



Herb Johnson  
Coating Development Manager

# AFG HAS REDEFINED SOLAR CONTROL.

Our Energy Star™ approved customers assemble their energy efficient windows and doors with Comfort Ti™, a Low-E glass made by AFG Industries.

# NOW THE CHOICES ARE YOURS

Windows are a wonderful part of any home you build or remodel. They let in light and allow us to share our environment. Windows are both decorative and functional, but today's high tech approach to fenestration can make explaining the various glass options and benefits to your customers a little difficult. First, over 90% of all windows sold today are insulated with two or more sealed lites of glass. Second, over 30% of all windows sold today include a low emissivity coating, and that percentage is much higher as the price point of the home increases. Low-E is a fact of life in today's residential construction, and the Energy Star™ program will speed the growth of this technology through consumer education.

To simplify the issues, there are three inter-related concepts to understand:

- How much solar heating energy should you allow to pass through a window?
- How much radiant energy (converted naturally from solar energy and generated through a furnace or heat pump) do you want to retain in your rooms?
- What is the balance of heating to cooling costs in your climate and geography?

The amount of solar energy passing through the glass in a window is measured by a term called the Solar Heat Gain Coefficient. A low SHGC is appropriate for southern climates with a heavy cooling cost. If you live in the



#### **Comfort Ti-PS**

*offers high passive solar transmission maximizing heat gain throughout the winter months, and reducing annual heating costs in colder regions.*



#### **Comfort Ti-R**

*with its high R-Value, is a balanced performer which can be used to maximize energy efficiency throughout North America.*



#### **Comfort Ti-AC**

*a solar heat blocker, was designed for regions where air conditioning is used most of the year. It minimizes solar heat gain and reduces annual air conditioning costs.*



north and you can save on your heating bills by allowing high levels of passive solar energy to pass through your windows, then you need a high SHGC. In our Comfort Ti™ performance chart, please note the difference in SHGC between the products. Comfort Ti-R™ has a SHGC which balances the differences between heating and cooling and can be used nationally.

The insulating factor of Low-E glass is measured by its emissivity, but the most practical measurement is the U-Value that is derived from emissivity. Basically, the higher the insulating qualities of the coating, the lower the emissivity/U-Value numbers.

## MAKE THE EFFICIENT CHOICE

The final issue is the appropriateness of any combination of performance data for your area. No one product fits all

climates, and in practical terms, it is how the products fit together on an annual basis—combining heating and cooling—which is most important to providing your customers with the best glass technology in the windows you install in your homes. If you have any questions, drop us a note at our “Builder Window” at [www.afglass.com](http://www.afglass.com).

## ENERGY STAR PARTNER

As a supplier partner in the department of Energy and EPA’s Energy Star™ Window Program, Comfort Ti™ glasses represent a breakthrough in solar energy control—offering a full range of product options that met the energy efficiency needs of an entire continent. Whether the goal is to minimize or maximize solar heat gain, Comfort Ti™ offers the right product for your customers’ specific energy control requirements.



## ASK YOUR WINDOW SUPPLIER FOR COMFORT Ti

To learn more about Comfort Ti™, call 1-800-251-0441 or visit [www.afglass.com](http://www.afglass.com).



P.O. Box 929 • Kingsport, TN 37662  
800/251-0441 • 423/229-7200  
[www.afglass.com](http://www.afglass.com)

# COMFORT-Ti PERFORMANCE DATA

The following data is based on dual glazed units with 1/8" glass thickness and a 1/2" air space. Note that calculations reflect coatings on the surface indicated.

	Emissivity (Coated Surface)	U-Factor Winter		U-Factor Summer		Transmittance %			Shading Coefficient		Solar Heat Gain Coefficient
		Air	Argon	Air	Argon	UV	Visible	Solar	Air	Argon	
<b>Comfort Ti-PS (Surface #3)</b>	.05	.30	.24	.30	.24	33	77	50	.68	.69	.59
<b>Comfort Ti-PS (Surface #2)</b>	.05	.30	.24	.30	.23	33	77	50	.62	.62	.54
<b>Comfort Ti-R (Surface #2)</b>	.03	.29	.24	.29	.22	30	71	44	.54	.54	.47
<b>Comfort Ti-AC (Surface #2)</b>	.04	.29	.24	.29	.22	29	62	36	.46	.46	.39

Data calculated by Customer Technical Services. LBL Window 4.1 Program. Center of Glass Values.

## BUILDER'S GLOSSARY OF WINDOW AND GLASS TERMS

**Argon**—An inert, nontoxic gas used in insulating windows to improve the insulating value of sealed glass units.

**Btu**—An abbreviation for British Thermal Unit—the heat required to increase the temperature of one pound of water one degree Fahrenheit.

**Condensation**—The accumulation of water vapor from the air's humidity on any cold surface whose temperature is below the dew point, such as a cold window glass or frame that is exposed to humid indoor air. Low conductivity or warm edge spacers reduce condensation.

**Conduction**—Heat transfer through a material. Heat flows from a higher-temperature area to a lower-temperature one.

**Emissivity**—The relative ability of a surface to reflect heat, with emissivity factors ranging from 0.00 to 1.00. Emissivity, U-Factor, and R-Factor are different ways to evaluate insulating values.

**Low-Emissance (low-E) coating**—Microscopically thin, virtually invisible, metal or metallic oxide layers deposited on a lite of glass and sealed in an insulating glass unit to reduce the U-Factor by suppressing radiant heat flow.

**NFRC**—National Fenestration Rating Council.

**Passive Solar Heat Gain**—Solar energy that passes through a material and is captured naturally, not by mechanical means.

**R-Value**—A measure of the resistance of a glazing material to heat flow. It is the inverse of the U-Factor ( $R = 1/U$ ) and is expressed in units of  $^{\circ}\text{F} \times \text{Sq. Ft.} \times \text{Hr./Btu.}$  A high R-Value window has a greater resistance to heat flow and a higher insulating value than one with a low R-Value.

**Shading coefficient (SC)**—A glass measurement comparing solar heat transmission, related to 1/8-inch clear glass. It is being phased out in favor of the solar heat gain coefficient, and is approximately equal to the SHGC multiplied by 1.15.

**Solar heat gain coefficient (SHGC)**—The fraction of solar radiation transmitted through a window or skylight. The SHGC has replaced the shading coefficient as the standard indicator of a window's shading ability. It is expressed as a percentage. The lower a window's solar heat gain coefficient, the less solar energy it transmits and the greater its shading ability. SHGC can be expressed in terms of the glass alone or can refer to the entire window assembly. SHGC should vary based upon climate and geography with a lower SHGC in the south and a higher SHGC in the north.

**U-Factor (U-Value)**—A measure of the rate of non-solar heat loss or gain through a material or assembly. It is expressed in units of  $\text{Btu/Hr.}\cdot\text{Sq. Ft.}\cdot^{\circ}\text{F}$  ( $\text{W/Sq. m}\cdot^{\circ}\text{C}$ ). Values are normally given for NFRC/ASHRAE winter conditions of  $0^{\circ}\text{F}$  ( $18^{\circ}\text{C}$ ) outdoor temperature,  $70^{\circ}\text{F}$  ( $21^{\circ}\text{C}$ ) indoor temperature, 15 mph wind, and no solar load. The U-Factor may be expressed for the glass alone or the entire window, which includes the effect of the frame and the spacer materials. The lower the U-Factor, the greater a window's resistance to heat flow and the better its insulating value.

**Visible transmittance (VT)**—The percentage or fraction of the visible spectrum (380 to 720 nanometers) weighted by the sensitivity of the eye, that is transmitted through the glazing.