



The Facts About Solar Heat Gain & Windows

Today and every day, the sun rains down immense quantities of energy on the earth. In colder climates and winter months, this energy can be quite beneficial, warming our homes and reducing our need for heating fuel. In some climates (with the proper designs) solar energy can be used to heat buildings and generate hot water. And there is technology available to create electricity with sunlight (photovoltaics). However, for homes in the warm summer months and for commercial office buildings most of the year, unmanaged solar energy creates a thermal heating load that must be removed by air-conditioning.

The majority of this solar heat gain comes through your windows, glazed doors, and skylights (also called fenestration). The most effective way to manage the amount of solar gain that enters your home or office is to block it before it gets into the building. One way to accomplish this is to install awnings or other exterior shading devices. A simpler method, however, is to simply specify and install windows that have a low Solar Heat Gain Coefficient (or SHGC) rating.

The National Fenestration Rating Council (NFRC) has established a standard method for rating the amount of solar heat gain that is admitted through a window. This standard is **NFRC 200** "Procedure for Determining Fenestration Product Solar Heat Gain Coefficients at Normal Incidents." This standard provides a uniform methodology for indicating the ability of a window, skylight or other glazed product to admit solar heat gain. Therefore, the **lower** the SHGC rating, the **better** the ability of the window to block the heat from the sun.

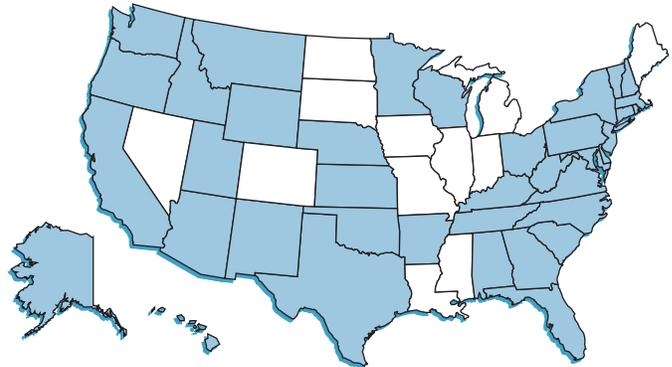
What is SHGC?

A simple way to explain SHGC is in terms of a ratio; where 1 is the maximum amount of solar heat gain that can come through a window and 0 is the least amount. An SHGC of 0.40 then means that 40% of the available solar heat is coming through the window.



It should be noted that SHGC ratings, like all NFRC ratings, express the performance rating for the entire window, not just the glass. This is important, because SHGC ratings also include the ability of a window to absorb the heat from the sun and transmit it (conduct it) through the entire window and into the room. Therefore the type of window, as well as the glass, can affect the SHGC rating.

Where NFRC-Certified Products Are Required or Encouraged

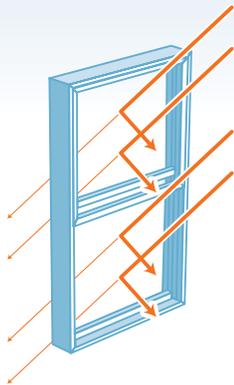


It's Amazing What Glass Can Do

The ability of the glass to block solar heat gain plays an important role in a window's overall SHGC rating. In commercial office buildings, architects have used many types of glass to reduce solar heat gain, including tinted and reflective glass. In the past several years, however, the industry has seen growth in the use of *spectrally selective glass*. This type of

NFRC administers an independent, uniform rating and labeling system for the energy performance of fenestration products, including windows, curtain walls, doors, and skylights. For more information on NFRC, please visit our Web site at www.nfrc.org or contact NFRC directly at 301-589-1776.

glass can be either *tinted* or *coated*, having special properties that actually block or re-radiate the energy from the sun, reducing solar heat gain through the windows. This type of product is also available for use in residential windows, typically with a spectrally selective low-e coating on the surface of the glass. **NFRC 200** ratings provide a simple and uniform means of comparing the Solar Heat Gain performance of these products.



Spectrally selective glass can actually block or re-radiate much of the energy from the sun.

Certified Solar Heat Gain Ratings

Any fenestration manufacturer that wishes to obtain **certified SHGC Ratings** must participate in the NFRC's Certification Program. When a manufacturer follows the certification guidelines, they can place an *NFRC Label* on their product showing the certified SHGC rating, along with ratings for U-factor and visible transmittance. For commercial buildings, a *Label Certificate* can be used to indicate that the fenestration products on that building have been rated in accordance with NFRC standards and programs. Homeowners, builders, architects, and code officials should use these labels to compare products and to assure that the products meet specifications and local code requirements.

NFRC Certified Products Directory

Manufacturers who participate in the NFRC Certification Program have their products and product energy ratings listed in the *NFRC Certified Products Directory*. This directory lists thousand of certified products. The simplified Solar Heat Gain ratings noted above are found in the appendix of the *Directory* under the heading "Specialty Products." In addition, please note that a manufacturer may have an NFRC certified SHGC rating and not be listed in the *Directory*. To be sure that products have an NFRC Certified rating, look for the NFRC Label. The *NFRC Certified Products Directory* is available online at www.nfrc.org.

| ENERGY PERFORMANCE RATINGS | |
|---|--|
| U-Factor (U.S./I-P) A 0.35 | Solar Heat Gain Coefficient B 0.32 |
| ADDITIONAL PERFORMANCE RATINGS | |
| Visible Transmittance C 0.51 | Air Leakage (U.S./I-P) D 0.2 |
| Condensation Resistance E 51 | |
| <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> | |

- A** **U-Factor** measures how well a product prevents heat from escaping a home or building. U-Factor ratings generally fall between 0.20 and 1.20. The lower the U-Factor, the better a product is at keeping heat in. U-Factor is particularly important during the winter heating season. This label displays U-Factor in U.S. units. Labels on products sold in markets outside the United States may display U-Factor in metric units.
- B** **Solar Heat Gain Coefficient (SHGC)** measures how well a product blocks heat from the sun. SHGC is expressed as a number between 0 and 1. The lower the SHGC, the better a product is at blocking unwanted heat gain. Blocking solar heat gain is particularly important during the summer cooling season.
- C** **Visible Transmittance (VT)** measures how much light comes through a product. VT is expressed as a number between 0 and 1. The higher the VT, the higher the potential for daylighting.
- D** **Air Leakage (AL)** measures how much outside air comes into a home or building through a product. AL rates typically fall in a range between 0.1 and 0.3. The lower the AL, the better a product is at keeping air out. AL is an optional rating, and manufacturers can choose not to include it on their labels. This label displays AL in U.S. units. Labels on products sold in markets outside the United States may display AL in metric units.
- E** **Condensation Resistance (CR)** measures how well a product resists the formation of condensation. CR is expressed as a number between 1 and 100. The higher the number, the better a product is able to resist condensation. CR is an optional rating, and manufacturers can choose not to include it on their NFRC labels.