



Getting Started

According to the U.S. Department of Energy, insulating basement walls produces a typical annual savings of between \$250 - \$450 per year depending on location and R-Value. The first decision for any YouthBuild program regarding basement weatherization is: *Will the basement itself be conditioned (heated and/or cooled) or unconditioned space?* Moisture management, sealing, and insulation tactics all flow from this decision.

Conditioned Basements – Sealing for More Insulation and Moisture Control

It costs a lot of money to dig up the exterior soil along the foundation and install moisture control measures. If possible, you should control moisture on the interior walls and foundation floor then insulate the interior. In conditioned (finished) basements, you may need to install mechanical vents or dehumidifiers for constant moisture management, even if you improve gutters, exterior soil grading, and other exterior moisture control measures.

- **To control moisture weeping or leaking through foundation walls, install 6- to 10-mil polyethylene sheeting, sealed with elastomeric caulk or appropriate tape.** This may sometimes be done in conjunction with whole wall applications of paste sealant. (Do not use a sealant that could chemically interact with the plastic.) See the diagram below.
- **If possible, install a sump pump and interior perimeter drain tiles or channels that direct water coming into the basement toward the sump.** If the home already has a sump pump, make sure it is in working order.

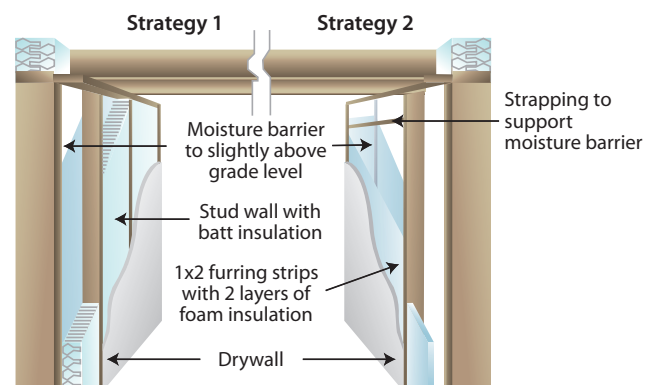
Insulating the Interior of Walls in Conditioned Basements

- **Select an appropriate insulation material and R-Value for your location.** Make sure it is fire resistant, according to your local building codes.
- **Install sheets of insulation to the basement walls and seal with caulk.**
- **Attach the sheets at the sill plate and along framing using a staple gun.** You may need to install wood furring or framing to hold sheet insulation in place along the basement wall.
- **When insulation batts or rolls are used on the underside of a floor above an unheated crawl space or basement, fit the insulation between the beams or joists and gently push it up against the floor overhead to touch the underside of the subfloor without compressing the insulation.** Hold it in place with strips of wood furring, chicken wire, or cross-roads that clip between the joists. Cut smaller strips of batts or rolls to fit between cross-bracing and against gaps near the perimeter at the sill plate, and stuff these into the space by hand – **after air sealing.**
- **See various resources in the “Link and Learn” section for additional installation technique resources.**

Before You Begin

For rehab or weatherization work, first assess green practices for cost, difficulty, and impact on energy savings, moisture control, and home integrity. While creating specifications, conduct an energy audit and do comparative research. Make sure you are teaching and using lead-safe practices in compliance with EPA’s Renovation, Repair and Painting Rule and HUD’s Lead Safe Housing Rule.

Interior Basement Wall Insulation Strategies



Here are two strategies for interior basement wall insulation. On the left, batt insulation is installed between the studs. On the right, two layers of foam boards are installed in addition to a moisture barrier. These tactics require good air sealing, water barriers and controls.

Source: www.energysavers.gov



Types of Basement Insulation

No matter what type of insulation you choose, make sure it provides the recommended R-Value for the basement:

- Blanket (batt and roll) insulation (for new or rehab)
- Concrete block insulation (for new construction)
- Foam board insulation (for new or rehab)
- Insulating concrete forms (for new construction)
- Loose-fill insulation (good choice for finished basements)
- Sprayed foam insulation (good choice for finished basements)



Link and Learn

General Information

http://www.energysavers.gov/your_home/insulation_airsealing/index.cfm/mytopic=11470

Insulation Charts and Fact Sheets from Oak Ridge National Lab:

http://www.ornl.gov/sci/roofs+walls/insulation/ins_06.html

The Complete Basement Treatment Guide for DIY from the Department of Energy:

<http://www.ornl.gov/sci/roofs+walls/insulation/fact%20sheets/basement%20Insulation%20Technology%20fact.pdf>

Estimating Pay Back on Insulation Choices:

http://www.energysavers.gov/your_home/insulation_airsealing/index.cfm/mytopic=11360

Moisture and Remodeling Guides

Builder's Guide - Mixed Climate; Builder's Guide - Cold Climate; Builder's Guide - Hot-Dry & Mixed Dry Climates. By Joseph Lstiburek. 1998. Complete and well-illustrated, with a full range of recommendations for moisture control and all systems of the home. Available at your local or online bookseller.

Ventilation Guidelines

The Homeowner's Guide to Ventilation, by the New York State Energy Research and Development Authority (NYSERDA):

<http://www.eeba.org/>

Controlling Radon

<http://www.epa.gov/radon/pubs/citguide.html>

Controlling Lead

Use this chart to help you assess your compliance with EPA's RRP and HUD's LSHR:

http://www.hud.gov/offices/lead/enforcement/lshr_rrp_changes.cfm

EPA's Renovation, Repair and Painting Rule:

<http://www.epa.gov/lead/pubs/renovation.htm>

HUD's Lead Safe Housing Rule:

<http://www.hud.gov/offices/lead/enforcement/lshr.cfm>

R-values Recommended For Basement Insulation

The International Energy Conservation Code's basement wall insulation requirements, based on Heating Degree Days (HDD), are as follows:

HDD Zone	R-value Interior	R-value Exterior
1 (0-1,500)	none	none
2 (1,501-4,500)	R-5 to R-9	R-5 to R-10
3 (4,501-8,500)	R-9 to R-10	R-10
4 (8,501-9,000)	R-10 to R-19	R-10 to R-15
5 (> 9,000)	R-19	R-15



HDD=heating Degree Days

Consult your local weather bureau for your city's actual Heating Degree Days, a measurement commonly used to determine fuel consumption and/or the cost of heating during a heating season.

Source: www.energysavers.gov