

# BaF<sub>2</sub> (Barium Fluoride)

Barium Fluoride (BaF<sub>2</sub>) — is widely used material in UV and IR spectroscopy due to the transmission in range from 0.2 to 11µm. It is very sensitive to mechanical and thermal shock. Can be used in IR laser applications. Barium Fluoride is less resistant to water than Calcium Fluoride but still can be used up to 800°C in dry air.



## Application:

- UV, IR, FTIR spectroscopy
- Laser spectroscopy

## Product types:

- Plane-parallel windows and wedges
- Beamsplitter substrates for FTIR spectroscopy
- Lenses
- Prisms

## Specifications

Tab.1. Typical specification of BaF<sub>2</sub> optical components

Specification	Typical	State-of-the-art
Sizes	See table in the article <i>Plane Windows and Wedged Windows</i>	Up to 1500 mm
Diameter tolerance, mm	+0/-0.25	RFQ
Thickness tolerance, mm	±0.25	RFQ
Thickness matching, mm	-	RFQ
Surface quality, scr/dig	60/40	20/10
Surface flatness, λ @ 633nm per inch*	2	1/8
Parallelism (wedge tolerance)	5 arc min	5 arc sec
Coating	none	beamsplitting

\* For "thick" windows: while Diameter/Thickness ratio ≤ 8

## Transmission Spectrum

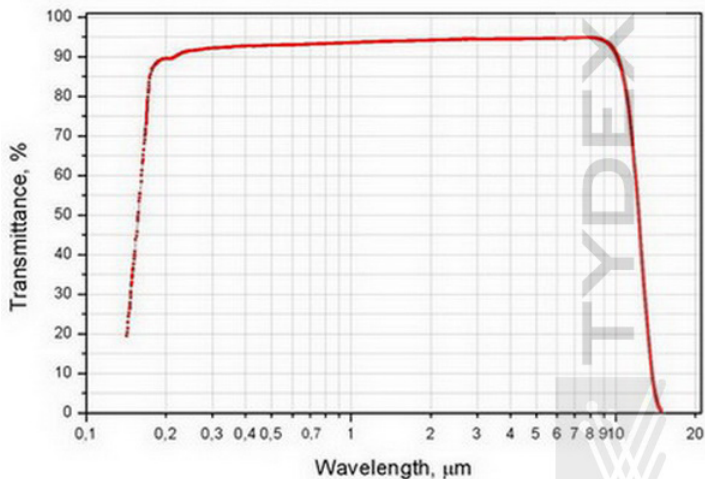


Fig. 1. The measurements were carried out on Perkin Elmer Lambda-35 spectrophotometer and on BrukerVertex-70 Fourier-spectrometer.

Tab.2. Refractive index

λ, µm	n	λ, µm	n
0.26	1.51	5.14	1.45
0.30	1.50	6.50	1.44
0.36	1.49	8.00	1.43
0.48	1.48	8.60	1.42
0.85	1.47	9.20	1.41
3.24	1.46	9.80	1.40
		10.60	1.39

Tab.3. Optical properties

Transmission range, microns	0,2 — 11
Colour	Colourless
Reflection losses @ 5 µm (2 surfaces), %	5,3
Restrahlen peak, µm	47
dN/dT, 10 <sup>-6</sup> /C	-15.2
dN/dμ = 0, мкм	1.95

Tab. 4. Физические и механические свойства

Class / Structure	Cubic FCC, Fm3m, (111) cleavage
Density @300K, g/cm <sup>3</sup>	4.83
Molecular Weight	175.36
Lattice Constant, Å	6.196
Melting Point, °C	1368
Thermal Conductivity @319K, W/(m×K)	11.72
Thermal Expansion @300K, 10 <sup>-6</sup> /C	18.1
Hardness, Knoop with 200 g indenter	82 вдоль (100)
Specific Heat Capacity, J/(kg×K)	410
Dielectric Constant for 10 <sup>6</sup> Hz @300K	7.33
Young Modulus (E), GPa	53.07
Shear Modulus (G), GPa	25.4
Bulk Modulus (K), GPa	56.4
Elastic Coefficient	C11 = 89.2, C12 = 40.0, C44 = 25.4МПа
Apparent Elastic Limit, MPa	26.9
Poisson Ratio	0.343

Tab.4. Physical and mechanical properties

in water (at 0°C)	0,17 г / 100 cm <sup>3</sup> non-hygroscopic	
in acids	soluble	
in organic solvents	acetone	insoluble
	lower spirits	slightly insoluble
	ether	insoluble

Please pay your attention that this article is for your information only. We do not supply BaF<sub>2</sub> in ingots as well as semi-finished products. Our standard products are polished parts.

For further information on our BaF<sub>2</sub> optical components please see the following: Windows for IR-spectroscopy, FTIR Beam Splitter, Packaging or fill in request form at [www.tydex.com](http://www.tydex.com).