

Calcium Fluoride (CaF₂)

Specialist Data Sheet

Product Name	Calcium Fluoride (CaF ₂)
Transmission Range	0.13 ~ 10 μ m
Refractive Index	1.39908 @ 5 μ m
Reflection Loss	5.4% @ 5 μ m
Absorption Coefficient	7.8 x 10 ⁻⁴ cm ⁻¹ @ 2.7 μ m
Reststrahlen Peak	35 μ m
dN/dT	-10.6 x 10 ⁻⁶ /°C
dN/du	1.7 μ m
Density	3.18 g/cc
Melting Point	1360 °C
Thermal Conductivity	9.71 W m ⁻¹ K ⁻¹
Thermal Expansion	18.85 x 10 ⁻⁶ /°C
Hardness	Knoop 158.3 (100) with 500g indenter
Specific Heat Capacity	854 J Kg ⁻¹ K ⁻¹
Dialectric Constant	6.76 @ 1 Mhz
Youngs Modulus (E)	75.8 Gpa
Shear Modulus (G)	33.77 Gpa
Bulk Modulus (K)	82.71 Gpa
Elastic Coefficients	C11=164; C12=53; C44=33.7
Apparent Elastic Limit	36.54 Mpa
Poisson Ratio	0.26
Solubility	0.0017g/100g water @ 20°C
Molecular Weight	78.08
Class/Structure	Cubic (111) cleavage

Notes:

Calcium fluoride is grown by vacuum Stockbarger technique in diameters up to about 250mm. Material for IR use is grown using naturally mined fluorite, in large quantities at relatively low cost. For UV applications chemically prepared raw material is generally used and for Eximer applications the highest grade of specially selected material and crystal.

Application:

Widespread IR application as spectroscopic windows, prisms and lenses. Specially pure grades find useful application in the UV and as UV Eximer laser windows. Available doped with europium as a gamma ray scintillator.



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μm	No	μm	No	μm	No	μm	No
0.149	1.5800	0.400	1.4419	1.650	1.4256	4.800	1.4014
0.161	1.5490	0.486	1.4370	1.900	1.4244	5.000	1.3910
0.195	1.5000	0.588	1.4339	2.058	1.4236	5.304	1.3952
0.200	1.4950	0.656	1.4325	2.450	1.4214	5.893	1.3871
0.222	1.4800	0.687	1.4320	2.700	1.4199	6.483	1.3782
0.248	1.4680	0.728	1.4314	2.800	1.4192	7.087	1.3681
0.266	1.4621	0.884	1.4298	3.050	1.4175	7.661	1.3570
0.280	1.4584	1.014	1.4288	3.400	1.4149	8.251	1.3444
0.300	1.4540	1.100	1.4283	4.000	1.4096	8.840	1.3308
0.337	1.4481	1.250	1.4275	4.400	1.4057	9.429	1.3161

Transmission Range Graph:

