



## **Insulation and Sealing Air Leaks**

Checking your home's insulation is one of the fastest and most cost-efficient ways to use a wholehouse approach to reduce energy waste and make the most of your energy dollars. A good insulating system includes a combination of products and construction techniques that protect a home from outside temperatures—hot and cold, protect it against air leaks, and control moisture. You can increase the comfort of your home while reducing your heating and cooling needs by up to 10% by investing in proper insulation and sealing air leaks.

### **Should I Insulate My Home?**

The answer is probably "yes" if you:

- Have an older home and haven't added insulation. Only 20% of homes built before 1980 are well insulated.
- Are uncomfortably cold in the winter or hot in the summer—adding insulation creates a more uniform temperature and increases comfort.
- Build a new home, addition, or install new siding or roofing.
- Pay high energy bills.
- Are bothered by noise from outside—insulation muffles sound.

### **Insulation**

First, check the insulation in your attic, ceilings, exterior and basement walls, floors, and crawl spaces to see if it meets the levels recommended for your area. Insulation is measured in R-values—the higher the R-value, the better your walls and roof will resist the transfer of heat.

Although insulation can be made from a variety of materials, it usually comes in four types; each type has different characteristics.

Rolls and batts—or blankets—are flexible products made from mineral fibers, such as fiberglass and rock wool. They are available in widths suited to standard spacings of wall studs and attic or floor joists: 2x4 walls can hold R-13 or R-15 batts; 2x6 walls can have R-19 or R-21 products.

Loose-fill insulation—usually made of fiberglass, rock wool, or cellulose—comes in shreds, granules, or nodules. These small particles should be blown into spaces using special pneumatic equipment. The blown-in material conforms readily to building cavities and attics. Therefore, loose-fill insulation is well suited for places where it is difficult to install other types of insulation.

Rigid foam insulation—foam insulation typically is more expensive than fiber insulation. But it's very effective in buildings with space limitations and where higher R-values are needed. Foam insulation R-values range from R-4 to R-6.5 per inch of thickness (2.54 cm), which is up to 2 times greater than most other insulating materials of the same thickness.

Foam-in-place insulation—can be blown into walls and reduces air leakage.

### **Insulation Tips**

- Consider factors such as your climate, building design, and budget when selecting insulation R-values for your home.
- Use higher density insulation, such as rigid foam boards, in cathedral ceilings and on exterior walls.
- Ventilation plays a large role in providing moisture control and reducing summer cooling bills. Attic vents can be installed along the entire ceiling cavity to help ensure proper airflow from the soffit to the attic to make a home more comfortable and energy efficient. Check with a qualified contractor.
- Recessed light fixtures can be a major source of heat loss,

but you need to be careful how close you place insulation next to a fixture unless it is marked IC—designed for direct insulation contact. Check your local building codes for recommendations.

- As specified on the product packaging, follow the product instructions on installation and wear the proper protective gear when installing insulation.
- **\$ Long-Term Savings Tip:** One of the most cost-effective ways to make your home more comfortable year-round is to add insulation to your attic.

Adding insulation to the attic is relatively easy and very cost effective. To find out if you have enough attic insulation, measure the thickness of the insulation. If it is less than R-22 (7 inches of fiber glass or rock wool or 6 inches of cellulose), you could probably benefit by adding more. Most homes should have between R-22 and R-49 insulation in the attic.

If your attic has enough insulation and your home still feels drafty and cold in the winter or too warm in the summer, chances are you need to add insulation to the exterior walls as well. This is a more expensive measure that usually requires a contractor, but it may be worth the cost if you live in a very hot or cold climate.

You may also need to add insulation to your crawl space. Either the walls or the floor above the crawl space should be insulated.

### **New Construction**

For new construction or home additions, R-11 to R-28 insulation is recommended for exterior walls depending on location. To meet this recommendation, most homes and additions constructed with 2 in. x 4 in. walls require a combination of wall cavity insulation, such as batts and insulating sheathing or rigid foam boards. If you live in an area with an insulation recommendation that is greater than R-20, you may want to consider building with 2 in. x 6 in. framing instead of 2 in. x 4 in. framing to allow room for thicker wall cavity insulation—R-19 to R-21.

Today, new products are on the market that provide both insulation and structural support and should be considered for new home construction or additions. Structural insulated panels, known as SIPS, and masonry products like insulating concrete forms are among these. Some homebuilders are even using an old technique borrowed from the pioneers, building walls using straw bales. Radiant barriers (in hot climates), reflective insulation, and foundation insulation should all be considered for new home construction. Check with your contractor for more information about these options.

## Sealing Air Leaks

Warm air leaking into your home during the summer and out of your home during the winter can waste a lot of your energy dollars. One of the quickest dollar-saving tasks you can do is caulk, seal, and weatherstrip all seams, cracks, and openings to the outside. You can save as much as 10% on your heating and cooling bill by reducing the air leaks in your home.

### Tips for Sealing Air Leaks

- First, test your home for air tightness. On a windy day, hold a lit incense stick next to your windows, doors, electrical boxes, plumbing fixtures, electrical outlets, ceiling fixtures, attic hatches, and other locations where there is a possible air path to the outside. If the smoke stream travels horizontally, you have located an air leak that may need caulking, sealing, or weatherstripping.
- Caulk and weatherstrip doors and windows that leak air.
- Caulk and seal air leaks where plumbing, ducting, or electrical wiring penetrates through exterior walls, floors, ceilings, and soffits over cabinets.
- Install rubber gaskets behind outlet and switch plates on exterior walls.
- Look for dirty spots in your insulation, which often indicate holes where air leaks into and out of your house. You can seal the holes by stapling sheets of plastic over the holes and caulking the edges of the plastic.

- Install storm windows over single-pane windows or replace them with doublepane windows.
- When the fireplace is not in use, keep the flue damper tightly closed. A chimney is designed specifically for smoke to escape, so until you close it, warm air escapes—24 hours a day!
- For new construction, reduce exterior wall leaks by either installing house wrap, taping the joints of exterior sheathing, or comprehensively caulking and sealing the exterior walls.