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Installing Ceiling Insulation

Inadequate insulation is the major cause of energy waste in the majority of American homes. People could save 20 to 30 percent of the energy used to heat their homes in winter and about 10 percent of the energy used to cool their homes in summer by adding enough insulation.

The amount of energy you can save depends on where you live, the size of your house and its construction. However, you can usually expect to pay for proper insulation in 3 to 5 years through energy savings.

Insulating the Uninsulated Ceiling

Batts or blankets are made of fibers woven into sheets for easy installation. The width of blankets and batts corresponds to standard stud spacings. Blankets are continuous rolls, which you hand-cut to a desired length. Batts are precut to 4- and 8-foot lengths.

All insulation is rated by its capacity to protect the temperature inside your home from extremes in temperature outside. An R-value tells you how effective an insulation is so you can purchase exactly the amount required to do a job. An insulating value of R-38 for ceilings is recommended by the Idaho Office of Energy.

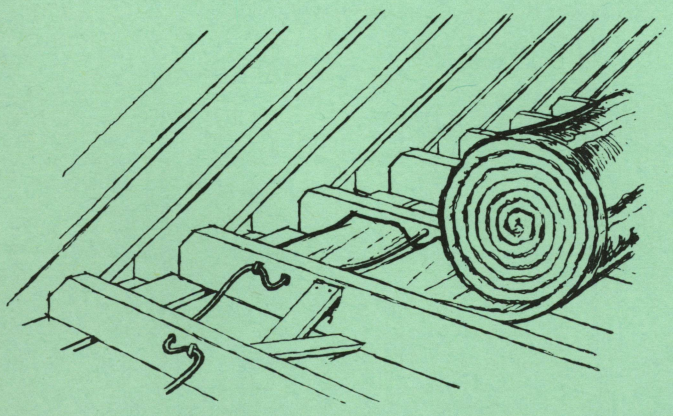

Fig. 1. Roll attic insulation between joists, beginning at the outer edges.

Lay the insulation between the attic joists with the vapor barrier facing down toward the rooms below (Fig. 1). Start from the outer edges of the attic and work toward the center. This allows you to do any cutting or fitting in the center where there is more headroom.

You don't have to staple the insulation between the joists; just push it down to the ceiling, smoothing out the vapor barrier against the ceiling and joists.

Where cross-bracing prevents you from getting the batt down to the ceiling, cut the batt and fit it tightly above and below the bracing.

Cover the ceiling as close to the eaves as possible, but . . .

- Do not cover eave vents or block venting space along the eave of the roof.
- Do not cover or allow the insulation to touch recessed lighting fixtures or exhaust fan motors.
- Do not overlook any areas where there are heated areas below.

Loose-fill insulation is made of material that can be poured into place. The R-values of loose fill from different manufacturers vary considerably per inch of thickness. Check the label on the bag to find out how many bags to buy and how thick to pour the loose fill to get an R-value of 38. The label will show the thickness in inches required to obtain R-38 and the number of square feet the contents will cover at that thickness.

In calculating the number of bags that you will need, remember that the joists take up about 10 percent of the attic area. So multiply the attic area by

0.9 to find the number of square feet you will be covering. A house with 1,000 square feet of attic would have 900 square feet of area to be insulated. If each bag you buy will cover 30 square feet at the required depth, you would need 30 bags to insulate the area.

Simply pour the loose-fill insulation from the bag into the space between the joists to the required level and smooth it out with a rake or flat board (Fig. 2). If parts of the attic are floored, you will have to push the insulation under the flooring. Cover all areas except the eave vents, recessed light fixtures and fan motors. These should be boxed off to keep them out of contact with insulation. If flooring covers them, the space in the floor above the recessed fixture should be cut out and a metal vent installed flush with the floor surface.

If you're adding blankets or batts to existing insulation, use insulation with a value of at least R-11. If available, use unfaced insulation, one with no vapor barrier. If the unfaced kind isn't available, be sure to peel off the vapor barrier to avoid trapping moisture in the existing insulation. Lay the insulation between the joists on top of the existing insulation.

When using bags of loose fill, pour it between the joists on top of the existing insulation until the total depth is at least 6 inches. Loose-fill insulation can be applied on top of any other type of batts, blankets or loose fill.

Fig. 2. Loose-fill insulation should be poured into place.

Blown fill is made up of unwoven fibers or **plastic foam** particles that are blown in with special pneumatic machinery by contractors. Blown fill can be applied to the same kind of attic areas as loose fill. Remember, however, that plastic insulation and improperly treated cellulose may have serious flammability characteristics. Urea-formaldehyde foam decomposes when exposed to air and should not be placed in "open" attics. It is also the only way of insulating between finished floors that overhang an outside area. It should be purchased with the same attention to its R-value as that given to purchases of loose fill.

Vapor Barriers

Vapor barriers should be used with all types of insulation. These barriers are simply special backing materials — usually paper, plastic or foil — that prevent the insulation and structural wood from dampening.

Batts and blankets can be purchased with vapor barriers already attached. For loose-fill insulation, install plastic sheeting first (next to the interior) and pour the insulation on top. In places where a vapor barrier cannot be installed — as in finished walls being filled with "blown-in" insulation — the interior surface of the wall can be made vapor resistant with two coats of an oil-based paint or with wallpaper that contains plastic.

No matter what form of insulation or what kind of vapor barrier is used, remember to put the vapor barrier on the warm, or "lived-in" side of the space to be insulated (Fig. 3). This keeps the moisture in the warm indoor air from reaching the insulation. The objective is to avoid trapping moisture that can cause structural and esthetic damage.

Ventilation

Adequate ventilation is the second aspect of controlling moisture. No matter how well a vapor barrier is installed, some moisture from inside the house will permeate the insulation. To avoid having

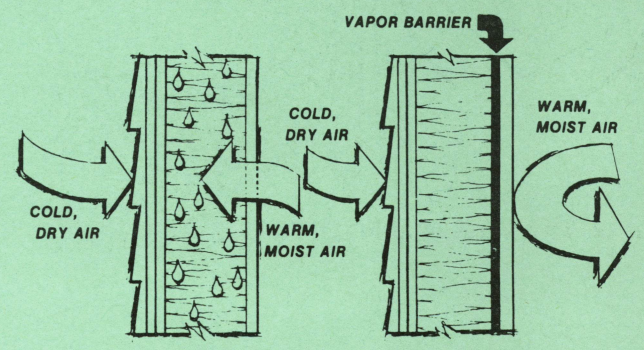

Fig. 3. A vapor barrier protects insulation from condensation.

this moisture settle in the insulation and the surrounding wood, the exterior of the insulation (upper side in the attic) must allow moisture that does permeate to escape outward.

A well-insulated attic must be well-ventilated to prevent moisture accumulation (Fig. 4). Attic vents should be placed so that air can flow freely into one vent and out the other, thus providing good cross ventilation. A good rule of thumb for attic ventilation is to provide 1 square foot of unobstructed ventilation opening for each 300 square feet of attic floor area. Never cover or block vents with insulation. Care should be taken with loose-fill insulation to make sure that it doesn't shift into vents or eaves (Fig. 5).

Take Safety Precautions

If you do the job yourself, observe a few safety measures. Handling insulation can temporarily irritate your skin, so keep your shirt sleeves rolled down and buttoned, and wear a pair of work gloves.

If you're using loose-fill, cover your nose and mouth with a piece of gauze or a handkerchief to avoid breathing flying dust. Never wear contact lenses when handling insulation.

Don't attempt to work in the attic on a hot sunny day. Temperatures can reach 140° F. Work in the morning or on a cool, cloudy day.

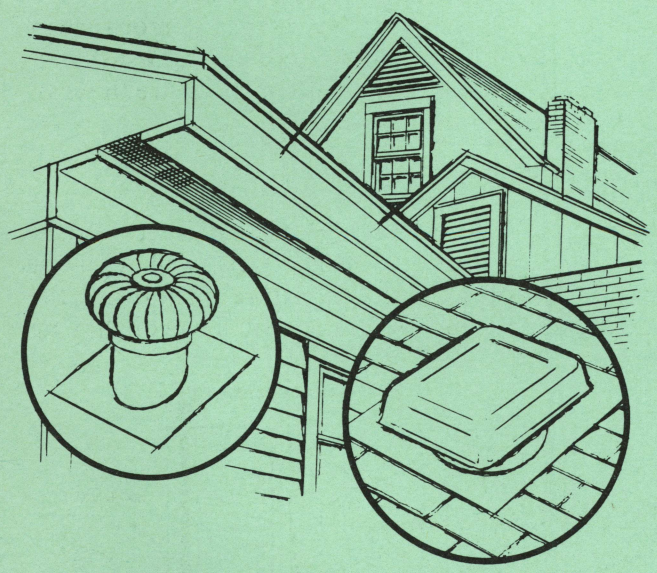

Fig. 4. Two kinds of attic ventilation systems.

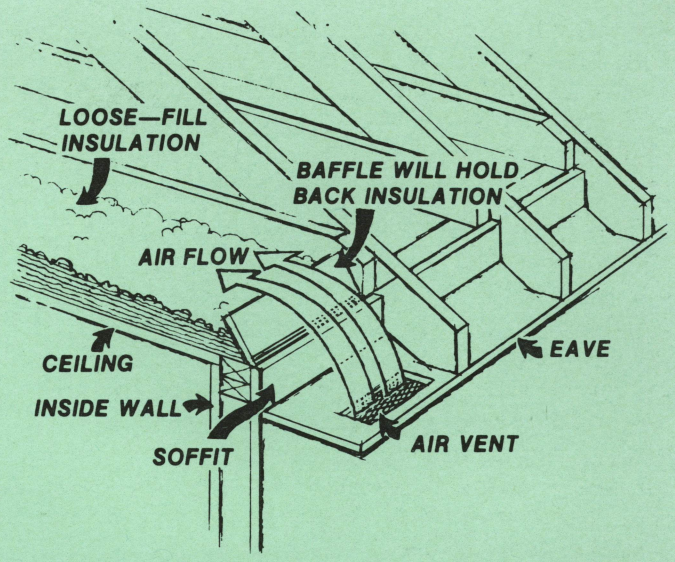

Fig. 5. Use baffles to hold loose-fill insulation away from air vents.

Finally, watch out for any nails that stick through the roof sheathing above your head.

After you have finished the job, take a cold shower. The cold water closes your pores and washes off the insulation, preventing it from getting into the skin.

Tools for the Job

Use these to make the job easier:

1. A sharp knife or serrated kitchen knife to cut blankets or batts. A pair of scissors with long blades work equally well.
2. A straight edge to cut along. A length of board will do the trick.
3. A rake, bamboo is best, to spread out loose-fill insulation or a metal rake to push or pull blankets or batts to edge of the eaves.
4. A sheet of ¾-inch plywood to lay across the joists to walk on. When in the attic, don't step between the joists or your foot will go through the ceiling.
5. A portable light with plenty of extension cord to use if your attic isn't lighted or if there are no windows.

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*Adapted from U.S.D.A. Fact Sheet 2-3-10. Recommended to Idaho residents by Shirley Nilsson, Extension housing and equipment specialist, and Roy Taylor, Extension agricultural engineer, both at the University of Idaho, Moscow.

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