

Title: Optical Material / Crystals (Ultraviolet)

Material / Specification: UV Grade Fused silica Corning 7980 2G for 170-2500nm transmission

Range / Description: OPM-7980-2G

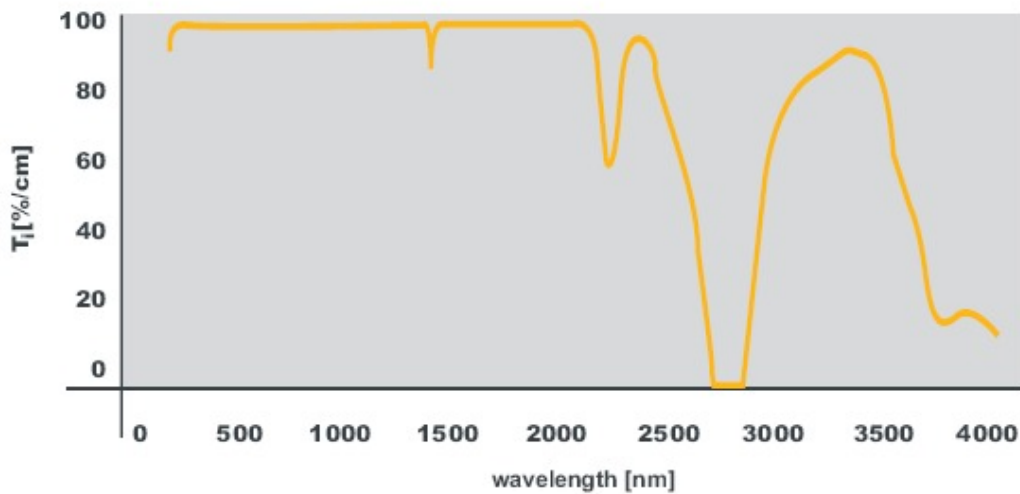


KNIGHT OPTICAL

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This material is a high purity synthetic amorphous silicon dioxide manufactured by flame hydrolysis. The colorless, noncrystalline silica glass combines a very low thermal expansion coefficient with excellent optical qualities and exceptional transmittance in the ultraviolet. It is available in a number of grades for different applications.

Internal Transmittance:



Quality Grade Selection Chart

Inclusion Class			Homogeneity ^{3,4} ppm							
Class	Total Inclusion ¹ Cross Section [mm ²]	Maximum ² Size [mm]	Grade							
			AA ≤ 0.5	A ≤ 1	B ≤ 1.5	C ≤ 2	D ≤ 3	E ≤ 4	F ≤ 5	G ⁵ NS
0	≤ 0.03	0.10	■	■	■	■	■	■	■	■
1	≤ 0.10	0.28		■	■	■	■	■	■	■
2	≤ 0.25	0.50			■	■	■	■	■	■
3	≤ 0.50	0.76				■	■	■	■	■
4	≤ 1.00	1.00					■	■	■	■
5	≤ 2.00	1.27					■	■	■	■

NOTES:

1. Defines the sum of the cross section in mm² of inclusions per 100 cm³ of glass. Inclusions with a diameter ≤ 0.10 mm are disregarded.
2. Refers to the diameter of the largest single inclusion.
3. Index homogeneity: the maximum index variation (relative), measured over the clear aperture of the blank.
4. Index homogeneity is certified using an interferometer at 632.8 nm. The numerical homogeneity is reported as the average through the piece thickness. Blanks with a diameter up to 450 mm can be analyzed over the full aperture. Larger parts can be analyzed using multiple overlapping apertures. The minimum thickness for index homogeneity verification is 20 mm. For thinner parts, the parent piece is certified.
5. NS (not specified)

Mechanical and Thermal Properties:

Unless otherwise stated, all values @ 25°C

Elastic (Young's) Modulus	72.7 GPa	Softening Point	1585 °C (10 ^{7.6} poises)
Shear Modulus	31.4 GPa	Annealing Point	1042 °C (10 ¹³ poises)
Modulus of Rupture, abraded	52.4 MPa	Strain Point	893 °C (10 ^{14.5} poises)
Bulk Modulus	35.4 GPa	Thermal Conductivity	1.30 W/m K
Poisson's Ratio	0.16	Thermal Diffusivity	0.0075 cm ² /s
Density	2.201 g/cm ³	Average C.T.E.	0.52 ppm/K 5 °C-35 °C
Knoop Hardness (100 g load)	522 kg/mm ²		0.57 ppm/K 0 °C-200 °C
			0.48 ppm/K -100 °C-200 °C

Chemical Durability and Impurities:

Solution	Time	Weight Loss [mg/cm ²]	Impurities
5% HCL by weight @95 °C	24 h	<0.010	OH content (by weight): 800-1000 ppm
5% NaOH @95 °C	6 h	0.453	Impurities other than OH: ≤ 1000 ppb
0.02N NA ₂ CO ₃ @95 °C	6 h	0.065	
0.02N H ₂ SO ₄ @95 °C	24 h	<0.010	
Deionized H ₂ O @95 °C	24 h	0.015	
10% HF by weight @25 °C	20 m	0.230	
10% NH ₄ F*HF by weight @25 °C	20 m	0.220	

Refractive Index and Dispersion:

Data in 22°C in 760mm Hg dry nitrogen gas

Wavelength [air] λ [nm]	Refractive Index ¹ n	Thermal Coefficient Δn/ΔT ³ (ppm/K)	Polynomial Dispersion Equation Constants ¹	
			A ₀	A ₁
1128.64	1.448870	9.6	2.104025406	-1.456000330 x 10 ⁻⁴
1064.00	1.449633	9.6	-9.049135390 x 10 ⁻³	8.801830992 x 10 ⁻³
1060.00	1.449681	9.6	8.435237228 x 10 ⁻³	1.681656789 x 10 ⁻⁶
1013.98 n _t	1.450245	9.6	-1.675425449 x 10 ⁻⁸	8.326602461 x 10 ⁻¹⁰
852.11 n _s	1.452469	9.7		
706.52 n _r	1.455149	9.9		
656.27 n _c	1.456370	9.9		
643.85 n _{c'}	1.456707	10.0		
632.80 n _{He-Ne}	1.457021	10.0		
589.29 n _D	1.458406	10.1		
587.56 n _d	1.458467	10.1		
546.07 n _e	1.460082	10.2		
486.13 n _F	1.463132	10.4		
479.99 n _{F'}	1.463509	10.4		
435.83 n _g	1.466701	10.6		
404.66 n _h	1.469628	10.8		
365.01 n _i	1.474555	11.2		
334.15	1.479785	11.6		
312.57	1.484514	12.0		
308.00	1.485663	12.1		
248.30	1.508433	14.2		
248.00	1.508601	14.2		
214.44	1.533789	17.0		
206.20	1.542741	18.1		
194.17	1.559012	20.4		
193.40	1.560208	20.5		
193.00	1.560841	20.6		
184.89	1.575131	22.7		
			Sellmeier Dispersion Equation Constants ²	
			B ₁	0.68374049400
			B ₂	0.42032361300
			B ₃	0.58502748000
			C ₁	0.00460352869
			C ₂	0.01339688560
			C ₃	64.49327320000
			Δn/ΔT Dispersion Equation Constants ³	
			C ₀	9.390590
			C ₁	0.235290
			C ₂	-1.318560 x 10 ⁻³
			C ₃	3.028870 x 10 ⁻⁴
			Other Optical Properties	
			v _d	67.79
			v _e	67.64
			n _F -n _C	0.006763
			n _F -n _{C'}	0.006802
			Stress Coefficient	35.0 nm/cm MPa
			Striae	ISO 10110-4 Class 5/Thickness Direction
			Birefringence	≤ 1nm/cm, lower specifications available



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