

Windows

More Than Just a View

High-performance windows are one of the smartest investments you can make in a new home. They bring several important benefits, including the opportunity to install smaller heating and cooling systems. Lower costs for heating and cooling components can offset the added cost for better windows.



Have You Experienced...

- Drafts near your windows during the winter, even when the wind isn't blowing?
- Condensation or ice on your windows on a cold winter morning?
- Overheating from too much sun?
- Fading of carpets, furniture and artwork?

These are common window-related problems.

High-Performance Windows

The menu of window choices has expanded tremendously in recent years. High-performance windows are widely available from almost all manufacturers. The most important difference between high-performance windows and conventional windows is the space-age coatings on the glass. Microscopic films of metal, applied to one or more surfaces of the window during manufacturing, generically are known as "low-e" coatings. By controlling the amount of heat and light that pass through the window, these virtually transparent coatings offer many benefits.

- **All low-e coatings** provide better comfort and energy savings and improve a window's resistance to condensation. They also block some of the wavelengths that cause fading.
- **Solar-control coatings** are specially designed to reduce the amount of heat coming into the house through windows exposed to the sun.

The performance and durability of low-e coatings are well proven from more than a decade of widespread use. Compared with add-on measures such as window films, solar screens or shutters, the coatings are a permanent part of the window and come at a small fraction of the cost.



The interior pane of a conventional, uncoated window gets cold enough to condense indoor moisture even in moderate weather conditions. In comparison, a high-performance window might show condensation only at zero degrees Fahrenheit or below.

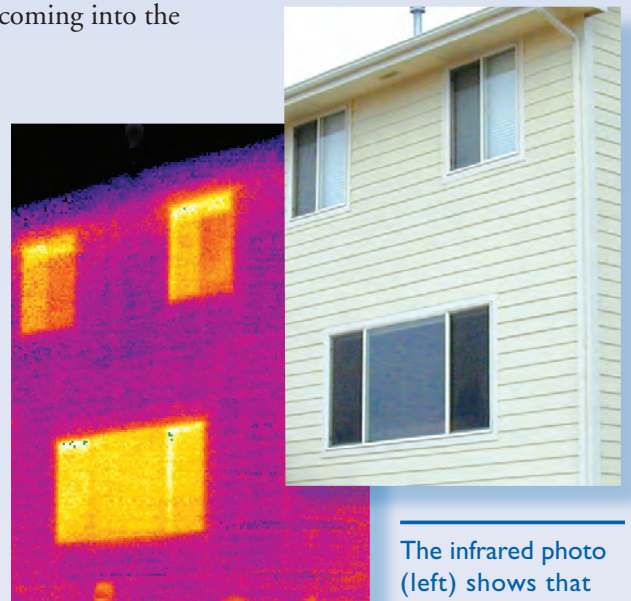
Capture the Opportunities

High-performance windows can provide many benefits:

Comfort. Your house will be warmer in winter, cooler in summer.

Durability. Less condensation means less moisture damage. Fading of interior furnishings will be reduced.

Value. Heating and cooling costs will be lower.



The infrared photo (left) shows that windows behave like holes for heat loss in the shell of your home. High-performance windows do a better job of plugging those holes.

Investing in Windows



Considered alone, high-performance windows will cost you a little more than conventional windows. However, that investment brings opportunities to save money elsewhere as the house is built. Heating and cooling equipment can be smaller (in fact, the need for air conditioning may be eliminated altogether, a \$2,000–4,000 up-front savings). In turn, you may get more up-front savings from installing smaller ductwork. The bottom line: a more expensive, energy-saving window can reduce overall construction costs. Lower heating and cooling bills over the life of the home make that investment look even better. See [Whole-House Approach](#) and [Summer Cooling Choices](#).

In many homes, low-cost metal-framed windows (top) are used in the basement. These windows lose a lot of heat and contribute to a cold basement. The front-end savings may be a false economy, as many owners spend a lot to replace windows like this when they finish the basement. Vinyl inserts (bottom) are one step up in thermal performance, yet not as good as windows typically used in the rest of the home.

NFRC Ratings

In addition to many coating choices, other important window features include frame materials and design, spacing between panes of glass, gas fills and different edge spacer materials. These technical differences between windows can be confusing. Fortunately, National Fenestration Rating Council (NFRC) ratings have made it easy to compare the performance of different windows without learning all the details. Pay most attention to these two NFRC rating numbers:

- **U-Factor** measures how readily a window transfers heat from hot to cold. The lower the U-Factor, the better the window's insulating value. This means better comfort winter and summer, more resistance to condensation, and lower heating and cooling bills.
- **Solar Heat Gain Coefficient** (SHGC) measures how well a window blocks the sun's heat on a zero-to-one scale. The lower the SHGC, the less solar heat passes through. This means better summer comfort, smaller cooling equipment and lower cooling bills.

In most of Colorado, these window ratings are advised: U-Factor of 0.35 or lower, SHGC of 0.40 or below. In cold mountain climates, consider windows with U-Factor of 0.30 or below, SHGC of about 0.50.

What's Important

- High-performance windows teamed up with a quality insulation job and tight construction bring a package of benefits. See [Whole-House Approach](#).
- Ask about window U-Factor and SHGC ratings.
- Look for the same quality windows in the basement that are installed in the rest of the home.
- Pay close attention to window placement, sizing and shading—also very important for comfort and energy bills. See [Solar-Smart Design](#).
- Insist that windows are installed with the proper details to prevent rainwater and snowmelt from getting past the weather barrier. See [Exterior Water Management](#).

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.

More Information

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



 National Fenestration Rating Council CERTIFIED	World's Best Window Co. Millennium 2000+ Vinyl-Clad Wood Frame Double Glazing • Argon Fill • Low E Product Type: Vertical Slider (per NFRC 100-97)
ENERGY PERFORMANCE RATINGS	
U-Factor (U.S./I-P) 0.35	Solar Heat Gain Coefficient 0.32
ADDITIONAL PERFORMANCE RATINGS	
Visible Transmittance 0.51	Air Leakage (U.S./I-P) 0.2
<small>Manufacturer stipulates that these ratings conform to applicable NFRC procedures for determining whole product performance. NFRC ratings are determined for a fixed set of environmental conditions and a specific product size. Consult manufacturer's literature for other product performance information. www.nfrc.org</small>	

Almost all new windows carry a NFRC rating label like this. The two most important numbers are U-Factor and Solar Heat Gain Coefficient.