

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^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 | 1.2 | 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 | 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, 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 60 | 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 | 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 | 0.141 | 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 | 0.026 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^a**

| CLIMATE ZONE | FENESTRATION U-FACTOR | SKYLIGHT ^b U-FACTOR | GLAZED FENESTRATION SHGC | CEILING R-VALUE | WOOD FRAME WALL R-VALUE | MASS WALL R-VALUE ^k | FLOOR R-VALUE | BASEMENT ^c WALL R-VALUE | SLAB ^d R-VALUE AND DEPTH | CRAWL SPACE ^e 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 | 49-60 | 21 | 19/21 | 30g | 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 | 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 | 0.141 | 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 | 0.026 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 | Furnace | | | | Attic | Cathedral Ceiling | Wall | | Floor |
|------|---------|-----------|----------|----------|------------|-------------------|------------|----------------------|-----------|
| | Gas | Heat Pump | Fuel Oil | Electric | | | 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

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

PART II – IRC BUILDING/ENERGY

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

ICCFILENAME: PRINDLE-EC-7-T. 402.1.1-T. N1102.1