

Technical Bulletin: Modeling Slab Insulation



Residential New Construction Program

BUILDING A SMARTER ENERGY FUTURESM

The average home in the RNC Program has a slab foundation and slab insulation. To ensure accurate savings, slab insulation needs to be assessed and modeled accurately. This technical bulletin will cover modeling partially insulated slab perimeters, slab insulation grading, and derating slab insulation with large termite gaps.

Partially insulated slab perimeter and insulation depth

Often, sections of the slab perimeter around garages, porches, and stone façades are not insulated. Raters should remember to model the slabs accurately based on the percentage of insulated and non-insulated perimeters. In addition to areas missing insulation, the reference home for the RNC Program assumes a footing depth of 2' which will skew savings if the proposed home's footing depth is larger or smaller. Raters should calculate the areas, perimeters, and insulation depths for insulated and uninsulated slabs using the following formulas.

- **Surface Area** = Total slab area x percent of slab type (example: uninsulated surface area = total slab area X percent of uninsulated slab)
- **Exterior Perimeter** = Total slab perimeter x percent of slab type
- **Insulation Depth** = (Slab insulation depth/Slab footing depth) x 2'

Ekotrope does not incorporate adiabatic slabs in their modeling. When modeling townhomes, the adiabatic portions of the slab should be excluded from the Ekotrope model. Below is an example of how to model a townhome slab where only the back of the home is insulated.

	Perimeter (ft)	Percentage of slab
Back (Insulated)	25	22%
Front/garage (uninsulated)	33	28%
Adiabatic	58	50%
Total	116	100%
Total slab area (ft ²)	705	

Slab
Name: Uninsulated Slab
Type: Uninsulated
Surface Area [ft²]: 705 sf x 28% = 201sf
Exterior Perimeter [ft]: 33 ft
Exposed Masonry Area [ft²]: 0
Covering R Value: 1.23
Floor Grade: On Grade
Encloses: Conditioned Space
Buttons: Remove, Copy

Slab
Name: Insulated Slab
Type: R-10 Perimeter
Surface Area [ft²]: 705 sf x 22% = 152sf
Exterior Perimeter [ft]: 25 ft
Exposed Masonry Area [ft²]: 0
Covering R Value: 1.23
Floor Grade: On Grade
Encloses: Conditioned Space
Buttons: Remove, Copy

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Slab Insulation Grading

The ekotrope library for slab insulation does not include grading, but Ekotrope recommends derating the insulation based on the grade and exposure to air. Ekotrope details the derated R-values in [this](#) article. If the insulation is grade I, the R-value doesn't need to be derated. For insulation with grades II or III, the R-value is determined by averaging the R-values and areas exposed to ambient air and below grade. The table below includes the calculated average R-values where the slab is 6-8" above grade and 16-18" below grade.

Grade	Percentage Range of Damaged Insulation	Derated R-value
I	0-2%	10
II	2-15%	8.5
III	15% or more	7

Large Termite Gap

Every slab with insulation in North Carolina requires a 3" termite gap by code. For the purposes of the RNC Program, the termite gap is considered insulated. However, if the termite gap is greater than 3", the slab is missing a portion of insulation and needs to be derated. If there is a 5" termite gap, there is a 2" gap in the insulation. The insulation is derated to R-3.87. The table below details the R-value for various inches of exposed slab insulation after the termite gap assuming the insulation is grade I.



An example of a large termite gap

Inches of exposed slab after termite gap	Derated Grade I R-value
1	5.58
2	3.87
3	2.96
4	2.40
5	2.02
6	1.74
7	1.53
8	1.36

Please contact us at DERNC@icfprogram.com with questions or for additional information.