Silica Glass (SiO_2)

Fused Silica is the glassy form of Quartz and is thus isotropic. Fused Silica is tough and hard and has a very low expansion. Normal varieties of Fused Silica contain water which gives strong absorption in the Infra-red. Water-free varieties of Fused Silica are available.

APPLICATIONS: Fused Silica is a hard, high temperature pure glass. Fused Silica is used for UV and visible components. Infra-red grades of Fused Silica are available for NIR use. Use the QR link on page 30 for our guide to silica glass.

Transmission Range	0.18 to 2.2µm (3µm for IR grades)
Refractive Index	1.47012 at 4µm (1)
Reflection Loss	7.0% at 0.4µm (2 surfaces)
Absorption Coefficient	10×10^{-6} cm^{-1} at 1µm
Reststrahlen Peak	n/a
dn/dT	$+12.9 \times 10^{-6}$ K^{-1} (2)
dn/dµ = 0	1.3µm
Density	2.203 g/cc
Melting Point	1600 °C (softening) *
Thermal Conductivity	1.38 W m^{-1} K^{-1}
Thermal Expansion	0.55×10^{-6} K^{-1} at 300K
Hardness	Knoop 500 with 200g indenter
Specific Heat Capacity	703 J Kg^{-1} K^{-1}
Dielectric Constant	3.78 at 25GHz
Youngs Modulus (E)	73.1 GPa
Shear Modulus (G)	31.2 GPa
Bulk Modulus (K)	36.7 GPa
Elastic Coefficients	n/a
Apparent Elastic Limit	55 MPa (7980 psi)
Poisson Ratio	0.17
Solubility	Insoluble in Water
Molecular Weight	28.09
Class/Structure	Amorphous glass

** The normal maximum working temperature is 1050°C*

(1) Handbook Optical Constants, ed Palik, V1, ISBN 0-12-544420-6
(2) Toyoda & Yabe J. Phys. D: Appl. Phys.,1 6 (1983)

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µm	No	µm	No	µm	No
0.20	1.55051	0.25	1.50745	0.30	1.48779
0.36	1.47529	0.40	1.47012	0.45	1.46557
0.50	1.46233	0.55	1.46008	0.60	1.45804
0.65	1.45653	0.70	1.45529	0.75	1.45424
0.8	1.45332	0.85	1.4525	0.90	1.45175
1.0	1.45042	1.1	1.4492	1.2	1.44805
1.3	1.44692	1.5	1.44462	1.6	1.44342
1.7	1.44217	1.8	1.44087	1.9	1.43951
2.0	1.43809	2.2	1.43501	2.4	1.43163
2.6	1.42789	2.8	1.42377	3.0	1.41925
3.2	1.41427	3.37	1.41099