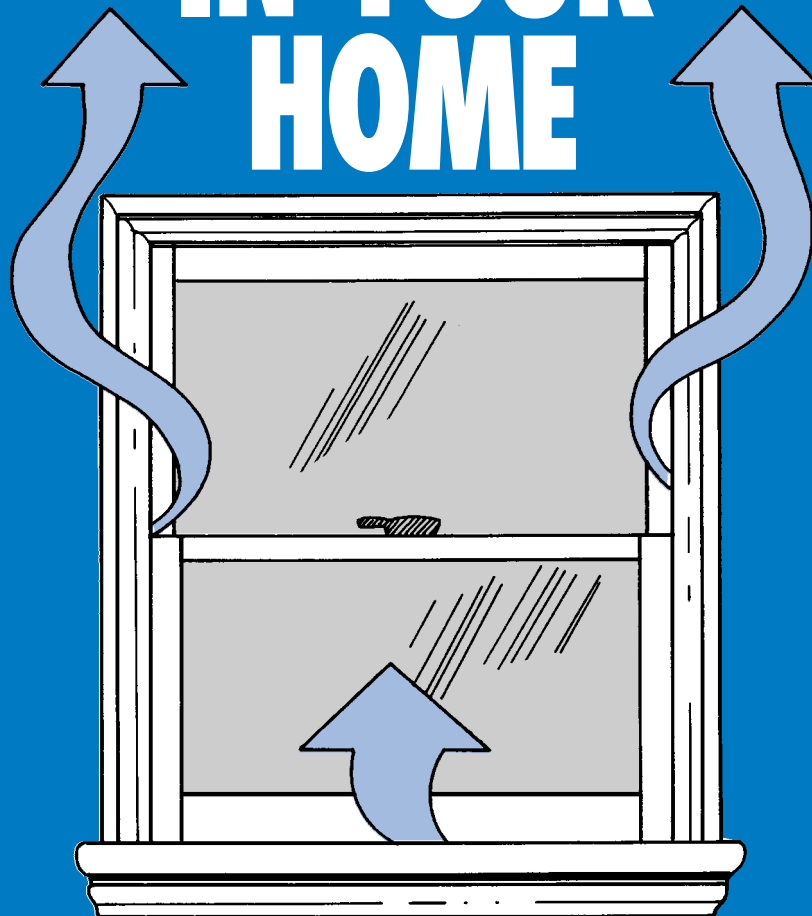


AIR INFILTRATION AND ENERGY EFFICIENCY IN YOUR HOME



When you think about the energy efficiency of a home, things like the heating and cooling system and insulation readily come to mind. These are certainly important to maintaining comfortable temperatures and acceptable energy bills.

Another topic you may have heard or read about recently is air infiltration. Air infiltration is the uncontrolled leakage of air through unintentional openings and it can account for a large part of heat loss in a typical home.

If you're concerned about air infiltration, and you live in an older home, make sure it is insulated to today's energy standards and is properly caulked and weatherstripped around doors and windows.

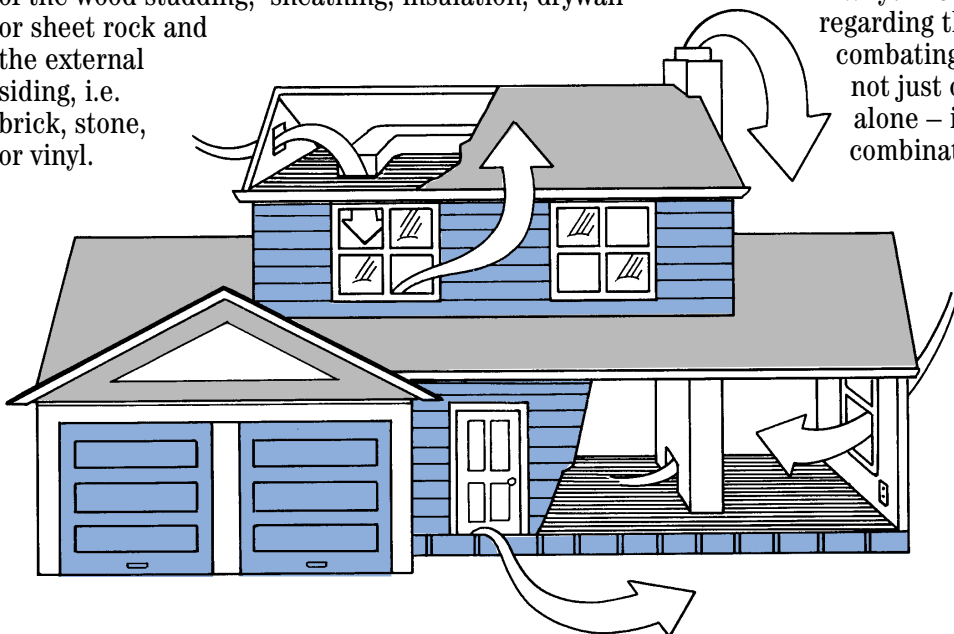
If, however, you are planning to build a new home, you should discuss air infiltration further with your builder. With more and more homebuyers again concerned about energy conservation, there is an increased interest today in controlling air infiltration.

This pamphlet will give you information on how to control air infiltration. First let's look at how heat is lost from a home.

HOW IS HEAT LOST FROM A HOME?

Heat is lost from homes in two ways – through thermal conduction and via air infiltration.

With thermal conduction, heat is lost through the exterior envelope or “shell” of the house. This consists of the wood studding, sheathing, insulation, drywall or sheet rock and the external siding, i.e. brick, stone, or vinyl.



Air infiltration occurs where there are openings in the exterior envelope. Differences in air pressure then allow too much air to easily enter or exit a home. The most common openings are those created by the joining of dissimilar building materials such as:

- **windows and doors and their framing**
- **electrical, cable, telephone & plumbing intrusions**
- **foundations and sill plates**
- **sill plates and sub floors**
- **sub floors and band joists**
- **band joists and sill plates**
- **air duct joints in unheated spaces**
- **HVAC systems**
- **fireplaces**

According to the Department of Energy (DOE), up to 40 percent of a home's heat loss can result from air infiltration.

To insure maximum energy efficiency, numerous factors must work together in a home such as a wise design, the use of quality building products and careful workmanship and installation of these materials. These are extremely important points to keep in mind when talking to your builder.

Why? Because there are a lot of myths out there regarding the effectiveness of some materials in combating air infiltration. Again, remember it's not just one product that fights air infiltration alone – it's an energy-efficient design and a combination of products working together.

The properly designed thermal envelope consists of drywall properly installed and taped, proper sealing and caulking on the inside, properly installed insulation, the exterior sheathing and a properly installed house wrap.

Recently, however, there has been some confusion concerning certain types of insulation and the role insulation plays in the air infiltration issue.

INSULATION AND AIR INFILTRATION FACT VS. MYTH

There are two common types of insulation materials on the market today. By far the most popular material is fiber glass which is made from sand and recycled glass and exists in common batt form and blown-in varieties. In addition to fiber glass, there is cellulose which is a blown-in material made of ground-up newspapers.

Obviously, these insulations have differing qualities as they are made of different materials. There can be differences in R-values, densities, combustibility, corrosivity and smell, to name a few.

But in the case of air infiltration, there are some facts and myths about insulation. Let's take a look at some of them.

FACT: The primary role of wall insulation – of any kind – is to control heat flow. Wall insulations' ability to provide air-flow resistance has little impact on the overall energy performance of a home. Exterior house wraps are meant to control infiltration.

FACT: While it may seem logical that high-density insulations can resist air flow better than low-density materials, this is not important when you realize as discussed above that there are many more products in addition to insulation in the exterior wall construction that must work together to impact air movement.

FACT: The large majority of air that passes through an exterior wall moves through interfaces and seams where the infiltrating air never encounters insulation.

FACT: The conclusion from the above is that insulation alone plays an insignificant role in affecting air infiltration – air barriers, foam sealants, and good construction practices are the keys to controlling it.

FACT: The most important benefits that sidewall insulation provides include comfort and energy savings as well as soundproofing and environmental protection.

FACT: The main route for infiltration through the insulated stud cavity area of exterior walls is through electrical outlets. Studies show that this leakage amounts to only 1% to 4% of a typical home's total infiltration. Since infiltration accounts for up to 40% of a home's total heat loss, electrical outlet infiltration is responsible for 4% of 40%, or 1.6% of a home's total heat loss. This small amount of infiltration can be virtually eliminated by sealing and gasketing electrical boxes.



WHAT SHOULD I DISCUSS WITH MY BUILDER TO INSURE ENERGY EFFICIENCY?

While some of these subjects can get very technical and confusing, the bottom line is that solid thermal construction, including carefully selected building materials combined with excellent workmanship, is the key to energy conservation in any new home.

First, discuss with your builder the overall construction of your home and his strategy for controlling air infiltration. Insist upon a high quality insulation like CertainTeed Fiber Glass Building Insulation with a vapor retarder for sidewall cavities.

On the overall construction, make sure your builder will use an exterior house wrap which is specifically meant to control air infiltration. Also make sure he limits the number of perimeter joints, seals between sills and foundations, caulks around windows and door frames, and weatherstrips around doors. These should all be a natural part of the building process of your new home.

Remember also that the introduction of some outdoor air is important in a home. Homes built "too tight" run the risk of developing odors, moisture and humidity build-up, excess carbon dioxide, radon or other contaminants.

For more information on insulation, air infiltration and building a new home, write to the CertainTeed Home Institute, P.O. Box 860, Valley Forge, PA 19482, call 1-800-782-8777, or visit us on the Internet at <http://www.certainteed.com>.

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