

Tight Construction

Take Control

Take better control of your indoor environment with tight construction. It can mean better comfort, lower energy bills and a more durable home. Tight construction also is a key element in providing healthy indoor air.



Have You Experienced...

- Cold drafts near your fireplace?
- Outdoor air gushing in through open combustion air ducts in your basement?
- Dry indoor air during the winter?
- A carbon monoxide monitor going off for no apparent reason?

These can be symptoms of uncontrolled air leakage.

Capture the Opportunities

A tightly built home can provide many benefits:

Comfort. You will experience fewer cold drafts and more uniform temperatures throughout your home.

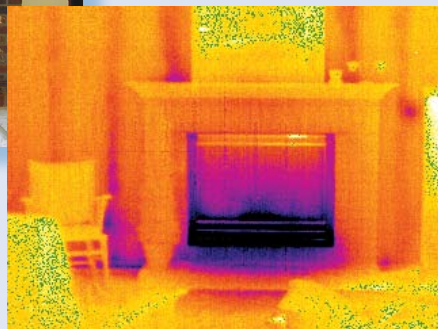
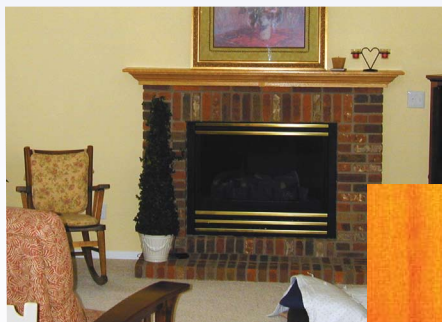
Health. You will have better control over moisture levels and indoor air quality.

Durability. There will be less potential for condensation, mold and rot in hidden building cavities.

Value. Heating and cooling costs will be lower.

Take Control

On average, homes have been built tighter in recent years. Yet, most still have many holes and cracks that allow air to leak between indoors and outdoors. In addition to higher energy costs, this means less control over comfort and indoor air quality. During the winter, air leaks can dry out your home while allowing indoor moisture to get into building cavities where it can cause hidden damage (see [Indoor Moisture](#)). Common construction practices also leave many opportunities for air to “bypass” insulation, meaning the insulation does not perform as well as expected (see [Insulation](#)).



In a Colorado survey of recent new home buyers, about one-quarter of those with fireplaces complained about cold drafts from their fireplaces. These photos show a direct-vent fireplace unit that allows no air movement through the fireplace itself. The cold draft from the base of the fireplace (dark area in infrared photo, right) is due to outdoor air leaking through holes and past the insulation in the framed cavity in which the fireplace is located.

With planning and quality control, it is easy and relatively inexpensive to build a much tighter home. Many common problems can be reduced or eliminated by taking control of air leakage.



The careful attention to air sealing and insulation details as this fireplace cavity is built will stop drafts and help the insulation deliver its rated performance.

Build Tight and Ventilate Right

There is a common perception that tight construction promotes indoor air pollution. The truth is that tight homes and leaky homes can both have indoor air quality problems. Though air leaks can dilute indoor pollutants, you have no control over how much leakage occurs (too much, too little), when it occurs (day, night, winter, summer) or where air that leaks into the house comes from (fresh air from outdoors or polluted air from places like the garage or soil around the foundation).



Open 3-inch hole
No sealing at
perimeter of cover



Holes between
garage and house

Air tightening actually is a key part of a comprehensive strategy for healthy air. Tight construction increases homeowner control over air quality by keeping unwanted pollutants out of the house and allowing mechanical ventilation systems to effectively dilute indoor pollutants. “Build tight and ventilate right” is a phrase coined by progressive builders concerned about their buyers’ health. See [Healthy Indoor Air](#).

Uncontrolled air leaks can bring polluted air into your home. Leakage through a basement sump pit (left) may bring with it moisture, radon and other soil gases. Unplanned connections between the house and garage (right) can bring carbon monoxide and other garage pollutants into the house.

How Tight is Your New Home?

Testing of recently built Colorado homes showed that, on average, homes were moderately tight. However, tightness of individual homes varied by more than a factor of six. In some instances, tightness of similar homes built by the same builder varied by a factor of four.

The only way to know how tight your home will be is through a “blower door test” (right). Progressive contractors set stringent leakage standards that the finished home must meet. See [Quality Control](#).

What’s Important

- Make sure tight construction is teamed up with a quality insulation job and high-performance windows to create an efficient shell. See [Whole-House Approach](#).
- Select sealed-combustion or direct-vent furnaces, water heaters and fireplaces to eliminate uncontrolled leakage through open flues and combustion air ducts. This also will improve comfort and enhance combustion safety. See [Combustion Safety](#).
- Reduce air leakage and avoid other problems by keeping furnaces, air conditioners and ductwork out of attics and vented crawl spaces.
- Ask for blower door test results for the homes you’re looking at.

House as a System

A house is more than just a collection of parts. It is a **system** that incorporates heating, cooling, air circulation, lighting and more. If the pieces don’t work well together, there will be problems. In a high-performing home, a “whole-house” design approach and quality craftsmanship combine to deliver better comfort, healthier indoor air and energy cost savings in a package that’s built to last and hold its value.

Blower Door Testing

A blower door is a quality-control tool that is used to measure how tight the



house has been built and to locate remaining leaks. A large fan in an airtight frame is temporarily placed in an exterior doorway. Pressures and

flows are measured as the fan pulls air from the house. Standard test procedures make it easy to compare the tightness of one home to another.

More Information

This fact sheet is one in a series. Visit the following Web site for more information about tight construction or to review fact sheets on other new home choices: www.ColoradoNewHomeChoices.org.