FAQ:
What are the significant changes between the 2018 and 2021 International Residential Code (IRC)?

This document includes a summary of significant changes to the 2021 International Residential Code (IRC) and includes the PA Uniform Construction Code Review and Advisory Council (RAC) Report Amendments. This document also provides further information for the identified code changes

Disclaimer: This document shall be utilized as guidance only. The design professional is responsible for reviewing the provisions of the International Codes, associated reference Standards, and the directives of the PA Department of Labor and Industry. The Department of Licenses and Inspections may only render a decision in response to a formal application for a construction permit or preliminary review.

Summary of changes between the 2018 and 2021 International Residential Code (IRC):

(Items marked with an asterisk (*) are identified as major code changes

Administration

Chapters 1 and 2

- R202 Definition of Emergency Escape and Rescue Opening

Building Planning

Chapter 3

- R301.1.4 Intermodal Shipping Containers*
- R301.2 Wind Speeds
- Table R301.2.1(1) Component and Cladding Wind Pressures
- R302.2 Townhouses
- R302.3 Two-Family Dwelling Separation
- R302.4 Dwelling Unit Rated Penetrations

- R302.5 Dwelling-Garage Opening Protection
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- R308.4.5 Glazing and Wet Surfaces
- R308.6 Skylight Glass Retention Screens
- R310.1 Emergency Escape and Rescue Opening Required
- R310.2.4 Emergency Escape and Rescue Openings
- R310.3 / R310.4 Area Wells for Emergency Escape and Rescue Openings
- R310.5 / R310.6 / R310.7 Emergency Escape and Rescue Openings in Existing Building*
- R311.7 / R311.8 Stairways and Ramps
- R311.7.4 Walkline
- R311.7.7 Stairway and Landing Walking Surface
- R312.2 Window Fall Protection
- R314.3 Smoke Alarm Locations*
- R314.4 Interconnection (Smoke Alarms)
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- R326 Habitable Attics

Building Construction

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- Table R403.1(1) Footings Below Light-Frame Construction
- R406.2 Foundation Waterproofing
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- R507.10 Exterior Guards (Decks)*
- Table R602.3(1) Fasteners – Roof and Wall
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- Table R602.3(2) Alternate Attachments
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- R702.7 Vapor Retarders
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- R703.3.1 Exterior Soffit Installation
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- R704.1 General Wind Limitations (Exterior Soffits)
- R704.2/R704.3 Exterior Soffit Installation
- R802 Wood Roof Framing
- R802.3 Ridge (Boards & Beams)
- Table R802.5.2(1) Heel Joint Connections
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- R806.1 Ventilation Required (Roof)
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- R905.4.4.1 Metal Roof Shingle Wind Resistance

Mechanical

Chapters 12 through 23

- M1305.1.3.2 Excavations (Appliance Installations)
- M1502.3.1 Clothes Dryer
- M1505 Balanced Ventilation System Credit
- M1802.4 Blocked Vent Switch for Oil-fired Appliances
- M2101 Hydronic Piping Systems Installation

Fuel Gas

Chapter 24

- G2403 Definitions of Point of Delivery and Service Meter Assembly
- G2414.8.3 Threaded Joint Sealing
- G2415.5 Fittings in Concealed Locations
- G2427.2.2 Appliances with integral vents
- G2427.5.1 Factory-Built Locations
- G2427.5.4 Size of Chimneys
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- G2427.5.10 Insulation Shield (Factory-Built Chimneys)
- G2427.8 Through-the-wall Vent Terminal Clearances
- G2439.5 Makeup Air for Dryer Installed in a Closet
- G2447.2 Commercial Cooking Appliances Prohibited

Summary of changes between the 2018 and 2021 International Residential Code (IRC):

Administration

Chapter 2 (Definitions)

- **Section R202 -** Definition of "Emergency Escape and Rescue Opening" and of "Grade Floor Emergency and Rescue Opening" has been updated for clarification and to be consistent with the IBC.

> [RB] **EMERGENCY ESCAPE AND RESCUE OPENING.** An operable exterior window, door or other similar device that provides for a means of escape and access for rescue in the event of an emergency. (See also "Grade floor emergency escape and rescue opening.")
>
> [RB] **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 (1118 mm) above or below the finished ground level adjacent to the opening. (See also "Emergency escape and rescue opening.")

Building Planning

Chapter 3 (Building Planning)

- **Section R301.1.4** - PA UCC RAC modification to provisions for Intermodal Shipping Containers to require third party inspection certification of the container structure to be documented as free from contaminants, along with certification from a Registered Design professional for all openings that exceed the limitations of IBC, Section 3115.

> - Section R301.1.4 Intermodal shipping containers, is adopted as follows:
>
> ***R301.1.4 Intermodal shipping containers.*** *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. Prior to permitting, the applicant shall have the unit certified as free from contaminants by a qualified 3rd party inspector approved by the AHJ. Any penetrations beyond those permitted in Section 3115 of the International Building Code shall be certified by a Pennsylvania Registered Design Professional.*

- **Section R301.2 -** Updated to match the IBC and ASCE 7 maps with a large portion of the country having wind speeds less than 115 mph. (*Figure R301.2(2) for ultimate design wind speeds identifies Philadelphia at 114 mph wind speed design.*)

- **Table R301.2.1(1) -** Component and cladding wind pressures in Table R301.2.1(1) are updated for new design wind speeds and hip or gable roof profiles for buildings with a mean roof height of 30 ft.

- **Section R302.2 –** Townhouse common walls are allowed to end inside outside walls where the required fire blocking is installed.

> **R302.2 Townhouses.**
>
> Walls separating *townhouse units* shall be constructed in accordance with Section R302.2.1 or R302.2.2 and shall comply with Sections 302.2.3 through 302.2.5.

R302.2.2 Common walls.

Common walls separating *townhouse units* shall be assigned a fire-resistance rating in accordance with Item 1 or 2 and shall be rated for fire exposure from both sides. Common walls shall extend to and be tight against the exterior sheathing of the exterior walls, or the inside face of exterior walls without stud cavities, and the underside of the roof sheathing. The common wall shared by two *townhouse units* shall be constructed without plumbing or mechanical equipment, ducts or vents, other than water-filled fire sprinkler piping in the cavity of the common wall. Electrical installations shall be in accordance with Chapters 34 through 43. Penetrations of the membrane of common walls for electrical outlet boxes shall be in accordance with Section R302.4.

1. Where an automatic sprinkler system in accordance with Section P2904 is provided, the common wall shall be not less than a 1-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the *International Building Code*.
2. Where an automatic sprinkler system in accordance with Section P2904 is not provided, the common wall shall be not less than a 2-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the *International Building Code*.

Exception: Common walls are permitted to extend to and be tight against the inside of the exterior walls if the cavity between the end of the common wall and the exterior sheathing is filled with a minimum of two 2-inch nominal thickness wood studs.

- **Section R302.3 –** Revised provisions to clarify that the existence of a lot line between two dwelling units in a single building has no bearing on the required fire-resistance rated distance between the units.

R302.3 Two-family dwellings.

Dwelling units in two-family dwellings shall be separated from each other by wall and floor assemblies having not less than a 1-hour fire-resistance rating where tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the *International Building Code*. Such separation shall be provided regardless of whether a *lot line* exists between the two *dwelling units* or not. Fire-resistance-rated floor/ceiling and wall assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.

Exceptions:

1. A fire-resistance rating of $^{1}/_{2}$ hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.
2. Wall assemblies need not extend through attic spaces where the ceiling is protected by not less than $^{5}/_{8}$-inch (15.9 mm) Type X gypsum board, an attic draft stop constructed as specified in Section R302.12.1 is provided above and along the wall assembly separating the *dwellings* and the structural framing supporting the ceiling is protected by not less than $^{1}/_{2}$-inch (12.7 mm) gypsum board or equivalent.

- **Section R302.4 –** The list of metal penetrating devices that do not need a firestop system now includes water filled fire sprinkler piping made of any permitted material, as long as the annular area is filled with the materials specified.

R302.4.1 Through penetrations.

Through penetrations of fire-resistance-rated wall or floor assemblies shall comply with Section R302.4.1.1 or R302.4.1.2.

Exceptions:

1. Where the penetrating items are steel, ferrous or copper pipes, tubes or conduits, the annular space shall be protected as follows:
   - 1.1. In concrete or masonry wall or floor assemblies, concrete, grout or mortar shall be permitted where installed to the full thickness of the wall or floor assembly or the thickness required to maintain the fire-resistance rating, provided that both of the following are complied with:
     - 1.1.1. The nominal diameter of the penetrating item is not more than 6 inches (152 mm).
     - 1.1.2. The area of the opening through the wall does not exceed 144 square inches (92 900 mm^2).
   - 1.2. The material used to fill the annular space shall prevent the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E119 or UL 263 time temperature fire conditions under a positive pressure differential of not less than 0.01 inch of water (3 Pa) at the location of the penetration for the time period equivalent to the fire-resistance rating of the construction penetrated.
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.

R302.4.2 Membrane penetrations.

Membrane penetrations shall comply with Section R302.4.1. Where walls are required to have a fire-resistance rating, recessed fixtures shall be installed so that the required fire-resistance rating will not be reduced.

Exceptions:

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.

- **Section R302.5** - Doors between the garage and residence must be self-latching.

R302.5.1 Opening protection.

Openings from a private garage directly into a room used for sleeping purposes shall not be permitted. Other openings between the garage and residence shall be equipped with solid wood doors not less than $1^3/_8$ inches (35 mm) in thickness, solid or honeycomb-core steel doors not less than $1^3/_8$ inches (35 mm) thick, or 20-minute fire-rated doors. Doors shall be self-latching and equipped with a self-closing or automatic-closing device.

- **Section R303.1** - Local exhaust systems are an acceptable substitute for natural ventilation in kitchens.

R303.1 Habitable rooms.

Habitable rooms shall have an aggregate glazing area of not less than 8 percent of the floor area of such rooms. Natural *ventilation* shall be through windows, skylights, doors, louvers or other *approved* openings to the outdoor air. Such openings shall be provided with ready access or shall otherwise be readily controllable by the building occupants. The openable area to the outdoors shall be not less than 4 percent of the floor area being ventilated.

Exceptions:

1. For habitable rooms other than kitchens, the glazed areas need not be openable where the opening is not required by Section R310 and a whole-house mechanical *ventilation* system or a mechanical ventilation system capable of producing 0.35 air changes per hour in the habitable rooms is installed in accordance with Section M1505.
2. For kitchens, the glazed areas need not be openable where the opening is not required by Section R310 and a local exhaust system is installed in accordance with Section M1505.

- **Section R305.1** - Ceiling height minimum is now reduced to 78 inches under beams and spaced at least 36 in apart with revised language under the PA UCC RAC.

- Section R305.1 Minimum height, is adopted as follows:

R305.1 Minimum height. *Habitable space, hallways and portions of basements containing these spaces shall have a ceiling height of not less than 7 feet (2134 mm). Bathrooms, toilet rooms and laundry rooms shall have a ceiling height of not less than 6 feet 8 inches (2032 mm).*

Exceptions:

1. *For rooms with sloped ceilings, the required floor area of the room shall have a ceiling height of not less than 5 feet (1524 mm) and not less than 50 percent of the required floor area shall have a ceiling height of not less than 7 feet (2134 mm).*

2. *The ceiling height above bathroom and toilet room fixtures shall be such that the fixture is capable of being used for its intended purpose. A shower or tub equipped with a showerhead shall have a ceiling height of not less than 6 feet 8 inches (2032 mm) above an area of not less than 30 inches (762 mm) by 30 inches (762 mm) at the showerhead.*

3. *Beams, girders, ducts or other obstructions in basements containing habitable space shall be permitted to project to within 6 feet 4 inches (1931 mm) of the finished floor.*

4. *Beams and girders spaced apart ~~not less than~~ a minimum of 36 inches (914 mm) in clear finished width between projections, and shall have a minimum clear ceiling height of 6 feet 6 inches (1981 mm) from the finished floor directly under the beam ~~shall project not more than 78 inches (1981 mm) from the finished floor~~.*

- **Section R308.4.5 -** For elements pertaining to wet surfaces, the phrases "facing" has been replaced by the phrases "adjacent to" in the language addressing glazing in walls, enclosures, or fences near tubs, showers, and swimming pools.

R308.4.5 Glazing and wet surfaces.

Glazing in walls, enclosures or fences containing or adjacent to hot tubs, spas, whirlpools, saunas, steam rooms, bathtubs, showers and indoor or outdoor swimming pools where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface shall be considered to be a hazardous location. This shall apply to single glazing and each pane in multiple glazing.

Exception: Glazing that is more than 60 inches (1524 mm), measured horizontally, from the water's edge of a bathtub, hot tub, spa, whirlpool or swimming pool or from the edge of a shower, sauna or steam room.

- **Section R308.6** - The wording has been changed to clarify the broken glass retention screen requirements for skylights based on specific conditions that would require retention screen installation.

R308.6.5 Screens not required.

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. Screens shall not be required where fully tempered glass is used as single glazing or the inboard pane in multiple glazing and either of the following conditions is met:

1. The glass area is 16 square feet (1.49 m^2) or less; the highest point of glass is not more than 12 feet (3658 mm) above a walking surface; the nominal glass thickness is not more than $^3/_{16}$ inch (4.8 mm); and for multiple glazing only the other pane or panes are fully tempered, laminated or wired glass.
2. The glass area is greater than 16 square feet (1.49 m^2); the glass is sloped 30 degrees (0.52 rad) or less from vertical; and the highest point of glass is not more than 10 feet (3048 mm) above a walking surface.

- **Section R310.1 -** Emergency escape and rescue opening requirements revised to identify a minimum 36-inch-wide pathway to be required to a public way, and operational requirements have been made explicit to clarify use of fall prevention devices and location of the opening to be provided a maximum of 70-inches above the finished floor. Revised provisions under the PA UCC Rac also provide exceptions to reduce the pathway width to 30-inches where access to a public way is provided through a shared easement from a sprinklered structure on an in-fill lot.

Section R310.1 Emergency escape and rescue opening required, is adopted as follows:

R310.1 Emergency escape and rescue opening required. *Basements, habitable attics and every sleeping room shall have not less than one operable emergency escape and rescue opening. Where basements contain one or more sleeping rooms, an emergency escape and rescue opening shall be required in each sleeping room. Emergency escape and rescue openings shall open directly into a public way, or to a yard or court having a minimum width of 36 inches (914 mm) that opens to a public way.*

Exceptions:

4. *Properties with in-fill lots that are sprinklered in accordance with Section 2904, and a minimum clear yard size of 80 sq ft (7.43 m^2)shall, be allowed to have access to the public way provided by a shared easement that is a minimum of 30 in (762 mm) wide.*

- **Section R310.2.4** - The emergency escape & rescue openings located under decks, porches, and cantilevers require a minimum of 36-inch-wide pathway and the opening dimensions have been clarified.

> **R310.2.4 Emergency escape and rescue openings under decks, porches and cantilevers.**
>
> *Emergency escape and rescue openings* installed under decks, porches and cantilevers shall be fully openable and provide a path not less than 36 inches (914 mm) in height and 36 inches (914 mm) in width to a *yard* or court.

- **R310.3 / R310.4 Area Wells for Emergency Escape and Rescue Openings** - Window well and area well provisions for emergency escape and rescue openings have been combined into one section for area well requirements.

- **R310.5 / R310.6 / R310.7 Emergency Escape and Rescue Openings in Existing Buildings** - For emergency escape and rescue openings installed for basement additions, remodels, and occupancy changes, opening dimension requirements reductions are more explicitly recognized under the 2021 IRC.

> **R310.6 Dwelling additions.**
>
> Where *dwelling additions* contain sleeping rooms, an *emergency escape and rescue opening* shall be provided in each new sleeping room. Where *dwelling additions* have *basements*, an *emergency escape and rescue opening* shall be provided in the new *basement*.
>
> **Exceptions:**
>
> 1. An *emergency escape and rescue opening* is not required in a new *basement* that contains a sleeping room with an *emergency escape and rescue opening*.
> 2. An *emergency escape and rescue opening* is not required in a new *basement* where there is an *emergency escape and rescue opening* in an existing *basement* that is accessed from the new *basement*.
> 3. An operable window complying with Section 310.7.1 shall be acceptable as an *emergency escape and rescue opening*.

> **R310.7 Alterations or repairs of existing basements.**
>
> New sleeping rooms created in an existing *basement* shall be provided with *emergency escape and rescue openings* in accordance with Section R310.1. Other than new sleeping rooms, where existing basements undergo alterations or repairs, an *emergency escape and rescue opening* is not required.
>
> **Exception:** An operable window complying with Section 310.7.1 shall be acceptable as an emergency escape and rescue opening.

> **R310.7.1 Existing emergency escape and rescue openings.**
>
> Where a *change of occupancy* would require an *emergency escape and rescue opening* in accordance with Section R310.1, operable windows serving as the *emergency escape and rescue opening* shall comply with the following:
>
> 1. An existing operable window shall provide a minimum net clear opening of 4 square feet (0.38 m^2) with a minimum net clear opening height of 22 inches (559 mm) and a minimum net clear opening width of 20 inches (508 mm).
> 2. A replacement window where such window complies with both of the following:
>
> 2.1. The replacement window meets the size requirements in Item 1.
>
> 2.2. The replacement window is the manufacturer's largest standard-size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.

- **R311.7 / R311.8 -** The exceptions under Sections R311.7 and R311.8 have been clarified to only apply to ramps and stairways that are part of or serve a porch, deck, or building.

R311.7 Stairways.

Where required by this code or provided, *stairways* shall comply with this section.

Exceptions:

1. *Stairways* not within or serving a building, porch or deck.
2. *Stairways* leading to nonhabitable attics.
3. *Stairways* leading to crawl spaces.

R311.8 Ramps.

Where required by this code or provided, *ramps* shall comply with this section.

Exception: *Ramps* not within or serving a building, porch or deck.

- **R311.7.4 -** PA UCC RAC modifications to revise walkline requirements to the language under the previously adopted modification under the 2018 adoption.

R311.7.4 Walkline. *The walkline across winder treads and landings shall be concentric to the turn and parallel to the direction of travel entering and exiting the turn. The walkline shall be located 12 inches (305 mm) from the inside of the turn. The 12-inch (305 mm) dimension shall be measured from the widest point of the clear stair width at the walking surface. Where winders are adjacent within a flight, the point of the widest clear stair width of the adjacent winders shall be used.*

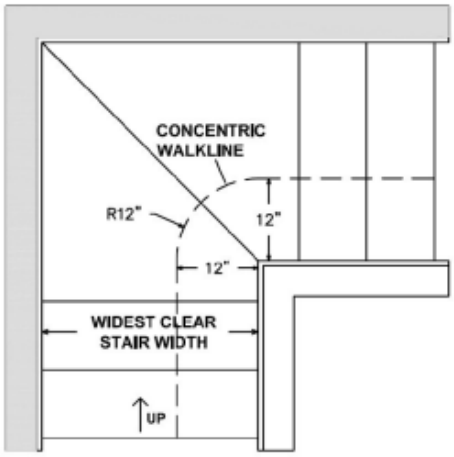

FIGURE R311.7.4
WINDER TREAD AND LANDING DETAIL

- **R311.7.7 -** Exterior landings that are intended to drain surface waters away from the building are permitted to a steeper slope by a recent exception, not to exceed a 5-percent slope (1V:20H).

R311.7.7 Stairway walking surface.

The walking surface of treads and landings of *stairways* shall be sloped not steeper than 1 unit vertical in 48 units horizontal (2-percent slope).

Exception: Where the surface of a landing is required elsewhere in the code 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.

- **R312.2** - The revised language clarifies that measurements for determining the need for fall protection are taken to the bottom of the clear opening of the window.

> **R312.2.2 Emergency escape and rescue openings.**
>
> Where an operable window serves as an *emergency escape and rescue opening*, a window opening control device or fall prevention device, after operation to release the control device or fall prevention device allowing the window to fully open, shall not reduce the net clear opening area of the window unit to less than the area required by Sections R310.2.1 and R310.2.2.

- **R314.3** - A new location requirement for smoke alarms addresses high ceilings adjacent to hallways serving bedrooms.

> **R314.3 Location.**
>
> Smoke alarms shall be installed in the following locations:
>
> 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 (610 mm) or more.

- **R314.4** - PA UCC RAC modifications maintain the language under the 2015 IRC adoption for smoke alarm interconnections.

> - Section R314.4 Interconnection, was not modified as part of the Pennsylvania 2018 IBC adoption, maintain g the 2015 IRC language. The national language was not modified in 2021 code, and as such, this language was again maintained as written in the 2015 adoption and in the current Pennsylvania 2021 IRC adoption as follows:
>
> ***R314.4 Interconnection.*** *Where more than one smoke alarm is required to be installed within an individual dwelling unit in accordance with Section R314.3, the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual dwelling unit. Physical interconnection of smoke alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm.*
>
> ***Exception:*** *Interconnection of smoke alarms in existing areas shall not be required where alterations or repairs do not result in removal of interior wall or ceiling finishes exposing the structure, unless there is an attic, crawl space or basement available that could provide access for interconnection without the removal of interior finishes.*

- **R315.2.2** - Carbon monoxide alarms are now retroactively required when repairs are made to an existing fuel-fired mechanical system.

> **R315.2.2 Alterations, repairs and additions.**
>
> Where *alterations*, *repairs* or *additions* requiring a *permit* occur, the individual *dwelling unit* shall be equipped with carbon monoxide alarms located as required for new *dwellings*.
>
> **Exceptions:**
>
> 1. Work involving the exterior surfaces of *dwellings*, such as the replacement of roofing or siding, or the addition or replacement of windows or doors, or the addition of a porch or deck.
> 2. Installation, *alteration* or repairs of plumbing systems.
> 3. Installation, alteration or repairs of mechanical systems that are not fuel fired.

- **R317.1** - The changes of section R317.1 were made for clarification of requirements (to include protection to exposed installations of wood members) and organization throughout the 2021 IRC, with no changes to the technical requirements for decay protection of wood elements.

- **R320** - Accessibility requirements are clarified for owner-occupied lodging houses and live/work units built under the IRC, with accessibility to be provided in non-residential portions of the unit.

> **R320.2 Live/work units.**
>
> In *live/work units*, the nonresidential portion shall be accessible in accordance with Sections 508.5.9 and 508.5.11 of the *International Building Code*. In a structure where there are four or more *live/work units*, the dwelling portion of the *live/work unit* shall comply with Section 1108.6.2.1 of the *International Building Code*.

- **R323** - Additional guidelines for storm shelter design are included to reference the design criteria under ICC-500.

> **R323.1.1 Sealed documentation.**
>
> 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.

- **R324.3** - Revised provisions included for building-integrated photovoltaic (BIPV) systems, to specify conformance with NFPA 70 standards and UL listing & labelling. Exceptions are also introduced to exempt setbacks or firefighter access routes where removal or cutting away of portions of the BIPV system during firefighting operations are determined to not expose a firefighter to electrical shock hazards.

- **R325.5** - Provisions for mezzanine openness were modified by the PA UCC RAC under the 2015 IRC adoption, and will remain under the adopted 2015 language.

> Section R325.5 Openness, was modified as part of the Pennsylvania 2015 IRC adoption. The national language was not modified in the 2018 code nor the 2021 code, and as such will remain as adopted in the Pennsylvania 2015 IRC adoption and in the current Pennsylvania 2021 IRC adoption as follows:
>
> ***R325.5 Openness.*** *Mezzanines shall be open and unobstructed to the room in which they are located except for walls not more than ~~42 inches (1067 mm)~~ 36 inches (914 mm) in height, columns and posts.*
>
> ***Exceptions:***
>
> 1. *Mezzanines or portions thereof are not required to be open to the room in which they are located, provided that the aggregate floor area of the enclosed space is not greater than 10 percent of the mezzanine area.*
> 2. ~~*In buildings that are not more than two stories above grade plane and equipped throughout with an automatic sprinkler system in accordance with NFPA 13R or NFPA 13D, a mezzanine having two or more means of egress shall not be required to be open to the room in which the mezzanine is located.*~~

- **R326 -** New restrictions introduced to limit the areas of habitable attics where they are not treated as a story above grade. Note that the PA UCC RAC modifies the code provisions to eliminate requirements for sprinkler coverage of habitable attics that are not considered a story above grade.

  - Section R326.3 Story above grade plane, is adopted as follows:

    R326.3 Story above grade plane. *A habitable attic shall be considered a story above grade plane.*

    Exceptions: A habitable attic shall not be considered to be a story above grade plane provided that the habitable attic meets all the following:

    1. *The aggregate area of the habitable attic is either of the following:*
       - 1.1. *Not greater than one-third of the floor area of the story below.*
       - 1.2. *Not greater than one-half of the floor area of the story below where the habitable attic is located within a dwelling unit equipped with a fire sprinkler system in accordance with Section P2904.*
    2. *The occupiable space is enclosed by the roof assembly above, knee walls, if applicable, on the sides and the floor-ceiling assembly below.*
    3. ~~*The floor of the habitable attic does not extend beyond the exterior walls of the story below.*~~
    4. ~~*Where a habitable attic is located above a third story, the dwelling unit or townhouse unit shall be equipped with a fire sprinkler system in accordance with Section P2904.*~~

Building Construction

Chapter 4 (Foundations)

- **Table R403.1(1) -** Tables R403.1(1), (2) and (3) are revised to more accurately reflect current practice for concrete footing installations below light-frame construction based on revised load combination factor calculations (for roof snow loads and live loads) and loading assumptions.

- **R406.2 -** Six-mil polyvinyl chloride and polyethylene fabrics are removed from the list of approved waterproofing materials for foundation systems due to the likelihood of these materials to rip and tear against debris, frost, and sharp stones/rocks.

Chapter 5 (Floors)

- **R506.2.3–** PA UCC RAC modifications revert the vapor retarder requirements to a minimum 6-mil thickness for flooring.

  Chapter 5 Floors, was adopted with the following modification:

  - Section R506.2.3 Vapor retarder, is adopted as follows:

    R506.2.3 Vapor retarder. *A minimum* ~~*10 mil (0.010 inch; 0.25mm) vapor retarder conforming to ASTM E1745 Class A requirements*~~ *6 mil (0.006 inch: 152 mm) polyethylene or approved vapor retarder with joints lapped not less than 6 inches (152 mm) shall be placed between the concrete floor slab and the base course or the prepared subgrade where a base course does not exist.*

    Exception: *The vapor retarder is not required for the following:*

    1. *Garages, utility buildings and other unheated accessory structures.*
    2. *For unheated storage rooms having an area of less than 70 square feet (6.5 m^2) and carports.*
    3. *Driveways, walks, patios and other flatwork not likely to be enclosed and heated at a later date.*
    4. *Where approved by the building official, based on local site conditions.*

- **R507 -** Deck design is now based on live and snow loads. (Live load design would govern deck installations in Philadelphia.)

> **R507.1 Decks.**
>
> Wood-framed decks shall be in accordance with this section. Decks shall be designed for the *live load* required in Section R301.5 or the ground snow load indicated in Table R301.2, whichever is greater. For decks using materials and conditions not prescribed in this section, refer to Section R301.

- **R507.3 -** A tributary area tabulation of 5 sf is added to the deck footing size table, and clarifications are provided regarding freestanding deck footing depth requirements, and exceptions where all requirements have been met for deck size limitations, joist bearing, and walking surface locations.

- **R507.4–** Revised table now includes parameters for the tributary area supported by a deck post and the wood species in order to determine the maximum post height.

- **R507.5** - The deck beam span table is divided into several tables that provide spans for a given snow or deck live load. Options are also included for supporting cantilevered deck joists as well as single and multi-ply spans listed.

- **R507.6** - For decks with significant ground snow loads, deck joist options have been added. (Deck Live Load still governs for Philadelphia.) Maximum joist spans are now the specific basis for cantilever spans.

- **R507.7 -** For single- and multi-span configurations, the wood decking table has been updated to display the maximum on-center joist spacing, with clarification on multi-span applications.

- **R507.10 -** Specific requirements for exterior deck guards are added to address: 1) reinforcement of load path from guard and rail to the deck joists, beams or blocking to which a guard is connected, 2) Restricted use of end grain connections in withdrawal, and 3) resistance to rotation when guards are connected to sides of beams/joists through the connection of the beam/joist to adjacent joists.

Chapter 6 (Wall Construction)

- **Table R602.3(1) -** The fastener table for the light-framed construction walls and roof now includes more fastener options.

- **Table R602.3(1) -** More fastener options are added to the roof sheathing section's fastener table for light-framed construction while maximum field nailing is reduced to conform with the 2018 Wood Frame Construction Manual & wind load values under ASCE 7.

- **Table R602.3(2)** - Table R602.3(2) footnote g is updated for clarity on alternate roof sheathing fastening limitations for light-framed construction based on the ultimate design wind speed.

- **R602.9** - Cripple wall requirements for light-framed construction revised to apply only to exterior cripple walls.

- **R609.4.1** - A permanent label identifying wind pressure ratings and other details must be attached to every garage door.

> **R609.4.1 Garage door labeling.**
>
> Garage doors shall be*labeled* with a permanent *label* provided by the garage door manufacturer. The *label* shall identify the garage door manufacturer, the garage door model/series number, the positive and negative design wind pressure rating, the installation instruction drawing reference number, and the applicable test standard.

Chapter 7 (Wall Covering)

- **R702.7** - The vapor retarder section is reorganized for clarity and ease of use.

> **R702.7 Vapor retarders.**
>
> Vapor retarder materials shall be classified in accordance with Table R702.7(1). A vapor retarder shall be provided on the interior side of frame walls of the class indicated in Table R702.7(2), including compliance with Table R702.7(3) or R702.7(4) where applicable. An *approved* design using accepted engineering practice for hygrothermal analysis shall be permitted as an alternative. The climate zone shall be determined in accordance with Section N1101.7.
>
> **Exceptions:**
>
> 1. *Basement walls.*
> 2. Below-grade portion of any wall.
> 3. Construction where accumulation, condensation or freezing of moisture will not damage the materials.
> 4. A vapor retarder shall not be required in Climate Zones 1, 2 and 3.

TABLE R702.7(1)VAPOR RETARDER MATERIALS AND CLASSES

CLASS	ACCEPTABLE MATERIALS
I	Sheet polyethylene, nonperforated aluminum foil or other approved materials with a perm rating less than or equal to 0.1.
II	Kraft-faced fiberglass batts, vapor retarder paint or other approved materials applied in accordance with the manufacturer's installation instructions for a perm rating greater than 0.1 and less than or equal to 1.0.
III	Latex paint, enamel paint or other approved materials applied in accordance with the manufacturer's installation instructions for a perm rating greater than 1.0 and less than or equal to 10.0.

TABLE R702.7(2)VAPOR RETARDER OPTIONS

CLIMATE ZONE	VAPOR RETARDER CLASS		
	CLASS I[a]	CLASS II[a]	CLASS III
1, 2	Not Permitted	Not Permitted	Permitted
3, 4 (except Marine 4)	Not Permitted	Permitted[c]	Permitted
Marine 4, 5, 6, 7, 8	Permitted[b]	Permitted[c]	See Table R702.7(3)

a. Class I and II vapor retarders with vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B) shall be allowed on the interior side of any frame wall in all climate zones.
b. Use of a Class I interior vapor retarder in frame walls with a Class I vapor retarder on the exterior side shall require an approved design.
c. Where a Class II vapor retarder is used in combination with foam plastic insulating sheathing installed as continuous insulation on the exterior side of frame walls, the continuous insulation shall comply with Table R702.7(4) and the Class II vapor retarder shall have a vapor permeance greater than 1 perm when measured by ASTM E96 water method (Procedure B).

TABLE R702.7(4)CONTINUOUS INSULATION WITH CLASS II VAPOR RETARDER

CLIMATE ZONE	CLASS II VAPOR RETARDERS PERMITTED FOR:[a]
3	Continuous insulation with *R*-value ≥ 2.
4, 5 and 6	Continuous insulation with *R*-value = 3 over 2 4 wall. Continuous insulation with *R*-value ≥ 5 over 2 6 wall.
7	Continuous insulation with *R*-value ≥ 5 over 2 4 wall. Continuous insulation with *R*-value ≥ 7.5 over 2 6 wall.
8	Continuous insulation with *R*-value ≥ 7.5 over 2 4 wall. Continuous insulation with *R*-value ≥ 10 over 2 6 wall.

a. The requirements in this table apply only to insulation used to control moisture in order to permit the use of Class II vapor retarders. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of Chapter 11.

- **R703.2 –** PA UCC RAC modifies the provisions of the code relating to water-resistive barriers and stucco installation to include revised materials allowance and barrier exceptions.

  - Section R703.2 Water-resistive barrier, is adopted as follows:

~~***R703.2 Water-resistive barrier.*** *Not fewer than one layer of water-resistive barrier shall be applied over studs or sheathing of all exterior walls with flashing as indicated in Section R703.4, in such a manner as to provide a continuous water-resistive barrier behind the exterior wall veneer. The water-resistive barrier material shall be continuous to the top of walls and terminated at penetrations and building appendages in a manner to meet the requirements of the exterior wall envelope as described in Section R703.1. Water-resistive barrier materials shall comply with one of the following:~~

~~1. No. 15 felt complying with ASTM D226, Type 1.~~

~~2. ASTM E2568, Type 1 or 2.~~

~~3. ASTM E331 in accordance with Section R703.1.1.~~

~~4. Other approved materials in accordance with the manufacturer's installation instructions.~~

~~No.15 asphalt felt and water-resistive barriers complying with ASTM E2556 shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm), and where joints occur, shall be lapped not less than 6 inches (152 mm).~~

R703.2 Water-resistive barrier. *Not fewer than one layer of water-resistive barrier shall be applied over studs or sheathing of all exterior walls with flashing as indicated in Section R703.4, in such a manner as to provide a continuous water-resistive barrier behind the exterior wall veneer. The water-resistive barrier material shall be continuous to the top of walls and terminated at penetrations and building appendages in a manner to meet the requirements of the exterior wall envelope as described in Section R703.1. Where the water-resistive barrier also functions as a component of a continuous air barrier, the water-resistive barrier shall be installed as an air barrier in accordance with Section N1102.4.1.1. Water-resistive barrier materials shall comply with one of the following:*

1. *No. 15 felt complying with ASTM D226, Type 1.*
2. *ASTM E2568, Type 1 or 2.*
3. *Foam plastic insulating sheathing water-resistive barrier systems complying with Section R703.1.1 and installed in accordance with the manufacturer's installation instructions.*
4. *ASTM E331 in accordance with Section R703.1.1.*
5. *Other approved materials in accordance with the manufacturer's installation instructions.*

No.15 asphalt felt and water-resistive barriers complying with ASTM E2556 shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm), and where joints occur, shall be lapped not less than 6 inches (152 mm).

Exception: A water-resistive barrier shall not be required in unconditioned detached tool sheds, playhouses, and other similar accessory structures provided all of the following requirements are met:

1. *Exterior wall covering is limited to siding that is attached directly to the studs.*
2. *Exterior walls are uninsulated.*
3. *Interior side of exterior walls has no wall covering or wall finishes.*

- **R703.3.1** – Soffit installation requirements are modified by the PA UCC RAC to be required for exterior soffits only.

  - Section R703.3.1 Exterior soffit installation (Previous Soffit installation), is adopted as follows:

    ~~***R703.3.1 Soffit installation.*** *Soffits shall comply with Section R704.*~~

    R703.3.1 Exterior soffit installation. *Exterior soffits shall comply with Section R704.*

- **R703.4.1** – PA UCC RAC modifications to flashing installation requirements at exterior window & door openings.

  Section R703.4.1 Flashing installation at exterior window and door openings, is adopted as follows:

  ~~***R703.4.1 Flashing installation at exterior window and door openings.*** *Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to a water-resistive barrier complying with Section 703.2 for subsequent drainage. Air sealing shall be installed around all window and door openings on the interior side of the rough opening gap. Mechanically attached flexible flashings shall comply with AAMA 712. Flashing at exterior window and door openings shall be installed in accordance with one or more of the following:*~~

  ~~*1. The fenestration manufacturer's installation and flashing instructions, or for applications not addressed in the fenestration manufacturer's instructions, in accordance with the flashing manufacturer's instructions. Where flashing instructions or details are not provided, pan flashing shall be installed at the sill of exterior window and door openings. Pan flashing shall be sealed or sloped in such a manner as to direct water to the surface of the exterior wall finish or to the water resistive barrier for subsequent drainage. Openings using pan flashing shall incorporate flashing or protection at the head and sides.*~~

  ~~*2. In accordance with the flashing design or method of a registered design professional.*~~

  ~~*3. In accordance with other approved methods.*~~

R703.4.1 Flashing installation at exterior window and door openings. *Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to a water-resistive barrier complying with Section 703.2 for subsequent drainage. Air sealing shall be installed around all window and door openings on the interior side of the rough opening gap. Mechanically attached flexible flashings shall comply with AAMA 712. Flashing at exterior window and door openings shall be installed in accordance with one or more of the following:*

1. *The fenestration manufacturer's installation and flashing instructions, or for applications not addressed in the fenestration manufacturer's instructions, in accordance with the flashing or water-resistive barrier manufacturer's instructions. Where flashing instructions or details are not provided, pan flashing shall be installed at the sill of exterior window and door openings. Pan flashing shall be sealed or sloped in such a manner as to direct water to the surface of the exterior wall finish or to the water resistive barrier for subsequent drainage. Openings using pan flashing shall incorporate flashing or protection at the head and sides.*
2. *In accordance with the flashing design or method of a registered design professional.*
3. *In accordance with other approved methods.*

- **R703.7** – PA UCC RAC modifications to maintain previous language adopted in 2018 for minimum ASTM compliance standards.

  - Section R703.7 Exterior plaster (stucco), was modified as part of the Pennsylvania 2018 IRC adoption. The national language was not modified in the 2021 code, and as such will remain as adopted in the Pennsylvania 2018 IRC adoption and in the current Pennsylvania 2021 IRC adoption as follows:

    R703.7 Exterior plaster (stucco). *Installation of exterior plaster shall be in compliance with ASTM C926-2018B, ASTM C1063-2018B and the provisions of this code.*

- **Table R703.8.4(1)** - To accommodate thicker continuous insulation, larger air gaps are permitted behind veneer.

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.) × 7/8 in. wide	8d common nail[c] (2 1/2 in. × 0.131 in.)	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[c] (2 1/2 in. × 0.131 in.)	Minimum nominal 1 in. between sheathing and veneer	Maximum 4 5/8 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] (2 1/2 in. × 0.131 in.)	Greater than 4 5/8 in. between backing and veneer	Maximum 6 5/8 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 4 5/8 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 4 5/8 in. between backing and veneer	Maximum 6 5/8 in. between backing and veneer

For SI: 1 inch = 25.4 mm.

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.
b. An airspace that provides drainage shall be permitted to contain mortar from construction.
c. In Seismic Design Category D_0, D_1 or D_2, the minimum tie fastener shall be an 8d ring-shank nail (2 1/2 in. × 0.131 in.).
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 inches.
e. Adjustable tie pintles shall include not fewer than 2 pintle legs with a maximum offset of 1 1/4 inches. Distance between inside face of brick and end of pintle shall be a maximum of 2 inches.
f. Adjustable tie backing attachment components shall consist of one of the following: eyes with minimum wire W2.8 (MW18), barrel with minimum 1/4-inch outside diameter, or plate with minimum thickness of 0.074 inch and minimum width of 1 1/4 inches.

- **R703.11.2 –** Wind pressure ratings for vinyl siding are decreased for consistency with ASTM D 3679.

- **R704.1** – PA UCC RAC modifications limit the design requirements for soffit installation to exterior applications only.

  - Section R704.1 General wind limitations, is adopted as follows:

    ~~***R704.1 General wind limitations.*** *Where the design wind pressure is 30 pounds per square foot (1.44 kPa) or less, soffits shall comply with Section R704.2. Where the design wind pressure exceeds 30 pounds per square foot (1.44 kPa), soffits shall comply with Section R704.3. The design wind pressure on soffits shall be determined using the component and cladding loads specified in Table R301.2.1(1) for walls using an effective wind area of 10 square feet (0.93 m2) and adjusted for height and exposure in accordance with Table R301.2.1(2).*~~

    R704.1 General wind limitations. *Where the design wind pressure is 30 pounds per square foot (1.44 kPa) or less, exterior soffits shall comply with Section R704.2. Where the design wind pressure exceeds 30 pounds per square foot (1.44 kPa), exterior soffits shall comply with Section R704.3. The design wind pressure on exterior soffits shall be determined using the component and cladding loads specified in Table R301.2.1(1) for walls using an effective wind area of 10 square feet (0.93 m2) and adjusted for height and exposure in accordance with Table R301.2.1(2).*

- **R704.2/704.3 –** Revised under PA UCC RAC modifications to limit design requirements to exterior soffit applications.

Chapter 8 (Roof-Ceiling Construction)

- **R802 –** Revised provisions clarifying ridge beam and ceiling joist requirements to address rafter thrust resistance, with clarification of ridge beam and rafter tie installation locations based on ceiling joist bearing support configuration.

R802.5 Ceiling joists.

Ceiling joists shall be continuous across the structure or securely joined where they meet over interior partitions in accordance withSection R802.5.2.1. Ceiling joists shall be fastened to the top plate in accordance with Table R602.3(1).

R802.5.2 Ceiling joist and rafter connections.

Where ceiling joists run parallel to rafters and are located in the bottom third of the rafter height, they shall be installed in accordance with Figure R802.4.5 and fastened to rafters in accordance with Table R802.5.2(1). Where the ceiling joists are installed above the bottom third of the rafter height, the ridge shall be designed as a beam in accordance with Section R802.3. Where ceiling joists do not run parallel to rafters, rafters shall be tied across the structure with a rafter tie in accordance with Section R802.5.2.2, or the ridge shall be designed as a beam in accordance with Section R802.3.

- **Section R802.3** - Modified by PA UCC RAC to allow ridge boards to be accepted by girder support structures when designed in accordance with accepted engineering practices.

  - Section R802.3 Ridge, is adopted as follows:

    R802.3 Ridge. *A ridge board used to connect opposing rafters shall be not less than 1 inch (25 mm) nominal thickness and not less in depth than the cut end of the rafter. Where ceiling joist or rafter ties do not provide continuous ties across the structure as required by Section R802.5.2, the ridge shall be supported by a wall or ridge beam designed in accordance with accepted engineering practice and supported on each end by a wall, or column, or girder.*

- **Table R802.5.2(1)** - The heel joint connection table has been modified to accommodate 19.2-inch rafter spacing and roof spans of 24 feet.

- **R802.6** - Clarifications provided for end bearing requirements for ridge board connections, to include configurations with collar tie/strap installations and continuous tension ties (ceiling joists or rafter ties).

  R802.6 Bearing.

  The ends of each rafter or ceiling joist shall have not less than $1^1/_2$ inches (38 mm) of bearing on wood or metal and not less than 3 inches (76 mm) on masonry or concrete. The bearing on masonry or concrete shall be direct, or a sill plate of 2-inch (51 mm) minimum nominal thickness shall be provided under the rafter or ceiling joist. The sill plate shall provide a minimum nominal bearing area of 48 square inches (30 968 mm^2). 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.

- **Table R804.3** - Connections for cold-formed steel (CFS) roof framing members are updated and clarified to address increased wind pressure coefficients on roof surfaces and revised wind to ground snow load tables for steeper pitched roofs.

- **Section R806.1** - Ventilation requirements modified by PA UCC RAC to remove provisions requiring preventative screens for vector control in conformance with 2018 code adoption.

  - Section R806.1 Ventilation required, was modified as part of the Pennsylvania 2018 IRC adoption. The national language was not modified in the 2021 code, and as such will remain as adopted in the Pennsylvania 2018 IRC adoption and in the current Pennsylvania 2021 IRC adoption as follows:

    R806.1 Ventilation required. *Enclosed attics and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain or snow. Ventilation openings shall have a least dimension of 1/16 inch (1.6 mm) minimum and 1/4 inch (6.4 mm) maximum. Ventilation openings having a least dimension larger than 1/4 inch (6.4 mm) shall be provided with corrosion-resistant wire cloth screening, hardware cloth, perforated vinyl or similar material with openings having a least dimension of 1/16 inch (1.6 mm) minimum and 1/4 inch (6.4 mm) maximum. Openings in roof framing members shall conform to the requirements of Section R802.7. Required ventilation openings shall open directly to the outside air ~~and shall be protected to prevent the entry of birds, rodents, snakes and other similar creatures~~.*

- **Section R806.2** - Minimum Vent Area modified by PA UCC RAC to maintain 2015 Code Adoption provisions for minimum roof ventilation exceptions for ventilator make-up air balance to be provided through eave or cornice vents.

  - Section R806.2 Minimum vent area, was not modified as part of the Pennsylvania 2018 IRC adoption. The national language was not modified in the 2021 code, and as such will remain as adopted in the Pennsylvania 2015 IRC adoption and in the current Pennsylvania 2021 IRC adoption as follows:

    R806.2 Minimum vent area. *The minimum net free ventilating area shall be 1/150 of the area of the vented space.*

    Exception: *The minimum net free ventilation area shall be 1/300 of the vented space provided one or more of the following conditions are met:*

    1. *In Climate Zones 6, 7 and 8, a Class I or II vapor retarder is installed on the warm-in-winter side of the ceiling.*
    2. *Not less than 40 percent and not more than 50 percent of the required ventilating area is provided by ventilators located in the upper portion of the attic or rafter space. Upper ventilators shall be located not more than 3 feet (914 mm) below the ridge or highest point of the space, measured vertically, with the balance of the required ventilation provided by eave or cornice vents. Where the location of wall or roof framing members conflicts with the installation of upper ventilators, installation more than 3 feet (914 mm) below the ridge or highest point of the space shall be permitted.*

- **Section R806.3** – Vent & Insulation clearance requirements modified by PA UCC RAC to maintain prohibitions on obstructions to eave & cornice vents in conformance with 2018 adoptions.

  - Section R806.3 Vent and insulation clearance, was modified as part of the Pennsylvania 2018 IRC adoption. The national language was not modified in the 2021 code, and as such will remain as adopted in the Pennsylvania 2018 IRC adoption and in the current Pennsylvania 2021 IRC adoption as follows:

    R806.3 Vent and insulation clearance. *Where eave or cornice vents are installed, ~~blocking, bridging and insulation~~ nothing shall ~~not~~ block the free flow of air. Not less than a 1-inch (25 mm) space shall be provided between the insulation and the roof sheathing and at the location of the vent.*

Chapter 9 (Roof Assemblies)

- **R905.4.4.1** - Requirements for metal shingle wind resistance are added to Section R905.4 based on expanded standards testing provisions of ASTM D3161, with revised tabular designs for increased wind speeds and required shingle classification requirements.

Chapter 10 (Chimneys and Fireplaces)

- **Section R1005.8 –** Insulation shield requirements for fireplaces and chimneys removed from 2021 IRC by PA UCC RAC in alignment with 2018 Code adoption.

  - Section R1005.8 Insulation shield, was not adopted was not adopted as part of the Pennsylvania 2018 IRC adoption. The national language was not modified in the 2021 code, and as such will remain as adopted in the Pennsylvania 2018 IRC adoption and in the current Pennsylvania 2021 IRC adoption **without** the inclusion of Section R1005.8 Insulation shield

Mechanical

Chapter 13 (General Mechanical System Requirements)

- **M1305.1.3.2 –** Excavation pit requirements for appliance installations modified by PA UCC RAC to align with 2015 IRC language regarding depth and clearance requirements.

  - Section M1305.1.3.2 Excavations (Previous Pit locations), was not modified as part of the Pennsylvania 2018 IRC adoption. The national language was not modified in the 2021 code, and as such will remain as adopted in the Pennsylvania 2018 IRC adoption (2015 IRC language) and in the current Pennsylvania 2021 IRC adoption as follows:

    M1305.1.3.2 Excavations. *Excavations for appliance installations shall extend to a depth of 6 inches (152 mm) below the appliance and 12 inches (305 mm) on all sides, except that the control side shall have a clearance of 30 inches (762 mm).*

Chapter 15 (Exhaust Systems)

- **Section M1502.3.1 -** Clothes Dryer exhaust termination outlet and passageway size requirements not adopted under the PA UCC RAC modifications.

  - Chapter 15 Exhaust Systems, was adopted with the following modification:

    - Section M1502.3.1 Exhaust termination outlet and passageway size, was not adopted as part of the Pennsylvania 2018 IRC adoption. The national language was not modified in the 2021 code, and as such was **not** adopted

- **Section M1505 –** For balanced ventilation systems, the code now permits a 30% decrease in the mechanical ventilation airflow rate where whole-house ventilation system is demonstrated as a balanced ventilation system (as defined by the IRC) with ducted systems supplying ventilation air directly to living rooms, dining rooms, and kitchens.

[MP] BALANCED VENTILATION. Any combination of concurrently operating mechanical exhaust and mechanical supply whereby the total mechanical exhaust airflow rate is within 10 percent of the total mechanical supply airflow rate.

[MP] BALANCED VENTILATION SYSTEM. A ventilation system where the total supply airflow and total exhaust airflow are simultaneously within 10 percent of their averages. The balanced ventilation system airflow is the average of the supply and exhaust airflows.

M1505.1 General.

Where local exhaust or whole-house mechanical *ventilation* is provided, the ventilation system shall be designed in accordance with this section.

M1505.3 Exhaust equipment.

Exhaust fans and whole-house mechanical ventilation fans shall be *listed* and *labeled* as providing the minimum required airflow in accordance with ANSI/AMCA 210-ANSI/ASHRAE 51.

M1505.4.2 System controls.

The whole-house mechanical ventilation system shall be provided with controls that enable manual override. Controls shall include text or a symbol indicating their function.

M1505.4.3 Mechanical ventilation rate.

The whole-house mechanical ventilation system shall provide outdoor air at a continuous rate not less than that determined in accordance with Table M1505.4.3(1) or not less than that determined by Equation 15-1.

Ventilation rate in cubic feet per minute = (0.01 × total square foot area of house) + [7.5 × (number of bedrooms + 1)] (Equation 15-1)

Exceptions:

1. Ventilation rate credit. The minimum mechanical ventilation rate determined in accordance with Table M1505.4.3(1) or Equation 15-1 shall be reduced by 30 percent, provided that both of the following conditions apply:
   - 1.1. A ducted system supplies ventilation air directly to each bedroom and to one or more of the following rooms:
     - 1.1.1. Living room.
     - 1.1.2. Dining room.
     - 1.1.3. Kitchen.
   - 1.2. The whole-house ventilation system is a balanced ventilation system.
2. Programmed intermittent operation. The whole-house mechanical ventilation system is permitted to operate intermittently where the system has controls that enable operation for not less than 25 percent of each 4-hour segment and the ventilation rate prescribed in Table M1505.4.3(1), by Equation 15-1 or by Exception 1 is multiplied by the factor determined in accordance with Table M1505.4.3(2).

Chapter 18 (Chimneys and Vents)

- **M1802.4 –** Revised oil-fired appliance provisions for consistency with the requirements for certain gas-fired appliances with code language added to require blocked (obstructed) vent switches that can serve to detect spillage from the venting system, shut off the appliance, and prevent carbon monoxide poisoning.

> **M1802.4 Blocked vent switch.**
>
> 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.

Chapter 21 (Hydronic Piping)

- **M2101 –** Section M2101 replicates the ground source heat pump loop piping system requirements found in Section M2105, making them applicable to all hydronic piping systems.

Fuel Gas

Chapter 24 (Fuel Gas)

- **G2403 –** Definitions have been updated to make clear which parts of the gas piping system are subject to serving utility regulation and which are subject to IRC fuel gas provisions downstream of the point of delivery.

> **POINT OF DELIVERY.** For natural gas systems, the *point of delivery* is the outlet of the service meter assembly or the outlet of the service regulator or service shutoff valve where a meter is not provided. Where a system shutoff valve is provided after the outlet of the service meter assembly, such valve shall be considered to be downstream of the *point of delivery*. For undiluted liquefied petroleum gas systems, the *point of delivery* shall be considered to be the outlet of the service pressure regulator, exclusive of line gas regulators, in the system.

> **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 the *point of delivery*, to shut off the entire *piping system*.

- **G2414.8.3 –** Thread joint sealants are now required for assembling threaded joints in gas piping.

> **G2414.8.3 (403.8.3)Threaded joint sealing.**
>
> Threaded joints shall be made using a thread joint sealing material. Thread joint sealing materials shall be nonhardening and shall be resistant to the chemical constituents of the gases to be conveyed through the *piping*. Thread joint sealing materials shall be compatible with the pipe and fitting materials on which the sealing materials are used.

- **G2415.5 –** The list of threaded fittings authorized for concealed locations now includes plugs and caps.

> **G2415.5 (404.5)Fittings in concealed locations.**
>
> Fittings installed in concealed locations shall be limited to the following types:
>
> 1. Threaded elbows, tees, couplings, plugs and caps.
> 2. Brazed fittings.
> 3. Welded fittings.
> 4. Fittings *listed* to ANSI LC1/CSA 6.26 or ANSI LC4/CSA 6.32.

- **G2427.2.2** – PA UCC RAC modifies language for appliances with integral vents to conform to Section G2427.8 without reference to items 1 & 2.

> ▪ Section G2427.2.2 (503.2.4) Appliances with integral vents, was adopted as follows:
>
> ***G2427.2.2 (503.2.4) Appliances with integral vents.*** *Appliances incorporating integral venting means shall be installed in accordance with Section G2427.8, ~~Items 1 and 2~~.*

- **G2427.5.1** – PA UCC RAC modifies language for factory-built chimneys to require installation compliance with the manufacturer's instructions.

> ▪ Section G2427.5.1 (503.5.1) Factory-built chimneys, is adopted as follows:
>
> ***G2427.5.1 (503.5.1) Factory-built chimneys.*** *Factory-built chimneys shall be listed in accordance with UL 103 and installed in accordance with manufacturer's instructions. Factory-built chimneys used to vent appliances that operate at a positive vent pressure shall be listed for such application.*

- **G2427.5.4** – PA UCC RAC modifications to chimney vents revises requirements for any chimney flue serving two appliances with draft hoods.

  - Section G2427.5.4 (503.5.5) Size of chimneys, is adopted as follows:

    G2427.5.4 (503.5.5) Size of chimneys. *The effective area of a chimney venting system serving listed appliances with draft hoods, Category I appliances, and other appliances listed for use with Type B vents shall be determined in accordance with one of the following methods:*

    1. *The provisions of Section G2428.*
    2. *The effective areas of the vent connector and chimney flue of a venting system serving a single appliance with a draft hood shall be not less than the area of the appliance flue collar or draft hood outlet, nor greater than seven times the draft hood outlet area.*
    3. *The effective area of a chimney flue or a venting system serving two appliances with draft hoods, shall be not less than the area of the larger draft hood outlet plus 50 percent of the area of the smaller draft hood outlet. Nor greater than seven times the smallest draft hood outlet.*
    4. *Chimney venting systems using mechanical draft shall be sized in accordance with approved engineering methods.*
    5. *Other approved engineering methods.*

- **G2427.5.5.1** – The exception allowing an existing chimney to vent replacement appliances have been deleted, closing exemptions that previously allowed new updated appliance systems to be served by unlined chimney vents.

- **G2427.5.10** – PA UCC RAC includes modifications to insulation shield requirements to ensure conformance of insulation shield installation to manufacturer's installation instructions were provided as part of a listed chimney system.

  - Section G2427.5.10 (503.5.11) Insulation shield, is adopted as follows:

    G2427.5.10 (503.5.11) Insulation shield. *Where a factory-built chimney passes through insulated assemblies, an insulation shield constructed of steel having a thickness of not less than 0.0187 inch (0.475 mm) (nominal 26 gage) shall be installed to provide clearance between the chimney and the insulation material. The clearance shall be not less than the clearance to combustibles specified by the chimney manufacturer's installation instructions. Where chimneys pass through attic space, the shield shall terminate not less than 2 inches (51 mm) above the installation materials and shall be secured in place to prevent displacement. Insulation shields provided as part of a listed chimney system shall be installed in accordance with the manufacturer's installation instructions.*

- **G2427.8 –** For convenience, through-the-wall vent terminal clearance distances have been moved from Appendix C of the 2018 IRC and arranged into a new table with a corresponding figure.

- **G2439.5 –** A separate section now clarifies the need for a minimum 100 sq-inches transfer opening to supply makeup air to a closet intended for a gas clothes dryer.

- **G2447.2 –** Exceptions that would permit the installation of commercial cooking appliances in a residential unit under the 2018 IRC has been removed from 2021 provisions.