


6mm HD Blue +12mm AS+ 6mm clear

Make-up Name	Make-up Icon	Glass 1 & Coating	Glass 2 & Coating	Transmittance		Reflectance			U-Value Summer Day (W/m ² ·K)	Relative Heat Gain (RHG)	Shading Coefficient (sc)	Solar Heat Gain Coefficient (SHGC)	Color Rendering Index (R _a)
				Visible (τ _v %)	Solar (τ _e %)	Visible		Solar					
						ρ _v % out	ρ _v % in	ρ _e % out					
Default Make-up 01		Guardian HD Blue (Middle East) on Clear (Middle East)	Clear (Middle East)	23	19	21	31	16	2.63	242	0.35	0.31	98.3

Calculation Standard: NFRC 2010

Default Make-up 01

		Outdoors		Thermal Stress Guidance (COG)
				(°C)
GLASS 1	Clear (Middle East) Thickness = 1/4" = 6mm	#1 -----	#2 Guardian HD Blue (Middle East)	Caution 69.0
	GAP 1	100% Air, 12mm		
GLASS 2	Clear (Middle East) Thickness = 1/4" = 6mm	#3 -----	#4 -----	Go 44.9
	Total Unit (Nominal) = 24 mm		Slope = 90°	
		Estimated Nominal Glazing Weight: 28.05 kg/m ²		
		Indoors		

Important Notes

The performance values shown above represent NOMINAL VALUES for the center of glass with no spacer system or framing. Slight variations may occur due to manufacturing tolerances, point of manufacture, and type of instrumentation used to measure the optical properties. For configurations that include non-specular (diffuse) components, performance results cannot be verified and should only be used as a general indication of performance. For configurations which include ceramic frit coating, the actual values may vary significantly based upon the thickness and composition of the frit. For configurations with coatings laminated facing the PVB, there may be a noticeable color change. Guardian recommends a full size mock-up be approved. Calculations and terms in this report are based on NFRC 2010.

Please note that the THERMAL STRESS GUIDELINE is only a rough reference to the thermal safety of a glazing. Other factors such as the size of glass areas, shapes and patterns, glass thickness, glass damaged during shipping, handling or installation, orientation of the building, exterior shading, overhangs/fins that reduce wind speed, and areas with high daily temperature fluctuations can all increase the probability of thermal breakage. The results shown are not for any specific glazing installation and do not constitute a warranty against glass breakage.

Explanation of Terms

% Transmittance Visible or Light Transmittance (τ_v %) is the percentage of visible light at normal incidence (90° to surface) that is transmitted by the glass.

% Ultraviolet (UV) Transmittance (τ_{UV} %) is the percentage of ultraviolet light at normal incidence directly transmitted by the glass. Ultraviolet Light is defined as radiant energy from the sun having a wavelength range of 300 nm to 380 nm.

% Solar Energy Direct Transmittance (τ_e %) is the percentage of solar energy at normal incidence directly transmitted by the glass. Solar Energy is the radiant energy from the sun having a wavelength range of 300 nm to 2500 nm.

% Reflectance Visible Outdoors or Light Reflectance Out (ρ_v % out) is the percentage of visible light at normal incidence directly reflected by the glass back outdoors.

% Reflectance Visible Indoors or Light Reflectance In (ρ_v % in) is the percentage of visible light at normal incidence directly reflected by the glass back indoors.

% Solar Energy Reflected Outdoors or Solar Direct Reflectance Out (ρ_e % out) is the percentage of solar energy at normal incidence directly reflected by the glass back outdoors.

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Absorptance (α_e %) (Solar, Visible or UV) is defined as a process in which a range of radiation is retained by a substance and converted into heat energy. The creation of heat energy also causes the substance to emit its own radiation.

U-Factor or U-Value (U_G) is the air-to-air thermal conductance of 39" high glazing and associated air films. US Standard units are Btu/hr.ft².F. and SI / Metric units are W/m²K. Winter night values are 12.3 mph wind at -0.4°F outdoors and 69.8°F still indoor air. Summer values are 0 sun, 6.15 mph wind at 89.6°F outdoors and 75.2°F still indoor air.

Relative Heat Gain (RHG) is the total net heat gain to the indoors due to both the air-to-air thermal conductance and the solar heat gain. Imperial units are Btu/hr.ft². $RHG = [(Summer\ U-Value)(89.6^\circ F - 75.2^\circ F) + (Shading\ Coefficient)(200\ Btu/hr-ft^2)]$. Metric units are W/m². $RHG = [(Summer\ U-Value)(32^\circ C - 24^\circ C) + (Shading\ Coef.)(631\ W/m^2)]$

Shading Coefficient (SC) is the fraction of solar heat, direct (300 to 2500 nm) plus indirect (5 to 40 μ m), 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).

Solar Heat Gain Coefficient (SHGC) is the 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 and convected indoors. No heat gain from warmer outdoor air is included. $SHGC = (Direct\ Solar\ Trans) + \{[(Indirect\ Solar\ Heat\ Gain) - (Summer\ U-Value)(89.6^\circ F - 75.2^\circ F)] / (248.209\ Btu/hr-ft^2)\}$

Light-to-Solar Gain (LSG) is the ratio of visible light gain to solar gain. $LSG = (Visible\ Transmittance) / (SHGC)$

Color Rendering Index in transmission, D65 (R_a) is the change in color of an object as a result of the light being transmitted by the glass.


Weighted Sound Reduction Index (R_w) is a single-number quantity which characterizes the airborne sound insulation of a material or building element over a range of frequencies.

Sound Transmission Class (STC) is a single-number quantity which characterizes the airborne sound insulation of a material or building element over a range of frequencies.

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6mm HD Bronze +12mm AS+ 6mm clear

Make-up Name	Make-up Icon	Glass 1 & Coating	Glass 2 & Coating	Transmittance		Reflectance			U-Value Summer Day (W/m ² ·K)	Relative Heat Gain (RHG)	Shading Coefficient (sc)	Solar Heat Gain Coefficient (SHGC)	Color Rendering Index (R _a)
				Visible (τ _v %)	Solar (τ _e %)	Visible		Solar					
						ρ _v % out	ρ _v % in	ρ _e % out					
Default Make-up 01		Guardian HD Bronze (Middle East) on Clear (Middle East)	Clear (Middle East)	21	16	14	10	17	2.47	210	0.30	0.27	95.6

Calculation Standard: NFRC 2010

Default Make-up 01

		Outdoors		Thermal Stress Guidance (COG)
				(°C)
GLASS 1	Clear (Middle East)	#1 -----	#2 Guardian HD Bronze (Middle East)	Caution 71.3
	Thickness = 1/4" = 6mm			
GAP 1	100% Air, 12mm			
GLASS 2	Clear (Middle East)	#3 -----	#4 -----	Go 44.0
	Thickness = 1/4" = 6mm			
Total Unit (Nominal) = 24 mm		Slope = 90°		
Estimated Nominal Glazing Weight: 28.05 kg/m ²				
		Indoors		

Important Notes

The performance values shown above represent NOMINAL VALUES for the center of glass with no spacer system or framing. Slight variations may occur due to manufacturing tolerances, point of manufacture, and type of instrumentation used to measure the optical properties. For configurations that include non-specular (diffuse) components, performance results cannot be verified and should only be used as a general indication of performance. For configurations which include ceramic frit coating, the actual values may vary significantly based upon the thickness and composition of the frit. For configurations with coatings laminated facing the PVB, there may be a noticeable color change. Guardian recommends a full size mock-up be approved. Calculations and terms in this report are based on NFRC 2010.

Please note that the THERMAL STRESS GUIDELINE is only a rough reference to the thermal safety of a glazing. Other factors such as the size of glass areas, shapes and patterns, glass thickness, glass damaged during shipping, handling or installation, orientation of the building, exterior shading, overhangs/fins that reduce wind speed, and areas with high daily temperature fluctuations can all increase the probability of thermal breakage. The results shown are not for any specific glazing installation and do not constitute a warranty against glass breakage.

Explanation of Terms

% Transmittance Visible or Light Transmittance (τ_v %) is the percentage of visible light at normal incidence (90° to surface) that is transmitted by the glass.

% Ultraviolet (UV) Transmittance (τ_{UV} %) is the percentage of ultraviolet light at normal incidence directly transmitted by the glass. Ultraviolet Light is defined as radiant energy from the sun having a wavelength range of 300 nm to 380 nm.

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Absorptance (α_e %) (Solar, Visible or UV) is defined as a process in which a range of radiation is retained by a substance and converted into heat energy. The creation of heat energy also causes the substance to emit its own radiation.

U-Factor or U-Value (U_G) is the air-to-air thermal conductance of 39" high glazing and associated air films. US Standard units are Btu/hr.ft².F. and SI / Metric units are W/m²K. Winter night values are 12.3 mph wind at -0.4°F outdoors and 69.8°F still indoor air. Summer values are 0 sun, 6.15 mph wind at 89.6°F outdoors and 75.2°F still indoor air.

Relative Heat Gain (RHG) is the total net heat gain to the indoors due to both the air-to-air thermal conductance and the solar heat gain. Imperial units are Btu/hr.ft². $RHG = [(Summer\ U-Value)(89.6^\circ F - 75.2^\circ F) + (Shading\ Coefficient)(200\ Btu/hr-ft^2)]$. Metric units are W/m². $RHG = [(Summer\ U-Value)(32^\circ C - 24^\circ C) + (Shading\ Coef.)(631\ W/m^2)]$

Shading Coefficient (SC) is the fraction of solar heat, direct (300 to 2500 nm) plus indirect (5 to 40 μ m), 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).

Solar Heat Gain Coefficient (SHGC) is the 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 and convected indoors. No heat gain from warmer outdoor air is included. $SHGC = (Direct\ Solar\ Trans) + \{[(Indirect\ Solar\ Heat\ Gain) - (Summer\ U-Value)(89.6^\circ F - 75.2^\circ F)] / (248.209\ Btu/hr-ft^2)\}$

Light-to-Solar Gain (LSG) is the ratio of visible light gain to solar gain. $LSG = (Visible\ Transmittance) / (SHGC)$

Color Rendering Index in transmission, D65 (R_a) is the change in color of an object as a result of the light being transmitted by the glass.


Weighted Sound Reduction Index (R_w) is a single-number quantity which characterizes the airborne sound insulation of a material or building element over a range of frequencies.

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6mm HD Green+12mm AS+ 6mm clear

Make-up Name	Make-up Icon	Glass 1 & Coating	Glass 2 & Coating	Transmittance		Reflectance			U-Value Summer Day (W/m ² ·K)	Relative Heat Gain (RHG)	Shading Coefficient (sc)	Solar Heat Gain Coefficient (SHGC)	Color Rendering Index (R _a)
				Visible (τ _v %)	Solar (τ _e %)	Visible		Solar					
						ρ _v % out	ρ _v % in	ρ _e % out					
Default Make-up 01		Guardian HD Green (Middle East) on Clear (Middle East)	Clear (Middle East)	30	27	28	21	16	2.69	291	0.43	0.37	94.7

Calculation Standard: NFRC 2010

Default Make-up 01

		Outdoors		Thermal Stress Guidance (COG)
				(°C)
GLASS 1	Clear (Middle East)	#1 -----	#2 Guardian HD Green (Middle East)	Caution 65.8
	Thickness = 1/4" = 6mm			
GAP 1	100% Air, 12mm			
GLASS 2	Clear (Middle East)	#3 -----	#4 -----	Go 44.6
	Thickness = 1/4" = 6mm			
Total Unit (Nominal) = 24 mm		Slope = 90°		
Estimated Nominal Glazing Weight: 28.05 kg/m ²				
		Indoors		

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6mm HD Grey +12mm AS+ 6mm clear

Make-up Name	Make-up Icon	Glass 1 & Coating	Glass 2 & Coating	Transmittance		Reflectance			U-Value Summer Day (W/m ² ·K)	Relative Heat Gain (RHG)	Shading Coefficient (sc)	Solar Heat Gain Coefficient (SHGC)	Color Rendering Index (R _a)
				Visible (τ _v %)	Solar (τ _e %)	Visible		Solar					
						ρ _v % out	ρ _v % in	ρ _e % out					
Default Make-up 01		Guardian HD Grey (Middle East) on Clear (Middle East)	Clear (Middle East)	18	15	12	13	14	2.58	214	0.31	0.27	94.9

Calculation Standard: NFRC 2010

Default Make-up 01

		Outdoors		Thermal Stress Guidance (COG)
				(°C)
GLASS 1	Clear (Middle East)	#1 -----	#2 Guardian HD Grey (Middle East)	Caution 72.3
	Thickness = 1/4" = 6mm			
GAP 1	100% Air, 12mm			
GLASS 2	Clear (Middle East)	#3 -----	#4 -----	Go 45.4
	Thickness = 1/4" = 6mm			
Total Unit (Nominal) = 24 mm		Slope = 90°		
Estimated Nominal Glazing Weight: 28.05 kg/m ²				
		Indoors		

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6mm HD Plus Blue +12mm AS+ 6mm clear

Make-up Name	Make-up Icon	Glass 1 & Coating	Glass 2 & Coating	Transmittance		Reflectance			U-Value Summer Day (W/m ² ·K)	Relative Heat Gain (RHG)	Shading Coefficient (sc)	Solar Heat Gain Coefficient (SHGC)	Color Rendering Index (R _a)
				Visible (τ _v %)	Solar (τ _e %)	Visible		Solar					
						ρ _v % out	ρ _v % in	ρ _e % out					
Default Make-up 01		SunGuard® HD Plus Blue T (Middle East) on Clear (Middle East)	Clear (Middle East)	12	11	11	13	12	2.57	190	0.27	0.24	95.9

Calculation Standard: NFRC 2010

Default Make-up 01

		Outdoors		Thermal Stress Guidance (COG)
				(°C)
GLASS 1	Clear (Middle East)	#1 -----		Stop 74.7
	Thickness = 1/4" = 6mm	#2 SunGuard® HD Plus Blue T (Middle East)		
GAP 1	100% Air, 12mm			
GLASS 2	Clear (Middle East)	#3 -----		Go 45.8
	Thickness = 1/4" = 6mm	#4 -----		
Total Unit (Nominal) = 24 mm		Slope = 90°		
Estimated Nominal Glazing Weight: 28.05 kg/m ²				
		Indoors		

Important Notes

The performance values shown above represent NOMINAL VALUES for the center of glass with no spacer system or framing. Slight variations may occur due to manufacturing tolerances, point of manufacture, and type of instrumentation used to measure the optical properties. For configurations that include non-specular (diffuse) components, performance results cannot be verified and should only be used as a general indication of performance. For configurations which include ceramic frit coating, the actual values may vary significantly based upon the thickness and composition of the frit. For configurations with coatings laminated facing the PVB, there may be a noticeable color change. Guardian recommends a full size mock-up be approved. Calculations and terms in this report are based on NFRC 2010.

Please note that the THERMAL STRESS GUIDELINE is only a rough reference to the thermal safety of a glazing. Other factors such as the size of glass areas, shapes and patterns, glass thickness, glass damaged during shipping, handling or installation, orientation of the building, exterior shading, overhangs/fins that reduce wind speed, and areas with high daily temperature fluctuations can all increase the probability of thermal breakage. The results shown are not for any specific glazing installation and do not constitute a warranty against glass breakage.

Explanation of Terms

% Transmittance Visible or Light Transmittance (τ_v %) is the percentage of visible light at normal incidence (90° to surface) that is transmitted by the glass.

% Ultraviolet (UV) Transmittance (τ_{uv} %) is the percentage of ultraviolet light at normal incidence directly transmitted by the glass. Ultraviolet Light is defined as radiant energy from the sun having a wavelength range of 300 nm to 380 nm.

% Solar Energy Direct Transmittance (τ_e %) is the percentage of solar energy at normal incidence directly transmitted by the glass. Solar Energy is the radiant energy from the sun having a wavelength range of 300 nm to 2500 nm.

% Reflectance Visible Outdoors or Light Reflectance Out (ρ_v % out) is the percentage of visible light at normal incidence directly reflected by the glass back outdoors.

% Reflectance Visible Indoors or Light Reflectance In (ρ_v % in) is the percentage of visible light at normal incidence directly reflected by the glass back indoors.

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Absorptance (α_e %) (Solar, Visible or UV) is defined as a process in which a range of radiation is retained by a substance and converted into heat energy. The creation of heat energy also causes the substance to emit its own radiation.

U-Factor or U-Value (U_G) is the air-to-air thermal conductance of 39" high glazing and associated air films. US Standard units are Btu/hr.ft².F. and SI / Metric units are W/m²K. Winter night values are 12.3 mph wind at -0.4°F outdoors and 69.8°F still indoor air. Summer values are 0 sun, 6.15 mph wind at 89.6°F outdoors and 75.2°F still indoor air.

Relative Heat Gain (RHG) is the total net heat gain to the indoors due to both the air-to-air thermal conductance and the solar heat gain. Imperial units are Btu/hr.ft². $RHG = [(Summer\ U-Value)(89.6^\circ F - 75.2^\circ F) + (Shading\ Coefficient)(200\ Btu/hr-ft^2)]$. Metric units are W/m². $RHG = [(Summer\ U-Value)(32^\circ C - 24^\circ C) + (Shading\ Coef.)(631\ W/m^2)]$

Shading Coefficient (SC) is the fraction of solar heat, direct (300 to 2500 nm) plus indirect (5 to 40 μ m), 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).

Solar Heat Gain Coefficient (SHGC) is the 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 and convected indoors. No heat gain from warmer outdoor air is included. $SHGC = (Direct\ Solar\ Trans) + \{[(Indirect\ Solar\ Heat\ Gain) - (Summer\ U-Value)(89.6^\circ F - 75.2^\circ F)] / (248.209\ Btu/hr-ft^2)\}$

Light-to-Solar Gain (LSG) is the ratio of visible light gain to solar gain. $LSG = (Visible\ Transmittance) / (SHGC)$

Color Rendering Index in transmission, D65 (R_a) is the change in color of an object as a result of the light being transmitted by the glass.


Weighted Sound Reduction Index (R_w) is a single-number quantity which characterizes the airborne sound insulation of a material or building element over a range of frequencies.

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6mm HD Plus Blue-Green +12mm AS+ 6mm clear

Make-up Name	Make-up Icon	Glass 1 & Coating	Glass 2 & Coating	Transmittance		Reflectance			U-Value Summer Day (W/m ² ·K)	Relative Heat Gain (RHG)	Shading Coefficient (sc)	Solar Heat Gain Coefficient (SHGC)	Color Rendering Index (R _a)
				Visible (τ _v %)	Solar (τ _e %)	Visible		Solar					
						ρ _v % out	ρ _v % in	ρ _e % out					
Default Make-up 01		SunGuard® HD Plus Blue-Green T (Middle East) on Clear (Middle East)	Clear (Middle East)	11	9	16	14	12	2.54	178	0.25	0.22	94.9

Calculation Standard: NFRC 2010

Default Make-up 01

		Outdoors		Thermal Stress Guidance (COG) (°C)
GLASS 1	Clear (Middle East) Thickness = 1/4" = 6mm	#1 -----	#2 SunGuard® HD Plus Blue-Green T (Middle East)	Stop 75.6
	GAP 1	100% Air, 12mm		
GLASS 2	Clear (Middle East) Thickness = 1/4" = 6mm	#3 -----	#4 -----	Go 45.8
	Total Unit (Nominal) = 24 mm		Slope = 90°	
Estimated Nominal Glazing Weight: 28.05 kg/m ²				
		Indoors		

Important Notes

The performance values shown above represent NOMINAL VALUES for the center of glass with no spacer system or framing. Slight variations may occur due to manufacturing tolerances, point of manufacture, and type of instrumentation used to measure the optical properties. For configurations that include non-specular (diffuse) components, performance results cannot be verified and should only be used as a general indication of performance. For configurations which include ceramic frit coating, the actual values may vary significantly based upon the thickness and composition of the frit. For configurations with coatings laminated facing the PVB, there may be a noticeable color change. Guardian recommends a full size mock-up be approved. Calculations and terms in this report are based on NFRC 2010.

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Explanation of Terms

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Absorptance (α_e %) (Solar, Visible or UV) is defined as a process in which a range of radiation is retained by a substance and converted into heat energy. The creation of heat energy also causes the substance to emit its own radiation.

U-Factor or U-Value (U_G) is the air-to-air thermal conductance of 39" high glazing and associated air films. US Standard units are Btu/hr.ft².F. and SI / Metric units are W/m²K. Winter night values are 12.3 mph wind at -0.4°F outdoors and 69.8°F still indoor air. Summer values are 0 sun, 6.15 mph wind at 89.6°F outdoors and 75.2°F still indoor air.

Relative Heat Gain (RHG) is the total net heat gain to the indoors due to both the air-to-air thermal conductance and the solar heat gain. Imperial units are Btu/hr.ft². $RHG = [(Summer\ U-Value)(89.6^\circ F - 75.2^\circ F) + (Shading\ Coefficient)(200\ Btu/hr-ft^2)]$. Metric units are W/m². $RHG = [(Summer\ U-Value)(32^\circ C - 24^\circ C) + (Shading\ Coef.)(631\ W/m^2)]$

Shading Coefficient (SC) is the fraction of solar heat, direct (300 to 2500 nm) plus indirect (5 to 40 μ m), 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).

Solar Heat Gain Coefficient (SHGC) is the 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 and convected indoors. No heat gain from warmer outdoor air is included. $SHGC = (Direct\ Solar\ Trans) + \{[(Indirect\ Solar\ Heat\ Gain) - (Summer\ U-Value)(89.6^\circ F - 75.2^\circ F)] / (248.209\ Btu/hr-ft^2)\}$

Light-to-Solar Gain (LSG) is the ratio of visible light gain to solar gain. $LSG = (Visible\ Transmittance) / (SHGC)$

Color Rendering Index in transmission, D65 (R_a) is the change in color of an object as a result of the light being transmitted by the glass.


Weighted Sound Reduction Index (R_w) is a single-number quantity which characterizes the airborne sound insulation of a material or building element over a range of frequencies.

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6mm HD Plus Bronze +12mm AS+ 6mm clear

Make-up Name	Make-up Icon	Glass 1 & Coating	Glass 2 & Coating	Transmittance		Reflectance			U-Value Summer Day (W/m ² ·K)	Relative Heat Gain (RHG)	Shading Coefficient (sc)	Solar Heat Gain Coefficient (SHGC)	Color Rendering Index (R _a)
				Visible (τ _v %)	Solar (τ _e %)	Visible		Solar					
						ρ _v % out	ρ _v % in	ρ _e % out					
Default Make-up 01		SunGuard® HD Plus Bronze T (Middle East) on Clear (Middle East)	Clear (Middle East)	12	11	12	17	15	2.56	185	0.26	0.23	99.0

Calculation Standard: NFRC 2010

Default Make-up 01

		Outdoors		Thermal Stress Guidance (COG) (°C)
GLASS 1	Clear (Middle East) Thickness = 1/4" = 6mm	#1 -----	#2 SunGuard® HD Plus Bronze T (Middle East)	Caution 73.1
	GAP 1	100% Air, 12mm		
GLASS 2	Clear (Middle East) Thickness = 1/4" = 6mm	#3 -----	#4 -----	Go 45.1
	Total Unit (Nominal) = 24 mm		Slope = 90°	
Estimated Nominal Glazing Weight: 28.05 kg/m ²				
		Indoors		

Important Notes

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U-Factor or U-Value (U_G) is the air-to-air thermal conductance of 39" high glazing and associated air films. US Standard units are Btu/hr.ft².F. and SI / Metric units are W/m²K. Winter night values are 12.3 mph wind at -0.4°F outdoors and 69.8°F still indoor air. Summer values are 0 sun, 6.15 mph wind at 89.6°F outdoors and 75.2°F still indoor air.

Relative Heat Gain (RHG) is the total net heat gain to the indoors due to both the air-to-air thermal conductance and the solar heat gain. Imperial units are Btu/hr.ft². $RHG = [(Summer\ U-Value)(89.6^\circ F - 75.2^\circ F) + (Shading\ Coefficient)(200\ Btu/hr-ft^2)]$. Metric units are W/m². $RHG = [(Summer\ U-Value)(32^\circ C - 24^\circ C) + (Shading\ Coef.)(631\ W/m^2)]$

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Light-to-Solar Gain (LSG) is the ratio of visible light gain to solar gain. $LSG = (Visible\ Transmittance) / (SHGC)$

Color Rendering Index in transmission, D65 (R_a) is the change in color of an object as a result of the light being transmitted by the glass.


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6mm HD Plus Green +12mm AS+ 6mm clear

Make-up Name	Make-up Icon	Glass 1 & Coating	Glass 2 & Coating	Transmittance		Reflectance			U-Value Summer Day (W/m ² ·K)	Relative Heat Gain (RHG)	Shading Coefficient (sc)	Solar Heat Gain Coefficient (SHGC)	Color Rendering Index (R _a)
				Visible (τ _v %)	Solar (τ _e %)	Visible		Solar					
						ρ _v % out	ρ _v % in	ρ _e % out					
Default Make-up 01		SunGuard® HD Plus Green T (Middle East) on Clear (Middle East)	Clear (Middle East)	11	10	16	13	11	2.56	185	0.26	0.23	95.7

Calculation Standard: NFRC 2010

Default Make-up 01

		Outdoors		Thermal Stress Guidance (COG)
				(°C)
GLASS 1	Clear (Middle East)	#1 -----		Stop 75.6
	Thickness = 1/4" = 6mm	#2 SunGuard® HD Plus Green T (Middle East)		
GAP 1	100% Air, 12mm			
GLASS 2	Clear (Middle East)	#3 -----		Go 46.0
	Thickness = 1/4" = 6mm	#4 -----		
Total Unit (Nominal) = 24 mm		Slope = 90°		
Estimated Nominal Glazing Weight: 28.05 kg/m ²				
		Indoors		

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6mm HD Plus Grey +12mm AS+ 6mm clear

Make-up Name	Make-up Icon	Glass 1 & Coating	Glass 2 & Coating	Transmittance		Reflectance			U-Value Summer Day (W/m ² ·K)	Relative Heat Gain (RHG)	Shading Coefficient (sc)	Solar Heat Gain Coefficient (SHGC)	Color Rendering Index (R _a)
				Visible (τ _v %)	Solar (τ _e %)	Visible		Solar					
						ρ _v % out	ρ _v % in	ρ _e % out					
Default Make-up 01		SunGuard® HD Plus Grey T (Middle East) on Clear (Middle East)	Clear (Middle East)	11	11	5	20	9	2.54	191	0.27	0.24	98.3

Calculation Standard: NFRC 2010

Default Make-up 01

		Outdoors		Thermal Stress Guidance (COG) (°C)
GLASS 1	Clear (Middle East) Thickness = 1/4" = 6mm	#1 -----	#2 SunGuard® HD Plus Grey T (Middle East)	Stop 76.2
	GAP 1	100% Air, 12mm		
GLASS 2	Clear (Middle East) Thickness = 1/4" = 6mm	#3 -----	#4 -----	Go 46.3
	Total Unit (Nominal) = 24 mm		Slope = 90°	
Estimated Nominal Glazing Weight: 28.05 kg/m ²				
		Indoors		

Important Notes

The performance values shown above represent NOMINAL VALUES for the center of glass with no spacer system or framing. Slight variations may occur due to manufacturing tolerances, point of manufacture, and type of instrumentation used to measure the optical properties. For configurations that include non-specular (diffuse) components, performance results cannot be verified and should only be used as a general indication of performance. For configurations which include ceramic frit coating, the actual values may vary significantly based upon the thickness and composition of the frit. For configurations with coatings laminated facing the PVB, there may be a noticeable color change. Guardian recommends a full size mock-up be approved. Calculations and terms in this report are based on NFRC 2010.

Please note that the THERMAL STRESS GUIDELINE is only a rough reference to the thermal safety of a glazing. Other factors such as the size of glass areas, shapes and patterns, glass thickness, glass damaged during shipping, handling or installation, orientation of the building, exterior shading, overhangs/fins that reduce wind speed, and areas with high daily temperature fluctuations can all increase the probability of thermal breakage. The results shown are not for any specific glazing installation and do not constitute a warranty against glass breakage.

Explanation of Terms

% Transmittance Visible or Light Transmittance (τ_v %) is the percentage of visible light at normal incidence (90° to surface) that is transmitted by the glass.

% Ultraviolet (UV) Transmittance (τ_{uv} %) is the percentage of ultraviolet light at normal incidence directly transmitted by the glass. Ultraviolet Light is defined as radiant energy from the sun having a wavelength range of 300 nm to 380 nm.

% Solar Energy Direct Transmittance (τ_e %) is the percentage of solar energy at normal incidence directly transmitted by the glass. Solar Energy is the radiant energy from the sun having a wavelength range of 300 nm to 2500 nm.

% Reflectance Visible Outdoors or Light Reflectance Out (ρ_v % out) is the percentage of visible light at normal incidence directly reflected by the glass back outdoors.

% Reflectance Visible Indoors or Light Reflectance In (ρ_v % in) is the percentage of visible light at normal incidence directly reflected by the glass back indoors.

% Solar Energy Reflected Outdoors or Solar Direct Reflectance Out (ρ_e % out) is the percentage of solar energy at normal incidence directly reflected by the glass back outdoors.

% Solar Energy Reflected Indoors or Solar Direct Reflectance In (ρ_e % in) is the percentage of solar energy at normal incidence directly reflected by the glass back indoors.

Absorptance (α_e %) (Solar, Visible or UV) is defined as a process in which a range of radiation is retained by a substance and converted into heat energy. The creation of heat energy also causes the substance to emit its own radiation.

U-Factor or U-Value (U_G) is the air-to-air thermal conductance of 39" high glazing and associated air films. US Standard units are Btu/hr.ft².F. and SI / Metric units are W/m²K. Winter night values are 12.3 mph wind at -0.4°F outdoors and 69.8°F still indoor air. Summer values are 0 sun, 6.15 mph wind at 89.6°F outdoors and 75.2°F still indoor air.

Relative Heat Gain (RHG) is the total net heat gain to the indoors due to both the air-to-air thermal conductance and the solar heat gain. Imperial units are Btu/hr.ft². $RHG = [(Summer\ U-Value)(89.6^\circ F - 75.2^\circ F) + (Shading\ Coefficient)(200\ Btu/hr-ft^2)]$. Metric units are W/m². $RHG = [(Summer\ U-Value)(32^\circ C - 24^\circ C) + (Shading\ Coef.)(631\ W/m^2)]$

Shading Coefficient (SC) is the fraction of solar heat, direct (300 to 2500 nm) plus indirect (5 to 40 μ m), 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).

Solar Heat Gain Coefficient (SHGC) is the 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 and convected indoors. No heat gain from warmer outdoor air is included. $SHGC = (Direct\ Solar\ Trans) + \{[(Indirect\ Solar\ Heat\ Gain) - (Summer\ U-Value)(89.6^\circ F - 75.2^\circ F)] / (248.209\ Btu/hr-ft^2)\}$

Light-to-Solar Gain (LSG) is the ratio of visible light gain to solar gain. $LSG = (Visible\ Transmittance) / (SHGC)$

Color Rendering Index in transmission, D65 (R_a) is the change in color of an object as a result of the light being transmitted by the glass.

Weighted Sound Reduction Index (R_w) is a single-number quantity which characterizes the airborne sound insulation of a material or building element over a range of frequencies.

Sound Transmission Class (STC) is a single-number quantity which characterizes the airborne sound insulation of a material or building element over a range of frequencies.

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