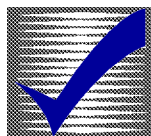




HOW-TO BOOKLET #3087

INSULATE SIDEWALLS



TOOL & MATERIAL CHECKLIST

- Insulation with Correct R-Value
- Knife
- Foil-Faced Tape
- Safety Glasses
- Stapler
- Straightedge Board
- Stepladder
- Respirator
- Razor
- Tape Measure
- Gloves

Read This Entire How-To Booklet for Specific Tools and Materials Not Noted in the Basics Listed Above.

TABLE OF MATERIAL R-VALUES	
MATERIAL	R-VALUE (PER INCH)
Batts and Blankets:	
Glass Fiber	3.3
Rock Wool	3.7
Loose Fill and Blown-In:	
Perlite	2.7
Vermiculite	2.4
Cellulose	3.6
Glass Fiber	2.2
Rock Wool	2.9
Rigid Boards:	
Molded Polystyrene	4.0
Extruded Polystyrene	5.0
Fiberglass Board	4.5
Isocyanurate Board	6.0 to 7.0
Phenolic	8.0

If the walls in your home are framed and covered with a finished material such as gypsum board, paneling, or lath and plaster, it would be impractical for you to insulate the walls yourself. To do this, the siding or the wallboard has to be removed—a job that probably would cost more than the energy you would save over a very long period of time.

These walls can be insulated, however, by a professional equipped with a machine to blow loose fill insulation or foam between framing members. If you can rent a machine to blow in insulation, you could do the job yourself. Otherwise, the cost of buying the equipment would be prohibitive for a one-time insulation project.

An alternative, however, would be if the wall framing is exposed, or if you would construct a false wall of framing over the finished wall, then you could insulate the wall handily.

TYPES OF INSULATION

There is a variety of types of insulation of the market. One type, insulation board sheathing, has to be put up while the house is being built or when you put on an addition to the house. The types of wall insulation that you can install, provided you have access to the framing or frame in a false wall, include these products:

Flange Batts. One side has a vapor barrier, while the other side has a kraft “breather” paper wrap. This product, however, is generally specified for use in crawl spaces under flooring.

Foil-Faced Fiberglass Insulation. One side has an aluminum foil-type covering. The other side is exposed. This is considered the standard material for sidewalls, attics, crawl spaces, and other insulation installations. It is manufactured by several major building material companies and highly advertised.

Paper-Faced Fiberglass Insulation. It is similar to foil-faced insulation, but with a kraft vapor barrier.

Unfaced Fiberglass Rolls. No vapor barrier is used at all here. If you want a vapor barrier, use polyethylene film, usually called sheet plastic or poly-film.

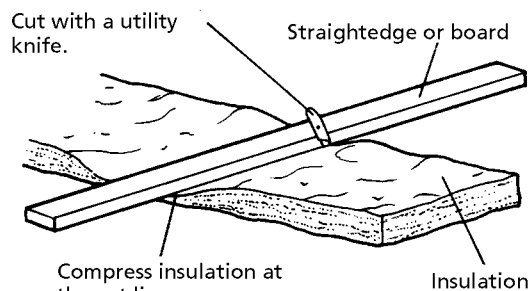
Loose Wool. Usually fiberglass, this material comes in bags and looks like chunks of pink or gray cotton. It is spread or blown between studs. You will need a professional for installation, or sometimes you can rent a machine to blow the material into position, as noted earlier. Vapor barriers, attached or separate from the insulation, must always face the warm side of the room. On a stud wall, the barrier faces toward the heated room, or usually toward you as you face the exterior.

PURCHASING ENOUGH R-VALUES

All house insulation is based on R (or resistance) factors. The higher the R-value, the more insulation quality of the product.

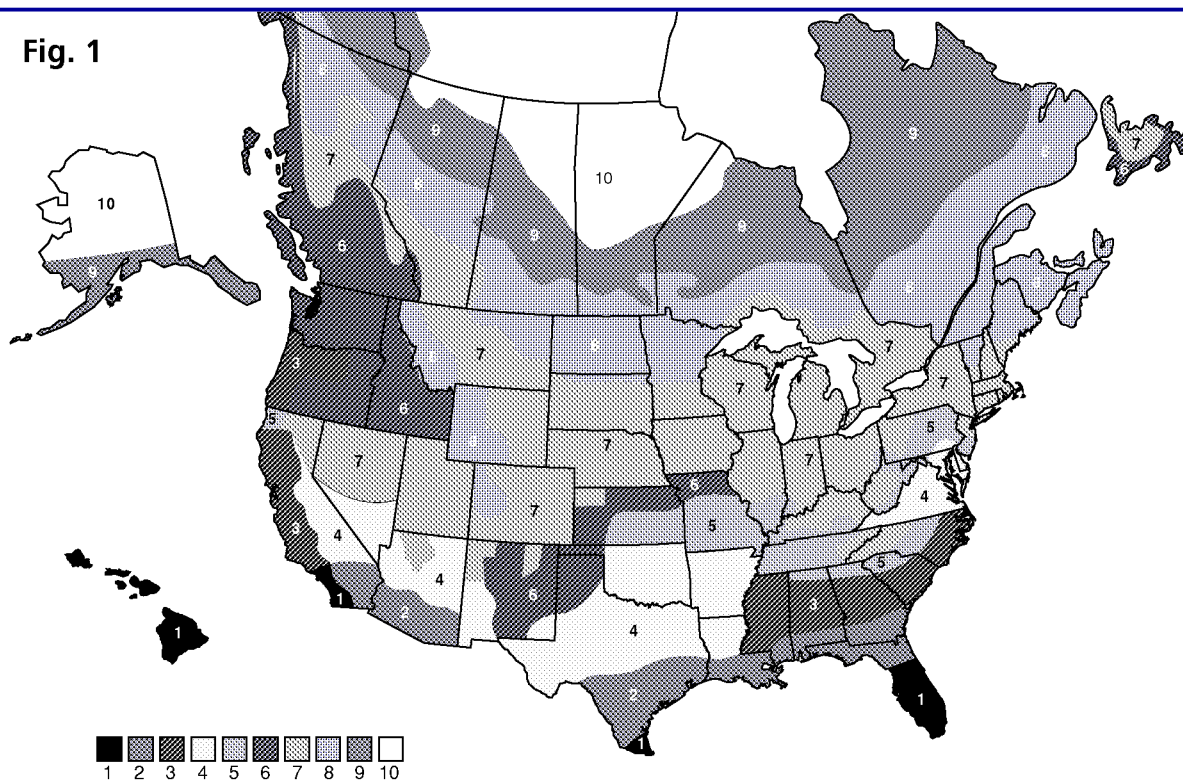
Before you buy any insulation, determine your insulation zone by locating your city or town on the map given in **Fig. 1**. To determine how much insulation your home needs, simply check the Table of Material R-Values.

Fig. 2



Cutting insulation batts or blankets with a razor knife and straightedge.

Fig. 1



RECOMMENDED TOTAL R-VALUES FOR EXISTING HOUSES IN TEN INSULATION ZONES^a

Component	Ceilings Below Ventilated Attics		Floors Over Unheated Crawl Spaces, Basements		Exterior Walls ^b (Wood Frame)		Crawl Space Walls ^c	
	Oil, Gas, Heat Pump	Electric Resistance	Oil, Gas, Heat Pump	Electric Resistance	Oil, Gas, Heat Pump	Electric Resistance	Oil, Gas, Heat Pump	Electric Resistance
1	19	30	0	0	0	11	11	11
2	30	30	0	0	11	11	19	19
3	30	38	0	19	11	11	19	19
4	30	38	19	19	11	11	19	19
5	38	38	19	19	11	11	19	19
6	38	38	19	19	11	11	19	19
7	38	49	19	19	11	11	19	19
8	49	49	19	19	11	11	19	19
9	49	49	19	19	11	11	19	19
10	55	55	19	19	11	11	19	19

^a These recommendations are based on the assumption that no structural modifications are needed to accommodate the added insulation.

^b R-Value of wall insulation, which is 3-1/2 inches thick, will depend on material used. Range is R-11 to R1-3. For new construction R-19 is recommended for exterior walls. Jamming an R-19 batt in a 3-1/2 inch cavity will not yield R-19.

^c Insulate crawl space walls only if the crawl space is dry all year, the floor above is not insulated, and all ventilation to the crawl space is blocked. A vapor barrier (e.g., 4- or 6-mil polyethylene film) should be insulated on the ground to reduce moisture migration into the crawl space.

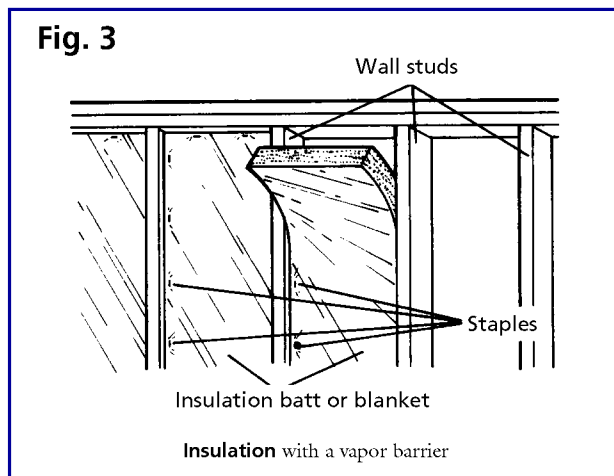
INSULATE SAFELY

If you are working with fiberglass insulation, wear safety glasses, gloves, and a paper-type respirator. The fine particles of fiberglass fly through the air as the material is being installed and it can cause irritation. Also, wear a shirt that can be buttoned at the collar and the cuffs, or preferably a plastic raincoat. And, after working for about 15 minutes or so, take a break and move into a fresh air area for a few minutes.

HOW TO INSULATE WALLS

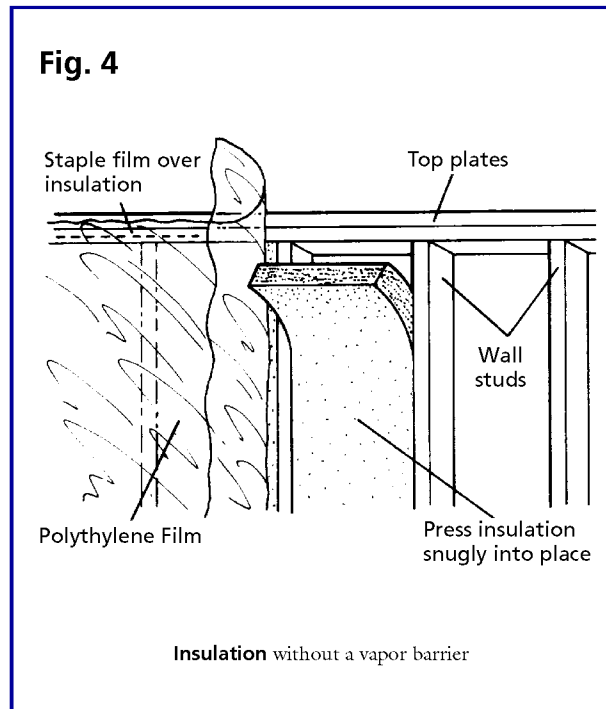
First, measure between the studs from the top plate to the bottom plate. Cut one piece of insulation to fit and try it on for size. If it fits, use this piece as a template to cut the rest of the strips. Before you make a series of cuts, make sure that the insulation fits tightly against the top and bottom plates of the framing. The insulation loses its efficiency if there is a “crack” or break in it.

Use a razor knife to cut the insulation (**Fig. 2**). Lay a board with a straightedge across the insulation. Stand on the board with one foot to compact the insulation. Then make a slicing cut with the razor knife, using the edge of the board as a guide. The cut is fast and it will produce a clean edge. Keep the knife blade clean, or replace it frequently.



Foil- or kraft-faced insulation goes between studs as shown in **Fig. 3**. The staples are spaced about every 2" to 3" apart and the edge of the flanges on the insulation are matched to the edge of the framing members and then stapled to the face of the framing members—not the edges. This way a 3/4" air space is created between the back of the wall covering you will install and the face of the vapor barrier. Air has insulation value.

The width of the insulation is designed to fit the standard width of framing members: 16" on-center. The correct way to hang the material is to staple one flange on first then pull the vapor barrier from the other side and staple it down. You can buy special staples made for insulation. Also it is recommended that you use an electric staple gun. It will save you plenty of time and energy and when compared with the cost of a hand gun, the cost is not prohibitive.

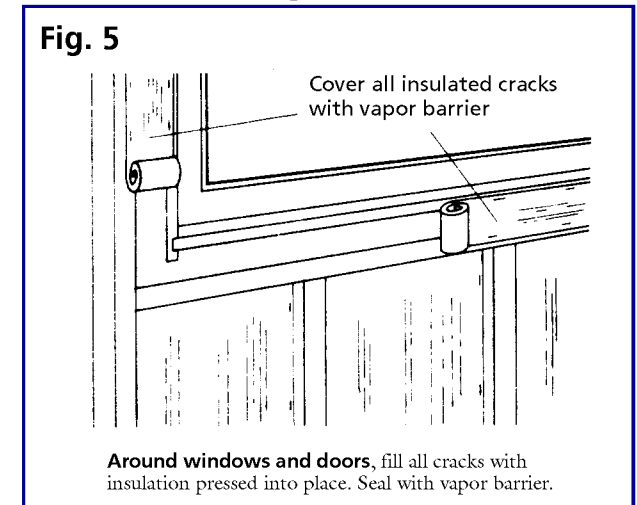


Most insulation comes with flanges for staples. The flanges measure 3/4" wide, which automatically spaces the insulation on the framing members. The flanges should be flush with the edges of the framing members and flat against the face of the framing members. The face of the vapor barrier then should be about 3/4" from the back of the finish wall to create an air of space. Using unfaced insulation (no vapor barrier) requires a separate vapor barrier such as 4- or 6-mil polyethylene film (**Fig. 4**).

If you tear the vapor barrier, patch it with a strip of foil-faced tape. Also, tape around projections in the wall such as heating/cooling ducts.

When you come to pipes or wires in the wall:

- 1 Pull the insulation out from between the studs.
- 2 Approximate where the pipe or wiring will cross the insulation.
- 3 Cut the insulation (not vapor barrier) with the razor knife—just cut part way through the thickness of the insulation with a quick slicing movement of the knife.
- 4 Insert the pipe or wiring in the slash and continue with the stapler.



At the top and bottom of the strip, tuck the insulation back away from the vapor barrier. Staple the vapor barrier to the bottom face of the header and the top face of the sill. Check your work. The insulation must fill the framing members—no gaps or bulges—to be efficient. Use foil-faced tape to seal the joints.

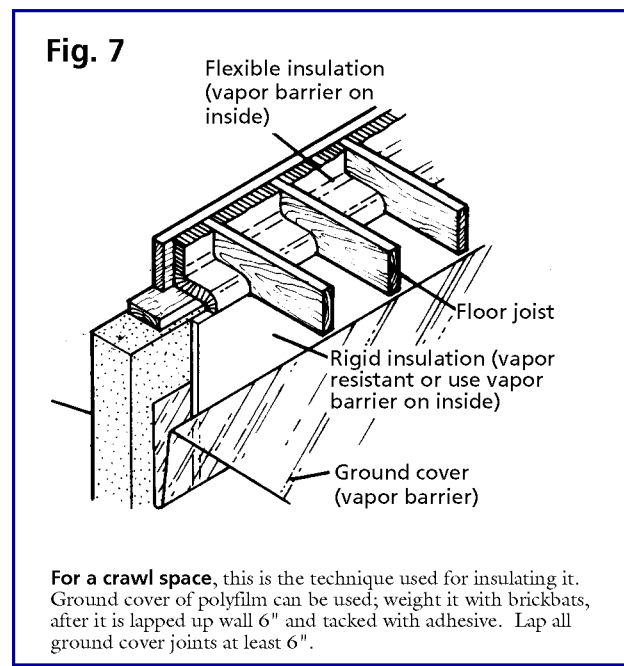
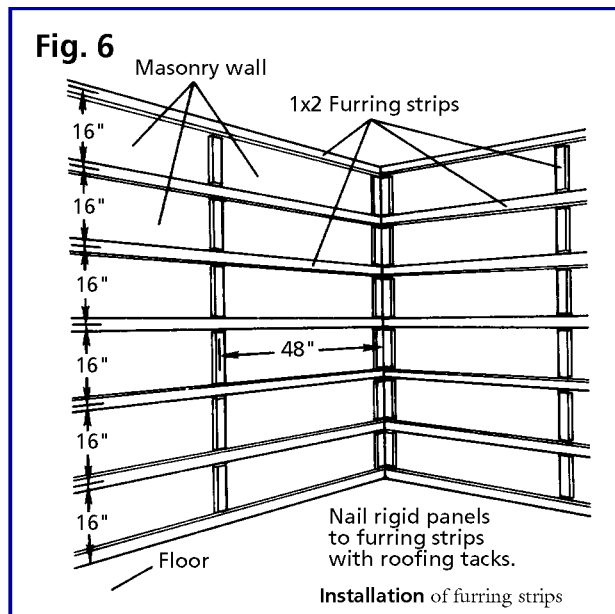
Around windows and doors, fill all cracks with insulation pressed into place (Fig. 5). Pack in the material so it is fairly “loose” to provide insulation qualities. Then seal it with strips of foil-faced tape, which serves as a vapor barrier. Staple the tape in place so it holds firmly.

CAUTION: Do not leave faced insulation or polyethylene exposed. The facings on standard kraft- and foil-faced insulations and polyethylene will burn and should be covered with an approved interior finish as required by local codes as soon as the insulation has been installed.

INSULATING BASEMENT WALLS

If the basement is bone dry you can insulate with sheets of styrofoam. Start in a corner. Apply the insulation panels to the wall with building adhesive. If you use a caulking gun, spread an adhesive ribbon down the edges of the panel and a couple of points at the center of it. Then stick the panel in place. You can cut the panels to fit with a razor knife. Make sure all joints are tight and all the wall surface is covered.

If you are paneling the wall, attach furring strips to the wall first (Fig. 6). Then stick the insulation panels between the furring. The panels are sized to go between framing 16" on center. If the wall covering will be wall paneling, give the backs of the panels a coat of penetrating wood sealer.



With fiberglass insulation, you have to build a false wall and hang the insulation between the framing. The false wall will butt against the foundation wall; it is a good idea to cover the foundation with polyfilm. Use building adhesive to stick on the polyfilm.

Nail the header of the false wall to the bottom edges of the floor joists. Fasten the sill to the floor with lead anchors and lag screws. However, we recommend using a nail gun. It will save you a lot of time and effort. If the basement is absolutely dry, you can stick down the sill with subfloor adhesive.

Check the framing for level and plumb. You may have to shim the 2X4s with either cedar shingles or wood shims. You can trim the excess shingles/shims later with a butt chisel.

If the basement walls are moist or wet, you must correct this situation before installing insulation. Sealants usually are adequate for moist walls. On wet walls, the correction almost always should be made to the exterior of the foundation. Check gutters and downspouts, too, to make sure they are working.

INSULATING FLOORS

Often the problem is an uninsulated floor above an unheated crawl space or basement. If you have a vented crawl space with insulated ducts and no pipes, the best course of action is to insulate the floor itself with 6 1/4", R-19 faced insulation. If there are pipes and uninsulated ducts in your crawl space, the better choice would be to insulate the walls of the crawl space (Fig. 7).