

EC47–09/10

Table 402.1.1, Table 402.1.3, Table 402.2.5; IRC Table N1102.1, Table N1102.1.2, Table N1102.2.5

Proponent: Bill Prindle, ICF International, representing the Energy Efficient Codes Coalition; Jeff Harris, Alliance to Save Energy; Harry Misuriello, American Council for an Energy-Efficient Economy (ACEEE); Garrett Stone, Brickfield, Burchette, Ritts & Stone; Steve Rosenstock, Edison Electric Institute; Brian Dean, ICF International

THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE IECC COMMITTEE. PART II WILL BE HEARD BY THE IRC BUILDING/ENERGY COMMITTEE. SEE THE TENTATIVE HEARING ORDERS FOR THESE COMMITTEES.

PART I – IECC

Revise tables as follows:

**TABLE 402.1.1
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 ^h	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	1.2	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	0.65	0.30	30	13 20 or 13 + 5	5/8 8/13	19	5/13 ^f	0	5/13
4 except Marine	0.35	0.60	NR	38	13 20 or 13+5	5/40 8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.35	0.60	NR	38	20 or 13+5 ^h	13/17	30 ^g	10/13	10, 2 ft	10/13
6	0.35	0.60	NR	49	20 or 13+5 ^h	15/19	30 ^g	15/19	10, 4 ft	10/13
7 and 8	0.35	0.60	NR	49	21	19/21	38 ^g	15/19	10, 4 ft	10/13

(Footnotes remain unchanged)

**TABLE 402.1.3
EQUIVALENT U-FACTORS^a**

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR	CEILING U-FACTOR	WOOD FRAME WALL U-FACTOR	MASS WALL U-FACTOR ^b	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR ^d	CRAWL SPACE WALL U-FACTOR ^c
1	1.20	0.75	0.035	0.082	0.197	0.064	0.360	0.477
2	0.65	0.75	0.035	0.082	0.165	0.064	0.360	0.477
3	0.50	0.65	0.035	0.082 0.057	0.144 0.098	0.047	0.091c	0.136
4 except Marine	0.35	0.60	0.030	0.082 0.057	0.144 0.098	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	0.028	0.050	0.065

(Footnotes remain unchanged)

**TABLE 402.2.5
STEEL-FRAME CEILING, WALL AND FLOOR INSULATION (R-VALUE)**

WOOD FRAME R-VALUE REQUIREMENT	COLD-FORMED STEEL EQUIVALENT R-VALUE ^a
Steel Truss Ceilings^b	
R-30	R-38 or R-30 + 3 or R-26 + 5
R-38	R-49 or R-38 + 3
R-49	R-38 + 5
Steel Joist Ceilings^b	
R-30	R-38 in 2 x 4 or 2 x 6 or 2 x 8 R-49 in any framing
R-38	R-49 in 2 x 4 or 2 x 6 or 2 x 8 or 2 x 10
Steel-Framed Wall	
R-13	R-13 + 5 or R-15 + 4 or R-21 + 3 or R-0 + 10
R-19	R-13 + 9 or R-19 + 8 or R-25 + 7
<u>R-20</u>	<u>R-13+10 or R-19+8 or R-25+7</u>
R-21	R-13 + 10 or R-19 + 9 or R-25 + 8
Steel Joist Floor	
R-13	R-19 in 2 x 6 R-19 + 6 in 2 x 8 or 2 x 10
R-19	R-19 + 6 in 2 x 6 R-19 + 12 in 2 x 8 or 2 x 10

(Footnotes remain unchanged)

PART II – IRC BUILDING/ENERGY

Revise tables as follows:

**TABLE N1102.1
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT^a**

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT ^b U-FACTOR	GLAZED FENESTRATION SHGC	CEILING R-VALUE	WOOD FRAME WALL R-VALUE ^b	MASS WALL R-VALUE ^k	FLOOR R-VALUE	BASEMENT ^c WALL R-VALUE	SLAB ^d R-VALUE AND DEPTH	CRAWL SPACE ^c WALL R-VALUE
1	1.2	0.75	0.35 ^j	30	13	3/4	13	0	0	0
2	0.65 ⁱ	0.75	0.35 ^j	30	13	4/6	13	0	0	0
3	0.50 ⁱ	0.65	0.35 ^{e,i}	30	13 20 or 13+5	5/8 8/13	19	5/13 ^f	0	5/13
4 except Marine	0.35	0.60	NR	38	13 20 or 13+5	5/4 8/13	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.35	0.60	NR	38	20 or 13 + 5 ^h	13/17	30 ^f	10/13	10, 2 ft	10/13
6	0.35	0.60	NR	49	20 or 13 + 5 ^h	15/19	30 ^g	10/13	10, 4 ft	10/13
7 and 8	0.35	0.60	NR	49	21	19/21	30 ^g	10/13	10, 4 ft	10/13

(Footnotes remain unchanged)

**TABLE N1102.1.2
EQUIVALENT U-FACTORS^a**

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR	CEILING U-FACTOR	WOOD 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	0.65	0.75	0.035	0.082	0.165	0.064	0.360	0.477
3	0.50	0.65	0.035	0.082 0.057	0.144 0.098	0.047	0.091c	0.136
4 except Marine	0.35	0.60	0.030	0.082 0.057	0.144 0.098	0.047	0.059	0.065
5 and Marine 4	0.35	0.60	0.030	0.060	0.082	0.033	0.059	0.065
6	0.35	0.60	0.026	0.060	0.060	0.033	0.059	0.065
7 and 8	0.35	0.60	0.026	0.057	0.057	0.033	0.059	0.065

(Footnotes remain unchanged)

**TABLE N1102.2.5
STEEL-FRAME CEILING, WALL AND FLOOR INSULATION (R-VALUE)**

WOOD FRAME R-VALUE REQUIREMENT	COLD-FORMED STEEL EQUIVALENT R-VALUE ^a
	Steel Truss Ceilings^b
R-30	R-38 or R-30 + 3 or R-26 + 5
R-38	R-49 or R-38 + 3
R-49	R-38 + 5
	Steel Joist Ceilings^b
R-30	R-38 in 2 x 4 or 2 x 6 or 2 x 8 R-49 in any framing
R-38	R-49 in 2 x 4 or 2 x 6 or 2 x 8 or 2 x 10
	Steel-Framed Wall
R-13	R-13 + 5 or R-15 + 4 or R-21 + 3 or R-0 + 10
R-19	R-13 + 9 or R-19 + 8 or R-25 + 7
<u>R-20</u>	<u>R-13+10 or R-19+8 or R-25+7</u>
R-21	R-13 + 10 or R-19 + 9 or R-25 + 8

WOOD FRAME R-VALUE REQUIREMENT	COLD-FORMED STEEL EQUIVALENT R-VALUE ^a
	Steel Joist Floor
R-13	R-19 in 2 x 6 R-19 + 6 in 2 x 8 or 2 x 10
R-19	R-19 + 6 in 2 x 6 R-19 + 12 in 2 x 8 or 2 x 10

(Footnotes remain unchanged)

Reason: This code proposal is intended to improve the thermal envelope efficiency through improved insulation in walls in climate zones 3 and 4. The table below illustrates the estimated energy cost savings from this measure in each climate zone. These savings in these zones are substantial and when coupled with other proposed code modifications can lead to significant overall energy savings for homes. Moreover, unlike many building components, wall insulation can last for the life of the building, delivering consistent energy savings far longer than many energy savings measures. In addition, it is difficult to add additional wall insulation after the home is constructed. As a result, the failure to adequately insulate the walls would impose needlessly higher energy costs on homeowners for decades to come.

	Climate Zone 3	Climate Zone 4
Heating, Cooling, Hot Water Purchased Energy Cost Percent Savings	5.5%	6.9%
Total Purchased Energy Cost Percent Savings (including appliances and lighting)	4.0%	5.2%

For wood frame walls, the specific values proposed for climate zones 3 and 4 match exactly current requirements for the Marine 4 climate zone and climate zones 5 and 6. As we work to increase the energy efficiency of the code, it is reasonable to extend these prescriptive requirements that are already being met in these colder climate zones to climate zones 3 and 4.

It is important to remember that the builder need not install the specific wall insulation that is designated by the prescriptive path. Compliance with thermal envelope criteria can be achieved through several paths:

1. Any combination of cavity and sheathing—Builders can easily combine various types of batt and blown cavity insulation with continuous sheathing to achieve any of these nominal R-values.
2. UA tradeoffs—Builders can calculate an average U-factor for the envelope, and adjust any component—walls, windows, ceilings, or floors—to adjust wall R-values to desired levels. Small changes in window specifications, for example, can easily allow builders to use a wide range of insulation solutions
3. Performance path—Builders can trade off wall insulation against a wide range of other measures.

Because of this built-in flexibility in the compliance options, as well as the fact that these requirements currently exist in three climate zones, there is no basis to claim that the insulation levels in this code change proposal are impractical or prevent competition. They are simply modest improvements in wall performance that are needed to achieve a larger overall performance improvement in American homes.

Cost Impact: The code change proposal will increase the cost of construction.

PART I – IECC

Public Hearing: Committee: AS AM D
 Assembly: ASF AMF DF

PART II – IRC BUILDING/ENERGY

Public Hearing: Committee: AS AM D
 Assembly: ASF AMF DF

ICCFILENAME: PRINDLE-EC-10-T. 402.1.1-T. N1102.1