

Solar Cell Coverglasses

Designed and manufactured to provide radiation protection

Qioptiq

- Design and manufacture of radiation-stable Coverglasses
- Over 40 years of Space Heritage
- Space Qualified
- Choice of glass types (CMX, CMG, CMO)
- Worlds leading manufacturer
- Bespoke solutions

Minimum Coverglass Transmission specifications with 0.10mm thick CMX, CMG and CMO glass types

		350 - 400nm	400 - 450nm	450 - 700nm	600 - 800nm	650 - 900nm	450 - 1100nm	900 - 1800nm	IR Cut-off	Min Emittance	Front Surface Resistance
CMX	Uncoated	73.5	91.5	94.0	95.0	95.0	95.0	95.0		0.88	
CMG		83.5	92.5	94.5	95.0	95.0	95.0	95.0		0.88	
CMO		88.0	94.0	94.5	95.0	95.0	95.0	95.0		0.88	
CMX	AR	73.5	93.0	96.5	97.5	97.5	96.5	96.5		0.88	
CMG		83.5	94.0	97.0	97.5	97.5	96.5	96.5		0.88	
CMO		88.0	95.5	97.0	97.5	97.5	96.5	96.5		0.88	
CMX	Conductive	73.5	94.0	96.5	97.0	97.0	96.5	96.0		0.86	<10M Ohms
CMG	AR	83.5	95.0	97.0	97.0	97.0	96.5	96.0		0.86	<10M Ohms
CMO		88.0	96.0	97.0	97.0	97.0	96.5	96.0		0.86	<10M Ohms
CMX	Conductive	71.0	89.0	94.0	95.0	95.0	94.5	94.5		0.84	<5K Ohms
CMG		80.0	89.0	94.0	95.0	95.0	94.5	94.5		0.84	<5K Ohms
CMO		80.0	89.0	94.0	95.0	95.0	94.5	94.5		0.84	<5K Ohms
CMX	UV Reflector	73.5	92.0	96.0	96.5	96.5	96.0	94.0		0.86	
CMG		83.5	93.0	96.5	96.5	96.5	96.0	94.0		0.86	
CMO		88.0	94.5	96.5	96.5	96.5	96.0	94.0		0.86	
CMX	AR/IRR Silicon	73.5	89.0	96.0	96.0	96.0	95.0		1165+/-	0.86	
CMG	Blue Red Silicon	83.5	90.0	96.0	96.0	96.0	95.0		50nm	0.86	
CMO		88.0	92.0	96.0	96.0	96.0	95.0			0.86	
CMX	UVR/IRR	73.5	92.0	96.5	96.5	96.5	95.0		1315+/-	0.86	
CMG	Triple Junction	83.5	93.0	96.5	96.5	96.5	95.0		35nm	0.86	
CMO	(PS 703)	88.0	88.0	96.5	96.5	96.5	95.0			0.86	

1. All spectral data measured at normal incidence in 1.43 matching index
2. Tolerances on specification values are available from relevant product specifications
3. Spectral data is for 0.10mm/0.004" coverglasses, please refer to relevant specification for spectral performance of other thicknesses.

Mechanical Properties

Thickness:	0.050mm to 0.50mm / 0.002" to 0.02" Special thicknesses on request
Tolerancing:	LxW ± 0.05mm / 0.002"
Surface Finish:	As drawn to: MIL-PRF-13830B, 80/50 scratch dig
Parallelism:	0.05mm per 20mm
Perpendicularity:	90° ± 0° 30'
Coating:	Uncoated area, masked by coating tooling, shall not exceed 1% of the total coverglass area
Edge Quality:	Chemically etched for strength enhancement
Toughening:	CMX and CMG glass can be chemically toughened if required
Humidity Resistance:	98% ± 2% relative humidity for 72 hours @ 50°C ± 20°C
Adhesion:	Using cellulose tape to MIL-M-13508
Abrasion:	20 strokes with 6mm pencil type eraser to MIL-E-12397 loaded to 10N
Radiation Resistance:	UV exposure, electron, low energy proton, high energy proton - please refer to relevant specifications
Thermal Cycling:	Details on request

Physical Properties

	CMX	CMG	CMO
Density:	2.60 ± 0.02g cm ³	2.54 ± 0.02g cm ³	2.54 ± 0.02g cm ³
Thermal Expansion Coefficient:			
Average over range -100°C to 100°C	6.0 ± 0.75 x 10 ⁻⁶ /°C	5.5 ± 0.75 x 10 ⁻⁶ /°C	5.5 ± 0.75 x 10 ⁻⁶ /°C
Average over range -100°C to 200°C	6.5 ± 0.75 x 10 ⁻⁶ /°C	6.0 ± 0.75 x 10 ⁻⁶ /°C	6.0 ± 0.75 x 10 ⁻⁶ /°C
Average over range +30°C to 200°C	7.0 ± 0.75 x 10 ⁻⁶ /°C	6.5 ± 0.75 x 10 ⁻⁶ /°C	6.5 ± 0.75 x 10 ⁻⁶ /°C
Youngs Modulus:	75.0 ± 2 GNm ⁻²	77.0 ± 2 GNm ⁻²	70 ± 2 GNm ⁻²
Poissons Ratio:	0.21 ± 0.05	0.20 ± 0.05	0.22 ± 0.05
Bulk Resistivity:			
At 20°C	11.5 ± 1 log ohm meter	13.5 ± 1 log ohm meter	16.0 ± 1 log ohm meter
At 60°C	10.0 ± 1 log ohm meter	11.5 ± 1 log ohm meter	14.0 ± 1 log ohm meter
Refractive Index:	1.524 – 1.530	1.513 – 1.519	1.510 – 1.516

For technical information contact:

sales@uk.qioptiq.com
phone +44 (0)1745 589833
www.qioptiq.com