National Association of Home Builders

2015

International Codes Suggested Amendments

7/18/2014

National Association of Home Builders

State and local HBAs should consider these amendments to maintain cost-effective and affordable code provisions when discussing the adoption of the 2015 International Codes. NAHB developed these amendments based on the outcome of the 2012-2014 ICC Code Development Cycles.

Each amendment is shown in *legislative text* (underline and ~~strikethrough~~) and includes a supporting reason s explaining why the jurisdiction should consider them.. Some of the suggested amendments, such as those for energy code provisions and the residential sprinklers, have additional supporting documents and information on the NAHB website and are so indicated.

From the *"Amendment Lookup"* page read the brief introduction and choose the amendment you are interested in. The underlined portion is a hotlink to the amendment.

This document is available upon request in "Word" format. You can copy and or change any portion of the "Word" document to fit you precise needs, if you would like the word document sent to you or if you have questions, please contact:

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2015 International Residential Code

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This amendment would return the fire separation distances between structures to those that were required prior to residential sprinklers becoming part of the IRC.

2. Self-Closing Devices

This amendment removes the mandatory requirements that all doors separating the garage from the interior dwelling be equipped with a self-closing and latching device.

3. Stair Geometry (8-¼ Inch Riser)

This amendment returns the IRC to the 8 ¼ inch riser by 9 inch tread depth used in the 2006 IRC.

4. Stair Geometry (8-Inch Riser)

This amendment revises the IRC to match the 8-inch riser by 9-inch tread depth as found in the UBC.

5. Guard Requirement

This amendment reinstates this requirement only for those areas where the elevation difference from the walking edge to the ground directly below is more than 30 inches.

6. Window Fall Protection Devices

This amendment deletes the language that requires installation of window fall protection devices and replaces it with language that governs how they must be installed when provided.

7. Residential Fire Sprinklers

This amendment deletes the “mandatory” requirement for residential sprinklers from the IRC.

8. Protection of Building Envelope

"This amendment eliminates the requirement to provide an exterior-rated door at the top of a stairway that is enclosed by breakaway walls and provides access to a dwelling elevated on piers or piles in a coastal flood zone."

9. Solar Photovoltaic Roof Systems

This amendment corrects language copied from the International Fire Code to address solar photovoltaic panels installed on the roof of one- and two-family dwellings.

10. Mezzanines

This amendment removes IBC language that=does not apply to mezzanines within a one- and two-family dwellings.

11. Foundation Anchorage

This amendment provides an exception to the requirement for attaching bottom plates of braced wall panels on the interior of a dwelling to foundations with anchor bolts. The exception applies in low-wind, low-seismic areas where gypsum board is used as the bracing method for the interior wall in question.

12. Comprehensive Energy Amendment

This is a comprehensive amendment, providing flexibility for meeting energy code requirements while maintaining energy performance. It provides a “true” unrestricted performance path that allows for cost-optimized construction of an energy-equivalent house utilizing energy neutral options. Incorporating; building tightness tradeoff, equipment efficiency tradeoff and window area tradeoff. ***(Includes Amendments 17, 25, 26)***

13. Remove "Mandatory" Requirements for Above-Code Programs

This amendment eliminates the need to meet all "mandatory" requirements identified by the IRC Chapter 11 as long as the program exceeds the energy-efficiency levels required.

14. Overhang Credit for SHGC (climate zones 1-4)

This amendment allows the use of overhangs to meet the solar heat gain coefficient requirements in the IECC.

15. Multifamily Air Leakage Testing

This amendment adds an exception to allow compliance to the air barrier requirements and allow builders to test the entire building as a whole, as permitted for commercial buildings.

16. Air Leakage Rate Correction (climate zones 1-8)

This amendment modifies the requirement from 3 air changes per hour (ACH) to 5 ACH in Climate Zones 1-8.

17. Air Leakage Trade-Off

This amendment allows builders to trade improvements in other building energy components for less stringent building envelope pressure test results, provides flexibility in meeting the air-tightness requirements and provides options for recovering from an unexpected air-tightness test failure. ***(Part of Amendment # 12)***

18. Prescriptive Table Requirements

This amendment replaces 2015 IRC Chapter 11 Tables N1102.1.2 and N1102.1.4 with tables from the 2009 IRC Chapter 11.

19. Basement Wall R-Value/U-Factors Reduction (Climate Zone 5)

This amendment reduces the basement wall R-value requirement in Climate Zone 5 to a more reasonable R-value based those acceptable to both NAHB and DOE in the 2009 IRC.

20. Ceiling R-Value/U-Factors Reduction (climate zones 2-5)

This amendment reinstates the appropriate minimum ceiling R-values in climate zones 2, 3, 4 and 5, those published in the 2009 IRC, Chapter 11.

21. Correct SHGC for Climate Zone 4

This amendment changes the Climate Zone 4 SHGC back to N/R, because a prescriptive restriction for the SHGC of 0.40 in Climate Zone 4 does not save energy.

22. Wall R-Value/U-Factors Corrections (Climate Zone 3)

This amendment reinstates the appropriate minimum wall assembly R-values/U-factors in Climate Zone 3 published in the 2009 IECC.

23. Wall R-Value/U-Factors Corrections (Climate Zones 6-8)

This amendment reinstates the appropriate minimum wall assembly R-Values/U-Factors in climate zones 6, 7 & 8 published in the 2009 IRC Chapter 1.

24. Mechanical Equipment Trade-Off

This amendment reinstates the performance option in the IRC Chapter 11 to reduce prescriptive requirements by installing HVAC equipment with higher energy-efficiency performance ratings than required by code. ***(Part of Amendment # 12)***

25. Window Area Trade-Off

This amendment provides the building designer the ability to reduce window area and get credit for the energy saved. ***(Part of Amendment # 12)***

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1. Fire Separation Distance

This amendment would return the fire separation distances between structures to those required before residential sprinklers became part of the International Residential Code.

Revise as follows:

Delete Tables R302.1(1) and R302.1(2) and replace with new table.

TABLE R302.1 EXTERIOR WALLS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E 119 or UL 263 with exposure from the outside	0 feet
	Not fire-resistance rated	0 hours	3 feet[a]
Projections	Not allowed	N/A	< 2 feet
	Fire-resistance rated	1 hour on the underside[b, c]	2 feet[a]
	Not fire-resistance rated	0 hours	3 feet
Openings in walls	Not allowed	N/A	< 3 feet
	Unlimited	0 hours	3 feet[a]
Penetrations	All	Comply with Section R302.4	< 3 feet
		None required	3 feet[a]

For SI: 1 foot = 304.8 mm.
N/A = Not Applicable
a. For residential subdivisions where all *dwellings* are equipped throughout with an automatic sprinkler system installed in accordance with Section P2904, the *fire separation distance* for nonrated exterior walls and rated projections shall be permitted to be reduced to 0 feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining *lot* provides an open setback *yard* that is 6 feet or more in width on the opposite side of the property line.
b. The roof eave fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave if fireblocking is provided from the wall top plate to the underside of the roof sheathing.
c. The roof eave fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave provided that gable vent openings are not installed.

Reason:

NAHB urges all state and local jurisdictions to adopt the 2012 International Residential Code with this amendment to the fire separation distance requirements for exterior walls. For years, NAHB has asked the IRC code committee to return to the requirements found in the 2003 IRC. During the supplemental code cycle, the fire separation distances were increased by 2 feet without any scientific data or reports that proved the allowable distance found in the 2003 IRC contributed to any increase in exposure fires from one dwelling to another.

To this day, there are no known reports or studies that demonstrate the previously allowed 3-foot separation distance from the property line and 6-foot separation between structures failed to provide the minimum required safe distance..

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2. Self Closing Devices

This amendment removes the mandatory requirements for all doors separating the garage from the interior dwelling to be equipped with a self-closing and latching device.

Revise as follows:

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~~, equipped with a self-closing device~~.

Reason:

NAHB strongly disagrees with the new requirement for door closures on openings between the garage and the house. For many years, proponents argued that fires that originate in the garage could pass through these openings but failed to provide any reliable data or statistics. As a result, the committee and the governmental members repeatedly disapproved this requirement.

During the 2009-10 code development process, the proponents returned with a new reason to prevent the spread of carbon monoxide from vehicles and the by-products produced by burning thermoplastics. While the proponents were able to produce a extremely lengthy dissertation on the hazards of carbon monoxide and the number of false alarms created by carbon monoxide detectors, nowhere in their written or oral testimony did they link any statistical substantiation to need for closures on these openings nor has there been any other evidence produced by other parties..

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3. Stair Geometry (8 ¼ Inch Riser)

This amendment revises the 2012 IRC to return stair geometry to the 8 ¼-inch riser by 9-inch tread depth of the 2006 IRC.

Revise as follows:

R311.7.5 Stair treads and risers. Stair treads and risers shall meet the requirements of this section. For the purposes of this section, dimensions and dimensioned surfaces shall be exclusive of carpets, rugs or runners.
R311.7.5.1 Risers. The riser height shall be not more than 8 ¼ inch (210mm) ~~7¾ inches (196 mm)~~. The riser shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm). Risers shall be vertical or sloped from the underside of the nosing of the tread above at an angle not more than 30 degrees (0.51 rad) from the vertical. Open risers are permitted provided that the openings located more than 30 inches (762 mm), as measured vertically, to the floor or grade below do not permit the passage of a 4-inch-diameter (102 mm) sphere.

Exceptions:

1. The opening between adjacent treads is not limited on spiral stairways.
2. The riser height of spiral stairways shall be in accordance with Section R311.7.10.1.

R311.7.5.2 Treads. The tread depth shall be not less than 9 inches (229mm) ~~10 inches (254 mm)~~. The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm).

Reason:

This amendment retains the stair geometry requirements allowed under the Building Officials and Code Administrators National Building Code (BOCA) these dimensions are still accepted by many state and local jurisdictions across the country.

These dimensions, originally accepted in the first draft of the IRC and the historic dimensions in the Council of American Building Official's CABO One- and Two-family Building Code, adequately provide for stair safety in residential occupancies.

No sound documentation or data has ever been presented demonstrating these proposed dimensions are any less safe or are a contributing factor in accidental residential falls than a stair geometry of 7 ¾"x 10".

The safety benefits of the 7 ¾"riser and 10" tread stair geometry are technically unsubstantiated and are not practical in many home designs. If the footprint of the house must be increased to accommodate the additional space needed, adequately sized living spaces are sacrificed without any demonstrated gain. This can lead to an economic hardship on first-time home buyers of smaller homes, and in particular for construction on smaller lots, infill projects, and townhomes.

As outlined in Section R101.3 of the IRC, the code is to provide minimum requirements for occupant safety and health. There is adequate substantiation to show that 8¼-inch x 9 inch geometry provides this minimum level of occupant safety.

Notes/additional background:

Prior to the Building Officials and Code Administrators 1996 BOCA National Building Code, and the 1995 CABO One-and-Two Family Building Code, stair geometry requirements were set at the 8¼" x 9" dimensions.

An alternative amendment is available for jurisdictions that wish to retain the use of past UBC requirements of an 8-inch maximum riser height and 9-inch minimum tread depth. For that amendment, please see suggested amendment "Stair Geometry (8" X 9")".

NAHB Policy on Stair Geometry Standards states: NAHB's Board of Directors recommends that all state and local governments which adopt the National Building Code (BOCA) and the Council of American Building Officials (CABO) model building codes, postpone the adoption of any new stair geometry. Also, NAHB's Board of Directors calls on all state and local governments that automatically adopt BOCA and CABO model building codes to amend the 1996 and 1995 editions respectively to continue the use of the 1993 BOCA and CABO model codes as they relate to stair geometry provisions. Also, NAHB's Board of Directors urges all state and local affiliated Home Builders Associations to contact state and local code authorities and persuade them to postpone the adoption of the new CABO and BOCA stair geometry standard. Also, NAHB's Board of Directors calls on NAHB to continue to vigorously pursue the adoption of a stair geometry standard consistent with the 1993 BOCA Code.

This amendment retains the provision for the installation of window opening limiting devices or window fall prevention devices where they are installed, and deletes the reference requiring these devices based on a window sill height. This change allows the builder and the building official to use their judgment for when these devices shall be installed and ensures that where these devices are provided, they conform with the referenced industry standard.

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4. Stair Geometry (8-Inch Riser)

This amendment revises the Internal Residential Code to coincide with the stair geometry to 8-inch riser by 9-inch tread depth as found in the UBC.

Revise as follows:

R311.7.5 Stair treads and risers. Stair treads and risers shall meet the requirements of this section. For the purposes of this section, dimensions and dimensioned surfaces shall be exclusive of carpets, rugs or runners.
R311.7.5.1 Risers. The riser height shall be not more than 8 inches (210 mm) ~~7¾ inches (196 mm).~~ The riser shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm). Risers shall be vertical or sloped from the underside of the nosing of the tread above at an angle not more than 30 degrees (0.51 rad) from the vertical. Open risers are permitted provided that the openings located more than 30 inches (762 mm), as measured vertically, to the floor or grade below do not permit the passage of a 4-inch-diameter (102 mm) sphere.

Exceptions:

1. The opening between adjacent treads is not limited on spiral stairways.
2. The riser height of spiral stairways shall be in accordance with Section R311.7.10.1.

R311.7.5.2 Treads. The tread depth shall be not less than 9 inches (229mm) ~~10 inches (254 mm)~~. The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm).

Reason:

This amendment retains the stair geometry requirements allowed under the Uniform Building Code (UBC). This amendment allows the continued use of the 8" x 9" geometry, the historically accepted requirement of many other state and local jurisdictions across the country. Many others actually adopt stair geometry requirements of 8 ¼" x 9."

The 8" x 9" geometry has always adequately provided for occupant safety in residential occupancies. No sound documentation or data has ever been presented demonstrating it is any less safe or a contributing factor in accidental residential falls than a stair geometry of 7 ¾" x 10" or other even more stringent geometries.

The safety benefits of the 7 ¾" riser and 10" tread stair geometry are technically unsubstantiated and are not practical in many home designs. If the footprint of the house must be increased to accommodate the additional space needed, adequately sized living spaces are sacrificed without any demonstrated gain. This can lead to an economic hardship on first-time home buyers of smaller homes, and in particular for construction on smaller lots, infill projects, and townhomes.

As outlined in Section R101.3 of the IRC, the code provides minimum requirements for occupant safety and health. There is adequate substantiation to show that an 8" x 9" geometry provides this minimum level of occupant safety.

Notes/additional background:

This is an alternative amendment to accommodate those jurisdictions accustomed to or that wish to retain the use of past UBC requirements of an 8-inch maximum riser height and a 9-inch minimum tread depth.

Prior to changes in 1996 BOCA and 1995 CABO One-and-Two Family Building Code, stair geometry requirements were set at an 8 ¼ inch maximum for risers and a 9-inch minimum tread depth. For these dimensions, please see suggested amendment "Stair Geometry (8 ¼" X 9")" which is consistent with NAHB policy.

NAHB Policy on Stair Geometry Standards states: NAHB's Board of Directors recommends that all state and local governments which adopt the National Building Code (BOCA) and the Council of American Building Officials (CABO) model building codes, postpone the adoption of any new stair geometry. Also, NAHB's Board of Directors calls on all state and local governments that automatically adopt BOCA and CABO model building codes to amend the 1996 and 1995 editions respectively to continue the use of the 1993 BOCA and CABO model codes as they relate to stair geometry provisions. Also, NAHB's Board of Directors urges all state and local affiliated Home Builders Associations to contact state and local code authorities and persuade them to postpone the adoption of the new CABO and BOCA stair geometry standard. Also, NAHB's Board of Directors calls on NAHB to continue to vigorously pursue the adoption of a stair geometry standard consistent with the 1993 BOCA Code.

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5. Guard Requirement

This amendment reinstates the guard requirement only for those areas where the elevation difference from the walking edge to the ground directly below is more than 30 inches.

Revise as follows:

R312.1.1 Where required. Guards shall be located along open-sided walking surfaces of all decks, porches, balconies, including stairs, ramps and landings that are located more than 30 inches 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.

Reason:

This amendment retains the provisions of the 2006 IRC, where guardrails were required when the elevation difference between the walking surface was greater than 30 inches to the floor or grade directly below. The 2015 IRC now requires a guardrail where the elevation difference is greater than 30 inches from the walking surface to a horizontal point 36 inches adjacent to the leading edge of the walking surface to the grade or floor below. This change will now require the building official to carry a four-foot level to conduct inspections.

During the 2007/2008 code development cycle, the proponent referred to work conducted and reports written by the ICC Code Technology Committee (CTC). At no time during the public hearing, nor the Final Action Hearing was any technical justification presented to substantiate the change requiring the building official to measure 36 inches away from the leading edge of the walking surface or tread to determine when a guardrail should or should not be required. After reviewing the many reports from the CTC website, it is still unclear from where the 36- inch requirement was derived. There are no studies that can support claims that this will have an effect on reducing possible injuries. While the proponent promotes this as a means for consistent enforcement of the guard requirements, there is no evidence of increased risk to the safety of the occupant if the current method of measuring from the edge of the walking surface to grade below is used.

Furthermore, the new language requires a guardrail to be applied to any open-sided walking surface. This could very well be interpreted by building officials to include driveways, landscaped walkways, retaining walls and other elevated surfaces used for the purpose of walking. This change substantially expands the areas needing to be equipped with guards beyond the previous edition of the code.

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6. Window Fall Protection Devices

This amendment deletes the language that requires window fall protection devices to be installed and replaces it with language that governs how they must be installed when provided.

Revise as follows:

R312.2 Window fall protection. Where window fall protection devices are provided, the device shall be ~~provided~~ installed in accordance with Sections R312.2.1 ~~and R312.2.2.~~

~~**R312.2.1 Window sills.** In dwelling units, where the top of the sill of an operable window opening is located less than24 inches (610 mm) above the finished floor and greater than 72 inches (1829 mm) above the finished grade or other surface below on the exterior of the building, the operable window shall comply with one of the following:~~
~~1.Operable windows with openings that will not allow a 4-inch-diameter (102 mm) sphere to pass through the opening where the opening is in its largest opened position.~~
~~2.Operable windows that are provided with window fall prevention devices that comply with ASTM F 2090.~~
~~3.Operable windows that are provided with window opening control devices that comply with SectionR312.2.2.~~

~~R312.2.2~~ **R312.2.1 Window opening control devices.** Window opening control devices shall comply with ASTM F 2090.The window opening control device, after operation to release the control 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 Section R310.2.1.

Reason:

This amendment retains the provision for the installation of window opening limiting devices or window fall prevention devices where they are installed, and delete the reference of requiring these devices based on a window sill height. This change allows the builder and the building official to use their judgment on when these devices shall be installed and insure that where these devices are provided they will conform with the referenced industry standard.

During the 2007/2008 code development cycle and the ICC Code Technology Committee (CTC) meetings, the Window and Door Manufacturers Association (WDMA) presented credible information that raised questions and concerns regarding the established minimum window sill heights. Despite the Consumer Product Safety Commission reports indicating a decrease in the number of injuries and deaths from children falling from windows, WDMA had discovered that in Denver, one of the few areas in the country that has had a minimum sill height requirement for the past decade, the number of child injuries and deaths were increasing. One of the many concerns is that there is the potential for the occupant to place furniture or other objects under the window that a child could climb upon. It is our opinion that the CTC needs to earnestly review the information presented by the WDMA and reconsider its position on minimum window sill heights.

Furthermore, the recommendation to require window opening limiting devices contradicts conclusions of the CTC Work Study Group. It was clear to many in the group that public education was the most effective means of reducing the number of falls by children through windows.

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7. Residential Fire Sprinklers

This amendment would delete the mandatory requirement for residential sprinklers from the IRC.

Revise as follows:

Delete Section R313 entirely

~~**SECTION R313**~~
~~**AUTOMATIC FIRE SPRINKLER SYSTEMS**~~
~~**R313.1 Townhouse automatic fire sprinkler systems.** An automatic residential fire sprinkler system shall be installed in townhouses.~~
~~**Exception:** An automatic residential fire sprinkler system shall not be required where additions or alterations are made to existing townhouses that do not have an automatic residential fire sprinkler system installed.~~
~~**R313.1.1 Design and installation**. Automatic residential fire sprinkler systems for townhouses shall be designed and installed in accordance with Section P2904 or NFPA 13D.~~
~~**R313.2 One- and two-family dwellings automatic fire systems.** An automatic residential fire sprinkler system shall be installed in one- and two-family dwellings.~~
~~**Exception:** An automatic residential fire sprinkler system shall not be required for additions or alterations to existing buildings that are not already provided with an automatic residential sprinkler system.~~
~~**R313.2.1 Design and installation.** Automatic residential fire sprinkler systems shall be designed and installed in accordance with Section P2904 or NFPA 13D.~~

Reason:

Since the inclusion of the mandatory requirement for residential sprinklers in the 2009 IRC, more than 42 states have amended or passed legislation prohibiting communities from mandating residential sprinklers in new one- and two-family dwellings. NAHB urges all state and local communities to oppose the mandatory requirement and continue to support the voluntary installation of residential sprinklers as the buyer's choice.

Fire sprinkler mandates should remain an option for state and local jurisdictions. This option is already adequately provided for in the appendix of the 2006 edition of the IRC.

Should a jurisdiction wish to mandate residential sprinkler systems, a provision for them to do so is now available in the 2006 IRC via adoption of Appendix P. Allowing state and local jurisdictions to decide for themselves based on the specific needs and concerns of their communities is the most appropriate approach. The ICC overwhelmingly endorsed that approach at the previous Final Action Hearings, where inclusion of the appendix was approved for that very reason -- even by the building officials who do believe sprinklers should be mandated – and that action should be honored and upheld.

The IRC clearly states, "The purpose of this code is to provide minimum requirements to safeguard life or limb, health and public welfare." The IRC Commentary states that the IRC is intended to provide reasonable minimum standards that reduce the factors of hazardous and substandard conditions that would otherwise put the public at risk to damaging their health, safety or welfare. Any imposition of a mandated sprinkler requirement is excessive and is not a reasonable minimum standard for meeting the "purpose" of the code. It is important to remember that the code is composed of many life-safety standards that have been proven to meet the "purpose" of the code. Proposals to mandate sprinklers as a requirement in the body of the IRC rather than an adoptable appendix exceed this "purpose" and should not approved.

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8. Protection of Building Envelope

This amendment eliminates the requirement to provide an exterior-rated door at the top of a stairway that is enclosed by breakaway walls and provides access to a dwelling elevated on piers or piles in a coastal flood zone.

Revise as follows:

~~**R322.3.5.1 Protection of building envelope.** An exterior door that meets the requirements of Section R609 shall be installed at the top of stairs that provide access to the building and that are enclosed with walls designed to break away in accordance with Section R322.3.4.~~

Reason:

This amendment deletes the requirement added in the 2015 IRC that an exterior door be provided at the top of a stairway enclosed by breakaway walls and providing access to a dwelling located in a Coastal A Zone or Zone V special flood hazard area and elevated on piers or piles. While having a door at the top of such a stair may be good practice, the additional requirements associated with it being an exterior door are overly conservative, particularly if the door at the bottom of the enclosed stair is also an exterior door. By requiring compliance with all of the requirements of Section R609, the specified door would need to have a design pressure rating consistent with the design wind speed for the site, the door frame would need to be stiffened to resist the loads from such a door, proper anchorage of the door to the frame would need to be provided, and the door opening would need head, jamb, and sill flashing. The minimum added cost to provide a standard exterior door with flashing in lieu of a standard interior door is around $300; a hurricane wind-rated door would add an additional $200-$300 to the minimum costs.

It is noted that this requirement does not appear in the basic construction requirements of the National Flood Insurance Program in accordance with 44 CFR 60.3. It is also not specified as a practice that a community would earn credit for mandating and enforcing under FEMA's Community Rating Service, and would not lead to discounted flood insurance premiums.

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9. Solar Photovoltaic Roof Systems

This amendment corrects language copied from the International Fire Code to address solar photovoltaic panels installed on the roof of a one- and two-family dwelling.

Revise as follows:

R324.7 Access and pathways. Roof access, pathways and spacing requirements shall be provided in accordance with Sections R324.7.1 through R324.7.2.5.

Exceptions:

1. Detached garages and accessory structures to one and two-family *dwellings* and *townhouses,* such as parking shade structures, carports, solar trellises and similar structures.
2. Roof access, pathways and spacing requirements need not be provided where an alternative ventilation method *approved* by the code official has been provided or where the code official has determined that vertical ventilation techniques will not be employed.

R324.7.1 Roof access points. Roof access points shall be located in areas that do not require the placement of ground ladders over openings such as windows or doors, and located at strong points of building construction in locations where the access point does not conflict with overhead obstructions such as tree limbs, wires or signs.

R324.7.2 Solar photovoltaic systems. Solar photovoltaic systems shall comply with Sections R324.7.2.1 through R324.7.2.5.

R324.7.2.1 Size of solar photovoltaic array. Each photovoltaic array shall be limited to 150 feet by 150 feet (45 720 by 45 720 mm). Multiple arrays shall be separated by a clear access pathway not less than 3 feet (914 mm) in width.

R324.7.2.2 Hip roof layouts. Panels and modules installed on *dwellings* with hip roof layouts shall be located in a manner that provides a clear access pathway not less than 3 feet (914 mm) in width from the eave to the ridge on each roof slope where panels and modules are located. The access pathway shall be located ~~at a structurally strong location on the building capable of supporting the live load of fire fighters~~ along the structural members of the roof framing to support any person accessing the roof.

Exception: These requirements shall not apply to roofs with slopes of 2 units vertical in 12 units horizontal (16.6 percent) and less.

R324.7.2.3 Single ridge roofs. Panels and modules installed on *dwellings* with a single ridge shall be located in a manner that provides two, 3-foot-wide (914 mm) access pathways from the eave to the ridge on each roof slope where panels or modules are located.

Exception: This requirement shall not apply to roofs with slopes of 2 units vertical in 12 units horizontal (16.6 percent) and less.

R324.7.2.4 Roofs with hips and valleys. Panels and modules installed on *dwellings* with roof hips or valleys shall not be located less than 18 inches (457 mm) from a hip or valley where panels or modules are to be placed on both sides of a hip or valley. Where panels are to be located on one side only of a hip or valley that is of equal length, the 18-inch (457 mm) clearance does not apply.

Exception: These requirements shall not apply to roofs with slopes of 2 units vertical in 12 units horizontal (16.6 percent) and less.

~~**R324.7.2.5 Allowance for smoke ventilation operations.** Panels and modules installed on dwellings shall not be located less than 3 feet (914 mm) below the roof ridge to allow for fire department smoke ventilation operations.~~

~~**Exception:** Where an alternative ventilation method approved by the code official has been provided or where the code official has determined that vertical ventilation techniques will not be employed, clearance from the roof ridge is not required.~~

Reason:

This change is suggested based on two reasons. First, there is no reference in any of the ICC codes which specifically quantifies the weight of a fully geared up fire fighter. In addition, the provision for the

access and the ability of the roof to support the live load of an individual should not be limited to the fire service. Solar PV panels will require cleaning and maintenance by the installer, electricians will need to periodically access it to repair or replace components, and owners will need to clear debris and perform other housekeeping items. Secondly, while the IRC does take in to consideration the safety of occupants and fire service personnel, the IRC is not a fire service manual and should not include operational requirements for attacking fires from an offensive or defensive position. The IRC is a standalone building code for one- and two family dwellings and townhouses and it is not a fire operation manual.

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10. Mezzanines

This amendment removes IBC language that does not apply to mezzanines within one- and two family dwellings.

Revise as follows:

R325 MEZZANINES

R325.1 General. Mezzanines shall comply with Section R325.

R325.2 Mezzanines. The clear height above and below mezzanine floor construction shall be not less than 7 feet 2134 mm).

R325.3 Area limitation. The aggregate area of a mezzanine or mezzanines shall be not greater than one-third of the floor area of the room or space in which they are located. The enclosed portion of a room shall not be included in a determination of the floor area of the room in which the *mezzanine* is located.

R325.4 Means of egress. The means of egress for mezzanines shall comply with the applicable provisions of Section R311.

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, Appendix S, 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.~~

Reason:

During the code hearings, the residential code committee approved a modified version of the proposal which extracted language dealing with mezzanines directly from the IBC. The committee modified the height of the wall between the mezzanine and the room below to have walls no greater than 36 inches in height to be coordinated with the guard heights in the IRC.

This change also deletes the two exceptions to the openness requirements of the mezzanine, which were extracted directly from the IBC and have no bearing on a mezzanine that would be constructed in a one- and two family dwelling or townhouse. The second exception also references automatic sprinklers system that are inappropriate for the IRC (NFPA 13R is four-story multifamily).

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11. Foundation Anchorage

This amendment provides an exception to the requirement for attaching bottom plates of braced wall panels on the interior of a dwelling to foundations with anchor bolts. The exception applies in low-wind, low-seismic areas where gypsum board is used as the bracing method for the interior wall in question.

Revise as follows:

R403.1.6 Foundation anchorage. Wood sill plates and wood walls supported directly on continuous foundations shall be anchored to the foundation in accordance with this section.

Cold-formed steel framing shall be anchored directly to the foundation or fastened to wood sill plates anchored to the foundation. Anchorage of cold-formed steel framing and sill plates supporting cold-formed steel framing shall be in accordance with this section and Section R505.3.1 or R603.3.1.

Wood sole plates at all exterior walls on monolithic slabs, wood sole plates of *braced wall panels* at building interiors on monolithic slabs and all wood sill plates shall be anchored to the foundation with minimum 1/2-inch diameter (12.7 mm) anchor bolts spaced a maximum of 6 feet (1829 mm) on center or *approved* anchors or anchor straps spaced as required to provide equivalent anchorage to 1/2-inch-diameter (12.7 mm) anchor bolts. Bolts shall extend a minimum of 7 inches (178 mm) into concrete or grouted cells of concrete masonry units. The bolts shall be located in the middle third of the width of the plate. A nut and washer shall be tightened on each anchor bolt. There shall be a minimum of two bolts per plate section with one bolt located not more than 12 inches (305 mm) or less than seven bolt diameters from each end of the plate section. Interior bearing wall sole plates on monolithic slab foundations that are not part of a *braced wall panel* shall be positively anchored with approved fasteners. Sill plates and sole plates shall be protected against decay and termites where required by Sections R317 and R318.

Exceptions:

1. Walls 24 inches (610 mm) total length or shorter connecting offset braced wall panels shall be anchored to the foundation with a minimum of one anchor bolt located in the center third of the plate section and shall be attached to adjacent braced wall panels at corners as shown in Item 9 of Table R602.3(1).

2. Connection of walls 12 inches (305 mm) total length or shorter connecting offset braced wall panels to the foundation without anchor bolts shall be permitted. The wall shall be attached to adjacent braced wall panels at corners as shown in Item 9 of Table R602.3(1).

3. Where the basic wind speed in accordance with Figure R301.2(4)A does not exceed 115 miles per hour (51 m/s), the seismic design category is A or B and Method GB in accordance with Section R602.10 is used for a *braced wall line* on the interior of the dwelling, anchor bolts shall not be required for the wood sole plates of the *braced wall panels*. Positive anchorage with approved fasteners shall be provided.

Reason:

This amendment revises the language for anchorage of light-frame wood stud walls to the foundations of the house. As currently stated, the provisions require anchor bolts for the portions of a wall on the interior of a dwelling that are designated as braced wall panels for a braced wall line passing through the dwelling. To provide the required 7–inch embedment depth, a thickened slab or other continuous footing would be necessary. Chapters 4 and 6 of the IRC do not explicitly require a continuous foundation in these locations in low-wind, low-seismic areas, and they are not traditionally provided. If interpreted and enforced by plan reviewers and inspectors in these areas, disputes and project delays will result and/or home owners will incur significant additional construction costs.

The ICC Ad-Hoc Committee on Wall Bracing revised this section during the 2007/2008 code cycle with the intent of ensuring that sufficient anchorage is provided along braced wall lines inside a dwelling to transfer lateral loads to either monolithic (thickened) slab foundations or continuous footings. While

NAHB agrees that providing a continuous load path is important, the new language is overly broad in its application and not technically justified for many common conditions. The typical bracing method used for braced wall lines on the interior of a one- or two-story dwelling in a low-wind, low-seismic area is Method GB, consistent with the use of gypsum board as the typical interior wall finish material. The allowable shear capacity for Method GB when used on both sides of a braced wall is 200plf (pounds per linear foot). The standard fastener schedule, Table R602.3(1), specifies 3-16d nails at 16" spacing for fastening the bottom plate of a braced wall panel on the interior of a dwelling to floor framing below (such as a raised floor system over a crawlspace or pier-and-beam foundation). This standard nailing provides a 200plf allowable capacity, as would many typical post-installed anchors (e.g. wedge or expansion anchors) that are short enough to be installed in just a slab-on-grade without the need for thickened footings, or even power-actuated fasteners. 1/2" diameter anchor bolts at 6-foot spacing are not necessary for the proper anchorage of these walls.

The proposed amendment provides an exception to the requirement that an interior wall that also used as part of a braced wall line be fastened to a slab-on-grade with anchor bolts, rather than other methods of making a "positive connection" such as wedge or expansion anchors, power fasteners, or concrete nails. The exception is limited to areas of low wind and low seismic hazards and to walls braced using gypsum board, with its lower allowable shear capacity.

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12. Comprehensive Energy Amendment

This is a comprehensive amendment, providing flexibility for meeting energy code requirements while maintaining energy performance. It provides a "true" unrestricted performance path that allows for cost-optimized construction of an energy-equivalent house utilizing energy neutral options. Incorporating; building tightness tradeoff, equipment efficiency tradeoff and window area tradeoff. (Includes Amendments 17, 25, 26)

Revise as follows:

N1102.4 (R402.4) Air leakage ~~(Mandatory)~~. The building thermal envelope shall be constructed to limit air leakage in accordance with the requirements of Sections N1102.4.1 through N1102.4.4.

N1102.4.1 (R402.4.1) Building thermal envelope. The *building thermal envelope* shall comply with Sections N1102.4.1.1 and N1102.4.1.2. The sealing methods between dissimilar materials shall allow for differential expansion and contraction.

N1102.4.1.1 (R402.4.1.1) Installation (Mandatory). The components of the *building thermal envelope* as listed in Table N1102.4.1.1 shall be installed in accordance with the manufacturer's instructions and the criteria listed in Table N1102.4.1.1, as applicable to the method of construction. Where required by the *building official*, an *approved* third party shall inspect all components and verify compliance.

N1102.4.1.2 (R402.4.1.2) Testing (Mandatory). The building or dwelling unit shall be tested ~~and verified as having an air leakage rate of not exceeding 5 air changes per hour in Climate Zones 1 and 2, and 3 air changes per hour in Climate Zones 3 through 8~~ for air leakage. Testing shall be c in accordance with ASTM E 779 or ASTM E 1827 and reported at a pressure of 0.2 inches w.g. (50 Pascals) Where required by the *code official*, testing shall be conducted by an *approved* third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the *code official*. Testing shall be performed at any time after creation of all penetrations of the *building thermal envelope*. During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping or other infiltration control measures;
2. Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed, but not sealed beyond intended infiltration control measures;
3. Interior doors, if installed at the time of the test, shall be open;
4. Exterior doors for continuous ventilation systems and heat recovery ventilators shall be closed and sealed;
5. Heating and cooling systems, if installed at the time of the test, shall be turned off; and
6. Supply and return registers, if installed at the time of the test, shall be fully open.

N1102.4.1.3 (R402.4.1.3) Leakage rate (Prescriptive). The building or dwelling unit shall have an air leakage rate not exceeding 5 air changes per hour in Climate Zones 1 and 2, and 3 air changes per hour in Climate Zones 3 through 8, when tested in accordance with Section N1102.4.1.2.

TABLE N1105.5.2(1) [R405.5.2(1)]
SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Vertical fenestration other than opaque doors	Total area[b] =	~~As proposed~~
	~~(a) The proposed glazing area; where proposed glazing area is less than 15% of the conditioned floor area.~~	
	~~(b)~~ 15% of the conditioned floor area~~; where the proposed glazing area is 15% or more of the conditioned floor area.~~	
	Orientation: equally distributed to four cardinal compass orientations (N, E, S, & W)	As proposed
	U-factor: from Table R402.1.3	As proposed
	SHGC: From Table R402.1.1 except that for climates with no requirement (NR) SHGC = 0.40 shall be used.	As proposed
	Interior shade fraction: 0.92-(0.21 × SHGC for the standard reference design)	0.92-(0.21 × SHGC as proposed)
	External shading: none	As proposed
Heating Systems[d, e]	~~As proposed for other than electric heating without a heat pump, Where the proposed design utilizes electric heating without a heat pump the standard reference design shall be an air source heat pump meeting the requirements of Section C403 of the IECC-Commercial Provisions.~~	~~As proposed~~
	Fuel type: same as proposed design	
	Efficiencies:	As proposed
	Electric: air-source heat pump with prevailing federal minimum standards	As proposed
	Nonelectric furnaces: natural gas furnace with prevailing federal minimum standards	As proposed
	Nonelectric boilers: natural gas boiler with prevailing federal minimum standards	As proposed
	Capacity: sized in accordance with Section N1103.7	As proposed
Cooling Systems[d, f]	~~As proposed~~ Fuel type: Electric Efficiency: in accordance with prevailing federal minimum standards Capacity: sized in accordance with Section N1103.7	As proposed As proposed
Service Water Heating[d, e, f]	~~As proposed~~ Fuel type: same as proposed design Efficiency: in accordance with prevailing federal minimum standards Use: gal/day = 30 + 10 × *Nbr* Tank temperature: 120°F ~~Use: same as proposed design~~	~~As proposed~~ As proposed Same as standard reference Same as standard reference ~~gal/day = 30 + (10 × *Nbr*)~~

Footnotes remain unchanged

Reason:

This is a comprehensive amendment, providing flexibility for meeting energy code requirements while maintaining energy performance. It provides a "true" unrestricted performance path that will allow for cost-optimized construction of an energy-equivalent house.

The amendment provides alternatives that encourage innovation and the use of materials and equipment which will result in a home which is at least equivalent of that prescribed in the energy code.

The modifications will reinstate many of the changes made since the 2006 IRC Chapter 11. Those changes restricted the flexibility of the builder/designer to construct an energy-efficient code compliant home while still meeting the energy performance levels of the current code.

Items included in this amendment:
Energy neutral building tightness trade-offs
Credit for more energy-efficient buildings which incorporate reduced window area
Energy neutral heating, cooling and water heating equipment efficiency trade-offs

Currently all homes have a mandatory requirement to be equal to or tighter than 3ACH50 or 5ACH50, depending on climate zone. Proposed changes will allow for homes to be less tight provided other efficiency changes are made to the house which offset energy lost due to the change in air infiltration.

Currently, when conducting a performance analysis, a building glazing area greater than 15% of the conditioned floor area (CFA) is penalized for using more energy. However, a building with less than 15% window to CFA does not get credit for saving energy. This amendment allows the builder/designer to optimize window area that is both energy efficient and pleasing to the consumer.

Return to Residential

13. Remove Mandatory Requirement for Above Code Programs

This amendment eliminates the need to meet all "Mandatory" requirements identified by the IRC Chapter 11 as long as the program exceeds the energy-efficiency levels required.

Revise as follows:

N1101.4 (R102.1.1) Above code programs. The *building official* or other authority having jurisdiction shall be permitted to deem a national, state or local energy-efficiency program to exceed the energy efficiency required by this code. Buildings *approved* in writing by such an energy-efficiency program shall be considered in compliance with this code. ~~The requirements identified as "mandatory" in Chapters 4 and 5 of this code, as applicable, shall be met.~~

Reason:

The key element of an above code program is that it must meet or exceed the energy-efficiency requirements of the IRC Chapter 11. Requiring such a program to also meet the detailed prescriptive requirements labeled as "mandatory" defeats the purpose of performance based above-code program. This amendment will allow flexibility in the methodology used for any above-code program to meet or exceed the minimum energy-efficiency requirements.

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14. Overhang Credit for SHGC (Climate Zones 1-4)

This amendment allows the use of overhangs to meet the solar heat gain coefficient requirements within the IECC.

Add new text as follows:

N1101.9 (R202) Defined Terms.

PROJECTION FACTOR. The ratio of the horizontal depth of an overhang, eave, or permanently attached shading device, divided by the distance measured vertically from the bottom of the fenestration glazing to the underside of the overhang, eave, or permanently attached shading device.

N1102.3.2.1 (R402.3.2.1) Glazed fenestration SHGC exception. In Climate Zones 1 through 4, permanently shaded vertical fenestration shall be permitted to satisfy the SHGC requirements. The projection factor of an overhang, eave, or permanently attached shading device shall be greater than or equal to the value listed in table N1102.2.3.1 for the appropriate orientation. The minimum projection shall extend beyond each side of the glazing a minimum of 12 inches (0.3 m). Each orientation shall be rounded to the nearest cardinal orientation (+/-45 degrees or 0.79 rad) for purposes of calculations and demonstrating compliance.

TABLE N1102.2.3.1 (R402.3.2.1)
MINIMUM PROJECTION FACTOR REQUIRED BY ORIENTATION FOR SHGC EXCEPTION

ORIENTATION	PROJECTION FACTOR
North	>=0.40[a]
South	>=0.20 –
East	>=0.50
West	>=0.50

a. *For the north orientation, a vertical projection located on the west-edge of the fenestration with equivalent PF >= 0.15 shall also satisfy the minimum projection factor requirement.*

Reason:

The concept of using shading to reduce heat gain is integral to the architecture of some of the oldest world cultures. Shading in modern construction offers many possibilities. This proposed code change allows for the use of overhangs to meet the solar heat gain coefficient requirements within the IRC Chapter 11. Permanent exterior shading features such as overhangs are allowed to be used in IECC Chapter 5 as a prescriptive trade-off to meeting SHGC requirements within the code. The calculation for determining the projection factor for overhangs has been in the 2000, 2003, 2006, and 2009 IECC for commercial buildings and has been proven to be very simple to calculate, fitting well into a prescriptive approach. Shading devices are allowed if using the 2003 IECC and are allowed as a trade-off under the commercial provisions of the IECC. Allowing flexibility in meeting the solar heat gain coefficient through the use of proven shading alternatives will increase the usability of the code for the building and design community while ensuring that the new fenestration is energy efficient. When credit for shading is permitted, it encourages an integrated approach to building designs, energy use, construction materials, renewable resources particularly as part of urban infrastructure, site and town planning and building design to be considered holistically. It also creates the opportunity for aesthetically pleasing and ingenious designs that might not otherwise be permitted.

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15. Multi-Family Air Leakage Testing

This amendment adds an exception to allow compliance to the air barrier requirements and allow an exception for testing the entire building as a whole, as is permitted for commercial buildings.

Revise as follows:

N1102.4 (R402.4) Air leakage (Mandatory). The building thermal envelope shall be constructed to limit air leakage in accordance with the requirements of Section N1102.4.1 through N1102.4.4.

Exception: Two family dwelling units and townhouses shall be permitted to comply with IECC Section C402.5

Reason:

Air-tightness testing for single-family detached homes is very straightforward; however, it is much more difficult to accurately test attached dwelling units, including multifamily buildings. The IECC treats low-rise multi-family buildings of 3 stories or less like single-family homes and multifamily buildings of 4 stories or more like commercial buildings. Regardless of height, all multifamily buildings have the same air-tightness testing complications, such as: Does the entire building need to be tested at one time? What about multifamily buildings with open corridors? Does every dwelling need to be tested? Can the leakages be averaged between units? Is the leakage tested only to the "outside" or should it include leakage to adjacent units?

By approving this amendment, low-rise multifamily buildings and attached single-family dwellings will avoid these complications while still being held to the same level of performance as high-rise (R-2) residential and commercial buildings.

Return to Residential

16. Air Leakage Rate Correction (Climate Zones 1-8)

This amendment modifies the requirement from 3 air changes per hour (ACH) to 5 ACH in climate zones 1-8.

Revise as follows:

N1102.4.1.2 (R402.4.1.2) Testing. The building or dwelling unit shall be tested and verified as having an air leakage rate of not exceeding five air changes per hour in Climate Zones 1 ~~and 2, and three air changes per hour in Climate Zones 3~~ through 8. Testing shall be conducted in accordance with ASTM E 779 or ASTM E 1827 and reported at a pressure of 0.2 inches w.g. (50 Pascals). Where required by the *code official*, testing shall be conducted by an *approved* third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the *code official*. Testing shall be performed at any time after creation of all penetrations of the *building thermal envelope*.

Table N1105.5.2(1) [R405.5.2(1)]
SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

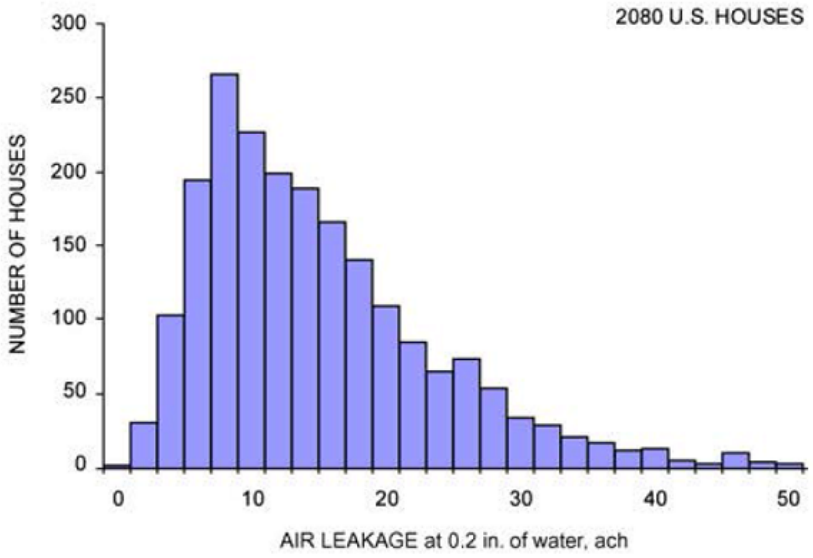
BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Air exchange rate	Air leakage rate of 5 air changes per hour in Climate Zones 1 ~~and 2, and 3 air changes per hour in Climate Zones 3~~ through 8 at a pressure of 0.2 inches w.g (50 Pa). The mechanical ventilation rate shall be in addition to the air leakage rate and the same as in the proposed design, but no greater than 0.01 × *CFA* + 7.5 × (*Nbr* + 1) where: *CFA* = conditioned floor area *Nbr* = number of bedrooms Energy recovery shall not be assumed for mechanical ventilation.	For residences that are not tested, the same air leakage rate as the standard reference design. For tested residences, the measured air exchange rate[a]. The mechanical ventilation rated shall be in addition to the air leakage rate and shall be as proposed.

Footnotes remain unchanged

Reason:

Building tightness is an important part of an energy-efficient and comfortable house. However, 3 air changes (ACH) per hour at 50 Pascals is an extremely low target tightness, especially for smaller homes. The ASHRAE Handbook of Fundamentals shows that around 8% of U.S. homes achieve 3 ACH or less, 13% achieve 4 and less than 23% achieve 5. The proposed 5 ACH while still an aggressive tightness level will provide a tight, comfortable, energy-efficient home.

2013 ASHRAE Handbook—Fundamentals



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17. Air Leakage Trade-Off

This amendment allows builders to trade improvements in other building energy components for less stringent building envelope pressure test results, provides flexibility in meeting the air-tightness requirements and provides options for recovering from an unexpected air-tightness test failure. (Part of Amendment # 12)

Revise as follows:

N1102.4 (R402.4) Air leakage ~~(Mandatory)~~. The building thermal envelope shall be constructed to limit air leakage in accordance with the requirements of Sections N1102.4.1 through N1102.4.4.

N1102.4.1 (R402.4.1) Building thermal envelope. The *building thermal envelope* shall comply with Sections N1102.4.1.1 and N1102.4.1.2. The sealing methods between dissimilar materials shall allow for differential expansion and contraction.

N1102.4.1.1 (R402.4.1.1) Installation (Mandatory). The components of the *building thermal envelope* as listed in Table N1102.4.1.1 shall be installed in accordance with the manufacturer's instructions and the criteria listed in Table N1102.4.1.1, as applicable to the method of construction. Where required by the *code official*, an *approved* third party shall inspect all components and verify compliance.

N1102.4.1.2 (R402.4.1.2) Testing (Mandatory). The building or dwelling unit shall be tested ~~and verified as having an air leakage rate of not exceeding 5 air changes per hour in Climate Zones 1 and 2, and 3 air changes per hour in Climate Zones 3 through 8~~ for air leakage. Testing shall be conducted with a blower door at a pressure of 0.2 inches w.g. (50 Pascals). Where required by the *code official*, testing shall be conducted by an *approved* third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the *code official*. Testing shall be performed at any time after creation of all penetrations of the *building thermal envelope*. During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping or other infiltration control measures;
2. Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed, but not sealed beyond intended infiltration control measures;
3. Interior doors, if installed at the time of the test, shall be open;
4. Exterior doors for continuous ventilation systems and heat recovery ventilators shall be closed and sealed;
5. Heating and cooling systems, if installed at the time of the test, shall be turned off; and
6. Supply and return registers, if installed at the time of the test, shall be fully open.

N1102.4.1.3 (R402.4.1.3) Leakage rate (Prescriptive). The building or dwelling unit shall have an air leakage rate not exceeding 5 air changes per hour in Climate Zones 1 and 2, and 3 air changes per hour in Climate Zones 3 through 8, when tested in accordance with Section N1102.4.1.2.

Reason:

These modifications remove the mandatory maximum air-tightness requirement and provide designers and builders the flexibility to trade off building tightness with other performance path measures when using the performance path. Currently the building tightness requirement is "mandatory" and the 3 and 5 ACH tightness levels, even under ideal circumstances, are very difficult to achieve. This amendment will provide energy neutral trade-offs, for expensive and sometimes unattainable requirements, with other building improvements. This amendment does not change the stringency; it only increases its flexibility while achieving the required energy efficiency.

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18. Prescriptive Table Requirements

This amendment replaces 2015 IRC Chapter 11 Tables N1102.1.2 and N1102.1.4 with tables from the 2009 IRC Chapter 11.

Delete Table N1102.1.2 and Table N1102.1.4 in their entirety and replace with the following:

TABLE N1102.1.2 (R402.1.2)
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION *U*-FACTOR[b]	SKYLIGHT[b] *U*-FACTOR	GLAZED FENESTRATION SHGC[b, e]	CEILING *R*-VALUE	WOOD FRAME WALL *R*-VALUE	MASS WALL *R*-VALUE[i]	FLOOR *R*-VALUE	BASEMENT[c] WALL *R*-VALUE	SLAB[d] *R*-VALUE & DEPTH	CRAWL SPACE[c] WALL *R*-VALUE
1	1.20	0.75	0.30	30	13	3 / 4	13	0	0	0
2	0.65[j]	0.75	0.30	30	13	4 / 6	13	0	0	0
3	0.50[j]	0.60	0.30	30	13	5 / 8	19	5/13[f]	0	5/13
4 except Marine	0.35	0.60	NR	38	13	5 / 10	19	10/13	10, 2ft	10/13
5 and Marine 4	0.35	0.60	NR	38	20 or 13+5[h]	13 / 17	30[g]	10/13	10, 2ft	10/13
6	0.35	0.60	NR	49	20 or 13+5[h]	15 / 19	30[g]	15/19	10, 4ft	10/13
7 and 8	0.35	0.60	NR	49	21	19 / 21	38[g]	15/19	10, 4ft	10/13

For SI: 1 foot = 304.8 mm.

a. R-values are minimums. U-factors and SHGC are maximums. R-19 batts compressed into a nominal 2 x 6 framing cavity such that the R-value is reduced by R-l or more shall be marked with the compressed batt R-value in addition to the full thickness R-value.

b. The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration.

c. "15/19" means R-15 continuous insulated sheathing on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulated sheathing on the interior or exterior of the home. "10/13" means R-10 continuous insulated sheathing on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.

d. R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Zones 1 through 3 for heated slabs.

e. There are no SHGC requirements in the Marine Zone.

f. Basement wall insulation is not required in warm-humid locations as defined by Figure 301.1 and Table 301.1.

g. Or insulation sufficient to fill the framing cavity, R-19 minimum.

h. "13+5" means R-13 cavity insulation plus R-5 insulated sheathing. If structural sheathing covers 25 percent or less of the exterior, insulating sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25 percent of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.

i. The second R-value applies when more than half the insulation is on the interior of the mass wall.

j . For impact rated fenestration complying with Section R301.2.1.2 of the *International Residential Code* or Section 1608.1.2 of the *International Building Code,* the maximum U-factor shall be 0.75 in Zone 2 and 0.65 in Zone 3.

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	1.20	0.75	0.035	0.082	0.197	0.064	0.360	0.477
2	0.75	0.75	0.035	0.082	0.165	0.064	0.360	0.477
3	0.65	0.65	0.035	0.082	0.141	0.047	0.360	0.136
4 except Marine	0.40	0.60	0.030	0.082	0.141	0.047	0.059	0.065
5 and Marine 4	0.35	0.60	0.030	0.057	0.082	0.033	0.059	0.065
6	0.35	0.60	0.026	0.057	0.060	0.033	0.050	0.065
7 and 8	0.35	0.60	0.026	0.057	0.057	0.033	0.050	0.065

a. Non-fenestration U-factors shall be obtained from measurement, calculation or an approved source.

b. When more than half the insulation is on the interior, the mass wall U-factors shall be a maximum of 0.17 in Zone 1, 0.14 in Zone 2, 0.12 in Zone 3, 0.10 in Zone 4 except Marine, and the same as the frame wall U-factor in Marine Zone 4 and Zones 5 through 8.

c. Basement wall U-factor of 0.360 in warm-humid locations as defined by Figure 301.1 and Table 301.2.

d. Foundation U-factor requirements shown in Table 402.1.3 include wall construction and interior air films but exclude soil conductivity and exterior air films. U-factors for determining code compliance in accordance with Section 402.1.4 (total*VA* alternative) of Section 405 (Simulated Performance Alternative) shall be modified to include soil conductivity and exterior air films .

Reason:

The increased table values in the 2012 IECC and the 2015 IECC did not show justification for the cost increases from the 2009 IECC. Studies indicate nationally almost a $6,000 increase to the cost of constructing a single-family detached dwelling with a 13-year simple payback. With statistics showing that for every $1,000 increase to the cost of construction nearly 206,000 potential home buyers will not qualify for a mortgage. This, increase disqualifies approximately 1.3 million families from purchasing a home every year. That equates to approximately $24,000,000 in potential taxes revenues never being generated for municipalities.

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19. Basement Wall R-Value/U-Factor Reduction (Climate Zone 5)

This amendment reduces the basement wall R-Value requirement in Climate Zone 5 to a more reasonable R-value based on values that were acceptable to both NAHB and DOE in the 2009 IRC.

Revise as follows:

TABLE N1102.1.2 (R402.1.2)
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION U-FACTOR[b]	SKYLIGHT[b] U-FACTOR	GLAZED FENESTRATION SHGCb,[e]	CEILING R -VALUE	WOOD FRAME WALL R -VALUE	MASS WALL R -VALUEi	FLOOR R -VALUE	BASEMENT[c] WALL R -VALUE	SLAB[d] R -VALUE AND DEPTH	CRAWL SPACE[c] WALL R - VALUE
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.35	0.55	0.25	38	20 or 13+5h',[i]	8/13	19	5/13f	0	5/13
4 except Marine	0.35	0.55	0.40	49	20 or 13+5[h,i]	8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5h,[i]	13/17	30g	10/13 ~~15/19~~	10, 2 ft	15/19
6	0.32	0.55	NR	49	20+5 or 13+10h',[i]	15/20	30g	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20+5 or 13+10[h,i]	19/21	38[g]	15/19	10, 4 ft	15/19

Footnotes remain unchanged

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-Factorb	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	0.35	0.55	0.030	0.060	0.098	0.047	0.091c	0.136
4 except Marine	0.35	0.55	0.026	0.060	0.098	0.047	0.059	0.065
5 and Marine 4	0.32	0.55	0.026	0.060	0.082	0.033	~~0.050~~ 0.059	0.055
6	0.32	0.55	0.026	0.045	0.060	0.033	0.050	0.055
7 and 8	0.32	0.55	0.026	0.045	0.057	0.028	0.050	0.055

Footnotes remain unchanged

Reason:

The prescriptive basement wall requirement increased from R-10 to R-15 in the 2012 IRC Chapter 11. Calculations used to justify the change were based on energy models, which had less sophisticated algorithms than Energy Plus, now the preferred modeling software for the Department of Energy (DOE). When using Energy Plus, the energy savings in a 700 square foot basement totaled $7/yr in Chicago (Climate zone 5). The additional cost for this is conservatively estimated at $590. This makes the simple payback in excess of 58 years. This also will create a negative cash flow for the consumer. The values being modified by this amendment are the same as what was proposed by DOE in its proposal EC13 from the 2009 cycle. The excessive values currently in code were not submitted by DOE.

The energy modeling was done using the Energy Plus simulation engine and BEopt version 1.4, Cost figures came from ASHRAE RP-1481.

Climate Zone	Representative City	Basement Wall R-Value Change	Energy Savings	Incremental Cost	Simple Payback
5	Chicago, IL	R-10->R-15	$7/yr	$590 ($0.82/ft2)	84 years

Return to Residential

20. Ceiling R-Value/U-Factor Reductions (climate zones 2-5)

This amendment reinstates the appropriate minimum ceiling R-Values in climate zones 2, 3, 4 and 5, those published in the 2009 IRC Chapter 11.

Revise as follows:

TABLE N1102.1.2(R402.1.2)
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION U-FACTOR[b]	SKYLIGHT[b] U-FACTOR	GLAZED FENESTRATION SHGC[b,e]	CEILING R -VALUE	WOOD FRAME WALL R -VALUE	MASS WALL R -VALUEi	FLOOR R -VALUE	BASEMENT[c] WALL R -VALUE	SLAB[d] R -VALUE AND DEPTH	CRAWL SPACE[c] WALL R - VALUE
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	~~38~~ 30	13	4/6	13	0	0	0
3	0.35	0.55	0.25	~~38~~ 30	20 or 13+5[h,i]	8/13	19	5/13f	0	5/13
4 except Marine	0.35	0.55	0.40	~~49~~ 38	20 or 13+5[h,i]	8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	~~49~~ 38	20 or 13+5[h,i]	13/17	30[g]	15/19	10, 2 ft	15/19
6	0.32	0.55	NR	49	20+5 or 13+10[h,i]	15/20	30[g]	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20+5 or 13+10[h,i]	19/21	38[g]	15/19	10, 4 ft	15/19

Footnotes remain unchanged

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~~ 0.035	0.084	0.165	0.064	0.360	0.477
3	0.35	0.55	~~0.030~~ 0.035	0.060	0.098	0.047	0.091c	0.136
4 except Marine	0.35	0.55	~~0.026~~ 0.030	0.060	0.098	0.047	0.059	0.065
5 and Marine 4	0.32	0.55	~~0.026~~ 0.030	0.060	0.082	0.033	0.050 0.059	0.055
6	0.32	0.55	0.026	0.045	0.060	0.033	0.050	0.055
7 and 8	0.32	0.55	0.026	0.045	0.057	0.028	0.050	0.055

Footnotes remain unchanged

Reason:

There were four changes in the Ceiling R-value requirements in the 2012 IECC, none of which are cost effective. An energy and cost analysis was performed to show that the simple paybacks are in the 80-130 year range.

Climate Zone	Representative City	Change	Energy Savings	Incremental Cost	Simple Payback
2	Orlando, FL	R-38->R-30	$10/yr	$1,305	130 years
3	Atlanta, GA	R-38->R-30	$16/yr	$1,305	82 years
4	Richmond, VA	R-49->R-38	$15/yr	$1,379	92 years
5	Indianapolis, IN	R-49->R-38	$15/yr	$1,379	92 years

The energy modeling was done using the Energy Plus simulation engine and BEopt version 1.4, Cost figures came from ASHRAE RP-1481. Vaulted or cathedralized ceiling are very problematic when trying to achieve R- 49, which is about 16 inches thick. This would require a rafter at least 17" tall (which does not exist) or an insulated panel, which represents a very small portion of the market.

Return to Residential

21. Correct SHGC for Climate Zone 4

This amendment changes the Climate Zone 4 SHGC back to N/R, because a prescriptive restriction for the SHGC of 0.40 in Climate Zone 4 does not save energy.

Revise as follows:

TABLE N1102.1.2 (R402.1.2)
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION U-FACTOR[b]	SKYLIGHT[b] U-FACTOR	GLAZED FENESTRATION SHGC[b,e]	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE[i]	FLOOR R -VALUE	BASEMENT[c] WALL R -VALUE	SLAB[d] R-VALUE AND DEPTH	CRAWL SPACE[c] WALL R - VALUE
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.35	0.55	0.25	38	20 or 13+5[h,i]	8/13	19	5/13f	0	5/13
4 except Marine	0.35	0.55	~~0.40~~ NR	49	20 or 13+5[h,i]	8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5[h,i]	13/17	30g	15/19	10, 2 ft	15/19
6	0.32	0.55	NR	49	20+5 or 13+10[h,i]	15/20	30g	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20+5 or 13+10[h,i]	19/21	38[g]	15/19	10, 4 ft	15/19

Footnotes remain unchanged

Reason:

The addition of a prescriptive restriction for the SHGC of 0.40 was added in the 2012 IECC. This is not a requirement that saves energy. In Climate Zone 4, heating degree days outnumber cooling degree days by about 2 to 3 times. Therefore for most of the year, the "sun is your friend" and solar heat gain is beneficial and reduces heating loads. There are some exceptions to this, but the majority of homes will not benefit from this restriction. The values being modified by this proposal are the same as what was proposed by the Department of Energy in their proposal EC13 from the last cycle. The values currently adopted were an increase from proposals not submitted by the Department of Energy

Return to Residential

22. Wall R-Value/U-Factors Corrections (Climate Zone 3 & 4)

This amendment reinstates the appropriate minimum wall assembly R-Values/U-Factors in Climate Zone 3 & 4 published in the 2009 IECC.

Revise as follows:

TABLE N1102.1.2 (R402.1.2)
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION U-FACTOR[b]	SKYLIGHT[b] U-FACTOR	GLAZED FENESTRATION SHGC[b,e]	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE[i]	FLOOR R -VALUE	BASEMENT[c] WALL R -VALUE	SLAB[d] R-VALUE AND DEPTH	CRAWL SPACE[c] WALL R - VALUE
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.35	0.55	0.25	38	13 ~~20 or 13+5[h,i]~~	8/13	19	5/13f	0	5/13
4 except Marine	0.35	0.55	0.40	49	13 ~~20 or 13+5[h,i]~~	8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5[h,i]	13/17	30g	15/19	10, 2 ft	15/19
6	0.32	0.55	NR	49	20+5 or 13+10[h,i]	15/20	30g	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20+5 or 13+10[h,i]	19/21	38[g]	15/19	10, 4 ft	15/19

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	0.35	0.55	0.030	~~0.060~~ 0.84	0.098	0.047	0.091c	0.136
4 except Marine	0.35	0.55	0.026	~~0.060~~ 0.84	0.098	0.047	0.059	0.065
5 and Marine 4	0.32	0.55	0.026	0.060	0.082	0.033	0.050	0.055
6	0.32	0.55	0.026	0.045	0.060	0.033	0.050	0.055
7 and 8	0.32	0.55	0.026	0.045	0.057	0.028	0.050	0.055

Footnotes remain unchanged

Reason:

Frame wall requirements in Climate Zone 3 changed from R-13 to R-20, which is not cost effective for the consumer.

Climate Zone	Representative City	Wall R-Value Change	Energy Savings	Incremental Cost	Simple Payback
3	Atlanta, GA	R-13->R-20	$50/yr	$1,199	24 years
4	Richmond, VA	R-13->R-20	$59/yr	S1,199	20 years

The energy modeling was done using the Energy Plus simulation engine and BEopt version 1.4, Cost figures came from ASHRAE RP-1481. Not only is the payback is extremely long, but for a consumer, there would be a negative cash flow based on the incremental cost and energy savings. The increase in the monthly mortgage would be $6.43 (@ 5%) and the average monthly energy savings would be $4.17 in zone 3 and $4.92 in zone 4 causing the home owner to pay more in additional monthly mortgage payments than the energy savings returns.

The values being modified by this amendment are the same as what was proposed by the Department of Energy in its proposal EC13 from the last cycle. The values currently adopted were an increase from proposals not submitted by the Department of Energy.

Return to Residential

23. Wall R-Value/U-Factors Corrections (Climate Zone 6-8)

This amendment reinstates the appropriate minimum wall assembly R-Values/U-Factors in climate zones 6, 7 & 8 published in the 2009 IRC Chapter 11.

Revise as follows:

TABLE N1102.1.4 (R402.1.4) EQUIVALENT U-FACTORS[a]

TABLE N1102.1.2 (R402.1.2)
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION U-FACTOR[b]	SKYLIGHT[b] U-FACTOR	GLAZED FENESTRATION SHGC[b,e]	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE[i]	FLOOR R -VALUE	BASEMENT[c] WALL R -VALUE	SLAB[d] R-VALUE AND DEPTH	CRAWL SPACE[c] WALL R - VALUE
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.35	0.55	0.25	38	20 or 13+5[h,i]	8/13	19	5/13f	0	5/13
4 except Marine	0.35	0.55	0.40	49	20 or 13+5[h,i]	8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5[h,i]	13/17	30g	15/19	10, 2 ft	15/19
6	0.32	0.55	NR	49	20 or 13+5[h,i] ~~20+5 or 13+10[h,i]~~	15/20	30g	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20 or 13+5[h,i] ~~20+5 or 13+10[h,i]~~	19/21	38[g]	15/19	10, 4 ft	15/19

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	0.35	0.55	0.030	0.060	0.098	0.047	0.091c	0.136
4 except Marine	0.35	0.55	0.026	0.060	0.098	0.047	0.059	0.065
5 and Marine 4	0.32	0.55	0.026	0.060	0.082	0.033	0.050	0.055
6	0.32	0.55	0.026	~~0.045~~ 0.060	0.060	0.033	0.050	0.055
7 and 8	0.32	0.55	0.026	~~0.045~~ 0.060	0.057	0.028	0.050	0.055

Footnotes remain unchanged

Reason:

The prescriptive wall requirement increased to R-20+R5 in climate zones 6, 7 and 8 of the 2012 IRC Chapter 11. The additional cost for this is estimated at $1,819 for 1,016 square feet of wall. This makes the simple payback between 26 and 55 years depending on the climate zone. This also will create a negative cash flow for the consumer in all cases.

Climate Zone	Representative City	Basement Wall R-Value Change	Energy Savings	Incremental Cost	Simple Payback
6	Minneapolis, MN	R-20->R-20+5	$33/yr	$1,819 ($1.79/ft2)	55 years
7	Bemidgi, MN	R-20->R-20+5	$41/yr	$1,819 ($1.79/ft2)	44 years
8	Fairbanks, AK	R-20->R-20+5	$71/yr	$1,819 ($1.79/ft2)	26 years

The energy modeling was done using the Energy Plus simulation engine and BEopt version 1.4, Cost figures came from ASHRAE RP-1481.

Return to Residential

24. Mechanical Equipment Trade-Off

This amendment reinstates the performance option in IRC Chapter 11 to reduce prescriptive requirements by installing HVAC equipment with higher energy-efficiency performance ratings than required by the code. (Part of Amendment # 1)

Revise as follows:

TABLEN1105.5.2 (1) (R405.5.2(1))
SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Heating systems [d,e]	~~As proposed for other than electric heating without a heat pump, Where the proposed design utilizes electric heating without a heat pump the standard reference design shall be an air source heat pump meeting the requirements of Section R403 of the IECC-Commercial Provisions.~~ Fuel type: same as proposed design Efficiencies: - Electric: air-source heat pump with prevailing federal minimum standards -Nonelectric furnaces: natural gas furnace with prevailing federal minimum standards -Nonelectric boilers: natural gas boiler with prevailing federal minimum standards -Capacity: sized in accordance with Section R403.6	~~As proposed~~ As proposed As proposed As proposed As proposed
Cooling systems [d, f]	~~As proposed~~ -Fuel type: Electric -Efficiency: in accordance with prevailing federal minimum standards -Capacity: sized in accordance with Section N1103.6	~~As proposed~~ As proposed As proposed As proposed
Service Water Heating [d,e,f,g]	~~As proposed~~ -Fuel type: same as proposed design -Efficiency: in accordance with prevailing federal minimum standards -Use: gal/day = 30 + 10 × *Nbr* -Tank temperature: 120°F ~~-Use: same as proposed design~~	~~As proposed~~ As proposed As proposed Same as standard reference Same as standard reference ~~gal/day = 30 + (10 × *Nbr*)~~

Footnotes remain unchanged

Reason:

This amendment serves to retain energy-neutral equipment trade-off provisions from 2006 IRC Chapter 11 for heating systems, cooling systems, and service water heating. By retaining these, builders can optimize a code-compliant house design by using energy-efficient equipment. Quite often, the use of this high-efficiency equipment provides a more cost-effective solution to achieve code compliance. Eliminating this ability discourages the concept of the "house as a system" approach which is a cornerstone of building science.

Rejecting this amendment will create a disincentive to install state-of- the-art, energy-efficient equipment. It will increase the cost of construction by driving builders to often use less efficient equipment while increasing the cost of construction.

Significant improvements in the efficiency of HVAC and water heating equipment have been made in the last 20 years. With the increased emphasis on new and improved technologies, this trend is expected to continue and will result in even higher energy savings in future years. If builders are forced to comply with the energy code by installing requirements which are not cost effective, there will be a resistance to install higher efficiency equipment. This could end up hurting energy efficiency in the long term: For instance, consumers in homes with non-condensing furnaces will be less likely to install a higher efficiency condensing replacement furnace because of the additional cost to run an exhaust vent.

Industries such as log home manufacturers may no longer be able to construct to projected higher envelope requirements. The combination of increases in envelope thermal requirements, building tightness and duct tightness combined with the elimination of energy-neutral trade-offs pose a serious threat to the viability of the log home industry. There are practical limitations to the thickness of log home walls, increases in log diameter have an exponential increase to the cost of logs, making log walls with a U-factor of 0.082 or lower prohibitively expensive.

Return to Residential

25. Window Area Trade-Off

This amendment provides the building designer the ability to reduce window area and get credit for the energy saved. (Part of Amendment # 12)

Revise as follows:

TABLE N1105.5.2 (1) (R405.5.2(1))
SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Glazing[a]	Total area[b] = ~~(a) The proposed glazing area; where proposed glazing area is less than 15% of the conditioned floor area.~~ ~~(b)~~ 15% of the conditioned floor area~~; where the proposed glazing area is 15% or more of the conditioned floor area.~~	As proposed
	Orientation: equally distributed to four cardinal compass orientations (N, E, S, & W)	As proposed
	U-factor: from Table N1102.1.3	As proposed
	SHGC: From Table N1102.1.1 except that for climates with no requirement (NR) SHGC = 0.40 shall be used.	As proposed
	Interior shade fraction: 0.92-(0.21 × SHGC for the standard reference design)	0.92-(0.21 × SHGC as proposed)
	External shading: none	As proposed

Footnotes remain unchanged

Reason:

Walls generally have better thermal performance than windows. The code contains no incentive in the performance path for the building designer to optimize the window area to save energy and provide daylighting, egress and views that makes for a safe and comfortable house. These modifications provide the building designer the ability to reduce window area and get credit for the energy saved. As this section is currently written in the code, the house is penalized for having more than 15% window area yet receives no credit toward code compliance when the window area is reduced below 15%. This change rectifies this disparity and makes the performance path more representative of actual energy use.

Return to Residential

2015 International Energy Conservation Code

E1. Comprehensive Amendment

This is a comprehensive amendment to provide flexibility for meeting energy code requirements while maintaining energy performance. It will provide a "true" unrestricted performance path to allow for cost-optimized construction of an energy-equivalent house.
(Includes Amendments E6,13,14)

E2. Remove Mandatory Requirements for Above Code Program

This proposal eliminates the need to meet all "Mandatory" requirements identified by the IRC/IECC as long as the program exceeds the energy-efficiency levels required.

E3. Overhang Credit for SHGC (Climate Zone 1-4)

This amendment allows for the use of overhangs to meet the solar heat gain coefficient requirements within the IECC

E4. Multi-Family Air Leakage Testing

This amendment adds and exception to allow compliance to the air barrier requirements as and allow builders to test the entire building as a whole, as is permitted for commercial buildings.

E5. Air Leakage Rate Correction (Climate Zones 1-8)

This amendment modifies the requirements from 3 air changes per hour (ACH) to 5 ACH in Climate Zones 1-8.

E6. Air Leakage Trade-Offs

This Amendment allows builders to trade improvements in other building energy components for less stringent building envelope pressure test results. This performance option provides flexibility in meeting the air tightness requirements and provides options for recovering from an unexpected air tightness test failure. ***(Part of Amendment E1)***

E7. Prescriptive Table Requirements

This amendment replaces 2015 IECC Tables R402.1.2 and R402.1.4 in the residential section of the 2015 with the following tables from the 2009 IECC.

E8. Basement Wall R-Value/U-Factors Reduction (Climate Zone 5)

This amendment reduces the basement wall insulation values requirements in Climate Zone 5, to a more reasonable R-Value/U-Factor based on values acceptable to both NAHB and DOE in the 2009 IRC.

E9. Ceiling R-Value/U-Factors Reduction (Climate Zones 2-5)

This amendment reinstates the appropriate minimum ceiling R-Values in climate zones 2, 3, 4 and 5, those published in the 2009 IRC CHAPTER 11.

E10. Correct SHGC for Climate Zone 4

This amendment changes the Climate Zone 4 SHGC back to N/R, because the addition of a prescriptive restriction for the SHGC of 0.40 is not a requirement that saves energy.

E11. Wall R-Value/U-Factors Corrections (Climate Zone 3 & 4)

This amendment reinstates the appropriate minimum wall assembly R-Values/U-Factors in climate zones 3 & 4 published in the 2009 IECC.

E12. Wall R-Value/U-Factors Corrections (Climate Zones 6-8)

This amendment reinstates the appropriate minimum wall assembly R-Values/U-Factors in climate zones 6, 7 & 8 published in the 2009 IRC Chapter 11.

E13. Mechanical Equipment Trade-Off This amendment reinstates the performance option in IRC Chapter 11 to reduce prescriptive requirements by installing HVAC equipment with higher energy-efficiency performance ratings than required by code. ***(Part of Amendment E1)***
E14. Window Area Trade-Off This amendment provides the building designer the ability to reduce window area and get credit for the energy saved. ***(Part of Amendment E1)***
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Return to IECC

E1. Comprehensive Amendment

This is a comprehensive amendment that provides flexibility for meeting the energy code requirements while maintaining energy performance. It provides a "true" unrestricted performance path that will allow for cost-optimized construction of an energy-equivalent house. (Includes Amendments E6, E7, 14, 15)

Revise as follows:

R402.4 Air leakage ~~(Mandatory).~~ The building thermal envelope shall be constructed to limit air leakage in accordance with the requirements of Sections N1102.4.1 through N1102.4.4.

R402.4.1 Building thermal envelope. The *building thermal envelope* shall comply with Sections N1102.4.1.1 and N1102.4.1.2. The sealing methods between dissimilar materials shall allow for differential expansion and contraction.

R402.4.1.1 Installation (Mandatory). The components of the *building thermal envelope* as listed in Table R402.4.1.1 shall be installed in accordance with the manufacturer's instructions and the criteria listed in Table R402.4.1.1, as applicable to the method of construction. Where required by the *code official*, an *approved* third party shall inspect all components and verify compliance.

R402.4.1.2 Testing (Mandatory). The building or dwelling unit shall be tested ~~and verified as having an air leakage rate of not exceeding 5 air changes per hour in Climate Zones 1 and 2, and 3 air changes per hour in Climate Zones 3 through 8~~ for air leakage. Testing shall be conducted with a blower door at a pressure of 0.2 inches w.g. (50 Pascals). Where required by the *code official*, testing shall be conducted by an *approved* third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the *code official*. Testing shall be performed at any time after creation of all penetrations of the *building thermal envelope*. During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping or other infiltration control measures;
2. Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed, but not sealed beyond intended infiltration control measures;
3. Interior doors, if installed at the time of the test, shall be open;
4. Exterior doors for continuous ventilation systems and heat recovery ventilators shall be closed and sealed;
5. Heating and cooling systems, if installed at the time of the test, shall be turned off; and
6. Supply and return registers, if installed at the time of the test, shall be fully open.

R402.4.1.3 Leakage rate (Prescriptive). The building or dwelling unit shall have an air leakage rate not exceeding 5 air changes per hour in Climate Zones 1 and 2, and 3 air changes per hour in Climate Zones 3 through 8, when tested in accordance with Section N1102.4.1.2.

TABLE R405.5.2(1)
SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Vertical fenestration other than opaque doors	Total area[b] =	~~As proposed~~
	~~(c) The proposed glazing area; where proposed glazing area is less than 15% of the conditioned floor area.~~	
	~~(d)~~ 15% of the conditioned floor area~~; where the proposed glazing area is 15% or more of the conditioned floor area.~~	
	Orientation: equally distributed to four cardinal compass orientations (N, E, S, & W)	As proposed
	U-factor: from Table R402.1.3	As proposed
	SHGC: From Table R402.1.1 except that for climates with no requirement (NR) SHGC = 0.40 shall be used.	As proposed
	Interior shade fraction: 0.92-(0.21 × SHGC for the standard reference design)	0.92-(0.21 × SHGC as proposed)
	External shading: none	As proposed
Heating Systems [d, e]	~~As proposed for other than electric heating without a heat pump, Where the proposed design utilizes electric heating without a heat pump the standard reference design shall be an air source heat pump meeting the requirements of Section C403 of the IECC-Commercial Provisions.~~	~~As proposed~~
	Fuel type: same as proposed design	
	Efficiencies:	As proposed
	Electric: air-source heat pump with prevailing federal minimum standards	As proposed
	Nonelectric furnaces: natural gas furnace with prevailing federal minimum standards	As proposed
	Nonelectric boilers: natural gas boiler with prevailing federal minimum standards	As proposed
	Capacity: sized in accordance with Section N1103.7	As proposed
Cooling Systems [d, f]	~~As proposed~~ Fuel type: Electric	
	Efficiency: in accordance with prevailing federal minimum standards	As proposed
	Capacity: sized in accordance with Section N1103.7	As proposed
Service Water Heating [d, e, f]	~~As proposed~~	~~As proposed~~
	Fuel type: same as proposed design	As proposed
	Efficiency: in accordance with prevailing federal minimum standards	Same as standard reference
	Use: gal/day = 30 + 10 × *Nbr* Tank temperature: 120°F	Same as standard reference
	~~Use: same as proposed design~~	~~gal/day = 30 + (10 × *Nbr*)~~

Footnotes remain unchanged

Reason:

This is a comprehensive amendment that provides flexibility for meeting the energy code requirements while maintaining energy performance. It provides a "true" unrestricted performance path that will allow for cost-optimized construction of an energy-equivalent house. The proposed changes provide alternatives

that encourage innovation and the use of materials and equipment to result in a home which is at least equivalent to that prescribed in the energy code.

The modifications will reinstate many of the changes made since the 2006 IRC Chapter 11 that restricted the flexibility of the builder/designer to construct an energy efficient code compliant home while still meeting the energy performance levels of the current code.

Items included in this amendment:
Energy-neutral building tightness tradeoffs
Credit for more energy-efficient buildings which incorporate reduced window area
Energy-neutral heating, cooling and water heating equipment efficiency tradeoffs

Currently all homes have a "mandatory" requirement to be equal to or tighter than 3ACH50 or 5ACH50, depending on climate zone. Proposed changes will allow for homes to be less tight provided other efficiency changes are made to the house to offset energy lost due to the change in air infiltration.

Currently, when conducting a performance analysis, a building glazing area greater than 15% of the conditioned floor area (CFA) is penalized for using more energy. However, a building with less than 15% window to CFA does not get credit for saving energy. This amendment allows the builder/designer to optimize window area that is both energy efficient and pleasing to the consumer.

Return to IECC

E2. Remove Mandatory Requirements for Above Code Program

This proposal eliminates the need to meet all "Mandatory" requirements identified by the IRC/IECC as long as the program exceeds the energy-efficiency levels required.

Revise as follows:

R102.1.1 Above code programs.

The *code official* or other authority having jurisdiction shall be permitted to deem a national, state or local energy efficiency program to exceed the energy efficiency required by this code. Buildings *approved* in writing by such an energy efficiency program shall be considered in compliance with this code. ~~The requirements identified as "mandatory" in Chapter 4 shall be met.~~

Reason:

The key element of an above-code program is that it must meet or exceed the energy-efficiency requirements of the IECC. Requiring such a program to also meet the detailed prescriptive requirements labeled as "mandatory" in the IECC defeats the purpose of performance based above code program. This code change proposal will allow flexibility in the methodology used for any above-code program to meet or exceed IECC minimums.

Return to IECC

E3. Overhang Credit for SHGC (Climate Zone 1-4)

This amendment allows for the use of overhangs to meet the solar heat gain coefficient requirements within the IECC.

Add new text as follows:

PROJECTION FACTOR. The ratio of the horizontal depth of an overhang, eave, or permanently attached shading device, divided by the distance measured vertically from the bottom of the fenestration glazing to the underside of the overhang, eave, or permanently attached shading device.

R402.3.2.1 Glazed fenestration SHGC exception. In Climate Zones 1 through 4, permanently shaded vertical fenestration shall be permitted to satisfy the SHGC requirements. The projection factor of an overhang, eave, or permanently attached shading device shall be greater than or equal to the value listed in table 402.3.3 for the appropriate orientation. The minimum projection shall extend beyond each side of the glazing a minimum of 12 inches (0.3 m). Each orientation shall be rounded to the nearest cardinal orientation (+/-45 degrees or 0.79 rad) for purposes of calculations and demonstrating compliance.

TABLE R402.3.2.1
MINIMUM PROJECTION FACTOR REQUIRED BY ORIENTATION FOR SHGC EXCEPTION

ORIENTATION	PROJECTION FACTOR
North	>=0.40[a]
South	>=0.20
East	>=0.50
West	>=0.50

a. *For the north orientation, a vertical projection located on the west-edge of the fenestration with equivalent PF >= 0.15 shall also satisfy the minimum projection factor requirement.*

Reason:

The concept of using shading to reduce heat gain is integral to the architecture of some of the oldest cultures. Shading in modern construction offers many possibilities. This proposed code change allows for the use of overhangs to meet the solar heat gain coefficient requirements within the IECC. Permanent exterior shading features such as overhangs are allowed to be used in IECC Chapter 5 as a prescriptive tradeoff to meeting SHGC requirements. The calculation for determining the projection factor for overhangs has been in the 2000, 2003, 2006, and 2009 IECC for commercial buildings and has been proven to be very simple to calculate, fitting well into a prescriptive approach. The use of shading devices was allowed under the 2003 IECC and is currently allowed as a tradeoff under the commercial provisions of the IECC. Allowing flexibility in meeting the solar heat gain coefficient through the use of proven shading alternatives will increase the usability of the code for the building and design community while ensuring that the new fenestration is energy efficient. When credit for shading is permitted in the building code, it encourages an integrated approach to building designs, energy use, construction materials and renewable resources particularly as part of urban infrastructure, site and town planning and building design to be considered holistically. It also creates the opportunity for aesthetically pleasing and ingenious designs that might not otherwise be permitted.

Return to IECC

E4. Multi-Family Air Leakage Testing

This amendment adds an exception to allow compliance to the air barrier requirements as and allow builders to test the entire building as a whole, as is permitted for commercial buildings.

Revise as follows:

R402.4 Air leakage (Mandatory). The building thermal envelope shall be constructed to limit air leakage in accordance with the requirements of Section R402.4.1 through R402.4.4.

> **Exception:** Dwelling units of R-2 Occupancies and multiple single family dwellings shall be permitted to comply with IECC Section C402.5

Reason:

Air tightness testing for single-family detached homes is very straightforward; however, it is much more difficult to accurately test attached dwelling units, including multi-family buildings. Currently the IECC treats low-rise multifamily buildings of three stories or less like single-family homes and multifamily buildings of four stories or more like commercial buildings. Regardless of height, all multifamily buildings have the same air-tightness testing complications, such as: Does the entire building need to be tested at one time? What about multifamily buildings with open corridors? Does every dwelling need to be tested? Can the leakages be averaged between units? Is the leakage tested only to the "outside" or should it include leakage to adjacent units?

By approving this change, low-rise multifamily buildings and attached single-family dwellings will avoid these complications, but still held to the same level of performance as high-rise (R-2) residential as well as all commercial buildings.

Return to IECC

E5. Air Leakage Rate Correction (climate zones 1-8)

This amendment modifies the requirements from 3 Air Changes per Hour (ACH) to 5 ACH in climate zones 1 through 8.

Revise as follows:

R402.4.1.2 Testing. The building or dwelling unit shall be tested and verified as having an air leakage rate not exceeding five air changes per hour in Climate Zones 1 ~~and 2, and three air changes per hour in Climate Zones 3~~ through 8. Testing shall be conducted in accordance with ASTM E 779 or ASTM E 1827 and reported at a pressure of 0.2 inch w.g. (50 Pascals). Where required by the *code official*, testing shall be conducted by an *approved* third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the *code official*. Testing shall be performed at any time after creation of all penetrations of the *building thermal envelope*.

Table R405.5.2(1)
SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

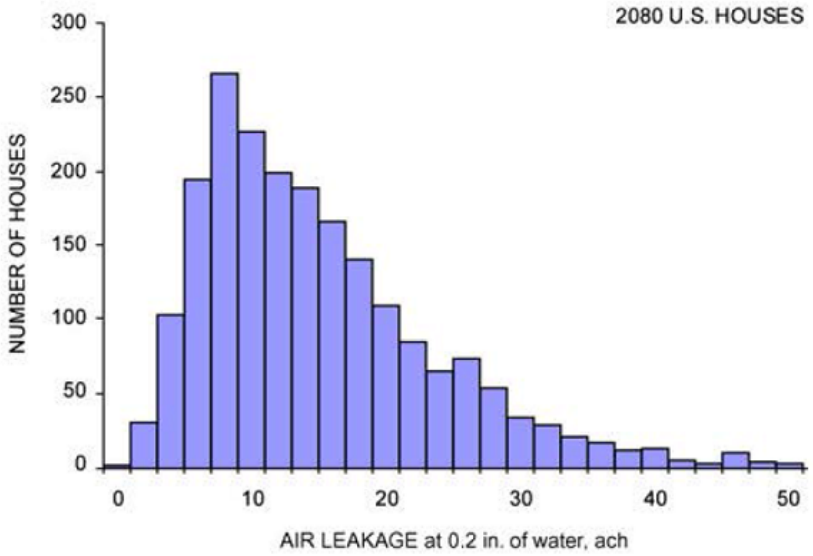
BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Air exchange rate	Air leakage rate of 5 air changes per hour in Climate Zones 1 ~~and 2, and 3 air changes per hour in Climate Zones 3~~ through 8 at a pressure of 0.2 inches w.g (50 Pa). The mechanical ventilation rate shall be in addition to the air leakage rate and the same as in the proposed design, but no greater than 0.01 × *CFA* + 7.5 × (*Nbr* + 1) where: *CFA* = conditioned floor area *Nbr* = number of bedrooms Energy recovery shall not be assumed for mechanical ventilation.	For residences that are not tested, the same air leakage rate as the standard reference design. For tested residences, the measured air exchange rate[a]. The mechanical ventilation rated shall be in addition to the air leakage rate and shall be as proposed.

Footnotes remain unchanged

Reason:

Building tightness is an important part of an energy-efficient and comfortable house. However, 3 air changes(ACH) per hour at 50 Pascals is an extremely low target tightness, especially for smaller homes. The ASHRAE Handbook of Fundamentals shows that around 8% of U.S. homes achieve 3 ACH or less, 13% achieve 4 and less than 23% achieve 5. The proposed 5 ACH while still an aggressive tightness level will provide a tight, comfortable, energy-efficient home.

2013 ASHRAE Handbook—Fundamentals



Return to IECC

E6. Air Leakage Trade-Offs

This Amendment allows builders to trade improvements in other building energy components for less stringent building envelope pressure test results. This performance option provides flexibility in meeting the air tightness requirements and provides options for recovering from an unexpected air tightness test failure. (Part of Amendment E1)

Revise as follows:

R402.4 Air leakage ~~(Mandatory).~~ The building thermal envelope shall be constructed to limit air leakage in accordance with the requirements of Sections R402.4.1 through R402.4.4.

R402.4.1 Building thermal envelope. The *building thermal envelope* shall comply with Sections R402.4.1.1 and R402.4.1.2. The sealing methods between dissimilar materials shall allow for differential expansion and contraction.

R402.4.1.1 Installation (Mandatory). The components of the *building thermal envelope* as listed in Table R402.4.1.1 shall be installed in accordance with the manufacturer's instructions and the criteria listed in Table R402.4.1.1, as applicable to the method of construction. Where required by the *code official*, an *approved* third party shall inspect all components and verify compliance.

R402.4.1.2 Testing (Mandatory). The building or dwelling unit shall be tested ~~and verified as having an air leakage rate of not exceeding 5 air changes per hour in Climate Zones 1 and 2, and 3 air changes per hour in Climate Zones 3 through 8~~ for air leakage. Testing shall be conducted with a blower door at a pressure of 0.2 inches w.g. (50 Pascals). Where required by the *code official*, testing shall be conducted by an *approved* third party. A written report of the results of the test shall be signed by the party conducting the test and provided to the *code official*. Testing shall be performed at any time after creation of all penetrations of the *building thermal envelope*. During testing:

7. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weatherstripping or other infiltration control measures;
8. Dampers including exhaust, intake, makeup air, backdraft and flue dampers shall be closed, but not sealed beyond intended infiltration control measures;
9. Interior doors, if installed at the time of the test, shall be open;
10. Exterior doors for continuous ventilation systems and heat recovery ventilators shall be closed and sealed;
11. Heating and cooling systems, if installed at the time of the test, shall be turned off; and
12. Supply and return registers, if installed at the time of the test, shall be fully open.

R402.4.1.3 Leakage rate (Prescriptive). The building or dwelling unit shall have an air leakage rate not exceeding 5 air changes per hour in Climate Zones 1 and 2, and 3 air changes per hour in Climate Zones 3 through 8, when tested in accordance with Section R402.4.1.2.

Reason:

These modifications remove the mandatory maximum air-tightness requirement and provide designers and builders the flexibility to trade off building tightness with other performance path measures. Currently the building tightness requirement is mandatory and the 3 and 5 ACH tightness levels, even under ideal circumstances, are very difficult to achieve. This will provide energy neutral tradeoffs for expensive and sometimes unattainable requirements with other building improvements. This proposal does not change the stringency or efficiency of the code; it only increases the flexibility.

Return to IECC

E7. Prescriptive Table Requirements

This amendment replaces 2015 IECC Tables R402.1.2 and R402.1.4 in the residential section of the 2015 with the following tables from the 2009 IECC.

Revise as follows:

Delete Table 402.1.1 and Table 402.1.3 in their entirety and replace with the following:

TABLE R402.1.2
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION *U*-FACTOR[b]	SKYLIGHT[b] *U*-FACTOR	GLAZED FENESTRATION SHGC[b, e]	CEILING *R*-VALUE	WOOD FRAME WALL *R*-VALUE	MASS WALL *R*-VALUE[i]	FLOOR *R*-VALUE	BASEMENT[c] WALL *R*-VALUE	SLAB[d] *R*-VALUE & DEPTH	CRAWL SPACE[c] WALL *R*-VALUE
1	1.20	0.75	0.30	30	13	3 / 4	13	0	0	0
2	0.65[j]	0.75	0.30	30	13	4 / 6	13	0	0	0
3	0.50[j]	0.60	0.30	30	13	5 / 8	19	5/13[f]	0	5/13
4 except Marine	0.35	0.60	NR	38	13	5 / 10	19	10/13	10, 2ft	10/13
5 and Marine 4	0.35	0.60	NR	38	20 or 13+5[h]	13 / 17	30[g]	10/13	10, 2ft	10/13
6	0.35	0.60	NR	49	20 or 13+5[h]	15 / 19	30[g]	15/19	10, 4ft	10/13
7 and 8	0.35	0.60	NR	49	21	19 / 21	38[g]	15/19	10, 4ft	10/13

For SI: 1 foot = 304.8 mm.

a. R-values are minimums. U-factors and SHGC are maximums. R-19 batts compressed into a nominal 2 x 6 framing cavity such that the R-value is reduced by R-l or more shall be marked with the compressed batt R-value in addition to the full thickness R-value.

b. The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration.

c. "15/19" means R-15 continuous insulated sheathing on the interior or exterior of the home or R-19 cavity insulation at the interior of the basement wall. "15/19" shall be permitted to be met with R-13 cavity insulation on the interior of the basement wall plus R-5 continuous insulated sheathing on the interior or exterior of the home. "10/13" means R-10 continuous insulated sheathing on the interior or exterior of the home or R-13 cavity insulation at the interior of the basement wall.

d. R-5 shall be added to the required slab edge R-values for heated slabs. Insulation depth shall be the depth of the footing or 2 feet, whichever is less in Zones 1 through 3 for heated slabs.

e. There are no SHGC requirements in the Marine Zone.

f. Basement wall insulation is not required in warm-humid locations as defined by Figure 301.1 and Table 301.1.

g. Or insulation sufficient to fill the framing cavity, R-19 minimum.

h. "13+5" means R-13 cavity insulation plus R-5 insulated sheathing. If structural sheathing covers 25 percent or less of the exterior, insulating sheathing is not required where structural sheathing is used. If structural sheathing covers more than 25 percent of exterior, structural sheathing shall be supplemented with insulated sheathing of at least R-2.

i. The second R-value applies when more than half the insulation is on the interior of the mass wall.

j . For impact rated fenestration complying with Section R301.2.1.2 of the *International Residential Code* or Section 1608.1.2 of the *International Building Code,* the maximum U-factor shall be 0.75 in Zone 2 and 0.65 in Zone 3.

TABLE 402.1.4
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	1.20	0.75	0.035	0.082	0.197	0.064	0.360	0.477
2	0.75	0.75	0.035	0.082	0.165	0.064	0.360	0.477
3	0.65	0.65	0.035	0.082	0.141	0.047	0.360	0.136
4 except Marine	0.40	0.60	0.030	0.082	0.141	0.047	0.059	0.065
5 and Marine 4	0.35	0.60	0.030	0.057	0.082	0.033	0.059	0.065
6	0.35	0.60	0.026	0.057	0.060	0.033	0.050	0.065
7 and 8	0.35	0.60	0.026	0.057	0.057	0.033	0.050	0.065

Footnotes remain unchanged

Nonfenestration Ufactors shall be obtained from measurement, calculation or an apprCNed source.

a. When more than half the insulation is on the interior, the mass wall Ufactors shall be a maximum of 0.17 in Zone 1, 0.14 in Zone 2, 0.12 in Zone 3, 0.10 in Zone 4 except Marine, and the same as the frame wall Ufactor in Marine Zone 4 and Zones 5 through 8.
b. Basement wall Ufactor of 0.360 in warm-humid locations as defined by Figure 301.1 and Table 301.2.
c. Foundation Ufactor requirements shown in Table 402.1.3 include wall construction and interior air films but exclude soil conductivity and exterior air films. Ufactors for determining code compliance in accordance with Section 402.1.4 (total*VA* alternative) ofSection 405 (Simulated Performance Alternative) shall be modified to include soil conductivity and exterior air films .

Reason:

The increased table values in the 2012 IECC and the 2015 IECC did not show justification for the cost increases from the 2009 IECC. Studies indicate nationally almost a $6,000 increase to the cost of constructing a single-family detached dwelling with a 13-year simple payback. With statistics showing that for every $1,000 increase to the cost of construction nearly 206,000 potential home buyers will not qualify for a mortgage. This, increase disqualifies approximately 1.3 million families from purchasing a home every year. That equates to approximately $24,000,000 in potential taxes revenues never being generated for municipalities.

Return to IECC

E8. BASEMENT WALL R-Value/U-Factors Reduction (Climate Zone 5)

This amendment reduces the basement wall insulation value requirements in Climate Zone 5, to a more reasonable R-Value/U-Factor based on values acceptable to both NAHB and DOE in the 2009 IECC.

Revise as follows:

TABLE R402.1.2
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION U-FACTOR[b]	SKYLIGHT[b] U-FACTOR	GLAZED FENESTRATION SHGC[b,e]	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE[i]	FLOOR R -VALUE	BASEMENT[c] WALL R -VALUE	SLAB[d] R-VALUE AND DEPTH	CRAWL SPACE[c] WALL R - VALUE
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.35	0.55	0.25	38	20 or 13+5[h,i]	8/13	19	5/13f	0	5/13
4 except Marine	0.35	0.55	0.40	49	20 or 13+5[h,i]	8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5[h,i]	13/17	30g	10/13 ~~15/19~~	10, 2 ft	15/19
6	0.32	0.55	NR	49	20+5 or 13+10[h,i]	15/20	30g	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20+5 or 13+10[h,i]	19/21	38[g]	15/19	10, 4 ft	15/19

Footnotes remain unchanged

TABLE 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	0.35	0.55	0.030	0.060	0.098	0.047	0.091c	0.136
4 except Marine	0.35	0.55	0.026	0.060	0.098	0.047	0.059	0.065
5 and Marine 4	0.32	0.55	0.026	0.060	0.082	0.033	0.059 ~~0.050~~	0.055
6	0.32	0.55	0.026	0.045	0.060	0.033	0.050	0.055
7 and 8	0.32	0.55	0.026	0.045	0.057	0.028	0.050	0.055

Footnotes remain unchanged

Reason:

The prescriptive basement wall requirement increased from R-10 to R-15 in the 2012 IECC. Calculations used to justify the change were based on energy models with less sophisticated algorithms than Energy Plus, now DOE's preferred modeling software. When using Energy Plus, the energy savings in a 700-square-foot basement totaled $7 a year in Chicago (Climate Zone 5). The additional cost for this is conservatively estimated at $590. This makes the simple payback in excess of 58 years. The values being modified by this proposal are the same as those that DOE proposed in EC13 during the last code cycle. The values currently adopted were an increase from proposals not submitted by DOE.

Climate Zone	Representative City	Basement Wall R-Value Change	Energy Savings	Incremental Cost	Simple Payback
5	Chicago, IL	R-10->R-15	$7/yr	$590 ($0.82/ft2)	84 years

The energy modeling was done using the Energy Plus simulation engine and BEopt version 1.4, Cost figures came from ASHRAE RP-1481.

Return to IECC

E9. Ceiling R-Value/U-Factors Reduction (Climate Zones 2-5)

This amendment reinstates the appropriate minimum ceiling R-Values in climate zones 2, 3, 4 and 5, those published in the 2009 IRC Chapter 11.

Revise as follows:

TABLE R402.1.2
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION U-FACTOR[b]	SKYLIGHT[b] U-FACTOR	GLAZED FENESTRATION SHGC[b,e]	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE[i]	FLOOR R -VALUE	BASEMENT[c] WALL R -VALUE	SLAB[d] R-VALUE AND DEPTH	CRAWL SPACE[c] WALL R - VALUE
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	~~38~~ 30	13	4/6	13	0	0	0
3	0.35	0.55	0.25	~~38~~ 30	20 or 13+5[h,i]	8/13	19	5/13f	0	5/13
4 except Marine	0.35	0.55	0.40	~~49~~ 38	20 or 13+5[h,i]	8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	~~49~~ 38	20 or 13+5[h,i]	13/17	30[g]	15/19	10, 2 ft	15/19
6	0.32	0.55	NR	49	20+5 or 13+10[h,i]	15/20	30[g]	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20+5 or 13+10[h,i]	19/21	38[g]	15/19	10, 4 ft	15/19

Footnotes remain unchanged

TABLE 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~~ 0.035	0.084	0.165	0.064	0.360	0.477
3	0.35	0.55	~~0.030~~ 0.035	0.060	0.098	0.047	0.091c	0.136
4 except Marine	0.35	0.55	~~0.026~~ 0.030	0.060	0.098	0.047	0.059	0.065
5 and Marine 4	0.32	0.55	~~0.026~~ 0.030	0.060	0.082	0.033	0.050	0.055
6	0.32	0.55	0.026	0.045	0.060	0.033	0.050	0.055
7 and 8	0.32	0.55	0.026	0.045	0.057	0.028	0.050	0.055

Footnotes remain unchanged

Reason:

There were four changes in the Ceiling R-value requirements in the 2012 IECC, none of which should have been considered cost effective. An energy and cost analysis was performed to show that the simple paybacks are in the 80-130 year range.

Climate Zone	Representative City	Change	Energy Savings	Incremental Cost	Simple Payback
2	Orlando, FL	R-38->R-30	$10/yr	$1,305	130 years
3	Atlanta, GA	R-38->R-30	$16/yr	$1,305	82 years
4	Richmond, VA	R-49->R-38	$15/yr	$1,379	92 years
5	Indianapolis, IN	R-49->R-38	$15/yr	$1,379	92 years

The energy modeling was done using the Energy Plus simulation engine and BEopt version 1.4, Cost figures came from ASHRAE RP-1481. Vaulted or cathedral ceiling are very problematic when trying to achieve R-49, which is about 16 inches thick. This would require a rafter at least 17" tall (which does not exist) or an insulated panel, which represents a very small portion of the market.

Return to IECC

E10. Correct SHGC for Climate Zone 4

This amendment changes the Climate Zone 4 SHGC back to N/R, since the addition of a prescriptive restriction for the SHGC of 0.40 is not a requirement that saves energy.

Revise as follows:

TABLE R402.1.2
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION U-FACTOR[b]	SKYLIGHT[b] U-FACTOR	GLAZED FENESTRATION SHGC[b,e]	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE[i]	FLOOR R -VALUE	BASEMENT[c] WALL R -VALUE	SLAB[d] R-VALUE AND DEPTH	CRAWL SPACE[c] WALL R - VALUE
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.35	0.55	0.25	38	20 or 13+5[h,i]	8/13	19	5/13f	0	5/13
4 except Marine	0.35	0.55	~~0.40~~ NR	49	20 or 13+5[h,i]	8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5[h,i]	13/17	30g	15/19	10, 2 ft	15/19
6	0.32	0.55	NR	49	20+5 or 13+10[h,i]	15/20	30g	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20+5 or 13+10[h,i]	19/21	38[g]	15/19	10, 4 ft	15/19

Footnotes remain unchanged

Reason:

The addition of a prescriptive restriction for the SHGC of 0.40 was added in the 2012 IECC. This is not a requirement that saves energy. In Climate Zone 4, heating degree days outnumber cooling degree days by about 2 to 3 times. Therefore for most of the year, the "sun is your friend" and solar heat gain is beneficial and reduces heating loads. The majority of homes will not benefit from this restriction. The values being modified by this proposal are the same as what DOE proposed in itsEC13 during the 2009 code cycle. The values currently adopted were an increase from proposals not submitted by DOE.

Return to IECC

E11. Wall R-Value/U-Factors Corrections (Climate Zone 3 & 4)

This amendment reinstates the appropriate minimum wall assembly R-Values/U-Factors in climate zone 3 & 4 published in the 2009 IECC.

Revise as follows:

TABLE R402.1.2

INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENTa

CLIMATE ZONE	FENESTRATION U-FACTOR[b]	SKYLIGHT[b] U-FACTOR	GLAZED FENESTRATION SHGC[b,e]	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE[i]	FLOOR R -VALUE	BASEMENT[c] WALL R -VALUE	SLAB[d] R-VALUE AND DEPTH	CRAWL SPACE[c] WALL R - VALUE
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.35	0.55	0.25	38	~~20 or 13+5[h,i]~~ 13[i]	8/13	19	5/13f	0	5/13
4 except Marine	0.35	0.55	0.40	49	~~20 or 13+5[h,i]~~ 13	8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5[h,i]	13/17	30g	15/19	10, 2 ft	15/19
6	0.32	0.55	NR	49	20+5 or 13+10[h,i]	15/20	30g	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20+5 or 13+10[h,i]	19/21	38[g]	15/19	10, 4 ft	15/19

Footnotes remain unchanged

TABLE 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	0.35	0.55	0.030	~~0.060~~ 0.84	0.098	0.047	0.091c	0.136
4 except Marine	0.35	0.55	0.026	~~0.060~~ 0.84	0.098	0.047	0.059	0.065
5 and Marine 4	0.32	0.55	0.026	0.060	0.082	0.033	0.050	0.055
6	0.32	0.55	0.026	0.045	0.060	0.033	0.050	0.055
7 and 8	0.32	0.55	0.026	0.045	0.057	0.028	0.050	0.055

All Footnotes remain unchanged

Reason:

Frame wall requirements in Climate Zone 3 changed from R-13 to R-20, which was, is not cost effective for the consumer.

Climate Zone	Representative City	Wall R-Value Change	Energy Savings	Incremental Cost	Simple Payback
3	Atlanta, GA	R-13->R-20	$50/yr	$1,199	24 years

4	Richmond, VA	R-13->R-20	$59/yr	S1,199	20 years

The energy modeling was done using the Energy Plus simulation engine and BEopt version 1.4, Cost figures came from ASHRAE RP-1481. Not only is the payback is extremely long, but for a consumer, there would be a negative cash flow based on the incremental cost and energy savings. The increase in the monthly mortgage would be $6.43 (@ 5%) and the average monthly energy savings would be $4.17 in Zone 3 and $4.92 in Zone 4 causing the home owner to pay more in additional monthly mortgage payments than the energy savings returns.

The values being modified by this proposal are the same as what DOE proposed in its EC13 during the 2009 code cycle. The values currently adopted were an increase from proposals not submitted by DOE.

Return to IECC

E12. Wall R-Value/U-Factors Corrections (Climate Zones 6-8)

This amendment reinstates the appropriate minimum wall assembly R-Values/U-Factors in climate zones 6, 7 & 8 published in the 2009 IRC Chapter 11.

Revise as follows:

TABLE R402.1.2
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT[a]

CLIMATE ZONE	FENESTRATION U-FACTOR[b]	SKYLIGHT[b] U-FACTOR	GLAZED FENESTRATION SHGC[b,e]	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE[i]	FLOOR R -VALUE	BASEMENT[c] WALL R -VALUE	SLAB[d] R-VALUE AND DEPTH	CRAWL SPACE[c] WALL R - VALUE
1	NR	0.75	0.25	30	13	3/4	13	0	0	0
2	0.40	0.65	0.25	38	13	4/6	13	0	0	0
3	0.35	0.55	0.25	38	20 or 13+5[h,i]	8/13	19	5/13f	0	5/13
4 except Marine	0.35	0.55	0.40	49	20 or 13+5[h,i]	8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.32	0.55	NR	49	20 or 13+5[h,i]	13/17	30[g]	15/19	10, 2 ft	15/19
6	0.32	0.55	NR	49	20 or 13+5h,i ~~20+5 or 13+10h,i~~	15/20	30[g]	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20 or 13+5h,i ~~20+5 or 13+10h,i~~	19/21	38[g]	15/19	10, 4 ft	15/19

Footnotes remain unchanged

TABLE 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	0.35	0.55	0.030	0.060	0.098	0.047	0.091c	0.136
4 except Marine	0.35	0.55	0.026	0.060	0.098	0.047	0.059	0.065
5 and Marine 4	0.32	0.55	0.026	0.060	0.082	0.033	0.050	0.055
6	0.32	0.55	0.026	~~0.048~~ 0.057	0.060	0.033	0.050	0.055
7 and 8	0.32	0.55	0.026	~~0.048~~ 0.057	0.057	0.028	0.050	0.055

Footnotes remain unchanged

Reason:

The prescriptive wall requirement increased to R-20+R5 in climate zones 6, 7 and 8 in the 2012 IECC. The additional cost for this is estimated at $1,819 for 1,016 square feet of wall. This makes the simple payback between 26 and 55 years depending on the climate zone. This also will create a negative cash flow for the consumer in all cases.

Climate Zone	Representative City	Basement Wall R-Value Change	Energy Savings	Incremental Cost	Simple Payback
6	Minneapolis, MN	R-20->R-20+5	$33/yr	$1,819 ($1.79/ft2)	55 years
7	Bemidgi, MN	R-20->R-20+5	$41/yr	$1,819 ($1.79/ft2)	44 years
8	Fairbanks, AK	R-20->R-20+5	$71/yr	$1,819 ($1.79/ft2)	26 years

The energy modeling was done using the Energy Plus simulation engine and BEopt version 1.4, Cost figures came from ASHRAE RP-1481.

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E13. Mechanical Equipment Trade-Off

This amendment reinstates the performance option in IRC Chapter 11 to reduce prescriptive requirements by installing HVAC equipment with higher energy-efficiency performance ratings than required by the code. (Part of Amendment E1)

Revise as follows:

TABLE R405.5.2(1)
SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Heating systems [d,e]	~~As proposed for other than electric heating without a heat pump, Where the proposed design utilizes electric heating without a heat pump the standard reference design shall be an air source heat pump meeting the requirements of Section R403 of the IECC Commercial Provisions.~~ Fuel type: same as proposed design Efficiencies: Electric: air-source heat pump with prevailing federal minimum standards Nonelectric furnaces: natural gas furnace with prevailing federal minimum standards Nonelectric boilers: natural gas boiler with prevailing federal minimum standards Capacity: sized in accordance with Section R403.6	~~As proposed~~ As proposed As proposed As proposed As proposed
Cooling systems [d,e]	~~As proposed~~ Fuel type: Electric Efficiency: in accordance with prevailing federal minimum standards Capacity: sized in accordance with Section R403,6	~~As proposed~~ As proposed As proposed
Service Water Heating [d,e,f,g]	~~As proposed~~ Fuel type: same as proposed design Efficiency: in accordance with prevailing federal minimum standards Use: gal/day = 30 + 10 × *Nbr* Tank temperature: 120°F ~~Use: same as proposed design~~	~~As proposed~~ As proposed Same as standard reference Same as standard reference ~~gal/day = 30 + (10 × *Nbr*)~~

Footnotes remain unchanged

Reason:

This amendment serves to retain energy-neutral equipment trade-off provisions from the 2006 IECC for heating and cooling systems and service water heating. By retaining these, builders have an opportunity to optimize a code-compliant house design by using energy-efficient equipment. Quite often, the use of this high-efficiency equipment provides a more cost-effective solution to achieve code compliance. Eliminating this ability discourages the concept of the "house as a system" approach, which is a cornerstone of building science.

Rejecting this amendment will reduce any incentive to install state-of- the-art, energy-efficient equipment. It will increase the cost of construction by driving builders to often use less efficient equipment.

Significant improvements in the efficiency of HVAC and water heating equipment have been made in the last 20 years. With the increased emphasis on new and improved technologies, this trend is expected to continue and will result in even higher energy savings in future years. If builders are forced to comply with the energy code by installing requirements which are not cost-effective, there will be a resistance to install higher efficiency equipment. This could end up hurting energy efficiency in the long term, consumers which have non-condensing furnaces will be less likely to install a higher efficiency condensing replacement furnace because of the additional cost to run an exhaust vent.

Industries such as log home manufacturers may no longer be able to construct to projected higher envelope requirements. The combination of increases in envelope thermal requirements, building tightness and duct tightness combined with the elimination of energy neutral trade-offs pose a serious threat to the viability of the log home industry. There are practical limitations to the thickness of log home walls. Increasing requirements for the log diameter has a exponential increase in the cost of the logs, making log walls with a U- factor of 0.082 or lower prohibitively expensive

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E14. Window Area Trade-Off

This amendment will provide the building designer the ability to reduce window area and get credit for the energy saved. (Part of Amendment E1)

Revise as follows:

TABLE R405.5.2(1)
SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Vertical fenestration other than opaque doors	Total area[b] = ~~(a) The proposed glazing area; where proposed glazing area is less than 15% of the conditioned floor area.~~ ~~(b)~~ 15% of the conditioned floor area~~; where the proposed glazing area is 15% or more of the conditioned floor area.~~	As proposed
	Orientation: equally distributed to four cardinal compass orientations (N, E, S, & W)	As proposed
	U-factor: from Table R402.1.3	As proposed
	SHGC: From Table R402.1.1 except that for climates with no requirement (NR) SHGC = 0.40 shall be used.	As proposed
	Interior shade fraction: 0.92-(0.21 × SHGC for the standard reference design)	0.92-(0.21 × SHGC as proposed)
	External shading: none	As proposed

Footnotes remain unchanged

Reason:

Walls generally have better thermal performance than windows. There is no incentive in the performance path for the building designer to optimize the window area to save energy and provide daylighting, egress and views that makes for a safe and comfortable house. These modifications will provide the building designer the ability to reduce window area and get credit for the energy saved. As this section is now written, the house is penalized for having more than 15% window area yet receives no credit toward code compliance when the window area is reduced below 15%. This change rectifies this disparity and makes the performance path more representative of actual energy use.

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2015 International Building Code

B1. Canopies and Marquees

This amendment removes the requirement to design a multifamily building canopy with a flat or low-slope top surface using the higher live load associated with a marquee where such canopies cannot be accessed from a window or door above the canopy.

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B1. Canopies and Marquees

This amendment removes the requirement to design a multifamily building canopy with a flat or low-slope top surface using the higher live load associated with a marquee where such canopies cannot be accessed from a window or door above the canopy.

Revise as follows:

MARQUEE. A canopy that is supported entirely by a building, is constructed of noncombustible materials, and has a top surface which is sloped less than 25 degrees from the horizontal ~~and is located less than 10 feet (3.05 m) from operable openings above or adjacent to the level of the marquee~~.

TABLE 1607.1
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS, L_o, AND MINIMUM CONCENTRATED LIVE LOADS[g]

OCCUPANCY OR USE	UNIFORM (psf)	CONCENTRATED (lbs.)
21. Marquees~~, except one- and two-family dwellings~~	75	—
25. Residential		
One- and two-family dwellings		
Uninhabitable attics without storage[i]	10	
Uninhabitable attics with storage [i, j, k]	20	
Habitable attics and sleeping areas[k]	30	
Canopies~~, including marquees~~	20	
All other areas	40	
Hotels and multifamily dwellings		
Private rooms and corridors serving them	40	
Public rooms[m] and corridors serving them	100	
26. Roofs		
All roof surfaces subject to maintenance workers		300
Awnings and canopies:		
Fabric construction supported by a skeleton structure	5 Nonreducible	
All other construction, except one- and two-family dwellings and occupiable canopies	20	
Ordinary flat, pitched, and curved roofs (that are not occupiable)	20	
Where primary roof members are exposed to a work floor, at single panel point of lower chord of roof trusses or any point along primary structural members supporting roofs:		
Over manufacturing, storage warehouses, and repair garages		2,000
All other primary roof members		300
Occupiable roofs:		
Roof gardens	100	
Assembly areas	100[m]	
Canopies	75[n]	
All other similar areas	Note l	Note l

n. An occupiable canopy is a canopy that has a top surface which is sloped less than 25 degrees from the horizontal and is located less than 10 feet (3.05 m) from operable openings above or adjacent to the level of the canopy.

Reason:

This amendment revises the 2015 IBC language regarding canopies and marquees. Language

approved initially for the 2012 IBC substantially changed the design requirements for many small porch and patio roofs or canopies on residential buildings, particularly those located nowhere near public streets. Prior to the 2012 IBC, these roofs were designed for standard roof live loads or local ground snow loads (typically in the range of 20 or 30 pounds per square foot). These elements are now required to be designed for 75psf if they happen to be less than 10 feet vertically from a window above or horizontally from a window at the level of the canopy. This represents a substantial increase in design requirements for apartment or condominium complexes with these elements, as well as a substantial issue for renovations. An NAHB proposal amended the 2015 IBC to restore the traditional 20psf roof live load requirement for porches, patios, or canopies on one- and two-family dwellings, but the issue remains for multifamily buildings.

This amendment makes two key changes. First, it revises the definition of a marquee to reflect the specific construction requirements provided in Section 3106.5. This fixes a conflict that was introduced when the longstanding definition of a "marquee" (an element generally associated with theaters) was amended to include elements that had previously been considered "canopies." Second, it adds a line item under "occupiable roofs" for canopies and establishes a 75psf live load requirement for a canopy that could be considered an "occupiable roof." As described in the new Footnote n, this would be a canopy with a flat or low-slope top surface which can be accessed from an operable window or other opening that is less than 10 feet above the top surface of the canopy or within 10 feet of either end of the canopy. These changes preserve the intent of what the National Council of Structural Engineering Associations' (NCSEA) Code Advisory Committee was trying to achieve – requiring a higher live load for a canopy that could be used as a means of egress or otherwise accessed by building occupants – without applying the term "marquee" to an element that most code users, not to mention the average person on the street, would call a "canopy". These changes would also remove the 75psf requirement from flat or low-slope canopies on multifamily buildings as long as they are not accessible as noted above.

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2015 International Fire Code

F1. Scoping of the International Fire Code

This amendment removes language that would apply the provisions of the International Fire Code on one- and two-family dwellings that are constructed using the International Residential Code.

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F1. Scoping of the International Fire Code

This amendment removes language that would apply the provisions of the International Fire Code on one- and two-family dwellings that are constructed using the International Residential Code.

Revise as follows:

IFC [A] 102.5 Application of residential code. Where structures are designed and constructed in accordance with the International Residential Code, the provisions of this code shall apply as follows:

1. Construction and design provisions: Provisions of this code pertaining to the exterior of the structure shall apply including, but not limited to, premises identification, fire apparatus access and water supplies. ~~Where interior or exterior systems or devices are installed, construction permits required by Section 105.7 of this code shall also apply~~.
2. Administrative, and operational and ~~maintenance~~ provisions: All such provisions of this code shall apply.

Reason:

This code change addresses some of the controversy that has risen since the passage of a public comment on F3-07/08. The original purpose was to clear up the vagueness between the interaction between the IRC and the IFC and how they apply to one- and two-family dwellings and townhouses. The Fire Code Committee did not approve the original proposal, which clearly stated that the IFC does not regulate the construction and design features of the structure built in accordance with the IRC, but it does regulate the fire protections features leading up to the structure (such as premise identification, fire protection water supplies and fire apparatus access). A public comment was submitted and approved at the final action hearing which resulted in the current code text. Unfortunately, instead of clearing up where the scope of IFC ends and the scope of IRC begins. the current language has created more controversy over which code regulates the construction, design and maintenance of interior features in one- and two-family dwellings and townhouses.

One of the significant problems is found in the last sentence of the first application, regarding the construction permits required by section 105.7. All of the required construction permits that would apply to these types of structures, as indicated in this section, are already addressed within the scope of the IRC. The concept of the IRC being a single-source construction code is specifically stated within the commentary to R101.1, which says the intent of the IRC is to be a "stand-alone residential code that establishes minimum regulations for one- and two-family dwellings and townhouses." The IFC commentary to 102.5 further emphasizes this concept by stating "The IRC is designed and intended for use as a stand-alone code for the construction of detached one- and two-family dwellings and townhouses not more than three stories in height". As such, the construction of detached one- and two-family dwellings and townhouses is regulated exclusively by the IRC and not subject to the provision of any other I-Codes, other than to the extent specifically referenced. The intent of providing a stand-alone residential code is that there is no need for duplicative construction or permitting requirements within the I-Codes that would require a builder or home owner to get separate permits under the IRC and IFC for the same scope of work. Approval of this proposal will ensure the intent of the IRC scope, as a stand-alone construction document, is maintained while ensuring that the exterior fire protection features are still regulated under the scope of the IFC. Another problem with the current language is the reference to all maintenance requirements of the

IFC for IRC constructed structures. Prior to the approval of the public comment on F3-07/08, there was no specific language in the IFC that required maintenance for IRC structures in accordance with the IFC. Due to the language that was approved in F3-07/08 public comment, all of the maintenance provisions in the IFC should be being applied right now.

Looking over some of the maintenance requirements for fire alarm systems and carbon monoxide detectors it raises the question: Has the fire service been enforcing these provisions and if so how? In many states, once a one- and two-family dwelling or townhouse receives its certificate of occupancy there is no more involvement with the building official. The IFC states that it is the fire official's responsibility to ensure existing buildings meet the requirements of this code and that all buildings are maintained in accordance with its provisions. How many departments have requested entry to ensure that every existing one- and two- family dwelling is equipped with a carbon monoxide detector as required by the 2012 IFC? The current language of the IFC leaves the fire service open to liability if they are not enforcing the provisions of this code as it is written and adopted. Although some of the referenced standards in the IFC do not require maintenance on some of the systems in a one-and two-family dwellings or townhouses, the inference is that maintenance is required because the term "maintenance" is used in 102.5 (2).

Return to IFC

2015 International Existing Building Code

EB1.Scoping of the International Existing Building Code

This amendment removes language that would apply the provisions of the International Existing Building Code on one- and two-family dwellings constructed using the International Residential Code.

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EB1.Scoping of the International Existing Building Code

This amendment removes language that would apply the provisions of the International Existing Building Code on one- and two-family dwellings that are constructed using the IRC.

Revise as follows:

IEBC [A] 101.2 Scope. The provisions of the *International Existing Building Code* shall apply to the *repair, alteration, change of occupancy, addition* and relocation of *existing buildings*.

Exception: Detached one- and two-family *dwellings* and multiple single-family *dwellings (townhouses)* not more than three *stories* above *grade plane* in height with a separate *means of egress* and their accessory structures are not required to comply with the International Existing Building Code.

Reason:

Now that Chapter 34 has been removed from the 2015 IBC, the following exception needs to be added to the International Existing Building Code. The IEBC was not meant to apply to one- and two-family dwellings and townhouses, yet there was some confusion at the code hearings as to whether the IEBC would apply to structures built under the IRC. When you look at the IRC's scoping, it is clear that the IRC shall apply to the construction, alteration, movement, enlargement, replacement, repair, equipment, use and occupancy, location, removal and demolition of detached one- and two-family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress and their accessory. By clearly stating in the IEBC that one and two family dwellings and townhouses are exempt from the provisions of this code, there will be less chance of confusion when code officials begin using the IEBC.

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