

## Seal air leaks and save

Almost every home can benefit from sealing air leaks. Stopping leaks through a home’s outer walls, ceiling, windows, doors and floors can greatly improve energy efficiency and comfort. According to Energy Star (a program of the Environmental Protection Agency), a knowledgeable homeowner or skilled contractor can [save up to 20% on heating and cooling costs \(or up to 10% on their total annual energy bill\)](#) by sealing and insulating.

To get started, take a few minutes to watch these brief videos from the Washington State University Extension Energy program about air leaks in buildings:

[Chapter 1: Introduction](#)

[Chapter 2: Why Air Seal?](#)

[Chapter 3: New Homes](#)

[Chapter 4: Measuring Building Tightness](#)

[Chapter 5: Existing Homes](#)

[Chapter 6: Combustion Safety](#)

[Chapter 7: Final Thoughts](#)

Many products available in your local hardware store can do the job, some better than others. Mark Wiser, senior conservation adviser, offers the following tips in selecting and using products for do-it-yourselfers.

## Leaks around doors and windows

Use weather stripping to seal leaks around doors. For leaks at the bottom of doors, a new threshold with weatherstripping, such as those following (1 and 2), may be what you need.



If you have single-pane windows or patio doors, try an insulation kit (3 and 4, below). These clear plastic sheets have an adhesive on the edges. Simply apply around the frame and heat with an electric hair dryer. The plastic will shrink, resulting in a smooth, clear storm window. This is an inexpensive way to improve comfort and save energy.



Caulk small cracks and holes in exterior walls and ceilings (5 and 6, above). Silicone is the most durable sealant, but it cannot be painted. Urethane, butyl and latex caulks are paintable, but don’t last as long. Read the directions and choose a caulk with the longest life that fits your needs. Caulks are available that dry clear, white or in common colors. For more information, visit this website: [www.caulkingmaterials.com](http://www.caulkingmaterials.com); [Watch a video](#); [Additional videos](#).

Larger cracks up to 3/4” should be filled with a product called backer rod or caulk backing. This product is a closed cell foam rope that comes in various diameters from 1/4 to 3/4 inches. Choose a diameter that is slightly larger than the crack and simply push it into the opening. This will slightly compress the foam to keep it in place. Next, cover the backer rod and crack with your caulk of choice. You’ll use less caulk and it won’t crack or shrink like it would if you tried to fill a large crack with just caulk. For larger cracks and openings in areas where appearance is not an issue, aerosol foam may be a better option. Choose a product with low expanding properties. Foam is quickly affected by UV light, so make sure you cover the area if sunlight exposure is a possibility.

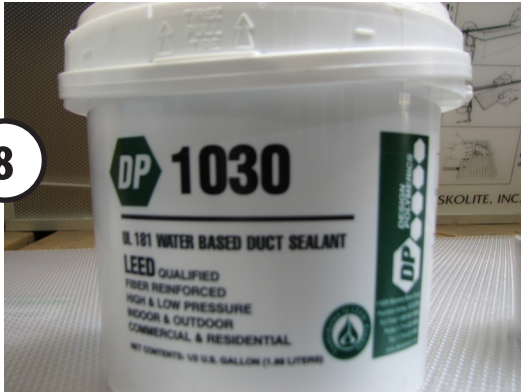
Cracks between frames and operable parts of doors and windows can often be sealed with stick-on weather stripping (7, right). Sponge-type tape foam weather stripping is a good choice, but make sure



you use closed cell foam. It is denser than open cell foam and although it costs a little more, it is much more durable. Closed cell foam is particularly good for sealing around attic and crawlspace hatches. Another good product, called V-channel or V-shaped fin, comes in a polypropylene roll with an adhesive back. When placed on a window or door frame, the weather stripping will fold over in the middle, creating a good air seal. Since the channel is thin, it often is a good choice for windows and doors.

Leaks from heating and cooling ducts

Cracks in heating ducts that are located in unheated areas should be sealed. Studies show that the average Northwest heating duct system leaks over 400 cubic feet per minute



(CFM) to the outside through the crawlspace or attic. This is heated air that you pay for but is not used to heat your home. This equals up to 30 percent of the heat supplied by your heating system. An

excellent way to seal these ducts is a product called mastic (8, above). This water-based product is easy to install with a brush or your hand. Once dry, it remains flexible and creates a tight seal, allowing the heated or cooled air in your ducts to go where intended. Another product that is effective, but not as durable as mastic, is foil tape (9, above right). This makes a neater installation, but be sure to clean the ducts before you install it, and follow the manufacturer’s instructions.

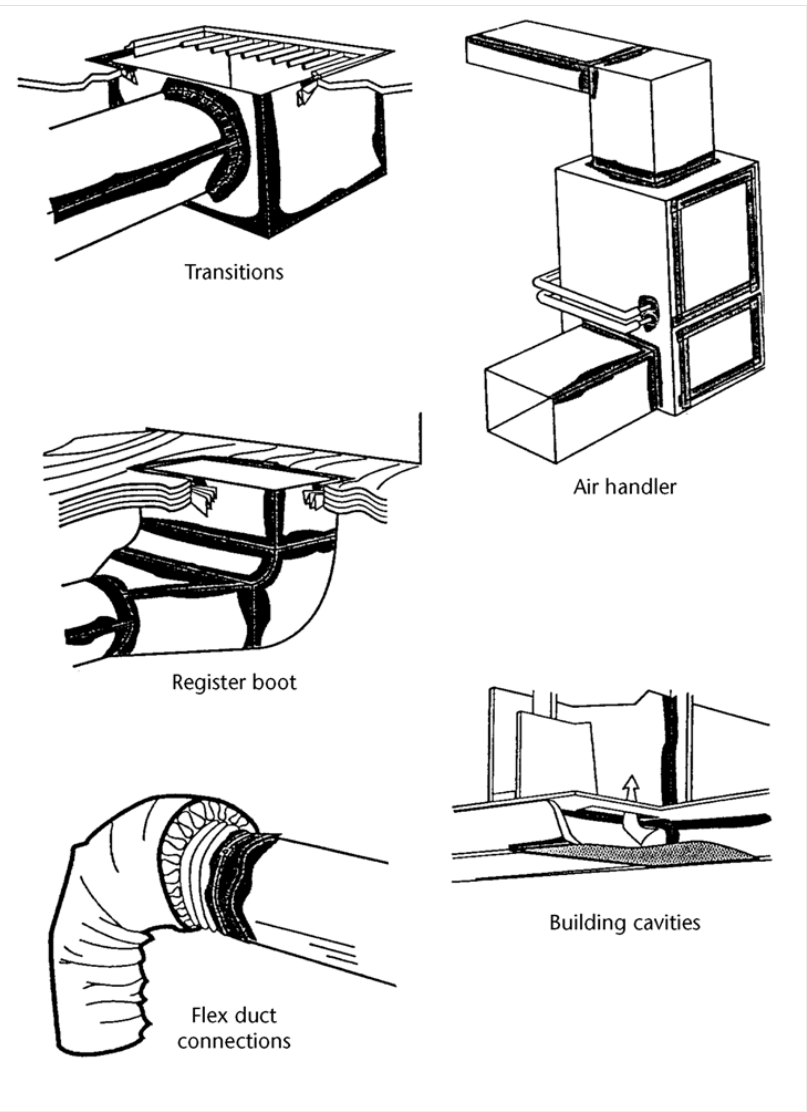
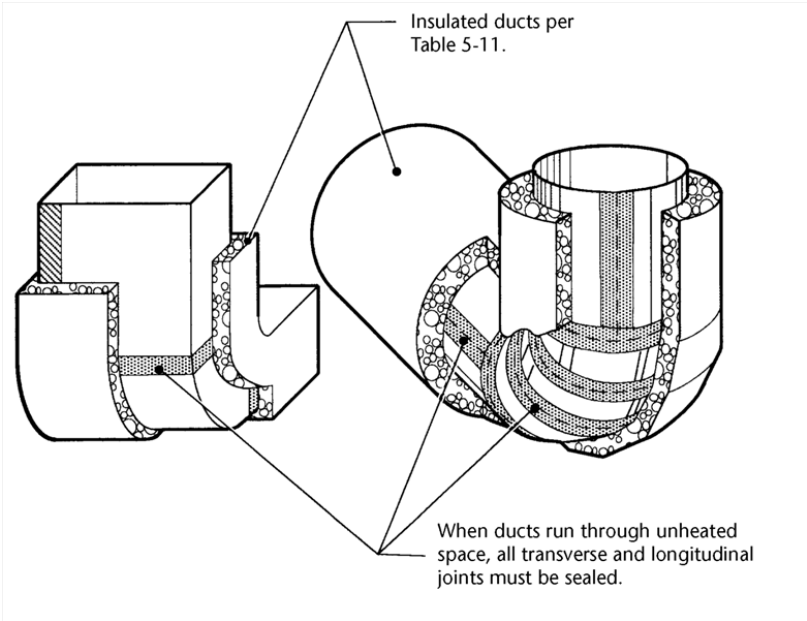


**One word of caution:** Don’t use cloth-backed duct tape (10, below). In fact all mastics and tapes must have a UL-181 rating. Regular cloth-backed duct tape



(also known by some as temporary tape) does not have a UL-181 rating. The adhesive on this tape will dry up and the tape will fall off.

[Here](#) is a video on duct sealing from the WSU Extension Energy Program.





Always seal duct work before you add insulation. The 2012 Washington State Energy Code requires ducts in unheated areas be insulated to R-8. R-4 insulation is available at many stores and can be doubled up. An easier way is to simply use R-11 (11, right) fiberglass insulation. It is easy to find and work with and usually less expensive. When adding insulation, make sure the insulation is not compressed; compressing the insulation reduces the R-value.



Some stores sell an insulation product that has a foil face sandwiched with bubble wrap or a thin layer of polyethylene foam (12, below). This product is advertised as insulation, duct wrap or a radiant barrier (see Attic Shield in "Beware of some claims" below). This product does not meet the R-value requirements of insulated ducts and is not recommended as a duct wrap.



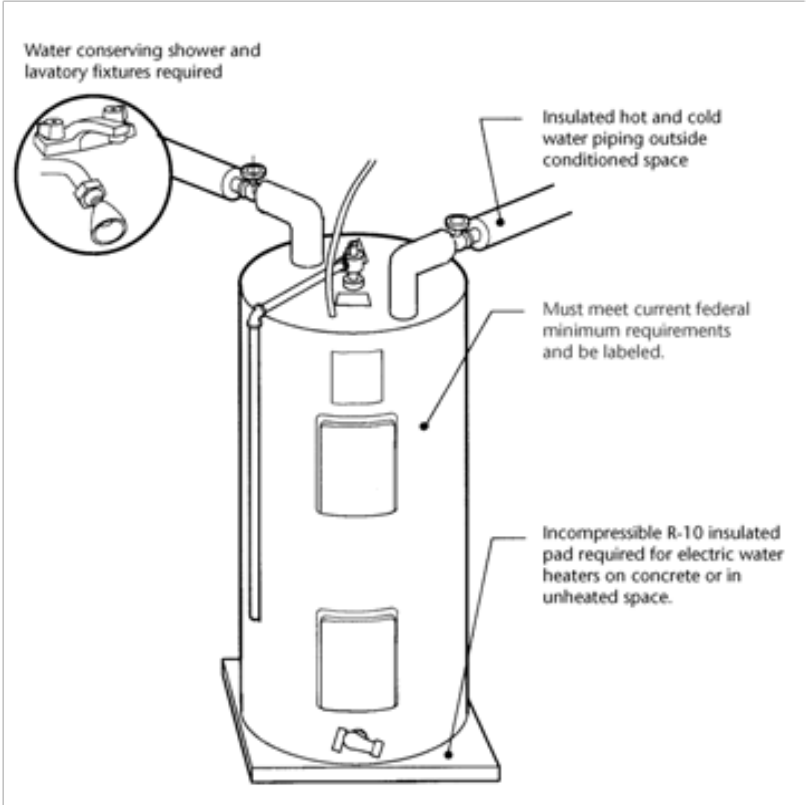
## Other tips and products

### Hot water pipe wrap

Hot water pipes in unheated areas, such as garages, should be wrapped with insulation. Several products types are available including fiber glass and foams. One product that is easy to use, looks good and insulates well is pre-cut closed cell foam. This comes in straight lengths and corner pieces (13 and 14, below). We recommend wrapping the first 5 feet from the hot water tank of both hot and cold water pipes. Since it is an inexpensive process, it's a good idea to wrap the pipes even if the water heater is in a heated area. The wrap helps keep the water pipes warm so that the hot water gets to the faucet quickly.



Make sure your water heater is sitting on an R-10 pad if located on a slab (basement or garage); see diagram below.



Moisture Control

Make sure you vent your clothes dryer and exhaust fans to the outside of your home, not into the attic or crawlspace. Ducting material should be metal (flex is OK), not vinyl as seen in the picture below (15, right).



Window Replacement

Whenever you purchase a new window, verify that the window is NFRC (National Fenestration Rating Council) certified to the appropriate U-value. An NFRC label (16, right) should be mounted on the glass of the window and it should specify the rating. In this case the U-value is .30. This is the standard required in most new homes. The lower the U-value, the better.



Filter Your Air

In order to keep your heating and cooling system operating at peak efficiency and comfort, it's important to filter the air moving through it. Use a high quality filter which offers the added benefit of filtering most contaminants (17, below). Check filters monthly and replace if dirty. A dirty filter can cause premature failure of a heat pump or air conditioner and reduce the system's efficiency.



Wood stoves and fireplaces

Wood stoves and fireplaces should use outside combustion air. If not, your heated inside air will be pulled into the combustion chamber and most of the heat will go up the chimney or flue. If you have an older stove, check the door gasket to see if it is damaged. If it is, you can change the gasket (18, right) with a replacement kit similar to the one in the following picture.



Beware of some claims

From time to time, various companies come through the area selling products with claims of extraordinary energy savings. If it sounds too good to be true, it probably is!

Chelan PUD conservation staff can help you evaluate the cost effectiveness of energy-efficiency products and whether they're appropriate for your lifestyle and the area's climate. It's also a good idea to contact local retailers for price comparisons. Many window installers from out of the area charge significantly more than local companies for the same or similar work.

**One tip:** Read the fine print. Often, savings are calculated for average retail rates of 10-12 cents per kilowatt hour or more. Chelan PUD customers pay an average of 3.2 cents per kilowatt hour.

If you have a question about the value or benefit of energy products, please call Chelan County PUD's Conservation experts at (509) 661-8008.

Some products that have been sold in the area but generally don't work well here:

- Attic shield** This is usually a radiant barrier with a small amount of polyethylene closed cell foam. This product will reflect some radiant heat. It has about a quarter-inch of insulation. In our area, most heat loss is through convection (air movement through openings such as cracks and holes) and conduction (heat movement through building materials), not radiation (when an object radiates **thermal energy** in the form of electromagnetic waves). This product will save an almost immeasurable amount of energy.
- Roof guard** This is a white, heat-reflective elastomeric coating. It is often used on mobile homes and flat roofs as a reflective barrier. This product works best during times when air conditioning is needed; air conditioning is not a major cost for homes in our area. We are a heating climate primarily.
- Souped-up surge protectors** Some companies sell surge protectors which include capacitors to improve power quality, for residential use,. Some commercial and industrial customers with large motor loads may see some benefit with improved power quality. But, tests done on these types of products have shown no discernable energy savings in a residential application.

Are you experiencing other problems in your home that we haven't addressed? Check [here](#) for a list of common problems and possible solutions.