

## Sapphire Prisms

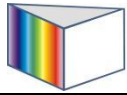
**Single crystal sapphire prisms** are ideal for demanding applications (such as laser systems) and harsh environments because of their extreme surface hardness, high thermal conductivity, high dielectric constant and resistance to common chemical acids and alkalis. Sapphire is the second hardest crystal next to diamond and, because of their structural strength, sapphire crystal lenses can be made much thinner than other common materials. Chemically, sapphire is single crystal aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) and is useful in a transmission range from 0.15 to 5.5μm. Customized lenses are offered upon customer's request.



## SPECIFICATIONS

Specifications	
Types	Right angle prisms, 60 度 equilateral dispersing prism, customized prisms
Materials	Optical grade single crystal sapphire
Aperture	>90%
Dimension tolerance	+0.0/-0.2mm
Thickness tolerance	+/-0.2mm
Surface Quality	40/20 S/D
Flatness	1Lambda@633nm

Customized specifications is available.



## Basic Properties

Physical and optical properties	
Transmission Range	0.17 to 5.5 $\mu\text{m}$
Refractive Index	No 1.75449; Ne 1.74663 at 1.06 $\mu\text{m}$ (1)
Reflection Loss	14% at 1.06 $\mu\text{m}$
Absorption Coefficient	$0.3 \times 10^{-3} \text{ cm}^{-1}$ at 2.4 $\mu\text{m}$ (2)
Reststrahlen Peak	13.5 $\mu\text{m}$
dn/dT	$13.1 \times 10^{-6}$ at 0.546 $\mu\text{m}$ (3)
dn/d $\mu$ = 0	1.5 $\mu\text{m}$
Density	3.97 g/cc
Melting Point	2040°C
Thermal Conductivity	27.21 W m <sup>-1</sup> K <sup>-1</sup> at 300K
Thermal Expansion	5.6 (para) & 5.0 (perp) $\times 10^{-6}/\text{K}$ *
Hardness	Knoop 2000 with 2000g indenter
Specific Heat Capacity	763 J Kg <sup>-1</sup> K <sup>-1</sup> at 293K (4)
Dielectric Constant	11.5 (para) 9.4 (perp) at 1MHz
Youngs Modulus (E)	335 GPa
Shear Modulus (G)	148.1 GPa
Bulk Modulus (K)	240 GPa
Elastic Coefficients	C11=496 C12=164 C13=115 C33=498 C44=148
Apparent Elastic Limit	300 MPa (45,000 psi)
Poisson Ratio	0.25
Solubility	$98 \times 10^{-6}$ g/100g water
Molecular Weight	101.96
Class/Structure	Trigonal (hex), R3c

## Features

- Large wavelength range: 0.15~5  $\mu\text{m}$
- Extreme hardness for harsh environment
- Chemical and erosion resistant front surface