






Christopher Hine – October 12, 2022

PA UCC Residential Code Update: Part 2



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1

Description



In accordance with the requirements of Act 45 of 1999 as amended, the Pennsylvania Uniform Construction Code (UCC) Review and Advisory Council (RAC) completed the review of the 2018 I-Codes on April 29, 2021. The code provisions that were adopted during this process will take effect in the first quarter of 2022 with the official effective date to be confirmed. This session will build on Part 1 by providing an overview of the most substantial changes between the 2015 and 2018 ICC base codes for residential construction.

2

Learning Objectives

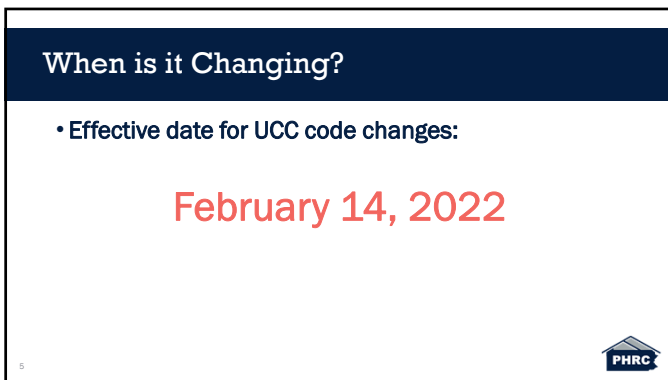
1. Review the most efficient ways to find out which code provisions have changed between the 2015 and 2018 ICC codes, including available ICC resources.
2. Discuss and highlight some of the most substantial and noteworthy code provision changes that will impact design, cost, and occupant safety.
3. Dive deeper into various code changes that will more substantially impact residential construction, including increased building envelope airtightness requirements.
4. Understand available resources to further study best practices that may be impacted by code changes, specifically focusing on those that affect the building enclosure.

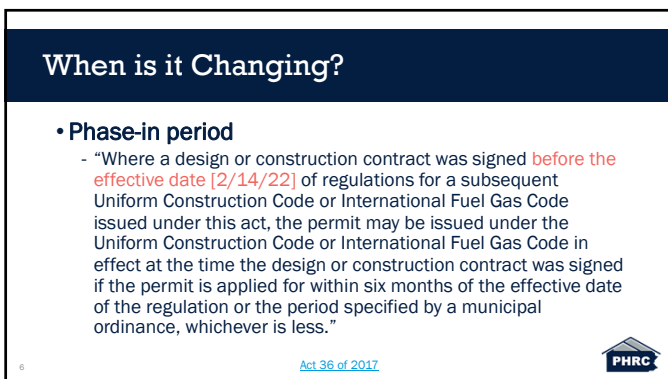
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6

More Questions & Clarification

- **What is defined as a contract?**
 - "design or construction contract "
- **Important dates:**
 - 2/14/22: Effective date of regulations
 - Contract signed on or after 2/14/22 is subject to new codes
 - 8/13/22: Last day of phase-in period



7

Scenarios

- **Contract signed before 2/14/22**
 - Can apply for permit before 8/14/22 and be subject to previous UCC codes
 - If permit application submitted on or after 8/14/22, subject to new codes
- **Contract signed after 2/14/22**
 - Subject to new codes



8

Where Do I Go for More Information?


- **PA UCC RAC Report:**
 - <https://www.dli.pa.gov/ucc/Documents/ICC-Code-Review-2018-Final-Report.pdf>
- **2018 IRC**
 - <https://codes.iccsafe.org/content/IRC2018>
- **2018 IECC**
 - <https://codes.iccsafe.org/content/iecc2018>



9

List of Statutory Amendments

- What are statutory amendments?
- Full list of statutory amendments to the UCC:
 - <https://www.dli.pa.gov/ucc/Pages/Regulations-and-Statutes.aspx>



10


Statutory Amendments

- **Act 13 of 2004:** Stairway tread & riser requirements
- **Act 92 of 2004:** Smoke alarm requirements
- **Act 108 of 2006:** Siding installation, lumber grading, & coal-fired boilers
- **Act 9 of 2007:** Concrete & masonry foundations
- **Act 1 of 2011:** Log walls, fire sprinklers, fire protection of floors, & wall bracing



11


What Type of Changes Will We See?



12

“Section of Change” – “Provision Modified or Not Adopted”

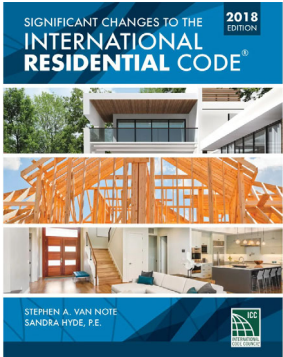
- Change Type – Addition, Modification or Clarification
- Change Summary – Summary of the significant change
- Code language with **changes in RED**




13

Today's Information

- International Code Council. (2018). *2018 Significant Changes to the International Residential Code, ICC, Country Club Hill, Ill.*





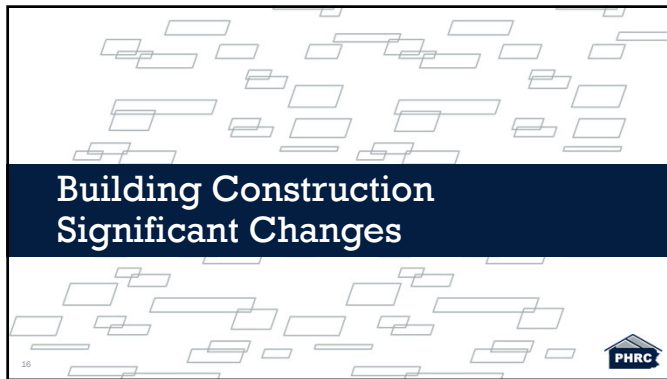
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References

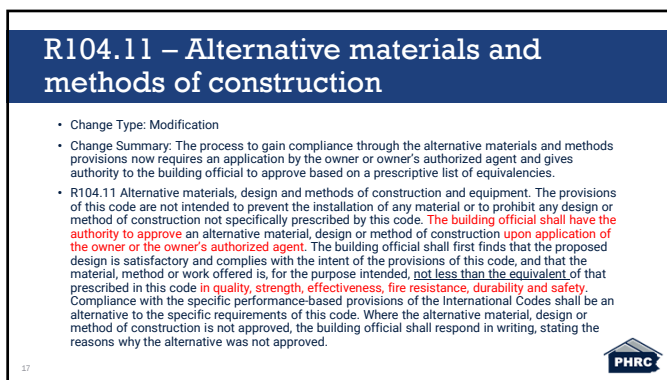
- International Code Council. (2008). *2009 International Residential Code, ICC, Country Club Hill, Ill.*
- International Code Council. (2014). *2015 International Residential Code, ICC, Country Club Hill, Ill.*
- International Code Council. (2017). *2018 International Residential Code, ICC, Country Club Hill, Ill.*
- International Code Council. (2018). *2018 Significant Changes to the International Residential Code, ICC, Country Club Hill, Ill.*



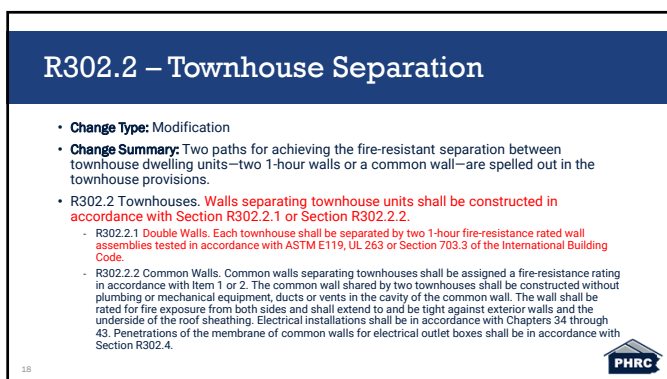
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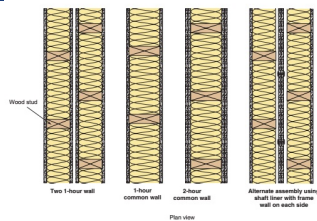


17



18

R302.2 – Townhouse Separation



Note: Support wallboard and wood stud assemblies must meet all materials, dimensions, spacing, installation and fastening requirements of the specific tested assembly.

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

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19

R302.4.2 – Membrane Penetrations

- **Change Type:** Modification
- **Change Summary:** Listed luminaires that have been tested for the application are specifically permitted for fire-resistant-rated ceiling membrane penetrations.
- 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:

- 1. through 3. No change to text
- 4. 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.



20

R302.5 – Dwelling-Garage Opening Protection – Not adopted per RAC Report; 2009 IRC

- **Change Type:** Modification
- **Change Summary:** An automatic-closing device is now permitted as an alternative to a self-closing device for the door between the garage and dwelling.
- RAC amended this and removed from UCC



21

R302.13 – Fire Protection of Floors above Crawl Spaces - Not Adopted Per Act 1 of 2011

- **Change Type:** Modification
- **Change Summary:** Fire-resistant membrane protection is now required for the applicable floor framing materials above crawl spaces containing fuel-fired or electric-powered heating appliances.
- R302.13 Fire protection of floors. Floor assemblies that are not required elsewhere in this code to be fire-resistance rated, shall be provided with a 1/2-inch (12.7 mm) gypsum wallboard membrane, 5/8-inch (16 mm) wood structural panel membrane, or equivalent on the underside of the floor framing member. Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaires, wires, speakers, drainage, piping and similar openings or penetrations shall be permitted.
- **Exceptions:**
 1. Floor assemblies located directly over a space protected by an automatic sprinkler system in accordance with Section P2904, NFPA 130, or other approved equivalent sprinkler system.
 2. Floor assemblies located directly over a crawl space not intended for storage or for the installation of fuel-fired or electric-powered heating appliances.
 3. 3 and 4. No change to text

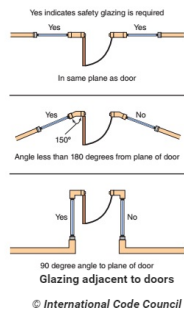
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22

R308.4.2 – Glazing Adjacent to Doors

- **Change Type:** Modification
- **Change Summary:** Glazing within 24 inches of the hinge side of an in-swinging door now requires safety glazing where the glazing is at an angle less than 180 degrees from the plane of the door.
- R308.4.2 Glazing adjacent to doors. Glazing in an individual fixed or operable panel adjacent to a door shall be considered to be a hazardous location where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) above the floor or walking surface and it meets either of the following conditions:
 1. Where the glazing is within 24 inches of either side of the door in the plane of the door in a closed position.
 2. Where the glazing is on a wall perpendicular to less than 180 degrees from the plane of the door in a closed position and within 24 inches of the hinge side of an in-swinging door.



23



23

R310.1 – Emergency Escape and Rescue Openings

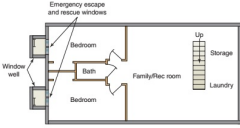
- **Change Type:** Modification
- **Change Summary:** Emergency escape and rescue openings are no longer required for bedrooms in basements when the dwelling unit is protected with an automatic fire sprinkler system and other conditions are met.
- R310.1 Emergency escape and rescue opening required. 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 that opens to a public way.
- **Exceptions:**
 1. Storm shelters and basements used only to house mechanical equipment not exceeding a total floor area of 200 square feet (18.58 m²).
 2. Where the dwelling or townhouse is equipped with an automatic sprinkler system installed in accordance with Section P2904, sleeping rooms in basements shall not be required to have emergency escape and rescue openings provided that the basement has one of the following:
 - 2.1. One means of egress complying with Section R311 and one emergency escape and rescue opening.
 - 2.2. Two means of egress complying with Section R311.

24



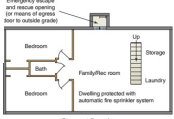
24

R310.1 – Emergency Escape and Rescue Openings



2015 [IBC](#) required emergency escape and rescue opening in each bedroom

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2018 [IBC](#) does not require emergency escape and rescue openings in basement bedrooms when meeting conditions

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25

25

R310.3 – Area Wells for Emergency Escape and Rescue Doors

- Change Type:** Modification
- Change Summary:** R310.3 Emergency escape and rescue doors. Where a door is provided as the required emergency escape and rescue opening, it shall be a side-hinged door or a slider. Where the opening is below the adjacent grade, it shall be provided with an area well.
- R310.3.1 Minimum door opening size. The minimum net clear height opening for any door that serves as an emergency and escape rescue opening shall be in accordance with Section R310.2.1.
- R310.3.2 Area Wells. Area wells shall have a width of not less than 36 inches (914 mm). The area well shall be sized to allow the emergency escape and rescue door to be fully opened.
- R310.3.2.1 Ladder and steps. Area wells with a vertical depth greater than 44 inches (1118 mm) shall be equipped with a permanently affixed ladder or steps usable with the door in the fully open position. Ladders or steps required by this section shall not be required to comply with Section R311.7. Ladders or rungs shall have an inside width of not less than 12 inches (305 mm), shall project not less than 3 inches (76 mm) from the wall and shall be spaced not more than 18 inches (457 mm) on center vertically for the full height of the exterior stairwell.

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26

26

R311.7.1, R311.7.8 – Handrail Projection

- Change Type:** Modification
- Change Summary:** A new exception to the handrail projection limitation provides for adequate clearance behind the handrail when it passes a projection of a floor, landing or tread return.
- R311.7.1 Width. Stairways shall be not less than 36 inches (914 mm) in clear width at all points above the permitted handrail height and below the required headroom height. The clear width of stairways at and below the handrail height, including treads and landings, shall be not less than 31 inches (787 mm) where a handrail is installed on one side and 27 inches (698 mm) where handrails are installed on both sides.
Exception: The width of spiral stairways shall be in accordance with Section R311.7.10.1.
- R311.7.8.2 Handrail Projection. Handrails shall not project more than 4 1/4 inches on either side of the stairway.
Exception: Where nosings of landings, floors, or passing flights project into the stairway reducing the clearance at passing handrails, handrails shall project not more than 6 1/4 inches into the stairway, provided that the stair width and handrail clearance are not reduced to less than that required.
- R311.7.8.3 Handrail Clearance. Handrails adjacent to a wall shall have a space of not less than 1 1/4 inches (38 mm) between the wall and the handrails.

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27

27

R311.7.3 – Maximum Stair Rise between Landings

- **Change Type:** Modification
- **Change Summary:** The maximum rise of a flight of stairs has **increased by 4 inches, from 147 to 151 inches**.
- R311.7.3 Vertical rise. A flight of stairs shall not have a vertical rise larger than 151 inches between floor levels or landings.

28

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28

R311.7.11, R311.7.12 – Alternating Tread Devices and Ships Ladders

- **Change Type:** Modification
- **Change Summary:** Alternating tread devices and ships ladders are now permitted as a means of egress for serving lofts that do not exceed 200 square feet in area.
- R311.7.11 Alternating tread devices. Alternating tread devices shall not be used as an element of a means of egress. Alternating tread devices shall be permitted provided that the required means of egress stairway or ramp serves the same space at each adjoining level or where a means of egress is not required. The clear width at and below the handrails shall be not less than 20 inches (508 mm).
 - Exception: Alternating tread devices are allowed to be used as an element of a means of egress for lofts, mezzanines, and similar areas of **200 gross square feet** (18.6 m²) or less where such devices do not provide exclusive access to a kitchen or bathroom.
- R311.7.12 Ships ladders. Ships ladders shall not be used as an element of a means of egress. Ships ladders shall be permitted provided that a required means of egress stairway or ramp serves the same space at each adjoining level or where a means of egress is not required. The clear width at and below the handrails shall be not less than 20 inches.
 - Exception: Ships ladders are allowed to be used as an element of a means of egress for lofts, mezzanines, and similar areas of **200 gross square feet** (18.6 m²) or less where such devices do not provide exclusive access to a kitchen or bathroom.

29

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29

R311.7.11, R311.7.12 – Alternating Tread Devices and Ships Ladders – Cont.

30

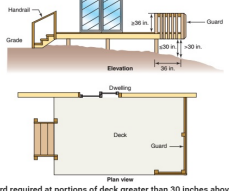
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30


R312.1 – Guards

- **Change Type:** Clarification
- **Change Summary:** The guard requirements **only apply to the specific portion of a walking surface that exceeds 30 inches above grade.**
- R312.1 Guards. Guards shall be provided in accordance with Sections R312.1.1 through R312.1.4.
- R312.1.1 Where required. Guards **shall be provided for those portions of** open-sided walking surfaces, including stairs, ramps and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or grade below at any point within 36 inches (914 mm) horizontally to the edge of the open side. Insect screening shall not be considered as a guard.



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

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31

R314 – Smoke Alarms – Modified – 2015 IRC

- **Change Type:** Modification
- **Change Summary:** The exemption for interconnection of alarms during alterations based on feasibility has been removed from the code. Added back in due to RAC report to stay with 2015 language
- R314.2.2 Alterations, repairs and additions. Where alterations, repairs or additions requiring a permit occur, the individual dwelling unit shall be equipped with smoke alarms located as required for new dwellings.
- **Exceptions:**
 - 1. Work involving the exterior surfaces of dwellings, such as the replacement of roofing or siding, the addition or replacement of windows or doors, or the addition of a porch or deck.
 - 2. Installation, alteration or repairs of plumbing or mechanical systems.
- 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. — 2015 IRC ADDED BACK IN PER RAC REPORT




32

R315 – Carbon Monoxide Alarms

- **Change Type:** Modification
- **Change Summary:** Interconnection is now required where multiple carbon monoxide alarms are required in a dwelling unit.
- 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 or mechanical systems.
- R315.5 Interconnectivity. Where more than one carbon monoxide alarm is required to be installed within an individual dwelling unit in accordance with Section R315.3, 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 carbon monoxide alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm.

Exception: Interconnection of carbon monoxide 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.



33

R317.3 – Fasteners in Treated Wood

- **Change Type:** Modification
- **Change Summary:** Staples in preservative-treated wood and fire-retardant-treated wood are now required to be made of stainless steel.
- R317.3.1 Fasteners for preservative-treated wood. Fasteners, including nuts and washers, for preservative-treated wood shall be of hot-dipped, zinc-coated galvanized steel, stainless steel, silicon bronze or copper. **Staples shall be of stainless steel.** Coating types and weights for connectors in contact with preservative-treated wood shall be in accordance with the connector manufacturer's recommendations. In the absence of manufacturer's recommendations, a minimum of not less than ASTM A 653 type G185 zinc-coated galvanized steel, or equivalent, shall be used.
- Exceptions:
 1. ½-inch-diameter (12.7 mm) or greater steel bolts.
 2. **Fasteners other than nails, staples,** and timber rivets shall be permitted to be of mechanically deposited zinc-coated steel with coating weights in accordance with ASTM B 695, Class 55 minimum.
 3. Plain carbon steel fasteners in SBX/DOT and zinc borate preservative-treated wood in an interior, dry environment shall be permitted.



34

R317.3 – Fasteners in Treated Wood – Cont.

TABLE R307.2.3 FASTENER AND CONNECTOR SPECIFICATIONS FOR DECKING^{a,b}

ITEM	MATERIAL	MINIMUM FINISH/COATING	ALTERNATE FINISH/COATING ^c
Nails and timber rivets	In accordance with ASTM F1667	Hot-dipped galvanized per ASTM A153	Stainless steel, silicon bronze or copper
Boths ^d Lag screws ^e (including nuts and washers)	ASTM A307 (bolts), ASTM A563 (nuts), ASTM F444 (washers)	Hot-dipped galvanized per ASTM A153, Class C (Class D for ½-inch diameter and less) or mechanically galvanized per ASTM B695, Class 55 or 410 stainless steel	Stainless steel, silicon bronze or copper
Metal connectors	Per manufacturer's specification	ASTM A653 type G185 zinc coated galvanized steel or post hot-dipped galvanized per ASTM A123 providing a minimum average coating weight of 2.0 oz./ft ² (total both sides)	Stainless steel

For 10 to 12 in x 24 to 4 in, 1 inch x 24 to 8 in.

- a. Fastened materials, coatings and finishes shall be permitted.
- b. Fasteners and connectors exposed to salt water or located within 300 feet of a salt water shoreline shall be stainless steel.
- c. Nails to be used shall be either a minimum 102 mil and a maximum 110 mil edge to be used.
- d. Lag screws 1/2 inch and larger shall be permitted to avoid wood splitting per the National Design Specification (NDS) for Wood Construction.
- e. Stainless steel-driven fasteners shall be in accordance with ASTM A193.



35

R324.6 – Roof Access for Photovoltaic Solar Energy Systems

- **Change Type:** Addition
- **Change Summary:** Requirements for roof access and pathways for firefighters have been introduced into the IRC provisions for rooftop-mounted photovoltaic solar energy systems.
- R324.6 Roof access and pathways. 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:
 - 1. Detached, nonhabitable structures, including but not limited to, detached garages, parking shade structures, carports, solar trellises, and similar structures shall not be required to provide roof access.
 - 2. Roof access, pathways, and setbacks need not be provided where the code official has determined that rooftop operations will not be employed.
 - 3. These requirements shall not apply to roofs with slopes of 2 units vertical in 12 units horizontal (17-percent slope) or less.
- 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 (914 mm) wide, shall be provided on all buildings, but 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 (914 mm) shall be provided from the lowest roof edge to ridge on the same roof plane as the photovoltaic array, or an adjacent roof plane, or straddling the same and adjacent roof planes. Pathways shall be clear areas capable of supporting fire fighters accessing the roof. Pathways shall be located in areas with minimal obstructions such as vent pipes, conduits, or mechanical equipment.
- R324.6.2 Setback at ridge. For photovoltaic arrays occupying not more than 33 percent of the plan view total roof area, not less than an 18-inch (457 mm) clear setback is required on both sides of a horizontal ridge. For photovoltaic arrays occupying more than 33 percent of the plan view total roof area, not less than a 36-inch (914 mm) clear setback is required on both sides of a horizontal ridge.
- R324.6.2.1 Alternative setback at ridge. Where an automatic sprinkler system is installed within the dwelling in accordance with NFPA 130 or Section P2904, setbacks at ridges shall comply with one of the following:
 - 1. For photovoltaic arrays occupying not more than 66 percent of the plan view total roof area, not less than an 18-inch (457 mm) clear setback is required on both sides of a horizontal ridge.
 - 2. For photovoltaic arrays occupying more than 66 percent of the plan view total roof area, not less than a 36-inch (914 mm) clear setback is required on both sides of a horizontal ridge.



36

R324.6 – Roof Access for Photovoltaic Solar Energy Systems - Cont.

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

Required roof access and pathways for firefighters for roof-mounted PV solar systems
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37

R324.6.2.2 – Solar Panels near Emergency Escape and Rescue Openings

- **Change Type:** Addition
- **Change Summary:** Rooftop-mounted photovoltaic solar energy panels and modules are not permitted to be installed directly below emergency escape and rescue openings
- R324.6.2.2 Emergency escape and rescue opening. Panels and modules installed on dwellings shall not be placed on the portion of a roof that is below an emergency escape and rescue opening. A pathway not less than 36-inches (914 mm) wide shall be provided to the emergency escape and rescue opening.

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38

R324.6.2.2 – Solar Panels near Emergency Escape and Rescue Openings – Cont.





A 36-inch-wide pathway is required for emergency escape and rescue openings above roof-mounted PV solar panels.
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39

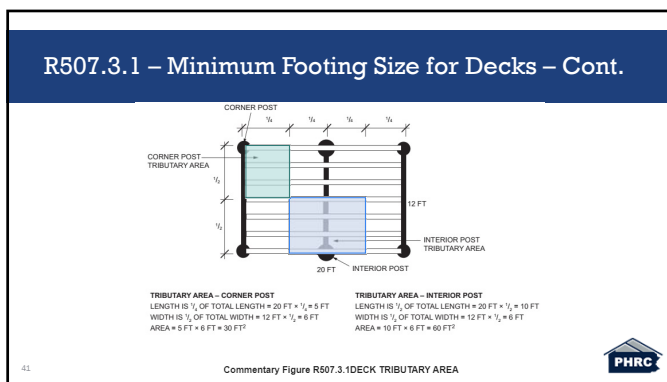
R507.3.1 – Minimum Footing Size for Decks

- Change Type:** Addition
- Change Summary:** Table R507.3.1 has been added and provides the minimum residential deck footing sizes based on Live or Ground Snow Load (highest case load)

LIVE OR GROUND SNOW LOAD ^a (psf)	TRIBUTARY AREA (sq. ft.)	LOAD BEARING VALUE OF SOIL ^{b, c, d} (psf)											
		1500 ^e			2000 ^e			2500 ^e			≥ 3000 ^e		
		Side of a square footing (inches)	Diameter of a round footing (inches)	Thickness (inches)	Side of a square footing (inches)	Diameter of a round footing (inches)	Thickness (inches)	Side of a square footing (inches)	Diameter of a round footing (inches)	Thickness (inches)	Side of a square footing (inches)	Diameter of a round footing (inches)	Thickness (inches)
40	20	12	14	6	12	14	6	12	14	6	12	14	6
	40	14	16	6	12	14	6	12	14	6	12	14	6
	60	17	19	6	15	17	6	13	15	6	12	14	6
	80	20	22	7	17	19	6	15	17	6	14	16	6
	100	22	25	8	19	21	6	17	19	6	15	17	6
	120	24	27	9	21	23	7	19	21	6	17	19	6
140	26	29	10	23	25	8	20	23	7	18	21	6	
	160	28	31	11	24	27	9	21	24	8	20	22	7

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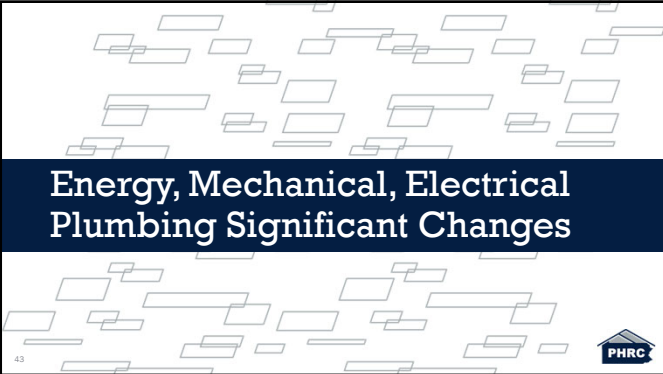
2015 IRC Section R806.2 Roof Ventilation

*2015 IRC per RAC Report


- The reduction net free ventilation can be reduced from 1/150 to 1/300 provided one or more of the following conditions are met:
 - CZs 6, 7 & 8, a class I or II vapor retarder is installed
 - Not less than 40% and not more than 50% of ventilation in upper portion less than or equal to 3 feet below the ridge (previously 50%-80%)

Source: International Code Council (ICC), (2014), 2015 International Residential Code, Country Club Hills, IL

42



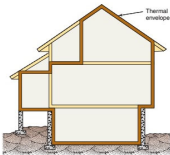
Energy, Mechanical, Electrical Plumbing Significant Changes



43

N1101.6 – Definition of Air Barrier

- **Change Type:** Clarification
- **Change Summary:** The revised definition for building thermal envelope clarifies that it is an assembly of materials enclosing conditioned space or creating a boundary between conditioned and unconditioned space.
- **BUILDING THERMAL ENVELOPE.** The basement walls, exterior walls, floors, ceilings, roofs and any other building element assemblies that enclose conditioned space or provide a boundary between conditioned space and exempt or unconditioned space.




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

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44

N1101.6, Tables N1101.10.3(1) & N1101.10.3(2) – Fenestration Definitions and U-Factors

- **Change Type:** Clarification
- **Change Summary:** The definitions for skylights and vertical fenestration have been moved under the definition for fenestration, and a definition for opaque door has been added.
- **FENESTRATION.** Products classified as either vertical fenestration or skylights.
 - Skylights. Glass or other transparent or translucent glazing material installed at a slope of less than 60 degrees (1.05 rad) from horizontal.
 - Vertical Fenestration. Windows that are fixed or operable, opaque doors, glazed doors, glazed block and combination opaque/glazed doors composed of glass or other transparent or translucent glazing materials and installed at a slope of not less than 60 degrees (1.05 rad) from horizontal.
- **OPAQUE DOOR.** A door that is not less than 50 percent opaque in surface area.



45

N1102.1.2 & N1102.1.4 – Insulation and Fenestration Requirements

- **Change Type:** Modification
- **Change Summary:** The prescriptive U-factors for fenestration have been lowered to improve the energy efficiency of dwellings and townhouses.



46

N1102.1.2 & N1102.1.4 – Insulation and Fenestration Requirements – Cont.

TABLE N1102.1.2 (R402.1.2) Insulation and Fenestration Requirements by Component^a

Climate Zone	Fenestration U-Factor ^b	Skylight U-Factor ^c	Ceiling Fenestration U-Factor ^d	Ceiling R-Value	Wood Frame Wall R-Value	Mass Wall R-Value	Floor U-Factor	Basement Wall R-Value	Roof R-Value & Depth	Crawl Space Wall R-Value
1	N/A	0.75	0.25	30	13	34	13	0	0	0
2	0.40	0.65	0.25	36	13	46	13	0	0	0
3	0.40-0.35 ^e 0.35	0.55	0.25	36	20 or 13 + 2 ^f	6/13	19	5/13 ^g	0	5/13
4 except Marine	0.40-0.30	0.55	0.40	40	20 or 13 + 2 ^f	6/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.40-0.30	0.55	N/A	40	20 or 13 + 2 ^f	13/17	20 ^h	15/19	10, 2 ft	15/19
6	0.40-0.30	0.55	N/A	40	20 + 3 ⁱ or 13 + 10 ^j	10/20	20 ^h	15/19	10, 4 ft	15/19
7 and 8	0.40-0.30	0.55	N/A	40	20 + 3 ⁱ or 13 + 10 ^j	10/21	20 ^h	15/19	10, 4 ft	15/19

For 101 ft from 0.04 m.

- ^a R-values are minimum. U-factors are 0.90 and 0.92 are maximums. Where U-factor is provided in a range, the lowest U-factor is the value to be used in design. The lowest R-value of the insulation and fenestration shall be the value specified in the table.
- ^b The fenestration U-factor shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing.
- ^c Fenestration in Climate Zone 1 through 3 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing. Fenestration in Climate Zone 4 through 8 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing. Fenestration in Climate Zone 9 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing.
- ^d Fenestration in Climate Zone 1 through 3 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing. Fenestration in Climate Zone 4 through 8 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing. Fenestration in Climate Zone 9 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing.
- ^e Fenestration in Climate Zone 3 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing. Fenestration in Climate Zone 4 through 8 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing. Fenestration in Climate Zone 9 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing.
- ^f Fenestration in Climate Zone 3 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing. Fenestration in Climate Zone 4 through 8 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing. Fenestration in Climate Zone 9 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing.
- ^g Fenestration in Climate Zone 3 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing. Fenestration in Climate Zone 4 through 8 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing. Fenestration in Climate Zone 9 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing.
- ^h Fenestration in Climate Zone 3 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing. Fenestration in Climate Zone 4 through 8 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing. Fenestration in Climate Zone 9 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing.
- ⁱ Fenestration in Climate Zone 3 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing. Fenestration in Climate Zone 4 through 8 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing. Fenestration in Climate Zone 9 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing.
- ^j Fenestration in Climate Zone 3 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing. Fenestration in Climate Zone 4 through 8 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing. Fenestration in Climate Zone 9 shall include the U-factor of the glazing, the U-factor of the frame, and the U-factor of the glazing.



47

N1102.1.2 & N1102.1.4 – Insulation and Fenestration Requirements – Cont.

TABLE N1102.1.4 (R402.1.4) Equivalent U-Factors^a

Climate Zone	Fenestration U-Factor	Skylight U-Factor	Ceiling U-Factor	Frame Wall U-Factor	Mass Wall U-Factor ^b	Floor U-Factor	Basement Wall U-Factor	Crawl Space Wall U-Factor
1	0.50	0.75	0.035	0.084	0.197	0.064	0.360	0.477
2	0.40	0.65	0.030	0.084	0.165	0.064	0.360	0.477
3	0.40-0.35 ^c 0.35	0.55	0.030	0.060	0.098	0.047	0.091 ^d	0.136
4 except Marine	0.40-0.30	0.55	0.026	0.060	0.098	0.047	0.059	0.065
5 and Marine 4	0.40-0.30	0.55	0.026	0.060	0.092	0.033	0.050	0.055
6	0.40-0.30	0.55	0.026	0.045	0.060	0.033	0.050	0.055
7 and 8	0.40-0.30	0.55	0.026	0.045	0.057	0.028	0.050	0.055

- ^a Fenestration U-factors shall be obtained from measurement, calculation, or an approved source.
- ^b Fenestration U-factors shall be obtained from measurement, calculation, or an approved source. Fenestration U-factors shall be obtained from measurement, calculation, or an approved source. Fenestration U-factors shall be obtained from measurement, calculation, or an approved source.
- ^c Fenestration U-factors shall be obtained from measurement, calculation, or an approved source. Fenestration U-factors shall be obtained from measurement, calculation, or an approved source. Fenestration U-factors shall be obtained from measurement, calculation, or an approved source.
- ^d Fenestration U-factors shall be obtained from measurement, calculation, or an approved source. Fenestration U-factors shall be obtained from measurement, calculation, or an approved source. Fenestration U-factors shall be obtained from measurement, calculation, or an approved source.



48

N1102.2.2 – Reduction of Ceiling Insulation

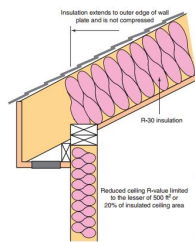
- **Change Type:** Modification
- **Change Summary:** When applying the exception for insulation in ceilings without attics, the insulation must extend to the outside of the top plate.
- N1102.2.2 (R402.2.2) Ceilings without attic spaces. Where Section N1102.1.2 requires insulation R-values greater than R-30 in the ceiling and the design of the roof/ceiling assembly does not allow sufficient space for the required insulation, the minimum required insulation R-value for such roof/ceiling assemblies shall be R-30. **Insulation shall extend over the top of the wall plate to the outer edge of such plate and shall not be compressed.** This reduction of insulation from the requirements of Section N1102.1.2 shall be limited to 500 square feet (46 m²) or 20 percent of the total insulated ceiling area, whichever is less. This reduction shall not apply to the U-factor alternative approach in Section N1102.1.4 and the Total UA alternative in Section N1102.1.5.

49



49

N1102.2.2 – Reduction of Ceiling Insulation – Cont.



50



50

N1103.3.2, N1103.3.3 – Duct Sealing and Testing

- **Change Type:** Clarification
- **Change Summary:** If not part of the heating or cooling system ductwork, ducts serving heat or energy recovery ventilators do not require an air leakage test.
- N1103.3.2 (R403.3.2) sealing (mandatory). Ducts, air handlers and filter boxes shall be sealed. Joints and seams shall comply with Section M1601.4.1.
- N1103.3.3 (R403.3.3) Duct testing (Mandatory). Ducts shall be pressure tested to determine air leakage by one of the following methods:
 - 1. Rough-in test: Total leakage shall be measured with a pressure differential of 0.1 inch w.g. (25 Pa) across the system, including the manufacturer's air handler enclosure if installed at the time of the test. Registers shall be taped or otherwise sealed during the test.
 - 2. Postconstruction test: Total leakage shall be measured with a pressure differential of 0.1 inch w.g. (25 Pa) across the entire system, including the manufacturer's air handler enclosure. Registers shall be taped or otherwise sealed during the test.
- **Exceptions:**
 - 1. A duct air leakage test shall not be required where the ducts and air handlers are located entirely within the building thermal envelope.
 - 2. A duct air leakage test shall not be required for ducts serving heat or energy recovery ventilators that are not integrated with ducts serving heating or cooling systems.
- A written report of the results of the test shall be signed by the party conducting the test and provided to the building official.

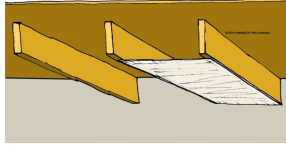
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51

2018 IRC N1103.3.5 - Not Adopted per RAC Report

- **Topic:** Ducts & building cavities
- **Code Section Summary:** 2015 IECC does not allow building cavities to be used as ducts or plenums
- **PA Amendment:**
 - Exclude 2018 IECC Section R403.3.5 (2015 IRC Section N1103.3.5)
 - Adopt 2009 IECC Section R403.2.3 (2009 IRC Section N1103.2.3)



Source: International Code Council. (2014). 2018 International Energy Conservation Code, ICC Country Club Hill, IL. Image Source: <https://www.youtube.com/watch?v=supplyreturnducts>



52

N1103.3.6, N1103.3.7 – Ducts Buried within Ceiling Insulation

- **Change Type:** Addition
- **Change Summary:** New provisions address the methods, minimum coverage requirements and thermal benefits for ducts buried within ceiling insulation, and when those ducts are considered inside the building thermal envelope.
- N1103.3.6 (R403.3.6) Ducts buried within ceiling insulation. Where supply and return air ducts are partially or completely buried in ceiling insulation, such ducts shall comply with all of the following:
 - 1. The supply and return ducts shall have insulation of an R-value not less than R-8.
 - 2. At all points along each duct, the sum of the ceiling insulation R-values above the top of the duct, and against and below the bottom of the duct shall be not less than R-19, excluding the duct R-value.
 - 3. In climate zones 1A, 2A and 3A, the supply ducts completely buried within ceiling insulation, insulated to an R-value of not less than R-13 and in compliance with the vapor retarder requirements of Section M1601.4.6.
- **Exception:** Sections of supply ducts less than 3 feet (914 mm) from the supply outlet shall not be required to comply with these requirements.



53

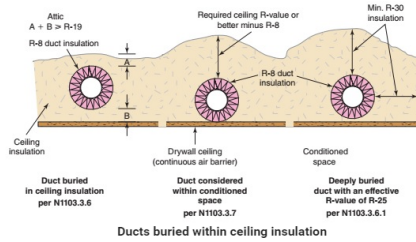
N1103.3.6, N1103.3.7 – Ducts Buried within Ceiling Insulation – Cont.

- **Change Type:** Addition
- N1103.3.6.1 (R403.3.6.1) Effective R-value of deeply buried ducts. Where using a simulated energy performance analysis, sections of ducts that are installed in accordance with Section N1103.3.6, located directly on, or within 5.5 inches (140 mm) of the ceiling, surrounded with blown-in attic insulation having an R-value of R-30 or greater and located such that the top of the duct is not less than 3.5 inches (89 mm) below the top of the insulation, shall be considered as having an effective duct insulation R-value of R-25.
- N1103.3.7 (R403.3.7) ducts located in conditioned space. For ducts to be considered as inside a conditioned space, such ducts shall comply with either of the following:
 - 1. The duct system is located completely within the continuous air barrier and within the building thermal envelope.
 - 2. The ducts are buried within ceiling insulation in accordance with Section N1103.3.6 and all of the following conditions exist:
 - 2.1 The air handler is located completely within the continuous air barrier and within the building thermal envelope.
 - 2.2 The duct leakage, as measured either by a rough-in test of the ducts or a post-construction total system leakage test to outside the building thermal envelope in accordance with Section N1105.5.4, is less than or equal to 1.5 cubic feet per minute (42.5 L/min) per 100 square feet (9.29 m²) of conditioned floor area served by the duct system.
 - 2.3 The ceiling insulation R-value installed against and above the insulated duct is greater than or equal to the proposed ceiling insulation R-value, less the R-value of the insulation on the duct.



54

N1103.3.6, N1103.3.7 – Ducts Buried within Ceiling Insulation – Cont.



Ducts buried within ceiling insulation
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55

N1104.1 – Lighting

- **Change Type:** Modification
- **Change Summary:** The required percentage of permanent lighting fixtures having high-efficacy lamps has increased from 75% to 90%.
- N1104.1 (R404.1) Lighting equipment (Mandatory). Not less than 90 percent of the permanently installed lighting fixtures shall contain only high-efficacy lamps.



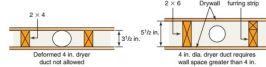
High-efficacy lamps, such as LED lamps, are required in 90 percent of permanent lighting fixtures.
mexicodigital/Shutterstock.com



56

M1502.4.2 – Concealed Dryer Exhaust Ducts

- **Change Type:** Modification
- **Change Summary:** Wall and ceiling cavities enclosing dryer exhaust ducts must provide sufficient space that the 4-inch duct is not squeezed out of its round shape.
- M1502.4.2 Duct installation. Exhaust ducts shall be supported at intervals not to exceed 12 feet (3659 mm) and shall be secured in place. The insert end of the duct shall extend into the adjoining duct or fitting in the direction of airflow. Exhaust duct joints shall be sealed in accordance with Section M1601.4.1 and shall be mechanically fastened. Ducts shall not be joined with screws or similar fasteners that protrude more than 1/8 inch (3.2 mm) into the inside of the duct. **Where dryer exhaust ducts are enclosed in wall or ceiling cavities, such cavities shall allow the installation of the duct without deformation.**



Dryer exhaust duct in concealed spaces
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57

M1503 – Domestic Cooking Exhaust Equipment

- **Change Type:** Modification
- **Change Summary:** Domestic cooking exhaust equipment" is the preferred terminology for "kitchen exhaust" because it is more descriptive and includes all of the components of the exhaust system.

SECTION M1503

RANGE HOODS DOMESTIC COOKING EXHAUST EQUIPMENT

- M1503.1 General. Domestic cooking exhaust equipment shall comply with the requirements of this section.
- M1503.2 Domestic cooking exhaust. Where domestic cooking exhaust equipment is provided it shall comply with one of the following:
 - 1. The fan for overhead range hoods and downdraft exhaust equipment not integral with the cooking appliance shall be listed and labeled in accordance with UL 507.
 - 2. Overhead range hoods and downdraft exhaust equipment with integral fans shall comply with UL 507.
 - 3. Domestic cooking appliances with integral downdraft exhaust equipment shall be listed and labeled in accordance with ANSI Z21.1 or UL 858.
 - 4. Microwave ovens with integral exhaust for installation over the cooking surface shall be listed and labeled in accordance with UL 923.
- M1503.2.1 Open top broiler exhaust. Domestic open-top broiler units shall be provided with a metal exhaust hood, having a thickness of not less than 0.0157-inch (0.3950 mm) (No. 28 gage). Such hoods shall be installed with a clearance of not less than ¼ inch (6.4 mm) between the hood and the underside of combustible material or and cabinets. A clearance of not less than 24 inches (610 mm) shall be maintained between the cooking surface and the combustible material and cabinets. The hood width shall be not less than the width of the broiler unit and shall extend over the entire unit.
- Exception: Broiler units that incorporate an integral exhaust system, and that are listed and labeled for use without an exhaust hood, shall not be required to have an exhaust hood.



58

M1503.6 – Makeup Air for Kitchen Exhaust System

- **Change Type:** Modification
- **Change Summary:** Makeup air for domestic cooking exhaust systems is no longer required if all fuel-burning appliances in the dwelling unit have a direct vent or mechanical draft vent system.
- M1503.6 Makeup air required. Where one or more gas, liquid, or solid-fuel burning appliance that is neither direct-vent nor uses a mechanical draft venting system is located within a dwelling unit's air barrier, each exhaust system capable of exhausting in excess of 400 cubic feet per minute (0.19 m³/s) shall be mechanically or naturally passively provided with makeup air at a rate approximately equal to the exhaust air rate. Such makeup air systems shall be equipped with not fewer than one damper complying with Section M1503.6.2.
 - Exception: Makeup air is not required for exhaust systems installed for the exclusive purpose of space cooling and intended to be operated only when windows or other air inlets are open.
- M1503.6.1 Location. Kitchen exhaust makeup air shall be discharged into the same room in which the exhaust system is located or into rooms or duct systems that communicate through one or more permanent openings with the room in which such exhaust system is located. Such permanent openings shall have a net cross-sectional area not less than the required area of the makeup air supply openings.
- M1503.6.2 Makeup air dampers. Where makeup air is required by Section M1503.6, makeup air dampers shall comply with this section. Each damper shall be a gravity damper or an electrically operated damper that automatically opens when the exhaust system operates. Dampers shall be accessible for inspection, service, repair and replacement without removing permanent construction or any other ducts not connected to the damper being inspected, serviced, repaired or replaced. Gravity or barometric dampers shall not be used in passive makeup air systems except where the dampers are rated to provide the design makeup airflow at a pressure differential of 0.01 inch w.c. (3 Pa) or less.



59

M2101.9 – Hanger Spacing for PEX Tubing

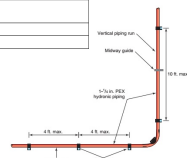
- **Change Type:** Modification
- **Change Summary:** Support spacing requirements for PEX tubing 1½ inches and greater in diameter have been added to Table M2101.9.

TABLE M2101.9 Hanger Spacing Intervals

Piping Material	Maximum Horizontal Spacing (ft/in)	Maximum Vertical Spacing (ft/in)
PEX tubing 1.3150	2.07	4
PEX tubing 1.3150/2	8	32 ^a

^a 10' = 1000' ± 25.4 mm, 1.60' = 384 mm.

^b Portions of table not shown remain unchanged.)



Hanger spacing for PEX tubing 1-1/4 inch and larger

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60

M2101.10 – Pressure Tests for Hydronic Piping

- **Change Type:** Modification
- **Change Summary:** Compressed air testing of PEX hydronic piping is now allowed when testing is in accordance with the manufacturer's instructions.
- M2101.10 Tests. Hydronic piping systems shall be tested hydrostatically at a pressure of one and one-half times the maximum system design pressure, but not less than 100 pounds per square inch (689 kPa). The duration of each test shall be not less than 15 minutes.
 - Exception: For PEX piping systems, testing with a compressed gas shall be an alternative to hydrostatic testing where compressed air or other gas pressure testing is specifically authorized by all of the manufacturer's instructions for the PEX pipe and fittings products installed at the time the system is being tested, and compressed air or other gas testing is not otherwise prohibited by applicable codes, laws, or regulations outside of this code.

61



61

M2103.2 – Thermal Barrier for Radiant Floor Heating Systems

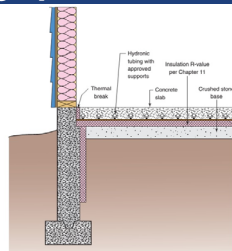
- **Change Type:** Modification
- **Change Summary:** For hydronic floor heating systems, the minimum insulation R-values have been removed from Section M2103.2 and a reference to the energy provisions of Chapter 11 has been added.
- M2103.2 Thermal barrier required. Radiant floor heating systems shall have a thermal barrier in accordance with Sections M2103.2.1 and M2103.2.2. **Insulation R-values for slab-on-grade and suspended floor installations shall be in accordance with Chapter 11.**
 - Exception: Insulation shall not be required in engineered systems where it can be demonstrated that the insulation will decrease the efficiency or have a negative effect on the installation.
- M2103.2.3 M2103.2.1 Thermal break required. A thermal break consisting of asphalt expansion joint materials or similar insulating materials shall be provided at a point where a heated slab meets a foundation wall or other conductive slab.
- M2103.2.4 M2103.2.2 Thermal barrier material marking. Insulating materials used in thermal barriers shall be installed so that the manufacturer's R-value mark is readily observable upon inspection.

62



62

M2103.2 – Thermal Barrier for Radiant Floor Heating Systems – Cont.



63


The energy provisions in [Chapter 11](#) determine the insulation R-value for floor heating systems.
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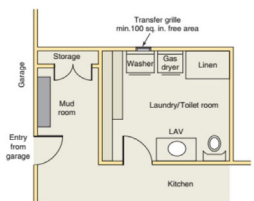
G2406.2 – Prohibited Locations for Appliances

- **Change Type:** Modification
- **Change Summary:** A gas-fired clothes dryer is now allowed to be installed in a bathroom or toilet room where a permanent opening communicates with other permitted spaces.
- G2406.2 (303.3) Prohibited locations. Appliances shall not be located in sleeping rooms, bathrooms, toilet rooms, storage closets or surgical rooms, or in a space that opens only into such rooms or spaces, except where the installation complies with one of the following:
- 1.through 5. No change to text.
- 6.A clothes dryer is installed in a residential bathroom or toilet room having a permanent opening with an area of not less than 100 square inches (0.06 m2) that communicates with a space outside of a sleeping room, bathroom, toilet room, or storage closet.

64



64

G2406.2 – Prohibited Locations for Appliances – Cont.



Gas clothes dryer permitted in a toilet room


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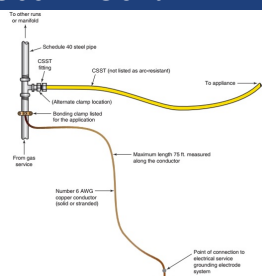

G2411.2, G2411.3 – Electrical Bonding of CSST

- **Change Type:** Modification
- **Change Summary:** The existing provisions for electrical bonding apply to CSST without an arc-resistant jacket or coating and a new section addresses electrical continuity and bonding of arc-resistant CSST.
- (G2411.3) (310.3) Arc-resistant CSST. This section applies to corrugated stainless steel tubing (CSST) that is listed with an arc-resistant jacket or coating system in accordance with ANSI LC1/CSA 6.26. The CSST shall be electrically continuous and bonded to an effective ground fault current path. Where any CSST component of a piping system does not have an arc-resistant jacket or coating system, the bonding requirements of Section G2411.2 shall apply. Arc-resistant-jacketed CSST shall be considered to be bonded where it is connected to an appliance that is connected to the appliance grounding conductor of the circuit that supplies that appliance.


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G2411.2, G2411.3 – Electrical Bonding of CSST – Cont.

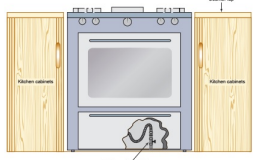
Different bonding requirements for CSST
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67


G2420.5.1 – Shutoff Valve Location

- Change Type:** Clarification
- Change Summary:** Shutoff valves located behind movable appliances are considered as meeting the requirement for access.
- G2420.5.1 (409.5.1) Located within same room. The shutoff valve shall be located in the same room as the appliance. The shutoff valve shall be within 6 feet (1829 mm) of the appliance, and shall be installed upstream of the union, connector or quick disconnect device it serves. Such shutoff valves shall be provided with access. **Shutoff valves serving movable appliances, such as cooking appliances and clothes dryers, shall be considered to be provided with access where installed behind such appliances.** Appliance shutoff valves located in the firebox of a fireplace shall be installed in accordance with the appliance manufacturer's instructions.



Shutoff valve behind gas range meets the requirement for access

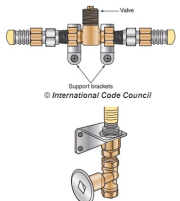
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68


G2420.6 – Support for Shutoff Valves in Tubing Systems

- Change Type:** Addition
- Change Summary:** Shutoff valves in gas tubing systems require rigid support separate from the tubing to prevent damage at the valve connection.
- G2420.6 Shutoff valves in tubing systems. Shutoff valves installed in tubing systems shall be rigidly and securely supported independently of the tubing.



Examples of support brackets for valves in gas tubing systems

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69

G2447.2 – Commercial Cooking Appliances

- **Change Type:** Modification
- **Change Summary:** Commercial cooking appliances are now permitted in dwelling units when installed in accordance with an engineered design and the manufacturer's instructions.
- G2447.2 (623.2) Prohibited location. Cooking appliances designed, tested, listed and labeled for use in commercial occupancies shall not be installed within dwelling units or within any area where domestic cooking operations occur.
- **Exceptions:**
 1. Appliances that are also listed as domestic cooking appliances.
 2. Where the installation is designed by a licensed professional engineer in compliance with the manufacturer's installation instructions.



Commercial cooking appliances are permitted with an engineered design
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70

70

P2503.7 – Air Testing of PEX Piping

- **Change Type:** Modification
- **Change Summary:** Compressed-air testing of PEX water-supply piping is now allowed when testing is in accordance with the manufacturer's instructions.
- P2503.7 Water-supply system testing. Upon completion of the water-supply system or a section of it, the system or portion completed shall be tested and proved tight under a water pressure of not less than the working pressure of the system or, for piping systems other than plastic, by an air test of not less than 50 psi (345 kPa). This pressure shall be held for not less than 15 minutes. The water used for tests shall be obtained from a potable water source.
 - **Exception:** For PEX piping systems, testing with a compressed gas shall be an alternative to hydrostatic testing where compressed air or other gas pressure testing is specifically authorized by the manufacturer's instructions for the PEX pipe and fittings products installed at the time the system is being tested, and compressed air or other gas testing is not otherwise prohibited by applicable codes, laws, or regulations outside of this code.



71

71

P2713.1 – Bathtub Overflow

- **Change Type:** Bathtub overflow outlets are no longer required.
- **Change Summary:** Overflow outlets are no longer required for bathtubs.
- P2713.1 Bathtub waste outlets and overflows. Bathtubs shall be equipped with a waste outlet that is not less than 1 1/2 inches (38 mm) in diameter. The waste outlet shall be equipped with a water-tight stopper. Where an overflow is installed, the overflow shall be not less than 1 1/2 inches (38 mm) in diameter.



72

72

P2903.5 – Water Hammer Arrestors – Remains at 2015 IRC

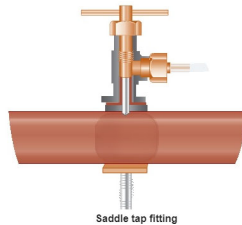
- Change Type: Modification
- Change Summary: A water hammer arrestor is now required where quick-closing valves are used in the water distribution system.
- P2903.5 Water hammer. The flow velocity of the water distribution system shall be controlled to reduce the possibility of water hammer. A water hammer arrestor shall be installed where quick-closing valves are utilized. Water hammer arrestors shall be installed in accordance with the manufacturer's instructions. Water hammer arrestors shall conform to ASSE-1010.
- 2015 IRC P2903.5 Water hammer. The flow velocity of the water distribution system shall be controlled to reduce the possibility of water hammer. Water hammer arrestors shall be installed in accordance with the manufacturer's instructions. Water hammer arrestors shall conform to ASSE 1010.



73

P2906.6.1 – Saddle Tap Fitting on Water Distribution Piping – NOT adopted by RAC

- Change Type: Addition
- Change Summary: Saddle tap fittings are no longer permitted on water distribution system piping.
- P2906.6.1 Saddle tap fittings. The use of saddle tap fittings and combination saddle tap and valve fittings shall be prohibited.



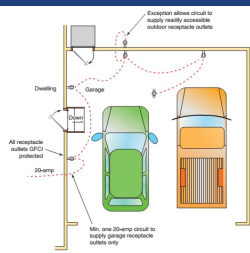
Saddle tap fitting
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74

E3703.5 – Garage Branch Circuits

- Change Type: Addition
- Change Summary: A separate 20-ampere branch circuit is now required to serve receptacle outlets of attached garages and detached garages with electric power.
- E3703.5 Garage branch circuits. In addition to the number of branch circuits required by other parts of this section, not less than one 120-volt, 20 ampere branch circuit shall be installed to supply receptacle outlets in attached garages and in detached garages with electric power. This circuit shall not have other outlets. [210.11(C)(4)]
 - Exception: This circuit shall be permitted to supply readily accessible outdoor receptacle outlets. [210.11(C)(4) Exception]

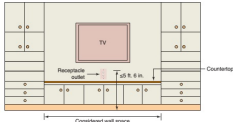


20-amp circuit to supply garage receptacle outlets
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75

E3901.2 – Wall Space for Receptacle Distribution

- Change Type:** Modification
- Change Summary:** Cabinets with countertops are now considered wall space in determining required locations for general purpose receptacle outlets.
- E3901.2 General purpose receptacle distribution. In every kitchen, family room, dining room, living room, parlor, library, den, sun room, bedroom, recreation room, or similar room or area of dwelling units, receptacle outlets shall be installed in accordance with the general provisions specified in Sections E3901.2.1 through E3901.2.3 (see Figure E3901.2).
- E3901.2.1 Spacing. Receptacles shall be installed so that no point measured horizontally along the floor line of any wall space is more than 6 feet (1829 mm), from a receptacle outlet. [210.52(A)(1)]
- E3901.2.2 Wall space. As used in this section, a wall space shall include the following: [210.52(A)(2)]
 - Any space that is 2 feet (610 mm) or more in width, including space measured around corners, and that is unbroken along the floor line by doorways and similar openings, fireplaces, and fixed cabinets that **do not have countertops or similar work surfaces**.
 - And 3. No change to text.



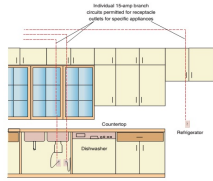
Cabinets with countertops or work surfaces are counted as wall space
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76

E3901.3 – Appliances on 15 Amp Circuits

- Change Type:** Modification
- Change Summary:** An individual 15-ampere branch circuit is permitted to serve any specific kitchen appliance.
- E3901.3 Small appliance receptacles. In the kitchen, pantry, breakfast room, dining room, or similar area of a dwelling unit, the two or more 20-ampere small-appliance branch circuits required by Section E3703.2, shall serve all wall and floor receptacle outlets covered by Sections E3901.2 and E3901.4 and those receptacle outlets provided for refrigeration appliances. [210.52(B)(1)]
- Exceptions:
 - In addition to the required receptacles specified by Sections E3901.1 and E3901.2, switched receptacles supplied from a general-purpose branch circuit as defined in Section E3903.2, Exception 1 shall be permitted. [210.52(B)(1) Exception No. 1]
 - In addition to the required receptacles specified by Section E3901.2, a receptacle outlet to serve a specific appliance shall be permitted to be supplied from an individual branch circuit rated at 15 amperes or greater. [210.52(B)(1) Exception No. 2]



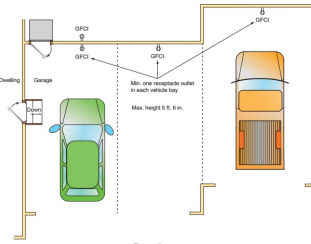
Receptacle outlet for a specific appliance can be on an individual 15-amp branch circuit
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77

E3901.9 – Garage Receptacle Outlet Location

- Change Type:** Modification
- Change Summary:** A receptacle outlet must be located in each vehicle bay in a garage.
- E3901.9 Basements, garages and accessory buildings. Not less than one receptacle outlet, in addition to any provided for specific equipment, shall be installed in each separate unfinished portion of a basement; in each vehicle bay not more than 5.5 feet above the floor in attached garages; in each detached garages that are provided with electrical power and in accessory buildings that are provided with electric power. [210.52(G)(1), (2), and (3)]



Receptacle outlet required in each vehicle space in garage
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78

Today's Information

- International Code Council. (2018). *2018 Significant Changes to the International Residential Code*, ICC, Country Club Hill, Ill.

79

References

- International Code Council. (2008). *2009 International Residential Code*, ICC, Country Club Hill, Ill.
- International Code Council. (2014). *2015 International Residential Code*, ICC, Country Club Hill, Ill.
- International Code Council. (2017). *2018 International Residential Code*, ICC, Country Club Hill, Ill.
- International Code Council. (2018). *2018 Significant Changes to the International Residential Code*, ICC, Country Club Hill, Ill.

80

PA UCC Residential Code Update: Part 2

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81
