responsiblenergy

how to insulate your attic

taking responsibility

As an individual, your efficient use of energy brings benefits such as lower bills, improved comfort levels in your home and a reduced personal impact on the environment.

Acting together, our individual choices add up—for the benefit of our community, our environment and our energy future. That's the power of working together.

As your community energy company, we are committed to sharing our experience and energy expertise. You can always contact us for:

- Answers to your energy questions.
- Energy efficiency information and advice.
- Help in evaluating energy-saving options.
- Assistance in finding energy-efficient products.

Take control of your energy costs

Energy to heat and cool your home is usually the largest portion of your utility bill. Control these costs by sealing and insulating your attic to recommended levels.

If your home has a flat roof, mansard roof, finished attic, cathedral ceiling or an unfinished attic with a permanent floor, you may want to hire a contractor. Contractors buy insulation in quantity, so they are often competitive with do-it-yourself costs.

Table of Contents

Do you need more attic insulation?

If attic insulation is more than 6 inches deep, other energy improvements are usually a better investment. Seal major leaks or insulate empty walls in homes with more than 6 inches of attic insulation. To decide whether more attic insulation is necessary, see page 3 or call MGE's Home Energy Line at 252-7117.

Common types of insulation

The common types of insulation used in our area are:

- Fiberglass or mineral wool batts and rolls.
- Medium- or high-density fiberglass batts.
- Fiberglass, mineral wool, cellulose or vermiculite loose fill.

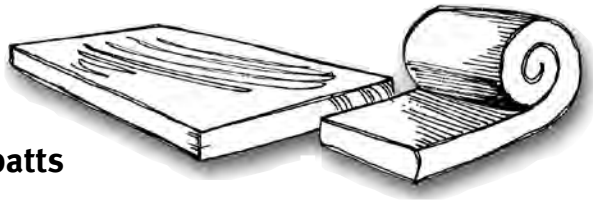


Figure 1 - Fiberglass batt and roll

Standard-density batts and rolls

Batts and rolls are made of fiberglass or mineral wool (see Figure 1). They are available in 15- and 23-inch widths to fit standard 16- or 24-inch joist spacing. Rolls are normally 16 to 100 feet in length. Batts are precut to specific lengths.

Both fiberglass and mineral wool batts are fire and moisture resistant. They are available with or without a vapor barrier facing. The facing is made of foil or kraft paper. Some batts are wrapped in plastic for easy handling. This plastic has small holes, so it is not a vapor barrier.

Medium- and high-density batts

Medium- and high-density fiberglass batts offer more insulation value for a given thickness than standard fiberglass. They are often used in cathedral ceilings and sidewalls.

Loose fill

Loose fill insulation comes packaged in bags (see Figure 2).

Loose fill is either blown with a machine or poured from the bag directly into the attic. Blowing in insulation is faster and offers better coverage. You can rent equipment to blow in loose fill, but most people hire an insulation contractor. Loose fill is better than rolls or batts for attics with irregular joist spacing or with many obstructions.

Figure 2 - Loose-fill insulation

How much insulation is needed?

Different insulation materials have different R-values per inch of depth, so it takes different depths of each material to reach the suggested R-value level.

R-value is a measure of the insulation's ability to resist heat flow. The higher the R-value, the greater the insulating power.

Insulation guidelines	
Thickness of your existing insulation	Add this amount of insulation to achieve R-38. (Assuming R-3 per inch for existing insulation.)
None	R-38
2 inches	R-32
4 inches	R-26
8 inches*	R-14
12 inches or more	No additional insulation is necessary.

**Adding insulation may not be cost effective if existing insulation is deeper than 6 inches.*

The recommended R-value for attics in new homes is 44 to 50. For attics in existing homes, the recommended level is at least R-38. Use the chart on page 3 to estimate how much insulation to add to reach R-38.

Preparing your attic for insulation

Install temporary flooring and lights

This step makes your work easier. Lay boards across the joists for convenient walkways and to hold tools and materials. Install temporary lighting in the attic (see Figure 3).

Figure 3 - Install temporary floor and lighting in the attic.

Seal air leaks

Insulation effectiveness will be reduced if warm air continues to leak into the attic (see Figure

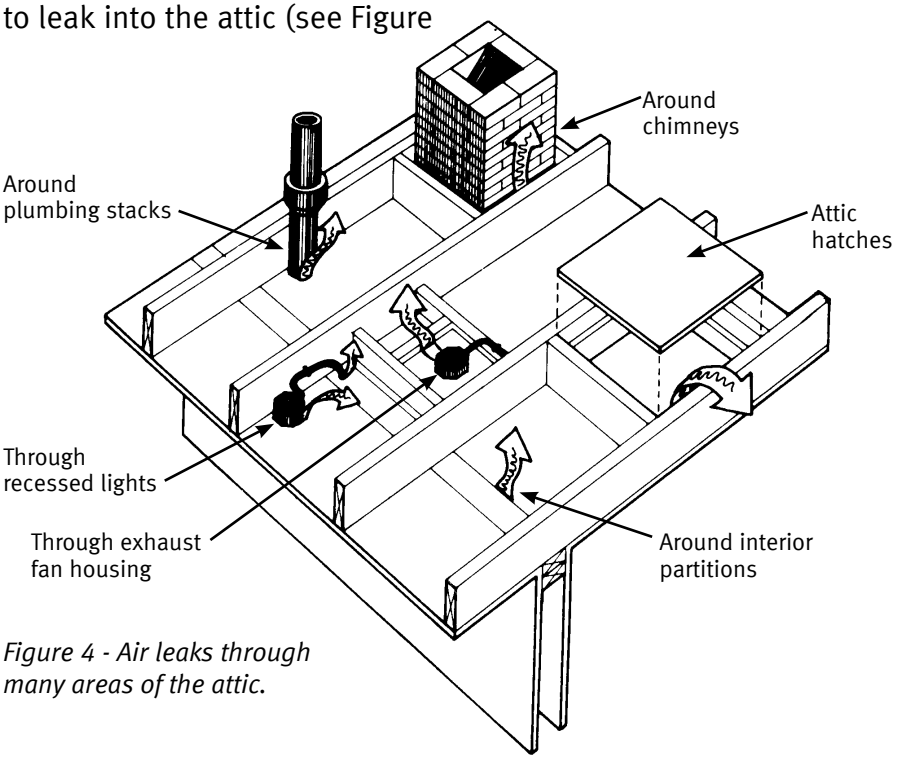


Figure 4 - Air leaks through many areas of the attic.

4). Air leaks can cause ice dams, too. Detecting and sealing air leaks is best accomplished by a contractor using a blower door. This device simulates a 20-mph wind on all sides of the house at once. It allows contractors to find and seal air leaks more effectively.

Areas to check and repair:

- **Attic access panels.** Insulate with a minimum of R-20 rigid board insulation. Add weather stripping and secure panel with latches (see Figure 5).
- **Walk-up attic door.** Cover the unheated side with fire code-approved insulation. Weather strip the door and add a door sweep (see Figure 6).

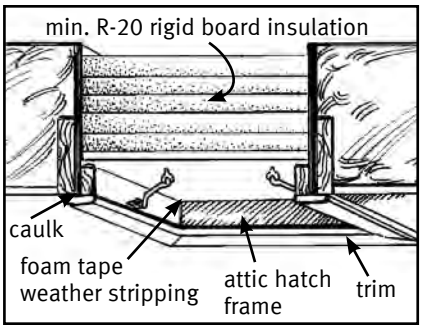


Figure 5 - Attic access panel

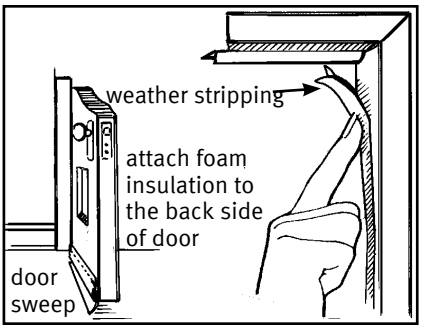


Figure 6 - Walk-up attic door

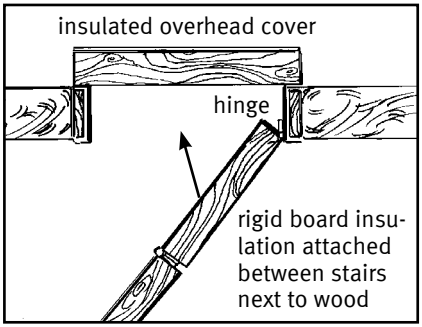


Figure 7 - Pull-down attic stairs

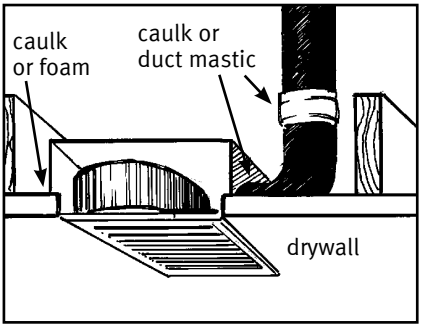


Figure 8 - Exhaust fan

- **Pull-down stairs.** Weather strip and install an airtight insulated cover. Cover should be hinged or removable (see Figure 7).
- **Exhaust fans.** Duct the fan to the outside. Use a tightly constructed box to cover fan housing on attic side. Seal around the duct where it exits the box. Seal the perimeter of the box to the drywall on attic side (see Figure 8).
- **Recessed lights.** Install blocking to box off light housings. Seal the blocking to the ceiling (see Figure 9).

Keep insulation 3 inches away from standard-recessed light fixtures. No insulation can be placed on top of standard-recessed fixtures. Failure to follow these instructions can create a fire hazard. This does not apply for fixtures that are IC (insulation contact) rated.

Better yet, replace older recessed lights with airtight fixtures or ceiling-mounted lights.

- **Soffits, bulkheads and dropped ceilings.** Cover openings into attic area with plywood and seal to the attic side of the ceiling (see Figure 10).

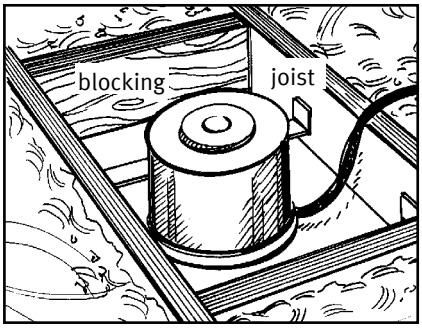


Figure 9 - Recessed light

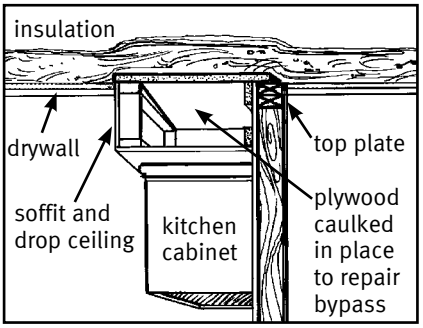


Figure 10 - Soffit areas

- **Chimneys.** Most newer homes have metal chimneys. The collar around this type of chimney may be loose or may not cover the entire opening. Repair the collar as necessary, and seal around the chimney and framing with high-temperature sealant. Older homes may have an open gap between the brick chimney and the wood framing (see Figure 11).
- **Tops of interior walls.** Use long-life caulk to seal the smaller gaps and holes; expanding foam or strips of rigid board insulation for the larger gaps (see Figure 12).
- **Plumbing vent stacks.** Spray gap with an expanding foam sealant.

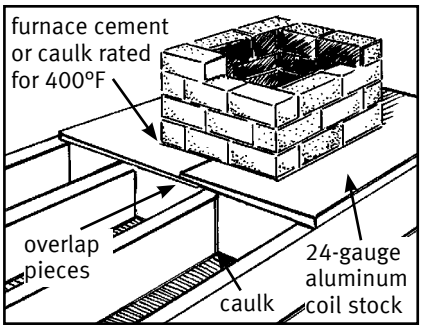


Figure 11 - Chimney

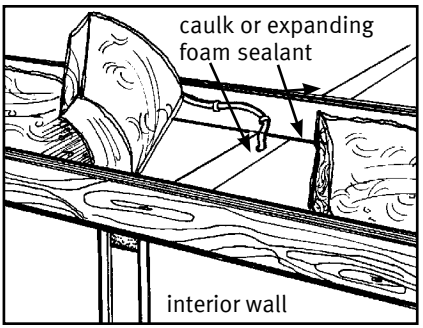


Figure 12 - Tops of interior walls

Allow for ventilation

Make sure insulation does not block soffit vents.

Attic ventilation:

- Allows moisture to escape. Moisture buildup can damage your home and ruin insulation.
- Helps prevent ice dams. Warm spots on the roof can melt snow. The melted snow may refreeze to form ice dams at the eaves. Ice dams can force water under shingles, damaging the roof and walls.

Proper attic ventilation requires a balance of intake and exhaust openings. At least half the venting should be in the soffits to draw air into the attic. Gable or roof area vents allow air to escape (see Figure 13).

Ventilation chutes allow installation of adequate insulation at the edge of the attic (see Figure 14).

MGE does not recommend powered attic fans or solar-powered ones. They can depressurize the attic and create moisture problems. Natural passive vents cause fewer problems.

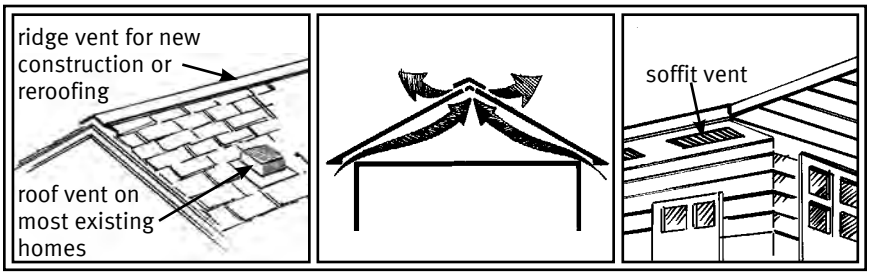


Figure 13 - Types of attic ventilation

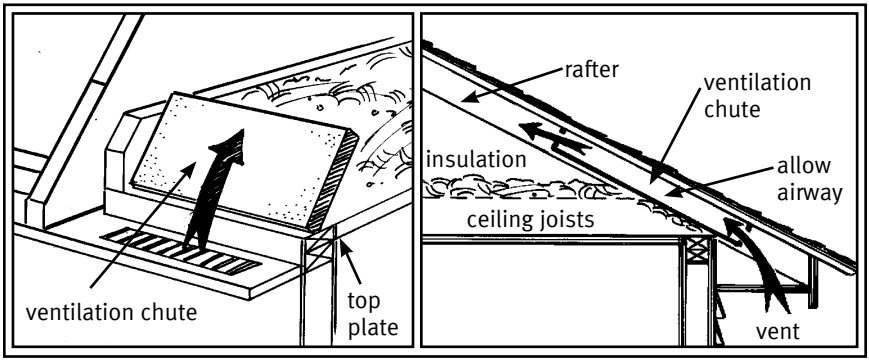


Figure 14 - Install ventilation chutes between the rafters to avoid blocking soffit vents with loose-fill insulation.

Check for water leaks

Check the attic ceiling for water stains or marks (see Figure 15)—they indicate roof leaks or lack of ventilation. Make repairs before you insulate. Wet insulation is ineffective and can damage your home.

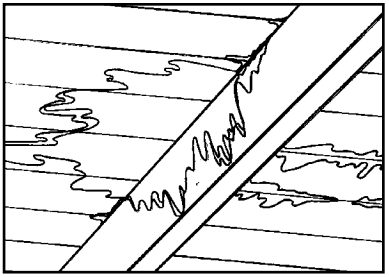


Figure 15 - Check for water stains or marks on the attic ceiling.

How to install attic insulation

Unfloored attics

Batt or roll insulation

Lay unfaced batts or rolls between joists. Cut them only when necessary. Butt pieces together tightly. A 1-inch gap can reduce R-value by 20%.

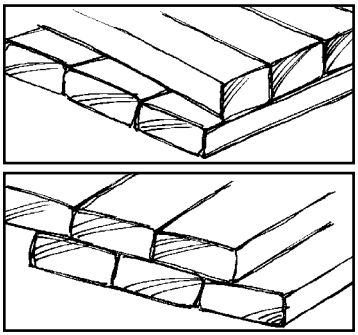


Figure 16 - For two or more layers of insulation, stagger the seams or place the top layer perpendicular to the bottom layer.

Slide insulation under wiring if possible, taking care not to disturb connections. Cut to fit snugly around cross braces. For two layers, lay the second layer (without a vapor barrier) perpendicular to the first (see Figure 16).

Loose-fill insulation

Pour or blow in the loose-fill insulation according to directions on the bag. Use the coverage chart on the bag to achieve the desired R-value. To ensure uniform coverage, make sure you've used one-quarter of the required bags when you've finished one-quarter of the attic, half the bags when you've done half the attic, etc. Fill all spaces, but maintain at least a 3-inch clearance from heat sources. Avoid blocking ventilation.

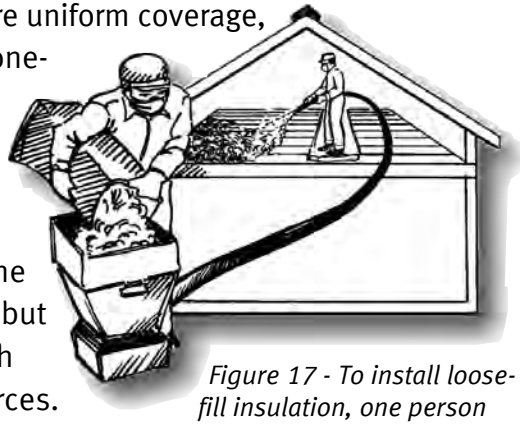


Figure 17 - To install loose-fill insulation, one person fills the blowing machine while the other directs the insulation into the attic.

Floored attics

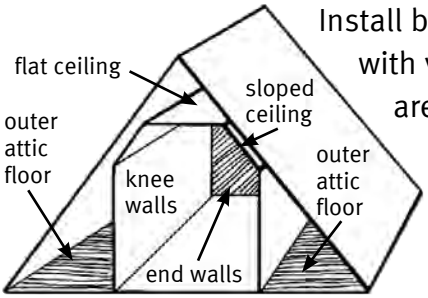
Blown-in insulation is best for insulating beneath an existing attic floor. Once the insulation is under the floor, you can add more insulation on top of the floor. You may want to hire a contractor for this project.

Installation process

A blower forces the insulation through a flexible hose and into the spaces between the attic floor and the ceiling of the rooms below. Before starting the machine, locate the cross bracing between the joists in the attic. Remove the floorboards above the ceiling bracing. Locate all recessed lights and other heat producers that are in the ceiling below (see Figure 9). Place blocking around these electrical fixtures. Insulation is blown under the floorboards on each side of the cross bracing and electrical guard boxes.

Story-and-a-half attics

Blow insulation into the space above the flat ceiling, onto the floor of the outer attic space and sloped ceiling of the finished space (see Figure 18).



Install batts on the back of kneewalls with vapor barrier toward heated area.

Seal air leaks between heated and unheated space before you insulate.

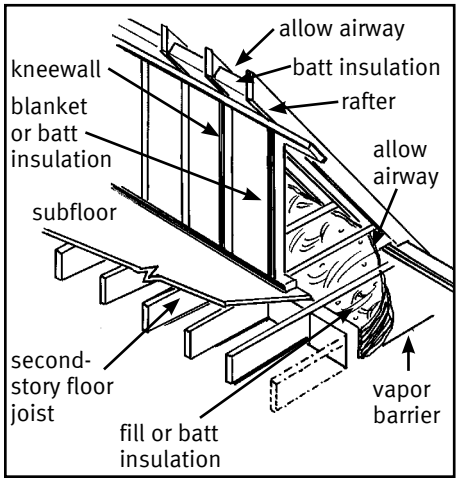
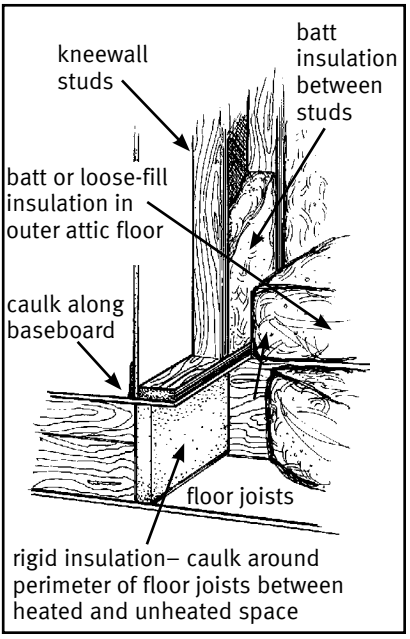


Figure 18 - Areas that need to be insulated in a story-and-a-half attic.



Safety tips

- Follow the manufacturer's directions for all products.
- Before insulating, ensure electrical connections and wires are in good condition. An electrician is best qualified to do this.
- Consult with an electrician if knob-and-tube wiring is present.
- Treat electrical wiring with care. Do not try to pull or bend it.
- Use temporary lighting and flooring.
- Use a mask to prevent inhalation of insulation fibers. Vermiculite insulation may contain asbestos. Don't disturb it!
- Watch out for nails protruding through the roof.
- Keep cellulose 3 inches away from chimneys.
- Keep insulation at least 3 inches away from recessed light fixtures and other heat sources.
- Do not cover or pack insulation around bare stove pipes, electrical fixtures, motors or any heat-producing equipment.
- Make sure the insulation meets either federal or ASTM (American Society for Testing and Materials) specifications.

Resources

Focus on Energy offers cash rewards for insulation through their "Home Performance with ENERGY STAR®" program. Call 1-800-762-7077 before you insulate or visit focusonenergy.org.

ENERGY STAR® guide to air sealing: http://tinyurl.com/da73fp

Vermiculite Safety: Wisconsin Asbestos line 261-6876.

Pre-made products to insulate your attic access include Battic Door, Attic Tent, Therma Dome, etc. Search online or call MGE's Home Energy Line at 608-252-7117.

listening. learning.

MGE takes responsibility to provide information and education to serve our customers and stakeholders. We educate customers today to help inform their decision making. We educate tomorrow's stakeholders so they can help plan our energy future.

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responsibleducation

In the winter, turn down your thermostat while asleep or at work. Each degree can save 1% on your heating bill. If we all set-back 1˚, we'll save enough gas for 3,100 homes.

Working together we can make a difference.

Contact us for information about:

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- Insulating/Weatherizing.
- Lighting.
- Windows/Doors.
- Appliances.
- Water heating.

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