CHANGE FOR THE BETTER WITH ENERGY STAR

Homes that earn the ENERGY STAR® prevent greenhouse gas emissions by meeting strict energy efficiency guidelines set by the U.S. Environmental Protection Agency. www.energystar.gov

AIR SEALING

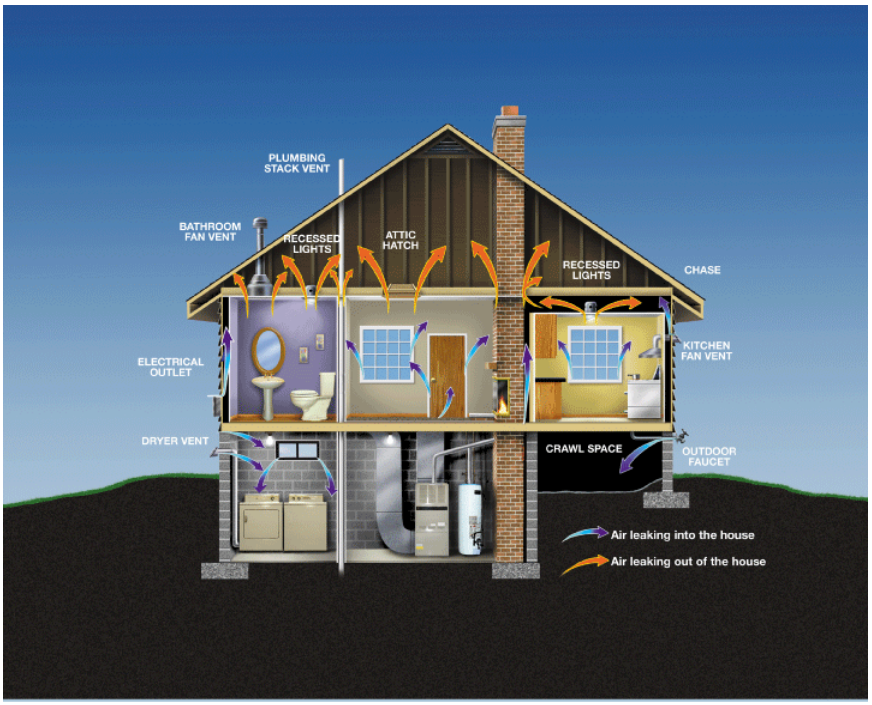
Building Envelope Improvements

Air will leak through a building envelope that is not well sealed. This leakage of air decreases the comfort of a residence by allowing moisture, cold drafts, and unwanted noise to enter and may lower indoor air quality by allowing in dust and airborne pollutants. In addition, air leakage accounts for between 25 percent and 40 percent of the energy used for heating and cooling in a typical residence.

The amount of air leakage in a house depends on two factors. The first is the number and size of air leakage paths through the building envelope. As shown in Figure 1, these paths include joints between building materials, gaps around doors and windows, and penetration for piping, wiring and ducts. The second factor is the difference in air pressure between the inside and outside. Pressure differences are caused by wind, indoor and outdoor temperature differences (stack effect), chimney and flue exhaust fans, equipment with exhaust fans (dryers, central vacuums) and ventilation fans (bath, kitchen).

Air sealing the building envelope is one of the most critical features of an energy efficient home. To prevent air leakage, it is best to seal the building envelope during construction prior to installation of the drywall. Once covered, many air leakage paths will be more difficult and costly to access and properly seal. A "blower door" test (typically included with a Home Energy Rating) is a good way to identify air leakage paths so that they can be sealed using an appropriate material. There are many products available for air sealing including caulks, foams, weatherstripping, gaskets, and door sweeps.

FIGURE 1: Location of Common Air Leakage Paths



In new homes that are tightly sealed, you will want to make sure there is adequate fresh air for ventilation. It is better to use controlled or active ventilation than to rely on air leakage. In many ENERGY STAR qualified homes, an active ventilation system is installed along with air sealing to ensure that fresh air is provided.

EPA United States Environmental Protection Agency

BENEFITS

Air Sealing the building envelope can provide many benefits including:

Improved comfort. A tighter building envelope reduces the amount of unconditioned air, drafts, noise, and moisture that enter your home. Proper air sealing will also minimize temperature differences between rooms. As a result, tight envelopes can maintain a more consistent level of comfort throughout a house.

Improved indoor air quality. A tighter building envelope reduces the infiltration of outdoor air pollutants, dust and radon as well as eliminating paths for insect infestation. Properly sealing the building envelope will also reduce moisture infiltration from outdoor air in humid climates.

Increased construction quality. Building codes establish the legal minimum construction standards. ENERGY STAR qualified homes, constructed to exceed these codes with air sealing, can offer a better quality product.

Lower energy bills. Air leakage accounts for 25 percent to 40 percent of the energy used for heating and cooling and also reduces the effectiveness of other energy-efficiency measures such as increased insulation and high-performance windows. Thus air sealing results in lower energy bills.

Fewer condensation problems. Condensation can lead to mold and mildew problems. In hot, humid climates, moisture can enter into wall cavities through exterior cracks and result in costly damage to framing and insulation. In cold climates, gaps in the interior walls allow moisture from warm indoor air to enter wall cavities and attics. This moisture can condense on cold surfaces and lead to structural damage. By significantly reducing air leakage, you can reduce or eliminate these problems.

Reduced obsolescence. Based on recent trends for improved efficiency and higher indoor air quality, tighter building envelopes are expected to become standard practice for the building industry. Since it is both difficult and costly to make the building envelope tighter after a house is constructed, it is best to seal all joints, holes and seams during construction. ENERGY STAR qualified homes constructed to exceed current building codes are therefore, expected to be less vulnerable to obsolescence.

ENERGY STAR® promotes the use of high-efficiency technologies and equipment to help homeowners improve the energy-efficiency of their homes. ENERGY STAR is sponsored by the U.S. Environmental Protection Agency and the U.S. Department of Energy.