

PRODUCT DESCRIPTION

Sungate ThermL™ on Starphire® coated glass by Vitro Architectural Glass is a low-e coating engineered for use on the interior surface of a typical insulated glass unit (IGU) that dramatically improves U-values when paired with a Solarban® solar control low-e glass. Its colorless and non-reflective aesthetic gives it the same look and feel as clear glass.

APPROXIMATE WEIGHTS

Per m ²		Per ft ²	
thickness	weight	thickness	weight
6.0 mm	14.2 kg	1/4"	2.9 lbs

MECHANICAL PROPERTIES

Knoop Hardness Number (indentation hardness) indenter load--500 gm	470 kgf/mm ²	
Poisson's Ratio	0.22	
Modulus of Elasticity (Young's)	73.1 GPa	10,600,000 psi
Tensile Strength (Determined as Modulus of Rupture, ultimate)	41.4 MPa	6,000 psi
Density at 21°C (70°F)	2.51 g/cm ³	157 lb/ft ³

COLOR

	6.0mm
Transmitted Color: D65, 10° L*	95.5
a*	-0.4
b*	0.2
Hue Angle (°)	151
Dominant wavelength: C, 2°	517 nm

THERMAL PROPERTIES

Hemispherical Emissivity at -18 to 66 °C (0 to 150°F)) glass / coating	0.84	
Expansion Coefficient (linear) 20 to 300°C (68 to 572°F)	8.7*10 ⁻⁶ / °C	4.9*10 ⁻⁶ / °F
Specific heat at 0 to 100°C (32 to 212°F)	858 J/kg-K	0.205 BTU/lb-°F
Thermal Conductivity (k) at 50°C (122°F)	1.00 W/m-K	0.58 Btu/hr-ft-°F
Softening Point	721°C	1329°F
Annealing Point	545°C	1014°F
Strain Point	509°C	949°F

CHEMICAL COMPOSITION

SiO ₂	73%
Na ₂ O	14%
CaO	10%
MgO and Trace elements	3%

Further information is available through VitroGlazings.com or by calling 855-887-6457 (VTRO GLS)

HEAT TREATMENT GUIDELINES

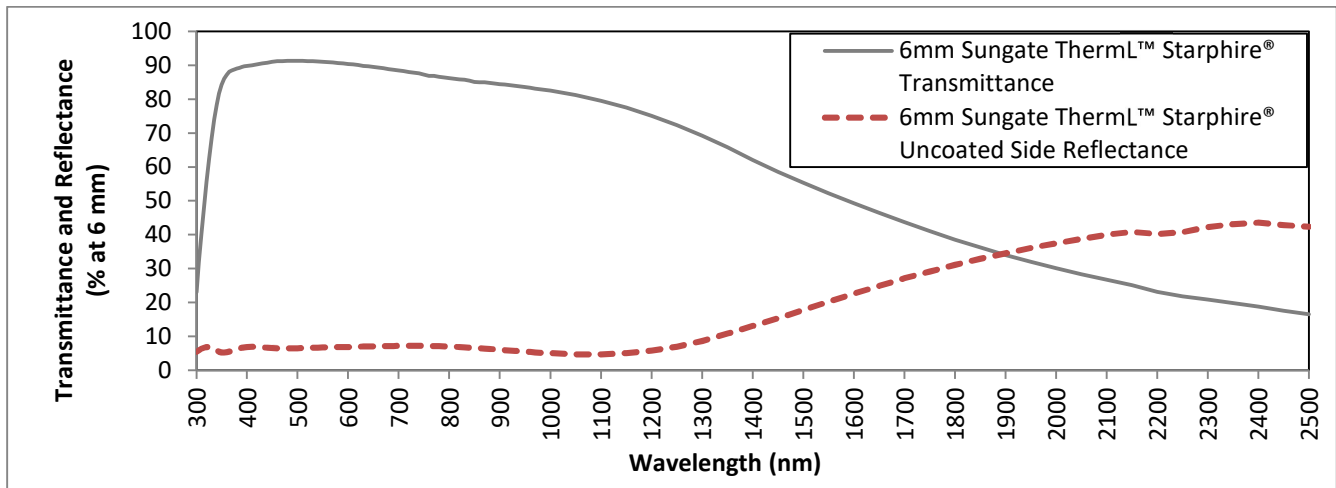
The coating on Sungate ThermL™ on Starphire® glass is permanent, allowing the glass to be heat treated to satisfy increased strength or safety glazing requirements. While heat treating Sungate ThermL™ on Starphire® coated glass, face the coating away from the furnace rolls to reduce the risk of introducing scratches to the coated surface. Process the glass the same as Solarban® coated glass. The coating on Sungate ThermL™ on Starphire® does not appreciably reflect furnace heat since the coating emissivity is essentially the same as uncoated glass. Glass heat cycle time will be reduced as compared to Solarban® on Starphire® solar control low-e glass. **Turn off SO₂ in the furnace.** SO₂ may cause an appreciable loss in durability of the Sungate ThermL™ on Starphire® coating. Degradation is the result of the SO₂ reducing the atmosphere causing potential damage to the coating.

SOLAR PERFORMANCE VALUES COATED SURFACE [4]

Glass Thickness		Transmittance				Reflectance	
inches	mm	Ultra-violet (%)	Visible (%)	Infrared (%)	Total Solar (%)	Visible (%)	Total Solar (%)
1/4	6.0	82	91	0	80	7	9

[1] Figures may vary due to manufacturing tolerances. All tabulated solar performance data are based on the methodology prescribed in ISO 9050, 2003 except Infrared, which is based on the solar irradiance data prescribed by ISO 9050, 2003 from 780 to 2500 nm. Slight changes in transmitted optical properties may occur on exposure to sunlight.

Wave-length (nm)	%T	%R	Wave-length (nm)	%T	%R	Wave-length (nm)	%T	%R	Wave-length (nm)	%T	%R	Wave-length (nm)	%T	%R
300	13.7	5.1	420	88.2	8.0	640	87.9	7.7	860	83.4	6.3	1400	51.4	22.2
305	23.7	5.4	430	88.3	8.0	650	87.8	7.7	870	83.2	6.1	1450	47.8	25.3
310	36.5	5.6	440	88.4	8.0	660	87.6	7.8	880	83.0	6.0	1500	44.5	28.4
315	49.7	5.7	450	88.5	8.1	670	87.4	7.8	890	82.7	5.9	1550	41.3	31.4
320	58.4	5.7	460	88.6	8.1	680	87.3	7.8	900	82.5	5.8	1600	38.4	34.2
325	65.7	5.6	470	88.7	8.1	690	87.1	7.8	910	82.2	5.7	1650	35.6	36.7
330	71.7	5.5	480	88.7	8.1	700	86.8	7.7	920	82.0	5.6	1700	33.0	39.0
335	76.3	5.7	490	88.8	8.1	710	86.6	7.7	930	81.7	5.5	1750	30.7	41.1
340	79.8	5.8	500	88.9	8.0	720	86.4	7.7	940	81.4	5.5	1800	28.5	42.9
345	82.2	6.1	510	88.9	8.0	730	86.2	7.7	950	81.1	5.4	1850	26.5	44.5
350	84.0	6.4	520	89.0	7.9	740	86.0	7.6	960	80.7	5.4	1900	24.7	46.0
355	85.1	6.6	530	89.0	7.9	750	85.8	7.5	970	80.4	5.3	1950	23.0	47.4
360	86.0	6.8	540	89.0	7.8	760	85.6	7.4	980	80.0	5.3	2000	21.5	48.6
365	86.7	7.0	550	89.0	7.8	770	85.3	7.3	990	79.6	5.3	2050	20.1	49.7
370	86.8	7.2	560	89.0	7.8	780	85.1	7.3	1000	79.2	5.4	2100	18.8	50.6
375	86.9	7.3	570	88.9	7.7	790	84.9	7.2	1050	76.8	5.8	2150	17.6	51.1
380	87.1	7.5	580	88.8	7.7	800	84.6	7.0	1100	74.0	6.8	2200	16.2	49.8
385	87.4	7.6	590	88.7	7.7	810	84.5	6.9	1150	70.8	8.2	2250	15.2	50.1
390	87.6	7.7	600	88.6	7.7	820	84.3	6.8	1200	67.3	10.5	2300	14.5	51.6
395	87.8	7.7	610	88.4	7.7	830	84.1	6.7	1250	63.5	13.3	2350	13.8	52.5
400	88.0	7.8	620	88.3	7.7	840	83.9	6.5	1300	59.4	16.2	2400	13.0	52.7
410	88.2	7.9	630	88.1	7.7	850	83.7	6.4	1350	55.4	19.2	2450	12.2	51.8
												2500	11.4	51.0



ADDITIONAL INFORMATION/DOCUMENTS

The following documents can be referenced for additional information regarding *Sungate ThermL™* glass.

Sungate ThermL™ Performance Data, Vitro *Sungate ThermL™* Coated Glass Warranty, Vitro MSVD Coated Glass SDS, TD-150

Note: Use of *Sungate ThermL™* coated glass in Silicone Structural Glazing (SSG) applications is only possible with the approval of the relevant SSG project principals and evaluations are required on an individual project basis.