

magine you're standing outside on a cold, blustery winter day. You have your coat tightly buttoned or zipped up to your chin. Your coat sleeves are layered over the tops of your gloves, and your stocking cap is pulled down tightly over your head. Despite the chilling weather, you're warm and toasty.

Now, imagine standing outside on that same day, with your coat unbuttoned, a hole in your glove and your hat in your pocket. You can feel that cold wind blowing right through you!

The same thing happens to your home if you have cracks around doors or windows, and gaps around vents and pipes. Those holes allow cold winds in, and let warm interior air escape increasing your energy use and heating costs.



The good news is, by weatherizing your home, a few dollars and a little effort can reduce your heating costs by up to 30 percent. You'll not only save energy and be more comfortable ... weatherizing can extend the life of your home and might even increase the value of your property!

Understanding the problem

When air moves in and out of your home through cracks and crevices, that's called infiltration. You want to find the source and eliminate it. Infiltration can occur in three different ways.

- Wind-driven infiltration occurs when the wind blows in through cracks in your house bringing cold air in and forcing warm air out. (The volume of air your house can hold is limited, so when unwanted cold air comes in, some of the existing heated air is pushed out). This cold/warm air displacement can happen in reverse during summer months.
- The chimney effect occurs when warm air rises, escaping through cracks, and draws cold air in at a lower level to replace it.
- Negative air pressure occurs when fuel-burning appliances decrease air pressure in your home, or air is expelled through your clothes dryer or exhaust fans. Air is then drawn in to equalize the air pressure.

Finding air leaks

Air infiltration can and does happen on all levels. Air usually enters low and exits up high in the home. Whether you start from the top in the attic or the bottom in the basement, a thorough examination is your first step in sealing the exterior



envelope of your home. Arm yourself with pencil and paper, a flashlight and tape measure before you begin.

In the basement or crawl space

Visually inspect exterior walls for cracks or gaps. Examine areas where pipes or vents exit through the walls and inspect basement window casings. Use your tape measure to determine the width of larger openings. Take notes as you go, and make sketches if that will help you later to prepare your plan of action.

Main floors

Again, look for gaps or cracks in exterior walls. Look closely around doors and windows and make a note of their condition. Is the weather stripping worn, or non-existent? Are there broken panes of glass or dried or missing putty? Measure the perimeter around doors and windows. Count the number of electrical outlets and switches. You'll need this



information later when you're ready to purchase supplies.

Examine the area where lighting fixtures and exhaust fans penetrate the ceiling and check for possible air leaks. Make a note of any cracks in drywall or plaster that could allow air to escape. If you have a fireplace, examine the damper.

In the attic

Your ability to examine the attic will depend on its accessibility and whether it is finished or unfinished. At the least, examine the entry door or hatch. Pay close attention to any area where wires or pipes or vents go through the attic floor.

Exterior

Take a walk around the outside of your home, again looking for any place the wires or pipes pass through from outside to inside. Note the exterior condition of windows, doors and siding.

Develop your strategy

With the notes from your home inspection in hand, you're ready to develop a strategy to eliminate air infiltration, increase the comfort of your home and cut your energy use!



An average house will cost about \$50 to weatherize completely. Although you can begin the project at any point, having a definite strategy will help insure nothing is missed. You can go top to bottom, or outside to in, as long as you address all the issues you discovered during your home inspection.

This would be a good time for trip to the hardware store or home center for supplies.

Caulking and weather stripping

Caulking and weather stripping will take care of the majority of your weatherizing needs. Caulk is used to permanently seal air leaks between stationary surfaces like the frame around your front door and the side of your house. (There are some removable caulks that can be used seasonally and then removed). Weather stripping is used to eliminate gaps between moving surfaces such as your front door and the door frame.

Choosing the right caulk

Caulk is inexpensive, easy-to-use and it has a multitude of applications. It will effectively seal openings up to ¼ inch wide. (Larger cracks require backing material before caulk is applied).

Most caulk is sold in tubes and requires a caulking gun for application.

One caulking gun will last most people a lifetime! Don't let the range of caulk choices overwhelm you! A few simple guidelines will help you choose the correct one for your application. When making your selection here are some things to consider:



- ALWAYS read the label.
- Is the caulk for interior or exterior use?
- What is the surface material you'll be caulking?
- Choose a color. Caulks come in white, brown and clear.
- Do you plan to paint over the caulk?
- How long do you want it to last?

Silicone vs. latex

There are two primary caulking materials, silicone and latex. Of the two, silicone is generally a little more expensive, but is much more durable and longer lasting. Some silicone caulks will last up to 20 years. It shrinks very little and will seal two dissimilar materials such as aluminum and wood. It remains somewhat flexible, allowing joined surfaces to expand or contract. Silicone caulk is generally not paintable.

Latex caulk is less expensive and less durable than silicone. It will not adhere to metal surfaces and is not flexible when cured. It must be painted in most exterior applications. Latex caulks bond well to drywall and plaster surfaces inside the home.

Using caulk

If you're caulking for the first time, you'll need to invest in a caulk gun. They cost just a few dollars and should last for years. When you get home, practice a few times on a scrap piece of wood or cardboard until you feel comfortable controlling the gun and creating a smooth bead of caulk.

Here are the rules of caulking in three easy steps:

- Make sure the area is clean and dry, so the caulk adheres properly.
 Use a utility knife or scraper to remove flaking paint and old caulk, and then wipe away dirt and dust.
- 2. Apply the caulk carefully. Try not to leave gaps; if you drip or apply too much, wipe it away with a wet rag. If you're sealing a wider crevice, be sure to force the caulk all the way in.
- 3. Gently smooth out the bead of caulk. Use a plastic spoon, a Popsicle stick or, for the best results, an ice cube; if you use your finger, make sure to wash your hands thoroughly when you're done. Let the caulk dry for a few days before painting.

When you're finished with a section, lay the caulking gun on a piece of newspaper – caulk may continue to ooze out of the canister for several seconds.

If you have a partial tube of caulk left when you're done, plug the end of the nozzle with a galvanized nail or a piece of wire hanger.

Rope caulk

Rope caulk is great for temporary or seasonal use. It comes in a roll and peels off in a long strip like play dough. Use it around the movable parts of windows (especially double-hung windows) and around doors you don't use during the winter. It's a good choice for basement windows that are rarely or never used,



but that you don't want to caulk permanently closed. Rope caulk will eventually harden and fall out, so check it yearly, and replace when necessary.

Expandable foam sealant

This sealant works well to fill larger cracks or gaps on the exterior of your home. It most commonly comes in a pressurized can about the size of a can of spray paint. Use it to fill in areas around pipes that pass through basement walls. When it's applied, it expands quickly to seal the space. Be careful when using expanding foam — it's difficult to clean up, and the rapid expansion can split wood or bend aluminum. Look for the low-expansion variety for use around windows and doors. It's less likely to over-expand and crack or bend window or door framework. One can of expanding foam equals about 20 tubes of caulk. Again: read the label! Make sure the product is suitable for the application you have in mind. Some varieties are not recommended for use adjacent to electrical wiring or fixtures.

Weather stripping

Weather stripping seals leaks around windows and doors by closing the gap between the moving parts and the frame. There are enough kinds of weather stripping to make your head spin! Hang in there; it's not difficult to figure out what kind to use where.

The type you choose should stand up to the wear and tear, weather and temperature fluctuation associated with its location. For example, a doublehung window that remains closed all winter requires a



different solution than a door that is opened and closed multiple times per day.

When choosing the right material it's primarily a matter of



durability and expense. If you're willing or able to spend a little more money up front, you can purchase a more durable product and replace it less often. The table on page 10 and 11 will help you choose the correct weather stripping for each application.

Table 1: Common Weather stripping		
Туре	Best Uses	
Tension seal: Self-stick plastic or springy metal folded lengthwise. Seals by pressing against the sides of a crack to block drafts.	Inside the track of a double-hung or sliding window, top and sides of door.	
Felt: Plain or reinforced with a flexible metal strip; sold in rolls. Must be stapled, glued, or tacked. Seals best if staples are parallel to length of the strip.	Around a door or window (reinforced felt); fitted into a door jamb so the door presses against it.	
Reinforced foam: Closed-cell foam attached to wood or metal strips.	Door or window stops; bottom or top of window sash; bottom of door.	
Tape: Nonporous, closed-cell foam, open-cell foam, or EDPM (Ethylene Propylene Diene Monomer) rubber.	Top and bottom of window sash; door frames; attic hatches and inoperable windows.	
Rolled or reinforced vinyl: Pliable or rigid strip gasket (attached to wood or metal strips.)	Door or window stops; top or bottom of window sash; bottom of a door (rigid strip only).	
Door sweep: Aluminum or stainless steel with brush of plastic, vinyl, sponge, or felt.	Bottom of interior side of in-swinging door; bottom of exterior side of exterior-swinging door.	
Magnetic: Works similarly to refrigerator gaskets.	Top and sides of doors, double-hung and sliding window channels.	
Tubular rubber and vinyl: Vinyl or sponge rubber tubes with a flange along length to staple or tack. Door or window presses against them to form a seal.	Around a door.	
Reinforced silicone: Tubular gasket attached to a metal strip that resembles reinforced tubular vinyl.	On a doorjamb or a window stop.	
Door shoe: Aluminum face attachment with vinyl C-shaped insert to protect under the door.	To seal space beneath door.	
Bulb threshold: Vinyl and aluminum.	Door thresholds.	
"Frost-brake" threshold: Aluminum or other metal on exterior, wood on interior, with door-bottom seam and vinyl threshold replacement.	To seal beneath a door.	
Fin seal: Pile weather strip with plastic Mylar fin centered in pile.	For aluminum sliding windows and sliding glass doors.	
Interlocking metal channels: Enables sash to engage one another when closed	Around door perimeters.	

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Cost	Advantages	Disadvantages
Moderate; varies with material used.	Durable. Invisible when in place. Very effective. Vinyl is fairly easy to install. Look of bronze works well for older homes.	Surfaces must be flat and smooth for vinyl. Can be difficult to install. Metal must be nailed in place. Can increase resistance in opening/closing doors or windows.
Low	Easy to install, inexpensive.	Low durability; least effective preventing airflow. Do not use where exposed to moisture or where there is friction or abrasion. Very visible.
Moderately low	Closed-cell foam an effective sealer; scored well in wind tests. Rigid.	Can be difficult to install; must be sawed, nailed, and painted. Very visible.
Low.	Extremely easy to install. Works well when compressed. Inexpensive. Can be reinforced with staples.	Durability varies with material, but not especially high; use where little wear is expected; visible.
Low to moderate.	Easy installation. Self-adhesive on pliable vinyl may not adhere to metal; some types of rigid strip gaskets provide slot holes to adjust height, increasing durability	Visible.
Moderate to high.	Relatively easy to install; many types are adjustable. Automatically retracting sweeps also available.	Visible. Can drag on carpet. Automatic sweeps are more expensive and can require a small pause once door is unlatched before retracting.
High	Very effective air sealer.	
Moderate to high.	Effective air barrier.	Self-stick versions challenging to install.
Moderate to high.	Seals well.	Installation can be tricky. Hacksaw required to cut metal; butting corners pose a challenge.
Moderate to high.	On the exterior, product sheds rain. Durable. Can be used with uneven opening. Some door shoes have replaceable vinyl inserts.	Fairly expensive; installation moderately difficult. Door bottom planing possibly required.
Moderate to high.	Combination threshold and weather strip; available in different heights.	Wears from foot traffic; relatively expensive.
Moderate to high.	The use of different materials means less cold transfer. Effective.	Moderately difficult to install, involves threshold replacement.
Moderate to high.	Very durable.	Can be difficult to install.
High.	Exceptional weather seal.	Very difficult to install as alignment is critical. To be installed by a professional only.

Weatherizing the outside

Start working on the outside of your home in the back. By the time you get to the front and inside, you'll be a pro!

- Caulk around the following areas on your home's exterior:
- The top and bottom edges of the rim joist this is the thick wooden board that sits on top of the concrete foundation and connects to the floor joists.
- The outside edges of window and door frames. Don't forget basement windows and doors.
- Any opening through the envelope of your house, including
 - water spigots, electrical outlets, air conditioner hoses, dryer vents and gas and water pipes. Be careful not to touch or move pipes and wires.
- If you find a large hole or crack, use expanding foam. A small squirt is usually enough to seal the opening too much
- can damage the surrounding materials. Don't use expanding foam around any electrical equipment.
- If you have storm windows, use them. If you don't, install plastic window film to the outside of windows, especially those facing north. The product has been much-improved over the past few years, with better visibility and stronger adhesive tape. Don't forget to cover basement windows!

Weatherizing inside your home

Start with the windows. West-facing windows are subjected to the harshest winds, so that's a good place to begin. North-facing windows are exposed to the coldest air, so do those next. Follow up with east-facing, then south-facing windows.

If you have any cracked window glass, replace it. Measure the



opening, get new glass, secure it with glazier's points and seal it with window glazing compounds. If this all sounds like gibberish to you ... take the window to your local hardware store and let them do the work!

If you find a window pane that's simply loose, you can seal it up with window glazing compound. It's designed specifically to seal the glass window pane against the window frame. Read and follow the directions. In most cases, the window frame will need to be primed before applying glazing compound.

Once all the window glass is secured you can move on to weather stripping. Double-hung windows are the draftiest, but older casement windows may also need to be sealed.

- Apply caulk around the outside edges of the window casing.
- Select and apply weather stripping according to the manufacturer's directions. Use the table to determine what type of weather stripping is best for your application.



- If you don't have storm windows, install interior window film.
- Heavy drapes or curtains can also help hold back cold air. This cools the glass surfaces, so remember to open them on sunny days to take advantage of the sun's rays. This also helps to minimize window fogging.
- Don't forget to caulk around the outer edges of basement windows and cover them with plastic film. Don't use permanent caulk to seal basement windows you may need quick ventilation in the event of a gas leak or a carbon monoxide problem. Use removable rope caulk instead.

After you've tackled the windows, it's time to move on to the doors.

- Apply caulk to the outside edges of the door casing.
- Open the door and install weather stripping to the inside of the door jamb. Use the table to find the kind that will work best for your situation.
- Stop under-door drafts by installing a rubber or vinyl sweep along the bottom. If you have a fiberglass or steel door, install a threshold with a flexible vinyl gasket along the bottom of the door jamb. Look for an adjustable model that's easy to fit to the proper height.
- If you have a side or basement door you don't use, seal the edges with removable rope caulk.



Other areas to weatherize

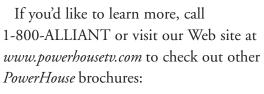
While windows and doors are the biggest culprits, there are three more indoor areas to weatherize:

- Electrical outlets and switches, especially on exterior walls. Be sure to turn off power at the fuse or circuit breaker before working around electrical outlets. Carefully unscrew the faceplate and press a foam gasket around the outlet or switch. Put the cover back on and insert safety caps into all unused outlets.
- The attic opening is a prime spot for warm air to escape. Install insulation over the back of the attic door; if you have hatchtype access, install weather stripping around the top edges of the opening.
- Fireplaces are notorious sources of air leaks. Tight-fitting glass doors are the best way to prevent air from escaping or entering. When you're not using the fireplace, keep the damper closed and close the glass doors tightly. If you never use the fireplace, plug the chimney with batt or blanket insulation and seal the glass doors shut with removable or silicone caulk.



Air leaks in the exterior envelope of your home can allow the entire volume of air in your home to escape as often as every half hour! A few dollars and a weekend spent on weatherizing can reduce your energy use by 25-40 percent. Even small weatherizing efforts will have a positive impact.

Once your weatherizing chores are complete, you may realize additional savings by increasing your home's insulation. See the PowerHouse brochure Insulating Your Home for further information.



- 101 Easy Ways to Save Energy
- Appliance Operating Costs
- Choosing & Using Appliances
- Cooling Your Home
- Electrical Safety
- Energy-Efficient Landscaping
- Green Power
- Holiday Decorating Safety
- Insulating Your Home
- Lighting Your Home
- Natural Gas Safety
- New Home Construction
- Power Quality and Surge Protection
- Weathering the Storm
- Weatherizing Your Home

You can also find great energy efficiency and safety tips on our Web site at www.alliantenergy.com.

For more information on cash rebates and energy efficiency programs call 1-800-723-7635.

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We're on for you."

