

Clarify Slab Insulation Requirements

Modify the 2021 International Energy Conservation Code as follows:

Revise as follows, portions of table not shown remain unchanged:

TABLE R402.1.2 MAXIMUM ASSEMBLY U-FACTORS^a AND FENESTRATION REQUIREMENTS

CLIMATE ZONE	BASEMENT WALL U-FACTOR	UNHEATED SLAB F-FACTOR	HEATED SLAB F-FACTOR	CRAWL SPACE WALL U-FACTOR
0	0.360	<u>0.73</u>	<u>1.03</u>	0.477
1	0.360	<u>0.73</u>	<u>1.03</u>	0.477
2	0.360	<u>0.73</u>	<u>1.03</u>	0.477
3	0.091 ^c	<u>0.54</u>	<u>0.77</u>	0.136
4 except Marine	0.059	<u>0.54</u>	<u>0.68</u>	0.065
5 and Marine 4	0.050	<u>0.54</u>	<u>0.68</u>	0.055
6	0.050	<u>0.48</u>	<u>0.68</u>	0.055
7 and 8	0.050	<u>0.48</u>	<u>0.68</u>	0.055

For SI: 1 foot = 304.8 mm.

g. F-factors for heated slabs correspond to the configuration described by footnote (d) of Table R402.1.3

R402.2.9 Slab-on-grade floors.

Slab-on-grade floors, in contact with the ground, with a floor surface ~~within 24~~^{less than 12} inches (600~~305~~ mm) above or below grade shall be insulated in accordance with Table R402.1.3.

Exception: Slab-edge insulation is not required in jurisdictions designated by the code official as having a very heavy termite infestation.

Reason:

Residential building energy codes that are based on any version of the International Energy Conservation Code (IECC) typically allow compliance to be demonstrated in several ways, one of which is a component tradeoff approach whereby prescriptive requirements for some building components may be relaxed in trade for corresponding improvements in other components. Calculations for this component tradeoff are based on maintaining a maximum overall building UA value, which is the sum across all building envelope components of the product of each component's U-factor (conductance) and area. For slabs on grade, the component UA is based on an F-factor rather than a U-factor and is multiplied by the slab-edge perimeter length rather than slab area.

The IECC does not give explicit instruction on calculating slab F-factors, relying instead on external materials such as ASHRAE's Handbook of Fundamentals. Slab insulation is usually required only around the perimeter of the slab, but the 2018 IECC added a new requirement for full under-slab insulation of heated slabs. It is not clear, even using the ASHRAE reference, how to calculate F-factors for such slabs.

The recommended code-change text refers to Appendix A of ASHRAE Standard 90.1, where precomputed F-factors are tabulated for various combinations of slab insulation placement and R-value, but any F-factor source consistent with the ASHRAE Handbook of Fundamentals may be used.

Cost Impact:

The code change proposal will neither increase nor decrease the cost of construction.

The text presented here does not change the code's requirements in any way; it merely adds clarifying text showing one good source of slab F-factors as a function of insulation R-value and depth. There is no additional cost and no energy impact.