



## Add Attic Insulation

**Task:** Add insulation to attic areas to appropriate levels. *Hint: To determine how much insulation you should have, try the Zip Code program: <http://www.ornl.gov/~roofs/Zip/ZipHome.html>*

Unless your home was constructed with special attention to energy efficiency, adding insulation will probably reduce your utility bills. Much of the existing housing stock in the United States was not insulated to the levels used today. Older homes are likely to use more energy than newer homes, leading to higher heating and air-conditioning bills.  
([http://www.ornl.gov/sci/roofs+walls/insulation/ins\\_06.html](http://www.ornl.gov/sci/roofs+walls/insulation/ins_06.html))

**Advanced:** Improve wall or basement insulation, windows, or other problem area in your home.

*The following is excerpted from the US Department of Energy website:*

[http://www.energysavers.gov/your\\_home/insulation\\_airsealing/index.cfm/mytopic=11390](http://www.energysavers.gov/your_home/insulation_airsealing/index.cfm/mytopic=11390)

### Before installing any type of insulation in your attic, follow these steps:

- Seal all attic-to-home air leaks. Most insulation does not stop airflow.
  - Duct exhaust fans 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.
  - Cover openings—such as dropped ceilings, soffits, and bulkheads—into attic area with plywood and seal to the attic side of the ceiling.
  - Seal around chimney and framing with a high-temperature [caulk](#) or furnace cement.
  - At the tops of interior walls, use long-life caulk to seal the smaller gaps and holes. Use expanding [foam](#) or strips of [rigid foam board insulation](#) for the larger gaps.
- Install blocking (metal flashing) to maintain fire-safety clearance requirements (usually 3 inches) for heat-producing equipment found in an attic, such as flues, chimneys, exhaust fans, and light housings/fixtures unless the light fixtures are IC (insulation contact) rated. IC-rated lights are airtight and can be covered with insulation.
- Make sure insulation doesn't block soffit vents to allow for attic ventilation.
- Check the attic ceiling for water stains or marks. They indicate roof leaks or lack of ventilation. Make repairs before you insulate. Wet insulation is ineffective and can damage your home.

Also [insulate and air seal your attic access](#) if it's located in a conditioned part of the house.

You'll want to properly [insulate and air seal any knee walls](#)—vertical walls with attic space directly behind them—in your home as well.

Finally, if you're constructing a new home or remodeling, make sure any attic decking, which provides additional storage space or a platform for an HVAC unit or hot water tank, is raised above the ceiling joists to ensure proper insulation depth. The decking then should be installed securely to the top of the raised lumber after the insulation has been installed.

### Adding Insulation to an Existing Home

Unless your home was specially constructed for energy efficiency, you can usually reduce your energy bills

by adding more insulation. Many older homes have less insulation than homes built today, but adding insulation to a newer home may also pay for itself within a few years.

To determine whether you should add insulation, you first need to find out how much insulation you already have in your home and [where](#).

A qualified home energy auditor will include an insulation check as a routine part of a whole-house [energy assessment](#). An energy assessment, also known as a home energy audit, will also help identify areas of your home that are in need of [air sealing](#). (Before you insulate, you should make sure that your home is properly air sealed.)

If you don't want an energy assessment, you need to find out the following:

- Where your home is, isn't, and/or should be insulated
- What [type of insulation](#) you have
- The [R-value](#) and the thickness or depth (inches) of the insulation you have.

If you live in a newer house, you can probably find out this information from the builder. If you live in an older house, you'll need to inspect the insulation yourself if you don't want an energy assessment.

### **Inspecting and Evaluating Your Insulation**

- Check the [attic](#), [walls](#) and floors adjacent to an unheated space, like a [garage](#) or [basement](#). The structural elements are usually exposed in these areas, which makes it easy to see what type of insulation you have and to measure its depth or thickness (inches).
- Inspect the exterior walls using an electrical outlet:
  1. Turn off the power to the outlet.
  2. Remove the outlet cover and shine a flashlight into the crack around the outlet box. You should be able to see if there is insulation in the wall and possibly how thick it is.
  3. Pull out a small amount of insulation if needed to help determine the type of insulation.
  4. Check outlets on the first and upper floors, if any, and in old and new parts of a house. Just because you find insulation in one wall doesn't mean that it's everywhere in the house.
- Inspect and measure the thickness (inches) of any insulation in unfinished basement ceilings and walls, or above [crawl spaces](#). If the crawl space isn't ventilated, it may have insulation in the perimeter wall. If your house is relatively new, it may have been built with insulation outside the basement or [foundation](#) walls. If so, the insulation in these spaces won't be visible. The builder or the original homeowner might be able to tell you if exterior insulation was used.

Once you've determined the type of insulation you have in these areas and its thickness (inches), see the U.S. Department of Energy's online Insulation Fact Sheet for how to [determine the R-values of insulation previously installed](#) in your home.

### **Additional information on adding attic insulation:**

- [http://www.energysavers.gov/your\\_home/insulation\\_airsealing/index.cfm/mytopic=11390](http://www.energysavers.gov/your_home/insulation_airsealing/index.cfm/mytopic=11390)
- [http://www.ornl.gov/sci/roofs+walls/insulation/ins\\_06.html](http://www.ornl.gov/sci/roofs+walls/insulation/ins_06.html)
- [http://www.energysavers.gov/your\\_home/insulation\\_airsealing/index.cfm/mytopic=11350](http://www.energysavers.gov/your_home/insulation_airsealing/index.cfm/mytopic=11350)



## Seal Large Air Leaks

**Task:** Stop air leaks with caulking, foam and weatherstripping.

A house with thermal leakage is like a ship with a small hole in the bottom. Some might decide to ignore the hole and instead bail a little every morning, but the wise person realizes that laboring a little bit every day will eventually waste more energy than putting in one day of work.

(<http://planetgreen.discovery.com/home-garden/sealing-thermal-envelope.html>)

**Advanced:** Improve insulation, windows, or other problem area in your home.

**Tips for sealing air leaks:** *Note: for comprehensive advice on sealing air leaks, please see [http://www.energysavers.gov/your\\_home/insulation\\_airsealing/index.cfm/mytopic=11240](http://www.energysavers.gov/your_home/insulation_airsealing/index.cfm/mytopic=11240) and follow the links for detecting air leaks, caulking, weatherstripping, etc. Also see [http://www1.eere.energy.gov/consumer/tips/air\\_leaks.html](http://www1.eere.energy.gov/consumer/tips/air_leaks.html)*

- The most common places for air leaks are around doors and windows, but leaks can also be found around chimneys, recessed lights and light fixtures, attic entrances, electric wires and boxes, vents and fans, plumbing utilities, water and furnace flues, and electrical outlets.
- Walk around the exterior and look closely at doors, windows, and places where pipes and wires enter your house. Large gaps can be filled with expanding foam (recommended: Great Stuff for Windows and Doors -- it won't expand quite as much as regular Great Stuff). Caulk is best for cracks and gaps less than 1/4" wide. A bead of caulk will stop air flow, but does not insulate.
- Inside, use a stick of incense on a windy day to detect places where air is getting through. Check around windows and doors, and also around can lights in the ceiling. Caulk around windows. If doors are leaky, check to see if weather stripping is worn. Replace it with the same kind: note the make and model of the door, if possible, and/or take a sample of the existing weather stripping along with you to your local hardware store. Note that the press-on foam weather stripping available everywhere will wear out quickly and need to be replaced often.

### What else you can do:

- Make foam boxes to cover attic stairs, whole-house fans, and other large openings to the attic.
- Install a chimney pillow or other device to stop air flowing in and out of your chimney when fireplace is not in use. (<http://www.chimneyballoon.us/chimneyballoon.html>)

The U.S. Department of Energy estimates that air leakage can add 10 percent to your annual energy bill. This equates to about \$70 per year for the average home.

## NON-ENERGY BENEFITS OF SEALING HOME AIR LEAKS

<http://homeenergysaver.lbl.gov/consumer/help-popup/content/~consumer~nebs~nebs-air-leaks>

**Having a professional seal your home's air leaks can make your home more comfortable, reduce the risk of moisture damage, improve indoor air quality and fire safety, and help to prevent frozen water pipes.**

A properly -sealed and -ventilated home can:

- Improve comfort. Leaky homes are uncomfortable, both in winter and summer.
- Reduce drafts and moisture problems. Sealing leaks reduces infiltration into your home, which helps to reduce drafts and the frequently associated moisture problems.
- Reduce annoying phenomena such as mysterious door slamming. Well-sealed homes also can avoid "pressure imbalances", which are created when more air is being exhausted than resupplied, or vice versa.
- Improve indoor air quality and fire safety. Pressure imbalances can lead to more serious situations in which furnace or combustion appliance exhausts are not removed fully from the home, or in which combustion flames are pulled down and out of their safe containment areas, potentially leading to house fires. Pressure imbalances can also increase the rate of radon entry into a home, particularly in basements.
- Keep your home comfortable and habitable longer during power outages. A well sealed home can remain comfortable and habitable longer than the ordinary home during power outages.
- Help prevent damages caused by frozen water pipes by reducing the infiltration of cold air into the house.
- Reduce your heating and/or cooling needs so that you may be able to get by with smaller, less expensive, heating or cooling equipment.

### Detecting Air Leaks

- Hold a lit incense stick or piece of string near doors, windows, vents, and other seams or openings. Drafts will become apparent as the incense or string moves with the air current.
- Mark these points with chalk and determine if caulking(the sealing of spaces in non-moving surfaces, such as gaps in walls around ducts and electrical outlets) or weatherstripping (the sealing of the edges of moving surfaces like windows and doors) is required.
- For best results choose a cool, windy day and turn on exhaust fans, the furnace, and the clothes dryer. This will draw air out of the house and prompt outside air to come in at leakage points and replace it.
- Your local utility or building contractor might also offer a blower door test. This uses infrared technology to pinpoint air leakage locations while pressurizing your home with a blower door.