

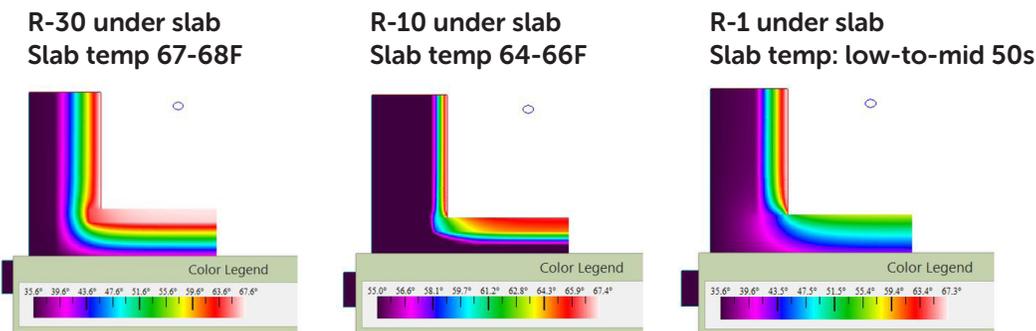
Residential New Construction Slab Insulation Reference

While not a code requirement for below-grade unheated slabs, insulation below a basement slab can have a positive impact on the comfort, efficiency, and air quality in a new home. There is really only one chance to insulate below the slab - before the concrete is poured.

There's heat in the ground; why should I insulate under a below-grade slab?

During the heating season, the ground is always colder than the basement. This leads to higher energy costs and potential comfort issues as heat is lost through the slab. In summer, warm, humid air coming into contact with a cool, uninsulated slab can lead to water condensation. This creates the potential for mold and mildew, which can have a serious effect on flooring (especially carpet) and stored items, and can cause poor indoor air quality.

The figure¹ below shows heat transfer modeling of a basement room with different levels of insulation underneath the slab. Even R-10 keeps the slab within a few degrees of a 68F thermostat set-point, but no insulation means that slab can easily be 10-15 degrees cooler than the air temperature.



The ASHRAE 55 thermal comfort standard specifies a minimum floor temperature of 66.2F to be comfortable for a person wearing shoes.

The following photo shows below-slab insulation prior to pouring concrete. Use of a vapor retarder between the insulation and concrete is strongly recommended.



Image: Building America Solutions Center²

Insulation below the slab helps:

- Improve comfort in below-grade and day-lit basements
- Save energy and reduce heating costs
- Reduce the likelihood of interior condensation and dampness
- Reduce the likelihood of damage due to freeze/thaw cycling in seasonal homes

¹ THERM model with 4" slab, 68F interior temperature, 36F soil temperature, and 1.42 surface film coefficient.

² <https://basc.pnnl.gov/resource-guides/capillary-break-beneath-slab-polyethylene-sheeting-or-rigid-insulation-over-0>