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Energy Sense: Home Insulating

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ENERGY SENSE:

home insulating



Cooperative Extension Service
South Dakota State University
U.S. Department of Agriculture

home insulating

Thermal insulation is a material installed in a structure to reduce heat transfer. Because it forms a protective blanket around the living area of a home, insulation is needed around all areas heated in winter and cooled in summer.

Adding insulation to an existing structure is sometimes difficult, but the time to start is now. Delay means continuing high costs for heating and cooling.

A homeowner planning to install insulation should be familiar with the effects of excess moisture in a home and should take steps to alleviate them. Moisture breaks down

insulation. Vapor barriers and ventilation restrict and reduce excess moisture; they go hand-in-hand with properly installed insulation.

Vapor Barriers

A vapor barrier restricts the passage of moisture through walls and ceilings. A barrier is necessary to protect a structure against mildew, rot, peeling paint, and a breakdown of insulation. Commonly used vapor barrier materials are kraft paper, aluminum foil, and plastic sheeting.

A vapor barrier is always placed next to the living area or against the warm side of a wall,

ceiling, or floor. In order to be most effective, the barrier must be continuous and must be in contact with the warm side of the area being insulated.

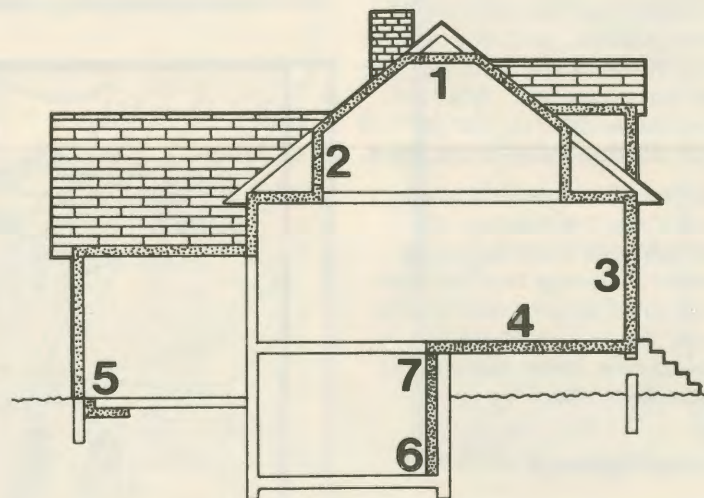
DO NOT INSTALL A VAPOR BARRIER BETWEEN LAYERS OF INSULATION.

Insulation "R" Value

The following chart shows the minimum R-Values recommended for homes in the northern part of the United States. Insulation can be combined to achieve a desired R-Value. For example, rolls of R-19 and R-11 can be used together to reach a total R-Value of 30. If two

Where to Insulate a Home

1. Ceilings with cold spaces above
2. Rafters and "knee" walls of a finished attic
3. Exterior walls; walls between heated and unheated spaces; dormer walls
4. Floors over outside or unheated spaces
5. Perimeter of a concrete floor slab close to grade level
6. Walls of finished or heated basement
7. Top of foundation or basement wall



layers are needed, strip the vapor barrier from the second layer and place it at right angles to the first. Insulation without vapor barriers is available.

Insulation	Where Used
R-11	walls, including basement; crawl spaces; heating ducts
R-13	floors over unheated spaces; walls in very cold climates; heating ducts
R-19	ceilings; floors in very cold climates
R-30	ceilings (if walls are poorly insulated)

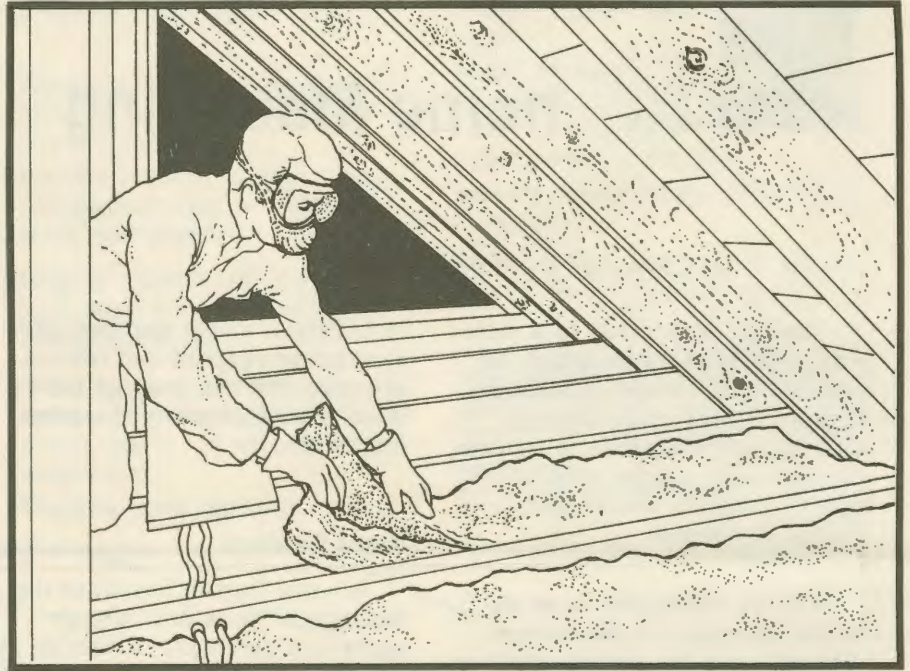
Quantity of Material Needed

To determine the amount of material needed, multiply in feet the length times the width of the area to be insulated. Also determine the width (15" or 23") if batts or blankets are to be used.

Labels on insulation wrappers indicate the number of square feet one bundle or bag will cover. Divide that number into the total square feet of the area you plan to insulate to determine how many bundles or bags you will need.

Attics and Ceilings

Unfinished attic floors can be insulated with batt, blanket or loose-fill material. Before you begin insulating, check for roof leaks and make necessary repairs. Also, caulk all openings where ducts, pipes, or wires penetrate the floor.



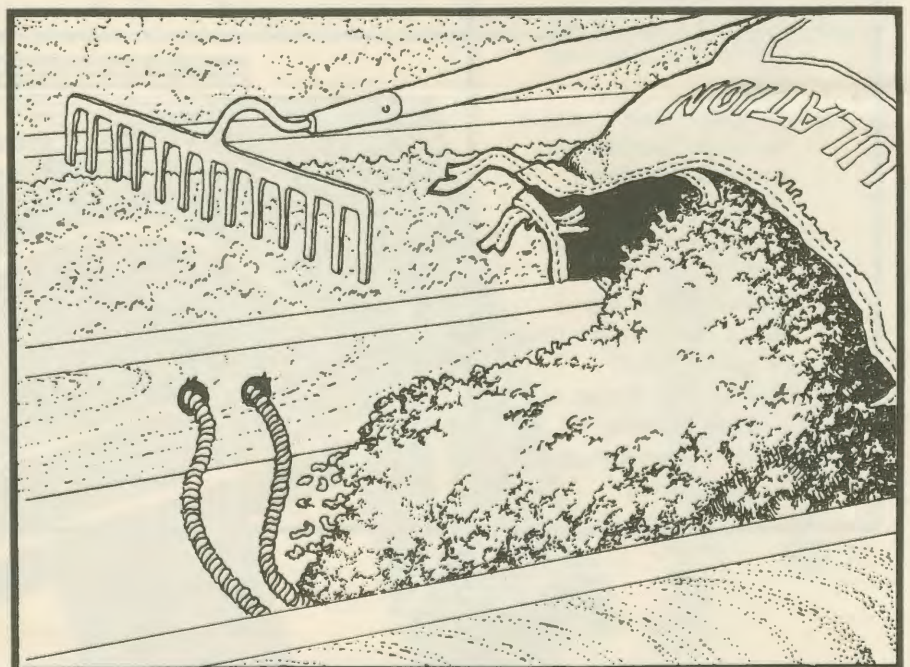
Press—but do not crush—the insulation between the joists or trusses. Begin at the outer edge and work toward the center where it is easier to cut and fit. Cover the top plate, but leave a 3" ventilation path around the attic perimeter. Don't leave gaps; butt the material at trusses or cross bracing.

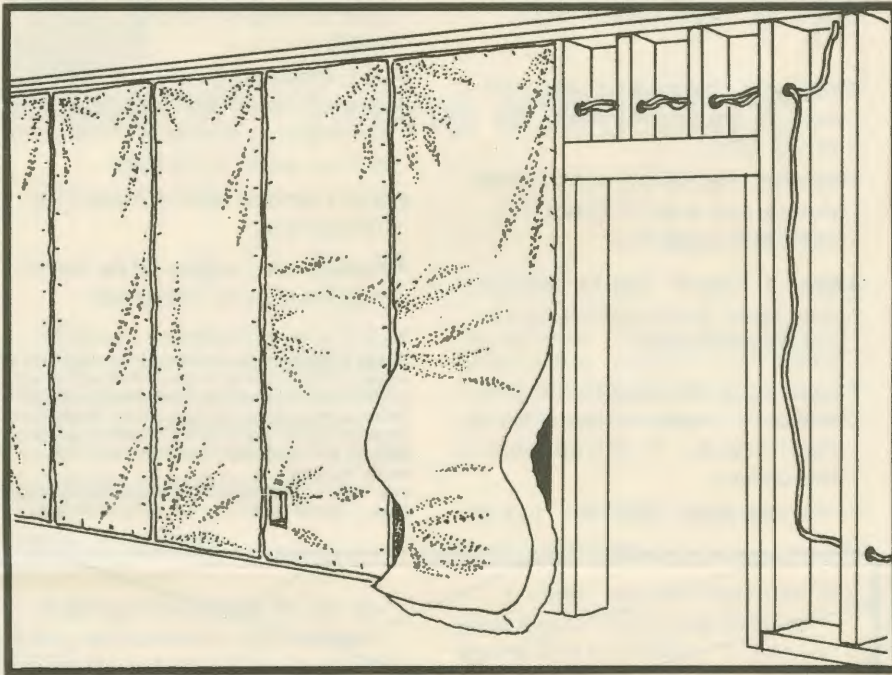
Use unfaced material to insulate the space between the chimney and wood framing.

Insulate heating ducts—first

making sure seams are sealed—and water pipes. If ducts are used for heating and air conditioning, keep the vapor barrier on the outside of the insulation, otherwise a barrier is unnecessary.

If using loose-fill, maintain a consistent density. Do not crush the material: use a rake or board to level it. Use a baffle—a piece of batt insulation works well—to keep insulation away from eave vents and ven-





open sidewalls. Cut the blankets slightly longer than the height of the wall so they can be tucked at the top and bottom. Press the insulation between the studs. The insulating material should touch the siding; the vapor barrier should face the heated side of the wall. Working from the top, staple the binding of the insulation to the face of the studs at 8" intervals.

Work insulation behind outlet boxes, ducts, and pipes. Use small pieces to get around and behind window and door frames, sills, and header joists. These areas should then be covered with a vapor barrier.

If unfaced blankets are used, cover the material after installation with 4-mil plastic sheeting. Cover the full wall and staple at the top, bottom, and along the studs. Cut out openings for windows, doors, and outlet boxes after the vapor barrier is secured.

tilation path.

Under Floors

Insulation is needed under floors if the space below is unheated. Faced batt insulation is the easiest material to work with in this situation. The vapor barrier should face up; a ventilation space should be left between the vapor barrier and the floor.

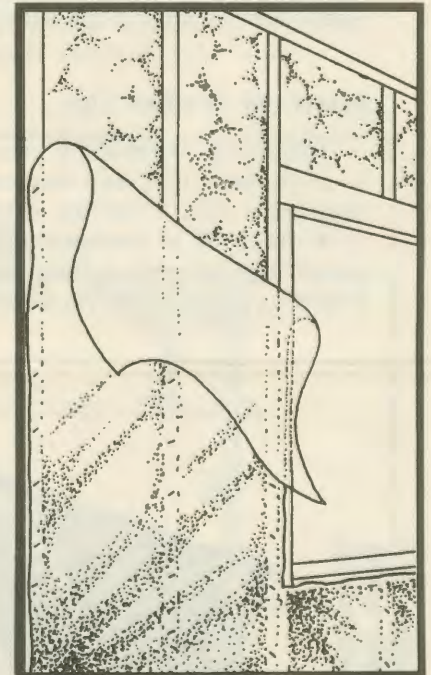
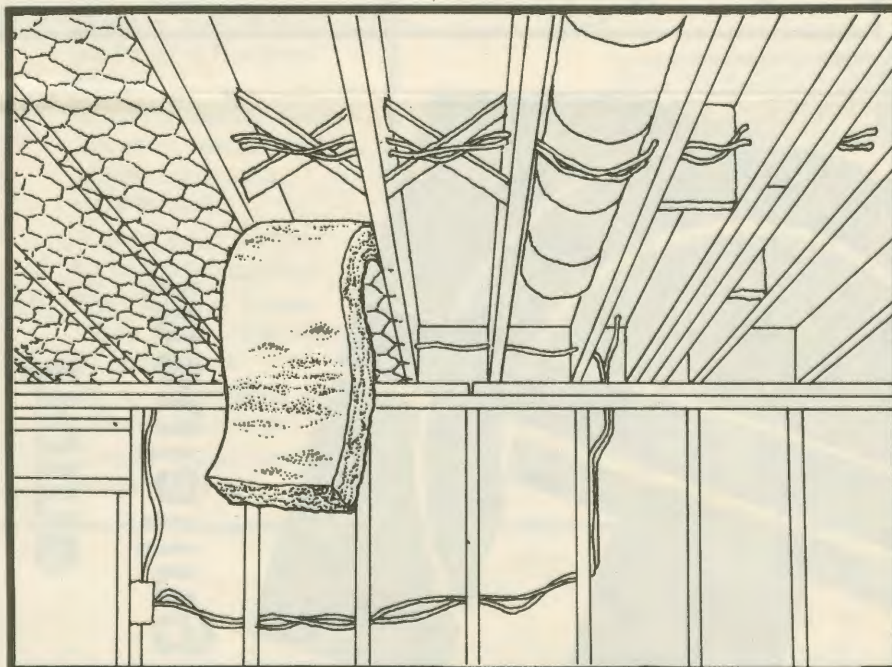
Keep the insulation in place

by lacing wire between the bottom of joists or staple short sections of chicken wire across the joists and slide the insulation on top of the wire. Don't leave gaps!

Cover ducts and water pipes as described in the section on attic and ceiling insulation.

Open Frame Walls

Batts or blankets are the usual choices of the do-it-yourselfer who wants to insulate



Masonry walls can be insulated in much the same way as frame walls. Nail treated furring strips 16" or 24" on center to the wall and proceed as directed in the section on open frame walls.

Crawl Spaces

Follow the directions for installing insulation under floors for the overhead part of the crawl space.

If joists run parallel with the wall, cut the insulation to cover the height of the wall and 2' of the floor. Use nailing strips to attach the insulation to the band joist.

If joists run at right angles to the wall, nail the insulation to the sill plate. Fill the area between the sill plate and the subfloor with short pieces of insulation.

After the insulation is in place, run a sheet of 6-mil plastic across the ground or floor. Tuck it under the insulation so it touches the wall. Tape the joints or lap them.

As a last step, weight the insulation around the perimeter of the crawl space with 2x4 lumber or rocks. Patch any tears or holes punched in the vapor barrier during installation.

Safety and Comfort Tips

Insulating material is usually dusty and itchy and may cause temporary skin irritation; often it is installed in cramped and sometimes hazardous locations. Protect yourself and your home

while installing insulation by following these safety tips:

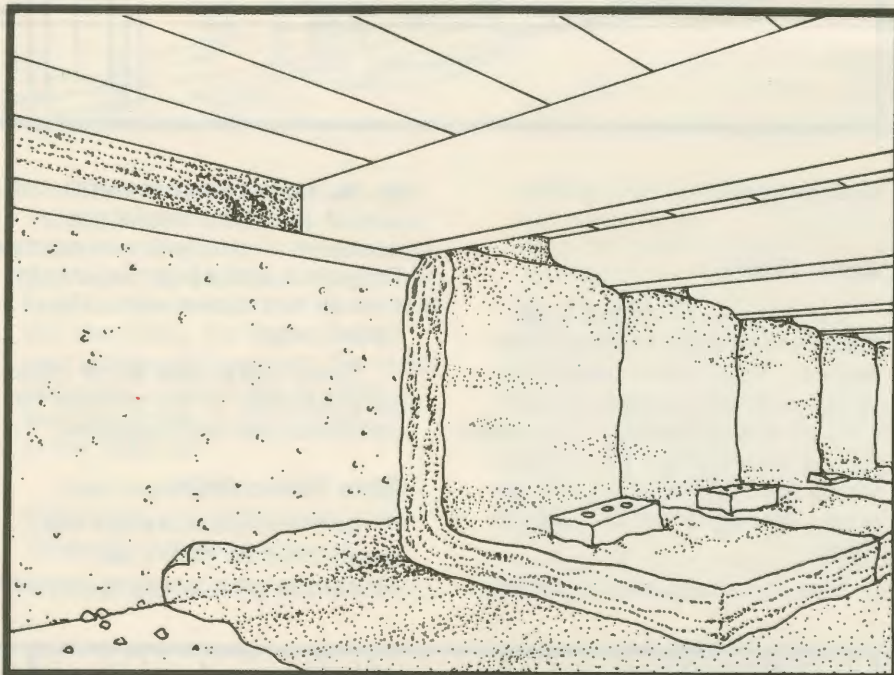
- Wear old, loose clothing and wash it separately when the job is done.
- Handle insulation with rubber gloves and wear a breathing mask and goggles.
- Wear a "hard" hat to protect your head from roofing nails and obstructions.
- Tape foam rubber around your knees if insulating an attic or crawl space. It will lessen discomfort.
- Provide good lighting: use a

"trouble" or spotlight and have a long extension cord handy.

- Use temporary flooring while insulating an unfinished attic. The ceiling below will not support an adult's weight.
- Don't smoke while installing insulation.
- Shower thoroughly after handling insulation material.

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