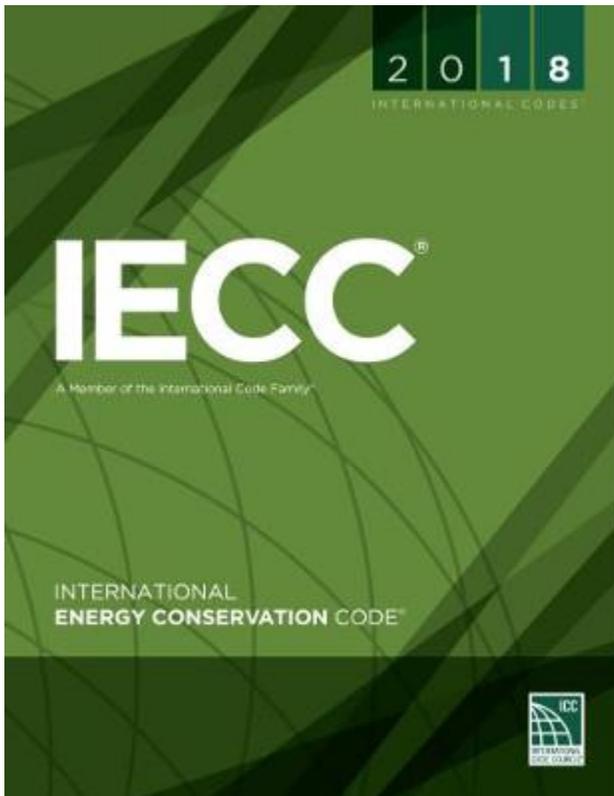




National
Association
of Home
Builders

2018

International Energy Code Suggested Amendments





State and local HBAs should consider these amendments to maintain cost-effective and affordable code provisions when discussing the adoption of the 2018 International Energy Code. NAHB developed these amendments based on the outcome of the 2015-2017 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, have additional supporting documents and information on the NAHB website.

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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2018 International Energy Conservation Code

E1. 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.

E2. 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.

E3. 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.

E4. 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.

E5. 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.

E6. 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.

E7. 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.

E8. Mechanical Equipment Trade-Off

This amendment reinstates the performance option in IECC Section *R405* to reduce prescriptive requirements by installing HVAC equipment with higher energy-efficiency performance ratings than required by code.

E9. Rooms Containing Fuel Burning Appliances

This amendment removes the requirement to insulate, seal and separate from the thermal envelope the area surrounding fuel burning appliances.

E1. 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 3 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 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 RESNET/ICC 380, 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 R405.5.2 (1)
SPECIFICATIONS FOR THE STANDARD REFERENCE AND PROPOSED DESIGNS

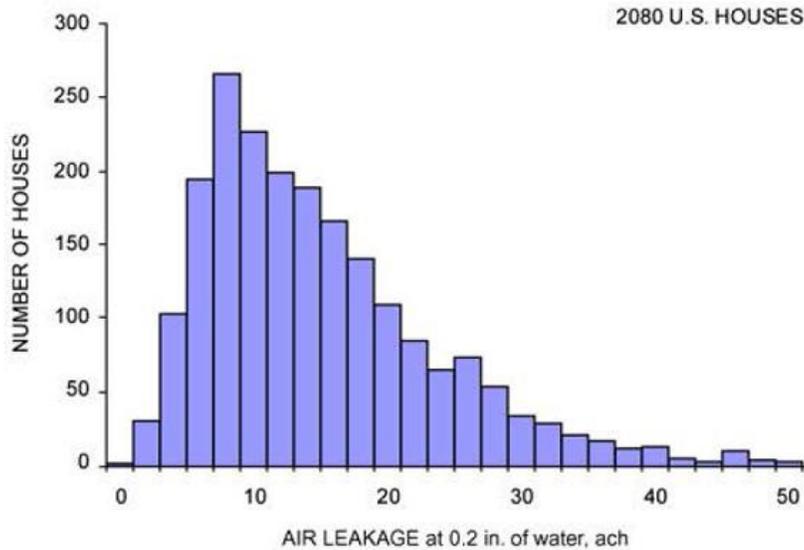
BUILDING COMPONENT	STANDARD REFERENCE DESIGN	PROPOSED DESIGN
Air exchange rate	<p>The air leakage rate at a pressure of 0.2 inch w.g. (50 Pa) shall be</p> <p style="text-align: center;">-</p> <p>Climate Zones 1 and 2: 5 air changes per hour. Climate Zones 3 through 8: 3 air changes per hour.</p> <p>The mechanical ventilation rate shall be in addition to the air leakage rate and shall be the same as in the proposed design, but not greater than</p> $0.01 \times CFA + 7.5 \times (N_{br} + 1)$ <p>where:</p> <p><i>CFA</i> = conditioned floor area, ft² <i>N_{br}</i> = number of bedrooms.</p> <p>Energy recovery shall not be assumed for mechanical ventilation.</p>	<p>The measured air exchange rate^a.</p> <p>The mechanical ventilation rated shall be in addition to the air leakage rate and shall be as proposed</p>

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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E2. 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.

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 in accordance with RESNET/ICC 380, ASTM E779 or ASTM E1827 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*. During testing:

1. Exterior windows and doors, fireplace and stove doors shall be closed, but not sealed, beyond the intended weather stripping 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 R402.4.1.2.

Reason:

These modifications relocate 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, by allowing other building improvements to be used to attain the same level of efficiency. This amendment does not change the stringency; it only increases its flexibility while achieving the required energy efficiency.

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E3. 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.

- 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-1 or more shall be marked with the compressed batt R-value in addition to the full thickness R-value.
- The fenestration U-factor column excludes skylights. The SHGC column applies to all glazed fenestration.
- "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.
- 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.
- There are no SHGC requirements in the Marine Zone.
- Basement wall insulation is not required in warm-humid locations as defined by Figure 301.1 and Table 301.1.
- Or insulation sufficient to fill the framing cavity, R-19 minimum.
- "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.
- The second R-value applies when more than half the insulation is on the interior of the mass wall.
- 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

- a. Nonfenestration 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 UA 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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E4. 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:

Footnotes remain unchanged

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 WALL R-VALUE ^c	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	5/13 ^f	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	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	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

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	0.091 ^c	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 84 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.

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E5. 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 IECC.

Revise as follows:

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 WALL R-VALUE ^c	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	5/13 ^f	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

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	0.091 ^c	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.

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E6. 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:

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 ^{h+} 13 ⁱ	8/13	19	5/13 ^f	0	5/13
4 except Marine	0.35	0.55	0.40	49	20 or 13 ^{h+} 13 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+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

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	0.091 ^c	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 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	\$1,199	20 years
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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.

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E7. 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 IECC.

Revise as follows:

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 WALL R-VALUE ^c	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	5/13 ^f	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+5 ^{h,i} 20+5 13+10	15/20	30 ^g	15/19	10, 4 ft	15/19
7 and 8	0.32	0.55	NR	49	20 or 13+5 ^{h,i} 20+5 13+10	19/21	38 ^g	15/19	10, 4 ft	15/19

Footnotes remain unchanged

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	0.091 ^c	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/ft ²)	55 years
7	Bemidji, MN	R-20->R-20+5	\$41/yr	\$1,819 (\$1.79/ft ²)	44 years
8	Fairbanks, AK	R-20->R-20+5	\$71/yr	\$1,819 (\$1.79/ft ²)	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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E8. Mechanical Equipment Trade-Off

This amendment reinstates the performance option in IECC Section R405 to reduce prescriptive requirements by installing HVAC equipment with higher energy-efficiency performance ratings than required by the code.

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}	<p>For other than electric heating without a heat pump: as proposed. 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.</p> <p>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</p> <p>Capacity: sized in accordance with Section R403.7</p>	<p>As proposed</p> <p>As proposed</p> <p>As proposed</p> <p>As proposed</p> <p>As proposed</p>
Cooling systems ^{d, e}	<p>As proposed</p> <p>Fuel type: Electric Efficiency: in accordance with prevailing federal minimum standards</p> <p>Capacity: sized in accordance with Section R403,7</p>	<p>As proposed</p> <p>As proposed</p> <p>As proposed</p> <p>As proposed</p>
Service Water Heating ^{d, e, f, g}	<p>As proposed</p> <p>Fuel type: same as proposed design Efficiency: in accordance with prevailing federal minimum standards Use: $gal/day = 30 + 10 \times N_{br}$ Tank temperature: 120°F</p> <p>Use: same as proposed design</p>	<p>As proposed</p> <p>As proposed</p> <p>Same as standard reference</p> <p>Same as standard reference</p> <p>$gal/day = 30 + (10 \times N_{br})$</p>

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 an 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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E9. Rooms Containing Fuel Burning Appliances

This amendment removes the requirement to insulate, seal and separate from the thermal envelope the area surrounding fuel burning appliances.

Revise as follows:

Delete section and do not replace.

~~**R402.4.4 (N1102.4.4) Rooms containing fuel-burning appliances.** In Climate Zones 3 through 8, where open combustion air ducts provide combustion air to open combustion fuel-burning appliances, the appliances and combustion air opening shall be located outside the building thermal envelope or enclosed in a room, isolated from inside the thermal envelope. Such rooms shall be sealed and insulated in accordance with the envelope requirements of Table R402.1.2, where the walls, floors and ceilings shall meet not less than the basement wall *R*-value requirement. The door into the room shall be fully gasketed and any water lines and ducts in the room insulated in accordance with Section R403. The combustion air duct shall be insulated where it passes through conditioned space to a minimum of *R*-8.~~

~~**Exceptions:**~~

- ~~1. Direct vent appliances with both intake and exhaust pipes installed continuous to the outside.~~
- ~~2. Fireplaces and stoves complying with Section R402.4.2 and Section R1006 of the *International Residential Code*.~~

Reason:

This was a new section to the 2015 IECC and has proven to be confusing and is being misinterpreted.

- No data was shown verifying a problem existed*
- No energy savings potential was shown.*
- No cost data was provided to justify the increase to the cost of construction.*
- A study done by Home Innovation Research Labs finds the cost of meeting this requirement would be \$878 for a home with space heating or water heating equipment in the basement.*

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