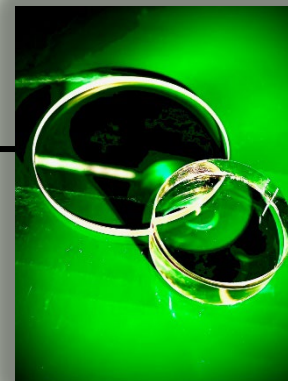


MATERIAL PROPERTIES & SPECIFICATIONS



Calcium Fluoride (CaF₂)

Calcium Fluoride (CaF₂) is a naturally occurring optical substance with a unique range of properties. Calcium fluoride has a long tradition as an optical material in microlithography for semiconductor production. Calcium fluoride crystals, synthetically grown from highly purified CaF₂ powder, are a high-performance optical material. The extremely high purity of the material enables an internal transmission of > 99.7 % at the critical wavelength of 193 nm. Besides pure transmission, the durability of CaF₂ optics is critical when exposed to high fluence UV lasers over a long period of time. In the recent years, CaF₂ crystals have found their way into development of a new generation astronomical instrumentation. The broadband transmittance and low spectral dispersion of CaF₂ crystals make them a desired optical material for spectrographs and imaging instruments for large telescopes.

	Calcium Fluoride	CaF ₂
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Optical Properties	
Transmission Range	0.15 to 7.0 μm
Internal Transmission	>99.5% from 193nm to 7 μm
Refractive Index Homogeneity	Range 3 to 15ppm @ 632.8 nm PV
Bubbles & Inclusions	1/1 x 0.050 (typ.)
Crystal Orientation	<111>, <100>, or Random
Stress Birefringence	Range 0.5nm/cm to 15nm/cm @632.8nm
Crystal Structure	Cubic
Surface Finish	1/20λ to 2λ @632.8nm
Surface Quality	Fine Ground to 10/5 S/D

Physical properties	
Density	3.18gm/cc
Melting Point	1420 deg C
Thermal Expansion	18.85 x 10 ⁻⁶ /deg C @ 273K
Youngs Modulus (E)	75.80 GPa
Knoop Hardness	158.3 Knoop
Crystal Structure	Cubic <111> cleavage plane
Absorption Coefficient @800 K	2x 10 ⁻³ @ 5μm
Thermal Expansion Coefficient	18.7x 10 ⁻⁶

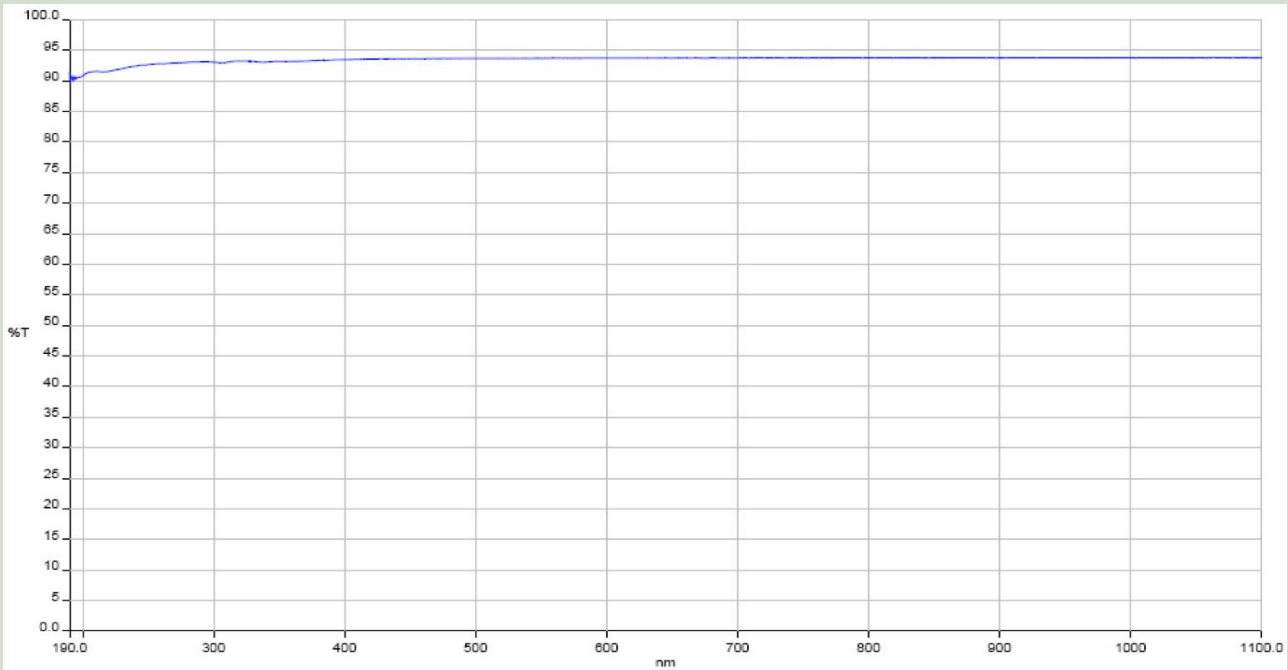
Substance	Form	Diameter Range	Thickness Range	Transmission Range (μm)	Finish
Calcium Fluoride	Single Crystal	5 to 250mm	1 to 76mm*	0.13 to 12.00	Fine Ground**

* Special orders available **
Standard finish – other finish available upon request

Our material has a number of important optical properties including excellent ultraviolet (UV) transmittance, high laser damage threshold, low axial and radial stress birefringence, and high refractive – index homogeneity.

**CaF2 Transmission Graph
(5.0mm thick sample)**

Transmission



Wavelength (nm)

CaF2 Stress Birefringence Graph

