

# With warm floors, come warm hearts

Thermal barrier keeps the heat in, saving on utility bills

The Earth is big and the temperature of the ground under your house is, on average, a little cooler than your barefoot comfort zone.

Physicists tell us heat energy moves from warm to cool spaces. So if your little bitty 70-degree home is nestled upon the 60-degree earth, you hear a great big sucking sound as heat and utility dollars are moved by laws of physics to the giant mass below.

Even in Las Cruces, where we are primarily concerned with cooling homes, heat loss through slab floors in the winter months is one of the main consumers of utility energy dollars.

To break the heat-loss cycle, we need a barrier – a thermal barrier. Our local residential code requires installation of rigid insulation at the edges of foundations beneath our homes. Until I became involved in energy modeling of homes, I was skeptical of the value of the dainty 1-inch sheet of Styrofoam installed just below the soil level around the base of my house. I now know this insulation between the slab and the earth is effective, but is really just a good first step in keeping my feet warm.

## Layers of warmth

Some of the most energy efficient and comfortable homes incorporate a continuous layer of rigid insulation under the slab and

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foundation footings as well as the slab edge on the perimeter of the home. Just like a camper who preps his sleeping bag spot with a roll of insulating foam, a continuous layer of insulation holds the warmth where we need it.

A Leadership in Energy and Environmental Design Gold Certified home completed recently in Silver City, N.M., incorporates insulated concrete form (ICF) blocks as the wall-support footing material at the perimeter of the home in addition to 2 inches of dense polystyrene rigid insulation board under the concrete slab. These measures provide a complete thermal break between the floor slab and the ground. The homeowner reports that through this colder-than-average winter, her propane gauge hardly twitched.

Under-slab insulation is inexpensive when installed during construction. Its use will typically pay for itself in reduced utility costs in climate zones like ours or cooler. If a complete insulation layer under the slab of the home does present cost issues, a band of the same type of rigid board insulation installed at just the outer 4-foot perimeter under the slab can also be beneficial.

Homes designed with radiant hydronic (in-floor liquid piping) or electric in-floor heating should always use under-slab insulation to herd the heat into the home.



Builder Cathy McMillan reaches for Leadership in Energy and Environmental Design Gold certification with a Silver City, N.M., home that uses rigid insulation on the concrete slab and insulated concrete forms.

## The different types

There are many types, thicknesses and grades of rigid foam board insulation. Usually, high-density polystyrene (e.g., Styrofoam) is used.

More exotic materials are available, such as polyisocyanurate, which is more expensive but provides twice the thermal resistance (R-value). Foil-faced foam board is sometimes installed under or adjacent to foundation walls. This material is more expensive and the foil radiant barrier's effectiveness is mitigated when there is no air-space gap at one side of

the foil, which is the circumstance with most slab installations.

Retrofits to install rigid under-slab insulation are not usually feasible on existing homes. But, if you are thinking of building a home, you should consider under-slab installation to keep your feet warm and your heart happy.

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