



August 26, 2009  
Thermal 5.2.5

## Guardian Total Performance Calculator

### OUTDOORS

Temps      R-Value  
Winter Nite      Air .189

Air -0.4

Lite	Clear	#1 -----	
	Thickness = 1/4" = 6 mm	#2 SunGuard® SuperNeutral 68	

3.5      .032

4.1

Gap	Air		2.384
	Space = 1/2" = 12 mm		

Lite	Clear	#3 -----	
	Thickness = 1/4" = 6 mm	#4 -----	

52.8      .032

**53.5**

Total Unit = .942" = 23.9mm      Slope = 90°      Air 69.8      Air .798

### INDOORS

(°F) R<sub>total</sub> = 3.435

Outboard Lite Coating & Substrate	Inboard Lite Coating & Substrate	Visible Light			Solar Energy (Direct)		Winter	Summer				Light to Solar Gain (LSG)
		% Trans- mittance	% Reflectance		% Trans- mittance	Reflect % Out	U-Factor	U-Factor	Shading Coef.	SHGC	Relative Heat Gain	
			Indoor	Outdoor			Night- time					
<b>Uncoated Clear</b>	<b>Uncoated Clear</b>	<b>80</b>	<b>15</b>	<b>15</b>	<b>66</b>	<b>12</b>	<b>.47</b>	<b>.50</b>	<b>.84</b>	<b>.732</b>	<b>176</b>	<b>1.09</b>
<b>SuperNeutral 68 on Clear</b>	<b>Uncoated Clear</b>	<b>68</b>	<b>12</b>	<b>11</b>	<b>33</b>	<b>32</b>	<b>.29</b>	<b>.28</b>	<b>.43</b>	<b>.377</b>	<b>90</b>	<b>1.80</b>

ASHRAE NFRC 2004

The performance values shown above represent NOMINAL VALUES for the center of glass (no spacer or framing). Slight variations may occur due to manufacturing tolerances, point of manufacture, and type of instrumentation used to measure the optical properties.

#### EXPLANATION OF NFRC 2001 STANDARD TERMS

Visible Light = radiant energy in the wavelength range of 380 nm to 780 nm with Ill. D65 and CIE 2° observer

% Transmittance = percentage of visible light at normal incidence (90° to surface) directly transmitted through the glass

% Reflectance Indoors = percentage of visible light at normal incidence directly reflected from the glass back indoors

% Reflectance Outdoors = percentage of visible light at normal incidence directly reflected from the glass back outdoors

Solar Energy (Direct) = radiant energy from the sun having a wavelength range of 300 nm to 2500 nm at ASTM air mass of 1.5

% Transmittance = percentage of solar energy at normal incidence (90° to surface) directly transmitted through the glass

Reflect % Out = percentage of solar energy at normal incidence directly reflected from the glass back outdoors

U-Factor = (also called U-Value) air-to-air thermal conductance of 39" high glazing and associated air films. Units are Btu/hr.ft².F.

**Winter-night = 12.3 mph wind at -0.4°F & 69.8°F indoors. Summer = 0 sun, 6.15 mph wind at 89.6°F & 75.2°F still indoor air.**

Shading Coef. = (SC) fraction of solar heat, direct (300 to 2500 nm) plus indirect (5 to 40 μm), transferred indoors through the glass. For reference, 1/8" (3.1 mm) clear glass has a value of 1.00 (SC is an older term being replaced by the SHGC).

SHGC = (Solar Heat Gain Coefficient) fraction of solar energy incident on the glazing that is transferred indoors both directly and indirectly through the glazing. The direct gain portion equals the direct solar transmittance, while the indirect is the fraction of the solar energy absorbed to the energy reradiated & convected indoors. No heat gain from warmer outdoor air is included.

SHGC = (Direct Solar Trans) + {[(Indirect Solar Heat Gain) - (Summer U-Value)(89.6°F - 75.2°F)] / (248.209 Btu/hr.ft²)}

Relative Heat Gain = (RHG) total net heat gain to the indoors due to both the air-to-air thermal conductance and the solar heat gain. The units are Btu/hr.ft². RHG = [(Summer U-Value)(89.6°F - 75.2°F) + (Shading Coef.)(200 Btu/hr.ft²)]