Beat Basement Heat Loss

Proven methods and materials make insulating foundation walls easy and cost effective.

Foundation walls are big heat losers. The R-value of an 8-inch concrete wall plus air films is 1.49, less than for double glazing. And the upper part of the foundation wall acts like a wick, drawing basement heat to the cold outdoors. In a well-insulated two-story home, basement heat loss will account for 15 to 30 percent of the annual heat load. In a single-story structure, the percentage may be higher. R-10 perimeter insulation from siding to footing (with one foot of exposed foundation) will cut basement heat loss in a heated basement by about 70 percent. Payback periods for perimeter insulation are relatively short, typically ranging from two to six years in a 5000 degree-day climate.

Materials
You should select a material that withstands the below-grade environment—the wetting and vapor drive, and the freeze/thaw cycles. If you plan to leave the material directly exposed to the soil, extruded polystyrene (such as Dow's Styrofoam™ or U.S. Gypsum's Foamular™) holds up best and retains most of its original R-value. Other insulating materials can be used, but they should be protected from direct contact with wet soil by plastic or other barriers. In Canada, some builders have reported success with burying fiberglass insulation in a pressure-treated plywood box.

Where and how much
Several arguments favor exterior versus interior insulation of masonry and concrete basements. First, an exterior job is usually cheaper, since the insulation can be left uncovered (except for above grade). On the interior a good fire retarder, such as 5/8-inch drywall, is required over the insulation. Second, if a decent job is done tying the insulation into the siding, the major air leak at the sill will be controlled. Third, the thermal mass of the foundation walls remains available to the house for both heating and cooling benefits. And fourth, exterior insulation protects the foundation from additional stresses caused by insulating. Deprived of your home's heat, the soil around the foundation will be more prone to frost heaves, which can be particularly damaging to block and stone foundations that cannot resist lateral forces. Cracks may result.

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