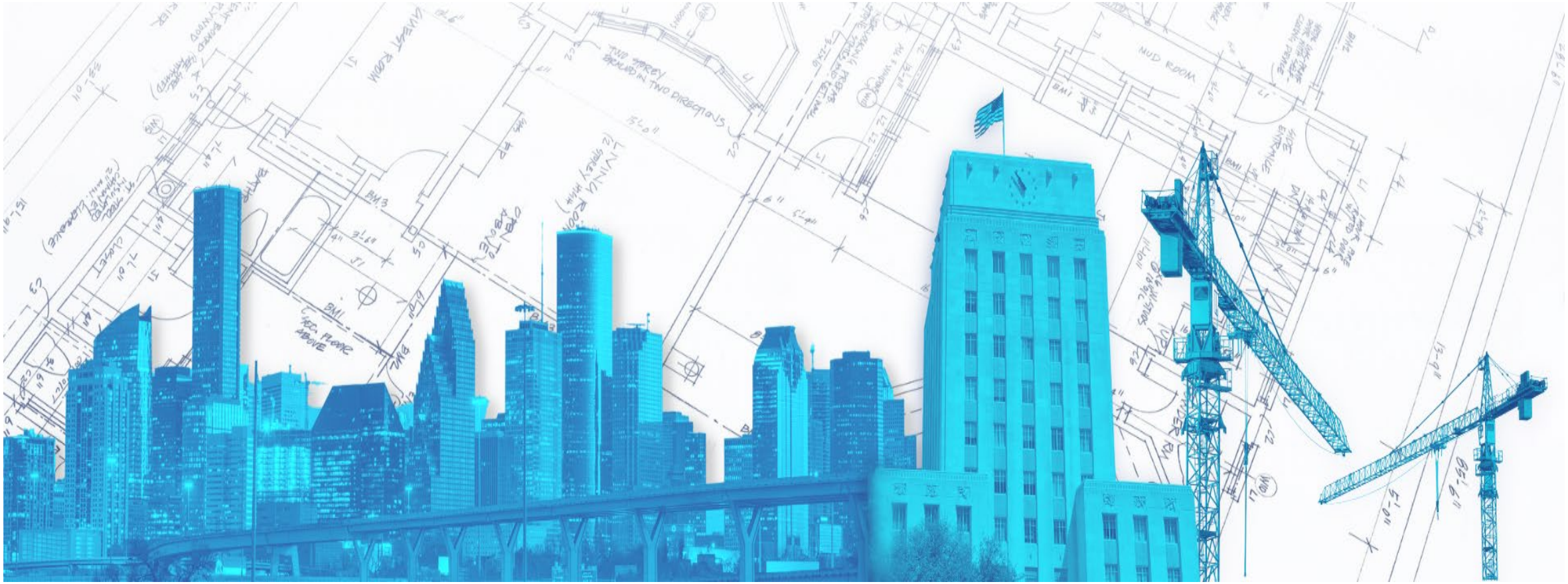
IRC Changes:

Revised definition for High-efficacy Lamps Light Sources.

- **Compact fluorescent lamps, light-emitting diode (LED) lamps, T-8 or smaller diameter linear fluorescent lamps, or other lamps with an efficacy of not less than the following: 65 lumens per watt, or luminaires with an efficacy of not less than 45 lumens per watt.**

HOUSTON PUBLIC WORKS

IRC CHAPTER 3 BUILDING PLANNING



2021 IRC – SIGNIFICANT CHANGES

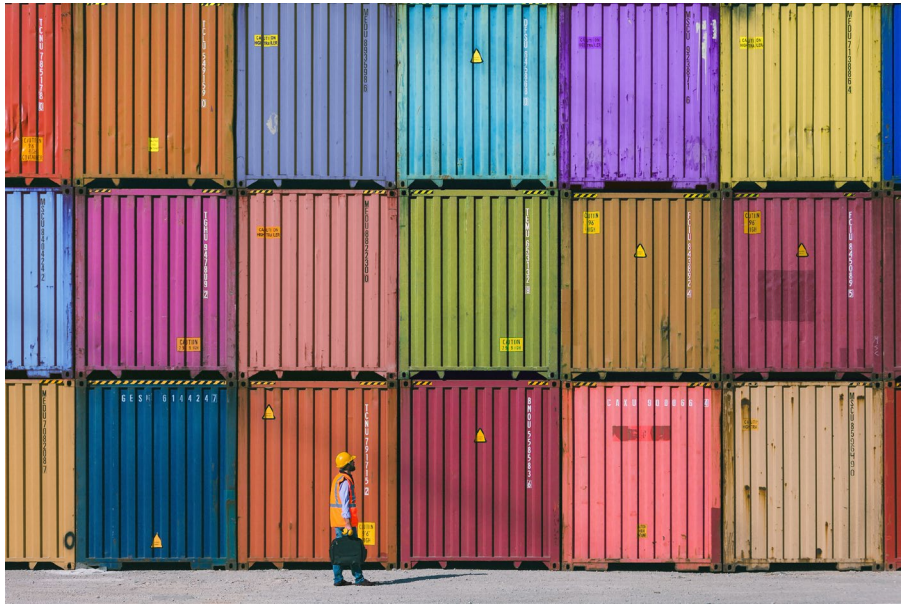
Code Section

Intermodal Shipping Containers

R301.1.4

IRC Changes:

Intermodal shipping containers that are repurposed for use as buildings or structures shall be designed in accordance with the structural provisions in Section 3115 of the International Building Code.



2018 IRC – SIGNIFICANT CHANGES

Code Section

Climatic and Geographic Design Criteria

Table R301.2(1)

IRC Changes:

Variables for Manual J – Residential Load Calculation assessments with other climatic and geographic design criteria are now included in the design criteria

Manual J Design Criteria[n]						
Elevation	Latitude	Winter Heating	Summer Cooling	Altitude Correction Factor	Indoor Design Temperature	Design Temperature Cooling

Heating Temperature Difference	Cooling Temperature Difference	Wind Velocity Heating	Wind Velocity Cooling	Coincident Wet Bulb	Daily Range	Winter Humidity	Summer Humidity

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

(no changes to footnotes a through m)

n. The jurisdiction shall fill in these sections of the table to establish the design criteria using Table 1a or 1b from ACCA Manual J or established criteria determined by the jurisdiction.

o. The jurisdiction shall fill in this section of the table using the Ground Snow Loads in Figure R301.2(6).

2021 IRC – SIGNIFICANT CHANGES

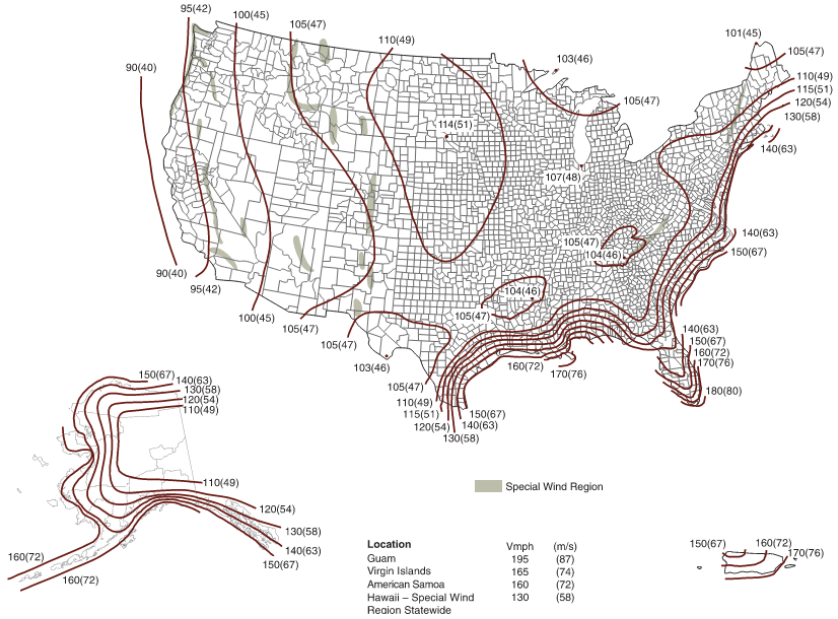
Code Section

Wind Speeds

R301.2

IRC Changes:

- Figure R301.2(2) has been updated, the map is now identical to the 2021 IBC and ASCE 7-16 wind speed maps for Risk Category II buildings.
- Table R301.2.1(1) has been updated for new design wind speeds and hip or gable roof profiles



2021 IRC – SIGNIFICANT CHANGES

Code Section

Wind Speeds

R301.2.1.1

IRC Changes:

- **The provisions of this code shall not apply to the design of buildings where wind design is required based on Figure R301.2.1.1.**

- **In regions where wind design is required in accordance with Figure R301.2.1.1 or where the ultimate design wind speed, V, in Figure R301.2(2) equals or exceeds 140 miles per hour (225 kph) in a special wind region, the design of buildings for wind loads shall be in accordance with one or more of the following methods:**

2018 IRC – SIGNIFICANT CHANGES

Code Section

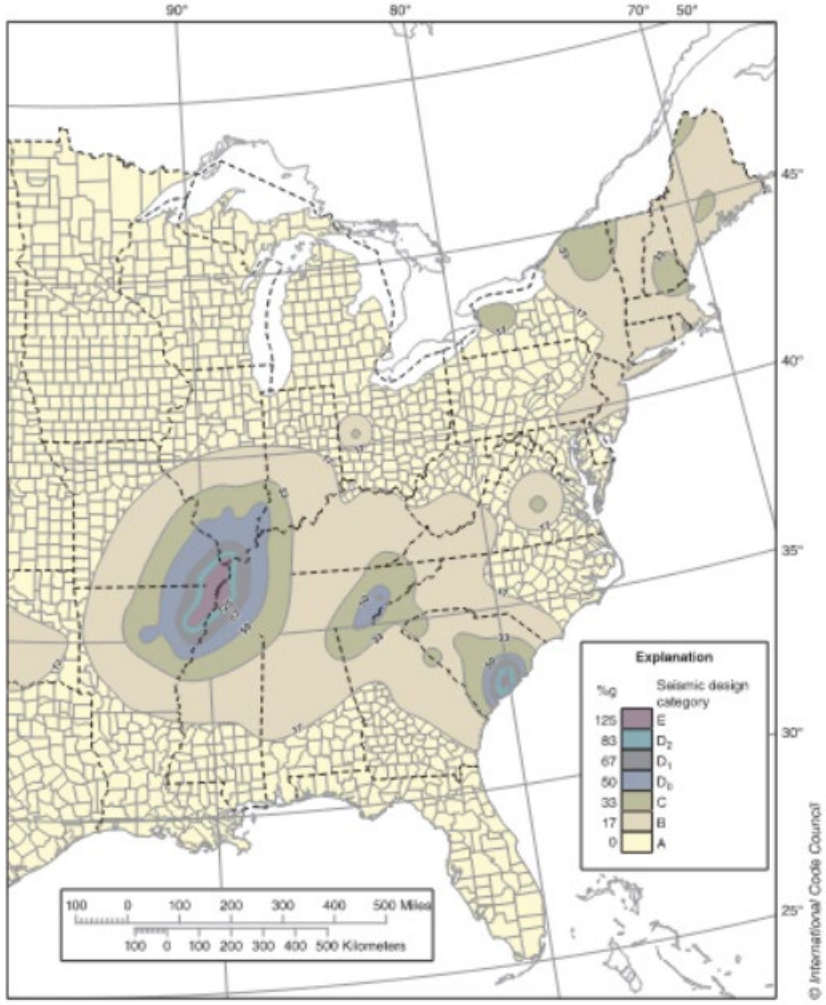
Seismic Design Category

R301.2.2.1

IRC Changes:

New alternative seismic map allows for the potential to lower the seismic design category due to soil type

- **The building code official can determine the soil conditions rather than assuming the default Site Class D and shall be in accordance with Figure R301.2(3) or Section 1613.2**



Alternate Seismic Design Categories

2018 IRC – SIGNIFICANT CHANGES

Code Section

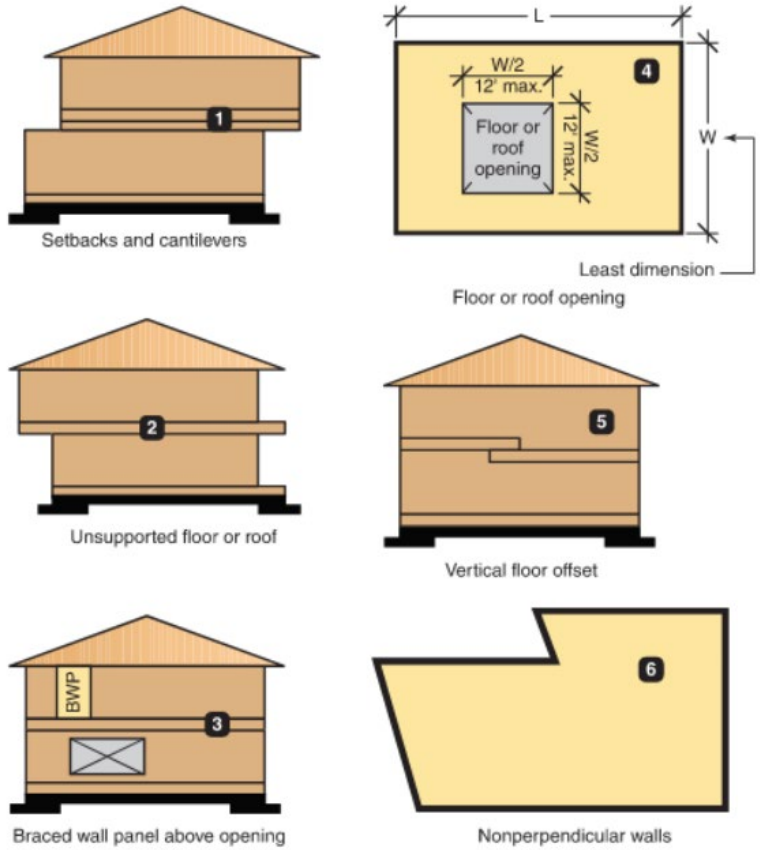
Irregular Buildings

R301.2.2.6

IRC Changes:

Modification. The section now clarifies that the seismic provisions are to be used for both irregular structures or portions thereof.

Clarifies that if one or more conditions are present in certain design categories the building is to be deemed irregular.



Seven irregularities requiring engineering in high seismic regions

2021 IRC – SIGNIFICANT CHANGES

Code Section

Irregular Buildings in Seismic Areas

R301.2.2.6

IRC Changes:

R301.2.2.6 modified to now include Hillside Light-Frame Construction as one of the conditions that define an irregular building.

2021 IRC – SIGNIFICANT CHANGES

Code Section

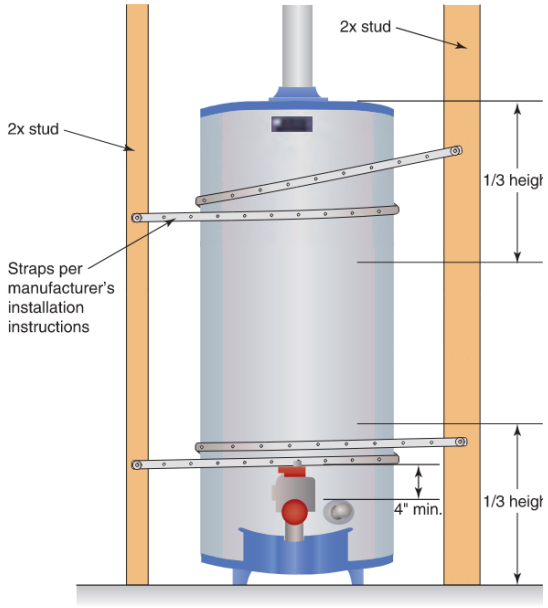
Seismic Anchorage of Water Heaters

R301.2.2.10

IRC Changes:

R301.2.2.10 adds Townhouses in Seismic Design Category C to list of locations where anchoring is required.

Thermal storage units are also specified as needing anchoring in addition to water heaters.



2021 IRC – SIGNIFICANT CHANGES

Code Section

Story Height

R301.3

IRC Changes:

New exception for story height reads:

- **Exception: A story height not exceeding 13 feet 7 inches (4140 mm) is permitted provided that the maximum wall stud clear height does not exceed 12 feet (3658 mm), the wall studs are in accordance with Exception 2 or 3 of Section R602.3.1 or an engineered design is provided for the wall framing members, and wall bracing for the building is in accordance with Section R602.10. Studs shall be laterally supported at the top and bottom plate in accordance with Section R602.3.**

2018 IRC – SIGNIFICANT CHANGES

Code Section

Exterior Walls

R302.1

IRC Changes:

Modification to requirements for fire-resistance ratings of exterior wall

- **Exception modified: Walls of dwellings exempt ➔ Walls of individual dwelling units exempt**
- **Fire-resistance rating of walls now references the International Building Code as an allowable testing standard**
- **Fire-resistance rating of projections now allows heavy timber or fire-retardant-treated wood**

Gable vent below rake overhang with soffit

2018 IRC – SIGNIFICANT CHANGES

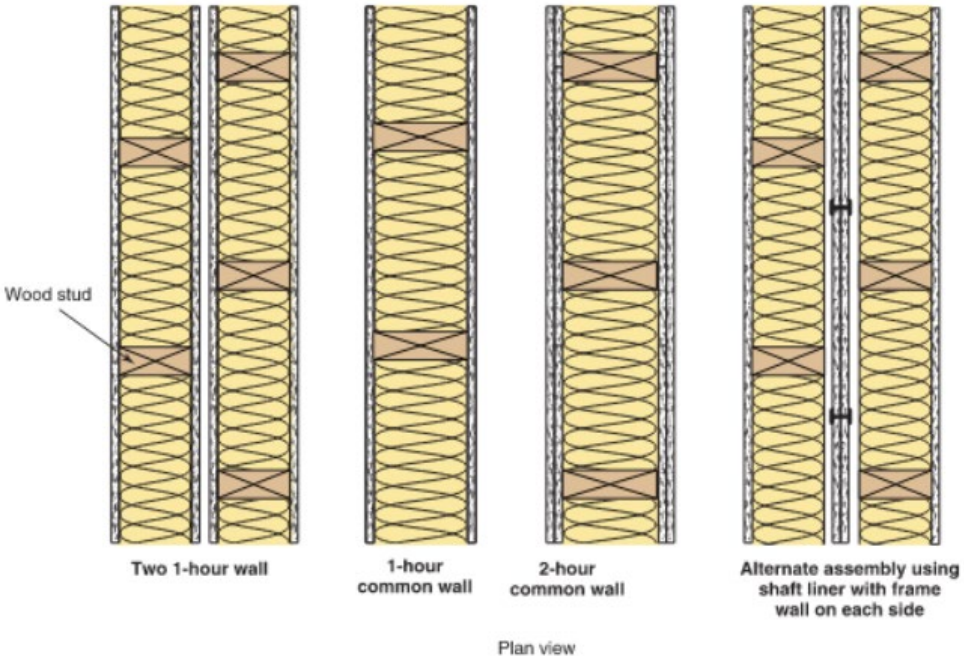
Code Section

Townhouse Separation

R302.2

IRC Changes:

- **Modification to the section to include double walls fire-resistance requirements in addition to common walls, providing two paths for compliance**
  - **Reference to the IBC Section 703.3 added throughout section R302.2**



Typical fire-resistant-rated wall assemblies for separating townhouse dwelling units

2021 IRC – SIGNIFICANT CHANGES

Code Section

Townhouses

R302.2

IRC Changes:

- **R302.2.1 and R302.2.2 have replaced the term Townhouse with the new more specific term Townhouse Unit.**
- **A new exception has been added to R302.2.2 Callowing for common walls to extend to and be tight against the inside of the exterior walls**
- **R302.2.6 A new exception has been added to structural independence requirement of Townhouse Units based on protection by a fire sprinkler system complying with Section P2904 or NFPA 13D.**

2018 IRC – SIGNIFICANT CHANGES

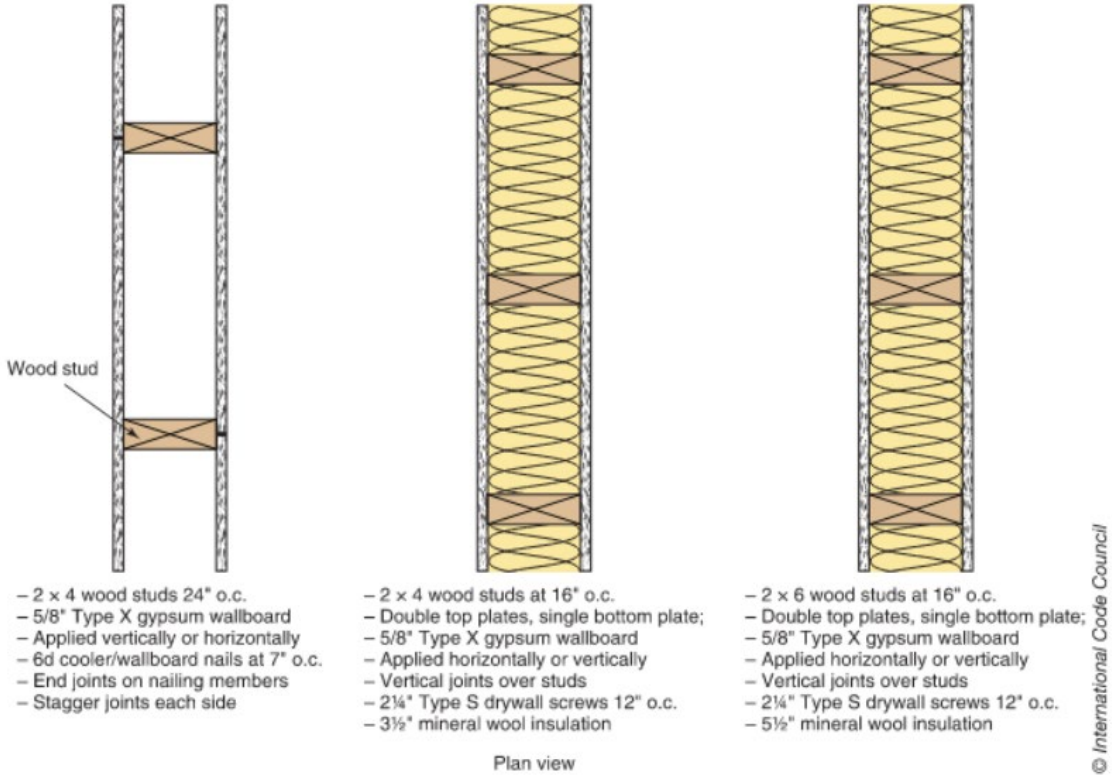
Code Section

Two-Family Dwelling Separation

R302.3

IRC Changes:

- **New reference to Section 703.3 of the International Building Code provides alternatives for determining the fire-resistance rating of wall and floor/ceiling assemblies for separation of dwelling units.**



Examples of prescriptive fire-resistant-rated wall assemblies from IBC Table 721.1(2)

2021 IRC – SIGNIFICANT CHANGES

Code Section

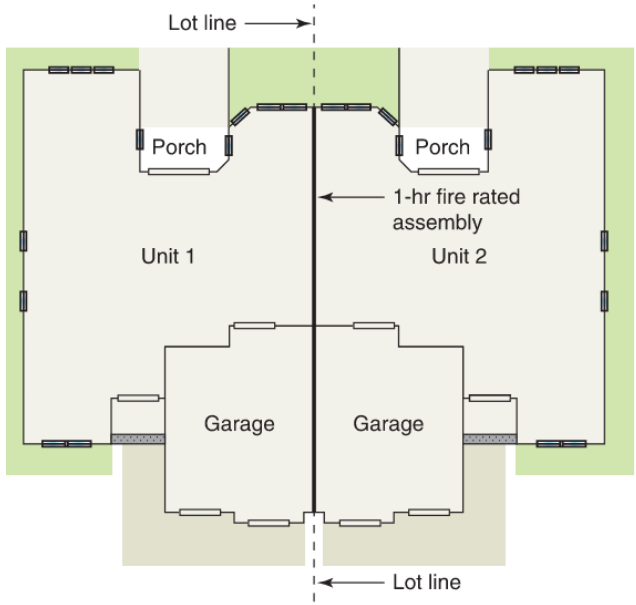
Two-Family Dwelling Separation

R302.3

IRC Changes:

Clarification of R302.3

- **The two-family dwelling rated separation of 1-hour is required regardless of whether a lot line exists between the two dwelling units or not.**



2018 IRC – SIGNIFICANT CHANGES

Code Section

Membrane Penetrations

R302.4.2

IRC Changes:

- New exception added for luminaires installed in fire-resistant construction:
  - Ceiling membrane penetrations by listed luminaires or by luminaires protected with listed materials that have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the listing

iStock.com/Bombaert

Recessed luminaire

2021 IRC – SIGNIFICANT CHANGES

Code Section

Dwelling Unite Rated Penetrations

R302.4

IRC Changes:

Addition of an exception to R302.4.1.

Exception 2: The annular space created by the penetration of water-filled fire sprinkler piping, provided that the annular space is filled using a material complying with item 1.2 of Exception 1.

Clarification of an exception to R302.4.2.

- **Exception 3: The annular space created by the penetration of a fire sprinkler or water-filled fire sprinkler piping, provided that the annular space is covered by a metal escutcheon plate.**

2018 IRC – SIGNIFICANT CHANGES

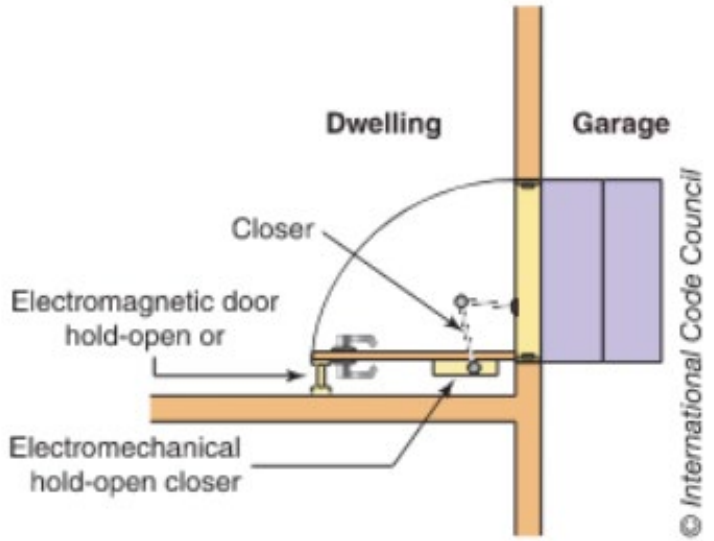
Code Section

Dwelling-Garage Opening Protection

R302.5.1

IRC Changes:

- **Modification to the code permitting the use of automatic closing as an alternative to self-closing for the door between the garage and the dwelling unit.**



Automatic closing door between house and garage

2021 IRC – SIGNIFICANT CHANGES

Code Section

Dwelling-Garage Opening Protection

R302.5.1

IRC Changes:

Modification of R302.5.1

- **Door openings between the garage and residence to be self-latching**

2018 IRC – SIGNIFICANT CHANGES

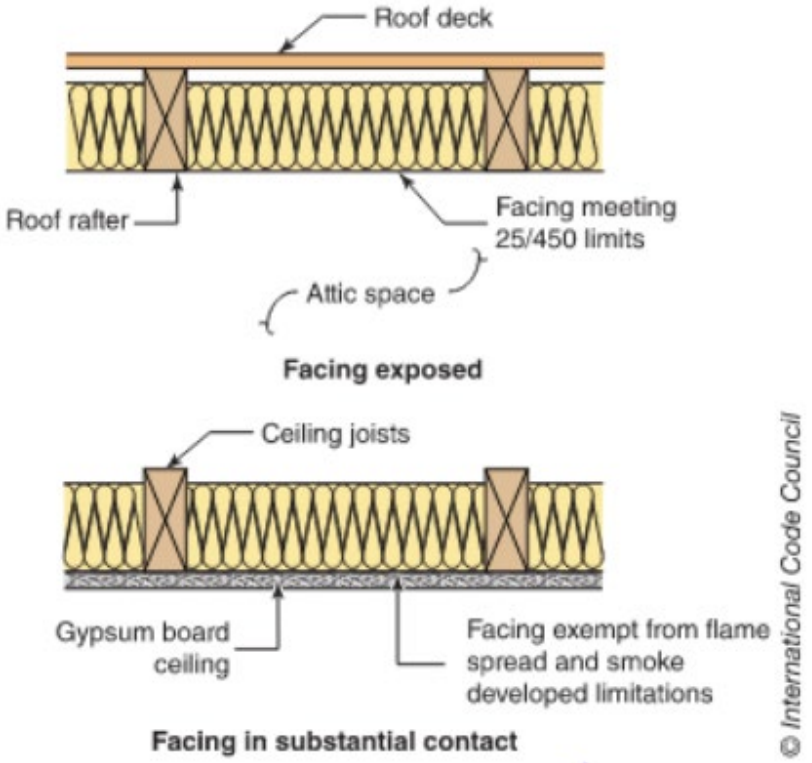
Code Section

Insulation Flame Spread

R302.10

IRC Changes:

- **The testing of insulating materials for flame spread and smoke-developed ratings applies to facings including vapor retarders and other coverings.**



Insulation facing

2018 IRC – SIGNIFICANT CHANGES

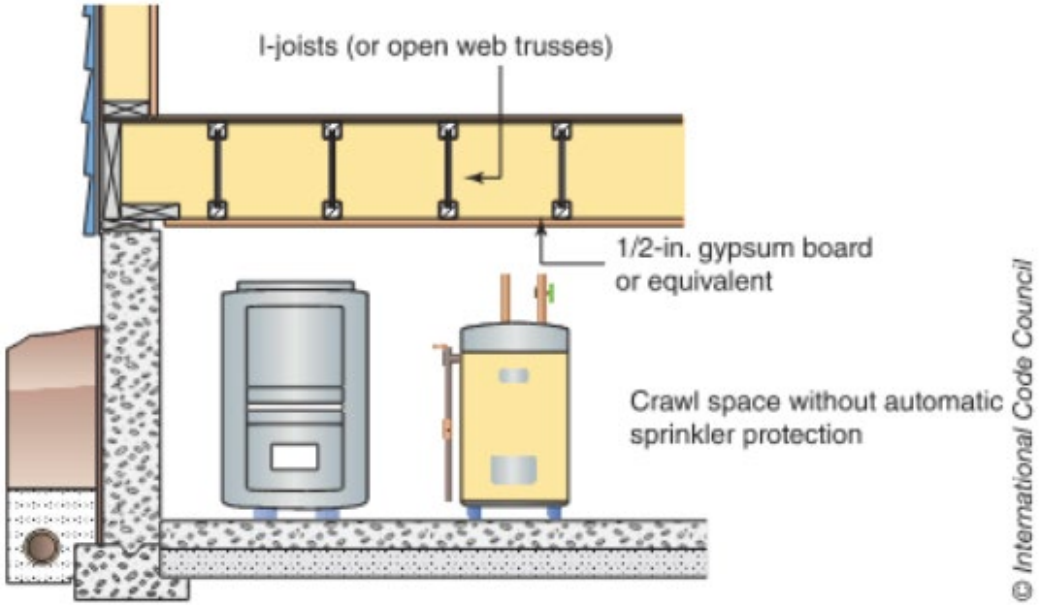
Code Section

Fire Protection of Floors above Crawl Spaces

R302.13

IRC Changes:

- **Exception 2 modified: Fire-resistant membrane protection is now required for the applicable floor framing materials above crawl spaces containing fuel-fired or electric-powered heating appliances.**



Protection required on underside of floor assembly over a crawl space with fuel-fired or electric-powered heating equipment

2021 IRC – SIGNIFICANT CHANGES

Code Section

Mechanical Ventilation

303.1

IRC Changes:

Modification to R303.1 allowing for local exhaust system as a substitute for natural ventilation in kitchens.

2021 IRC – SIGNIFICANT CHANGES

Code Section

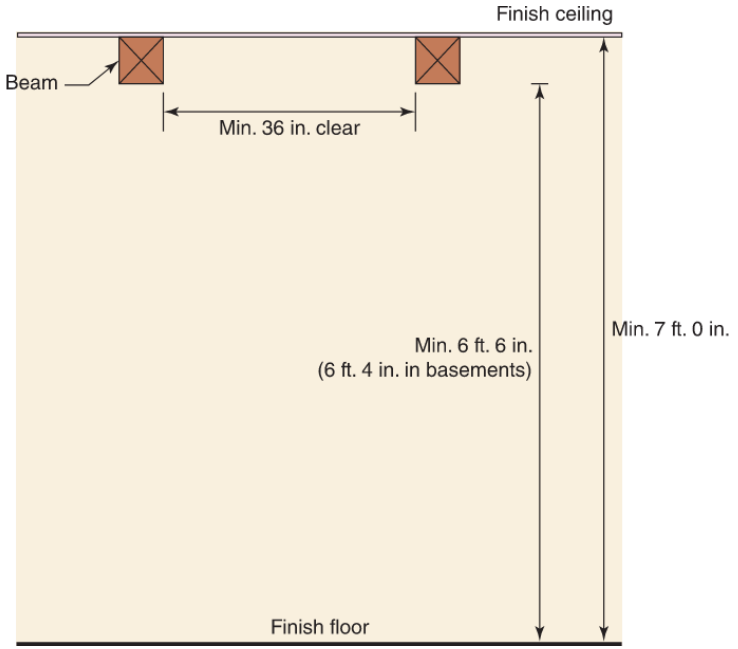
Ceiling Height

R305.1

IRC Changes:

Addition of an exception to R305.1

- **Exception 4: Beams and girders spaced apart not less than 36 inches in clear finished width shall project not more than 78 inches from the finished floor**



2018 IRC – SIGNIFICANT CHANGES

Code Section

Glazing Adjacent to Doors

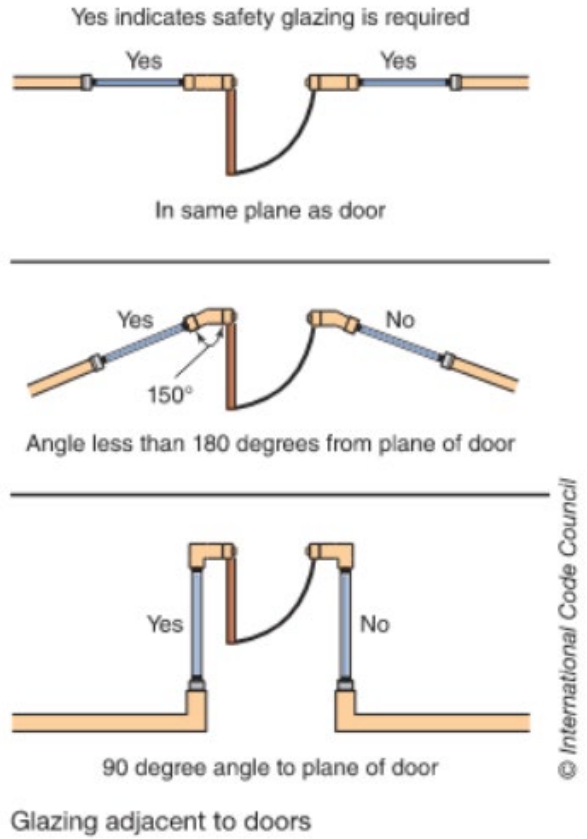
R308.4.2

IRC Changes:

- **Location of glazing that should be considered hazardous Condition 2 modified.**
- **For glazing on a wall less than 180° from plan of door in the closed position and within 24 inches (610 mm) of the hinge side of an in-swinging door.**

iStock.com/phototropic

Windows at an angle to adjacent door



2018 IRC – SIGNIFICANT CHANGES

Code Section

Glazing in Guards and Railings

R308.4.4

IRC Changes:

New sub-section Structural glass baluster panels R308.4.4.1.

- **Guards with structural glass baluster panels shall be installed with an attached top rail or handrail. The rail is to be supported by a minimum 3 glass baluster panels or shall be otherwise supported to remain in place should one glass baluster panel fail.**
  - **Exception: Rail is not required where the glass baluster panels are laminated with two or more glass piles of equal thickness and of the same glass type.**

© International Code Council

Structural glass baluster panels

2018 IRC – SIGNIFICANT CHANGES

Code Section

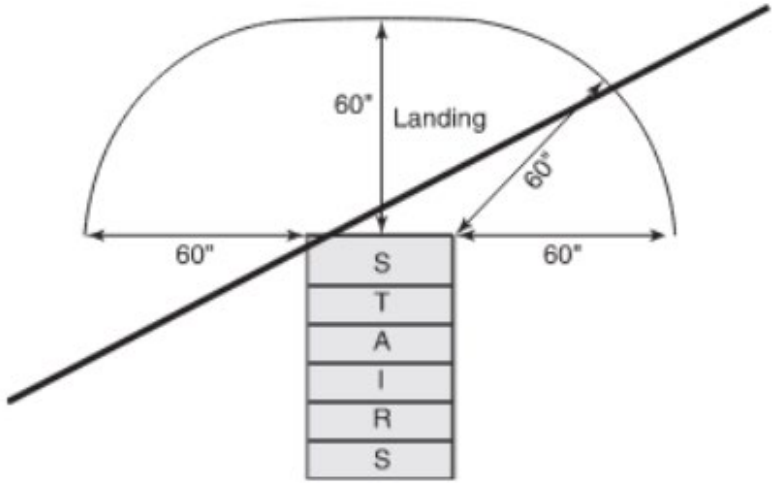
Glazing Adjacent to the Bottom of Stair Landing

R308.4.7

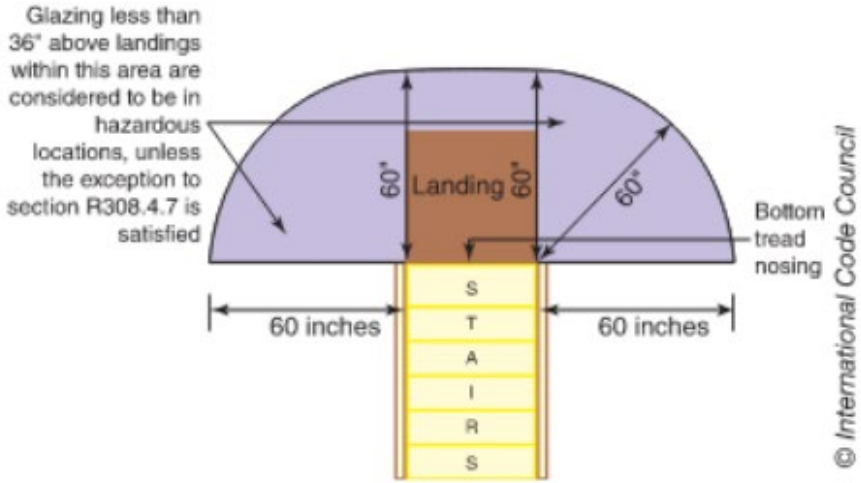
IRC Changes:

Figure R308.4.7 has been replaced with a new figure and the caption was modified to more accurately reflect the related code provision.

- **The verbiage in the exception was altered for clarity**



~~Prohibited~~ Hazardous Glazing Locations at Bottom Stair Landings



Hazardous Glazing Locations at Bottom Stair Landings

2021 IRC – SIGNIFICANT CHANGES

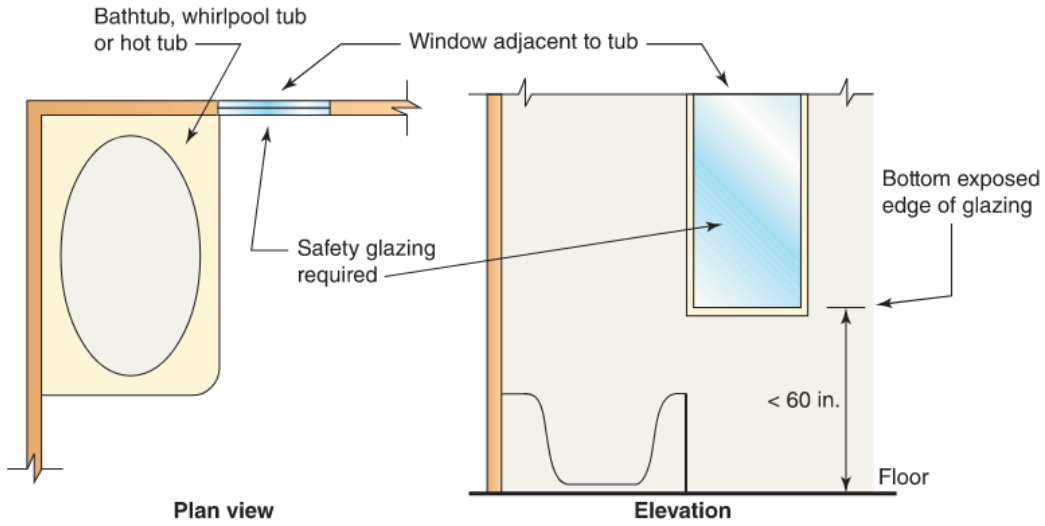
Code Section

Glazing and Wet Surfaces

R308.4.5

IRC Changes:

Clarification of the language used within R308.4.5. The word "facing" has been replaced with the words "adjacent to" for glazing provisions related to wet surface.



2021 IRC – SIGNIFICANT CHANGES

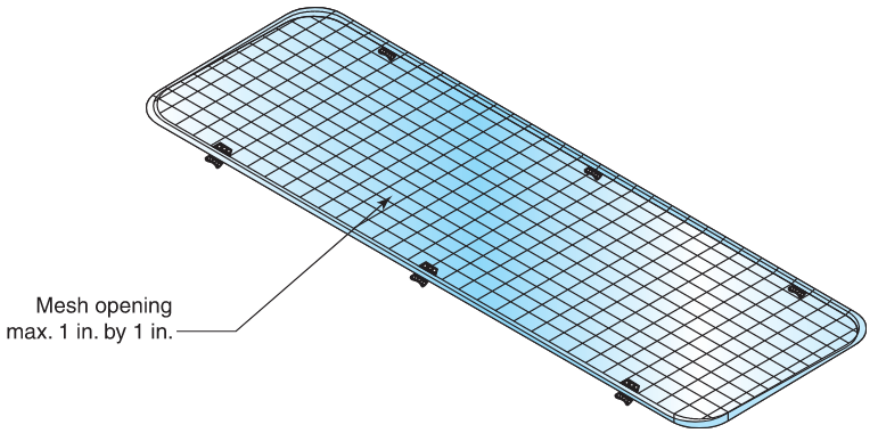
Code Section

Skylight Glass Retention Screens

R308.6

IRC Changes:

R308.6.3 Replaces the term “retaining screen” to “broken glass retention screen”



Broken glass retention screen.

2021 IRC – SIGNIFICANT CHANGES

Code Section

Skylight Glass Retention Screens

R308.6

IRC Changes:

Modification to R308.6.5 provides additional condition where screens are not required added.

- **Screens shall not be required where laminated glass complying with item 1 of Section R308.6.2 is used as single glazing or the inboard pane in multiple glazing.**

Additional requirement added to R308.6.7.

- **Screen are to be installed within 4 inches of the glass.**

2018 IRC – SIGNIFICANT CHANGES

Code Section

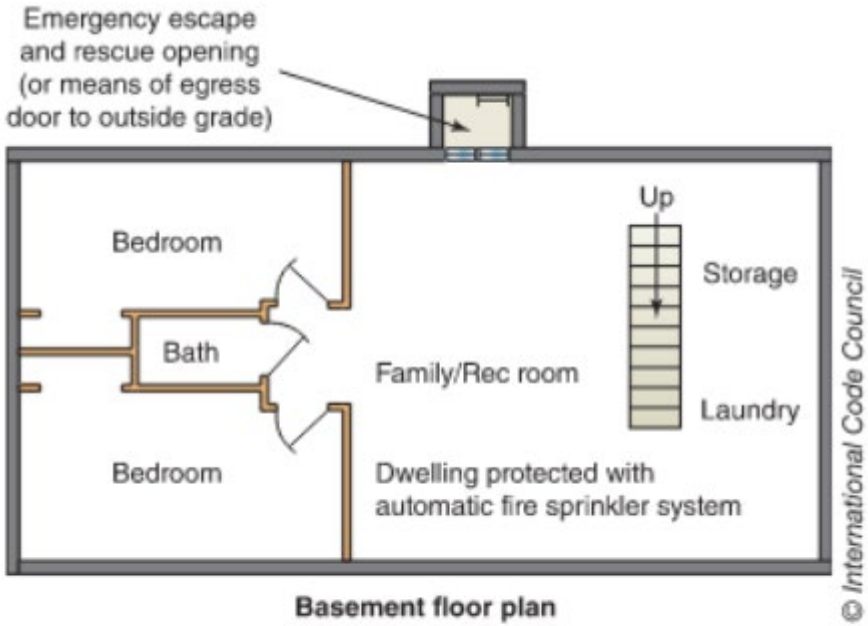
Emergency Escape and Rescue Openings

R310.1

IRC Changes:

A new exception added for emergency escape and rescue.

- **Where the dwelling or townhouse is equipped with an automatic sprinkler system, sleeping rooms in basements are not required to have emergency escape and rescue provided the basement is provided with one of the following:**
  - **One means of egress complying with Section R311 and one emergency escape and rescue opening**
  - **Two means of egress complying with Section R311**



Basement floor plan

2018 IRC does not require emergency escape and rescue openings in basement bedrooms when meeting conditions

2021 IRC – SIGNIFICANT CHANGES

Code Section

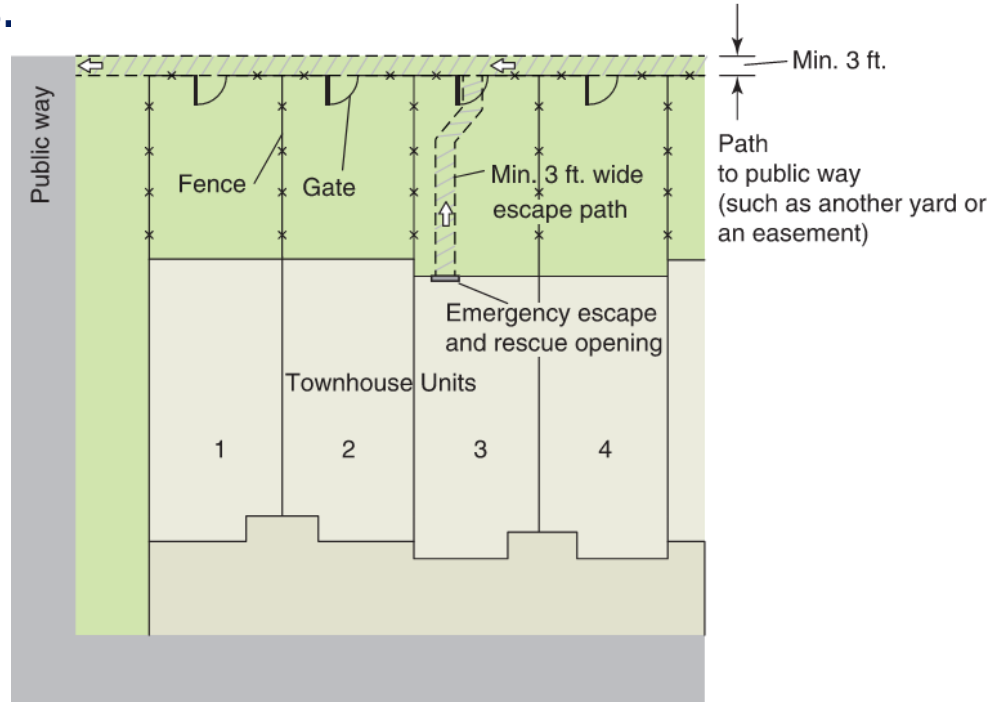
Emergency Escape and Rescue Opening Required

R310.1

IRC Changes:

Modification to R310.1

- **The public way, yard, or court that the emergency escape and rescue opens to has have a minimum width of 36 inches.**



2021 IRC – SIGNIFICANT CHANGES

Code Section

Emergency Escape and Rescue Opening Required

R310.1

IRC Changes:

City of Houston modifies R310.1 to include the provision that projections shall not reduce the clear width to less than 32 inches up to 80 inches above the floor or ground.

A new exception has been added to R310.1

- **Exception 3: A yard shall not be required to open directly into a public way where the yard opens to an unobstructed path from the yard to the public way. Such path shall have a width of not less than 36 inches.**

R310.1.1 has been modified to permit fall prevention devices complying with ASTM F2090. A limitation of 70 inches above the finished floor was also added to R310.1.1.

2021 IRC – SIGNIFICANT CHANGES

Code Section

Emergency Escape and Rescue Openings

R310.2

IRC Changes:

The minimum height and width dimensions have been removed from Section R310.2.1 and added to the new Section 310.2.2.

R310.2.4 has been clarified to include cantilevers in its scope. A 36 inches in width requirement has been added to this section.

2018 IRC – SIGNIFICANT CHANGES

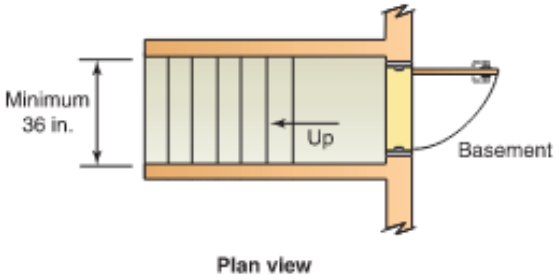
Code Section

Area Wells for Emergency Escape and Rescue Doors

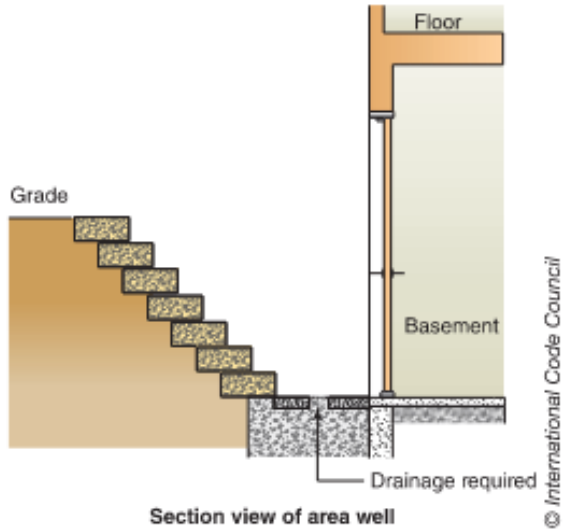
R310.3

IRC Changes:

- Revised terms used “bulkhead enclosures” → “Area wells”
- Added provisions for ladders and steps
  - Area wells to be a minimum of 36”
  - Area wells with a vertical depth greater than 44” shall be equipped with a permanent ladder or steps useable with a door in a fully open position
  - These ladders or steps do not have to comply with Section R311.7
  - See Section R310.3.2.1 for ladder minimum dimensions



Plan view



Section view of area well

Door serving as a required emergency escape and rescue opening from a basement with an area well

2021 IRC – SIGNIFICANT CHANGES

Code Section

Emergency Escape and Rescue Openings in Existing Buildings

R310.6, R310.7

IRC Changes:

New exception added to R310.6 which allowes an operable window complying with Section 310.7.1 to be acceptable as an emergency escape and rescue opening for basement dwelling additions

New Section R310.7.1 provides requirements for operable windows serving as the emergency escape and rescue opening.

2021 IRC – SIGNIFICANT CHANGES

Code Section

Stairways and Ramps

R311

IRC Changes:

Addition of 3 exceptions to R311.7 where stairways are not required to comply with R311.1

- **Exception 1: Stairways not within or attached to a building, porch or deck**
- **Exception 2: Stairways leading to non-habitable attics**
- **Exception 3: Stairways leading to crawl spaces.**

2021 IRC – SIGNIFICANT CHANGES

Code Section

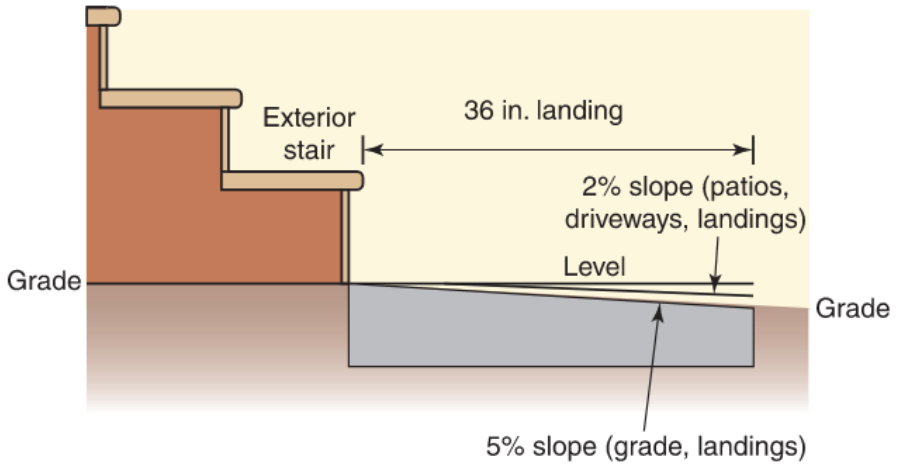
Stairways and Ramps

R311

IRC Changes:

Exception added to R311.7.7 which allows for steeper slopes.

- **Exception: Where the surface of a landing is required to drain surface water, the walking surface of the landing shall be sloped not steeper than 1 unit vertical in 20 units horizontal (5-percent slope) in the direction of travel.**



2018 IRC – SIGNIFICANT CHANGES

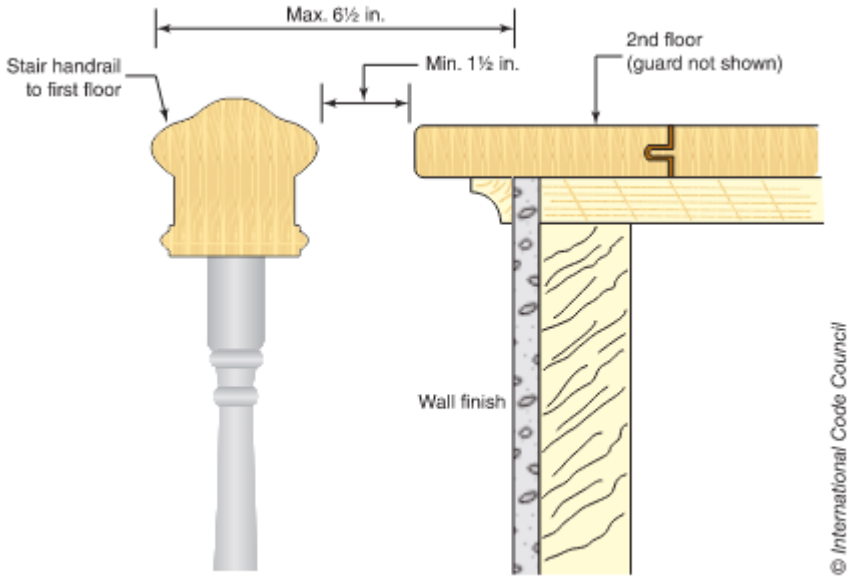
Code Section

Handrail Projection

R311.7.1, R311.7.8

IRC Changes:

- **Additional exception to section R311.7.8.2 allowing handrails to project a maximum 6.5” at nosing**
- **New Section R311.7.8.3 handrails adjacent to a wall shall have a space of not less than 1.5” between the wall and handrail**
- **Revised Section R311.7.8.4 revised for clarity and consistency**



Greater projection allowed where handrail passes a floor nosing

2018 IRC – SIGNIFICANT CHANGES

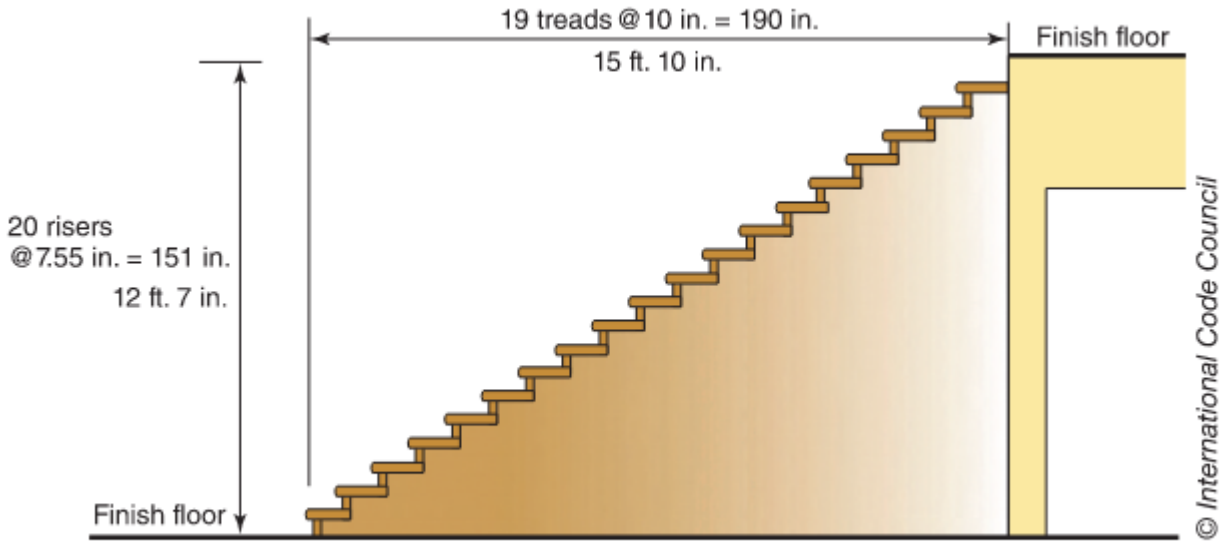
Code Section

Maximum Stair Rise between Landings

R311.7.3

IRC Changes:

- **The maximum rise of a flight of stair has been increased by 4” to 151”**



Maximum 151-inch total rise between floors or landings

2018 IRC – SIGNIFICANT CHANGES

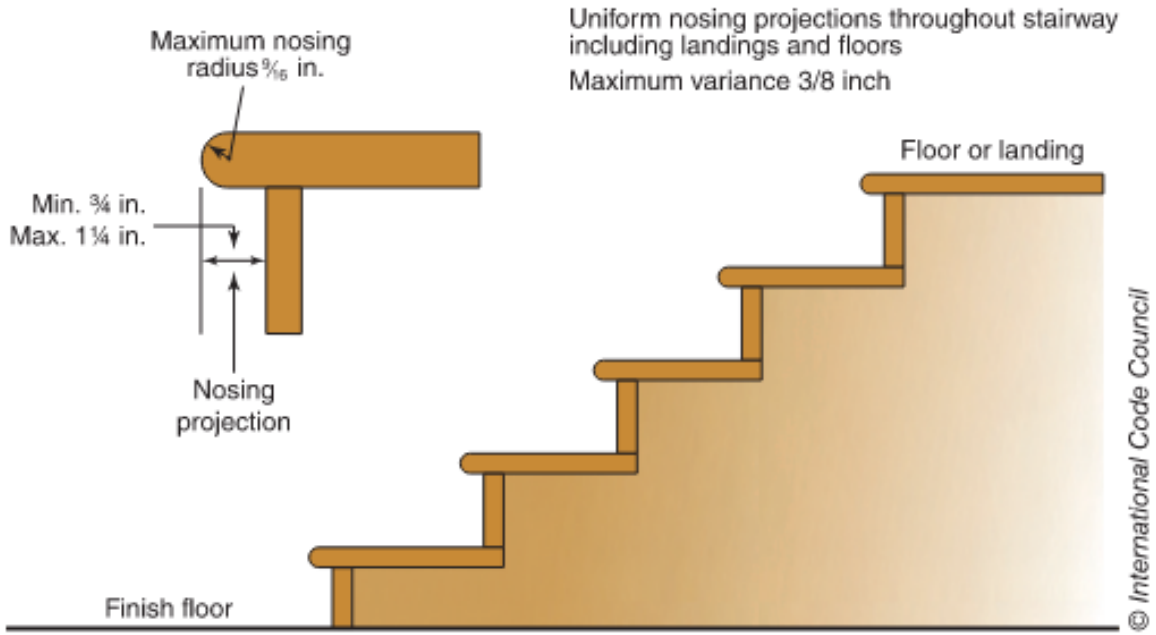
Code Section

Stair Nosing

R311.7.5.3

IRC Changes:

- **Clarification to code that nosings must be consistent throughout the stairway and are not to have a bevel greater than ½”**



Stairway nosing requirements

2018 IRC – SIGNIFICANT CHANGES

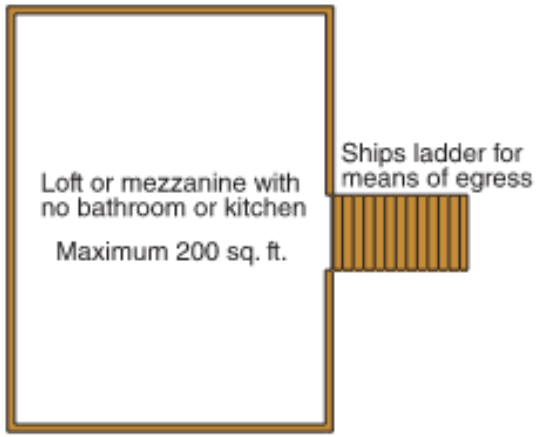
Code Section

Alternating Tread Devices and Ships Ladders

R311.7.11, R311.7.12

IRC Changes:

- **New exceptions added. Alternating tread devices and ship ladders are now allowed to be used as an element of a means of egress for lofts, mezzanines, and similar areas of 200 gross square feet or less provided there is not an exclusive kitchen or bathroom**



Ships ladder for means of egress

2018 IRC – SIGNIFICANT CHANGES

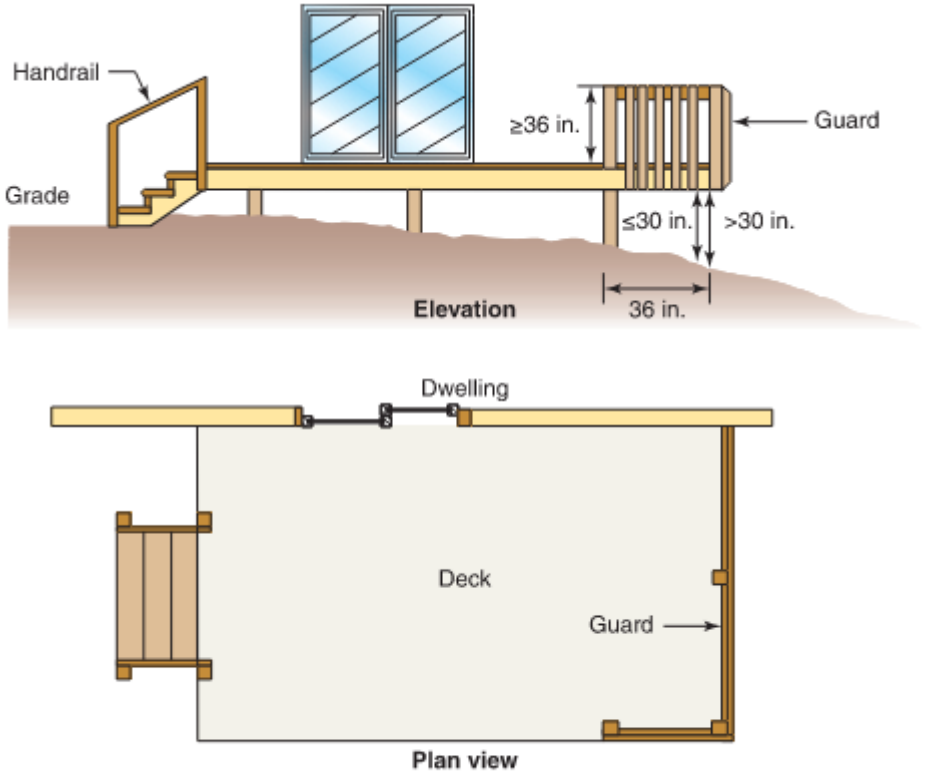
Code Section

Guards

R312.1

IRC Changes:

- **Clarification to the code. Guard requirements only apply to the specific portion of a walking surface that exceeds 30” above grade.**



Guard required at portions of deck greater than 30 inches above grade

2021 IRC – SIGNIFICANT CHANGES

Code Section

Window Fall Protection

R312.2

IRC Changes:

R311.7 clarifies the measurement for determining the need for fall protection.

- **The term “Top of sill” has been replaced with the term “bottom of clear opening”**

2021 IRC – SIGNIFICANT CHANGES

Code Section

One- and two-family dwellings automatic sprinkler systems

R313.2

IRC Changes:

City of Houston amendment deletes Sections R313.2 and R313.2.1 which requires automatic sprinkler systems to be installed in one- and two-family dwellings.

2018 IRC – SIGNIFICANT CHANGES

Code Section

Smoke Alarms

R314

IRC Changes:

- **Removed the exemption for interconnection of alarms during alterations based on feasibility.**

iStock.com/slobo

Interconnection is required for smoke alarms installed in existing buildings undergoing remodeling requiring a permit.

2021 IRC – SIGNIFICANT CHANGES

Code Section

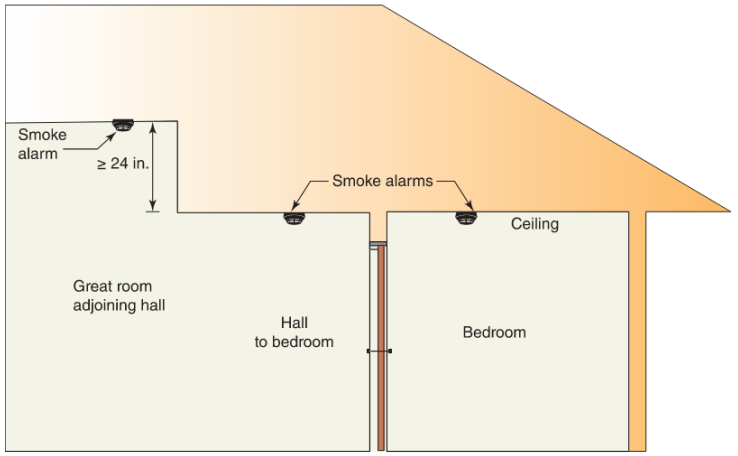
Smoke Alarm Locations

R314.3

IRC Changes:

The addition of Item 5 to R314.7 provides new location requirement for smoke alarms

- **Item 5: In the hallway and in the room open to the hallway in dwelling units where the ceiling height of a room open to a hallway serving bedrooms exceeds that of the hallway by 24 inches or more.**



2021 IRC – SIGNIFICANT CHANGES

Code Section

Smoke Alarm Locations

R314.3

IRC Changes:

The addition of Item 4 to R314.3.1 provides new requirement for where smoke alarms are not to be installed.

- **Item 4: Smoke alarms listed and marked "helps reduce cooking nuisance alarms" shall not be installed less than 6 feet horizontally from a permanently installed cooking appliance.**

2018 IRC – SIGNIFICANT CHANGES

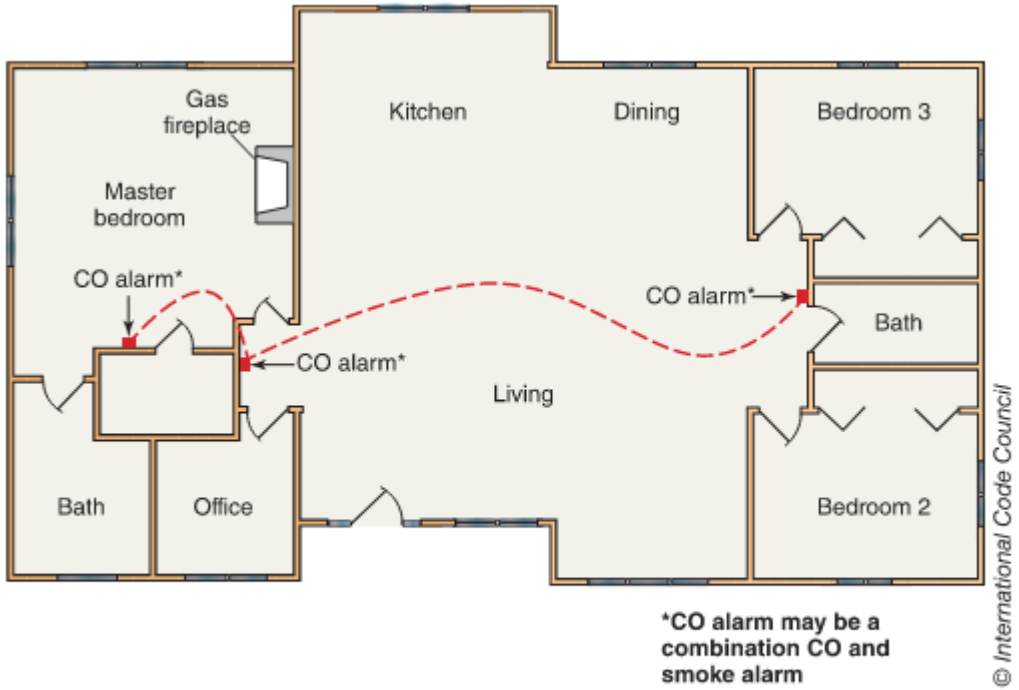
Code Section

Carbon Monoxide Alarms

R315

IRC Changes:

- New Section R315.2.2 Interconnection is required where multiple carbon monoxide alarms are required in a dwelling unit.
- Not required in existing areas where removal of interior finishes would be needed for the connection



Interconnection is required where multiple carbon monoxide alarms are required in a dwelling unit.

2021 IRC – SIGNIFICANT CHANGES

Code Section

Carbon Monoxide Alarms

R315.2.2

IRC Changes:

New exception added to R315.2.2 that clarifies that repairs to an existing fuel-fired mechanical system now trigger the requirements for carbon monoxide alarms.

2018 IRC – SIGNIFICANT CHANGES

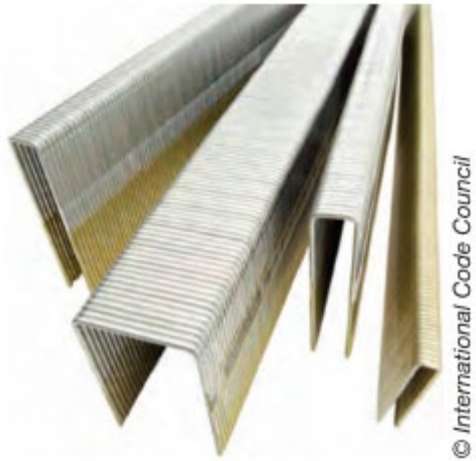
Code Section

Fasteners in Treated Wood

R317.3

IRC Changes:

- **Staples in treated wood are now required to be made of stainless steel.**



Stainless steel staples

2021 IRC – SIGNIFICANT CHANGES

Code Section

Accessibility

R320, R321

IRC Changes:

City of Houston amendment modifies R320.1

- **Where there are four or more dwelling units or sleeping units in a single structure, the provisions of Texas Accessibility Standards contained within Texas Government Code, Chapter 469, as may be amended, shall apply.**

City of Houston amendment modifies R321.3

- **Elevators or platform lifts that are part of an accessible route shall comply with the Texas Accessibility Standards contained within Texas Government Code, Chapter 469, as may be amended.**

2018 IRC – SIGNIFICANT CHANGES

Code Section

Coastal High-Hazard Flood Zones

R322.3.3

IRC Changes:

- **New Section R322.3.4. Provides guidance for concrete slabs including dimensions and resistance to the elements.**
- **New Section R322.3.7. Provides guidance for stairways and ramps and how they should be constructed for the event of a flood. They are to be constructed so water flows through them and minimizes the load on the house for egress paths and to breakaway when not part of the means of egress.**
- **New Section R322.3.8. Provides guidance for decks and porches. Requirements include elevation requirements and structural requirements.**

iStock.com/switas

Collapsed dwelling in coastal high hazard flood zone

2021 IRC – SIGNIFICANT CHANGES

Code Section

Storm Shelters

R323

IRC Changes:

The addition of R323.1.1 provides guidance on the design of storm shelters.

- **The construction documents for all structural components and impact protective systems of the storm shelter shall be prepared and sealed by a registered design professional indicating that the design meets the criteria of ICC-500.**

  Exception: Storm shelters, structural components and impact-protective systems that are listed and labeled to indicate compliance with ICC-500.

2018 IRC – SIGNIFICANT CHANGES

Code Section

Rooftop-Mounted Photovoltaic Systems

R324.4

IRC Changes:

- **Moved the requirements from Section R907 and consolidated requirements into Section R324.4 including wind load and, fire classifications, roof penetrations, and structural requirements.**
- **Section R324.4.1.1 Modified to reference Sections R301.2 and R301.6. Section no longer describes live loads and added the following load requirements:**
  - **Dead load (including photovoltaic panel weight) plus snow load in accordance with Table R301.2(1).**
  - **Dead load (excluding photovoltaic panel weight) plus roof live load or snow load, whichever is greater, in accordance with Section R301.6.**

divanov/Shutterstock.com

Rooftop-mounted photovoltaic panels

2018 IRC – SIGNIFICANT CHANGES

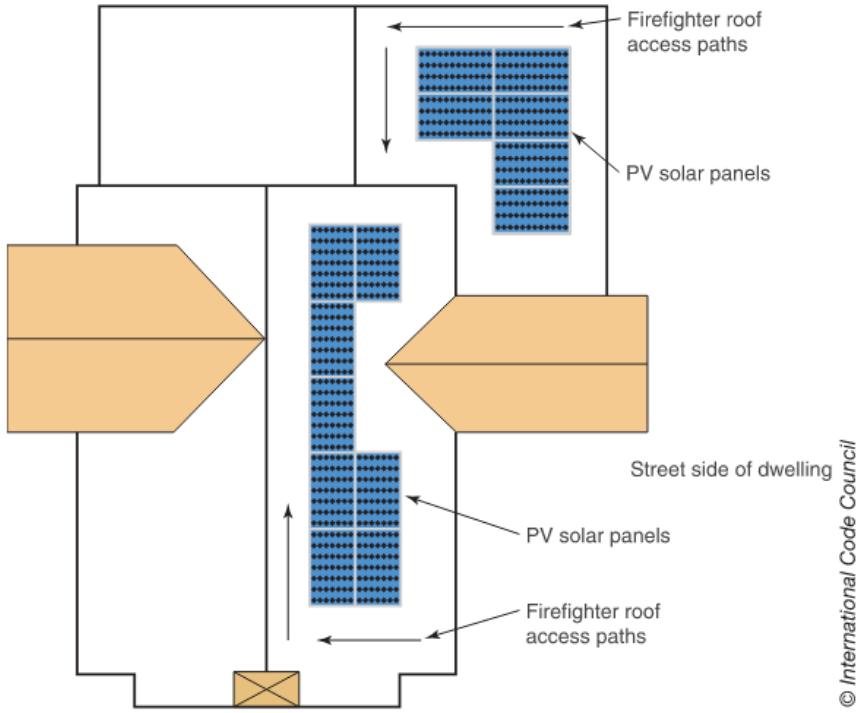
Code Section

Roof Access for Photovoltaic Solar Energy System

R324.6

IRC Changes:

- **New Section R324.6. Roof access, pathways, and setback requirements shall be provided in accordance with Sections R324.6.1 through R324.6.2.1. Access and minimum spacing shall be required to provide emergency access to the roof, to provide pathways to specific areas of the roof, provide for smoke ventilation opportunity areas, and to provide emergency egress from the roof. Exceptions:**
- **Detached, nonhabitable structures.**
- **Where code official determined rooftop operations will not be employed**
- **Roofs with slopes of 2 units vertical in 12 units horizontal or less**



Required roof access and pathways for firefighters for roof-mounted PV solar systems

2018 IRC – SIGNIFICANT CHANGES

Code Section

Roof Access for Photovoltaic Solar Energy System- continued.

R324.6.1

IRC Changes:

- **New Section R324.6.1 Pathways. Not fewer than two pathways, on separate roof planes from lowest roof edge to ridge and not less than 36 inches wide, shall be provided on all buildings.**
- **Not fewer than one pathway shall be provided on the street or driveway side of the roof. For each roof plane with a photovoltaic array, a pathway not less than 36 inches wide shall be provided from the lowest roof edge to ridge on the same roof plane as the photovoltaic array, on an adjacent roof plane, or straddling the same and adjacent roof planes.**
- **Pathways shall be over areas capable of supporting fire fighters accessing the roof. Pathways shall be located in areas with minimal obstructions such as vent pipes, conduit, or mechanical equipment**

2018 IRC – SIGNIFICANT CHANGES

Code Section

Roof Access for Photovoltaic Solar Energy System- continued.

R324.6.2

IRC Changes:

- **New Section R324.6.2 Setback at Ridge. Where photovoltaic arrays occupying not more than 33 percent of the plan view total roof area, a minimum 18” clear setback is required on both side of a horizontal ridge.**
- **New Section R324.6.2.1 Alternative setback at ridge. Where an automatic sprinkler system is installed within the dwelling in accordance with NFPA 13D or Section P2904, setbacks at ridges shall comply with one of the following:**
    - **For photovoltaic arrays occupying not more than 66 percent of the plan view total roof area, not less than an 18-inch clear setback is required on both sides of a horizontal ridge.**
    - **For photovoltaic arrays occupying more than 66 percent of the plan view total roof area, not less than a 36-inch clear setback is required on both sides of a horizontal ridge.**

TABLE 3-1 Minimum Ridge Setback

Array Percent of Roof Area	Fire Sprinkler System	Minimum Setback on Both Sides of Ridge (inches)
≤ 33 %	No	18
> 33%	No	36
≤ 66 %	Yes	18
> 66%	Yes	36

2021 IRC – SIGNIFICANT CHANGES

Code Section

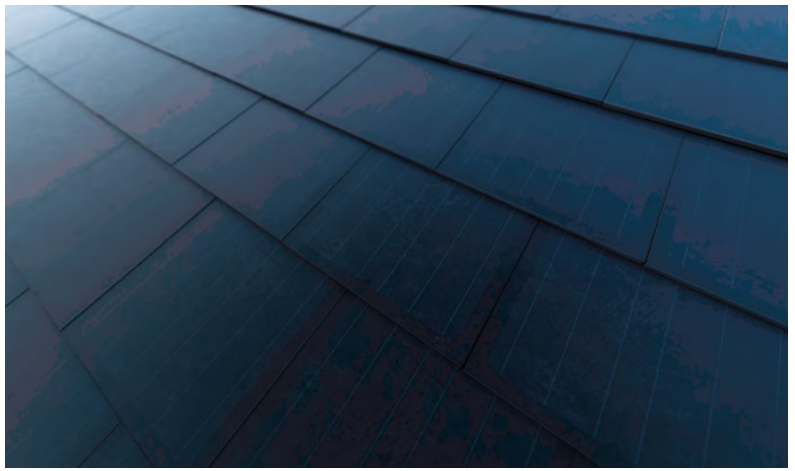
Photovoltaic Systems

R324.6

IRC Changes:

New exception to R324.6 allows Building-integrated Photovoltaic (BIPV) systems to be exempt from the R324.6 requirement to provide emergency access to the roof.

- **Exception 4: BIPV systems listed in accordance with Section 690.12(B) (2) of NFPA 70, where the removal or cutting away of portions of the BIPV system during firefighting operations have been determined to not expose a firefighter to electrical shock hazard.**



2018 IRC – SIGNIFICANT CHANGES

Code Section

Mezzanine Area Limitation

R325.3

IRC Changes:

- **New exception added to R324.6.2.2 Area limitation.**
- **The aggregate area of a mezzanine located within a dwelling unit equipped with a fire sprinkler system in accordance with Section P2904 shall not be greater than one-half of the floor area of the room, provided that the mezzanine meets all of the following requirements:**
  - **Except for enclosed closets and bathrooms, the mezzanine is open to the room in which such mezzanine is located.**
  - **The opening to the room is unobstructed except for walls not more than 42 inches in height, columns and posts.**
  - **The exceptions to Section R325.5 are not applied.**

iStock.com/JoeGough

A mezzanine is not considered a story.

2018 IRC – SIGNIFICANT CHANGES

Code Section

Habitable Attics

R325.6 and R202

IRC Changes:

- Revised definition of Attic, habitable: A finished or unfinished habitable space within an attic. This definition removed floor area and ceiling height restrictions as well as references to sections R304 and R305 which are now found in section R325.6.
- New section R325.6 states a habitable attic is not considered a story when all the following requirements are met:

1. The occupiable floor area is not less than 70 square feet in accordance with Section R304.
2. The occupiable floor area has a ceiling height in accordance with Section R305.
3. The occupiable space is enclosed by the roof assembly above, knee walls (if applicable) on the sides and the floor-ceiling assembly below.
4. The floor of the occupiable space shall not extend beyond the exterior walls of the floor below.

iStock.com/northlightimages

Finishing off an attic for habitable space

2021 IRC – SIGNIFICANT CHANGES

Code Section

Habitable Attics

R326

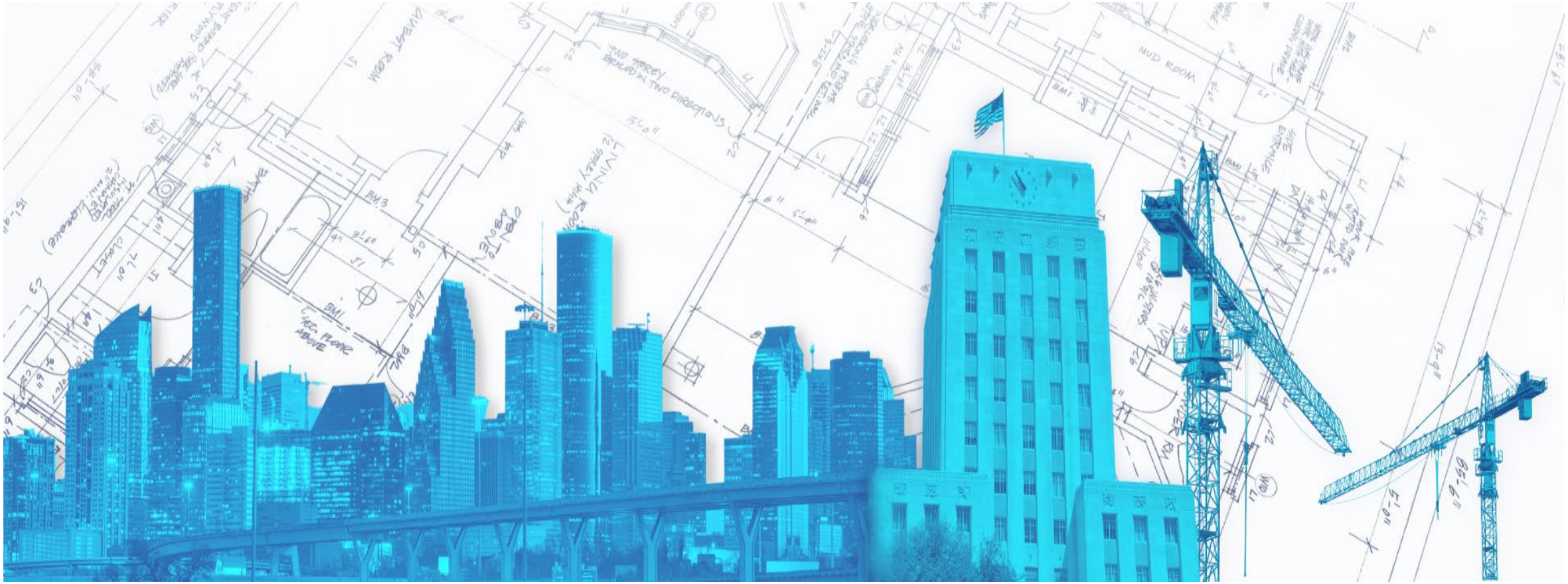
IRC Changes:

The new addition of R326.3 requires habitable attics to be considered a story above grade plane.

Four exceptions have been added to R326.3 that will allow habitable attics to be exempt from being considered a story.

HOUSTON PUBLIC WORKS

IRC CHAPTER 4 FOUNDATIONS



2021 IRC – SIGNIFICANT CHANGES

Code Section

Foundations

R401

IRC Changes:

City of Houston amendment provides the new addition of R401.5 which provides requirements for foundation elevation.

2018 IRC – SIGNIFICANT CHANGES

Code Section

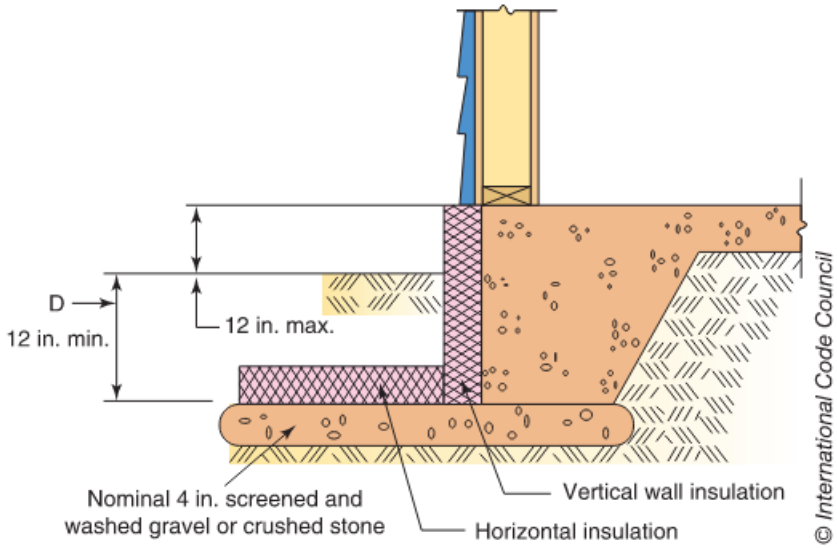
Insulation Requirements for Frost-Protected Footings

Table R403.3(1)

IRC Changes:

- **Modification to Table R403.3(1). Insulation thickness requirements for Type II and IX expanded polystyrene (EPS) have changed. The minimum R-value for specific types of EPS has been clarified while requirements for horizontal insulation were added. The following table summarizes the changes:**

Expanded Polystyrene	Insulation Requirements (per inch)	
Type	**Vertical**	**Horizontal**
II	3.2 R	2.6 R
IX	3.4 R	2.8 R
IV, V, VI, VII, and X	4.5 R	4.0 R



EPS placement in a frost-protected shallow foundation

2018 IRC – SIGNIFICANT CHANGES

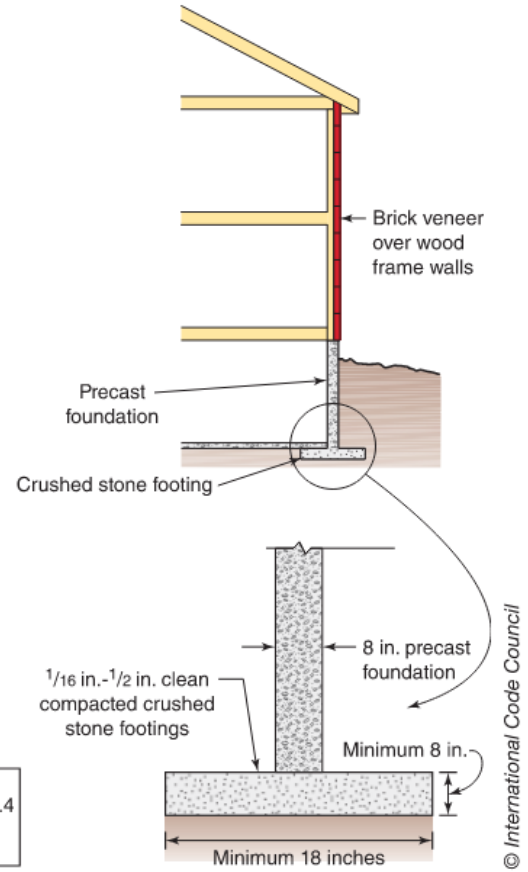
Code Section

Crushed Stone Footings

Table R403.4

IRC Changes:

- **Modification to Table R403.4. The table now includes minimum width requirements in addition to minimum depth requirements(some depth values were changed as well).**
- **Two footnotes have been added to the table that read as follows:**
  - **Crushed stone must be consolidated in 8-inch lifts with a plate vibrator.**
  - **Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R404.5.1.**



Footing thickness and width determined from Table R403.4 based on an assumed soil load bearing of 2,000 PSF

Crushed stone footing

2021 IRC – SIGNIFICANT CHANGES

Code Section

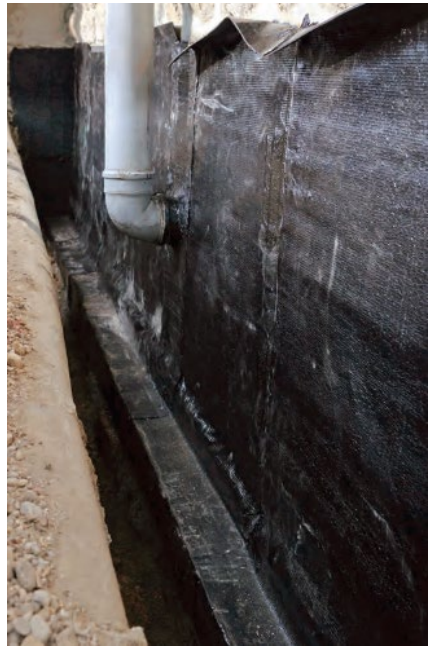
Footings

R403

IRC Changes:

Tables R403.1(1), (2) and (3) are revised to more accurately reflect current practice.

R403.2 modified to remove Six-mil polyvinyl chloride and polyethylene fabrics from the list of approved waterproofing materials.



2018 IRC – SIGNIFICANT CHANGES

Code Section

Unvented Crawl Spaces

R408.3

IRC Changes:

- **Modification to Section R408.3. Condition added to the section for additional requirements to allow an unvented crawl space. Condition 2.4 reads as follows:**
- **Dehumidification sized to provide 70 pints (33 liters) of moisture removal per day for every 1,000 square feet of crawl space floor area.**

© International Code Council

An unvented crawlspace requires moisture removal

2021 IRC – SIGNIFICANT CHANGES

Code Section

Vapor Retarder in Crawlspace

R408.8

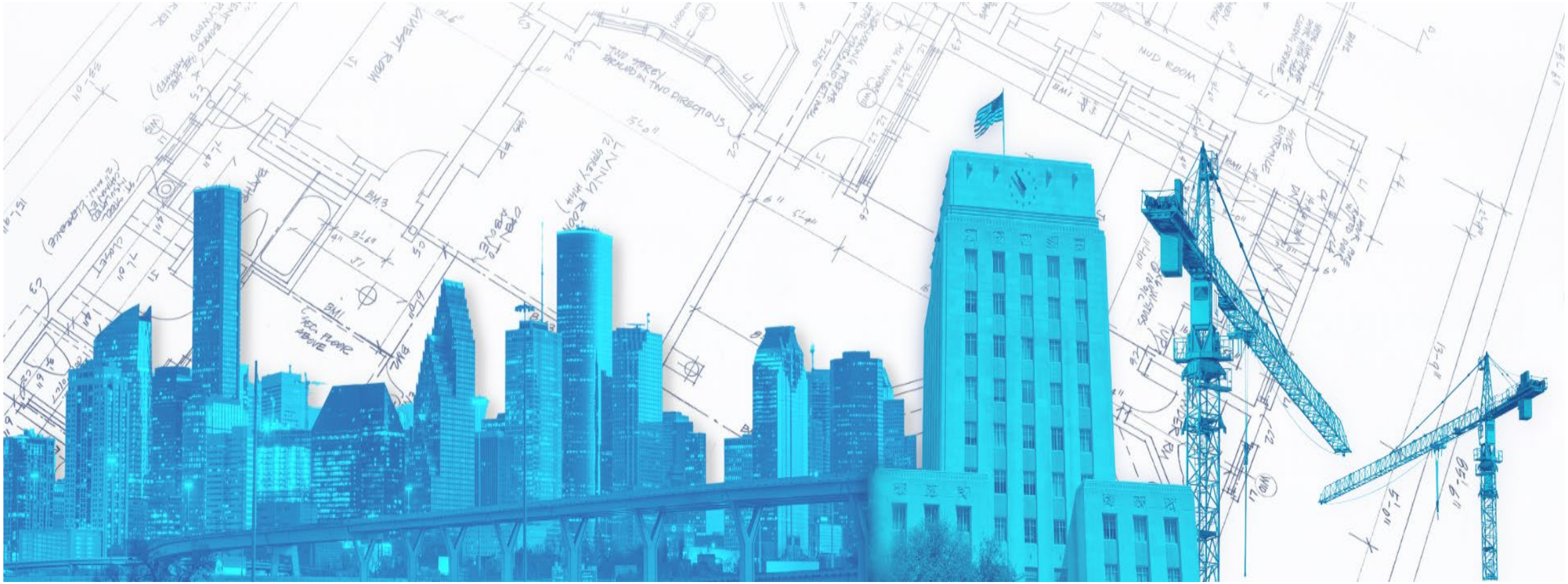
IRC Changes:

Ne addition of Section R408.8

- **In Climate Zones 1A, 2A, and 3A below the warm-humid line, a continuous Class I or II vapor retarder shall be provided on the exposed face of air permeable insulation installed between the floor joists and exposed to the grade in the under-floor space. The vapor retarder shall have a maximum water vapor permeance of 1.5 perms when tested in accordance with Procedure B of ASTM E96.**
- **Exception: The vapor retarder shall not be required in unvented crawl spaces constructed in accordance with Section R408.3**

HOUSTON PUBLIC WORKS

IRC CHAPTER 5 FLOORS



2018 IRC – SIGNIFICANT CHANGES

Code Section

Cold-Formed Steel Joist Spans

Table R505.3.2

IRC Changes:

- **Maximum spans for cold-formed steel joists are updated for wind speeds up to 140 miles per hour in single or continuous spans. Footnote f is added to clarify that 33 and 43 mil thickness joists need to be single-span joists when using this prescriptive table**

TABLE R505.3.2 Allowable Spans for Cold-Formed Steel Joists—Single or Continuous Spans

	30 psf Live Load			
	Spacing (inches)			
JOIST DESIGNATION	12	16	19.2	24
550S162-33	~~11′-7″~~11′-8″	~~10′-7″~~10′-4″	~~9′-6″~~9′-5″	~~8′-6″~~8′-5″
550S162-43	12′-8″	11′-6″	~~10′-10″~~10′-8″	~~10′-2″~~10′-5″
550S162-54	13′-7″	12′-4″	11′-7″	10′-9″
550S162-68	14′-7″	13′-3″	12′-6″	11′-7″
800S162-33	~~15′-8″~~14′-6″	~~13′-11″~~12′-6″	~~12′-9″~~11′-5″	~~11′-5″~~10′-3″
800S162-43	~~17′-1″~~17′-0″	~~15′-6″~~15′-1″	~~14′-7″~~13′-9″	~~13′-7″~~12′-4″
800S162-54	~~18′-4″~~18′-3″	~~16′-8″~~16′-7″	15′-8″	~~14′-7″~~14′-6″
800S162-68	19′-9″	17′-11″	~~16′-10″~~16′-11″	15′-8″

f. Table R505.3.2 is not applicable for 800S162-33 and 1000S162-43 continuous joist members.

(Only a portion of the table is shown for brevity and clarity.)

2021 IRC – SIGNIFICANT CHANGES

Code Section

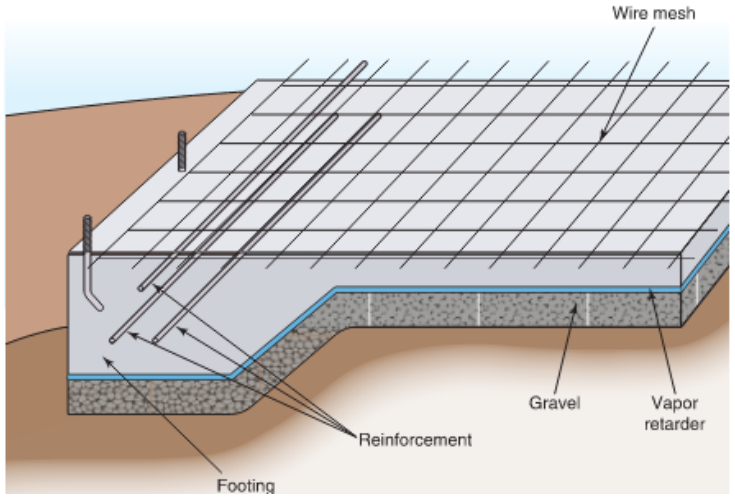
Vapor Retarders Under Concrete Slabs

R506.2.3

IRC Changes:

Modification to R506.2.3 requiring thicker vapor retarders below slabs-on-grade.

- **Minimum 6-mil replaced with a minimum 10-mil requirement.**
- **Addition of the requirement that the vapor retarder conform to ASTM E1745 Class A requirements.**



2018 IRC – SIGNIFICANT CHANGES

Code Section

Deck

R507.1 and R507.2

IRC Changes:

- **Section R507.1 Exterior Decks. The section is reorganized for ease of use and added design specifications for common deck materials.**
- **Section R507.2 Deck materials. All wood materials shall be No. 2 grade at a minimum. Materials must be in accordance with Sections R317 or R318.**
- **Section R507.2.1.1 Engineered wood products shall be in accordance with Section R502.**
- **Added section R507.2.3 and Table R507.2.3. Section and table add requirements for fasteners and connectors.**
- **Added Section R507.2.4 Flashing. Flashing must be corrosion resistant and have a minimum thickness of 0.019" or an approved non-metal material compatible with the used materials.**
- **Added Section R507.2.5 Alternate Materials. Permits the use of alternate materials including glass and metals.**

Fasteners in wood decking must be of approved material

2018 IRC – SIGNIFICANT CHANGES

Code Section

Deck Footings

R507.3

IRC Changes:

- Added section R507.3. Footings are to be concrete or an approved structural system that can accommodate all loads in accordance with R301. Footing depth shall be in accordance with Section R403.1.4 Exception for decks with joists directly supported on grade over their entire length.
- Section R507.3.1. The minimum size of concrete footings shall be in accordance with Table R507.3.1 based on the tributary area and allowable soil-bearing pressure in accordance with Table R401.4.1.
- Section R507.3.2. the minimum depth shall extend below the frost line Specified in Table R301.2(1) in accordance with Section R403.1.4.1.

Exceptions:

- Freestanding decks where all the following are met: The walking area is a maximum 20” above grade measured at any point within 36 “ from the edge, the area of the deck does not exceed 200 sf, and the joists bear directly in precast concrete blocks at grade without the support of beams or posts.

iStock.com/dlerick

Freestanding deck

2018 IRC – SIGNIFICANT CHANGES

Code Section

Deck Posts

R507.4

IRC Changes:

- Section reorganized so deck posts is in the middle of Section R507.4.
- Table R507.4 Deck Post Height added post size 8 x 8 with a maximum height of 14 feet and modified the allowed height of 4 x 4 beams to be 6’ - 9’.
    - New foot note added so that the maximum height is based on a 40 psf live load.
    - New foot note added for posts sized 4 x 4 are limited to 8’ in height for one-ply and two-play beams and a maximum 6’-9” for three-ply beams.
- SectionR507.4.1 Deck post to deck footing connection. Connections must be in accordance with Section R403 and Figure R507.4.1 and permits the use of other footing systems.
- Exception: Where expansive, compressible, shifting, or other questionable soils are present, surrounding soils shall not be relied upon for lateral support.

Deck post with cap

2018 IRC – SIGNIFICANT CHANGES

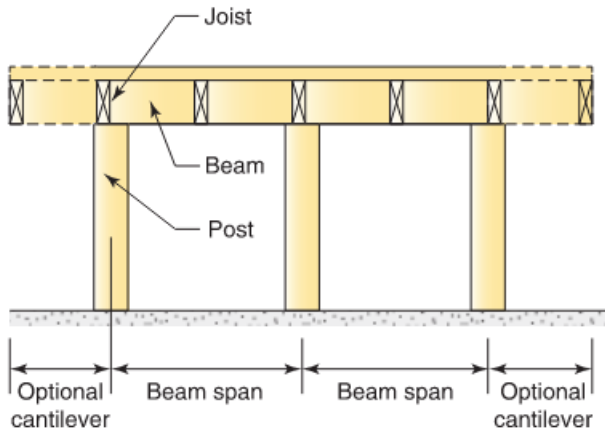
Code Section

Deck Beams

R507.5

IRC Changes:

- Verbiage added to Section R507.5 allowing other materials to be used when designed in accordance with accepted engineering practice. Cantilever beams are allowed to be ¼ of the allowable beam span, rather than the actual.
- Section R507.5.1 Deck beam bearing. Adds the requirement for multi-span beams on intermediate posts and adds a reference to Figures R507.1(1) and R507.5.1(2). Joists removed from the section.
- Section R507.5.2 Deck beam connection to supports. Deck beams are to be attached to supports in a way capable of transferring the vertical loads and resisting horizontal displacement. New references to R507.5.1(1) and R507.1(2).
- Table R507.5 included values for southern pine single ply 2 x 6 through 2 x 12.



Flush beam

2018 IRC – SIGNIFICANT CHANGES

Code Section

Deck Joists

R507.6

IRC Changes:

- Modification to Section R507.6 Joist spacing shall be limited by the material in accordance with Table R507.7. Cantilevers are allowed to be ¼ of the allowable joist span, rather than the actual.
- Section R507.6.1 Deck joist bearing. Adds the requirement for joist bearing on multiple ply beams or ledger to be fastened in accordance with Table R602.3(1). Beams were removed from the section.
- Section R507.6.2 Deck joist lateral restraint. Revised section title.
- Revised Table R507.6 Deck Joists Spans for Common Lumber Species adding maximum cantilever spacing.

Courtesy Peter Kulczyk

Deck Joists

2018 IRC – SIGNIFICANT CHANGES

Code Section

Decking, Vertical, and Lateral Support

R507.7

IRC Changes:

- **Modification to Section R507.7 Decking. Adds that other approved decking or fastener systems are to be installed in accordance with the manufacturer's installation requirements.**
- **Modification to Table R507.7 Maximum joist spacing for decking adding the word decking to the table**

TABLE ~~R507.4~~ R507.7 Maximum joist spacing for decking

Decking material type and nominal size	Maximum on-center joist spacing	
	Decking perpendicular to joist	Decking diagonal to joist[a]
1¼-inch thick wood	16 inches	12 inches
2-inch thick wood	24 inches	16 inches
Plastic composite	In accordance with Section R507.2	In accordance with Section R507.2

For SI: 1 inch = 25.4 mm

a. Maximum angle of 45 degrees from perpendicular for wood deck boards

2018 IRC – SIGNIFICANT CHANGES

Code Section

Decking, Vertical, and Lateral Support

R507.8

IRC Changes:

- **Modification to Section R507.8 Vertical and lateral supports. Removed the requirement for wood-framed decks and reorganized the section structure.**
- **Modification to Table R507.7 Maximum joist spacing for decking adding the word decking to the table**

Wood Deck

2018 IRC – SIGNIFICANT CHANGES

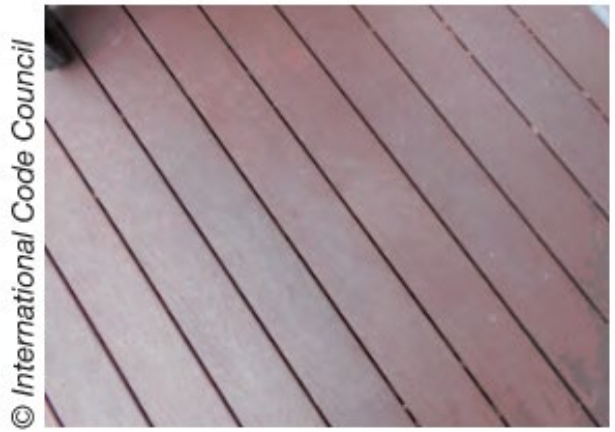
Code Section

Decking, Vertical, and Lateral Support

R507.9

IRC Changes:

- **Added Section R507.9 Vertical and lateral supports at band joist. Section R507.9.1 required vertical loads to be transferred to band joists with ledgers.**
- **Moved Sections R507.2.1-R507.2.3 to Section 507.9.**
- **Section R507.9.1.2 allows for different wood to be used if the quality is higher and the band joist shall be supported by the primary structure cable of supporting all loads.**
- **Added Section R507.9.1.4 Alternate ledger details. Permits alternate framing configurations are permitted if they meet the load requirements of Section R301.5.**



Composite Deck

2018 IRC – SIGNIFICANT CHANGES

Code Section

Decking, Vertical, and Lateral Support

R507.9 (cont.)

IRC Changes:

- **Moved Table R507.2 and R507.2.1 to Section R507.9.**
- **Moved Sections R507.2.1-R507.2.3 to Section 507.9.**
- **Revised Section R507.9.2 Lateral connection. Lateral loads are to be transferred to the ground or to a structure that can transfer the load to the ground.**

Courtesy Peter Kulczyk

Solid-sawn Wood Deck Ledger

2021 IRC – SIGNIFICANT CHANGES

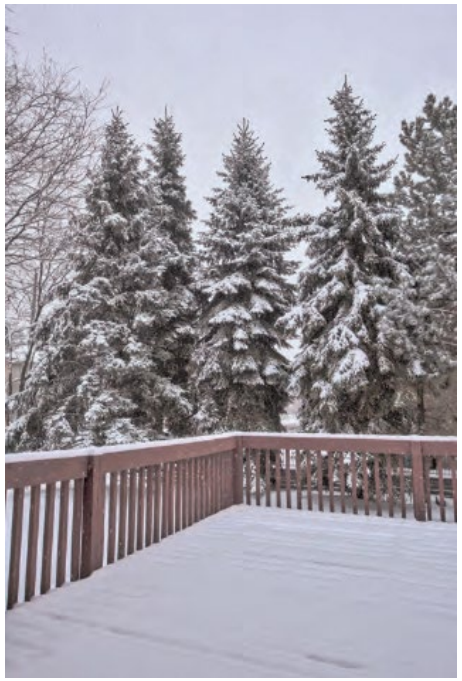
Code Section

Deck Loads

R507

IRC Changes:

R507 modified to specify that decks shall be designed include live or the ground snow load indicated in Table R301.2 whichever is greater.



2021 IRC – SIGNIFICANT CHANGES

Code Section

Decks

R507

IRC Changes:

Modifications to various Deck Tables

- **R507.4 Deck Post Height Table.**
- **R507.5 to split the Deck Beam Span Table into multiple tables.**
- **R507.6 Deck Joist Span Table.**
- **R507.7 Maximum Joist Spacing for Wood Decking table.**

2021 IRC – SIGNIFICANT CHANGES

Code Section

Decks

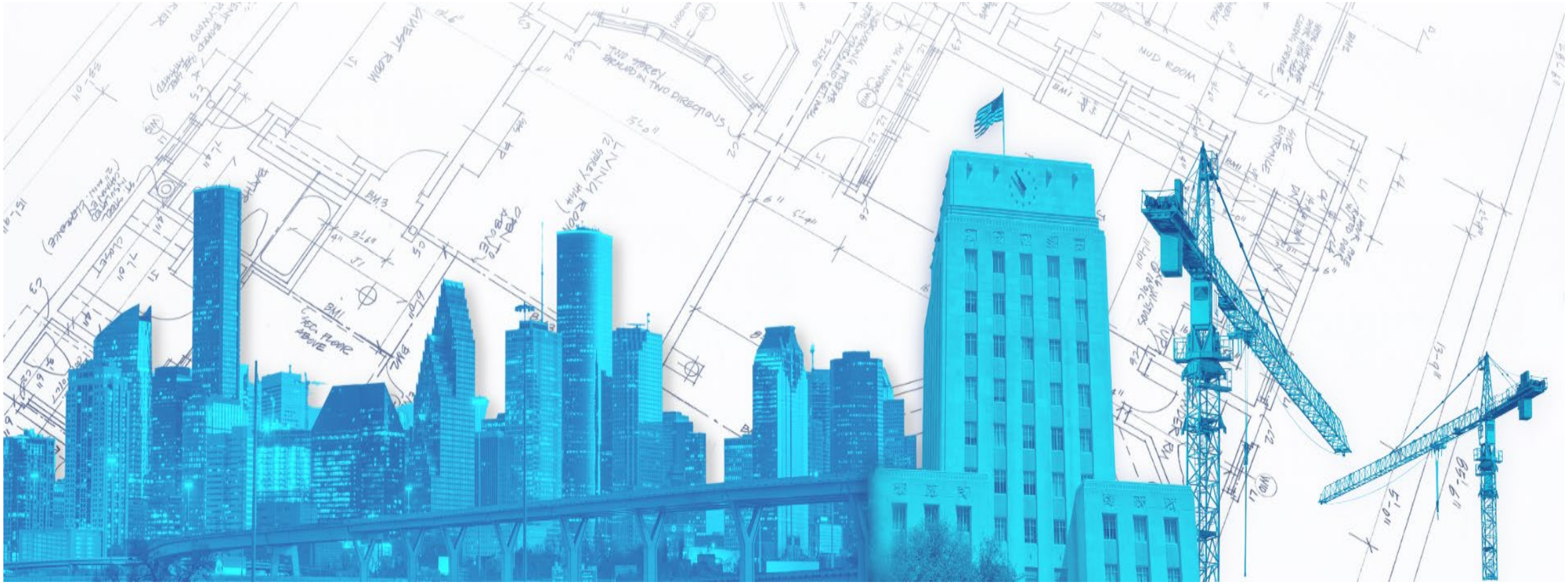
R507

IRC Changes:

New addition of R507.10 which provides requirements for deck guards

HOUSTON PUBLIC WORKS

IRC CHAPTER 6 WALL CONSTRUCTION



2021 IRC – SIGNIFICANT CHANGES

Code Section

Fasteners – Roof and Wall

Table R602.3(1)

IRC Changes:

Additional fastener options are added to the fastener table R602.3(1) for roof and walls.

Item	Description of Building Elements	Number and Type of Fastener[a,b,c,g]	Spacing and Location
		Roof	
1	Blocking between ceiling joists, ~~or~~ rafters or trusses to top plate or other framing below	4-8d box (2½" × 0.113") nails 3-8d common (2½" × 0.131") nails 3-10d box (3" × 0.128") nails 3-(3" × 0.131") nails	Toenail
	Blocking between rafters or truss not at the wall top plates, to rafter or truss	2-8d common (2½" × 0.131") nails 2-(3" × 0.131") nails	Each end, toenail
		2-16d common (3½" × 0.162") nails 3-(3" × 0.131") nails	End nail
	Flat blocking to truss and web filler	16d common (3½" × 0.162") nails 3-(3" × 0.131") nails	6"o.c. face nail
		Wall	
12	Adjacent full-height stud to end of header	3-16d common (3½" × 0.162") nails 4-16d box (3 ½" × 0.135") nails 4-10d box (3" × 0.128") nails 4-(3" × 0.131") nails	End nail

2021 IRC – SIGNIFICANT CHANGES

Code Section

Fasteners – Roof Sheathing

Table R602.3(1)

IRC Changes:

Additional fastener options are added to the fastener table R602.3(1) in the roof sheathing section while maximum field nailing is reduced

Item	Description of Building Elements	Number and Type of Fastener[a,b,c]	Spacing of Fasteners: Edges[h] (inches)	Spacing of Fasteners: Intermediate supports[c,e] (inches)
Wood structural panels (WSP), subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing				
~~30~~ 31	3/8" – 1/2"	6d common or deformed (2" × 0.113" × 0.266" head) ~~(subfloor, wall)~~[i]; 2 3/8" × 0.113" × 0.266" head nail (subfloor, wall)[i]	6[f]	~~12~~ 6[f]
		8d common (2½" × 0.131") (roof) RSRS-01 (2 3/8" × 0.113") nail (roof)[g,i]	6[f]	~~12~~ 6[f]
~~31~~ 32	19/32" – ~~1"~~ 3/4"	8d common (2 – 2½" × 0.131") (subfloor, wall) Deformed 2 3/8" × 0.113" × 0.266" head (wall or subfloor)	6	12
		8d common (2½" × 0.131") nail (roof) RSRS-01 (2 3/8" × 0.113") nail (roof)[g,i]	6[f]	~~12~~ 6[f]
~~32~~ 33	~~1 1/8"~~ 7/8" – 1 1/4"	10d common (3" × 0.148") nail ~~8d~~ (2½" × 0.131" × 0.281" head) deformed nail	6	12

2018 IRC – SIGNIFICANT CHANGES

Code Section

Alternate Stud Height

R602.3(6)

IRC Changes:

- **Exception 3 added to section. Exterior load-bearing studs not exceeding 12 feet in height are provided in accordance with Table R602.3(6). The minimum number of full-height studs adjacent to openings shall be in accordance with Section R602.7.5. The building shall be located in Exposure B, the roof live load shall not exceed 20 psf (0.96 kPa) and the ground snow load shall not exceed 30 psf (1.4 kPa). Studs and plates shall be No. 2 grade lumber or better.**

© International Code Council

Tall walls of up to 20-foot height allowed

2018 IRC – SIGNIFICANT CHANGES

Code Section

Alternate Stud Height

R602.3(6)

IRC Changes:

Added Table R602.3(6) Alternate Wood Bearing Wall Stud Size, Height, and Spacing.

TABLE R602.3(6) Alternate Wood Bearing Wall Stud Size, Height and Spacing

			Ultimate Design Wind Speed					
			115 mph		130 mph[b]		140 mph[b]	
			Maximum Roof/Floor Span[c]		Maximum Roof/Floor Span[c]		Maximum Roof/Floor Span[c]	
Stud Height	Supporting	Stud Spacing[a]	12 ft.	24 ft.	12 ft.	24 ft.	12 ft.	24 ft.
11 ft.	Roof Only	12 in.	2 × 4	2 × 4	2 × 4	2 × 4	2 × 4	2 × 4
		16 in.	2 × 4	2 × 4	2 × 4	2 × 6	2 × 4	2 × 6
		24 in.	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6
	Roof and One Floor	12 in.	2 × 4	2 × 6	2 × 4	2 × 6	2 × 4	2 × 6
		16 in.	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6
		24 in.	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6
12 ft.	Roof Only	12 in	2 × 4	2 × 4	2 × 4	2 × 6	2 × 4	2 × 6
		16 in.	2 × 4	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6
		24 in.	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6
	Roof and One Floor	12 in	2 × 4	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6
		16 in.	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6
		24 in.	2 × 6	2 × 6	2 × 6	2 × 6	2 × 6	DR

For SI: 1 inch = 25.4mm, 1 foot = 304.8 mm, 1 mph = 0.447 m/s

DR = Design Required

a. Wall studs not exceeding 16 inches on center shall be sheathed with minimum ½-inch (12.7 mm) gypsum board on the interior and ⅜-inch (9 mm) wood structural panel sheathing on the exterior. Wood structural panel sheathing shall be attached with 8d (2.5" × 0.131") (64 mm × 3.3 mm) nails spaced not greater than 6 inches (152 mm) on center along panel edges and 12 inches (305 mm) on center at intermediate supports, and all panel joints shall occur over studs or blocking.

b. Where the ultimate design wind speed exceeds 115 mph (51.4 m/s), studs shall be attached to top and bottom plates with connectors having a minimum 300 pound (136 kg) capacity.

c. The maximum span is applicable to both single- and multiple-span roof and floor conditions. The roof assembly shall not contain a habitable attic.

2018 IRC – SIGNIFICANT CHANGES

Code Section

Girder and Header Spans

Table R602.7(1) and R602.7(2)

IRC Changes:

- Girder and header spans are updated assuming No. 2 Southern pine rather than No. 1 Southern pine as used in the 2015 IRC. A footnote is added to clarify that headers and girders are assumed to be braced. For headers with pony walls above, a further reduction in span is taken for 2 x 8 and larger headers. Portion of table below.

TABLE R602.7(1) Girder Spans[a] and Header Spans[a] for Exterior Bearing Walls (Maximum spans for Douglas fir-larch, Hem-fir, Southern pine, and Spruce-pine-fir[b] and required number of jack studs)

Header and Girder Supporting	Size	Ground Snow Load[e] (psf)											
		30						50					
		Building Width[c] (feet)											
		12		24		36		12		24		36	
		Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]
Roof and ceiling	1-2 × 6	4 - 0	1	3 - 1	2	2 - 7	2	3 - 5	1	2 - 8	2	2 - 3	2
	1-2 × 8	5 - 1	2	3 - 11	2	3 - 3	2	4 - 4	2	3 - 4	2	2 - 10	2
	1-2 × 10	6 - 0	2	4 - 8	2	3 - 11	2	5 - 2	2	4 - 0	2	3 - 4	3
	1-2 × 12	7 - 1	2	5 - 5	2	4 - 7	3	6 - 1	2	4 - 8	3	3 - 11	3
	2-2 × 4	4 - 0	1	3 - 1	1	2 - 7	1	3 - 5	1	2 - 7	1	2 - 2	1
	2-2 × 6	6 - 0	1	4 - 7	1	3 - 10	1	5 - 1	1	3 - 11	1	3 - 3	2
	2-2 × 8	7 - 7	1	5 - 9	1	4 - 10	2	6 - 5	1	5 - 0	2	4 - 2	2

2018 IRC – SIGNIFICANT CHANGES

Code Section

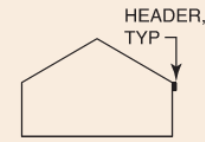
Girder and Header Spans

Table R602.7(1) and R602.7(2)

IRC Changes:

- Girder and header spans are updated assuming No. 2 Southern pine rather than No. 1 Southern pine as used in the 2015 IRC. A footnote is added to clarify that headers and girders are assumed to be braced. For headers with pony walls above, a further reduction in span is taken for 2 x 8 and larger headers. Portion of table below.

TABLE R602.7(1) Girder Spans[a] and Header Spans[a] for Exterior Bearing Walls (Maximum spans for Douglas fir-larch, Hem-fir, Southern pine, and Spruce-pine-fir[b] and required number of jack studs)

Header and Girder Supporting	Size	Ground Snow Load[e] (psf)											
		30						50					
		Building Width[c] (feet)											
		12		24		36		12		24		36	
		Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]
Roof and ceiling	1-2 × 6	4 - 0	1	3 - 1	2	2 - 7	2	3 - 5	1	2 - 8	2	2 - 3	2
	1-2 × 8	5 - 1	2	3 - 11	2	3 - 3	2	4 - 4	2	3 - 4	2	2 - 10	2
	1-2 × 10	6 - 0	2	4 - 8	2	3 - 11	2	5 - 2	2	4 - 0	2	3 - 4	3
	1-2 × 12	7 - 1	2	5 - 5	2	4 - 7	3	6 - 1	2	4 - 8	3	3 - 11	3
	2-2 × 4	4 - 0	1	3 - 1	1	2 - 7	1	3 - 5	1	2 - 7	1	2 - 2	1
	2-2 × 6	6 - 0	1	4 - 7	1	3 - 10	1	5 - 1	1	3 - 11	1	3 - 3	2
	2-2 × 8	7 - 7	1	5 - 9	1	4 - 10	2	6 - 5	1	5 - 0	2	4 - 2	2

2018 IRC – SIGNIFICANT CHANGES

Code Section

Lateral Support for Headers

Table R602.7.5

IRC Changes:

- The table increases the number of king studs in higher wind regions and requires only one or two king studs at each end of a header in regions with 115 mph wind speeds. Portion of the table is shown below

TABLE R602.7.5 Minimum Number of Full Height Studs at Each End of Headers in Exterior Walls[a]

Maximum Header Span (feet)	Ultimate Design Wind Speed and Exposure Category	
	≤ 115 mph, Exposure B[b]	< 140 mph, Exposure B or < 130 mph, Exposure C
4	1	1
6	1	2
8	1	2
10	2	3
12	2	3
14	2	3
16	2	4
18	2	4

a. For header spans between those given above, use the minimum number of full-height studs associated with the larger header span.
b. The tabulated minimum number of full-height studs is applicable where jack studs are provided to support the header at each end in accordance with Table R602.7(1). Where a framing anchor is used to support the header in lieu of a jack stud in accordance with Note d of Table R602.7(1), the minimum number of full-height studs at each end of a header shall be in accordance with requirements for wind speed < 140 mph, Exposure B.

2021 IRC – SIGNIFICANT CHANGES

Code Section

Cripple Walls

R602.9

IRC Changes:

R602.9 clarifies that Cripple wall requirements apply only to exterior cripple walls.

2021 IRC – SIGNIFICANT CHANGES

Code Section

Bracing for Winds

R602.10.3(1)

IRC Changes:

Table R602.10.3(1) modified to include rows with wind bracing requirements for 95 mph wind speeds.

- Exposure Category B
- 30-foot Mean Roof Height
- 10-foot Wall Height
- 2 Braced Wall Lines

Ultimate Design Wind Speed (mph)	Story Location	Minimum Total Length (feet) of Braced Wall Panels Required Along Each Braced Wall Line[a]: Braced Wall Line[c] (feet)	Method LIB[b]	Method GB	Methods DWB, WSP, SFB, PBS, PCP, HPS, BV-WSP, ABW, PFH, PFG, CS-SFB	Methods CS-WSP, CS-G, CS-PF
≤ 95 mph		10	2.5	2.5	1.5	1.5
		20	4.5	4.5	2.5	2.5
		30	6.5	6.5	4.0	3.5
		40	8.5	8.5	5.0	4.0
		50	10.5	10.5	6.0	5.0
		60	12.5	12.5	7.0	6.0
		10	5.0	5.0	3.0	2.5
		20	8.5	8.5	5.0	4.5
		30	12.5	12.5	7.0	6.0
		40	16.0	16.0	9.5	8.0
		50	20.0	20.0	11.5	10.0
		60	23.5	23.5	13.5	11.5
		10	NP	7.0	4.0	3.5
		20	NP	13.0	7.5	6.5
		30	NP	18.5	10.5	9.0
		40	NP	24.0	13.5	11.5
		50	NP	29.5	17.0	14.5
		60	NP	35.0	20.0	17.0

2018 IRC – SIGNIFICANT CHANGES

Code Section

Seismic Adjustment Factors

Table R602.10.3(4)

IRC Changes:

- Attempts to clarify roof and ceiling dead loads in the top story of a multi-story dwelling and an alternative to use of the BV-WSP bracing method have been added. Table R602.10.3(4) now allows use of Methods WSP and CS-WSP with brick veneer in the second story of a dwelling.
- Added item number 8 and 10 to the table.

TABLE R602.10.3(4) Seismic Adjustment Factors to the Required Length of Wall Bracing

Item Number	Adjustment Based On	Story	Condition	Adjustment Factor [Multiply length from table R602.10.3(3) by this factor]	Applicable Methods
8	Walls with stone or masonry veneer, detached one- and two-family dwellings in SDC $D_0 - D_2$[d,f]	First and second story of two-story dwelling	See Table R602.10.6.5	1.2	WSP, CS-WSP
10	Horizontal blocking	Any story	Horizontal blocking omitted	2.0	WSP, CS-WSP

2021 IRC – SIGNIFICANT CHANGES

Code Section

Adjustment Factors – Seismic

Table R602.10.3(4)

IRC Changes:

Table R602.10.3(4) is updated to clarify the limits of brick veneer use and when additional bracing must be used on the building in Seismic Design Category D0, D1 and D2.

Item Number	Adjustment Based On	Story[g]	Condition	Adjustment Factor [Multiply length from Table R602.10.3(3) by this factor]	Applicable Methods
7	Walls with stone or masonry veneer, detached one- or two-family dwellings in SDC D_0-D_2	Any Story	See Section R602.10.6.5.4 ~~Table R602.10.6.5~~		BV-WSP
8	Walls with stone or masonry veneer, detached one- or two-family dwellings in SDC D_0-D_2	First and second story of two-story dwelling	Limited Brick Veneer on Second Story. See Section R602.10.6.5.3, ~~Table R602.10.6.5~~	1.2	WSP, CS-WSP
10	Horizontal blocking	Any story	Horizontal blocking omitted	2.0	WSP, PBS, CS-WSP

g. One- and two-family dwellings in Seismic Design Category D_2 exceeding two stories shall be designed in accordance with accepted engineering practice.

2018 IRC – SIGNIFICANT CHANGES

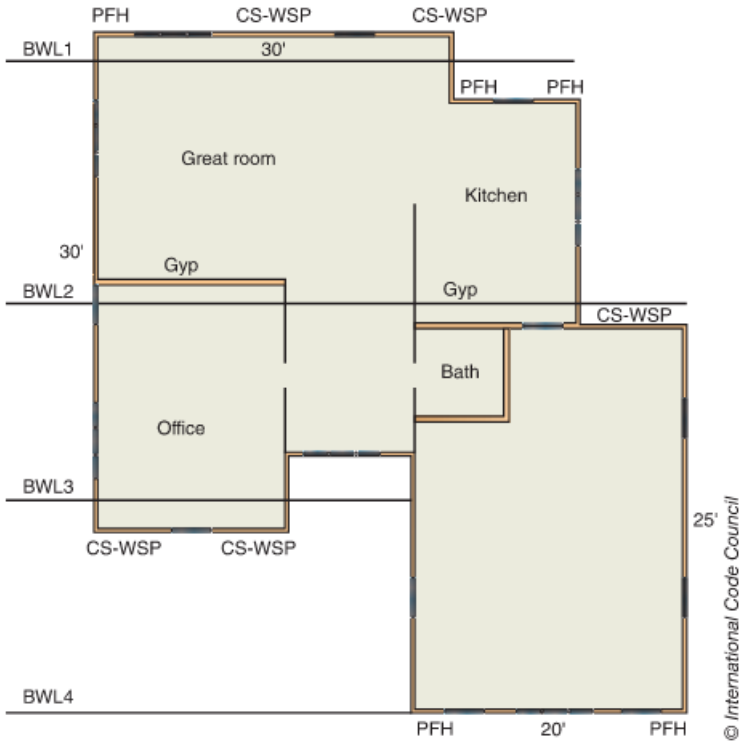
Code Section

Mixing Bracing Methods

R602.10.4.1

IRC Changes:

- **Allowance for mixing methods of bracing altered condition 4 to read as the following: Mixing of continuous sheathing methods CS-WSP, CS-G, and CS-PF along a braced wall line shall be permitted. Intermittent methods ABW, PFH, and PFG shall be permitted to be used along a braced wall line with continuous sheathed methods, provided that the length of required bracing for that braced wall line is determined in accordance with Table R602.10.3(1) or R602.10.3(3) using the highest value of the bracing methods used**



Braced wall lines with mixed methods

2018 IRC – SIGNIFICANT CHANGES

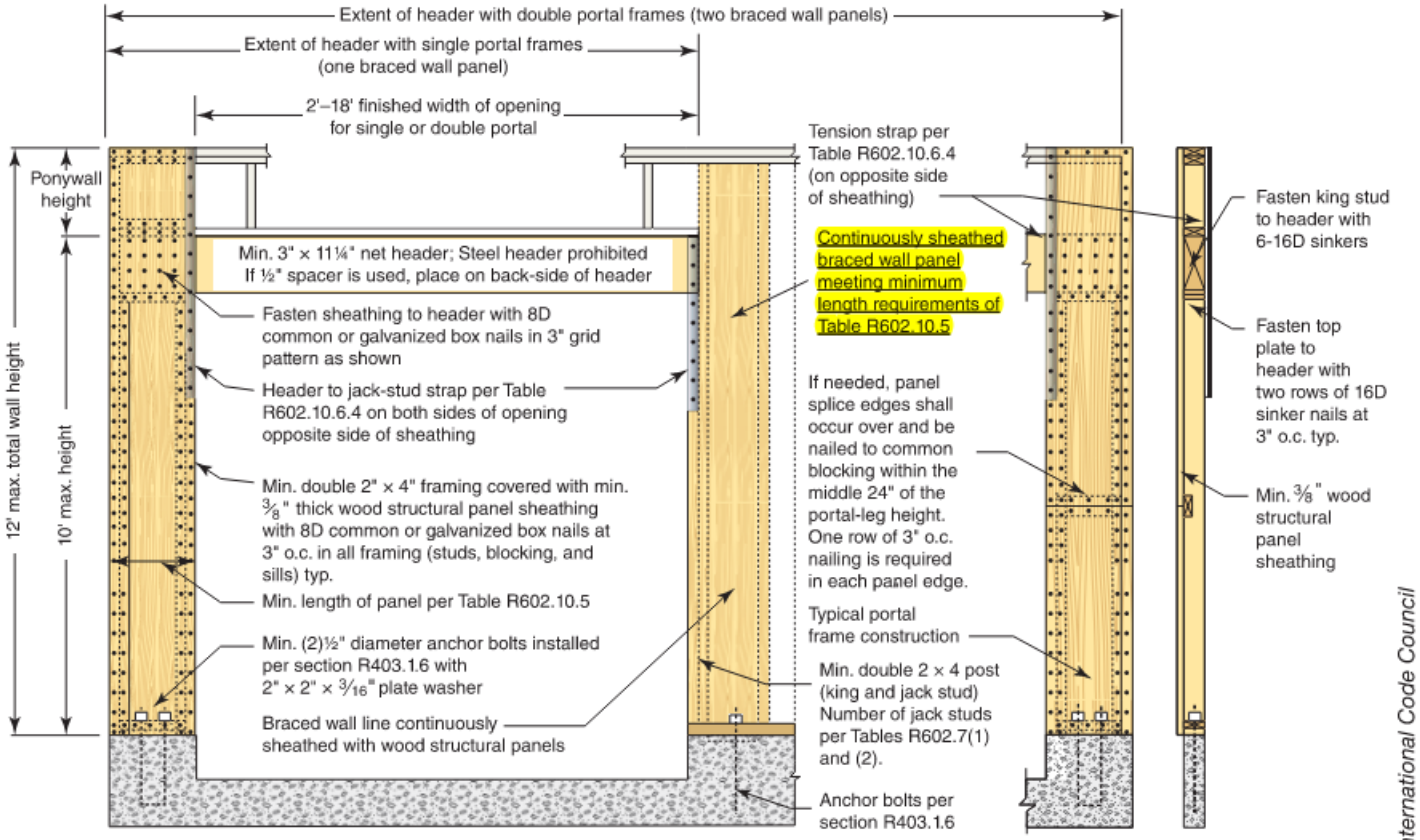
Code Section

Method CS-PF
Continuously Sheathed
Portal Frame

R602.10.6.4

IRC Changes:

- **Added text to Figure R602.10.6.4. : Continuously sheathed braced wall panel meeting minimum length requirements of Table R602.10.5**



Over concrete or masonry block foundation

2018 IRC – SIGNIFICANT CHANGES

Code Section

Method BV-WSP

R602.10.6.5

IRC Changes:

- Modification to Section R602.10.6.5 Wall bracing for dwellings with stone and masonry veneer in seismic design Categories D0, D1, and D2. Added information for detached one- or two-family dwellings with exterior veneer installed in accordance with Section R703.8 and are braced in accordance with Method WSP or CS-WSP.
- Veneer permitted in the second story where the dwelling is a maximum of 2 stories above plane, veneer thickness is no more than 5 inches, the height of veneer on gable-end walls is a maximum of 8 feet above the bearing wall top plate elevation, and the total length of braced wall panel specified by Table R602.10.3(3) is multiplied by 1.2 for each first and second story braced wall line. Where all of the requirements are met the veneer shall be installed in accordance with one of the following methods :

1. The total area of the veneer on the second-story exterior walls extends shall be permitted to extend up to 25 % of the occupied second floor area.

OR

1. The veneer on the second-story exterior walls covers one side of the dwelling, including walls on bay windows and similar appurtenances within the one dwelling side.

2021 IRC – SIGNIFICANT CHANGES

Code Section

Stone and Masonry Veneer

Table R602.10.6.5

IRC Changes:

Clarification to R602.10.5, veneer applications in high seismic areas broken into first story and above the first story applications.

2018 IRC – SIGNIFICANT CHANGES

Code Section

Cold-Formed Steel Wall Construction

Tables R603.3.1 and R603.3.1.1(2)

IRC Changes:

Cold-formed steel connection tables are updated for wind speeds less than 140 miles per hour. Values in the IRC tables now match AISI S230, the Standard for cold-formed steel framing—prescriptive method for one- and two-family dwellings.

See code for full list of value changes.

Walls built with cold-formed steel studs and gypsum board

2018 IRC – SIGNIFICANT CHANGES

Code Section

Cold-Formed Steel Wall Construction

Tables R603.3.1 and R603.3.1.1(2)

IRC Changes:

Cold-formed steel connection tables are updated for wind speeds less than 140 miles per hour. Values in the IRC tables now match AISI S230, the Standard for cold-formed steel framing—prescriptive method for one- and two-family dwellings.

See code for full list of value changes.

Walls built with cold-formed steel studs and gypsum board

2021 IRC – SIGNIFICANT CHANGES

Code Section

Garage Doors

R609.4.1

IRC Changes:

New addition of R609.4.1. Garage doors must have a permanent label identifying:

- **Garage door manufacturer.**
- **The garage door model/series number.**
- **The positive and negative design wind pressure rating.**
- **The installation instruction drawing reference number.**
- **Applicable test standard.**

2018 IRC – SIGNIFICANT CHANGES

Code Section

Structural Insulated Panels

R610

IRC Changes:

- **Section R602.1.11 and Section R610.4, Structural insulated panels (SIP) are now identified and manufactured in accordance with ANSI/APA PRS 610.1 and requirements deleted from the IRC.**
- **Section R610.5.3 Panel to Panel connection. SIPs are to be connected at the vertical in-plane joints in accordance with Figure R610.8 or by other approved methods.**
- **Section R610.5.4 Corner framing of SIP walls shall be constructed in accordance with Figure R610.5.4.**
- **Section R610.5.6 Thermal barrier. SIP walls are to be separated from the interior of a building in accordance with Section R316.4.**

Courtesy Federation of American Scientists

Structural insulated panels

2018 IRC – SIGNIFICANT CHANGES

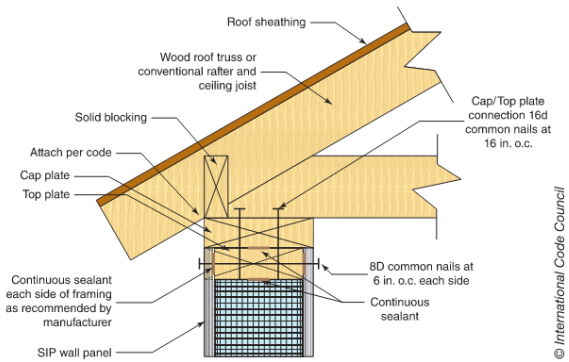
Code Section

Structural Insulated Panels

Table R610.8

IRC Changes:

- **Table R610.8 Maximum Spans for 11 7/8 inch or deeper SIP headers**
- **Footnotes modified:**
- **N/A (not applicable) replaced with DR (Design Required)**
- **Maximum deflection now L/240**
- **Maximum ceiling live load of 20 psf added**
- **Maximum first floor dead load of 10 psf added**
- **Wind loads based on Table R301.2(2).**
- **Strength axis of facing material applied horizontally.**
- **Building width is in the direction of horizontal framing members supported by the header.**
- **The table provides for roof slopes between 3:12 and 12:12.**
- **The maximum roof overhang is 24 inches (610 mm).**

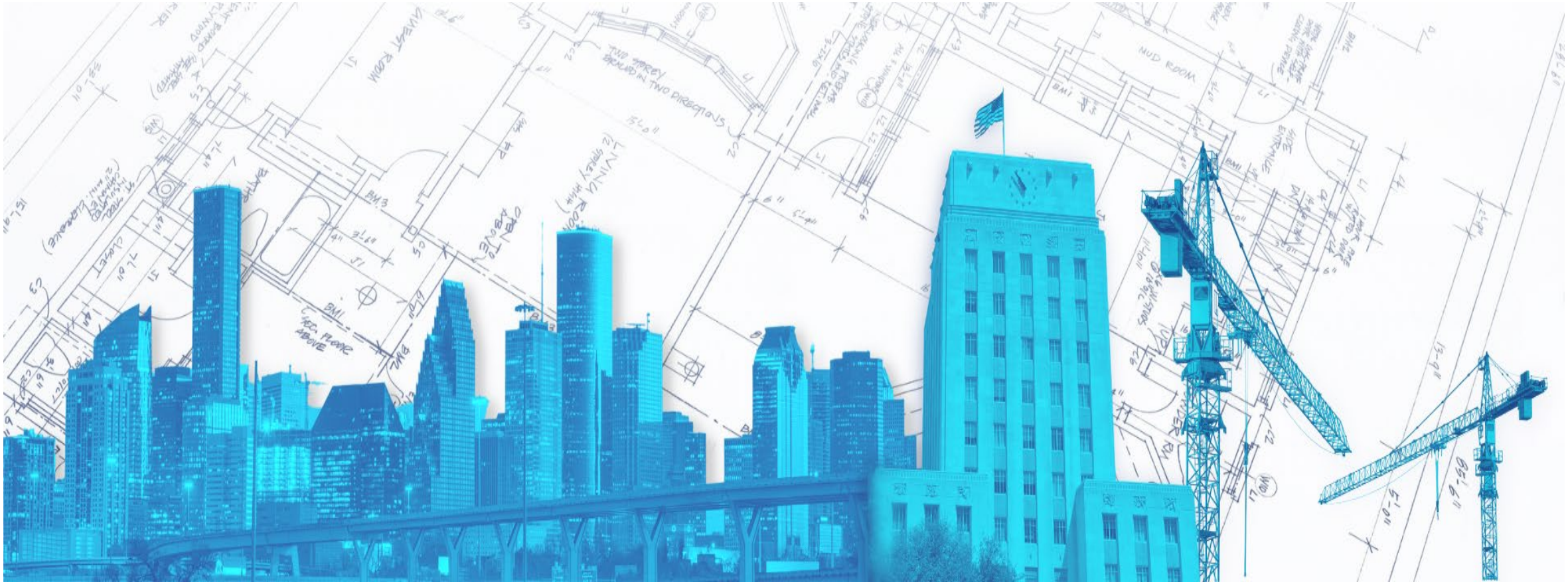


Roof truss or conventional rafter to top plate connection

HOUSTON PUBLIC WORKS

HOUSTON PUBLIC WORKS

IRC CHAPTER 7 WALL COVERING



2018 IRC – SIGNIFICANT CHANGES

Code Section

Water-Resistive Barrier

R703.2

IRC Changes:

- No. 15 Asphalt felt is the specified material to be applied horizontally
- Other approved materials are to be installed in the manufacturer's instructions
- Detached accessory buildings now to have a water-resistive barrier

Water resistive barrier

2021 IRC – SIGNIFICANT CHANGES

Code Section

Water-Resistive Barriers

R703.2,
R703.7.3

IRC Changes:

Modification to R703.2 and R703.7.3 clarifying language for water-resistive barriers with wet or dry climate specific requirements provided.

2021 IRC – SIGNIFICANT CHANGES

Code Section

Alternative Plaster Applications

R703.7.2.2

IRC Changes:

City of Houston amendment adds new Section R703.7.2.2.

- **When approved by the building official, plaster products and applications not covered in Section R703.7.2 shall be provided and installed in accordance with the manufacturer's approved instructions and approved design. Products and applications approved by ICC-ES Evaluation reports are considered approved unless specifically prohibited by the building official**

2018 IRC – SIGNIFICANT CHANGES

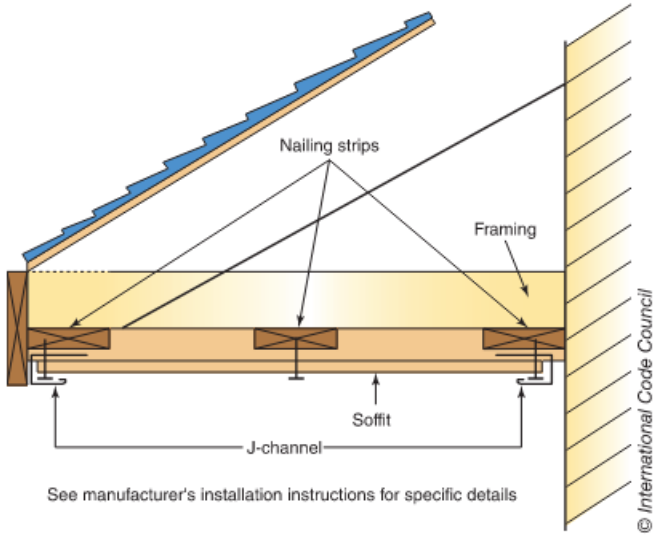
Code Section

Soffit Installation

R703.3.1

IRC Changes:

- Added Section R703.3.1 soffits to comply with Sections R703.1.1 and R703.3.1.2 or manufacturer's installation instructions.
- Added Section R703.1.1 Wood structural panel soffit. The minimum thickness shall be 3/8 inch and fastened to framing or nailing strips with 2-inch by 0.099-inch nails. Fasteners shall be spaced at a maximum of 6 inches on center at panel edges and 12 inches on center at intermediate supports.
- Section R703.11.1.4 moved to Section R703.3.1.2. Soffit panels to be supported at the facia and wall ends and to intermediate nailing strips as necessary to ensure no unsupported span is greater than 16 inches or as specified by the manufacturer.
- Section R703.3.2 Wind limitations include soffits in the section



Soffit installation

2018 IRC – SIGNIFICANT CHANGES

Code Section

Veneer Anchorage through Insulation

R703.8.4

IRC Changes:

- **Modification to Section R703.8.4 now references Table R703.8.4(1).**
- **For masonry veneer tie attachment through insulating sheathing not greater than 2 inches in thickness to not less than 7⁄16 performance category wood structural panel, see Table R703.8.4(2).**
- **Added table R703.8.4(2) Required Brick Tie Spacing for Direct Application to Wood Structural Panel Sheathing. A portion of Table is shown below.**

TABLE R703.8.4(2) Required Brick Tie Spacing for Direct Application to Wood Structural Panel Sheathing[a,b,c]

Fastener type[d]	Size (Diameter or Screw #)	Required Brick-tie Spacing (Vertical-tie Spacing/Horizontal-tie Spacing) (in./in.)					
		110 mph V_{ult}			115 mph V_{ult}		
		Zone 5, Exposure B	Zone 5, Exposure C	Zone 5, Exposure D	Zone 5, Exposure B	Zone 5, Exposure C	Zone 5, Exposure D
Ring Shank Nails	0.091	16/16, 16/12, 12/16, 12/12	16/12, 12/16, 12/12	12 × 12	16/16, 16/12, 12/16, 12/12	16/12, 12/16, 12/12	12/12
	0.148	24/16, 16/24, 16/16, 16/12, 12/16, 12/12	16/16, 16/12, 12/16, 12/12	16/16, 16/12, 12/16, 12/12	24/16, 16/24, 16/16, 16/12, 12/16, 12/12	16/16, 16/12, 12/16, 12/12	16/16, 16/12, 12/16, 12/12

2021 IRC – SIGNIFICANT CHANGES

Code Section

Veneer Attachment

Table R703.8.4(1)

IRC Changes:

Table R703.8.4(1) revised with larger air gaps behind veneer to accommodate thicker continuous insulation

TABLE R703.8.4(1) Tie Attachment and Airspace Requirements

Backing and Tie	Minimum Tie	Minimum Tie Fastener[a]	Airspace[b]	
Wood stud backing with corrugated sheet metal	22 U.S. gage (0.0299 in.) × ⅞ in. wide	8d common nail[b,c] (2½ in. × 0.131in.)	Nominal 1 in. between sheathing and veneer	
Wood stud backing with adjustable metal strand wire	W1.7 (No. 9 U.S. gage; 0.148 in. dia.) with hook embedded in mortar joint[d]	8d common nail[b,c] (2½ in. × 0.131in.)	Minimum nominal 1in. between sheathing and veneer	Maximum ~~4½~~ 4⅝ in. between backing and veneer
Wood stud backing with adjustable metal strand wire	W2.8 (0.187 in. dia.) with hook embedded in mortar joint[e,f]	8d common nail[c] (2½ in. × 0.131in.)	Greater than 4⅝ in. between backing and veneer	Maximum 6⅝ in. between backing and veneer
Cold-formed steel stud backing with adjustable metal strand wire	W1.7 (No. 9 U.S. gage; 0.148 in. dia.) with hook embedded in mortar joint[d]	No. 10 screw extending through the steel framing a minimum of three exposed threads	Minimum nominal 1 in. between sheathing and veneer	Maximum ~~4½~~ 4⅝ in. between backing and veneer
Cold-formed steel stud backing with adjustable metal strand wire	W2.8 (0.187 in. dia.) with hook embedded in mortar joint[e,f]	No. 10 screw extending through the steel framing a minimum of three exposed threads	Greater than 4⅝ in. between backing and veneer	Maximum 6⅝ in.between backing and veneer

~~b.~~a. All fasteners shall have rust-inhibitive coating suitable for the installation in which they are being used or be manufactured from material not susceptible to corrosion.
~~c.~~b. An airspace that provides drainage shall be permitted to contain mortar from construction.
~~a.~~c. In Seismic Design Category D_0, D_1 or D_2, the minimum tie fastener shall be an 8d ring-shank nail (2½ in. × 0.131 in.) ~~or a No. 10 screw extending through the steel framing a minimum of three exposed threads~~.
d. Adjustable tie pintles shall include not fewer than 1 pintle leg of wire size W2.8 (MW18) with a maximum offset of 1-1/4 in.
e. Adjustable tie pintles shall include not fewer than 2 pintle legs with a maximum offset of 1¼ in. Distance between inside face of brick and end of pintle shall be a maximum of 2 in.
f. Adjustable tie backing attachment components shall consist of one of the following: eyes with minimum wire W2.8 (MW18), barrel with minimum ¼ in. outside dia., or plate with minimum thickness of 0.074 in. and minimum width of 1¼ in.

2018 IRC – SIGNIFICANT CHANGES

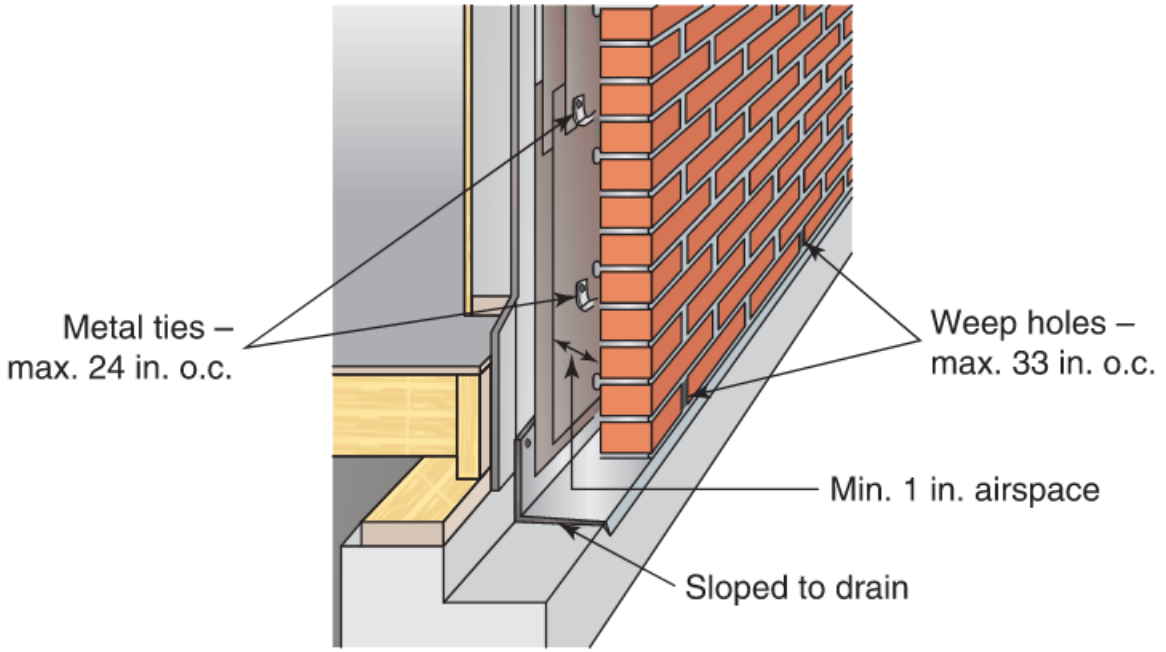
Code Section

Airspace Requirements

Table
R703.8.4(1)

IRC Changes:

- **Added footnote to Table R703.8.4(1): "An airspace that provides drainage shall be permitted to contain motor from construction"**



Drainage airspace behind veneer

2018 IRC – SIGNIFICANT CHANGES

Code Section

Vinyl Siding Installation Over Foam Plastic

R703.11.2

IRC Changes:

- **Modified Section R703.11.2 clarifying the use of vinyl or insulated siding installed over foam plastic is to be in accordance with Section R703.11**
- **Removed Sections R703.11.2.1-R703.11.2.3 and consolidated information into Table R703.11.2**
- **New Table R703.11.2 gives design wind pressures for vinyl siding resisting all wind loads without reliance on wood structural panel sheathing below. New exceptions added:**

2. Where the vinyl siding manufacturer's product specifications provide an approved design wind pressure rating for installation over foam plastic sheathing, use of this design wind pressure rating shall be permitted, and the siding shall be installed in accordance with the manufacturer's instructions.

3. Where the foam plastic sheathing and its attachment have a design wind pressure resistance complying with Sections R316.8 and R301.2.1, the vinyl siding shall be installed in accordance with Sections R703.3.3 and R703.11.1.

Construction beneath vinyl siding

2021 IRC – SIGNIFICANT CHANGES

Code Section

Vinyl Siding Installation Over Foam Plastic Sheathing

R703.11.2

IRC Changes:

Wind pressure ratings for vinyl siding are decreased.

TABLE R703.11.2 ~~Adjusted~~ Required Minimum Wind Load Design ~~Wind~~ Pressure ~~Requirement~~ Rating for Vinyl Siding Installed over Foam Plastic Sheathing Alone

Ultimate Design Wind Speed (mph)	Adjusted Minimum Design Wind Pressure (ASD) (psf)[a,b]					
	Case 1: With interior gypsum wallboard[c]			Case 2: Without interior gypsum wallboard[c]		
	Exposure			Exposure		
	B	C	D	B	C	D
≤95	-30.0	-33.2	-39.4	-33.9	-47.4	-56.2
100	-30.0	-36.8	-43.6	-37.2	-52.5	-62.2
105	-30.0	-40.5	-48.1	-41.4	-57.9	-68.6
110	~~-44.0~~ -31.8	~~-61.6~~ -44.5	~~-73.1~~ -52.8	~~-62.9~~ -45.4	~~-88.1~~ -63.5	~~-104.4~~ -75.3
115	~~-49.2~~ 35.5	~~-68.9~~ -49.7	~~-81.7~~ -59.0	~~-70.3~~ -50.7	~~-98.4~~ -71.0	~~-116.7~~ -84.2
120	~~-51.8~~ -37.4	~~-72.5~~ -52.4	~~-86.0~~ -62.1	~~-74.0~~ -53.4	~~-103.6~~ -74.8	~~-122.8~~ -88.6
130	~~-62.2~~ -44.9	~~-87.0~~ -62.8	~~-103.2~~ -74.5	~~-88.8~~ -64.1	~~124.3~~ -89.7	~~-147.4~~ -106
> 130	See Footnote d ~~Not Allowed~~[d]					

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.0929 m^2, 1 mile per hour = 0.447 m/s, 1 pound per square foot = 0.0479 kPa.

a. Linear interpolation is permitted.

b. The table values are based on a maximum 30-foot mean roof height, and effective wind area of 10 square feet Wall Zone 5 (corner), and the ASD design component and cladding wind pressure from Table R301.2.1(1), adjusted for exposure in accordance with Table R301.2.1(2), multiplied by the following adjustment factors: ~~2.6~~ 1.87 (Case 1) and ~~3.7~~ 2.67 (Case 2) ~~for wind speeds less than 130 mph and 3.7 (Case 2) for wind speeds greater than 130 mph~~.

c. Gypsum wallboard, gypsum panel product or equivalent.

d. For the indicated wind speed condition, and where foam sheathing is the only sheathing on the exterior of frame walls with vinyl siding, ~~is not allowed unless the vinyl siding complies with an adjusted minimum design wind pressure requirement as determined in accordance with Note b and~~ the wall assembly ~~is~~ shall be capable of resisting an impact without puncture at least equivalent to that of a wood frame wall with minimum $^{7}/_{16}$-inch OSB sheathing as tested in accordance with ASTM E1886. The vinyl siding shall comply with an adjusted design wind pressure requirement in accordance with Note b, using an adjustment factor of 2.67.

HOUSTON PUBLIC WORKS

2021 IRC – SIGNIFICANT CHANGES

Code Section

Soffits

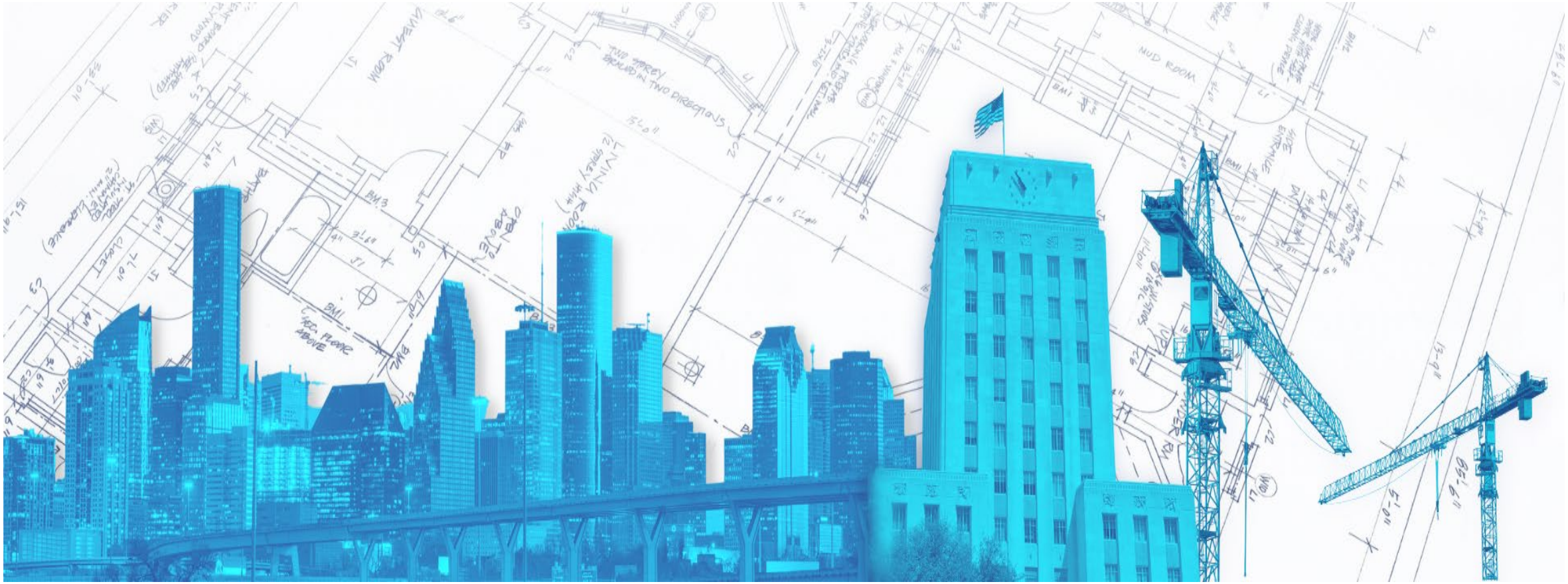
R704

IRC Changes:

- **New Section in IRC for Soffits based on design wind pressure.**
- **Design wind pressure of 30 psf or less requires compliance with R704.2.1, R704.2.2, R704.2.3 or R704.2.4. Specifies material type and installation specifics.**
- **Design wind pressure of greater than 30 psf requires compliance with R704.3.1, R704.3.2, R704.3.3 or R704.3.4. Specifies material type and installation specifics.**

HOUSTON PUBLIC WORKS

IRC CHAPTER 8 ROOF CEILING CONSTRUCTION



2018 IRC – SIGNIFICANT CHANGES

Code Section

Roof Framing

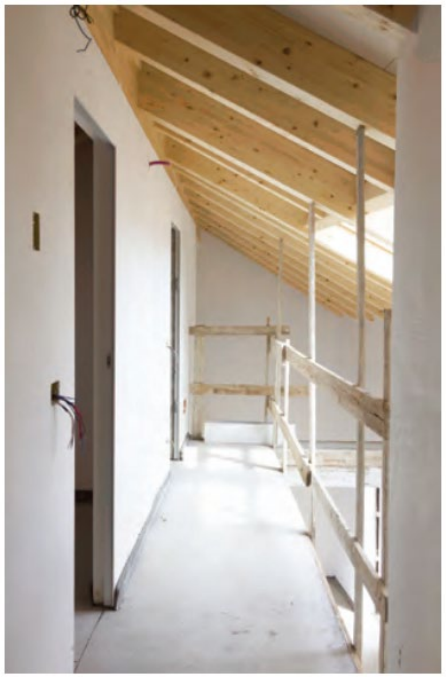
R802

IRC Changes:

- Section R802, design and construction of roofs, has been clarified by dividing the content into three separate sections on roof ridges, rafters, and ceiling joists. Little material is added in the revised section although wording has been slightly changed for clarity.

- Section R802.3 Roof ridge, Section R802.4 Rafters, and Section R802.5 Ceiling joists.

- Section R802.5.2.1 Ceiling joists lapped. Added that a cantilever shall not be more than 9 inches beyond the gable end wall unless supported by gable overhang framing.



iStock.com/tostphoto

Stick built roof

2021 IRC – SIGNIFICANT CHANGES

Code Section

Wood Roof Framing

R802

IRC Changes:

R802 modified to clarify ridge beam and ceiling joist requirements.

2018 IRC – SIGNIFICANT CHANGES

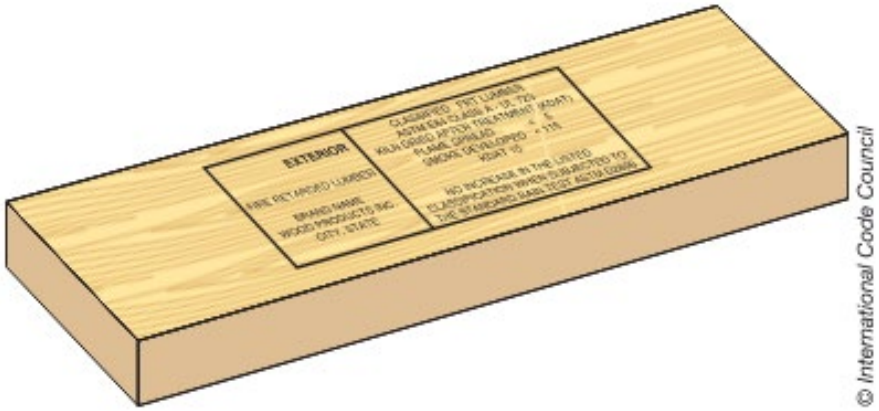
Code Section

Labeling

R802.1.5.4

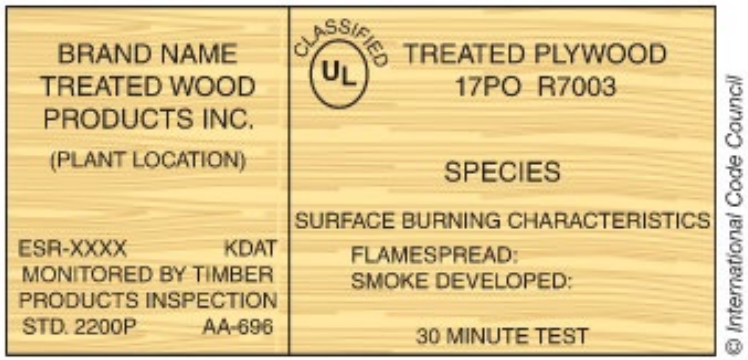
IRC Changes:

- **Modifies the section to require that in addition to the labels required by Section 802.1.1 for sawn lumber and Section 803.2.1 for wood structure panels shall be labeled in accordance with the requirement listed in the Section R802.1.5.4.**



© International Code Council

Fire-retardant treated lumber



© International Code Council

FRT plywood

2021 IRC – SIGNIFICANT CHANGES

Code Section

Heel Joint Connections

Table R802.5.2(1)

IRC Changes:

Table R802.5.2(1) modified for 24- and 36-foot roof spans and a 19.2-inch rafter spacing.

TABLE R802.5.2(1) Rafter/Ceiling Joist Heel Joint Connections[g]

RAFTER SLOPE	RAFTER SPACING (inches)	GROUND SNOW LOAD (psf)											
		20[g]			30			50			70		
		Roof span (feet)											
		12	24	36	12	24	36	12	24	36	12	24	36
		Required number of 16d common nails per heel joint splice[a,b,c,d,f]											
3:12	12	3	5	8	3	6	9	5	9	13	6	12	17
	16	4	7	10	4	8	12	6	12	17	8	15	23
	19.2	4	8	12	5	10	14	7	14	21	9	18	27
	24	5	10	15	6	12	18	9	17	26	12	23	34
4:12	12	3	4	6	3	5	7	4	7	10	5	9	13
	16	3	5	8	3	6	9	5	9	13	6	12	17
	19.2	3	6	9	4	7	11	6	11	16	7	14	21
	24	4	8	11	5	9	13	7	13	19	9	17	26
5:12	12	3	3	5	3	4	6	3	6	8	4	7	11
	16	3	4	6	3	5	7	4	7	11	5	9	14
	19.2	3	5	7	3	6	9	5	9	13	6	11	17
	24	3	6	9	4	7	11	6	11	16	7	14	21
7:12	12	3	3	4	3	3	4	3	4	6	3	5	8
	16	3	3	5	3	4	5	3	5	8	4	7	10
	19.2	3	4	5	3	4	6	3	6	9	4	8	12
	24	3	5	7	3	5	8	4	8	11	5	10	15
9:12	12	3	3	3	3	3	3	3	3	5	3	4	6
	16	3	3	4	3	3	4	3	4	6	3	5	8
	19.2	3	3	4	3	4	5	3	5	7	3	6	9
	24	3	4	5	3	4	6	3	6	9	4	8	12
12:12	12	3	3	3	3	3	3	3	3	4	3	3	5
	16	3	3	3	3	3	3	3	3	5	3	4	6
	19.2	3	3	3	3	3	4	3	4	6	3	5	7
	24	3	3	4	3	3	5	3	5	7	3	6	9

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. 10d common (3" × 0.148") nails shall be permitted to be substituted for 16d common (3-1/2" × 0.162") nails where the required number of nails is taken as 1.2 times the required number of 16d common nails, rounded up to the next full nail. ~~40d box nails shall be permitted to be substituted for 16d common nails.~~

~~b. Nailing requirements shall be permitted to be reduced 25 percent if nails are clinched.~~

b.c. Heel joint connections are not required where the ridge is supported by a load-bearing wall, header or ridge beam.

c.d. Where intermediate support of the rafter is provided by vertical struts or purlins to a load-bearing wall, the tabulated heel joint connection requirements shall be permitted to be reduced proportionally to the reduction in span.

d.e. Equivalent nailing patterns are required for ceiling joist to ceiling joist lap splices.

e.f. Applies to roof live load of 20 psf or less.

f.g. Tabulated heel joint connection requirements assume that ceiling joists or rafter ties are located at the bottom of the attic space. Where ceiling joists or rafter ties are located higher in the attic, heel joint connection requirements shall be increased by the adjustment factors in Table R802.5.2(2).

g. Tabulated requirements are based on 10 psf roof dead load in combination with the specified roof snow load and roof live load.

2021 IRC – SIGNIFICANT CHANGES

Code Section

Rafter Bearings

R802.6

IRC Changes:

- **Where the roof pitch is greater than or equal to 3 units vertical in 12 units horizontal (25-percent slope), and ceiling joists or rafter ties are connected to rafters to provide a continuous tension tie in accordance with Section R802.5.2, vertical bearing of the top of the rafter against the ridge board shall satisfy this bearing requirement.**

2018 IRC – SIGNIFICANT CHANGES

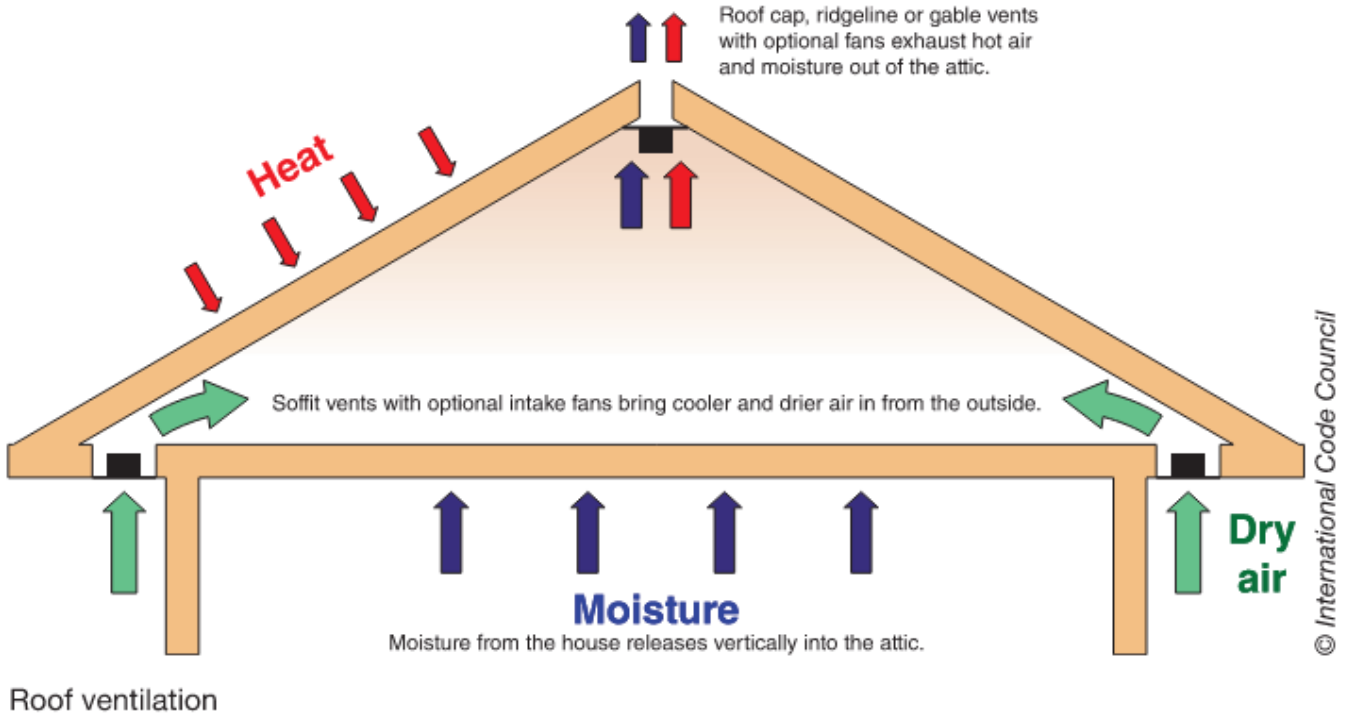
Code Section

Minimum Vent Area

R806.2

IRC Changes:

- **Both conditions of the exception need to be met for the exception to apply.**
- **Condition 2 adjusted that the required ventilation shall be located in the bottom third of the attic space.**



Roof ventilation

2018 IRC – SIGNIFICANT CHANGES

Code Section

Unvented Attics

R806.5

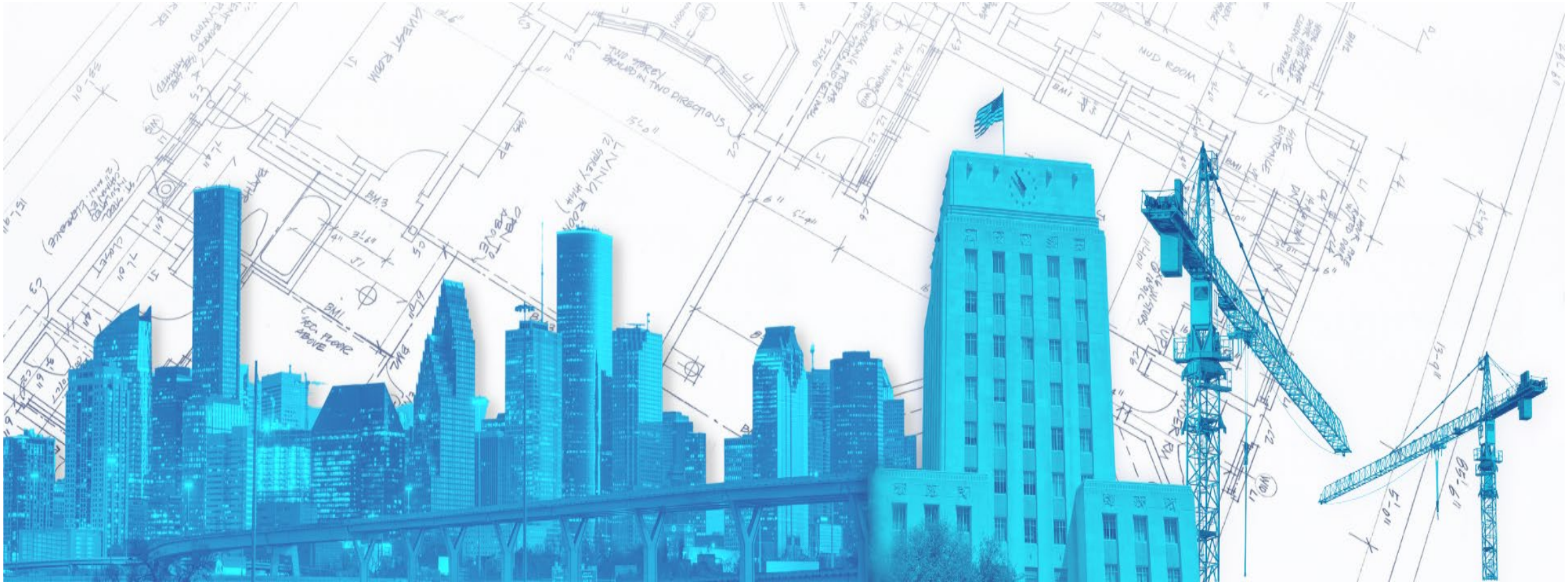
IRC Changes:

- Item 5.2 is added as an alternative path for un-vented attics and rafter assemblies to the requirements of Item 5.1. The new option is limited to warm climates and has 10 requirements to address in the installation of air-permeable insulation.
- In climate zones 1, 2, and 3 air-permeable insulation installed in unvented attics shall meet the following requirements:

1. An approved vapor diffusion port shall be installed at a maximum of 12 inches from the roof's highest point to the lower edge.
2. Port area is a minimum 1:600 of the ceiling area. For multiple ports, the areas shall be summed together.
3. The vapor permeable membrane shall have a permanence rating a minimum of 20 perms when tested in accordance with Procedure A of ASTM E 96.
4. Vapor diffusion port shall serve as an air barrier between the attic and the exterior of the building.
5. The vapor diffusion port shall protect the attic from the entrance of water and snow
6. Framing members and blocking shall not block the free flow of water vapor to the port. A minimum 2-inch clearance would be provided between blocking and roof sheathing. Air-permeable insulation shall be permitted within that space.

HOUSTON PUBLIC WORKS

IRC CHAPTER 9 ROOF ASSEMBLY



2018 IRC – SIGNIFICANT CHANGES

Code Section

Underlayment Requirements of Photovoltaic Shingles

Tables R905.1.1(1) and R905.1.1(2)

IRC Changes:

- **Underlayment requirements for photovoltaic (PV) shingles are revised for consistency with other roofing materials and moved to the Tables R905.1.1(1) and R905.1.1(2) for underlayment.**

TABLE R905.1.1(1) Underlayment Types

Roof Covering	Section	Maximum Ultimate Design Wind Speed, $V_{ult} < 140$ mph	Maximum Ultimate Design Wind Speed, $V_{ult} \geq 140$ mph
Photovoltaic shingles	R905.16	ASTM D 4869 Type I, II, III or IV ASTM D 6757	ASTM D 4869 Type III or IV ASTM D 6757

iStock.com/laremenko

PV shingles

2018 IRC – SIGNIFICANT CHANGES

Code Section

Underlayment Requirements of Photovoltaic Shingles

Tables R905.1.1(1) and R905.1.1(2) (cont.)

IRC Changes:

- **Underlayment requirements for photovoltaic (PV) shingles are revised for consistency with other roofing materials and moved to the Tables R905.1.1(1) and R905.1.1(2) for underlayment.**

TABLE R905.1.1(2) Underlayment Application

Roof Covering	Section	Maximum Ultimate Design Wind Speed, V_{ult} < 140 mph	Maximum Ultimate Design Wind Speed, $V_{ult} \geq$ 140 mph
Photovoltaic Shingles	R905.16	For roof slopes from two units vertical in 12 units horizontal (2:12), up to four units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of four units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	Same as Maximum Ultimate Design Wind Speed, Vult < 140 mph except all laps shall be not less than 4 inches.

(Table rows without changes and deleted section text not shown for brevity and clarity.)

2018 IRC – SIGNIFICANT CHANGES

Code Section

Building Integrated Photovoltaic Panels

R905.17 and R202

IRC Changes:

- **Added definition of Building-integrated photovoltaic Roof panel (BipV Roof panel): A photovoltaic panel that functions as a component of the building envelope.**
- **Addition to the code Section R905.17 BIPV roof panels applied directly to the roof deck. The installation of BIPV roof panels shall comply with NFPA 70 and Sections R905.17 and R324**
- **Section R905.17.1 Deck requirements. BIPV roof panels shall be applied to a solid or closely-fitted deck, except where the roof covering is specifically designed to be applied over spaced sheathing.**
- **R905.17.2 Deck slope. BIPV roof panels shall be used only on roof slopes of two units vertically in 12 units horizontally or greater.**
- **R905.17.3 Underlayment. Underlayment shall comply with Section R905.1.1.**
- **R905.17.3.1 Ice barrier. When required, an ice barrier shall comply with Section R905.1.2.**

2018 IRC – SIGNIFICANT CHANGES

Code Section

Building Integrated Photovoltaic Panels (BIPV)

R905.17 (cont.)

IRC Changes:

- **R905.17.4 Ice barrier. In areas where there has been a history of ice forming along the eaves causing a backup of water, as designated in Table R301.2(1), an ice barrier that consists of not less than two layers of underlayment cemented together or of a self-adhering polymer modified bitumen sheet shall be used in lieu of normal underlayment and extend from the lowest edges of all roof surfaces to a point not less than 24 inches inside the exterior wall line of the building. Exception: Detached accessory structures that do not contain conditioned floor area.**
- **R905.17.5 Material standards. BIPV roof panels shall be listed and labeled in accordance with UL 1703.**
- **R905.17.6 Attachment. BIPV roof panels shall be attached in accordance with the manufacturer's installation instructions.**
- **R905.17.7 Wind resistance. BIPV roof panels shall be tested in accordance with UL 1897. BIPV roof panel packaging shall bear a label to indicate compliance with UL 1897.**

PixOne/Shutterstock.com

Building integrated photovoltaic panels

2021 IRC – SIGNIFICANT CHANGES

Code Section

Requirements for Roof Coverings

R905

IRC Changes:

New addition of R905.4.4.1 and Table R905.4.4.1 which provides requirements for metal shingle wind resistance.

Modification of 905.7 to provide requirements for wood shingles and wooden shakes

- **Wood shingles and wooden shakes shall not be used in new construction. Wood shingles or wooden shakes in existing construction shall not be replaced with other wood shingles or wooden shakes unless the replacement wood shingles or wooden shakes are fire-retardant-treated in accordance with Section R902.2 and installed in accordance with this section.**

2021 IRC – SIGNIFICANT CHANGES

Code Section

Wind Resistance of Metal Roof Shingles

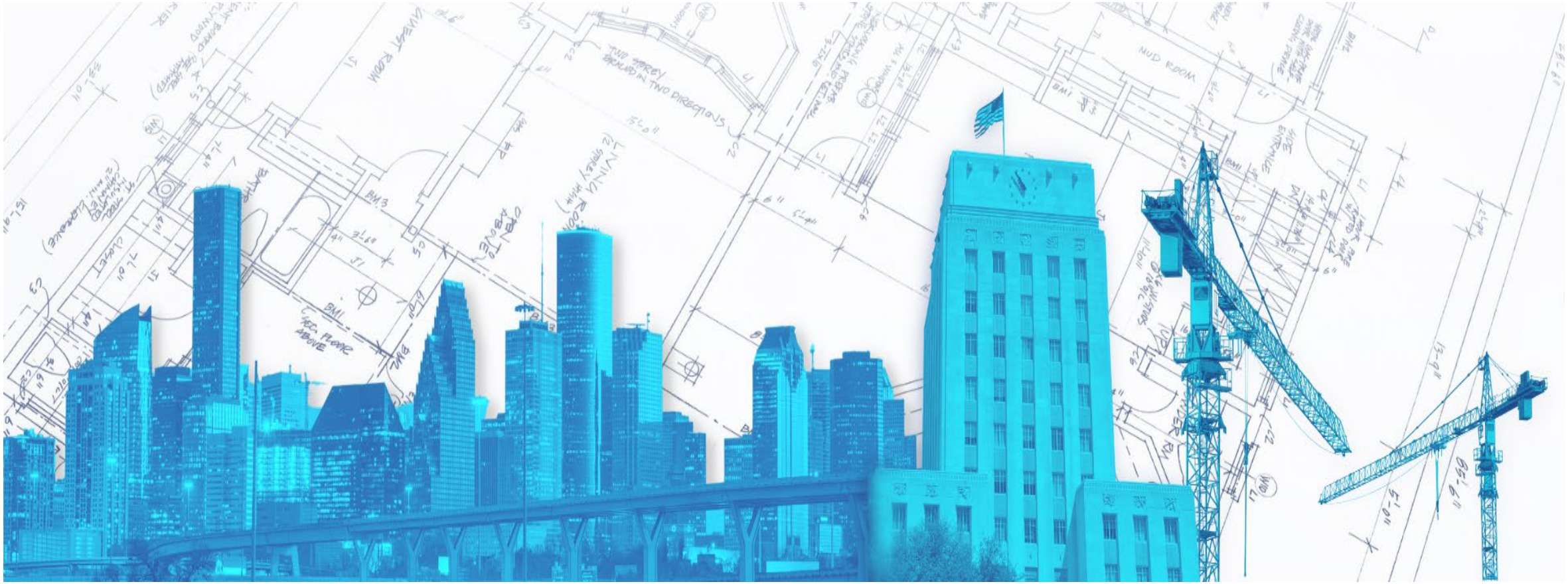
R905.4.4.1

IRC Changes:

- **Metal roof shingles applied to a solid or closely fitted deck shall be tested in accordance with ASTM D3161, FM 4474, UL 580 or UL 1897. Metal roof shingles tested in accordance with ASTM D3161 shall meet the classification requirements of Table R905.4.4.1 for the appropriate maximum basic wind speed and the metal shingle packaging shall bear a label to indicate compliance with ASTM D3161 and the required classification in Table R905.2.4.1.**

HOUSTON PUBLIC WORKS

IRC CHAPTER 10 CHIMNEYS AND FIREPLACES



2018 IRC – SIGNIFICANT CHANGES

Code Section

Chimney Insulation Shield

R1005.8

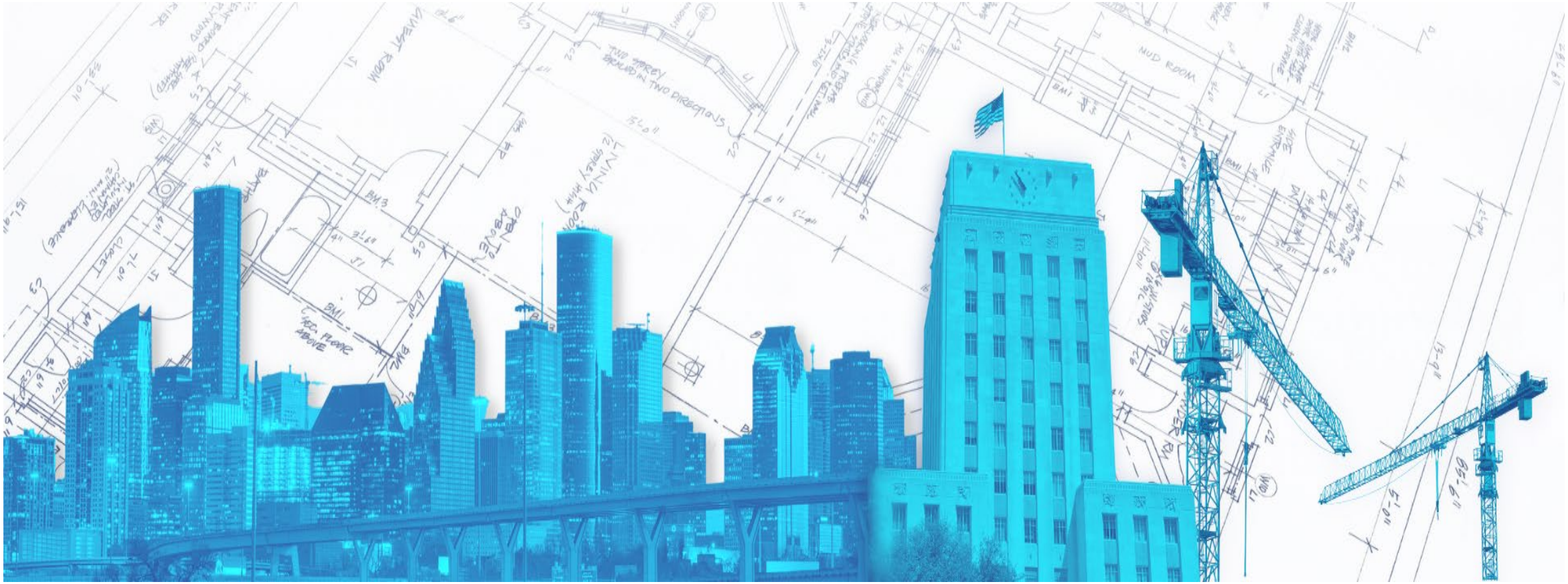
IRC Changes:

- **Added Section R1005.8 Insulation shield.**
- **A steel insulation shield with a minimum thickness of 0.0187 inches (No. 26 gage) is to be installed for clearance between a factory-built chimney and insulation material.**
- **Installation must be in accordance with the manufacture's instructions.**
- **Where chimneys pass through attic space, the shield shall terminate not less than 2 inches (51 mm) above the insulation materials and shall be secured in place**

Insulation shield

HOUSTON PUBLIC WORKS

IRC CHAPTER 11 ENERGY EFFICIENCY



2021 IRC – SIGNIFICANT CHANGES

Code Section

Energy Efficiency

N1101.1

IRC Changes:

City of Houston amendment to Chapter 11 dictates that the Energy Conservation Code will regulate energy efficiency for the design and construction of buildings regulated by this code.

Chapter 11 of the IRC has been deleted in its entirety per the local amendment.

2018 IRC – SIGNIFICANT CHANGES

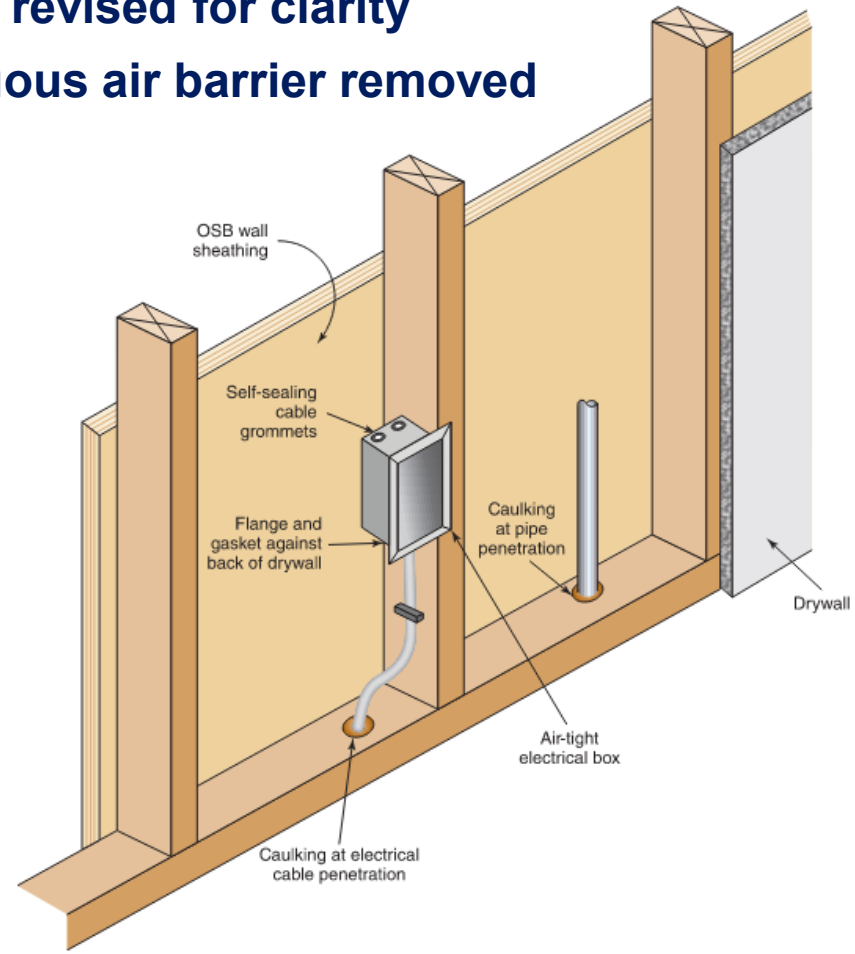
Code Section

Definition of Air Barrier

N1101.6

IRC Changes:

- Air barrier definition revised for clarity
- Definition of continuous air barrier removed



Components of a continuous air barrier

2018 IRC – SIGNIFICANT CHANGES

Code Section

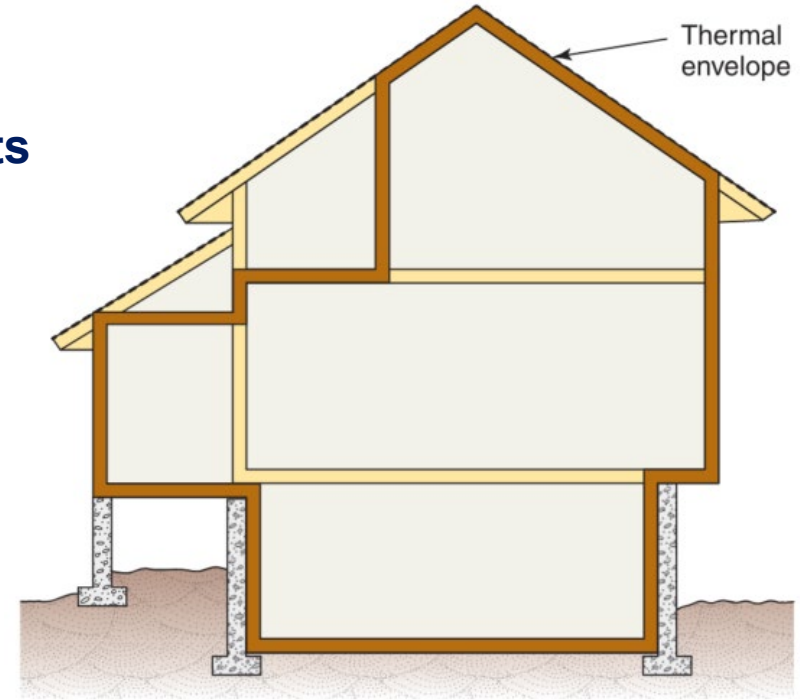
Definition of Building Thermal Envelope

N1101.6

IRC Changes:

Revised definition of building thermal envelope

- **Ceilings now added to included elements**
- **Any other building elements ➔ any other building element assemblies**



The building thermal envelope is an assembly of elements that provide a boundary between conditioned space and unconditioned space.

2018 IRC – SIGNIFICANT CHANGES

Code Section

Fenestration Definitions and U-factors

N1101.6, Tables N1101.10.3(1) and N1101.10.3(2)

IRC Changes:

Revisions to N1101.6 (R202): Defined Terms

- **Definitions for skylights and vertical fenestration moved under definition for fenestration**
- **Added definition for opaque door**
    - **Door not less than 50 percent opaque in surface area**

rSnapshotPhotos/Shutterstock.com

Examples of vertical fenestration including an opaque door

2018 IRC – SIGNIFICANT CHANGES

Code Section

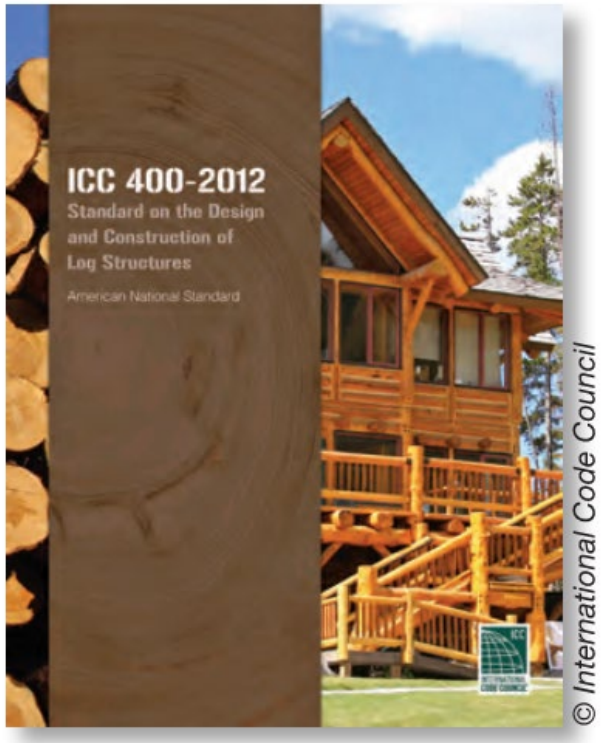
Building Thermal Envelope for Log Homes

N1102.1

IRC Changes:

New exception to prescriptive building thermal envelope requirements

- **Log homes designed in accordance with ICC-400, Standard on the Design and Construction of Log Structures, exempt from thermal envelope requirements**



ICC-400 offers a prescriptive path for substantiating the thermal performance of log walls

2018 IRC – SIGNIFICANT CHANGES

Code Section

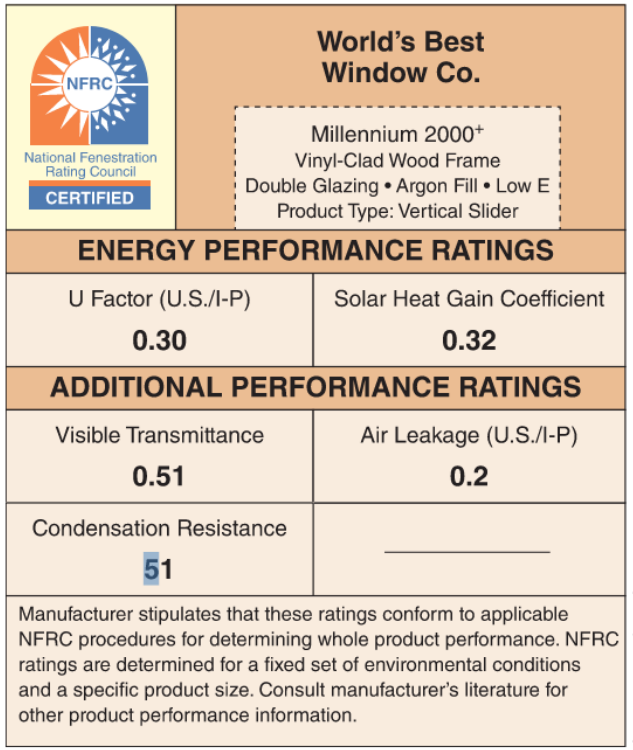
Insulation and Fenestration Requirements

Tables N1102.1.2 and N1102.1.4

IRC Changes:

Prescriptive U-factors for fenestration have been lowered to improve the energy efficiency of dwellings and townhouses

- **Table N1102.1.2 now requires minimum R-5 insulation under the entire heated slab in addition to the insulation at the slab's edge**



NFRC National Fenestration Rating Council CERTIFIED	**World's Best Window Co.** Millennium 2000+ Vinyl-Clad Wood Frame Double Glazing • Argon Fill • Low E Product Type: Vertical Slider
ENERGY PERFORMANCE RATINGS	
U Factor (U.S./I-P) **0.30**	Solar Heat Gain Coefficient **0.32**
ADDITIONAL PERFORMANCE RATINGS	
Visible Transmittance **0.51**	Air Leakage (U.S./I-P) **0.2**
Condensation Resistance **51**	_____
Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining whole product performance. NFRC ratings are determined for a fixed set of environmental conditions and a specific product size. Consult manufacturer's literature for other product performance information.	

A maximum fenestration U-factor of 0.30 is prescribed for Climate Zones 5 through 8 and Marine 4

2018 IRC – SIGNIFICANT CHANGES

Code Section

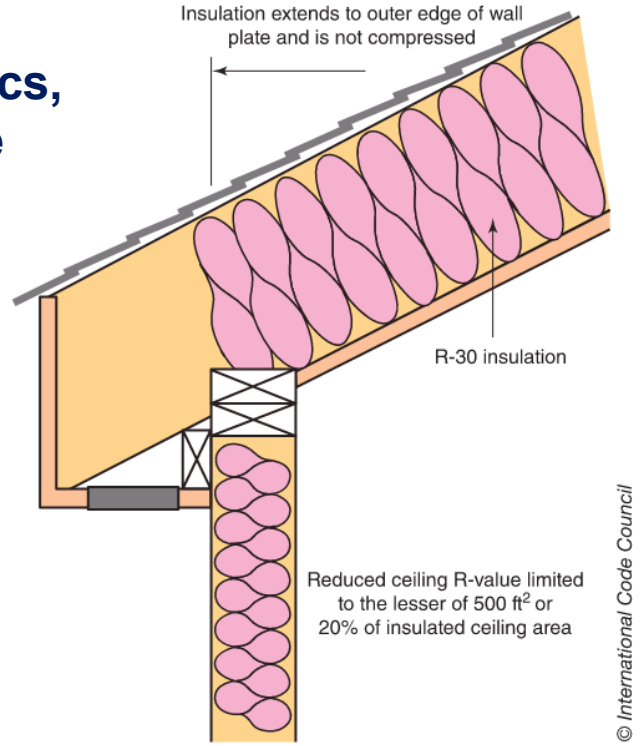
Reduction of Ceiling Insulation

N1102.2.2

IRC Changes:

Modification to exception for insulation in ceilings without attic spaces

- **When applying the exception for insulation in ceilings without attics, the insulation must extend to the outside of the top plate and shall not be compressed**



Reduced R-value for vaulted ceiling

2018 IRC – SIGNIFICANT CHANGES

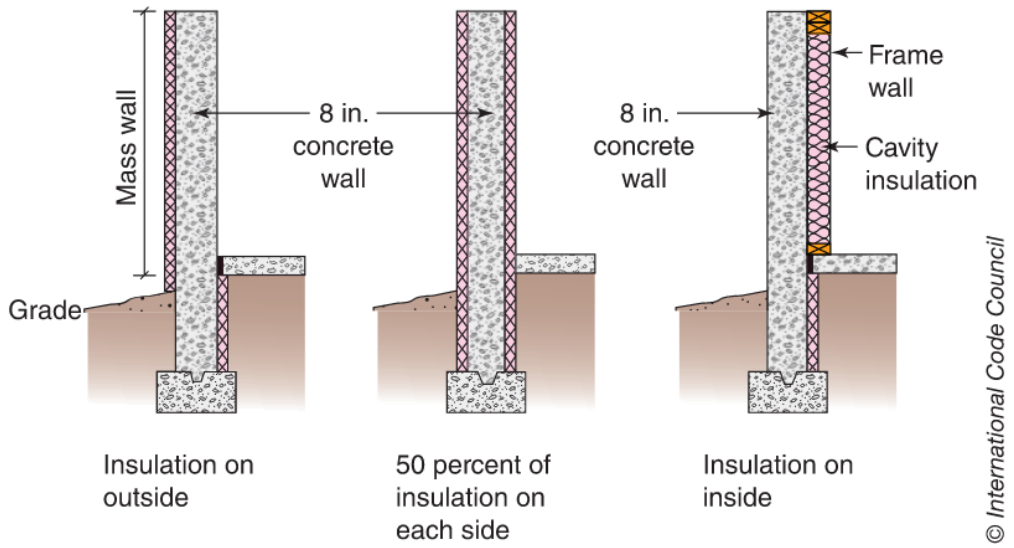
Code Section

Mass Walls

N1102.2.5

IRC Changes:

Mass wall provisions reorganized into a numbered list for accuracy and clarity



Above-ground concrete mass walls

2018 IRC – SIGNIFICANT CHANGES

Code Section

Cold-Formed Steel Framing R-Values

Table N1102.2.6

IRC Changes:

Conflicting entries removed from Table N1102.2.6: Steel-Frame Ceiling, Wall and Floor Insulation R-Values

TABLE 11-1 Summary of corrections to steel-framed wall R-values

Wood-framed wall R-value	Steel-framed wall with studs at 16 inches on center	
	Values in 2015 IRC	Correct values in 2018 IRC
R-13	R-19 cavity plus R-2.1 continuous R-21 cavity plus R-3.1 continuous	R-19 cavity plus R-3.1 continuous
	R-21 cavity plus R-2.8 continuous	R-21 cavity plus R-2.8 continuous*

*Values have not changed

2018 IRC – SIGNIFICANT CHANGES

Code Section

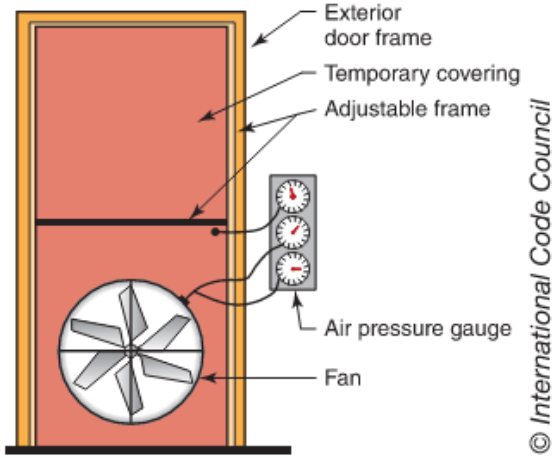
Testing for Air Leakage

N1102.4

IRC Changes:

New standard referenced for air-leakage testing

- **References RESNET/ICC 380, Standard for Testing Airtightness of Building Enclosures, Airtightness of Heating and Cooling Air Distribution Systems, and Airflow of Mechanical Ventilation Systems**



The air leakage rate of the building thermal envelope is tested with a blower door

2018 IRC – SIGNIFICANT CHANGES

Code Section

Duct Sealing and Testing

N1103.3.2,
N1103.3.3

IRC Changes:

Removed exceptions to requirements for ducts, air handlers and filter boxes to be sealed

- **Joints and seams to comply with either International Mechanical Code or Section M1601.4.1 ➔ to comply with Section M1601.4.1**

Exception added to mandatory duct testing requirements

- **Duct air leakage test not required for ducts serving heat or energy recovery ventilators that are not integrated with ducts serving heating or cooling systems**

All ducts are required to be sealed

2018 IRC – SIGNIFICANT CHANGES

Code Section

Ducts Buried Within Ceiling Insulation

N1103.3.6, N1103.3.7

IRC Changes:

New Section N1103.3.6 (r403.3.6): Ducts buried within ceiling insulation

- **Regulates R-values of ducts**
- **Exception: Sections of supply ducts less than 3 feet from supply outlet not required to comply**

New Section N1103.3.7 (R403.3.7): Ducts located in conditioned space

- **For ducts to be considered as inside a conditioned space, must be either:**
  - **Located completely within the continuous air barrier and within the building thermal envelope**
  - **Buried within ceiling insulation in accordance with Section N1103.3.6 and fulfill additional conditions**

2018 IRC – SIGNIFICANT CHANGES

Code Section

Lighting

N1104.1

IRC Changes:

Increased required percentage of permanent lighting fixtures having high-efficacy lamps

- **Not less than 75 ➔ 90 percent of permanently installed lighting fixtures shall contain only high-efficacy lamps**
- **Removed exception for low-voltage lighting**

mnowicki/Shutterstock.com

High-efficacy lamps, such as LED lamps, are required in 90 percent of permanent lighting fixtures

2018 IRC – SIGNIFICANT CHANGES

Code Section

Maximum Energy Rating Index

N1106.3, N1106.4

IRC Changes:

Revised requirements for Energy Rating Index (ERI)

- **ERI to follow prescriptive code ➔ to be determined in accordance with RESNET/ICC 301**
  - **ERI reference design ventilation rate to follow equation:**

$$\text{Ventilation rate, CFM} = (0.01 \times \text{total square foot area of house}) + [7.5 \times (\text{number of bedrooms} + 1)]$$

- **Increase in ERI values for Table N1106.4 (R406.4): Maximum Energy Rating Index**

TABLE N1106.4 (R406.4) Maximum Energy Rating Index

Climate Zone	Energy Rating Index[a]
1	~~52~~ 57
2	~~52~~ 57
3	~~51~~ 57
4	~~54~~ 62
5	~~55~~ 61
6	~~54~~ 61
7	~~53~~ 58
8	~~53~~ 58

a. Where on-site renewable energy is included for compliance using the ERI analysis of Section N1106.4, the building shall meet the mandatory requirements of Section N1106.2, and the building thermal envelope shall be greater than or equal to the levels of efficiency and SHGC in Table N1102.1.2 or Table N1102.1.4.

HOUSTON PUBLIC WORKS

IRC CHAPTER 13 GENERAL MECHANICAL SYSTEM REQUIREMENTS

2018 IRC – SIGNIFICANT CHANGES

Code Section

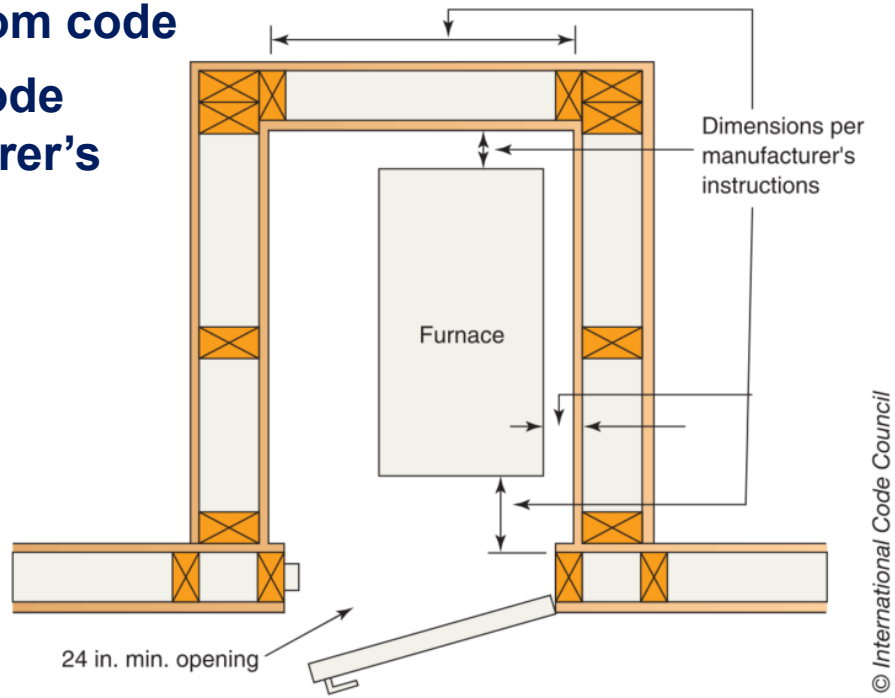
Access to Furnaces within Compartments

M1305.1.1

IRC Changes:

Appliance access and clearance requirements for furnaces in compartments removed from code

- **Now references other code sections and manufacturer's instructions**



The access and clearance requirements for furnaces in compartments have been removed in favor of the manufacturer's instructions.

2018 IRC – SIGNIFICANT CHANGES

Code Section

Appliances Installed in Pits

M1305.1.3.2

IRC Changes:

Expansion of requirements for appliance installation in pits

- **Minimum bottom clearance: 6 ➔ 3 inches**
- **Sides of pit now to be held back minimum 12 inches from appliance**
- **Where pit depth exceeds 12 below adjoining grade, the walls of the pit now to be lined with concrete or masonry**
    - **Concrete or masonry to extend not less than 4 inches above adjoining grade and shall have sufficient lateral load-bearing capacity to resist collapse**
- **Excavation on the control side of the appliance now to extend horizontally not less than 30 inches**

2021 IRC – SIGNIFICANT CHANGES

Code Section

Appliance Access

M1305

IRC Changes:

City of Houston amendment to M1305.1.2 for attics containing appliances:

- **To be provided with pull down stairs with a load capacity of not less than 350 pounds, large enough to allow removal of the largest appliance, and a stair width not less than 22 inches at its narrowest point**
- **A clear and unobstructed passageway large enough to allow removal of the largest appliance, but not less than 30 inches high and 30 inches wide. Increased from the base code requirement of 22 inches wide.**

New addition of Section M1305.1.4 for appliances on roofs.

- **Appliances located on roofs shall meet the access requirements of Chapter 3 of the Mechanical Code.**

2021 IRC – SIGNIFICANT CHANGES

Code Section

Appliance Installation, Mechanical System Installation

M1307, M1308

IRC Changes:

City of Houston amendment revising the reference standard required in M1307.4.2 .

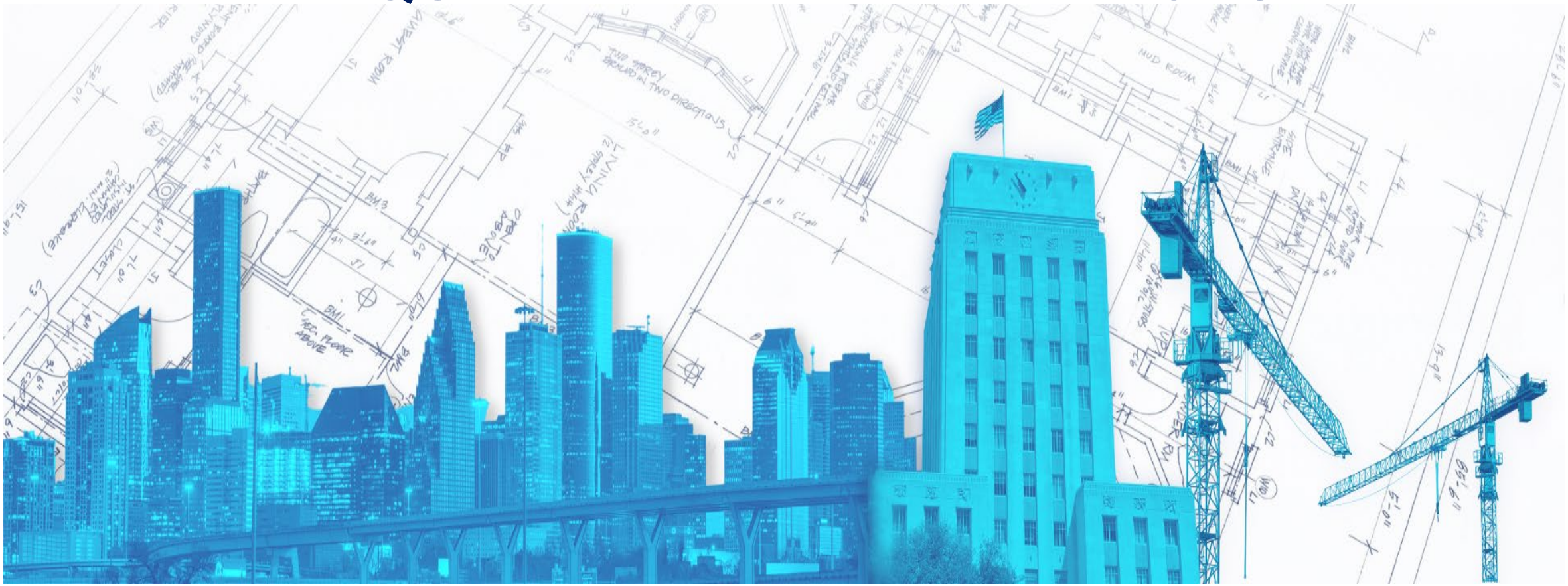
- **Section 2311 of the Fire Code provided as the standard instead of Section 502.16 of the International Mechanical Code.**

City of Houston amendment modifying the exception to M1308.2.

- **The requirement for the steel piping to be galvanized has been removed.**

HOUSTON PUBLIC WORKS

IRC CHAPTER 14 HEATING AND COOLING EQUIPMENT AND APPLIANCES



2021 IRC – SIGNIFICANT CHANGES

Code Section

Heating and Cooling Equipment and Appliances

M1401

IRC Changes:

City of Houston amendment to M1401 adds requirement that a level service space at least 30 inches deep and 30 inches wide shall be present along all sides of the appliance where access is required.

2021 IRC – SIGNIFICANT CHANGES

Code Section

Insulation of Refrigerant Piping

M1411.6

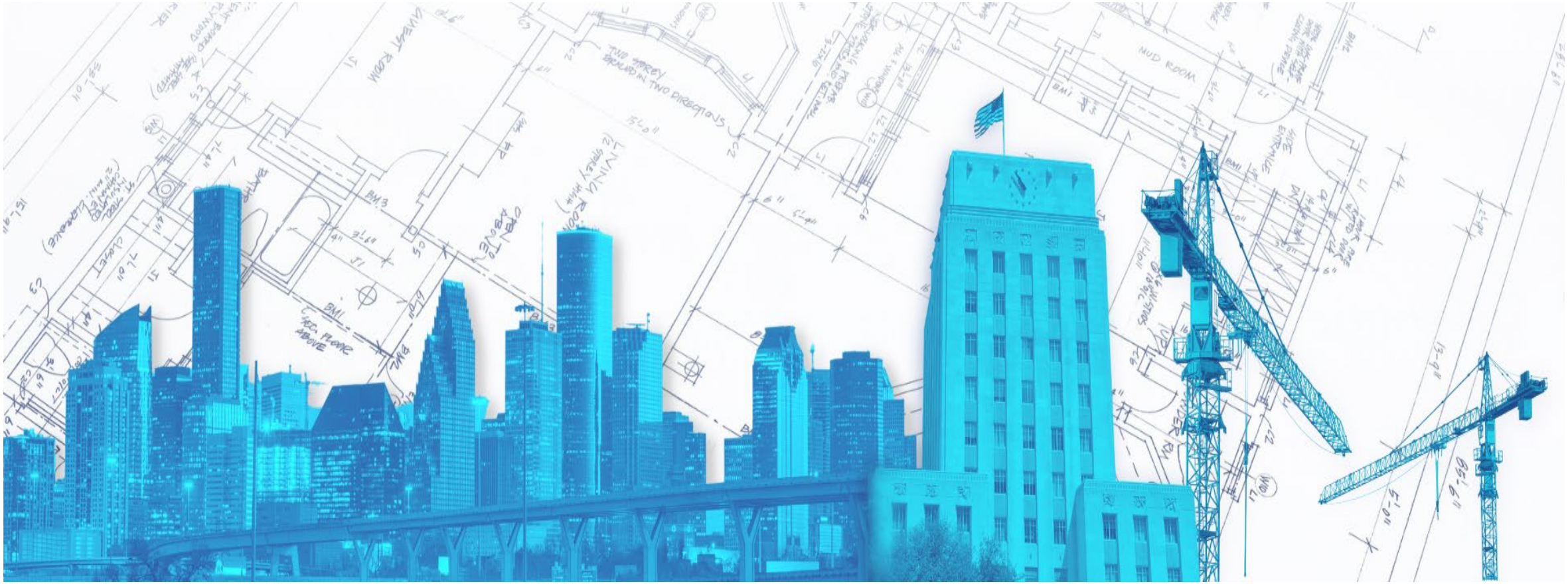
IRC Changes:

New City of Houston amendment M1411.6

- **Piping and fittings for refrigerant vapor (suction) lines shall be insulated with insulation having a thermal resistivity of not less than R-3 and having an external surface permeance not exceeding 0.05 perm when tested in accordance with ASTM E96.**

HOUSTON PUBLIC WORKS

IRC CHAPTER 15 EXHAUST SYSTEMS



2018 IRC – SIGNIFICANT CHANGES

Code Section

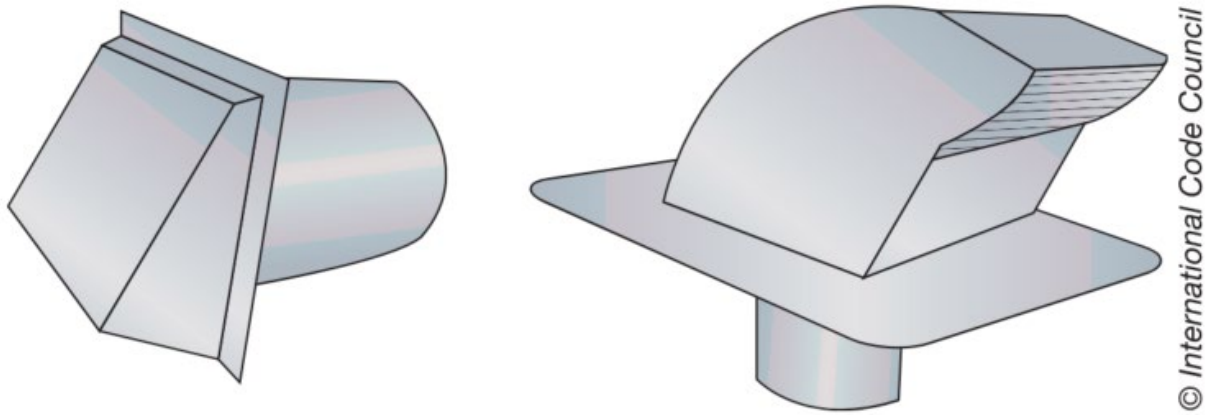
Dryer Exhaust Duct Termination

M1502.3.1

IRC Changes:

New Section M1502.3.1: Exhaust termination outlet and passageway size

- **Passageway of dryer exhaust duct terminals to be undiminished in size with an open area of minimum 12.5 square inches**



Wall and roof terminations for dryer exhaust must be undiminished in size and provide 12.5 square inches of area.

2018 IRC – SIGNIFICANT CHANGES

Code Section

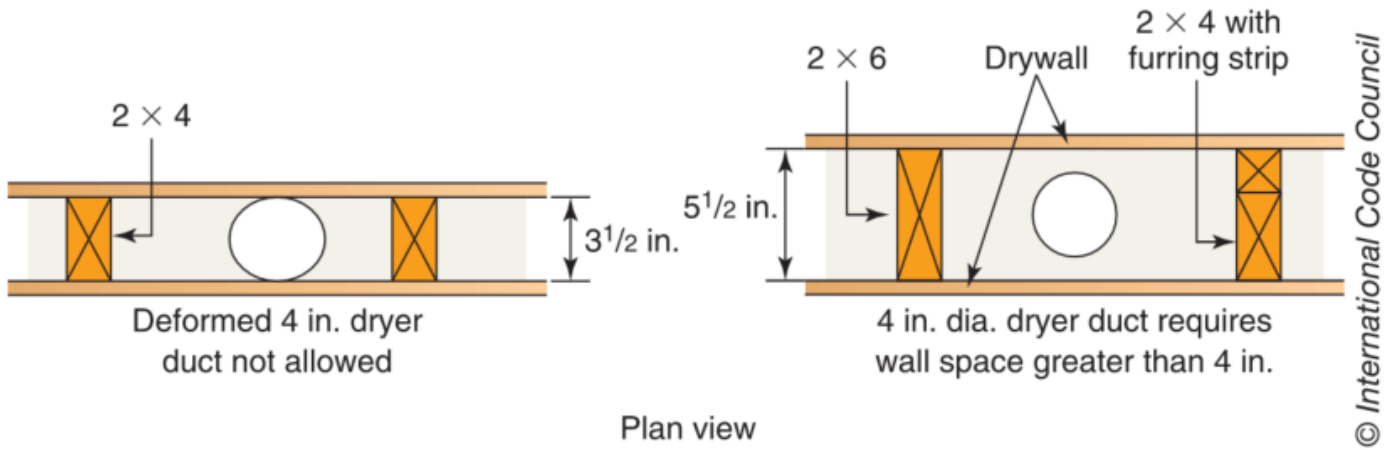
Concealed Dryer Exhaust Ducts

M1502.4.2

IRC Changes:

New requirement for wall and ceiling cavities enclosing dryer exhaust ducts

- **Cavities for dryer exhaust ducts must allow installation of the duct without deformation**



Dryer exhaust duct in concealed spaces

2021 IRC – SIGNIFICANT CHANGES

Code Section

Clothes Dryer Exhaust

M1502

IRC Changes:

New City of Houston amendment M1502.6

- **When a closet is designed for the installation of a clothes dryer, a minimum opening of 100 square inches for makeup air shall be provided in the door or by other approved means.**

2018 IRC – SIGNIFICANT CHANGES

Code Section

Domestic Cooking Exhaust Equipment

M1503

IRC Changes:

- **Terminology changed: Range hoods ➔ Domestic cooking exhaust equipment**
- **General section reorganization and editorial modification**

Artazum/Shutterstock.com

Domestic cooking exhaust equipment

2018 IRC – SIGNIFICANT CHANGES

Code Section

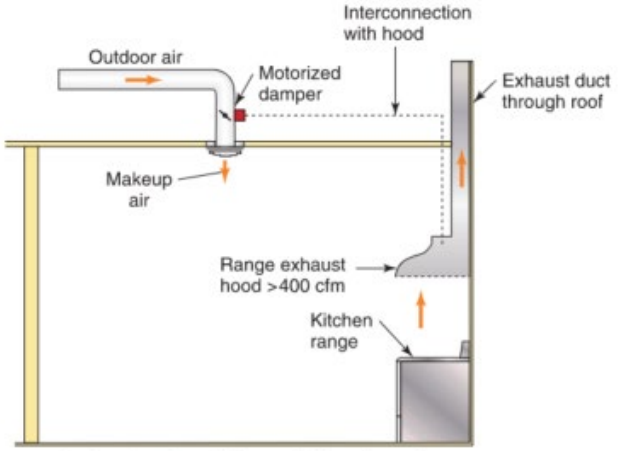
Makeup Air for Kitchen Exhaust Systems

M1503.6

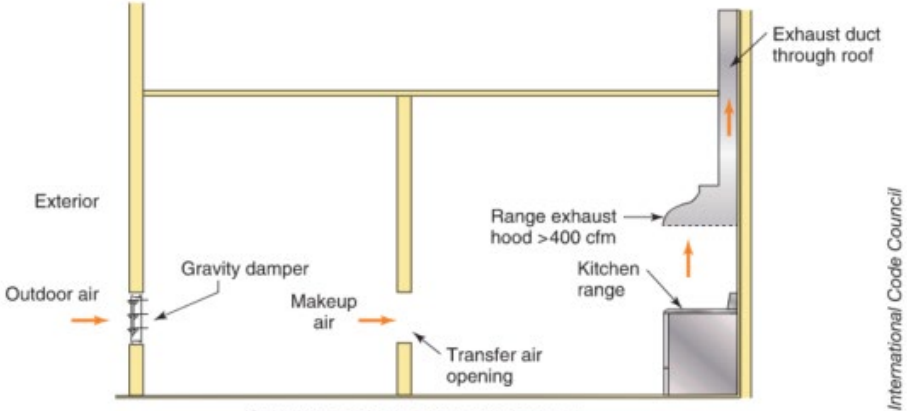
IRC Changes:

New exception added for makeup air requirements

- **No longer required if all fuel-burning appliances in dwelling unit have a direct vent or mechanical draft vent system**
- **Gravity or barometric dampers not to be used in passive systems except where dampers are rated to provide makeup airflow at pressure differential 0.01 inch w.c. or less**



Option 1: mechanically provided makeup air



Option 2: passively provided makeup air

Makeup air is required for exhaust rates greater than 400 cfm unless all fuel-fired appliances are direct vent or mechanical draft.

2021 IRC – SIGNIFICANT CHANGES

Code Section

Exhaust Ducts And Exhaust Openings

M1503

IRC Changes:

City of Houston amendment modifying Exception 3 and 4 of M1503.4

- **Exception 3: The PVC duct extends not more than 6 inches above the indoor concrete floor surface. Increased from 1 inch from base code.**
- **Exception 4: The PVC duct extends not more than 12 inches above grade outside of the building. Increased from 1 inch from base code.**

2021 IRC – SIGNIFICANT CHANGES

Code Section

Balanced Ventilation System Credit

M1505

IRC Changes:

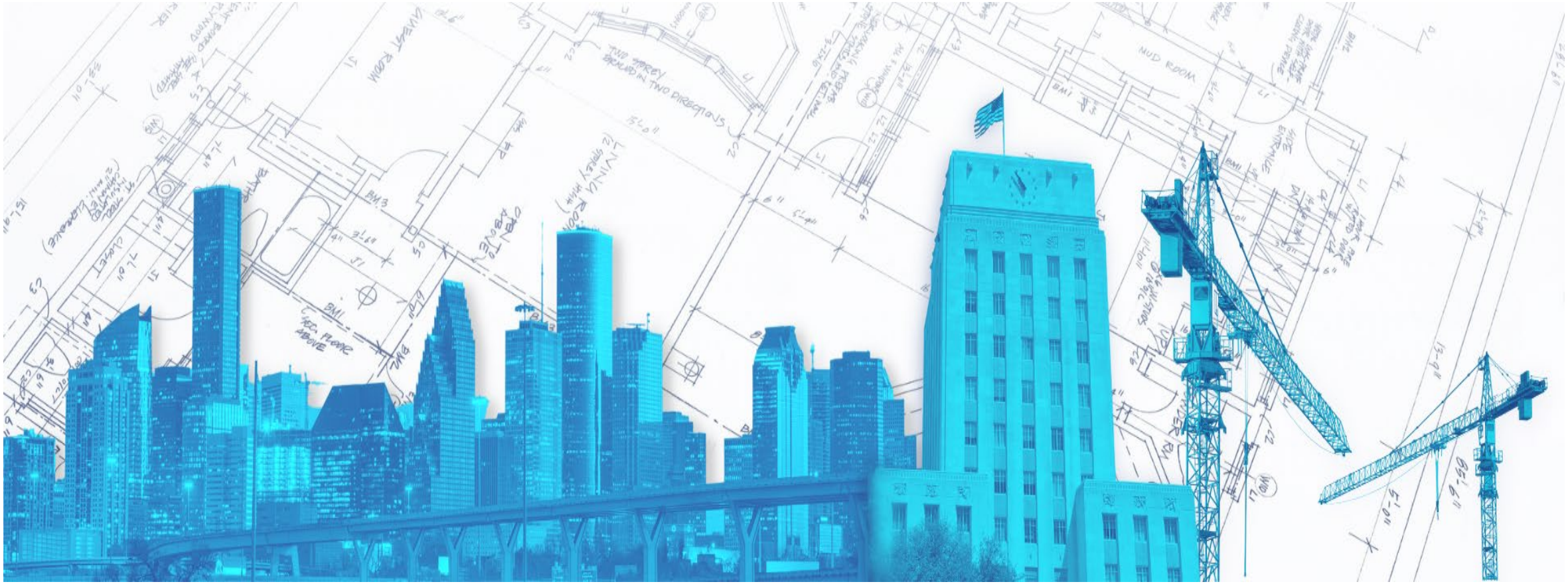
Modification of M1505 which now allows a 30 percent reduction to the mechanical ventilation airflow rate for balanced ventilation systems.

New Definition for Balanced Ventilation System

- **A ventilation system where the total supply airflow and total exhaust airflow are simultaneously within 10 percent of their average. The balanced ventilation system airflow is the average of the supply and exhaust airflows.**

HOUSTON PUBLIC WORKS

IRC CHAPTER 16 DUCT SYSTEMS



2018 IRC – SIGNIFICANT CHANGES

Code Section

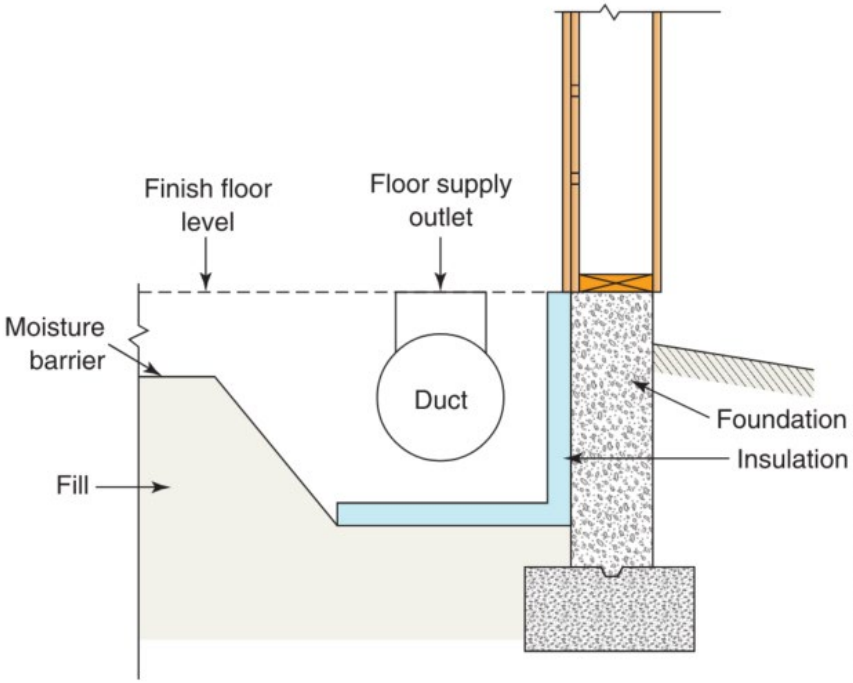
Underground Duct Systems

M1601.1.2

IRC Changes:

New requirements on duct testing

- **Both direct-burial and concrete-encased ducts require sealing and testing prior to encasing or burial**
- **Duct tightness to be verified as required by Section N1103.3**



Underground ducts require sealing and testing prior to encasement or backfill.

2021 IRC – SIGNIFICANT CHANGES

Code Section

Central Vacuum Systems

M1603

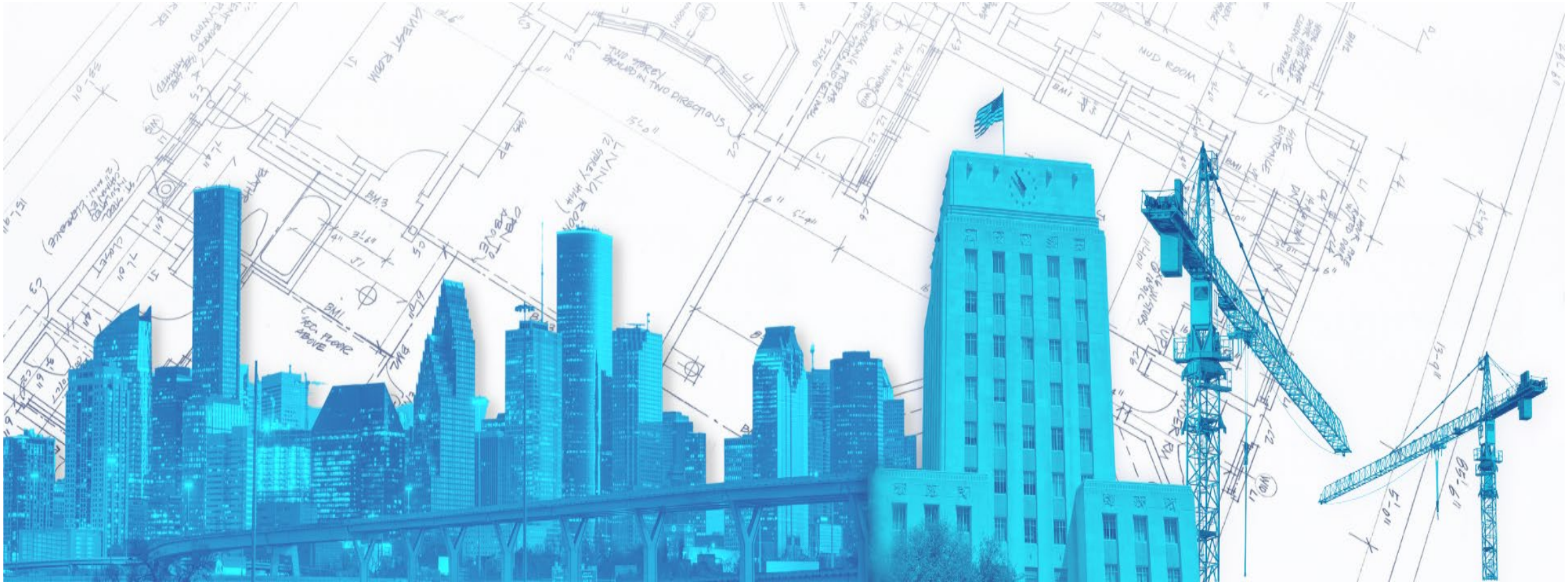
IRC Changes:

New City of Houston amendment M1603.

- **Ducts used in central vacuum-cleaning systems within a dwelling unit shall be permitted to be of PVC pipe. Penetrations of fire walls, as well as rated floor- ceiling and 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.**

HOUSTON PUBLIC WORKS

IRC CHAPTER 18 CHIMNEYS AND VENTS



2021 IRC – SIGNIFICANT CHANGES

Code Section

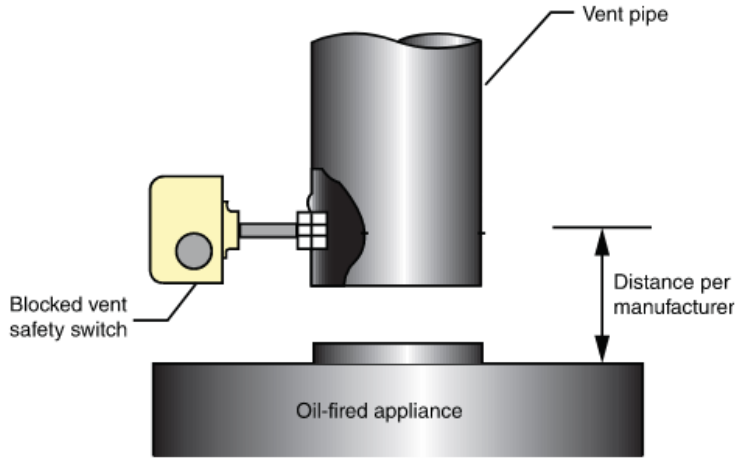
Blocked Vent Switch for Oil-fired Appliances

M1802.4

IRC Changes:

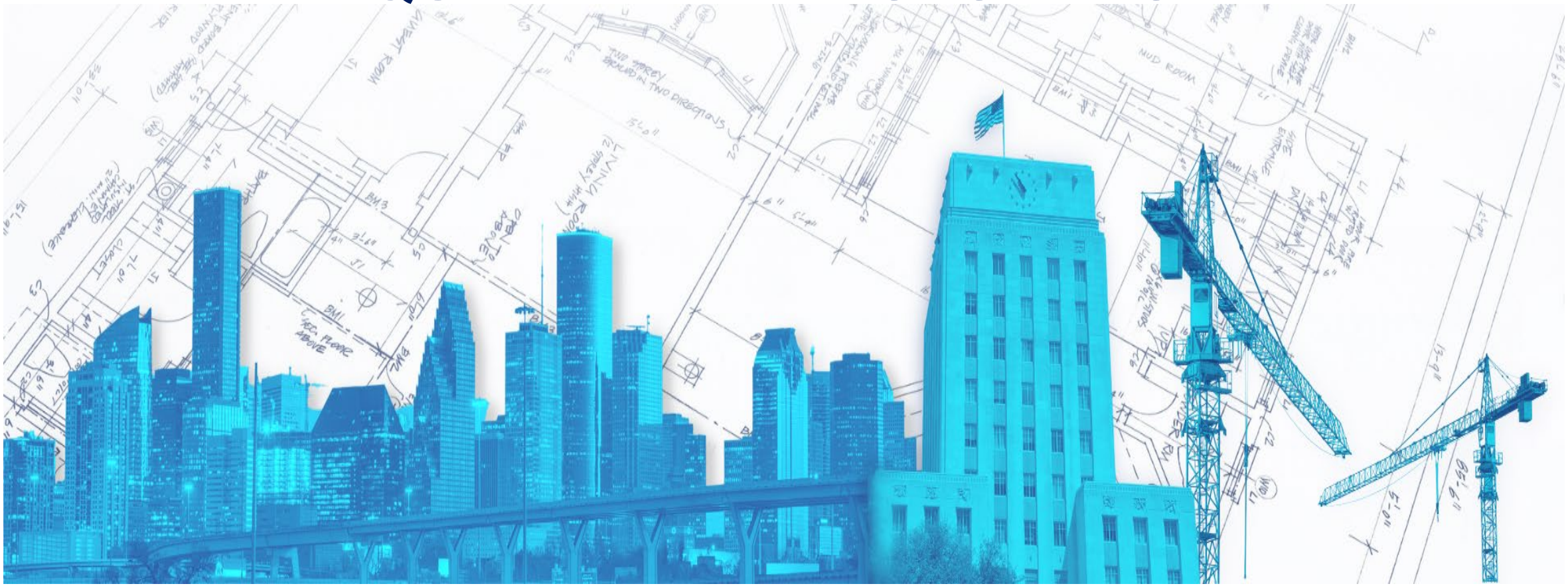
New Section M1802.4 requires blocked vent switch for oil-fired appliances.

- **Oil-fired appliances shall be equipped with a device that will stop burner operation in the event that the venting system is obstructed. Such device shall have a manual reset and shall be installed in accordance with the manufacturer's instructions.**



HOUSTON PUBLIC WORKS

IRC CHAPTER 19 SPECIAL APPLIANCES, EQUIPMENT AND SYSTEMS



2018 IRC – SIGNIFICANT CHANGES

Code Section

Ranges and Ovens

M1901

IRC Changes:

Clarification to requirements for reduced clearances above cooking surfaces

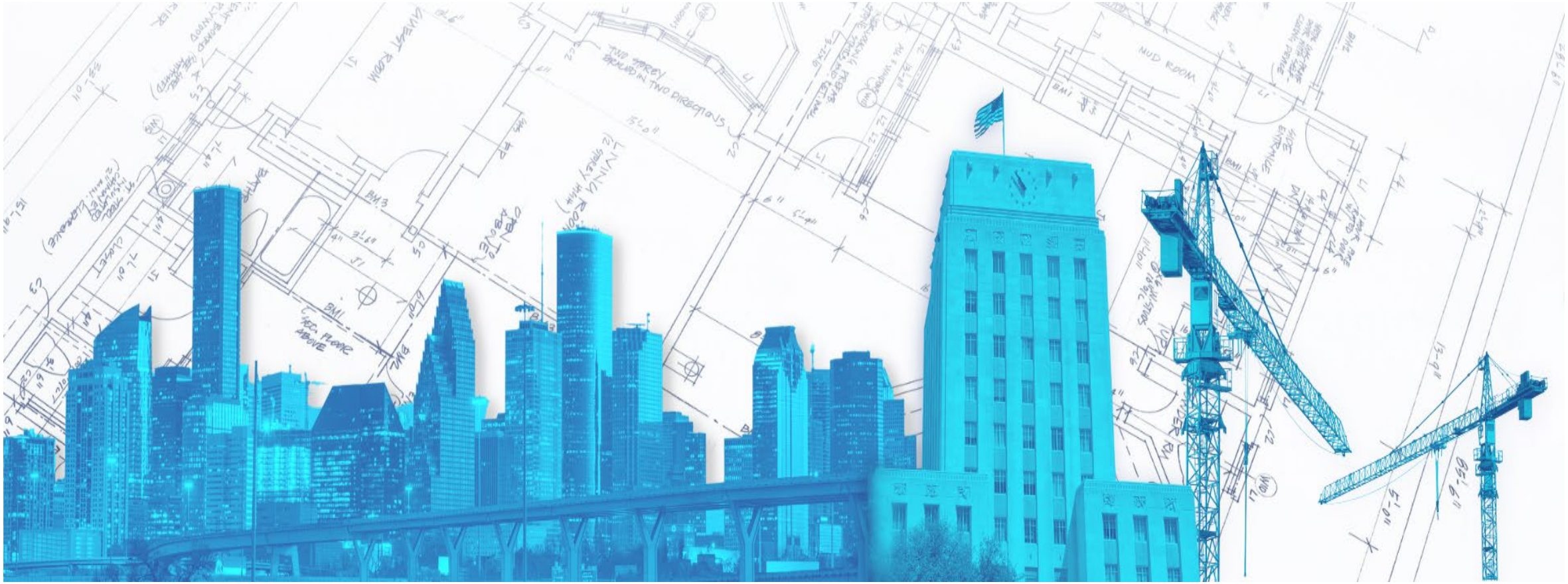
- **Microwave ovens to comply with UL 923**

Stuart Monk/Shutterstock.com

Microwave oven with integral exhaust requires clearance above a cooking surface in accordance with its listing and labeling.

HOUSTON PUBLIC WORKS

IRC CHAPTER 21 HYDRONIC PIPING



2018 IRC – SIGNIFICANT CHANGES

Code Section

Hanger Spacing for PEX Tubing

Table M2101.9

IRC Changes:

Support spacing requirements for PEX tubing of diameter 1¼ inches and greater have been added to Table M2101.9: Hanger Spacing Intervals

TABLE M2101.9 Hanger Spacing Intervals

Piping Material	Maximum Horizontal Spacing (feet)	Maximum Vertical Spacing (feet)
PEX tubing ≤ 1 inch	2.67	4
PEX tubing ≥ 1 ¼ inches	4	10[a]

2018 IRC – SIGNIFICANT CHANGES

Code Section

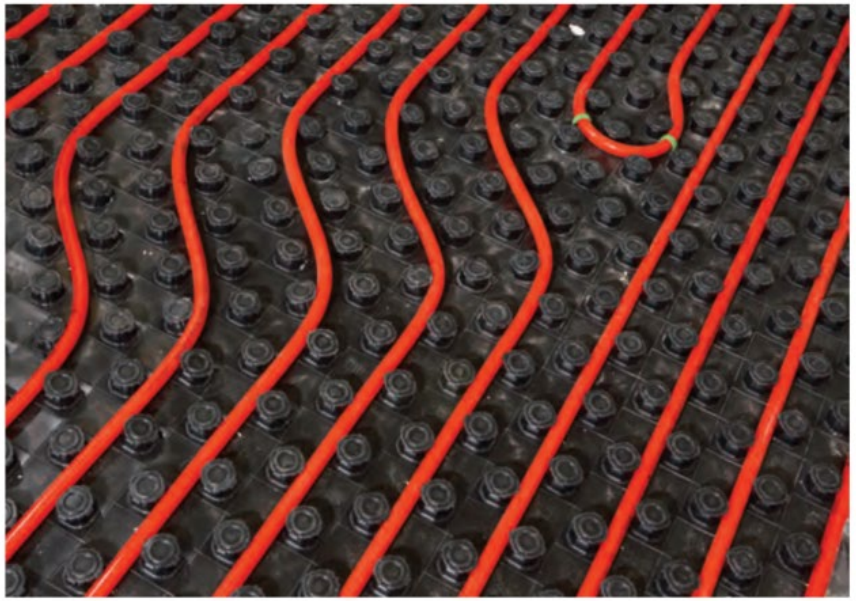
Pressure Tests for Hydronic Piping

M2101.10

IRC Changes:

Revision to hydrostatic testing on hydronic piping systems

- **Removes requirement for 20 minute maximum testing time**
- **PEX piping systems: testing with a compressed gas an allowed alternative to hydrostatic testing**
  - **Testing must be specifically authorized by manufacturer's instructions for PEX pipe and all products installed**



anistidesign/Shutterstock.com

PEX radiant floor heat piping

2021 IRC – SIGNIFICANT CHANGES

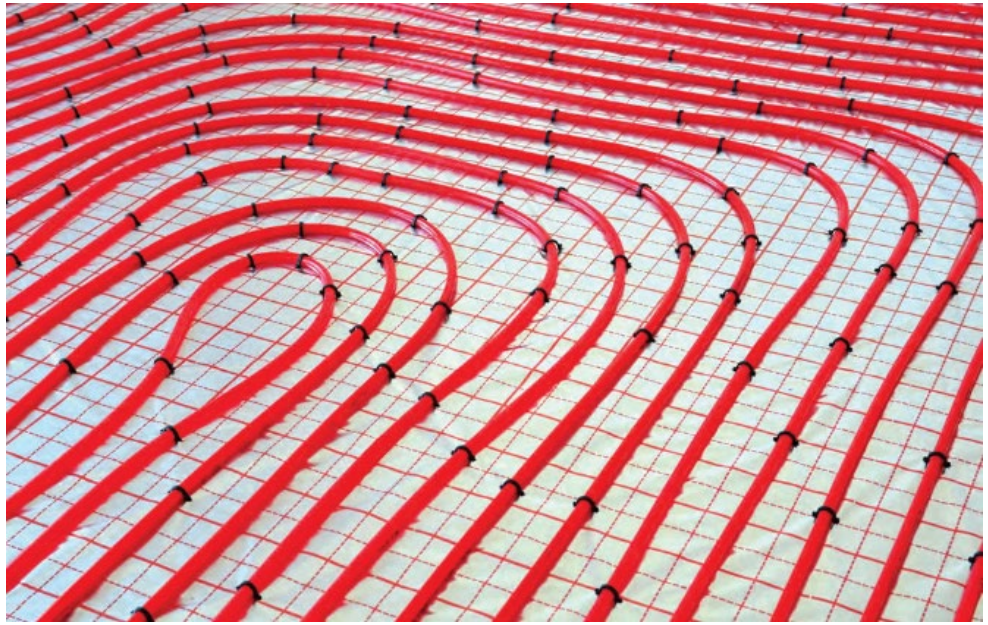
Code Section

Hydronic Piping Systems Installation

M2101

IRC Changes:

The provisions for ground source heat pump loop piping systems in Section M2105 have been duplicated in Section M2101 to apply to all hydronic piping systems.



2018 IRC – SIGNIFICANT CHANGES

Code Section

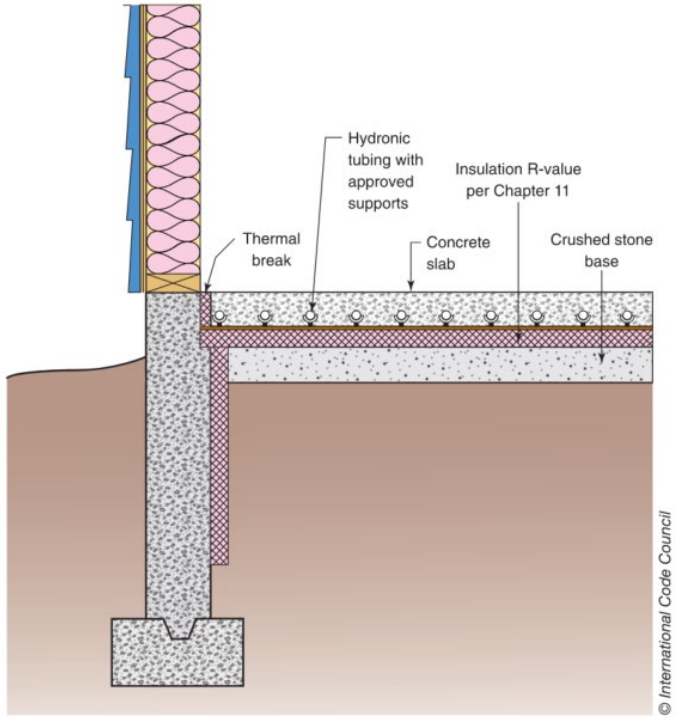
Thermal Barrier for Radiant Floor Heating Systems

M2103.2

IRC Changes:

Removes minimum R value requirements for hydronic floor heating systems

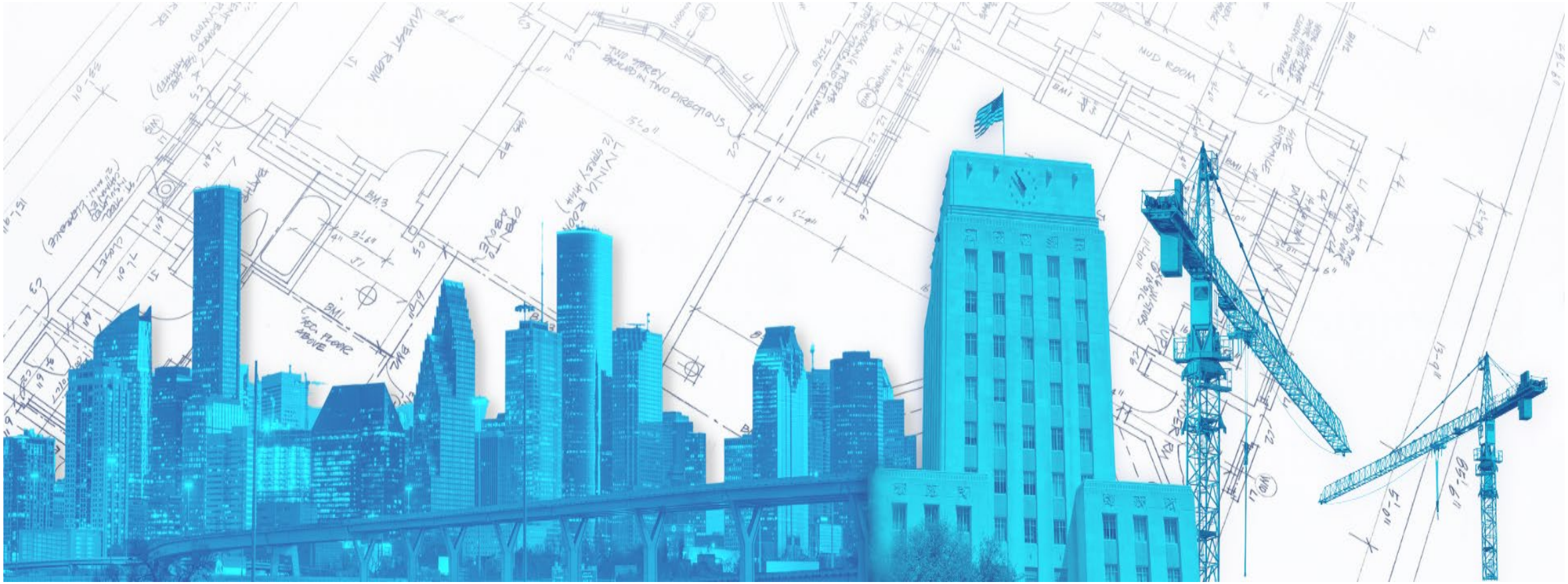
- **Now references energy provisions of Chapter 11**



The energy provisions in Chapter 11 determine the insulation R-value for floor heating systems.

HOUSTON PUBLIC WORKS

IRC CHAPTER 23 SOLAR THERMAL ENERGY SYSTEMS



2018 IRC – SIGNIFICANT CHANGES

Code Section

Solar Thermal Energy Systems

M2301

IRC Changes:

Requirements expanded to provide guidance to code users

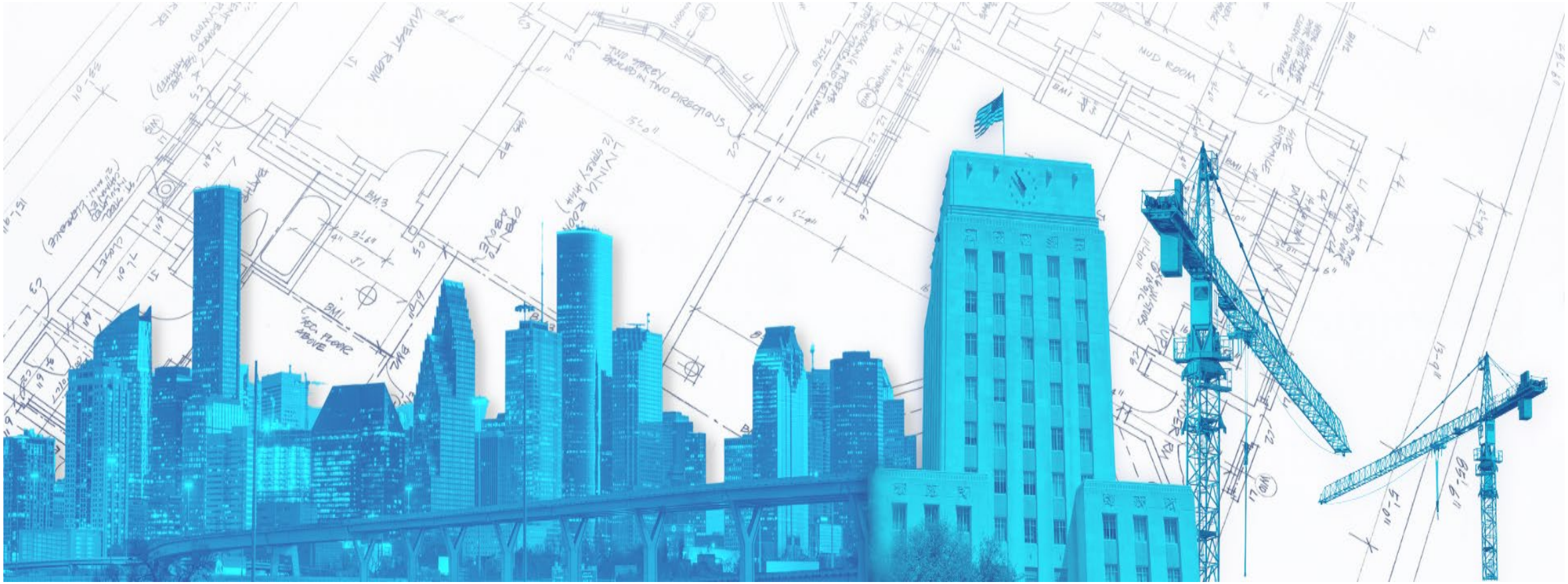
- **Clarifies roof-mounted solar collectors and equipment not to interfere with operation of key safety components and features from other systems**
- **Now references to ICC 900/SRCC 300: Solar Thermal System Standard for applicable freeze protection methods**
  - **Addresses drain-back systems and freeze protection valves**

Radovan1/Shutterstock.com

Solar thermal energy panel

HOUSTON PUBLIC WORKS

IRC CHAPTER 24 FUEL GAS



2021 IRC – SIGNIFICANT CHANGES

Code Section

Fuel Gas

G2401

IRC Changes:

- **City of Houston amendment to G2401.1 dictates that gaseous hydrogen systems shall be regulated by the Fire Code.**
- **City of Houston amendment states that Chapter G2401 shall not apply to 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 61 of the Fire Code

2021 IRC – SIGNIFICANT CHANGES

Code Section

Definitions of Point of Delivery and Service Meter

G2403

IRC Changes:

Modifications to the following gas piping system definitions.

- **Service Meter Assembly - The meter, valve, regulator, piping, fittings and equipment installed by the service gas supplier before the point of delivery.**
- **System Shutoff - A valve installed after the point of delivery to shut off the entire piping system.**
- **Service Shutoff - A valve, installed by the serving gas supplier between the source of supply and point of delivery, to shut off the entire piping system**

2018 IRC – SIGNIFICANT CHANGES

Code Section

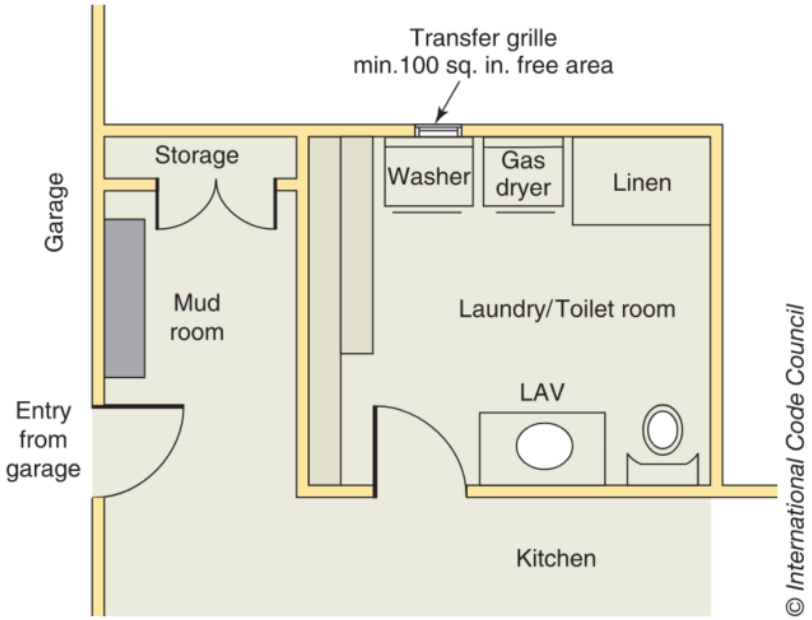
Prohibited Locations for Appliances

G2406.2

IRC Changes:

Gas-fired clothes dryer now permitted in bathroom or toilet room where a permanent opening communicates with other permitted spaces

- **Applies to rooms where permanent opening has area of not less than 100 square inches**
- **Must communicate with a space outside of a sleeping room, bathroom, toilet room, or storage closet**



Gas clothes dryer permitted in a toilet room

2018 IRC – SIGNIFICANT CHANGES

Code Section

Electrical Bonding of CSST

G2411.2, G2411.3

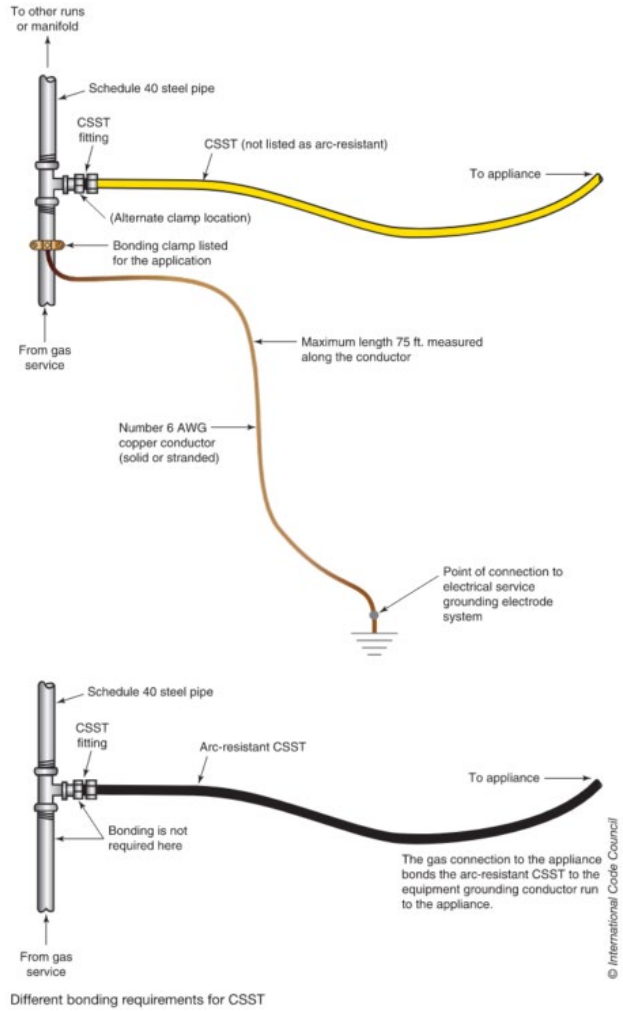
IRC Changes:

Modifies existing provisions for electrical bonding

- **Now applies to corrugated stainless steel tubing (CSST) without arc-resistant jacket or coating**

New Section G2411.3

- **Addresses electrical continuity and bonding of arc-resistant CSST**



Different bonding requirements for CSST

2021 IRC – SIGNIFICANT CHANGES

Code Section

Maximum operating pressure

G2413.7

IRC Changes:

City of Houston amendment modification to G2413.7 removes the list of conditions and replaces it with the phrase “where allowed by Section 1210.5 of the Plumbing Code.”

2021 IRC – SIGNIFICANT CHANGES

Code Section

Piping Materials

G2414

IRC Changes:

G2414.8.3 modified to now require thread joint sealants for assembling threaded joints in gas piping.

City of Houston amendment adds a new requirement to G2414.9.5 that metallic fitting shall comply to.

- **Brass or bronze fittings, if exposed to soil, shall have a minimum 80-percent copper content.**

2018 IRC – SIGNIFICANT CHANGES

Code Section

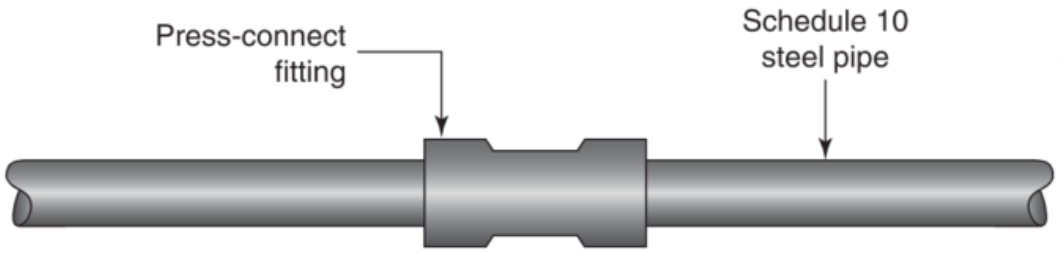
Schedule 10 Steel Gas Piping

G2414.4.2, G2414.10.1

IRC Changes:

Schedule 10 steel pipe now allowed to be used for fuel-gas piping

- **Allows compliance with ASTM A312**
- **Allows Schedule 10 piping to be connected press-connect fittings, flanges, brazing or welding**



Press-connect fittings use gaskets and special equipment to join steel pipes

2018 IRC – SIGNIFICANT CHANGES

Code Section

Protection Against Corrosion

G2415.11

IRC Changes:

Reorganization of Section G2415.11 with new provisions to address corrosion protection of underground steel gas piping

- **Zinc coating not adequate protection for underground gas piping**
- **Underground piping requires one method of protection:**
  - **Piping to be made of corrosion-resistant material**
  - **Pipe to have a factory-applied, electrically-insulating coating**
  - **The piping to have a cathodic protection system installed and monitored**
- **Steel risers connected to plastic piping to be cathodically protected by a welded anode,**
  - **Exception where risers are anodeless risers**

2021 IRC – SIGNIFICANT CHANGES

Code Section

Piping System Installation

G2415

IRC Changes:

- **G2415.5 has been modified to include plugs and caps on to the list of threaded fittings approved for concealed locations.**
- **City of Houston amendment modification to G2415.6 that clarifies that the wall shall be sealed at any point where the pipe enters the building.**

2021 IRC – SIGNIFICANT CHANGES

Code Section

Piping System Installation

G2415

IRC Changes:

- **G2415.11.3 modified by City of Houston amendment to eliminate the word “underground”**
- **G2415.12.1 local amendment modifies the language to state not less than 12 inches below finished grade. Increased from the base code of 8 inches.**
- **Local amendment to G2415.17.1 adds the provision that that a minimum depth of 18 inches of cover be provided for plastic pipe installed outdoors underground.**

2021 IRC – SIGNIFICANT CHANGES

Code Section

Inspection, Testing and Purging

G2417

IRC Changes:

- **City of Houston amendment to G2417.1.1 provides further information regarding the rough piping inspection and the final piping inspection.**
- **City of Houston amendment to G2417.4.2 increases test duration to 15 minutes from the base code requirement of 10 minutes.**
- **City of Houston amendment Section G2417.4.3 provides approved alternative pressure measuring devices that can be used.**

2021 IRC – SIGNIFICANT CHANGES

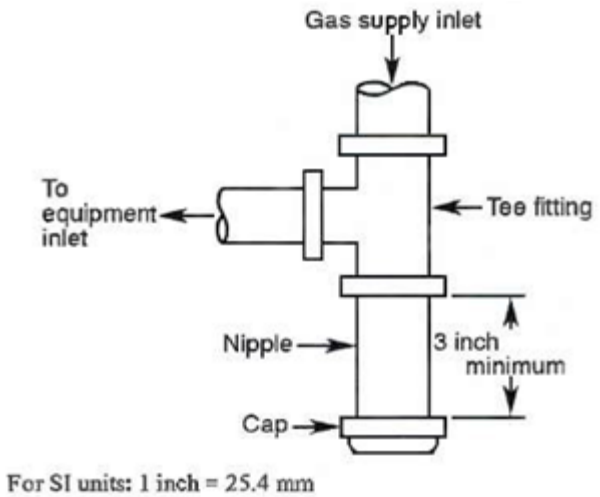
Code Section

Drips and Sloped Piping

G2419

IRC Changes:

- **City of Houston amendment to G2419.4 requires a 3-inch minimum length for the capped nipple of the sediment trap. Base code allowed for any length.**



HOUSTON PUBLIC WORKS

2018 IRC – SIGNIFICANT CHANGES

Code Section

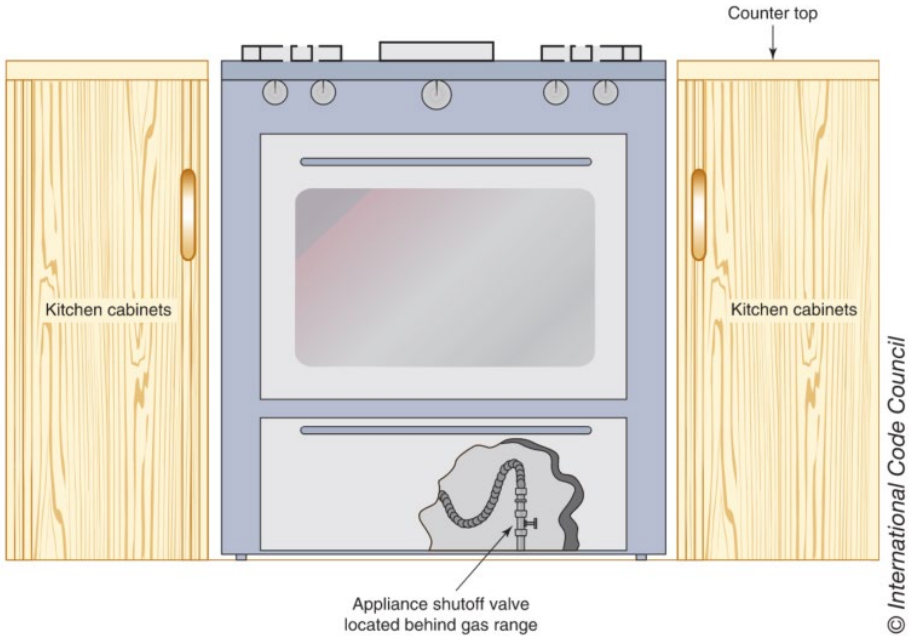
Shutoff Valve Location

G2420.5.1

IRC Changes:

Clarifies access to shutoff valves serving movable appliances, such as cooking appliances and clothes dryers

- **Shutoff valves are considered to be provided with access where installed behind such appliances**



Shutoff valve behind gas range meets the requirement for access

2018 IRC – SIGNIFICANT CHANGES

Code Section

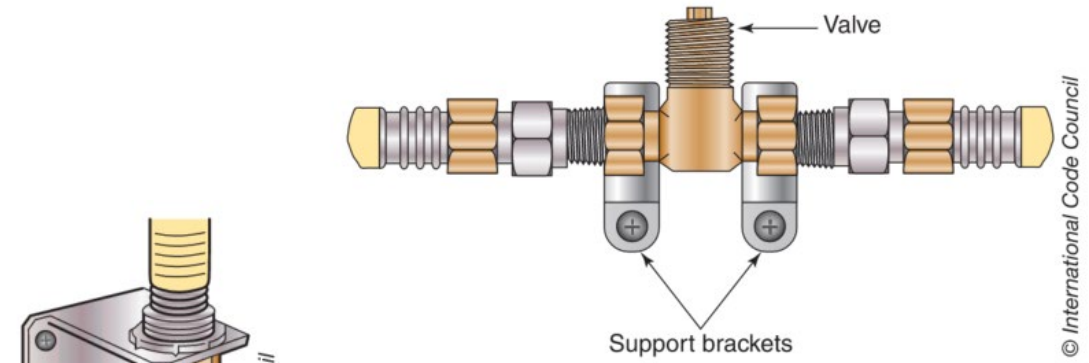
Support for Shutoff Valves in Tubing Systems

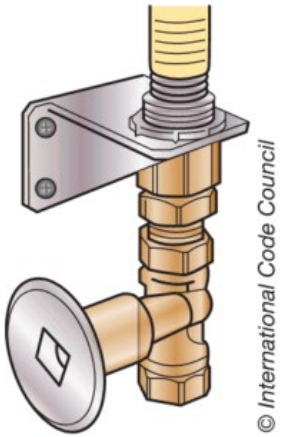
G2420.6

IRC Changes:

New requirements for shutoff valves in tubing systems

- **Valves to be rigidly and securely supported independently of tubing**





Examples of support brackets for valves in gas tubing systems

2021 IRC – SIGNIFICANT CHANGES

Code Section

Compressed Natural Gas Motor Vehicle Fuel-dispensing Facilities

G2423

IRC Changes:

- **City of Houston amendment to G2423.1 modifies the reference standard for facilities for CNG fuel and their operation to be in accordance with the Fire Code.**

2021 IRC – SIGNIFICANT CHANGES

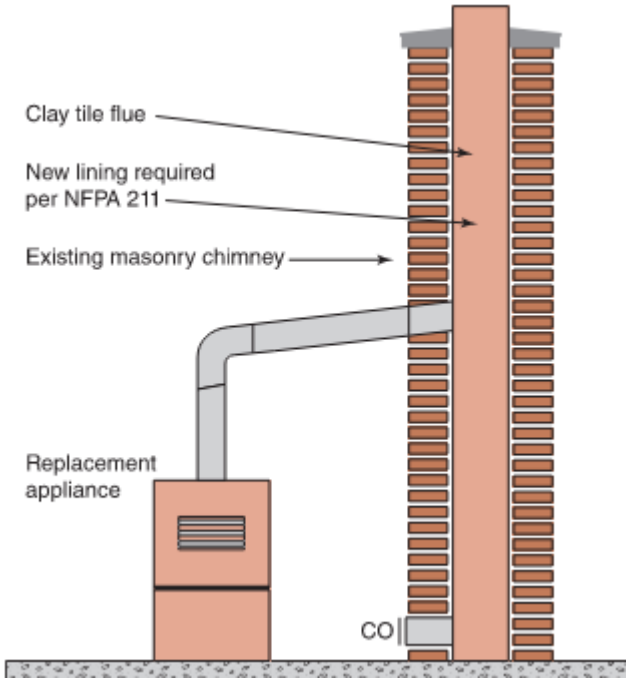
Code Section

Chimney Lining

G2427.5.5.1

IRC Changes:

G2415.5 has been modified to eliminate the exception allowing an existing unlined chimney to vent replacement appliances



2021 IRC – SIGNIFICANT CHANGES

Code Section

Through-the-wall Vent Terminal Clearances

G2427.8

IRC Changes:

Through-the-wall vent terminal clearance distances have been placed in a new table, Table G2427.8.

TABLE G2427.8 (503.8) Through-the-Wall Vent Terminal Clearances

Figure Clearance	Clearance Location	Minimum clearances for Direct- Vent Terminals	Minimum clearances for Non-Direct Vent Terminals
A	Clearance above finished grade level, veranda, porch, deck, or balcony	12 inches	
B	Clearance to window or door that is openable	6 inches: Appliances ≤ 10,000 Btu/hr 9 inches: Appliances > 10,000 Btu/hr ≤ 50,000 Btu/hr 12 inches: Appliances > 50,000 Btu/hr ≤ 150,000 Btu/hr Appliances > 150,000 Btu/hr, in accordance with the appliance manufacturer's instructions and not less than the clearances specified for non-direct vent terminals in Row B	4 feet below or to side of opening or 1 foot above opening
C	Clearance to non-openable window	None unless otherwise specified by the appliance manufacturer	
D	Vertical clearance to ventilated soffit located above the terminal within a horizontal distance of 2 feet from the center line of the terminal	None unless otherwise specified by the appliance manufacturer	
E	Clearance to unventilated soffit	None unless otherwise specified by the appliance manufacturer	
F	Clearance to outside corner of building	None unless otherwise specified by the appliance manufacturer	
G	Clearance to inside corner of building	None unless otherwise specified by the appliance manufacturer	
H	Clearance to each side of center line extended above regulator vent outlet	3 feet up to a height of 15 feet above the regulator vent outlet	
I	Clearance to service regulator vent outlet in all directions	3 feet for gas pressures up to 2 psi 10 feet for gas pressures above 2 psi	
I	Clearance to non-mechanical air supply inlet to building and the combustion air inlet to any other appliance	Same clearance as specified for row B	
K	Clearance to a mechanical air supply inlet	10 feet horizontally from inlet or 3 feet above inlet	
L	Clearance above paved sidewalk or paved driveway located on public property	7 feet and shall not be located above public walkways or other areas where condensate or vapor can cause a nuisance or hazard	
M	Clearance to underside of veranda, porch deck, or balcony	12 inches where the area beneath the veranda, porch deck or balcony is open on not less than two sides. The vent terminal is prohibited in this location where only one side is open.	

For SI units, 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square inch = 6.895 kPa, 1 Btu/hr = 0.293 W

2021 IRC – SIGNIFICANT CHANGES

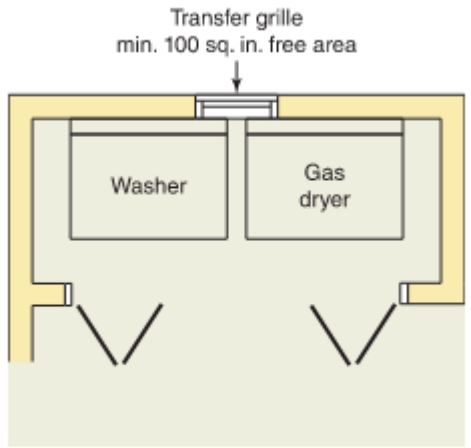
Code Section

Makeup Air for Dryer Installed in a Closet

G2439.5

IRC Changes:

The requirement for a transfer opening for supplying makeup air to a closet designed for a gas dryer has been moved from G2439.5 into a separate section G2439.5.1.



Makeup air required for gas dryer installed in a closet.

2021 IRC – SIGNIFICANT CHANGES

Code Section

Clothes Dryer Exhaust

G2439.7.4.1

IRC Changes:

City of Houston amendment to G2439.7.4.1 provides a new exception to the maximum length of the exhaust duct.

- **Exception: Listed booster fans installed per manufacturer's specifications may be provided to extend the maximum length of the exhaust duct.**

2018 IRC – SIGNIFICANT CHANGES

Code Section

Forced Air Furnace Duct Size

G2442.2

IRC Changes:

Removal of prescriptive duct size requirements for forced-air furnaces

- **Code now points to sizing methods specific to the appliance**

Branka Tasevski/Shutterstock.com

Ducts must be sized for the specific appliance and installation

2018 IRC – SIGNIFICANT CHANGES

Code Section

Commercial Cooking Appliances

G2447.2

IRC Changes:

New exception to restrictions on installation of commercial cooking appliances in dwelling units or for domestic cooking

- **Now allows installation when designed by a licensed professional engineer in and is compliance with manufacturer's installation instructions**

Artazum/Shutterstock.com

Commercial cooking appliances are permitted with an engineered design

2021 IRC – SIGNIFICANT CHANGES

Code Section

Commercial Cooking Appliances Prohibited

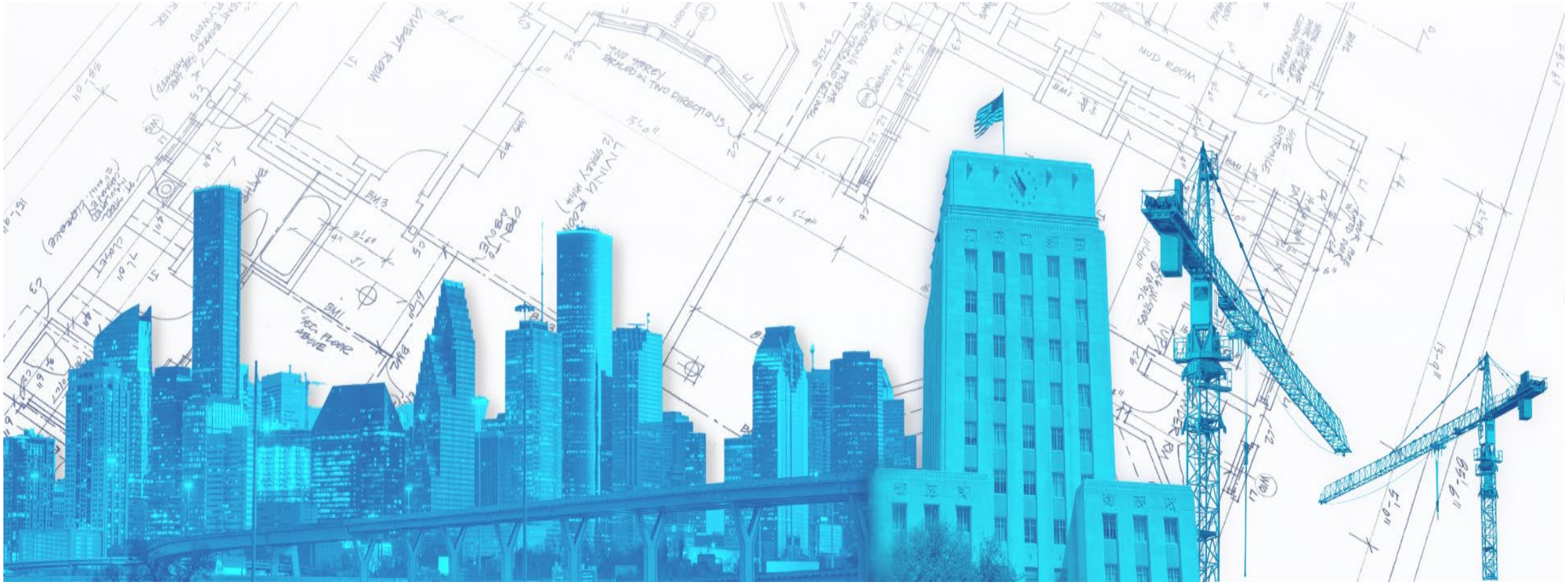
G2447

IRC Changes:

Modification to G2447.2 removes the exception allowing a commercial cooking appliance in a dwelling unit when the installation is designed by an engineer.

HOUSTON PUBLIC WORKS

IRC CHAPTER 25 PLUMBING ADMINISTRATION



2021 IRC – SIGNIFICANT CHANGES

Code Section

Drain, Waste and Vent Systems Testing

P2503.5.1

IRC Changes:

City of Houston amendment modifies Item 1 of P2503.5.1. The requirement that each section be filled with water to a point not less than 10 feet has been removed. The requirement now only states that each section shall be filled with water to a point not less than he highest point in the completed system

2018 IRC – SIGNIFICANT CHANGES

Code Section

Air Testing of PEX Piping

P2503.7

IRC Changes:

New exception added to water supply testing requirements

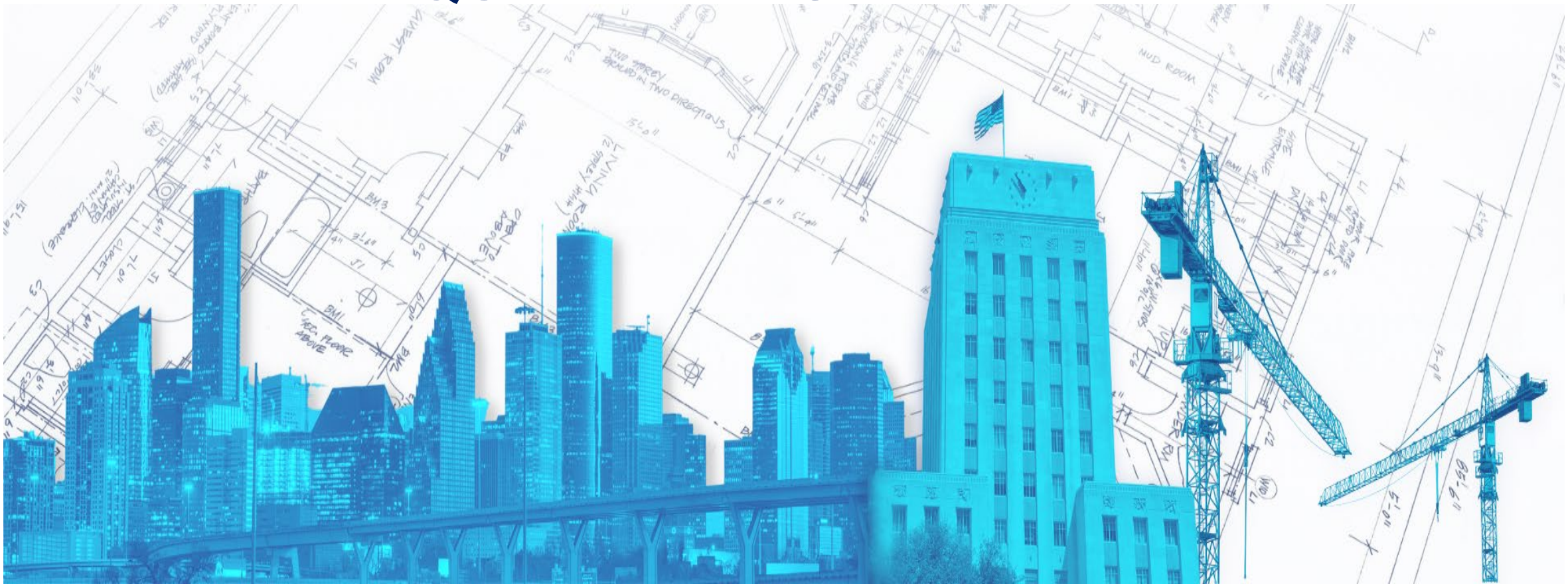
- **Compressed-air testing of PEX water-supply piping now allowed when testing is in accordance with the manufacturer's instructions**

icemanj/Shutterstock.com

Air testing of PEX water piping is permitted

HOUSTON PUBLIC WORKS

IRC CHAPTER 26 GENERAL PLUMBING REQUIREMENTS



2018 IRC – SIGNIFICANT CHANGES

Code Section

Connections to Public Sewer or Private Sewage Disposal System

P2602.1

IRC Changes:

Requires dwelling-unit plumbing to connect to a public water system and a public sewer system

- **If those systems are not available, an individual water supply and a private sewage disposal system are permitted**
- **Points to a new standard ANSI/NGWA-01-14 Water Well Construction Standard where state and local ordinances do not govern private wells**

New exception for gray water

- **Gray water can be diverted from sewer or private sewage disposal system to be processed**

2018 IRC – SIGNIFICANT CHANGES

Code Section

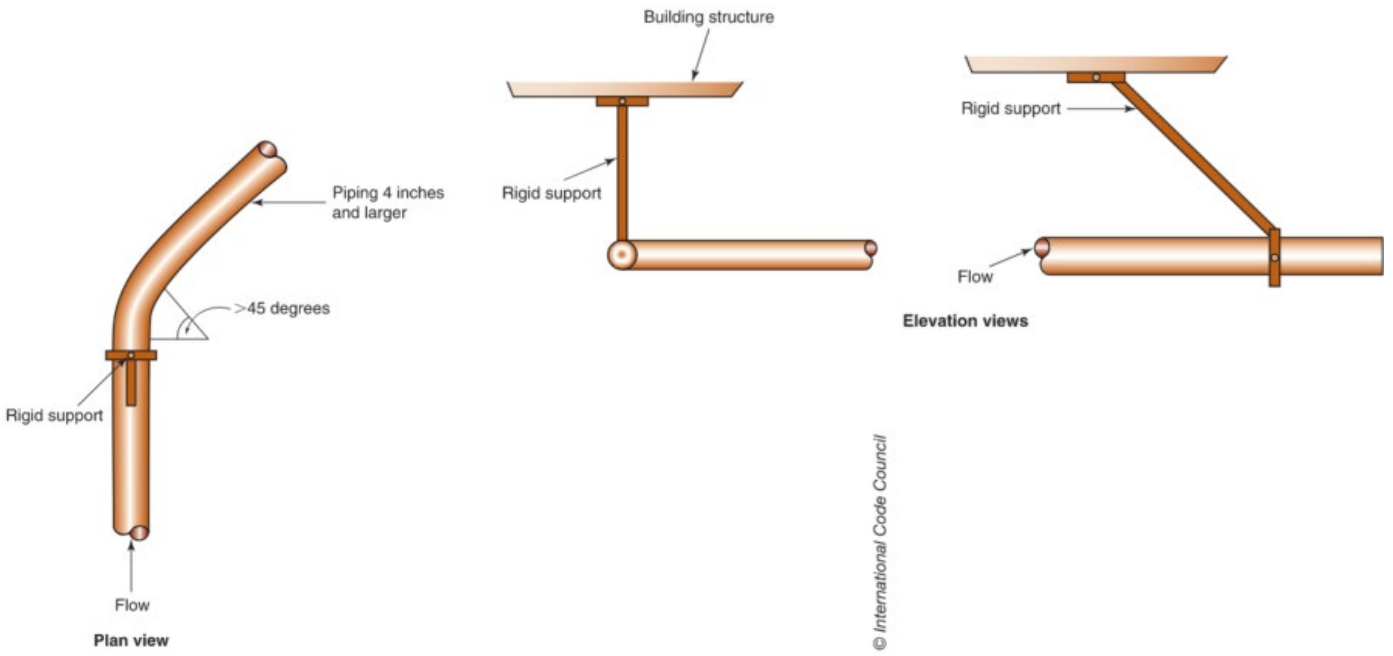
Sway Bracing for Drainage Piping

P2605

IRC Changes:

Clarification on sway bracing for drainage piping

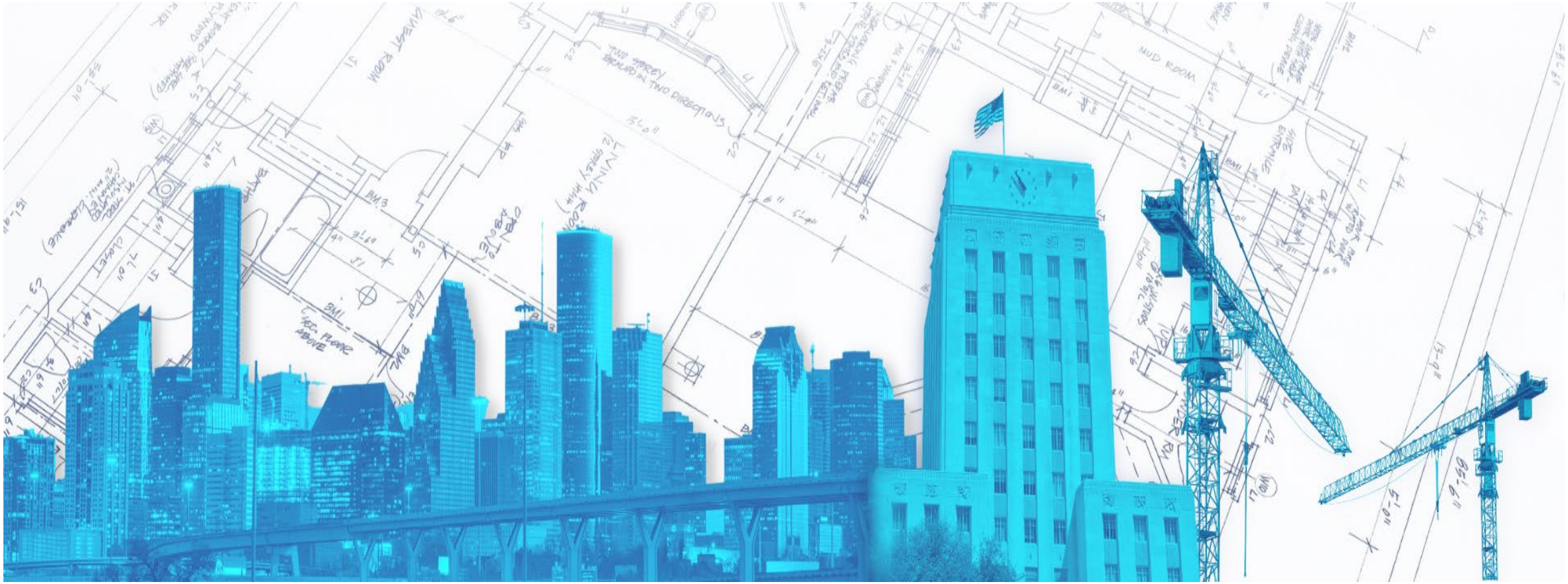
- **Sway bracing provisions only apply to horizontal drainage piping 4 inches and larger where flow direction changes greater than 45 degrees**



Bracing to reduce the potential for piping sway

HOUSTON PUBLIC WORKS

IRC CHAPTER 27 PLUMBING FIXTURES



2018 IRC – SIGNIFICANT CHANGES

Code Section

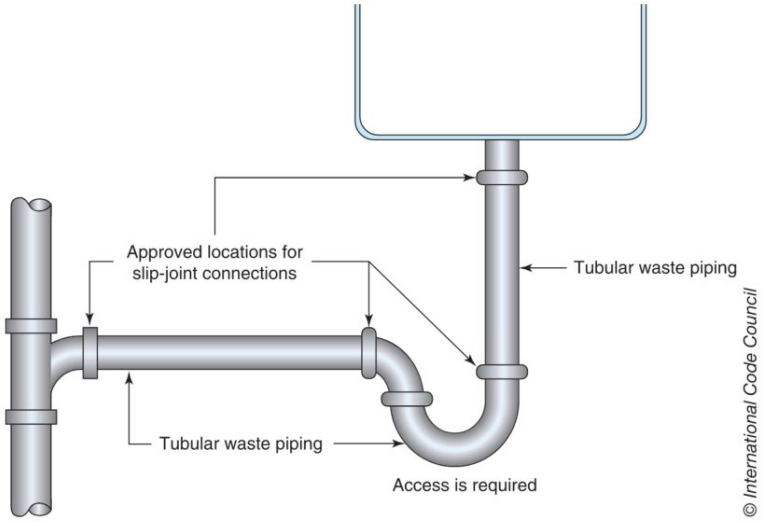
Slip Joint Connections

P2704

IRC Changes:

Increase in locations where slip joint connections are permitted

- **Limited to trap inlet, outlet and trap seal locations ➔ permitted anywhere between the fixture outlet and the drainage piping**



Slip joint connections

2021 IRC – SIGNIFICANT CHANGES

Code Section

Showers

P2708

IRC Changes:

City of Houston amendment to P2708.1 increases the interior cross-sectional area of shower compartments to 1024 square inches. The base code requirement is 900 square inches.

City of Houston amendment to P2708.2 increases the outlet size of shower drains to 2 inches in diameter. The base code requirement is 1½ inches in diameter.

2021 IRC – SIGNIFICANT CHANGES

Code Section

Shower and Bathtub Control Valves

P2708.4

IRC Changes:

P2708.4 clarified to specifically require shower control valves to be rated for the flow rate of the installed showerhead to provide the scald and thermal shock protection.

2021 IRC – SIGNIFICANT CHANGES

Code Section

Showers Receptors

P2709

IRC Changes:

New City of Houston amendment adds Section P2709.5

- **Test for shower receptors: Shower receptors shall be tested for watertightness 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 subpan shall be subjected to the test at the point where it is clamped to the drain.**

2018 IRC – SIGNIFICANT CHANGES

Code Section

Bathtub Overflow

P2713.1

IRC Changes:

Overflow outlets no longer required for bathtubs

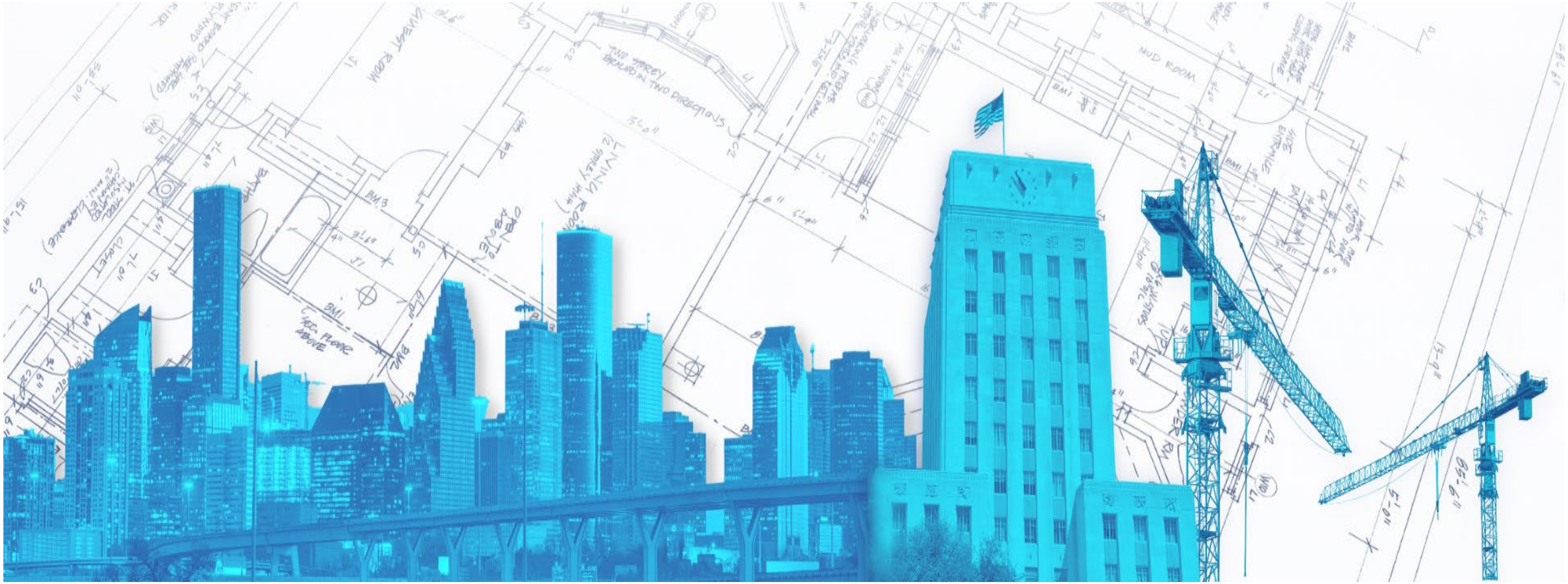
- **Where overflow is installed, the diameter to be not less than 1.5 inches**

paul prescott/Shutterstock.com

An overflow is not required for a bathtub

HOUSTON PUBLIC WORKS

IRC CHAPTER 28 WATER HEATERS



2018 IRC – SIGNIFICANT CHANGES

Code Section

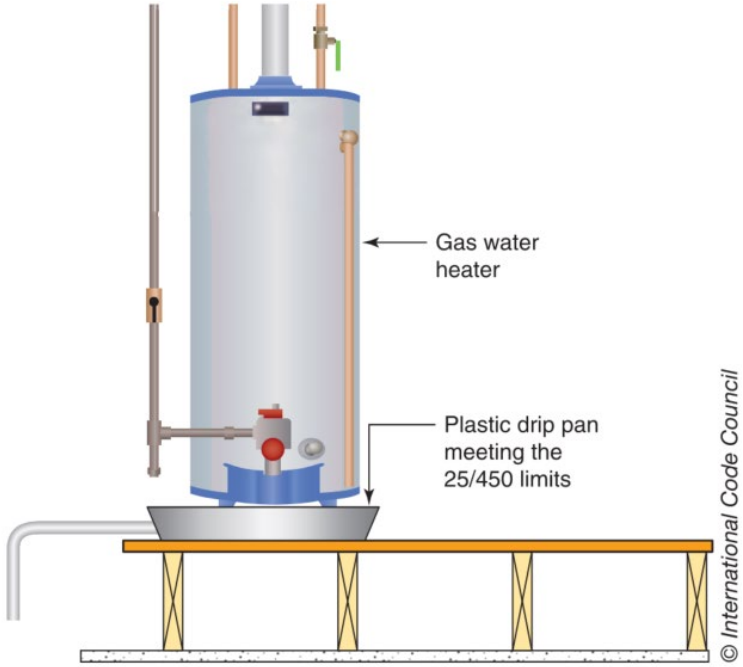
Plastic Pan for Gas-fired Water Heaters

P2801.6

IRC Changes:

Plastic safety pans are now allowed under gas water heaters

- **Material must have a flame spread index of 25 or less**
- **Material must have a smoke-developed index of 450 or less when tested in accordance with ASTM E 84 or UL 723**



Plastic pan for gas-fired water heaters

2021 IRC – SIGNIFICANT CHANGES

Code Section

Water Heaters

P2801

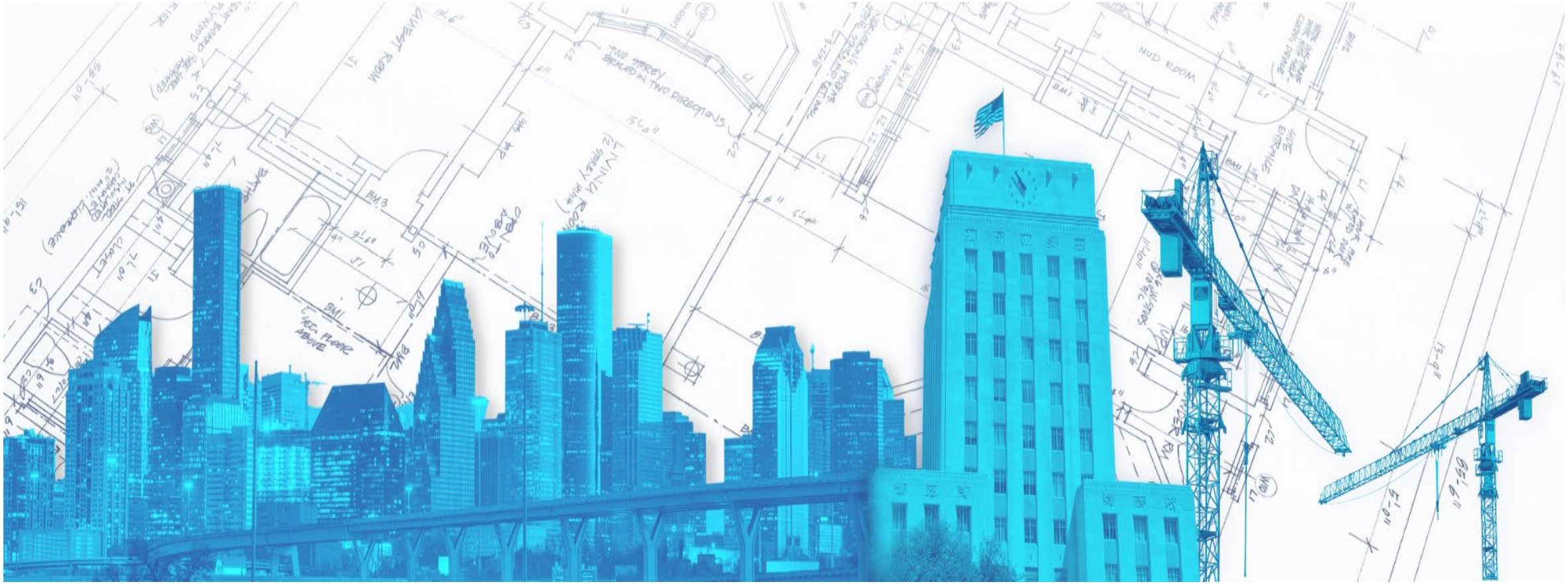
IRC Changes:

City of Houston amendment to P2801.6.1 requires a drain pan if one was not previously installed.

- **Where a pan drain was not previously installed, a pan drain shall be required for a replacement water heater installation and shall be installed in accordance with Section P2801.6.2.**

HOUSTON PUBLIC WORKS

IRC CHAPTER 29 WATER SUPPLY AND DISTRIBUTION



2018 IRC – SIGNIFICANT CHANGES

Code Section

Backflow Protection for Fire Sprinkler Systems

P2902.5.4, P2904.1

IRC Changes:

Stand-alone and multipurpose fire sprinkler systems complying with Section P2904 or NFPA 13D do not require back-flow protection given:

- **Sprinkler system must comply with Section P2906 and NFPA 13D or Section P2904**
- **Sprinkler system must not contain antifreeze**
- **Sprinkler system must not have a fire department connection**

Artjom Shipilov/Shutterstock.com

Sprinkler

2021 IRC – SIGNIFICANT CHANGES

Code Section

Water Supply System

Table P2903.2

IRC Changes:

City of Houston amendment modifies Table 2903.2. Water closets now require 1.28 gallons per flushing cycle. Base code requirement was 1.6 gallons per flushing cycle.

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	1.28 ~~1.6~~ gallons per flushing cycle

2018 IRC – SIGNIFICANT CHANGES

Code Section

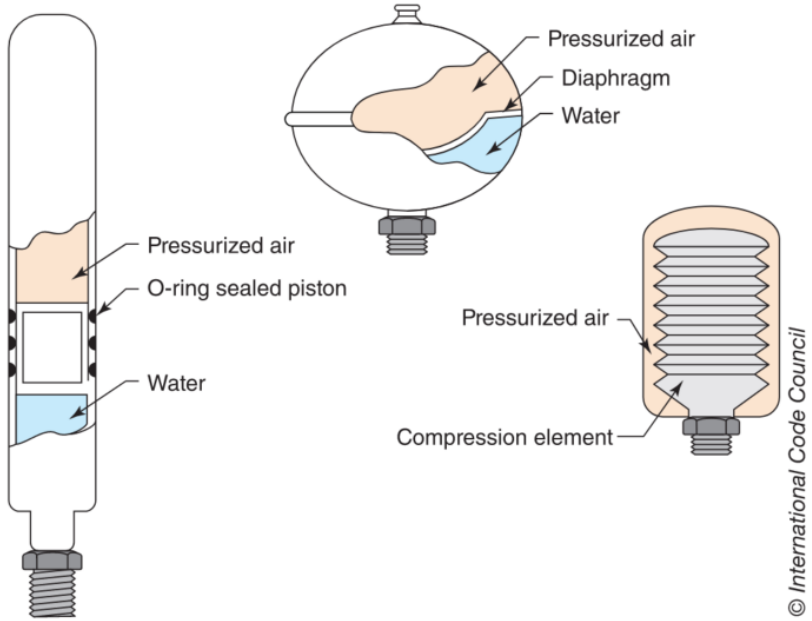
Water Hammer Arrestors

P2903.5

IRC Changes:

Increase in requirements for water hammer arrestors

- **Now required where quick-closing valves are used in the water distribution system**



Examples of mechanical water hammer arrestors

2021 IRC – SIGNIFICANT CHANGES

Code Section

Installation Practices for Residential Sprinklers

P2904

IRC Changes:

P2904 expands installation practices to more closely align with NFPA 13D.

- **P2904.2.1 increases the max temperature rating from 170°F to 225°F.**
- **P2904.2.3 allows a listed dry pipe residential sprinkler**
- **system for freeze protection.**
- **P2904.3.2 permits a control valve on a standalone sprinkler system.**
- **P2904.4.1 correlates with NFPA 13D and current installation practices for protecting spaces with sloped or beamed ceilings.**

2021 IRC – SIGNIFICANT CHANGES

Code Section

Installation Practices for Residential Sprinklers

P2904

IRC Changes:

Table P2904.6.2(2) revises the water meter table in the IRC to better correlate with the water meter table in NFPA 13D.

TABLE P2904.6.2(2) Minimum Water Meter Pressure Loss (PL_m)[a]

Flow Rate (gallons per minute, gpm)[b]	5/8-Inch Meter Pressure Loss (pounds per square inch, psi)	3/4-Inch Meter Pressure Loss (pounds per square inch, psi)	1-Inch Meter Pressure Loss (pounds per square inch, psi)
8	~~2~~ 3	~~1~~ 3	1
10	3	~~1~~ 3	1
12	4	~~1~~ 3	1
14	~~5~~ 6	~~2~~ 5	1
16	7	~~3~~ 6	1
18	9	~~4~~ 7	~~1~~ 2
20	11	~~4~~ 9	2
~~22~~ 23	~~NP~~ 14	~~5~~ 11	~~2~~ 3
~~24~~	~~NP~~	~~5~~	~~2~~
26	~~NP~~ 18	~~6~~ 14	~~2~~ 3
~~28~~	~~NP~~	~~6~~	~~2~~
~~30~~ 31	~~NP 26~~	~~7~~ 22	~~2~~ 4
~~32~~ 39	~~NP~~ 38	~~7~~ 35	~~3~~ 6
~~34~~	~~NP~~	~~8~~	~~3~~
~~36~~ 52	NP	~~8~~ NP	~~3~~ 10

For SI: 1 inch = 25.4 mm, 1 pound per square inch = 6.895 kPa, 1 gallon per minute = 0.063 L/s. NP = Not permitted unless the actual water meter pressure loss is known.

a. Table P2904.6.2(2) establishes conservative values for water meter pressure loss or installations where the water meter loss is unknown. Where the actual water meter pressure loss is ~~known~~ published and available from the meter manufacturer, PL_m shall be the ~~actual loss.~~ published pressure loss for the selected meter.

b. Flow rate from Section P2904.4.2. Add 5 gpm to the flow rate required by Section P2904.4.2 where the water service pipe supplies more than one dwelling.

2021 IRC – SIGNIFICANT CHANGES

Code Section

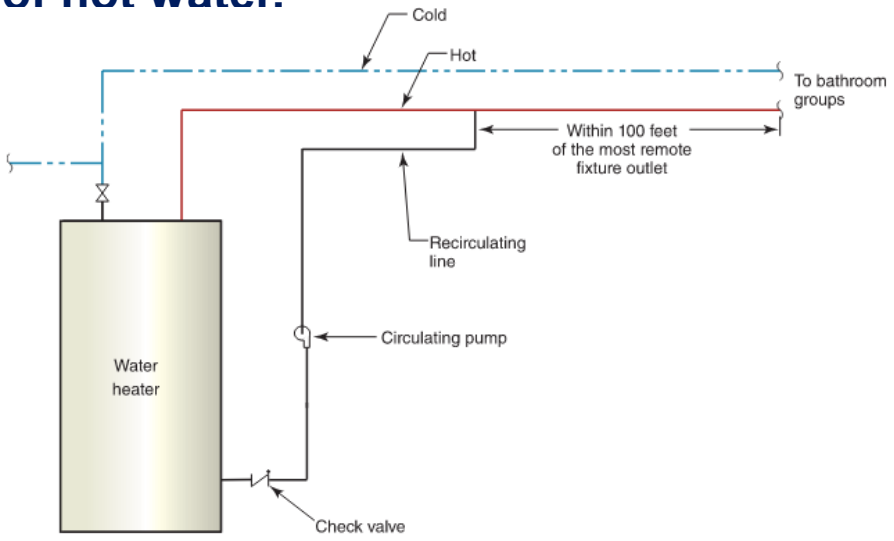
Length of Hot Water Piping to Fixtures

P2905.3

IRC Changes:

New addition of P2905.3 which now limits the length of hot water piping serving fixtures.

- **P2905.3: The developed length of hot water piping, from the source of hot water to the fixtures that require hot water, shall not exceed 100 feet Water heaters and recirculating system piping shall be considered to be sources of hot water.**



Hot water piping is limited to 100 feet from the source.

2018 IRC – SIGNIFICANT CHANGES

Code Section

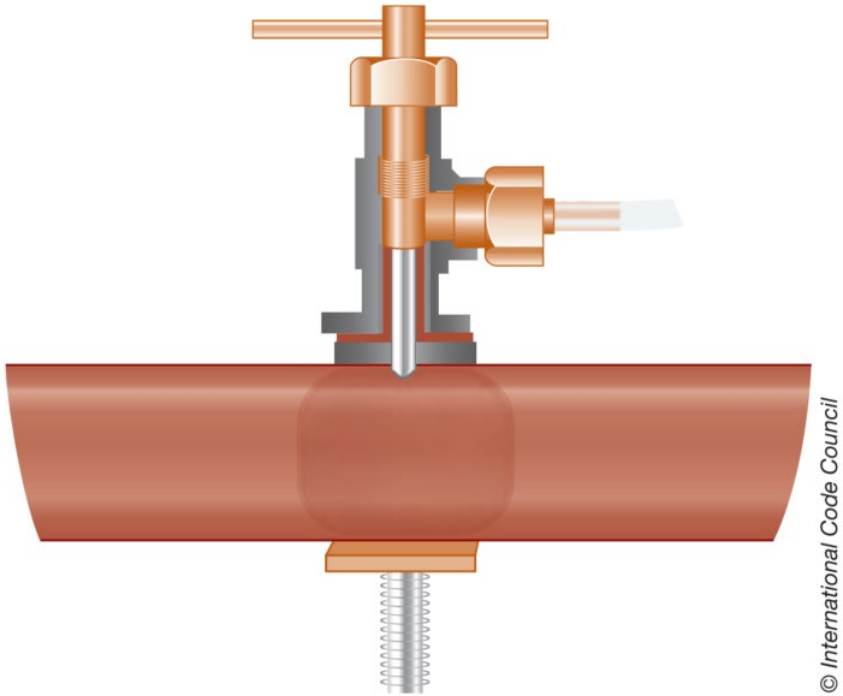
Saddle Tap Fittings on Water Distribution Piping

P2906.6.1

IRC Changes:

New restriction prohibiting use of saddle tap fittings

- **Use of saddle tap fittings and combination saddle tap and valve fittings prohibited**



Saddle tap fitting

2018 IRC – SIGNIFICANT CHANGES

Code Section

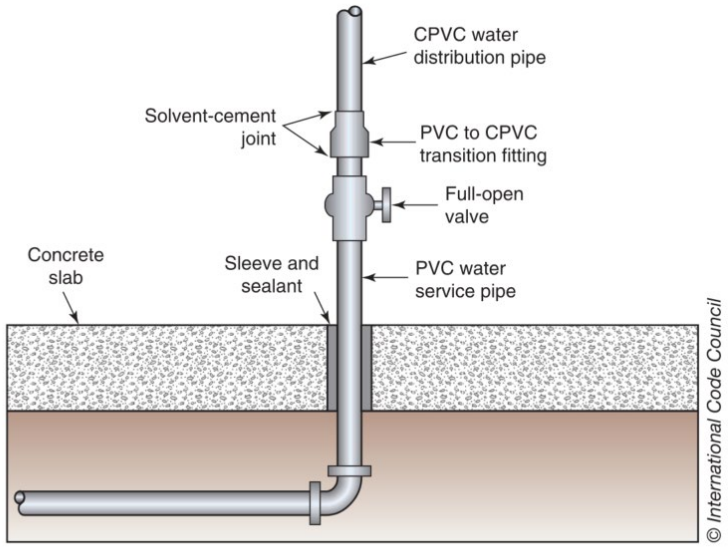
Joints between PVC and CPVC Piping

P2906.18.2

IRC Changes:

New Section P2906.18.2: Joints between PVC and CPVC Piping

- **Where a PVC water service pipe connects to a CPVC pipe at the beginning of a water distribution system**
- **Transition to be by a mechanical fitting, an approved adapter fitting, a transition fitting or by a single solvent-cemented transition joint**



PVC service pipe connection to CPVC water pipe

2021 IRC – SIGNIFICANT CHANGES

Code Section

Material, Joints and Connections

P2906

IRC Changes:

City of Houston amendment to P2906.8 specifies that no joints shall be permitted under slabs.

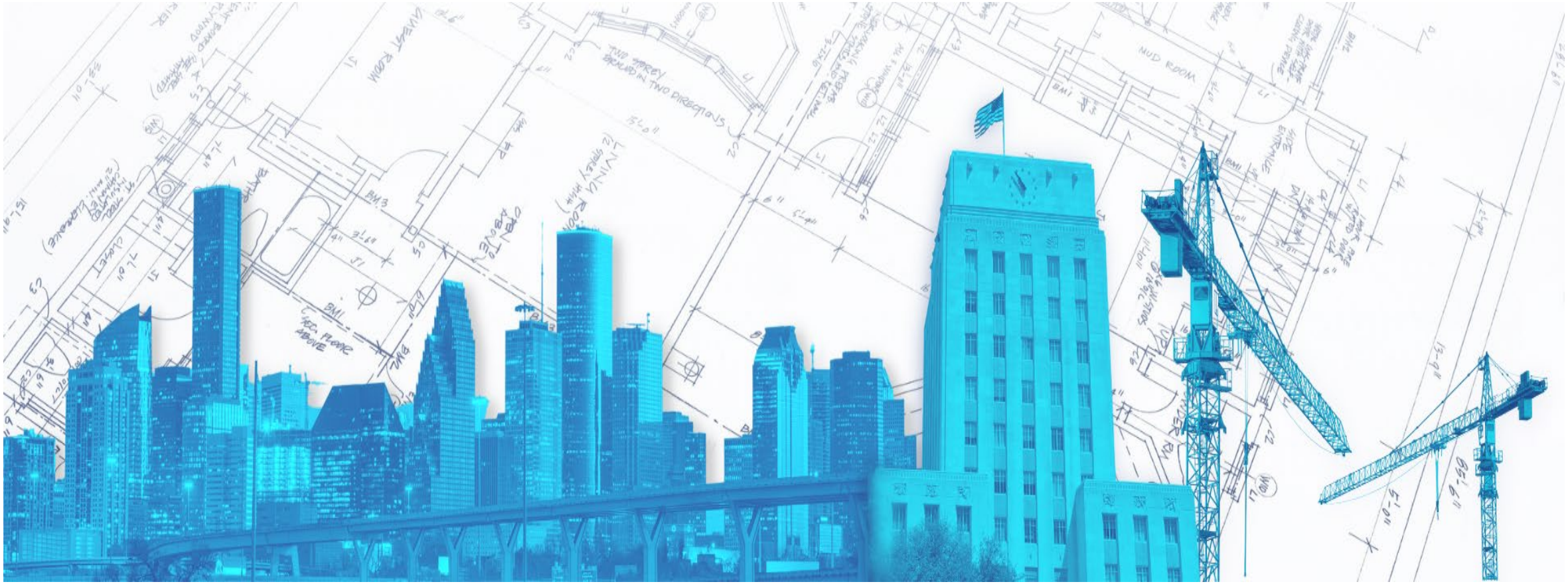
New City of Houston amendment Section P2906.10.3 added.

- **Tubing: PEX tubing shall have a minimum chlorine designation code of 5 to meet minimum chlorine resistance at end use condition of 100% of the time at 140oF. Acceptable markings on the tubing are PEX 5106, PEX 5206, and PEX 5306.**

City of Houston amendment to P2906.18.3 specifies that plastic adapter fittings shall be male only.

HOUSTON PUBLIC WORKS

IRC CHAPTER 30 SANITARY DRAINAGE



2018 IRC – SIGNIFICANT CHANGES

Code Section

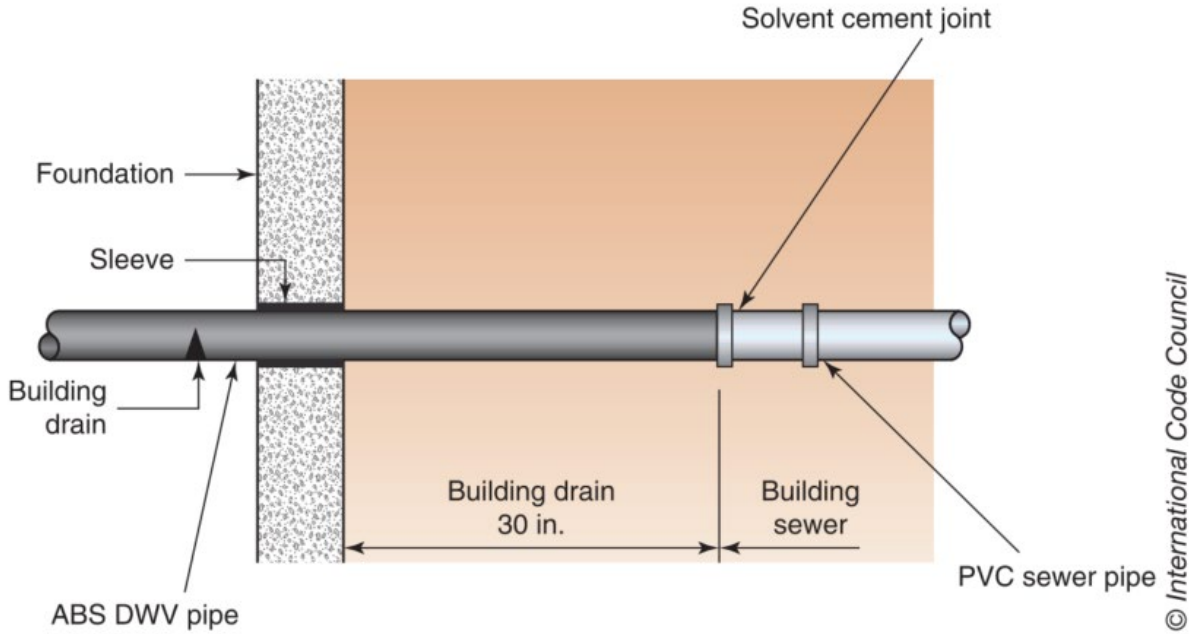
Prohibited Joints for Sanitary Drainage

P3003.2

IRC Changes:

New allowance for solvent cement joints

- **Now permitted for joining ABS and PVC piping at connection of the building drain to building sewer**



Solvent cement joint between ABS and PVC pipe

2021 IRC – SIGNIFICANT CHANGES

Code Section

Joints and Connections

P3003

IRC Changes:

Local amendment to P3003.9.2 eliminates the exception to the Solvent Cementing section. The exception previously allowed for primer to not be required when certain conditions were met.

2018 IRC – SIGNIFICANT CHANGES

Code Section

Reduction in Pipe Size

P3005.1.6

IRC Changes:

New addition to items that are not considered a reduction in size in the direction of flow

- **Water closet bend fitting with a 4-inch inlet and a 3-inch outlet provided the 4-inch leg of the fitting is upright and below, but not necessarily directly connected to, the water closet flange**
- **Offset closet flange**

2021 IRC – SIGNIFICANT CHANGES

Code Section

Removable Fixture Traps as Cleanouts

P3005.2.10.1

IRC Changes:

Clarification of P3005.2.10.1 which allows removable traps and fixtures with integral traps for use as cleanouts.

- **P2905.3: A fixture trap or a fixture with an integral trap, removable without altering the concealed piping shall be acceptable as a cleanout equivalent.**

2021 IRC – SIGNIFICANT CHANGES

Code Section

Drainage System

P3005

IRC Changes:

- **City of Houston amendment modifies P3005.2.10.1, the manholes intervals have been reduced to 300 feet. The base code requirement was 400 feet.**
- **City of Houston amendment modifies P3005.2.8 eliminates Exception 1 for test tees serving as cleanouts.**
- **City of Houston amendment modifies P3005.4.1, the allowable diameter of below grade drain pipes increased to 2 inches. The base code requirement was 1½ inches.**

2021 IRC – SIGNIFICANT CHANGES

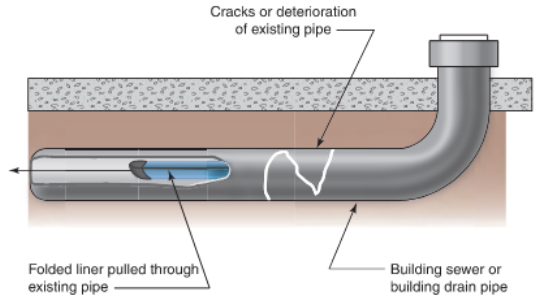
Code Section

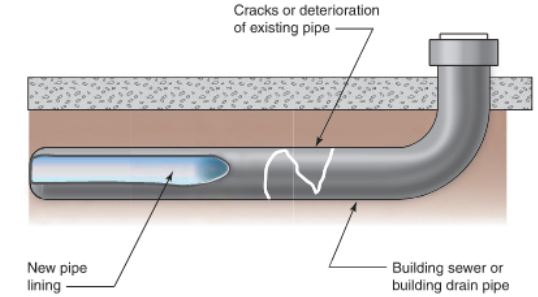
Relining of Building Sewers and Building Drains

P3011

IRC Changes:

P3011 has ben modified to include more information regarding the camera survey, material requirements, permitting, and prohibited applications.

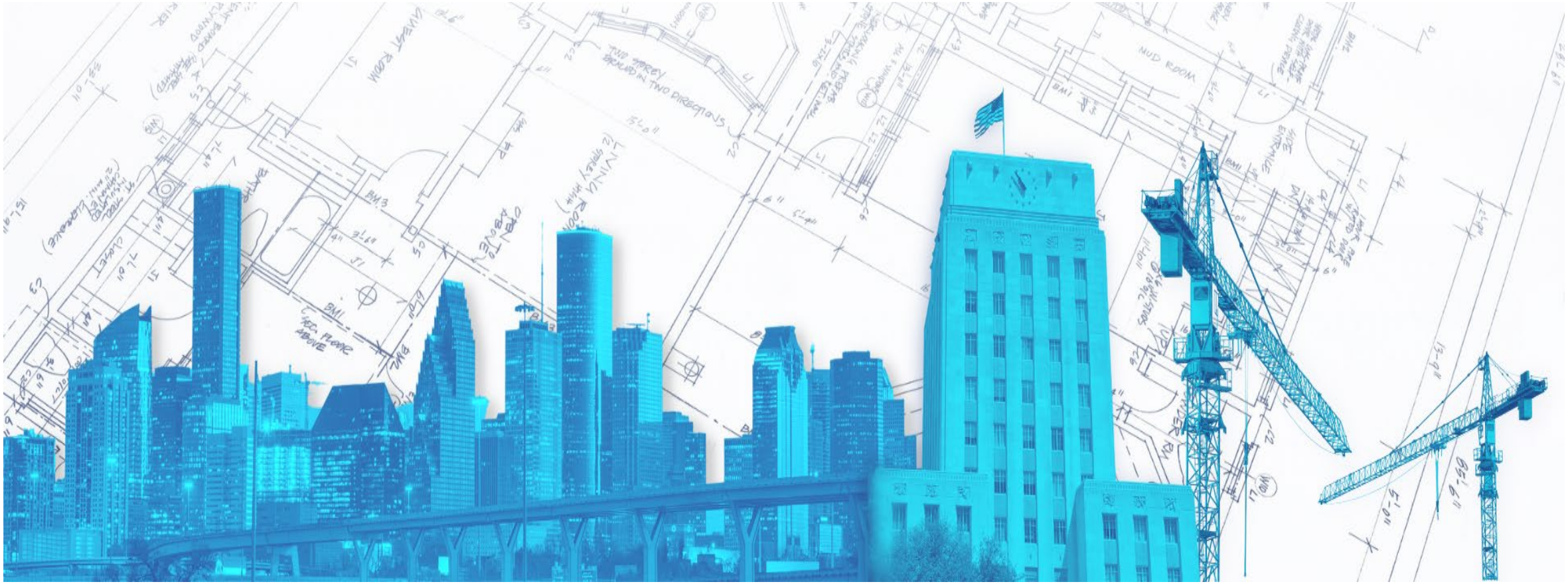




Fold and form method of pipe relining.

HOUSTON PUBLIC WORKS

IRC CHAPTER 31 VENTS



2018 IRC – SIGNIFICANT CHANGES

Code Section

Vent Pipe Terminations

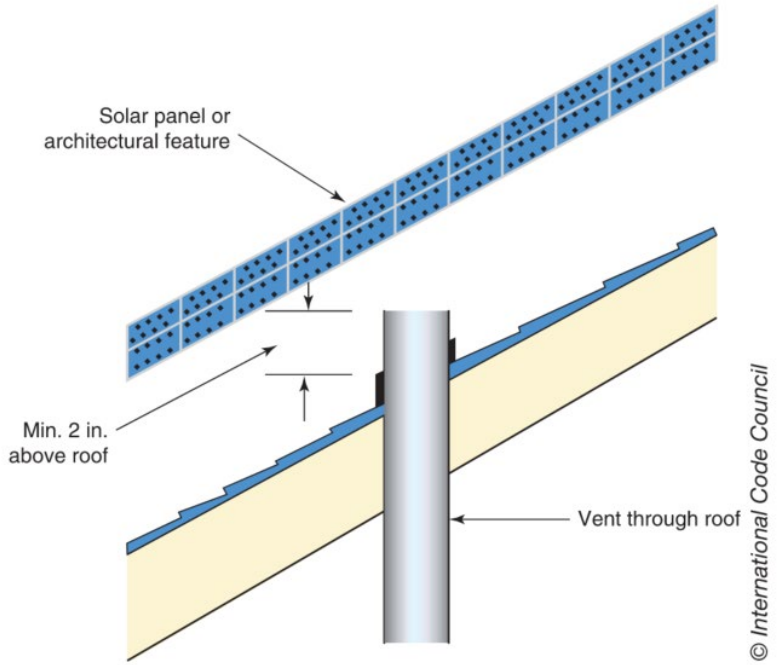
P3103.1

IRC Changes:

General reorganization of code section

New option allowing 2-inch vent extension through a sloped roof when the vent is covered

- **For use when roof is covered by either roof-mounted panel (such as a photovoltaic panel) or a roof element**
- **Vent terminals to be protected by a method that prevents birds and rodents from entering or blocking the vent pipe opening**



Covered vent pipe termination through roof

2018 IRC – SIGNIFICANT CHANGES

Code Section

Combination Waste and Vent System

P3111

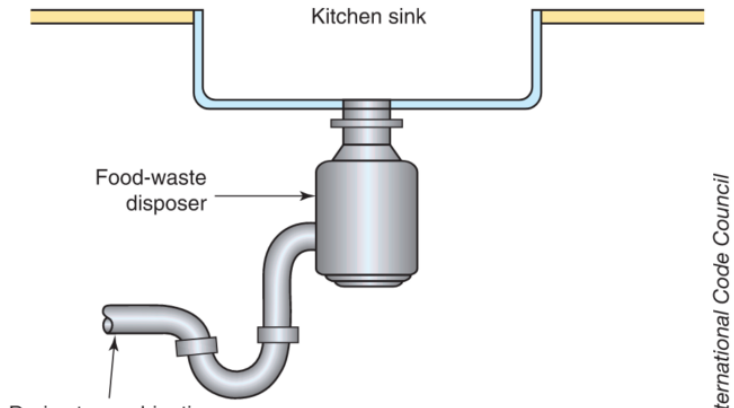
IRC Changes:

New allowances for a combination waste and vent system

- **Food waste disposers permitted to connect to system**

Revises general provisions

- **A horizontal fixture drain of a single fixture can serve as the combination waste and vent system**
- **General revisions for clarity**



Food waste disposer drain is permitted to connect to a combination waste and vent system

2018 IRC – SIGNIFICANT CHANGES

Code Section

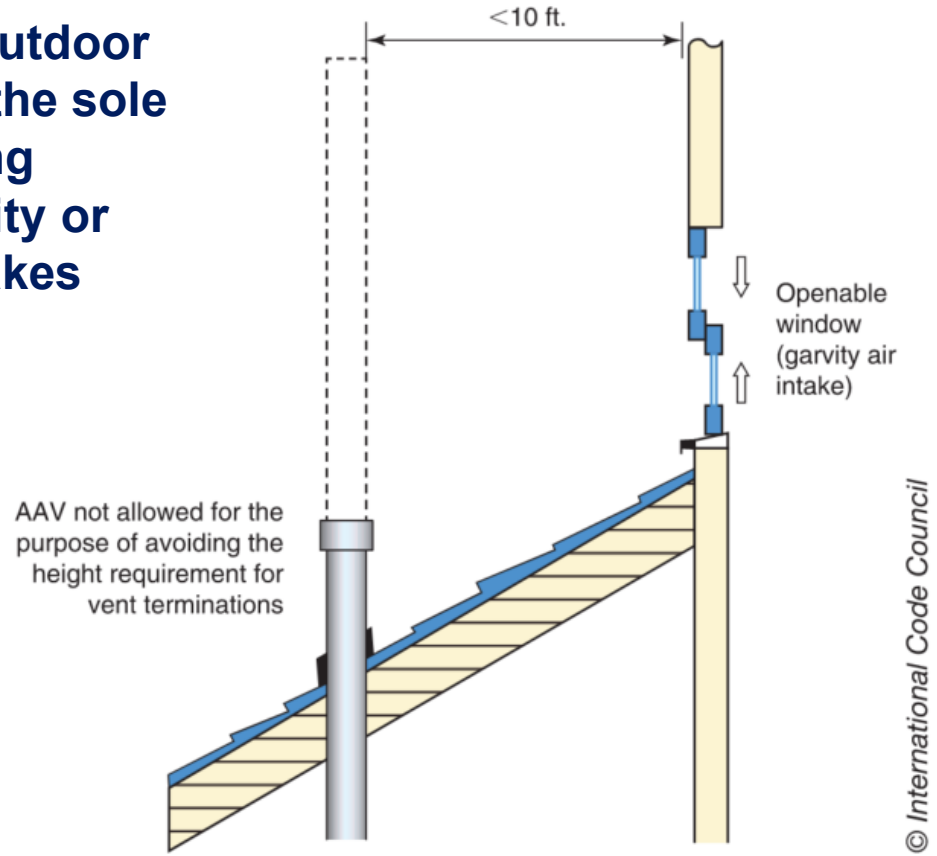
Prohibited Installations for Air Admittance Valves

P3114.8

IRC Changes:

New restriction on installation of air admittance valves

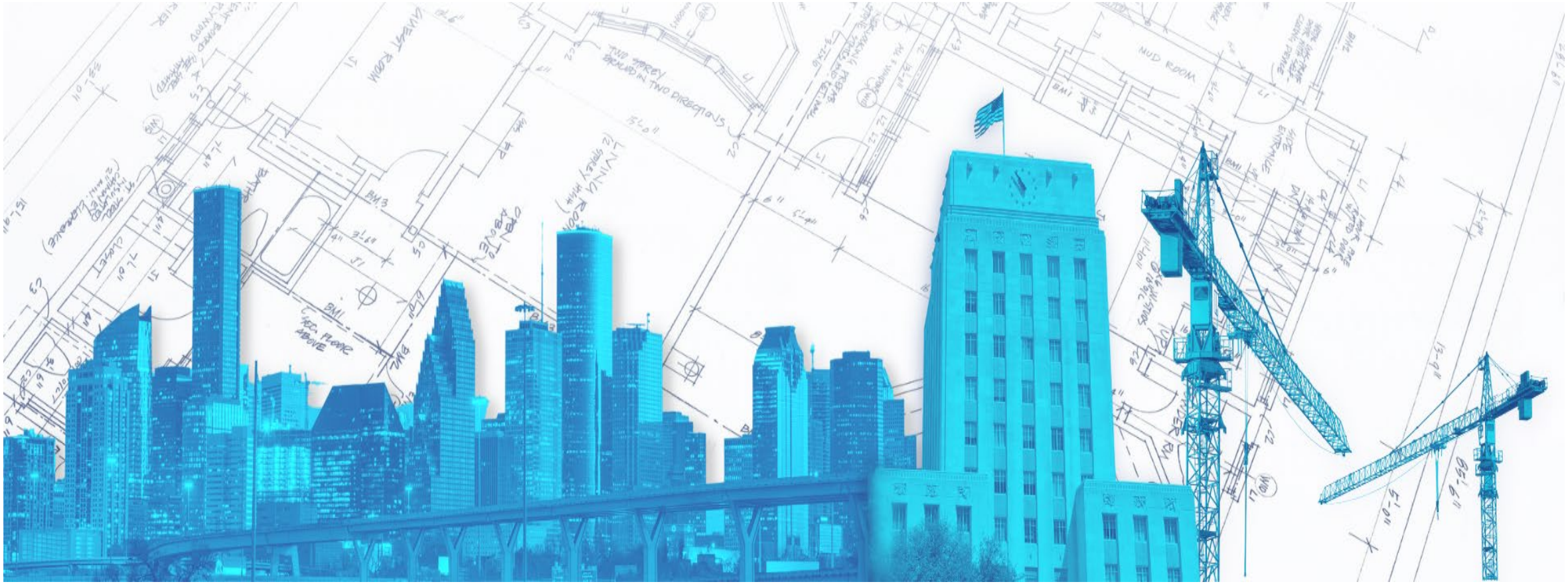
- **Not permitted on outdoor vent terminals for the sole purpose of reducing clearances to gravity or mechanical air intakes**



Prohibited installation for air admittance valves

HOUSTON PUBLIC WORKS

IRC CHAPTER 32 TRAPS



2021 IRC – SIGNIFICANT CHANGES

Code Section

Fixture Traps

Table 3201.7

IRC Changes:

City of Houston amendment modifies Table 3201.7

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 food waste disposer)	1½
Laundry tub (one or more compartments)	1½
Lavatory	1 ¼
Shower (based on the total flow rate through showerheads and body sprays) Flow rate:	
5.7 gpm and less	~~1½~~2
More than 5.7 gpm up to 12.3 gpm	2
More than 12.3 gpm up to 25.8 gpm	3
More than 25.8 gpm up to 55.6 gpm	4
Water closet	3

HOUSTON PUBLIC WORKS

IRC CHAPTER 37 BRANCH CIRCUIT AND FEEDER REQUIREMENTS

2018 IRC – SIGNIFICANT CHANGES

Code Section

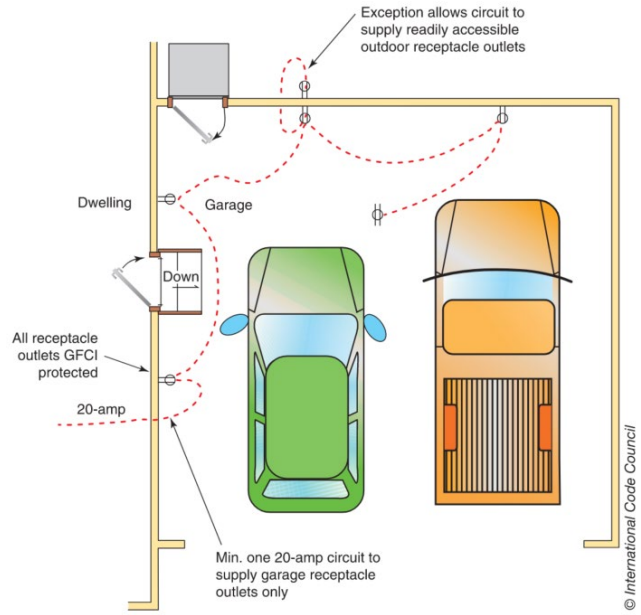
Garage Branch Circuits

E3703.5

IRC Changes:

New Section E3703.5: Garage branch circuits

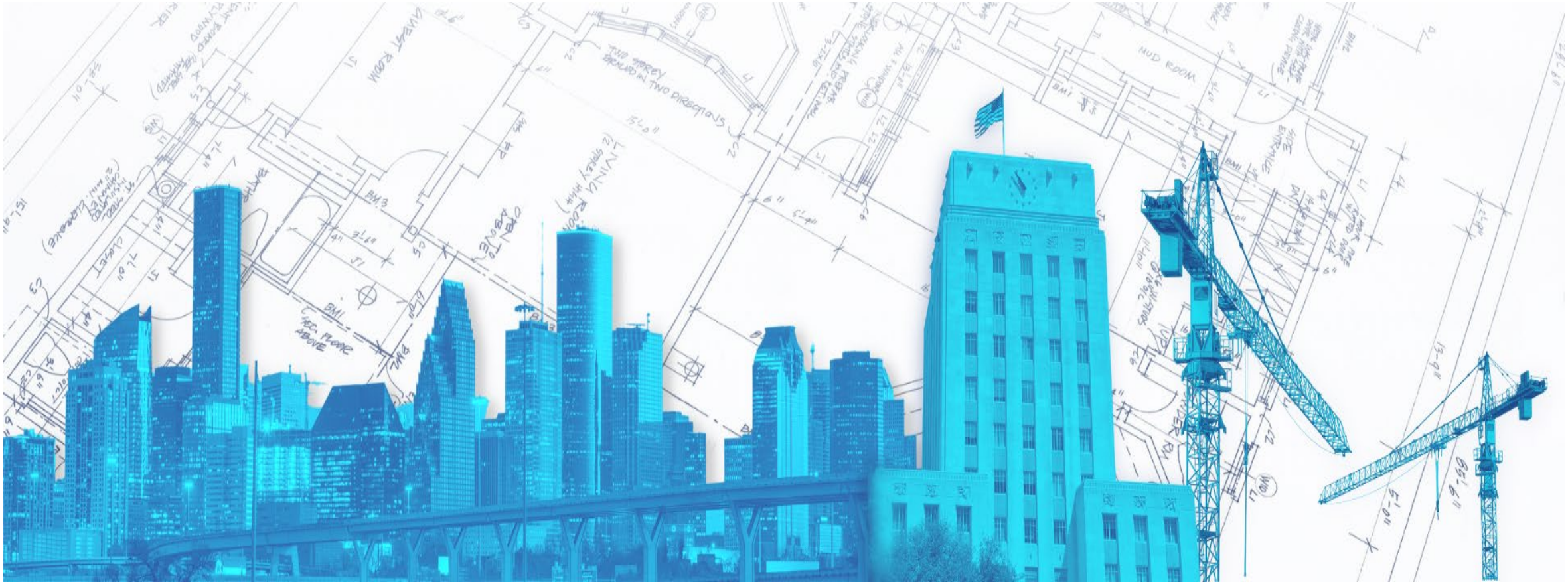
- **Not less than one 120-volt, 20 ampere branch circuit to supply receptacle outlets in attached garages and in detached garages with electric power**
  - **Circuit to not have other outlets**
  - **Adds to number of branch circuits required by other parts of this section**
  - **Exception: circuit permitted to supply readily accessible outdoor receptacle outlets.**



20-amp circuit to supply garage receptacle outlets

HOUSTON PUBLIC WORKS

IRC CHAPTER 39 POWER AND LIGHTING DISTRIBUTION



2018 IRC – SIGNIFICANT CHANGES

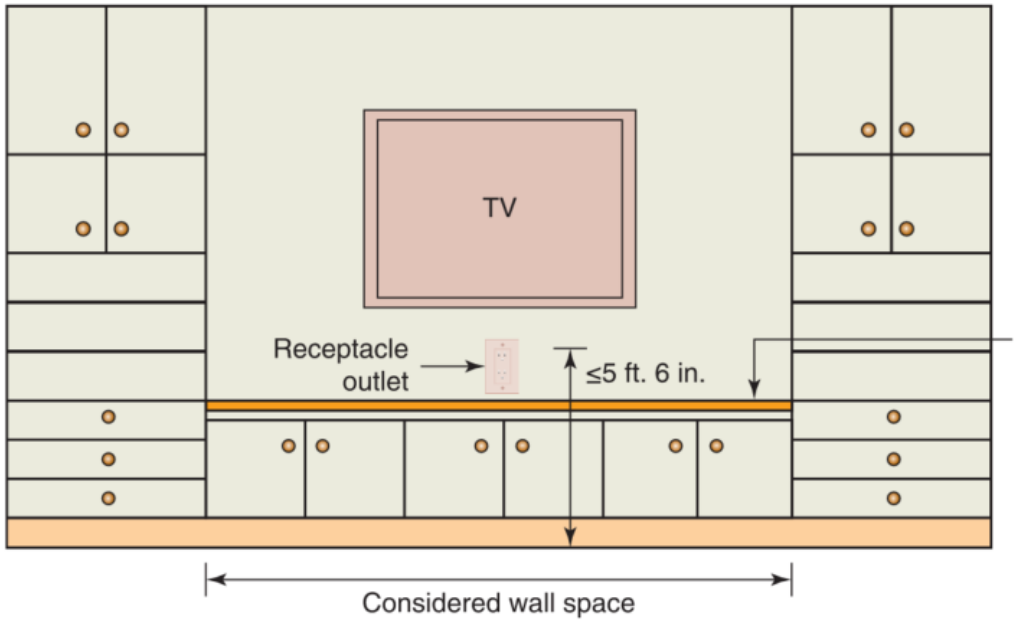
Code Section

Wall Space for Receptacle Distribution

E3901.2

IRC Changes:

- **Cabinets with countertops now considered wall space in determining required locations for general purpose receptacle outlets**



Elevation—Family room

Cabinets with countertops or work surfaces are counted as wall space

2018 IRC – SIGNIFICANT CHANGES

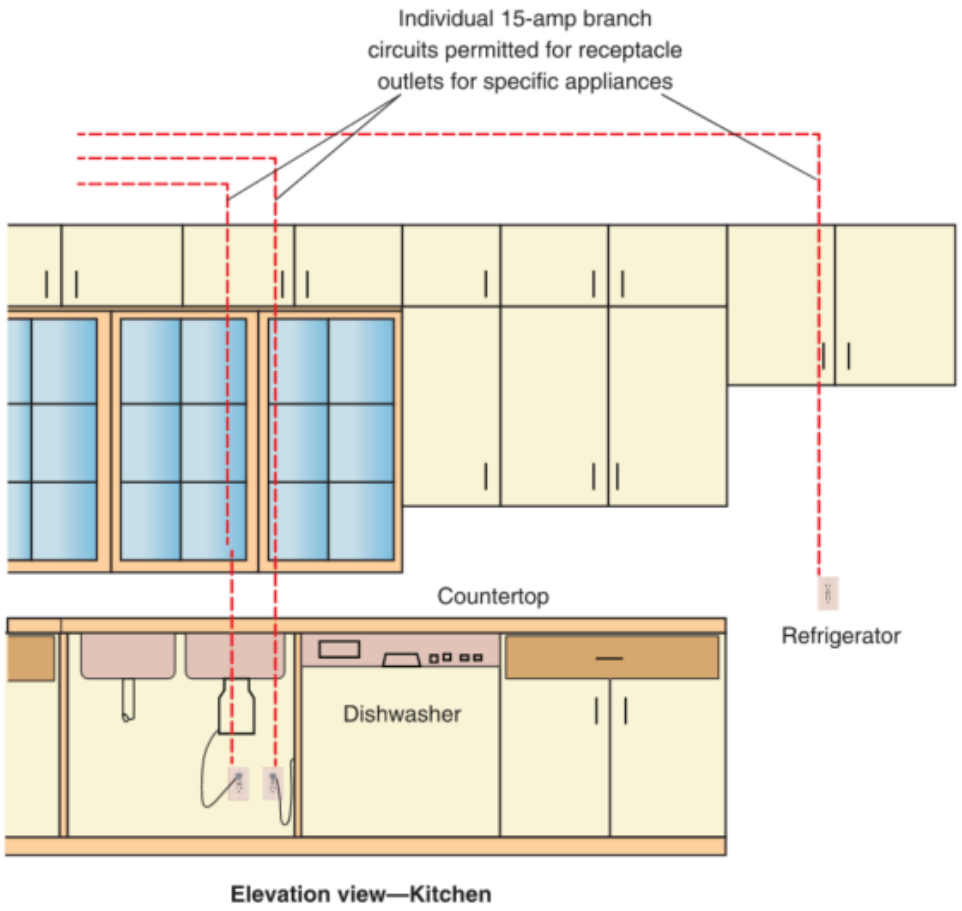
Code Section

Appliances on 15 Amp Circuits

E3901.3

IRC Changes:

- **An individual 15-ampere branch circuit permitted to serve any specific kitchen appliance**



Receptacle outlet for a specific appliance can be on an individual 15-amp branch circuit

2018 IRC – SIGNIFICANT CHANGES

Code Section

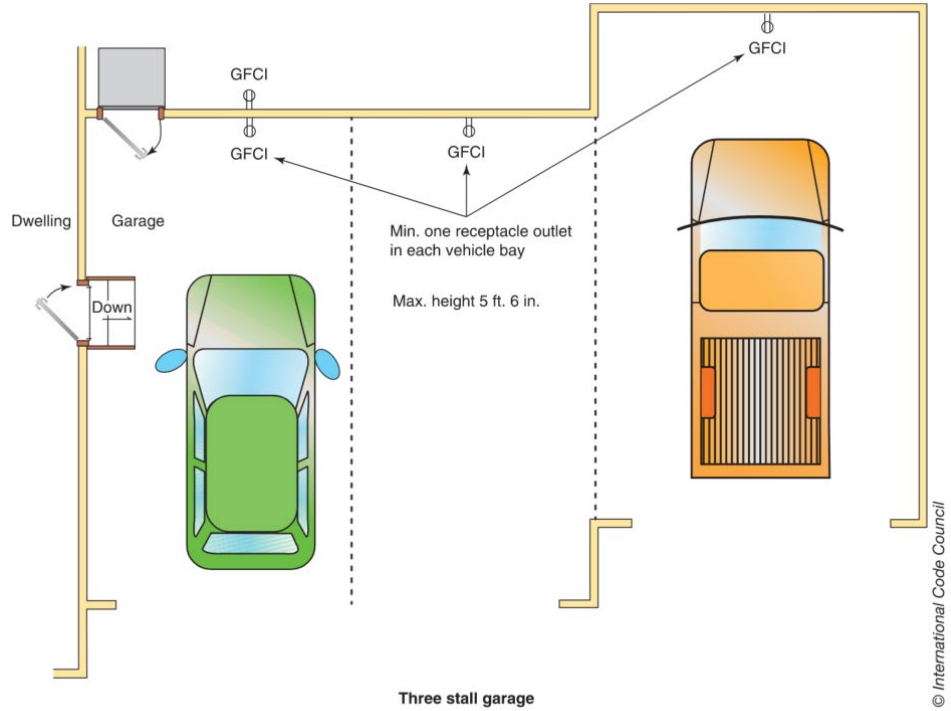
Garage Receptacle Outlet Location

E3901.9

IRC Changes:

New requirements for receptacle outlet in a garage

- **Must be located in each vehicle bay**
- **Located not more than 5.5 feet above the floor**



Receptacle outlet required in each vehicle space in garage

2018 IRC – SIGNIFICANT CHANGES

Code Section

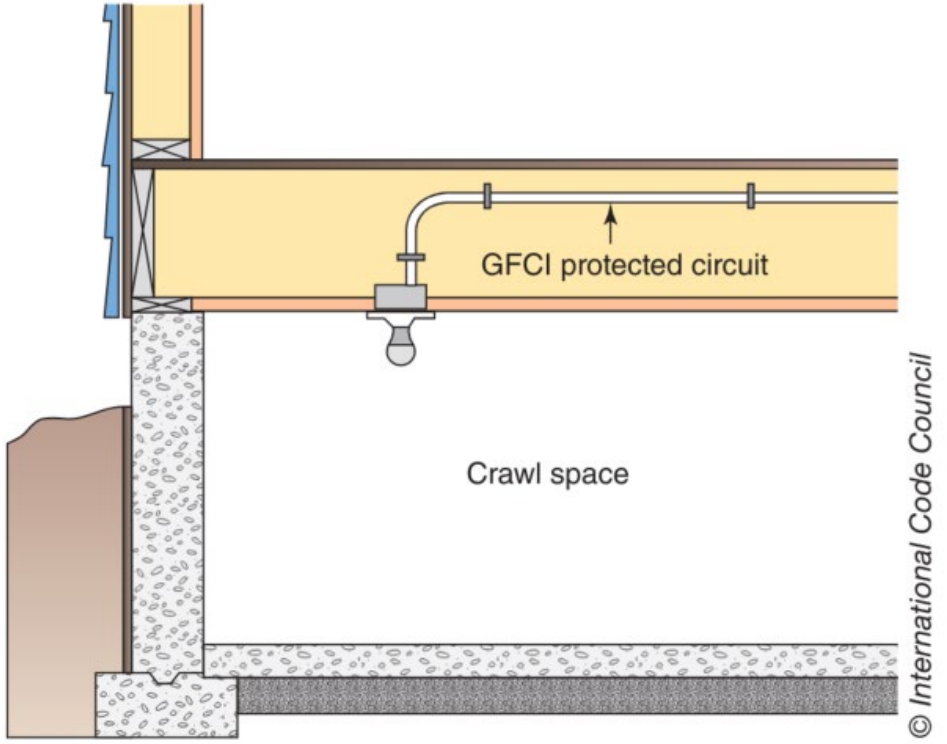
GFCI Protection for Crawl Space Lighting Outlets

E3902.4

IRC Changes:

New requirement for lighting outlets of crawl spaces

- **Outlets not exceeding 120 volts to have ground-fault circuit-interrupter protection**



GFCI protection required for crawl space lighting outlets

HOUSTON PUBLIC WORKS

2018 IRC – SIGNIFICANT CHANGES

Code Section

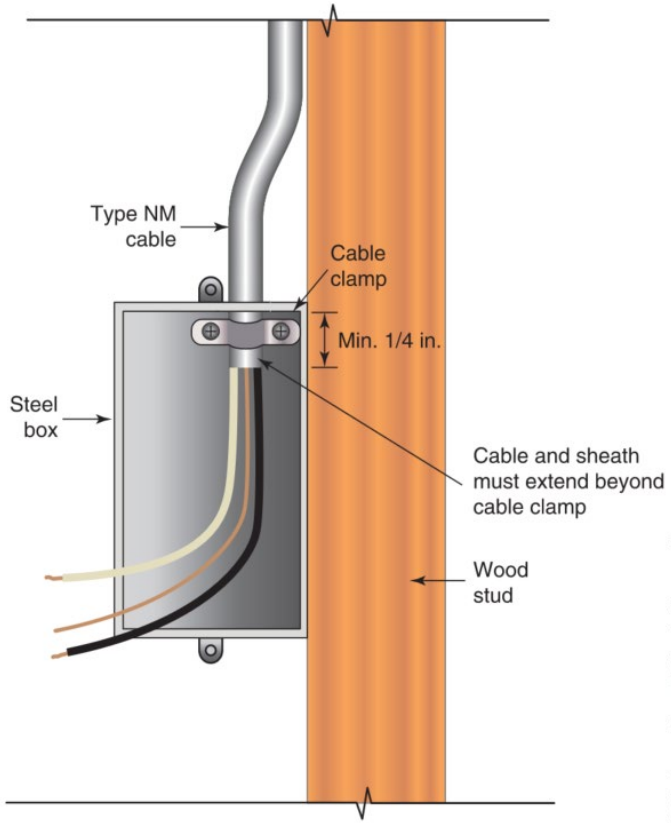
Nonmetallic-Sheathed Cable and Metal Boxes

E3906.3

IRC Changes:

Requirements for nonmetallic-sheathed cable or multi-conductor Type UF cable in metal boxes and conduit bodies

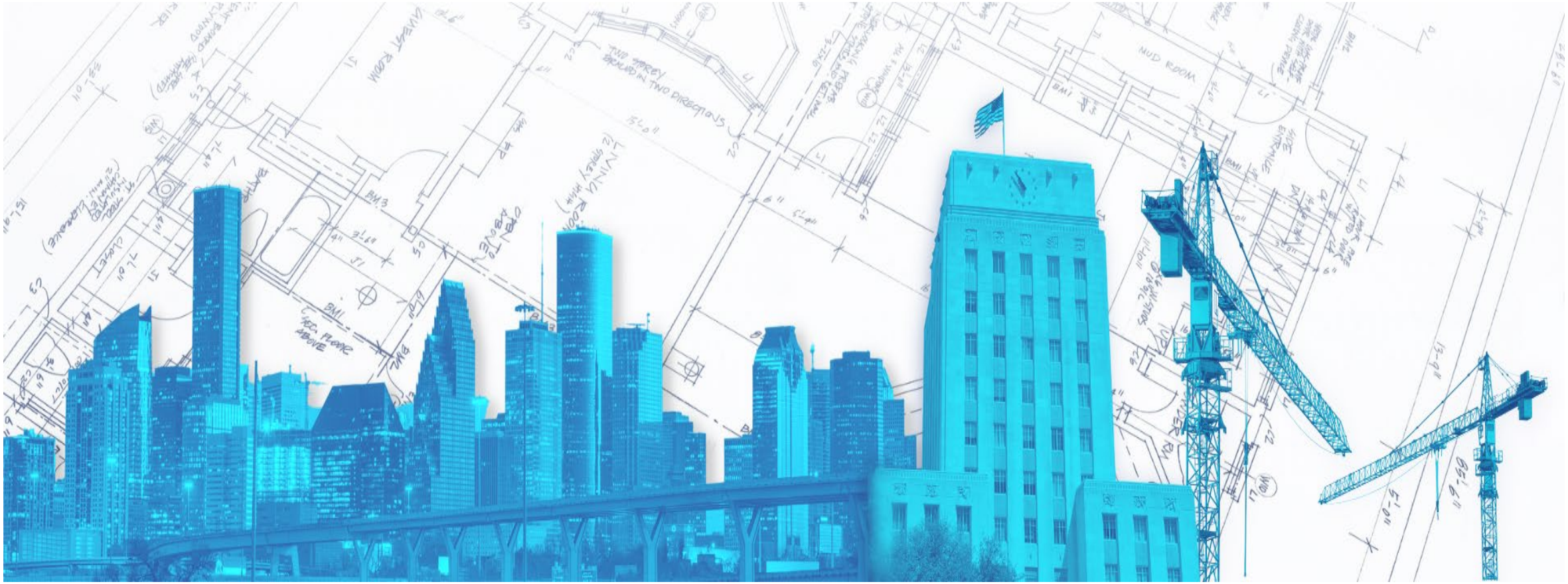
- **Sheath must extend not less than 1/4 inch inside the box and beyond any cable clamp**



Non-metallic sheathed cable entering a metal box

HOUSTON PUBLIC WORKS

IRC - ELECTRICAL



2018 IRC – SIGNIFICANT CHANGES

Code Section

Cord-and-Plug–Connected Appliances

#

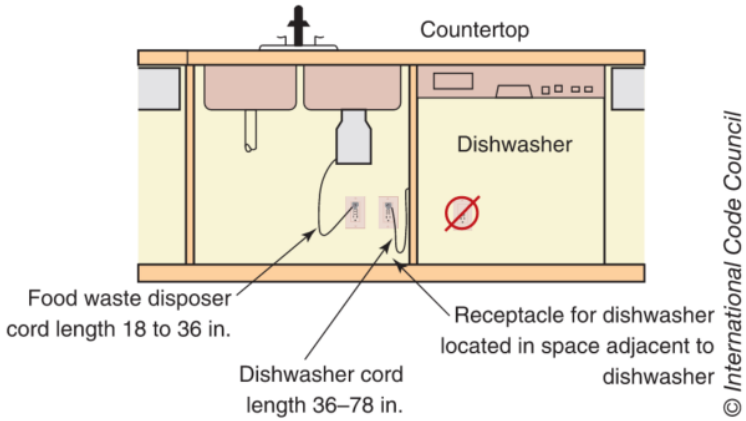
IRC Changes:

Increase in maximum cord lengths for range hoods and built-in dishwashers

- **Built-in dishwasher: 48 ➔ 78**
- **Range hoods: 36 ➔ 48**

New specifications on measuring cord length

- **Built-in dishwashers and trash compactors: measured from the face of attachment plug to the rear plane of appliance**



Cord and plug kitchen appliances

2021 IRC – SIGNIFICANT CHANGES

Code Section

Electrical

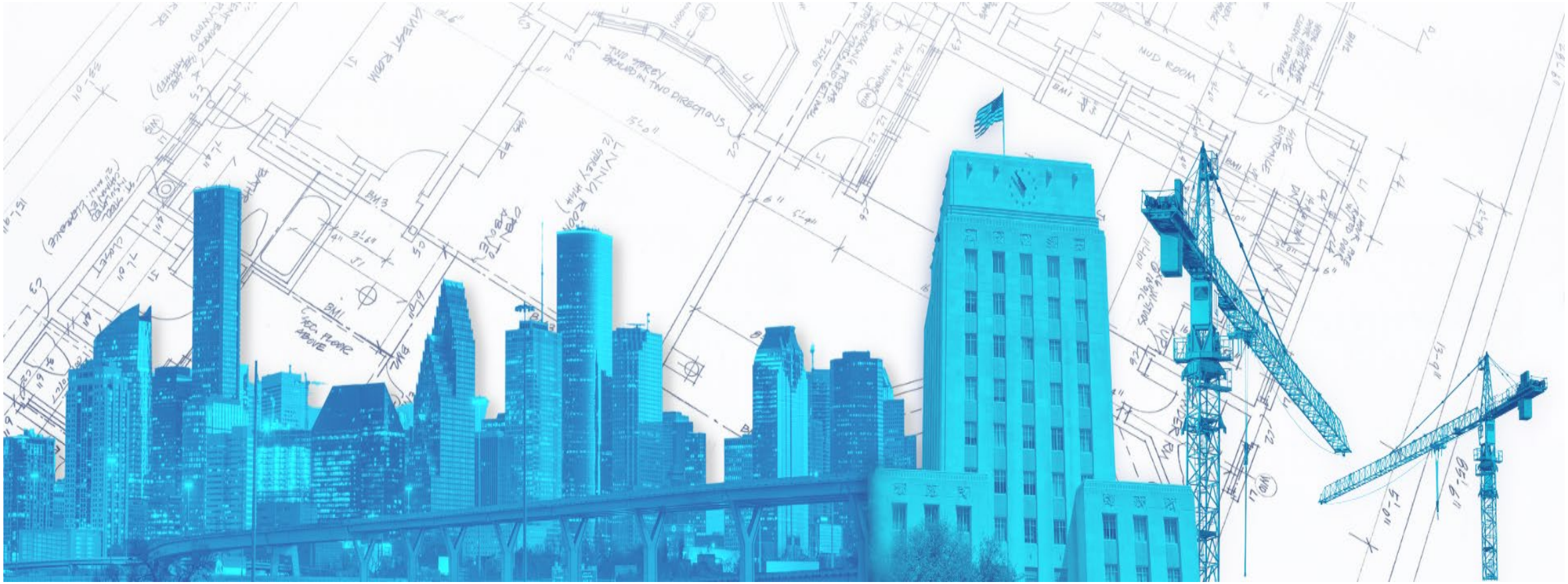
Chapters 34-43

IRC Changes:

Part VIII-Electrical (Chapters 34-43) of the 2021 Residential Code have not been adopted by the City of Houston. All electrical work and licensing shall comply with the Electrical Code.

HOUSTON PUBLIC WORKS

IRC APPENDIX Q – TINY HOUSES



2018 IRC – SIGNIFICANT CHANGES

Code Section

Tiny Houses

Appendix Q

IRC Changes:

New Appendix Q: Tiny Houses

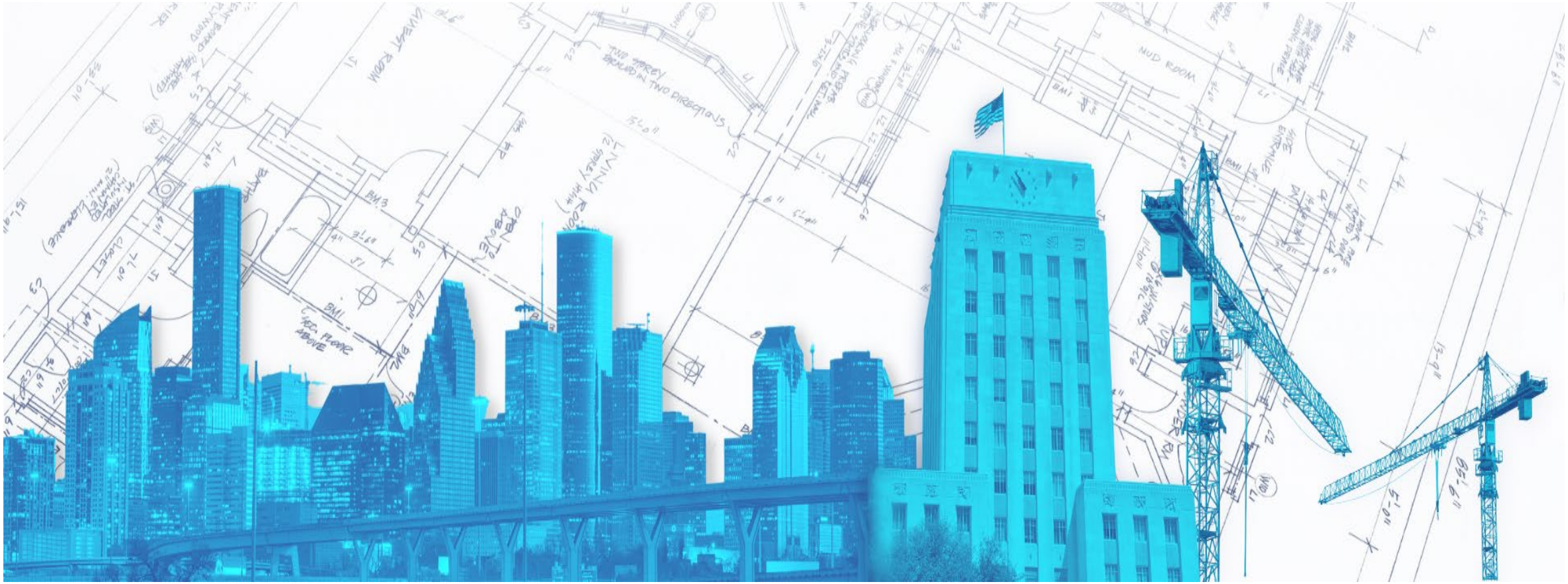
- **Defines Tiny House**
  - **Dwelling that is 400 square feet or less in floor area excluding lofts**

TABLE A-1

Element	General requirement
Egress roof access window	A skylight or roof window for emergency escape from a loft
Loft	Open on one side with a ceiling height of less than 6 feet 8 inches
Tiny house	Maximum area 400 square feet excluding lofts
Ceiling heights	Generally 6 feet 8 inches or less
Minimum loft area	35 square feet with 5-foot minimum dimension
Stairway	Width: 17 to 25 inches Headroom: 6 feet 2 inches Risers: 7 to 12 inches Treads: Calculated based on riser height
Ladders	Width: 12 inches Rung spacing: 10 to 14 inches Incline 70 to 80 degrees
Loft guard height	One-half of the clear height to ceiling Not required to be over 36 inches

HOUSTON PUBLIC WORKS

IRC APPENDIX R – LIGHT STRAW-CLAY CONSTRUCTION



2018 IRC – SIGNIFICANT CHANGES

Code Section

Light Straw-Clay Construction

Appendix R

IRC Changes:

Updates to light straw-clay construction requirements

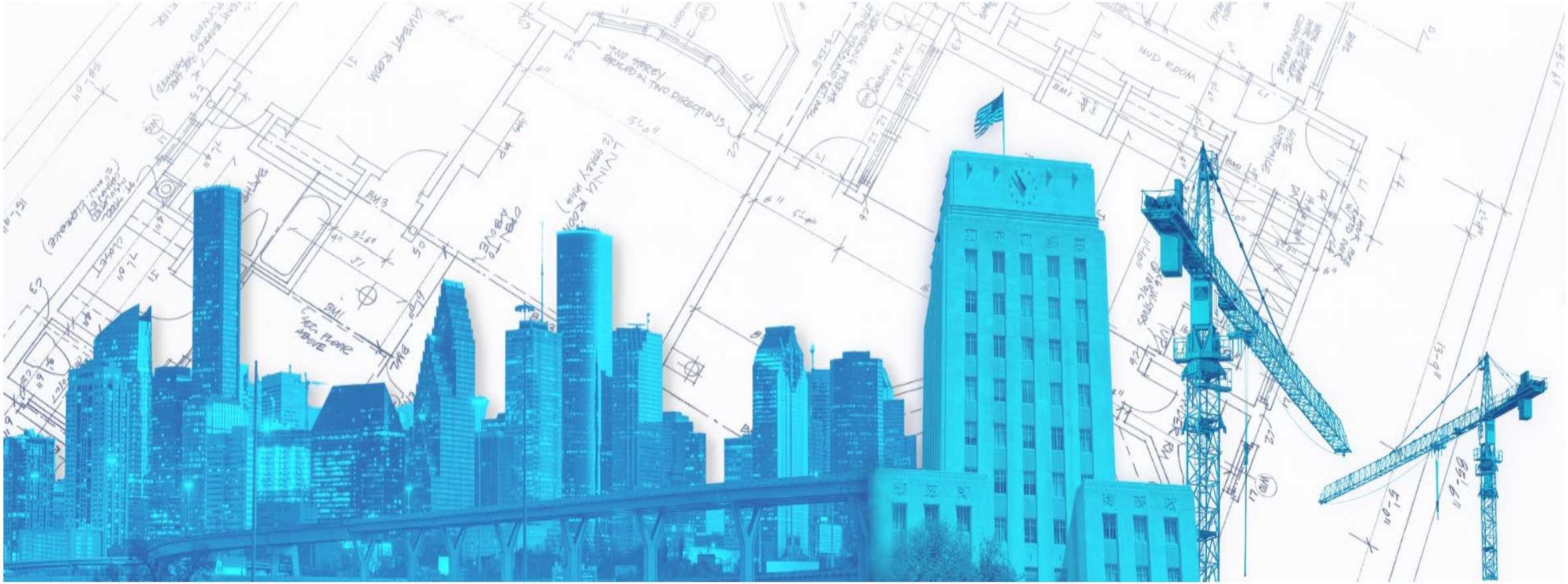
- **Lateral bracing at light straw-clay infill must be Method Let-In-Brace and solid sheathing not allowed**
- **New Table AR103.2.3: Requirements and Properties of Light Straw-Clay Mixtures**
    - **Describes required properties and components of light straw-clay mixtures at various densities**
- **Language change: Reinforcement ➔ Stabilization of light straw-clay**

iStock.com/CREATISTA

Straw-clay construction

HOUSTON PUBLIC WORKS

IRC APPENDIX S – STRAWBALE CONSTRUCTION



2018 IRC – SIGNIFICANT CHANGES

Code Section

Strawbale Construction

Appendix S

IRC Changes:

Section revised for clarity

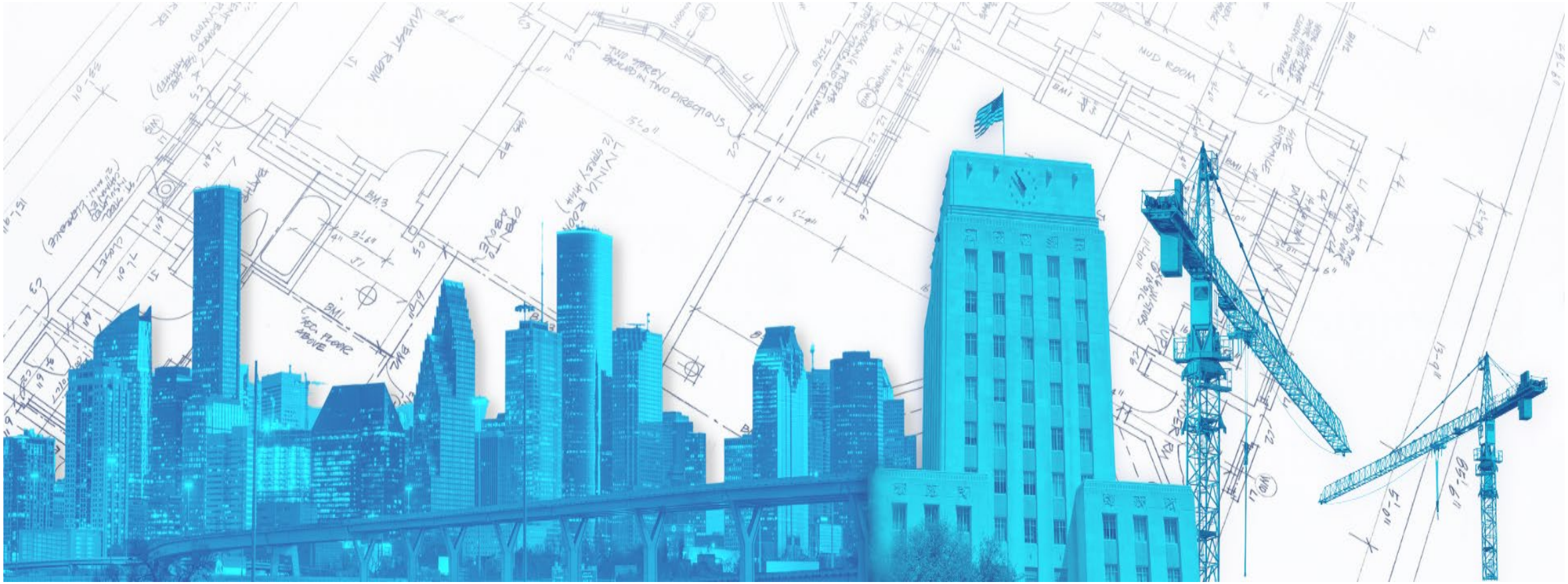
- **New figures and tables added**
- **Wood framing as a method of out-of-plane resistance with approved means of attachment of the bales to the framing**
- **New building limitations and requirements for use of strawbale structural walls**

iStock.com/anandoart

Strawbale walls

HOUSTON PUBLIC WORKS

IRC APPENDIX T – SOLAR READY PROVISIONS



2018 IRC – SIGNIFICANT CHANGES

Code Section

Solar-Ready Zone

Appendix T

IRC Changes:

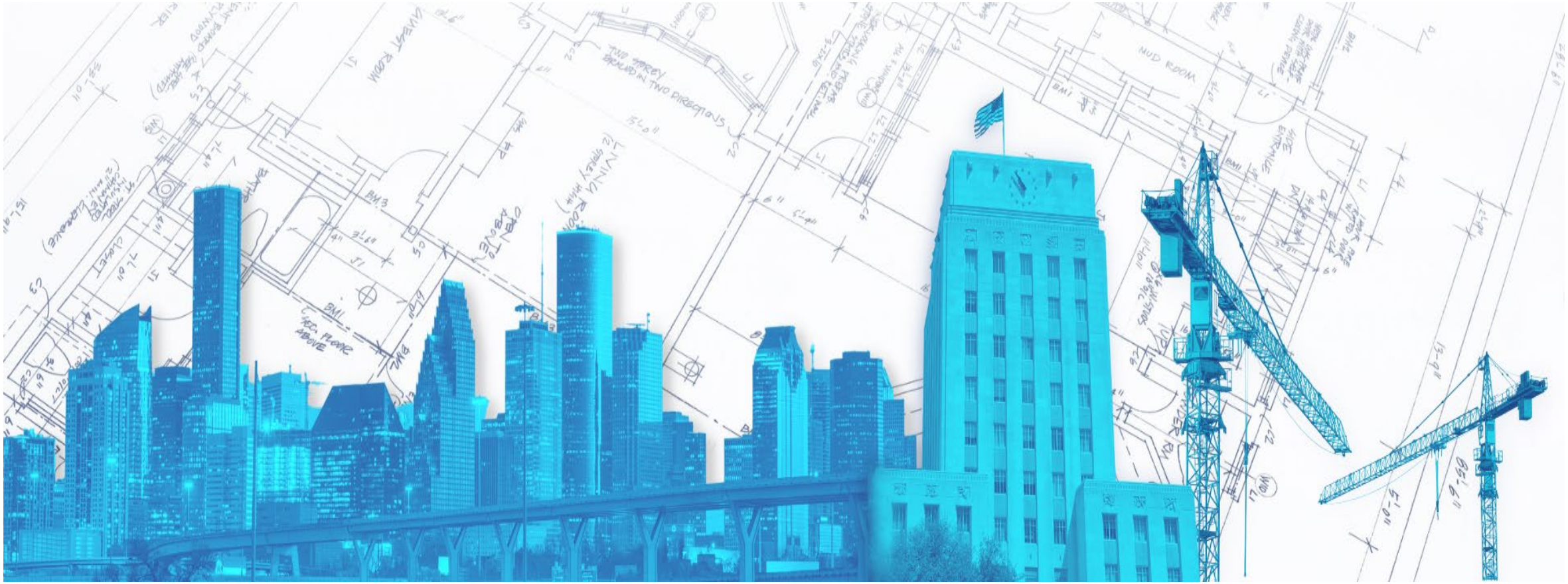
Clarifications to solar-ready zone requirements

- Roof area orientation minimum angle: 110 degrees ➔ 90 degrees
- Shading now clarified by defining setback for designated solar-ready zone from permanently affixed objects
- Sleeves to provide a path for future wiring from the solar panel to the meter
    - Apply to roofs with slope of 1:12 or less

Roof with installed solar panels

HOUSTON PUBLIC WORKS

IRC APPENDIX LOCAL AMENDMENTS



2021 IRC – SIGNIFICANT CHANGES

Code Section

Conventional Light Frame Wood Construction For Single Family Residential Construction In High Wind Areas

Appendix AL

IRC Changes:

City of Houston modifies the content within Appendix AL. The appendix formerly contained information on Permit Fees. The information within this appendix has been deleted in its entirety and renamed Appendix AL: Conventional Light Frame Wood Construction For Single Family Residential Construction In High Wind Areas.

- **The new Appendix AL will contain requirements that apply to regular-shaped single family residential buildings that are not more than three stories in height and are of conventional light-frame construction**

2021 IRC – SIGNIFICANT CHANGES

Code Section

Airport Sound Attenuation Requirements

Appendix AU

IRC Changes:

City of Houston modifies the content within Appendix AU. The appendix formerly contained information on Cob Construction (Monolithic Adobe). The information within this appendix has been deleted in its entirety and renamed Appendix AU: Airport Sound Attenuation Requirements

- **The purpose of this appendix is to set forth sound attenuation specifications for buildings when such sound attenuation is required by Chapter 9, Article VI, of the City Code to achieve an interior sound level of 45 dBa or less.**

2021 IRC – SIGNIFICANT CHANGES

Code Section

Visitability

Appendix AV

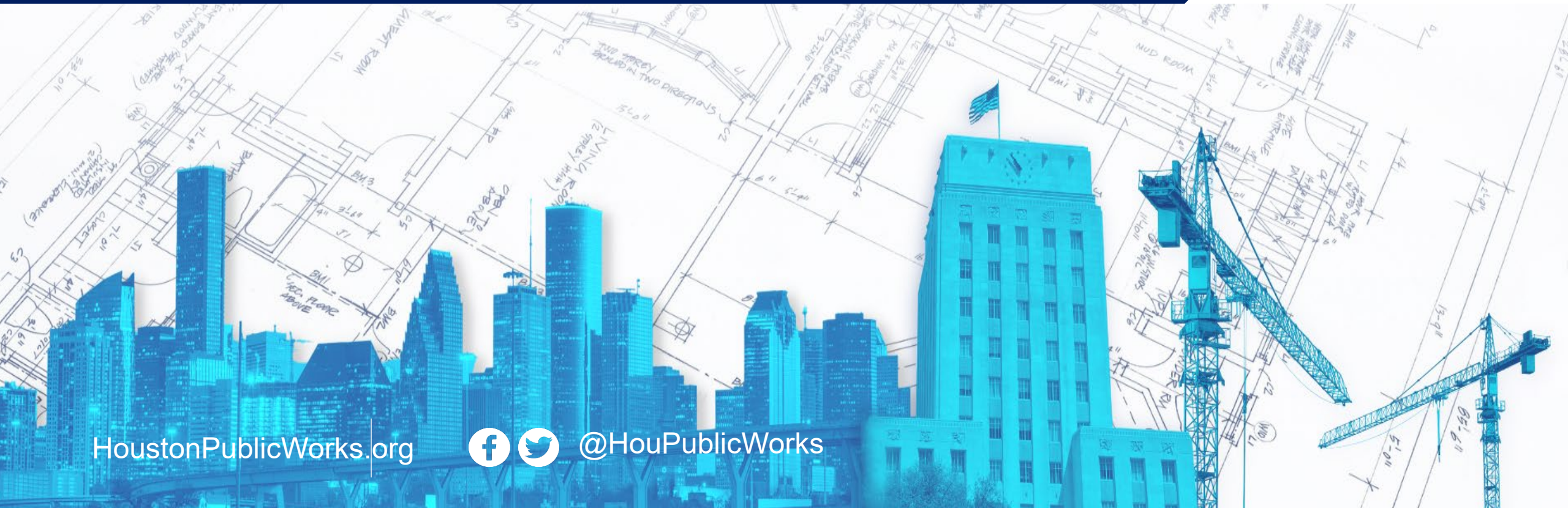
IRC Changes:

City of Houston modifies the content within Appendix AV. The appendix formerly contained information on Board of Appeals. The information within this appendix has been deleted in its entirety and renamed Appendix AV: Visitability

- **This set of standards is intended to provide minimum residential features to allow a mobility-impaired person to visit and use a home.**

HOUSTON PUBLIC WORKS

THANK YOU!



HoustonPublicWorks.org @HouPublicWorks