



Consumer Guide to Air Sealing the Home

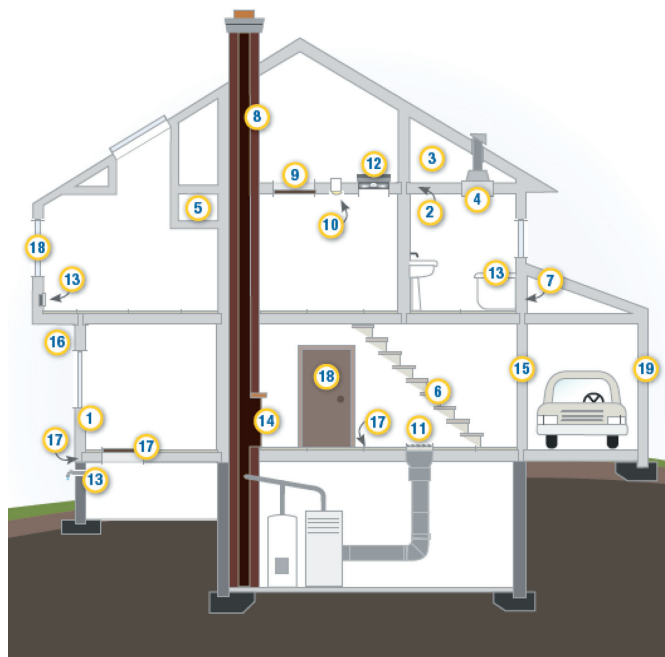
Air sealing is one of the most cost-effective ways to improve the comfort and energy efficiency of your home.

PAIR IT WITH VENTILATION

Air sealing and ventilation go hand in hand. The first step in the air sealing process involves determining how much fresh air is needed to ensure healthy indoor air quality and to properly ventilate combustion appliances such as stoves, ovens, fuel-burning furnaces, and fireplaces. Without proper ventilation, excessive water vapor and harmful combustible gases can accumulate in the home. If combustion appliances do not get enough oxygen, they will operate inefficiently and may release dangerous gases such as carbon monoxide into the home. Ensuring that you have proper ventilation is yet another reason you should hire a professional home energy auditor or certified HVAC (heating, ventilating, and air conditioning) contractor. Please see the DOE Guide to Ventilation for more information on ventilating a house.



Caulking is one DIY strategy for sealing air leaks.



Air Sealing Trouble Spots

- 1 Air Barrier and Thermal Barrier Alignment
- 2 Attic Air Sealing
- 3 Attic Kneewalls
- 4 Shaft for Piping or Ducts
- 5 Dropped Ceiling/Soffit
- 6 Staircase Framing at Exterior Wall
- 7 Porch Roof
- 8 Flue or Chimney Shaft
- 9 Attic Access
- 10 Recessed Lighting
- 11 Ducts
- 12 Whole-House Fan
- 13 Exterior Wall Penetrations
- 14 Fireplace Wall
- 15 Garage/Living Space Walls
- 16 Cantilevered Floor
- 17 Rim Joists, Sill Plate, Foundation, Floor
- 18 Windows & Doors
- 19 Common Walls Between Attached Dwelling Units

This illustration shows the 19 key areas where air sealing can improve a home's energy efficiency, comfort, and building durability. The information in this guide can help you find a certified home performance contractor and work with your contractor to identify problem areas, prioritize projects with safety in mind, and start sealing the air leaks in your home for cost-effective energy savings.

Why Air Sealing?

Proper insulation helps keep a house warm in summer and cool in winter. Insulation works by blocking the flow of heat through a surface such as a wall or roof. But insulation does not necessarily block the movement of air, especially when cracks, holes, or other gaps are found in the house. Think of insulation as a sweater – it can keep you warm when the air outside is cold, but it doesn't block the wind. For that you need a windbreaker. Air sealing acts like a windbreaker.

Air leaks can make your home feel drafty and uncomfortable and place an unnecessary strain on heating and cooling equipment, which decreases their efficiency and raises your energy bills. Air leaks can also let in moisture that can warp and damage wood and lead to mold.

Air Leak Locations

Air leaks can occur anywhere gaps exist in the home. Those around windows and doors are the most obvious, but there are often many smaller and less detectable gaps present. Air leaks can also be found where rising warm air is replaced by cooler air (as often happens between an attic and the conditioned spaces below) or where exposed insulation contains dirty spots (showing air infiltration). Air leaks also often

occur where brick and wood siding or foundations and walls meet. At least 19 key areas (shown in the illustration) have been identified where air sealing can improve a home's energy efficiency, comfort, and building durability.

Finding and Sealing Air Leaks in an Existing Home

A professional energy assessor will first carry out a home energy assessment in order to find air leaks, determine the best course of action for sealing those leaks, and carry out the upgrade work. Many homeowners, however, elect to use a do-it-yourself approach to finding and sealing air leaks. This approach can be effective for obvious leaks such as those around door frames and exterior wall penetrations for pipes, vents, electrical fixtures and wires, and around ducts and fans. However, this approach will not work for small and hard to detect leaks, especially those in the attics of existing homes that may be covered by layers of insulation.

Use a Certified Professional Contractor

A certified home energy assessor is trained to evaluate the efficiency and durability of a home. These professionals evaluate the patterns of energy usage in a home and employ techniques such as a blower door test and thermal (infrared) camera imaging to locate the sources of air leaks. Assessors also can determine how well a house is ventilated to avoid the buildup of damaging water vapor or harmful gases.

There are two nationally recognized certifications for home energy assessors and contractors: the Building Performance Institute (BPI) Building Analyst certification and the Residential Energy Services Network (RESNET) Home Energy Rating System (HERS) Rater certification. The easiest and most effective way to find a certified contractor is through the "Home Performance with ENERGY STAR®" program that promotes a comprehensive, whole-house approach to energy-efficient improvements. Please see the Energy Saver article on home energy assessments under Further Reading for more information.

Upon completion of the assessment, you will receive a report detailing the most energy-efficient measures and cost-effective options available for air sealing your home. A certified contractor will help you deal with any safety or health issues that may arise before undertaking energy-efficient upgrades and address local building codes that must be met.

Doing It Yourself

If you are going to undertake a do-it-yourself approach to air sealing those readily accessible parts of your home where there are obvious air leaks, you have a number of materials available to you. They include:

- Caulk, including acrylic latex and high temperature-resistant silicone caulk (for sealing around flues, vents, and pipes associated with chimneys, furnaces, and water heaters; however, it is recommended that you go to a professional contractor for such air sealing needs);
- Spray foam, including expandable polyurethane (which may also be used for insulation) and water-based foams;
- Weather-stripping (such as around doors and between window frames and sashes), including tension seal, felt, reinforced foam, rubber tape, aluminum or stainless steel door sweeps, metal gaskets, bulb or fin seals, and other types of interlocking metal channels.

FURTHER READING

Energy Saver: Insulation and Air Sealing
energy.gov/energysaver/weatherize/air-sealing-your-home

Building Performance Institute
bpi.org

Energy Saver Guide to Home Energy Assessments
energy.gov/energysaver/weatherize/home-energy-audits

Energy Saver Guide to Ventilation
energy.gov/energysaver/weatherize/ventilation/whole-house-ventilation

Home Performance with ENERGY STAR Locations
energystar.gov/index.cfm?c=home_improvement.hm_improvement_hpwes_partners

RESNET – HERS Rater
resnet.us/trade/home-energy-raters-hers-raters

Financial Incentives
Financial incentives may be available in your area. Please visit energystar.gov/about/federal_tax_credits for more information.