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Technical Information

PROPERTIES OF FUSED QUARTZ

Silica is found almost everywhere in nature, and represents almost 1/3 the mass of the earth's crust. Vitreous Silica is the generic term used to describe all types of silica glass, and manufacturers refer to the material as either Fused Quartz or Fused Silica.

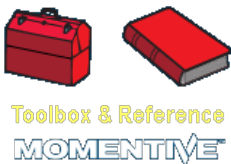
Fused Quartz is manufactured by melting naturally occurring crystalline silica, such as sand or rock crystal. The production method is either electrically fused or flame fused. Afterward, items will appear transparent, translucent, or opaque; making it possible to create a wide range of products.

Fused silica, commonly referred to as synthetic fused quartz, is produced using high purity silica sand that is manufactured from SiCL4. The finished product's appearance will be transparent.

Vitreous Silica, in all its forms, offers a variety of properties such as:

- Permeability
- Extreme Hardness
- Very Low Coefficient of Thermal Expansion
- Resistance to High Temperature
- High Chemical Purity
- High Corrosion Resistance
- Extensive Optical Transmission from Ultra-Violet to Infra-Red
- Excellent Electrical Insulation Qualities
- Remarkable Stability Under Atomic Bombardment

PROPERTY	TYPICAL VALUES
Density	2.2 x 10 <sup>3</sup> kg/m <sup>3</sup>
Hardness	5.5–6.5 Mohs' Scale  570 KHN <sub>100</sub>
Design Tensile Strength	4.8 x 10 <sup>7</sup> Pa (N/m <sup>2</sup> ) (7,000 psi)
Design Compressive Strength	>1.1 x 10 <sup>9</sup> Pa (160,000 psi)
Bulk Modulus	3.7 x 10 <sup>10</sup> Pa (5.3 x 10 <sup>6</sup> psi)
Rigidity Modulus	3.1 x 10 <sup>10</sup> Pa (4.5 x 10 <sup>6</sup> psi)
Young's Modulus	7.2 x 10 <sup>10</sup> Pa (10.5 x 10 <sup>6</sup> psi)
Poisson's Ratio	0.17
Coefficient of Thermal Expansion (20°C–320°C)	5.5 x 10 <sup>-7</sup> cm/cm °C
Thermal Conductivity (20°C)	1.4 W/m °C
Specific Heat (20°)	670 J/kg °C
Softening Point	1683°C
Annealing Point	1215°C
Strain Point	1120°C
Electrical Resistivity (350°C)	7 x 10 <sup>7</sup> ohm cm
Dielectric Properties (20°C, 1 MHz)	
Constant	3.75
Strength	5 x 10 <sup>7</sup> V/m



Loss Factor	<4 x 10 <sup>-4</sup>
Dissipation Factor	<1 x 10 <sup>-4</sup>
Index of Refraction	1.4585
Constringence (Nu value)	67.56
Velocity of Sound-Shear Wave	3.75 x 10 <sup>3</sup> m/s
Velocity of Sound/Compressional Wave	5.90 x 10 <sup>3</sup> m/s
Sonic Attenuation	<11dB/m MHz
Permeability Constants (700°C)	(cm <sup>3</sup> mm/cm <sup>2</sup> sec cm Hg)
Helium	210 x 10 <sup>-10</sup>
Hydrogen	21 x 10 <sup>-10</sup>
Deutrium	17 x 10 <sup>-10</sup>
Neon	9.5 x 10 <sup>-10</sup>

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