

THE SKINNY

Air Sealing



According to the EPA, adding together all of the air leaks in a typical home can be equal to a hole the size of an open window. These air leaks can add 10% to your annual energy bill. The second most common energy saving recommendation found in REAP participant reports is air sealing—that is, eliminating the small cracks and gaps around window and door frames, and other areas where heated or cooled air can escape. Properly air sealing such cracks and openings in your home can significantly reduce heating and cooling costs, improve comfort, safety and building durability, help prevent winter moisture problems and create a healthier indoor environment.

DETECTING AIR LEAKS

A blower door test is performed as part of all REAP energy audits. This test is the most thorough and accurate measurement of air leakage in your home. A blower door test involves installing a false door with a large exhaust fan in an exterior doorframe to depressurize the home. The outside air then flows in through any unsealed cracks and openings. The auditors may then use a smoke pencil to reveal the location of, and measure, air leaks.

The most common locations for air leaks are:

- Door and window frames
- Anywhere two different building materials meet
- Around any type of wall penetration for electrical and gas lines, outlets, and vents
- Mail chutes & dog doors
- Outdoor water faucets
- Around the foundation and air conditioner units

SEALING AIR LEAKS

Caulk and weather-stripping will usually pay for themselves in energy savings within one year. Applying these materials will also alleviate drafts and help your home feel warmer when it's cold outside.

Sealing up the leaks around the house is inexpensive and easy to do. Caulk and weatherstripping are the most commonly used materials and a variety of products are available (see sidebar).

Caulking

Caulk is a weatherproofing sealant that is used to fill cracks, crevices and holes in a home. It works best for cracks and gaps less than about a quarter-inch wide. For larger cracks and holes use expanding foam sealant. Backer rod, which is flexible extruded polyethylene that looks like foam rope, can be used to fill very deep cracks which are then sealed with caulk or sealant.

Make sure to apply caulk to a clean, dry surface and hold the gun at a consistent angle. Forty-five degrees is best for getting deep into the crack. If possible, use a caulk gun with an automatic release trigger and caulk in one straight continuous stream using even pressure—the result will be cleaner and more consistent. Once you've applied the caulk, use a caulk smoother or a wet finger to even out the finish. Let the caulk set thoroughly before painting it. The best time to apply caulk is during dry weather when the outdoor temperature is above 45°F.

Types of Caulk

Most caulking compounds come in either squeeze tubes or disposable cartridges that fit into caulking guns. Check the label to determine whether the product is for interior use, exterior use or both and whether it can be exposed to water or painted. You'll probably need a half-cartridge per window or door and four cartridges for the foundation sill. Costs are about \$3.00 to \$5.00 per cartridge or tube.

Silicone acrylic and silicone latex caulk are the best general-purpose caulking products and can be used indoors or outdoors. They are inexpensive, long-lasting, easy-to-use and can be painted. But, acrylic caulk can deteriorate in water, so if the area will be exposed to moisture use a solvent-based caulk.

Pure silicone caulk works well for caulking seams in ducts and for areas exposed to high temperatures. It usually cannot be painted but is extremely durable and has excellent elasticity. It is more expensive than other caulk and more difficult to clean up.

Clear, removable caulk is used in areas where a temporary seal is desired—for example, attic hatches or the upper sash on double-hung windows during the winter.

Expanding or non-expanding plastic foam can fill a larger gap than standard caulk. Allow for expansion when applying. Plastic foam is sold in applicator cans and is difficult to clean up.

Filling gaps between materials like metal, plastic or stone requires specialized caulk. Avoid pure latex caulk because it's effective only for a few years.

Source: Xcel Energy *GUIDE TO HOME ENERGY SAVINGS*, p.6

Weatherstripping

Weatherstripping is a plastic, rubber or metal strip installed around windows and doors to reduce air leaks. Installed between the frame and the moving parts of windows and doors, good weather stripping provides a tight seal without restricting use. This is also important to consider if you are shopping for replacement windows or doors.

To determine how much weatherstripping you will need, add the perimeters of all windows and doors to be weatherstripped, then add 5%–10% to accommodate any waste. Weatherstripping comes in a variety of depths, widths and materials (see side bar), so choose a product that will meet the needs of each specific location. Consider the use and the amount of wear and tear associated with each location, and look for weatherstripping that will withstand friction, weather, and temperature changes.

Weatherstripping should be applied to clean, dry surfaces in temperatures above 20°F. Measure the amount you'll need twice before cutting. Apply the material snugly against both surfaces; the weatherstripping should compress and be well sealed when the window or door is closed and still allow it to move freely. Apply weatherstripping in one continuous strip along each side of the door or along windows between the sash and frame, and make sure it fits snugly at the corners.

Applying door sweeps can be tricky. Be sure to choose an appropriate door sweep or threshold for the bottom of each door.

SEAL TIGHT VENTILATE RIGHT

When creating an energy-efficient, airtight home through air sealing techniques, it's important to maintain proper ventilation. Unless properly ventilated, an airtight home can seal in indoor air pollutants. Ventilation also helps control moisture, another important consideration for a healthy home. Excess moisture can lead to high humidity levels that can promote mold growth and even structural damage to your home. While it is rare to seal older homes to the point where additional make-up air is required, newer homes can be designed and constructed such that the amount of outside air is effectively calculated and provided to maintain healthy indoor environments.

LEARN MORE

Energy Star: http://www.energystar.gov/ia/home_improvement/home_sealing/DIY_COLOR_100_dpi.pdf

U.S. DOE: http://www.eere.energy.gov/consumer/your_home/insulation_airsealing/index.cfm/mytopic=11240

U.S. Environmental Protection Agency: <http://www.epa.gov/iaq/homes/hip-ventilation.html>

Xcel Energy: http://www.xcelenergy.com/XLWEB/CDA/0,3080,1-1-4_19898_8402_7985-6940-2_366_583-0,00.html

The CRC's contractor referral network: http://www.conservationcenter.org/e_contractors.htm

Types of Weatherstripping

Weatherstripping comes in a variety of shapes and sizes some come with self-adhesive tape, others must be nailed into place. Costs also range depending on the product so choose wisely! Be sure to get the right product for your application. The old adage, you get what you pay for applies here.

Foam tape is inexpensive and easy to apply, and can be effective in low traffic areas such as an attic hatch, but has poor durability for doors and windows.

Flexible, vinyl-covered foam weatherstripping is very effective for sealing doors and provides good durability.

Two-piece magnetic weatherstripping is used on some new foam-filled steel doors.

Vinyl flap weatherstripping is flexible, resists moisture and forms an excellent seal, but it loses its flexibility during very cold weather, especially in sub-zero temperatures.

Tubular silicone is a very flexible door weatherstripping that stays flexible even in very cold weather.

Metal V-seal is the most permanent door weatherstripping. It also seals the meeting rail of double-hung windows. Metal prevents drafts but doesn't provide much insulation.

Vinyl V-strip works well for sealing the sides of double hung windows, but only lasts one to three years on doors. V-shaped weatherstripping is designed to create a seal by pressing against the sides of a crack to block drafts.

A door bottom that seals to a **raised threshold** is the best way to close the gap at the bottom of a door.

Door sweeps also effective for sealing door bottoms, but they are more likely to drag on the floor.

Source: Xcel Energy *GUIDE TO HOME ENERGY SAVINGS*, p.8