



## SAPPHIRE

Sapphire can offer the ideal solution for applications where standard glass and technical ceramics are not sufficient. Superior physical, chemical and optical properties allow sapphire to be used in demanding conditions.

Sapphire is transparent, single crystal aluminium oxide. Sometimes, particularly for sapphire balls, a slight trace of chromium oxide is added which gives it a "ruby" colour. The material can be made in different ways which affects the properties, particularly optical properties, and the shapes which can be manufactured.

Advantages:   Excellent optical characteristics, UV to IR  
                  High wear and scratch resistance  
                  High operating temperature (1800°C)  
                  Chemically inert  
                  High strength  
                  High electrical resistance  
                  High thermal conductivity

Applications:   Optics  
                  Engineered components  
                  Substrates  
                  High pressure windows  
                  Precision spheres

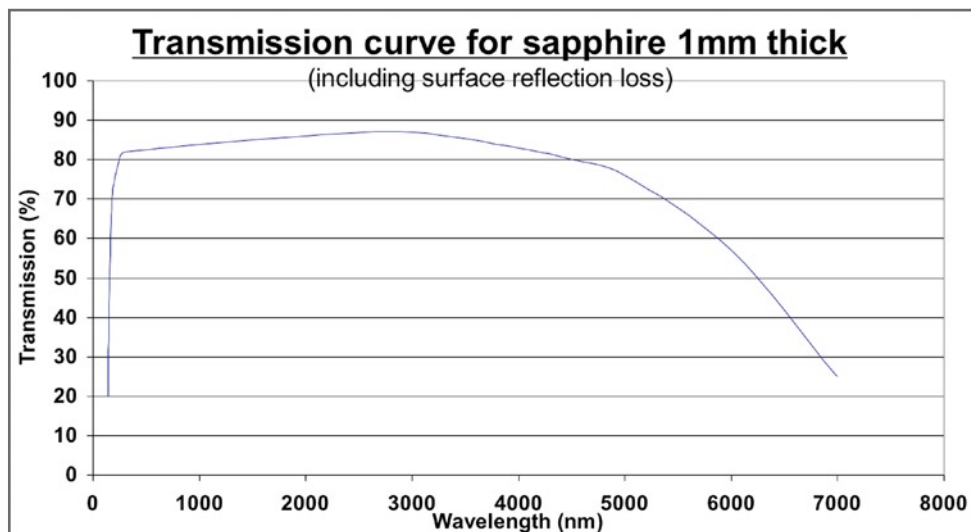


## SAPPHIRE (Continued)

### PROPERTIES OF SAPPHIRE

	PROPERTY	UNITS	
<b>GENERAL</b>	Chemical formula	n/a	Al <sub>2</sub> O <sub>3</sub>
	Density	g/cm <sup>3</sup>	3.98
	Water Absorption	%	0
<b>MECHANICAL</b>	Compressive Strength	MPa	2000
	Flexural Strength	MPa	480-900
	Young's Modulus	GPa	350
<b>THERMAL</b>	Max. use temperature	°C	1800
	Thermal Conductivity	W/m <sup>°</sup> K	40
	Coefficient of Linear Thermal Expansion	10 <sup>-6</sup> /°C	8.0
<b>ELECTRICAL</b>	Volume Resistance	Ωcm	10 <sup>14</sup>
	Dielectric Constant		9.4 – 11.5
	Dielectric Strength	kV/mm	48

Note: Sapphire is anisotropic, ie some properties are not the same in all directions.



Properties shown are typical values, they are not absolute material properties, and should be used for guidance only. It is recommended that materials and components are tested for their suitability for a specific application.

For more information and advice please discuss your application with our sales staff.