

## **EC46-09/10 Part I & Part II**

### **EECC Requested Final Action: Approved as Submitted**

#### **EECC Public Comment:**

*EC46, Parts I & II should be approved as submitted.*

Simply put, this proposal will require more insulation in ceilings in the coldest locations of the US. The IECC Code Development Committee cited only two reasons for disapproval, and neither reason was related to energy efficiency. We believe that the reasons cited do not justify disapproving EC46, and we recommend approving as submitted.

First, the Committee cited the need for “extra protection” for attic insulation to allow attic storage. The current ceiling insulation requirement for these climate zones in the 2009 IECC is R-49, which would already require a raised platform to ensure that insulation is not compacted. Although attic storage is not covered in the energy code, we believe that whenever attic storage is incorporated into building designs, the designer should allow some measure of protection, such as wooden platforms that ensure that the insulation is not compressed or compromised. This is a common sense building practice that should be used regardless of the level of attic insulation.

Second, we do not believe that the answer to snow accumulation is to encourage less-efficient ceilings. Snow accumulation on the roof is not dependent only on the insulation levels in the attic (i.e. heat loss from the conditioned home), but is also highly dependent on the design of the home, such as the slope of the roof, color of the roof and roof material. If the home is designed and built according to the code, the homeowner will have a more comfortable home with less money going to pay to heat and cool the house. Snow accumulation is not directly addressed in the energy code, and we do not believe that the level of ceiling insulation required is an accurate or appropriate means of controlling snow loads.

EC46 will save energy over the building lifetime at a relatively low cost. We recommend approval as submitted.

#### **Proposal History:**

##### **Committee Recommended Action on Original Proposal at Public Hearing:**

**Part I IECC** – Disapproved

**Part II IRC** – Disapproved

##### **Committee Reason(s) for Recommended Action:**

**Part I IECC** – The committee believes that there might be unintended consequences related to this proposal that were not considered. First, extra protection will need to be provided for the insulation to allow storage in the attics. Second, this could result in a greater amount of snow accumulation on roofs.

**Part II IRC** – The values would be inconsistent with the approach taken in EC16.

**Initial Recommendation of EECC:** Approve

#### **Initial Proposal for Reference:**

## EC46–09/10

### Table 402.1.1, Table 402.1.3, 402.2.1; IRC Table N1102.1, Table N1102.1.2, N1102.2.1

**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 as follows:

**TABLE 402.1.1  
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT<sup>a</sup>**

CLIMATE ZONE	FENESTRATION U-FACTOR <sup>b</sup>	SKYLIGHT <sup>b</sup> U-FACTOR	GLAZED FENESTRATION SHGC <sup>b, e</sup>	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE <sup>i</sup>	FLOOR R-VALUE	BASEMENT <sup>c</sup> WALL R-VALUE	SLAB <sup>d</sup> R-VALUE & DEPTH	CRAWL SPACE <sup>c</sup> WALL R-VALUE
1	1.2	0.75	0.30	30	13	3/4	13	0	0	0
2	0.65 <sup>j</sup>	0.75	0.30	30	13	4/6	13	0	0	0
3	0.50 <sup>j</sup>	0.65	0.30	30	13	5/8	19	5/13 <sup>f</sup>	0	5/13
4 except Marine	0.35	0.60	NR	38	13	5/10	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.35	0.60	NR	38	20 or 13+5 <sup>h</sup>	13/17	30 <sup>g</sup>	10/13	10, 2 ft	10/13
6	0.35	0.60	NR	49	20 or 13+5 <sup>h</sup>	15/19	30 <sup>g</sup>	15/19	10, 4 ft	10/13
7 and 8	0.35	0.60	NR	<del>49</del> 60	21	19/21	38 <sup>g</sup>	15/19	10, 4 ft	10/13

(Footnotes remain unchanged)

**TABLE 402.1.3  
EQUIVALENT U-FACTORS<sup>a</sup>**

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR	CEILING U-FACTOR	FRAME WALL U-FACTOR	MASS WALL U-FACTOR <sup>b</sup>	FLOOR U-FACTOR	BASEMENT WALL U-FACTOR <sup>d</sup>	CRAWL SPACE WALL U-FACTOR <sup>c</sup>
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	0.141	0.047	0.091c	0.136
4 except Marine	0.35	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	<del>0.026</del> 0.024	0.057	0.057	0.028	0.050	0.065

(Footnotes remain unchanged)

**402.2.1 Ceilings with attic spaces.** When Section 402.1.1 would require R-38 in the ceiling, R-30 shall be deemed to satisfy the requirement for R-38 wherever the full height of uncompressed R-30 insulation extends over the wall top plate at the eaves. Similarly R-38 shall be deemed to satisfy the requirements for R-49 or higher wherever the full height of uncompressed R-38 insulation extends over the wall top plate at the eaves. This reduction shall not apply to the U-factor alternative approach in Section 402.1.3 and the total UA alternative in Section 402.1.4.

**PART II – IRC BUILDING/ENERGY**

Revise as follows:

**TABLE N1102.1  
INSULATION AND FENESTRATION REQUIREMENTS BY COMPONENT<sup>a</sup>**

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT <sup>b</sup> U-FACTOR	GLAZED FENESTRATION SHGC	CEILING R-VALUE	WOOD FRAME WALL R-VALUE	MASS WALL R-VALUE <sup>k</sup>	FLOOR R-VALUE	BASEMENT <sup>c</sup> WALL R-VALUE	SLAB <sup>d</sup> R-VALUE AND DEPTH	CRAWL SPACE <sup>e</sup> WALL R-VALUE
1	1.2	0.75	0.35j	30	13	3/4	13	0	0	0
2	0.65i	0.75	0.35j	30	13	4/6	13	0	0	0
3	0.50i	0.65	0.35e, j	30	13	5/8	19	5/13f	0	5/13
4 except Marine	0.35	0.60	NR	38	13	5/10	19	10/13	10, 2 ft	10/13
5 and Marine 4	0.35	0.60	NR	38	20 or 13 + 5h	13/17	30f	10/13	10, 2 ft	10/13
6	0.35	0.60	NR	49	20 or 13 + 5h	15/19	30g	10/13	10, 4 ft	10/13
7 and 8	0.35	0.60	NR	<del>49</del> 60	21	19/21	30g	10/13	10, 4 ft	10/13

(Footnotes remain unchanged)

**TABLE N1102.1.2  
EQUIVALENT U-FACTORS<sup>a</sup>**

CLIMATE ZONE	FENESTRATION U-FACTOR	SKYLIGHT U-FACTOR	CEILING U-FACTOR	FRAME WALL U-FACTOR	MASS WALL U-FACTOR <sup>b</sup>	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	0.141	0.047	0.091c	0.136
4 except Marine	0.35	0.60	0.030	0.082	0.141	0.047	0.059	0.065
5 and Marine 4	0.35	0.60	0.030	0.060	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	<del>0.026</del> 0.024	0.057	0.057	0.033	0.059	0.065

(Footnotes remain unchanged)

**N1102.2.1 Ceilings with attic spaces.** When Section N1102.1.1 would require R-38 in the ceiling, R-30 shall be deemed to satisfy the requirement for R-38 wherever the full height of uncompressed R-30 insulation extends over the wall top plate at the eaves. Similarly R-38 shall be deemed to satisfy the requirements for R-49 or higher wherever the full height of uncompressed R-38 insulation extends over the wall top plate at the eaves. This reduction shall not apply to the U-factor alternative approach in Section N1102.1.2 and the total UA alternative in Section N1102.1.3.

**Reason:** This code proposal is intended to improve thermal envelope efficiency through improved insulation in ceilings in climate zones 7 and 8. By increasing the ceiling insulation from R-49 to R-60 in climate zones 7 & 8 residential buildings can achieve approximately 0.6 to 0.7% purchased energy cost savings. These savings, especially coupled with other proposed code modifications can lead to significant overall energy savings for homes. Moreover, unlike many building components, ceiling insulation can last for the life of the building, delivering consistent energy savings far longer than many energy savings measures. Given that these climates are extremely cold, insulation measures are especially cost-effective.

	Climate Zone 7	Climate Zone 8
Heating, Cooling, Hot Water Purchased Energy Cost Percent Savings	1.0%	0.9%
Total Purchased Energy Cost Percent Savings (also including major appliances and lighting)	0.7%	0.6%

The U.S. Department of Energy issued new recommendations for cost-effective insulation levels in new homes in early 2008. The R-values proposed in here are consistent with those recommendations as shown in the table below from the DOE.

Zone	Heating System				Attic	Cathedral Ceiling	Wall		Floor
	Gas	Heat Pump	Fuel Oil	Electric Furnace			Cavity	Insulation Sheathing	
1	✓	✓	✓	✓	R30 to R49	R22 to R38	R13 to R15	None	R13
2	✓	✓	✓		R30 to R60	R22 to R38	R13 to R15	None	R13
2				✓	R30 to R60	R22 to R38	R13 to R15	None	R19 - R25
3	✓	✓	✓		R30 to R60	R22 to R38	R13 to R15	None	R25
3				✓	R30 to R60	R22 to R38	R13 to R15	R2.5 to R5	R25
4	✓	✓	✓		R38 to R60	R30 to R38	R13 to R15	R2.5 to R6	R25 - R30
4				✓	R38 to R60	R30 to R38	R13 to R15	R5 to R6	R25 - R30
5	✓	✓	✓		R38 to R60	R30 to R38	R13 to R15	R2.5 to R6	R25 - R30
5				✓	R38 to R60	R30 to R60	R13 to R21	R5 to R6	R25 - R30
6	✓	✓	✓	✓	R49 to R60	R30 to R60	R13 to R21	R5 to R6	R25 - R30
7	✓	✓	✓	✓	R49 to R60	R30 to R60	R13 to R21	R5 to R6	R25 - R30
8	✓	✓	✓	✓	R49 to R60	R30 to R60	R13 to R21	R5 to R6	R25 - R30

Source: <http://www1.eere.energy.gov/consumer/tips/insulation.html>

These modest, cost-effective savings are part of a larger package of proposals that together will get the IECC to the 30% improvement that national policymakers are seeking. Achieving this goal requires several modest improvements, in multiple components of the building. Recent energy price increases, despite softening effects of the current economic downturn, signal a new era of sharply higher energy costs. In addition, climate change policy is likely to be enacted before the 2012 IECC is published, and its effects will likely include further energy price increases. This proposal represents one of a set of reasonable and cost effective improvements that give states new options to increase the efficiency of their energy codes.

**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

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