

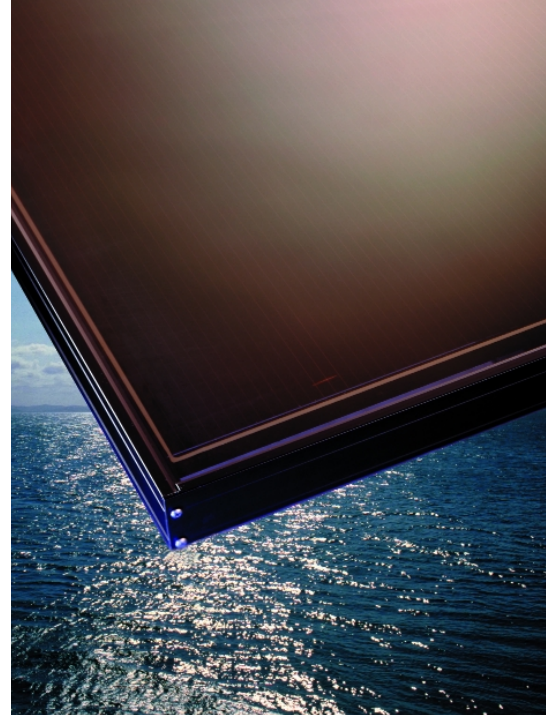


AFG Industries, the leading solar glass supplier in the world, now offers a transparent conductive oxide product to compliment its established solar glass products. AFG's PV-TCO is a specialty-coated glass designed to maximize amorphous silicon cell efficiency. The product features high transmission, good conductivity, and high-haze to help trap light into the amorphous silicon layer.

PV-TCO is available in 3.2mm and is fully temperable. The product is produced in sizes up to 130 x 204 (3300mm x 5180mm).

Haze ranges from 11% to 15%. PV-TCO's visible transmission is greater than 77% direct measured—with greater than 83% effective transmission when haze compensated. The electrical conductivity of the coating is 9-15 ohms/square.

The coating is composed of tin oxide doped with fluorine with an overall thickness of greater than 7500 angstroms. The durability of AFG's PV-TCO is excellent as the pyrolytic coating is fired into the glass during manufacturing. The product offers excellent adhesion with silver frit bus bars. PV-TCO can be etched by laser ablation and wet chemical etching.



Common Physical Properties of AFG PV-TCO Solar Glass

Maximum Sizes				Approximate Net Weight Per Sq. Ft.	400-1000nm Transmission Haze Compensated
Nominal Thickness	Width	Length	Area Sq. Ft.		
1/8"	130"	204"	184	1.6	83.0%

Mechanical Properties*

Hardness: Moh's Scale (Scratch hardness) (Diamond = 10, Sapphire = 9, etc.) Knoop Hardness Number (indentation hardness) indenter load - 500 grams	~6 470
Poisson's Ratio	0.22
Density	156 lb/cf 2.5 g/cc
(Young's) Modulus of Elasticity	10,600,000 psi 73.1 GPa
Tensile Strength (determined as Modulus of Rupture, ultimate)	6000 lb/in ² 41.4 MPa
Specific Gravity at 70°F (21°C)	2.5
Approximate Weight	
Per Square Foot	Per Square Meter
1/8 = 1.6 lbs	3mm = 7.8 kg



P V - T C O

Thermal Properties*

Hemispherical Emissivity at 0°-150° (-18° - 66°C)	0.17
Expansion Coefficient (Linear in the range of 25°C to 300°C)	per °C = 9.03×10^{-6} per °F = 5.02×10^{-6}
Specific Heat at 32° - 212°F (0° - 100°C)	0.2
Calculated Thermal Conductivity at 20°C in (watt/m ² /K)	1.04
Softening Point	1332°F 722°C
Annealing Point	1025°F 552°C
Strain Point	932°F 500°C

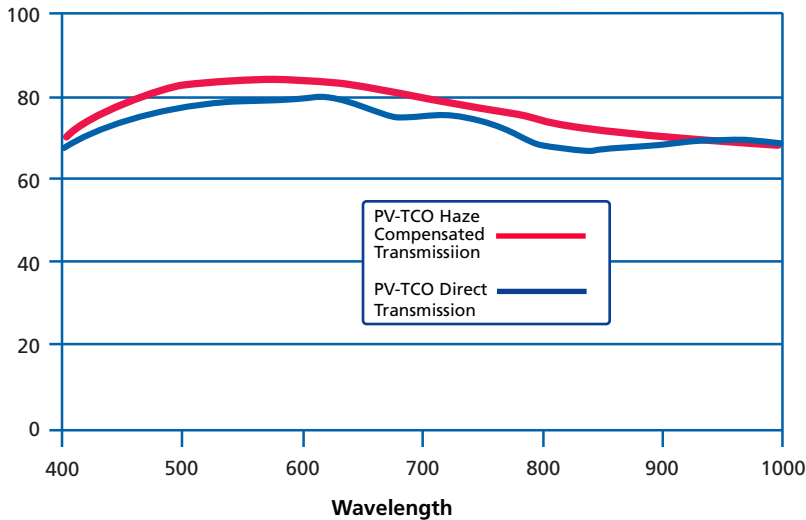
Glass Properties

Approximate Chemical Composition:	
Silicon Dioxide	73%
Sodium Oxide	14%
Calcium Oxide	8.7%
Magnesium Oxide	3.9%
Trace Elements	0.4%

* Mechanical, Thermal and Chemical properties applicable to test samples under specific testing conditions.

Spectral Data

Percent Transmission



Spectral Data 3MM

Wave Length	PV-TCO Direct Transmission	PV-TCO Haze Compensated Transmission
400	68.21	71.73
410	69.72	74.34
420	70.95	76.08
430	71.96	77.57
440	72.52	78.46
450	73.45	79.62
460	74.41	80.68
470	75.33	81.54
480	76.01	82.24
490	76.65	82.84
500	77.08	83.30
510	77.46	83.71
520	77.69	83.90
530	77.83	84.14
540	77.83	84.39
550	77.92	84.49
560	78.02	84.55
570	78.28	84.63
580	78.59	84.63
590	78.93	84.57
600	78.96	84.49
610	78.79	84.15
620	78.49	83.85
630	77.99	83.67
640	77.34	83.28
650	76.83	82.96
660	76.40	82.73
670	76.11	82.28
680	75.94	81.91
690	76.00	81.41
700	76.14	81.14
710	76.34	80.65
720	76.36	80.20
730	76.32	79.71
740	76.08	79.29
750	75.76	78.91
760	74.83	78.30
770	74.12	77.68
780	73.34	77.19
790	72.38	76.82
800	71.42	75.98
810	70.59	75.51
820	69.90	74.65
830	69.62	74.57
840	69.02	74.08
850	69.00	73.68
860	68.42	73.46
870	68.82	72.85
880	69.15	72.17
890	68.79	71.84
900	69.31	71.59
910	69.72	71.51
920	70.03	71.19
930	70.33	70.85
940	70.41	70.95
950	70.35	70.78
960	70.36	70.35
970	70.02	70.27
980	69.70	69.87
990	69.39	69.81
1000	68.71	69.49



AFG Industries, Inc.

1400 Lincoln Street • Kingsport, TN 37660
1-800-251-0441 • www.afglass.com