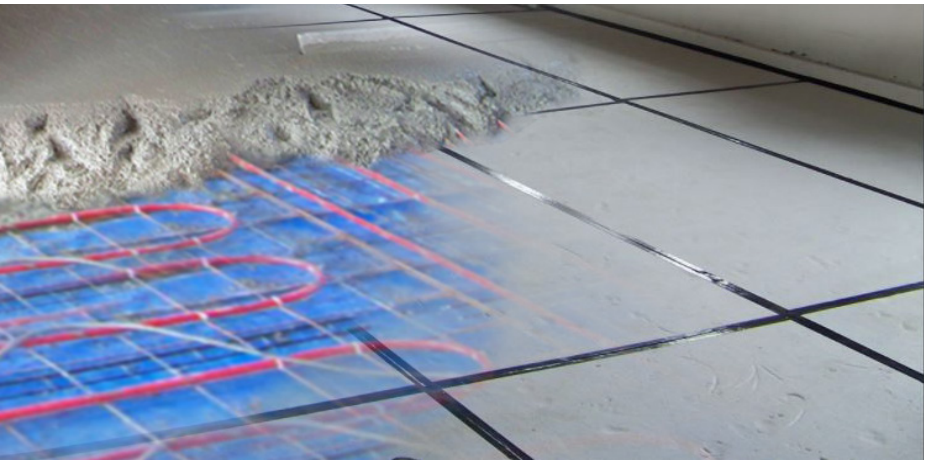
SEDAC
SMART ENERGY DESIGN ASSISTANCE CENTER

Energy Code Smart Tips

Slab Insulation



Slabs can be big culprits for energy loss from heat that is conducted outward through the perimeter of the slab. Properly insulating slab edges can save up to **8%** on heating use[1] and prevents issues with condensation and discomfort.

The current Illinois Energy Conservation Code (2018 IECC) has requirements for slab-on-grade insulation. This document summarizes the code requirements for Illinois and provides guidance for designing successful installations.

Slab-on-grade requirements 2018 IECC

Construction Type	Climate Zone	Insulation Location	Unheated Slab	Heated Slab
Commercial	4	Perimeter	R-10 24" below	R-15 24" below
		Slab	None Required	R-5
	5	Perimeter	R-10 for 24" below	R-15 36" below
		Slab	None Required	R-5
Residential	4 & 5	Perimeter	R-10 for 24" below	R-10 24" below
		Slab	None Required	R-5

Source: Table C402.1.3 and R402.1.2

Commercial (C402.2.4)

Location of insulation can either be inside or outside the foundation wall.
Depth of insulation is indicated in Table C402.1.3. Insulation must extend vertically from the top of the slab to code depth or to the top of the footer, whichever is less.[2]
Horizontal Insulation may be used under slab or outward from foundation. The combined vertical and horizontal distance must equal the code depth. Insulation extended outward from foundation must be protected by pavement or 10" of soil.
R-value. Table C402.1.3 indicates minimum R-value.

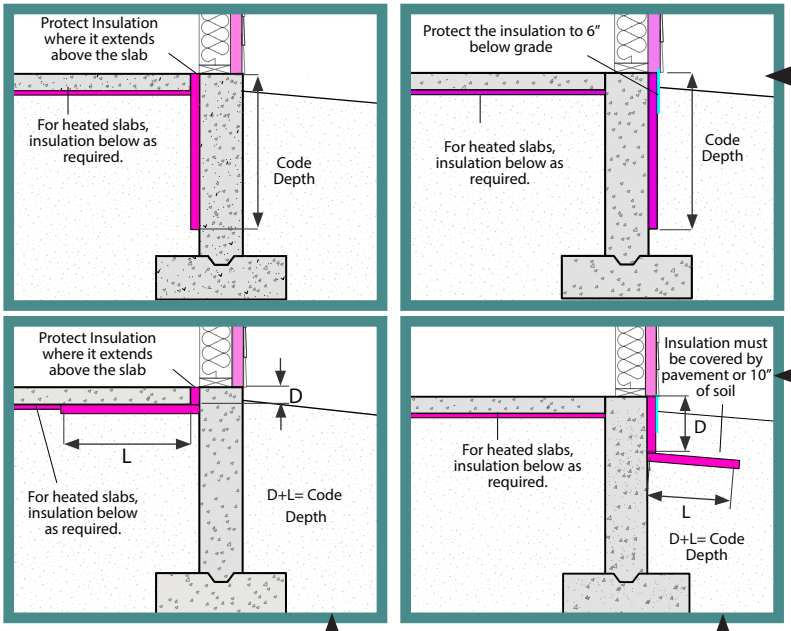
Residential (R402.2.10)

Commercial requirements apply with a few exceptions.
Termite Exception: Slab edge insulation is not required in areas with very heavy termite infestations.
Frost line is determined by the authority having jurisdiction.

[1]https://www.phrc.psu.edu/assets/docs/Webinars/SlabInsulation.pdf - "How to Properly Insulate a Slab" Penn State Univ. webinar 4/10/2012 by Mike Turns, Assc. Dir. PA Housing Resource Center.
[2]Foundation footers must be located below frost line unless protected per the 2019 IBC Section 1809.5. The frost line is determined by the local authority and varies accross the State of Illinois from ~24"-42".

Successful Slab Insulation

To match the unique needs of each project, the code provides installation options. Insulation can be vertical, horizontal, inside or outside of the foundation.



Vertical Insulation

When the insulation is fully vertical the minimum depth of the insulation is equal to the Code Depth called out in Tables C402.1.3 and R402.1.2

Horizontal Insulation

When the insulation is partially horizontal and vertical, the length and depth together must equal the Code Depth.

Interior

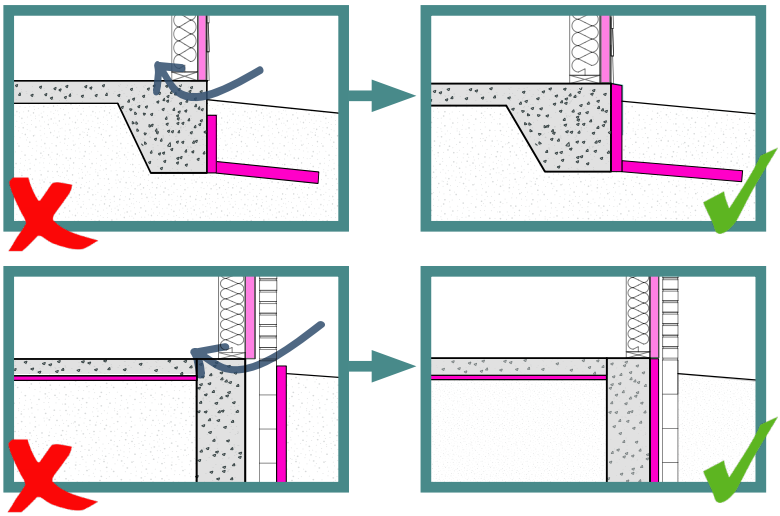
When placed on the interior, the exposed end of the insulation can be vulnerable to damage where it extends vertically through the slab. The insulation can be angled and covered by concrete or the sill plate can cover it.

Exterior

When the insulation is on the outside of the foundation it must be protected where it extends above grade and down to 6" below. But this location provides good continuity with the continuous exterior wall insulation.

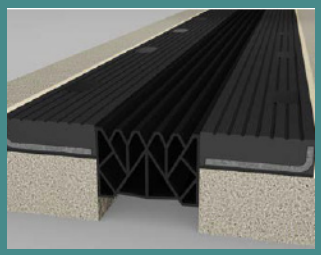
Continuous Insulation

Foundation insulation was noted by one building science professor as "one of the most abused details in construction."[1] The code provides slab edge insulation options for designers. Maintaining a continuous thermal envelop from the wall system down over the slab edge can avoid common errors, as shown.



Thresholds.

Where insulataion along the edge of a slab encounters a threshold where vehicle or foot travel will be present, products are available to provide a robust thermal break. See below, for examples of products designed to provide thermal breaks for perimeter insulation at vehicle doorways by Energy Edge ® and Wabo®.



WHO WE ARE

SEDAC is the Energy Code Training Provider on behalf of the Illinois EPA Office of Energy. Attend SEDAC's workshops and webinars to learn more. We also offer online courses and technical support.

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