



Optical Materials Specification Chart

Specifications are offered as assistance to Engineers and Purchasing professionals in the design and procurement of thin and thick film circuit substrates.

Centerline Technologies makes no certification as to the suitability of materials for any application. (Basis for specifications available upon request.)

Properties	Units	Fused Silica Quartz	Sapphire (Crystalline)
Chemical Composition		SiO ₂	Al ₂ O ₃
Purity	%	100	100
Color		Transparent	Transparent
Nominal Density	g/cm ³	2.2	3.97
Surface Finish (Polished)	μ-inches	60/40 Optical	<1.0μ-inch CLA
Surface Finish (Lapped)	μ-inches	7-12*	10-20*
Surface Finish (As fired)	μ-inches	n/a	n/a
Camber	inch/inch	.0003/.0005	.0003/.0005
Thickness	inches	0.004-0.080*	0.004-0.050*
Thickness Tolerance	inches	±0.0005	±0.0005
Process Sizes	inches		
(L/W)	1.0/2.25	1.0/2.25	
Coefficient of Thermal Expansion (CTE)	10-6	0.55 (20-320°C)	A plane @ 25°C-5.3
Thermal Conductivity	Watts/m°K	n/a	n/a
Dielectric Constant	@1 MHz	3.826	11.5/9.3†
Dielectric Constant	@4 MHz	—	—
Dielectric Constant	@10 MHz	—	—
Dissipation Factor (Loss Tangent)	@1 MHz	0.000015	.00086/.0003†
Dissipation Factor (Loss Tangent)	@10 MHz	—	—
Q	@1 GHz	—	—
Hardness	Rockwell	7 Mohs	1800/2200A Knoop
Flexural Strength	K(10-3) lbs/sq.in.	25	60
Compressive Strength	M(10-3) lbs/sq.in.	161	350
Grain Size	um (microns)	Amorphous	Single Crystal

• Additional thicknesses and tolerances available upon request

• Additional surface finishes available upon request

† Value varies with orientation (“A” plane / “C” plane)