Magnesium Fluoride (MgF_2)

Magnesium Fluoride is grown by vacuum Stockbarger technique in ingots of various diameters. Magnesium Fluoride is a tough material and polishes well. Therefore, it can be worked to the highest standards. MgF2 is slightly birefringent and usually supplied with the optic axis cut perpendicular to the window faces.

APPLICATIONS: Magnesium Fluoride transmits well into the VUV region to the hydrogen Lyman-alpha line (121nm) and beyond. Magnesium Fluoride is used mostly for UV optics and is excellent for Excimer laser applications.

Transmission Range	0.12 to 7µm(1)
Refractive Index	No 1.413 at 0.22µm (4)
Reflection Loss	5.7% at 0.22µm (2 surfaces)
Absorption Coefficient	5.5×10^{-3} cm^{-1} at 2.8µm (5)
Reststrahlen Peak	20µm (1)
dn/dT	2.3 (para) 1.7 (perp) at 0.4µm (1)
dn/dµ = 0	1.4µms
Density	3.1766g/cc at 25°C
Melting Point	1255°C
Thermal Conductivity	21 (para) 33.6 (perp) W m^{-1} K^{-1} at 300K (3)
Thermal Expansion	13.7 (para) 8.9 (perp) x 10^{-6} /K (1)
Hardness	Knoop 415
Specific Heat Capacity	1003 J Kg m^{-1} K^{-1}
Dielectric Constant	4.87 (para) 5.45 (perp) at 1MHz (1)
Youngs Modulus (E)	138 GPa (2)
Shear Modulus (G)	54.66GPa (2)
Bulk Modulus (K)	101.32 GPa (2)
Elastic Coefficients	C_{11}=140 C_{12}=89 C_{44}=57 C_{13}=63 C_{66}=96 (2)
Apparent Elastic Limit	49.6 MPa (7200 psi)
Poisson Ratio	0.276 (2)
Solubility	0.0002g/100g water
Molecular Weight	62.32
Class/Structure	Tetragonal P42/mnm (#136) Rutile Structure. Can cleave on c-axis but not easily.

(1) Duncanson et.al. Proc.Phys.Soc. V72, p1001, 1958
(2) Kandil et.al. J.App.Phys. V52, p749, 1981
(3) Kashnow & MCarthy, J.Phys.Chem. V30, p813, 1969
(4) Laporte et. al. J.Opt. Soc. Am. V73, No 8, p1062
(5) Corning Inc published data

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µm	No	Ne	µm	No	Ne
0.1137	1.7805		0.1149	1.7420	
0.1179	1.6800		0.1198	1.6510	
0.121	1.628	1.632	0.130	1.566	1.568
0.140	1.5095	1.523	0.150	1.480	1.494
0.160	1.461	1.475	0.170	1.448	1.462
0.180	1.439	1.453	0.190	1.431	1.444
0.200	1.423	1.437	0.220	1.413	1.426
0.248	1.403	1.416	0.257	1.401	1.414
0.266	1.399	1.412	0.280	1.396	1.409
0.300	1.393	1.405	0.330	1.389	1.402
0.337	1.389	1.401	0.350	1.387	1.400
0.355	1.386	1.399	0.400	1.384	1.396
0.546	1.379	1.390	0.700	1.376	1.388
1.087	1.373	1.385	1.512	1.370	1.382
2.000	1.368	1.379	2.5	1.364	1.375
3.030	1.360	1.370	3.571	1.354	1.364
4.000	1.349	1.359	4.546	1.341	1.350
5.000	1.334	1.343	5.556	1.324	1.332
6.060	1.314	1.321