

# UV & IR Optics

COATINGS

WINDOWS & FILTERS

MIRRORS

LENSES

PRISMS

POLARIZING OPTICS

UV & IR OPTICS

## LITHIUM FLUORIDE (LiF) COMPONENTS

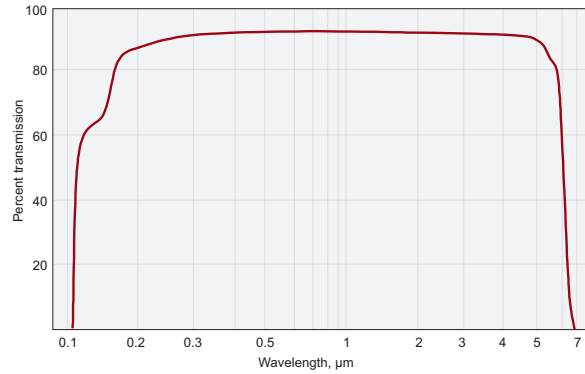
### FEATURES

- › Optically isotropic, medium hard, hygroscopic, insoluble in water
- › Wide transmission range from 150 nm to 6000 nm

Lithium fluoride crystals are well-suited for manufacturing of optical elements (mirrors, windows, lenses) for UV, visible and IR applications.

LiF is very useful for x-ray monochromators and for the study of fundamental properties and defects in crystals.

LiF lenses, Brewster windows, prisms are available upon request.



External transmission of LiF window of 10 mm thickness.

### PHYSICAL PROPERTIES

Crystal type	cubic
Lattice constant, Å	a = 4.026
Density, g/cm <sup>3</sup>	2.64
Melting point, °C	870
Refractive index @ 1.0 µm	n = 1.387
Transmission range, µm	0.12 – 6

### SPECIFICATIONS FOR LiF WINDOWS

Material	optical quality LiF crystal ( $\Delta n/cm < 0.5 \times 10^{-5}$ )
Spectral range	UV, VIS, IR
Surface quality	60 – 40 scratch & dig (MIL-PRF-13830B)
Clear aperture	90% of the diameter
Diameter tolerance	+0.0 / -0.1 mm
Thickness tolerance	±0.2 mm
Surface flatness	$\lambda/4$ @ 633 nm
Parallelism	< 3 arcmin

### HOUSING ACCESSORIES

Optical Component Mount 830-0037



Diameter, mm	Thickness, mm	Substrate	Catalogue number	Price, EUR
25.4	3.0	UV grade LiF	<b>510-5253</b>	102
38.1	4.0	UV grade LiF	<b>510-5384</b>	215
50.8	6.0	UV grade LiF	<b>510-5506</b>	315

Please contact us for other size, shape or precision requirements.

## MAGNESIUM FLUORIDE (MgF<sub>2</sub>) COMPONENTS

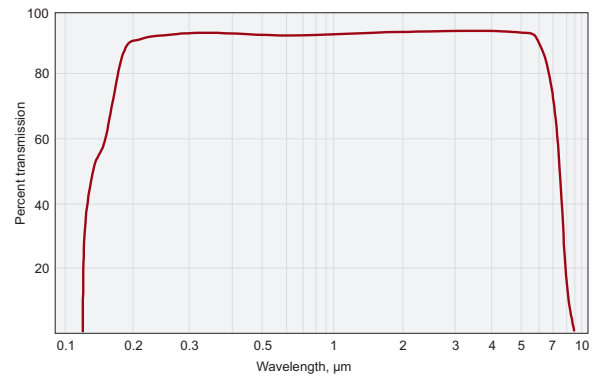
### FEATURES

- › Very hard and rugged
- › Resistant to mechanical and thermal shock
- › The only optical material combining a wide spectral transmission band with the birefringence phenomenon

Magnesium fluoride is a proven material for high energy lasers, and in particular for lasers operating in the UV range.

Generally all optical elements are manufactured with the working surface perpendicular to the c-axis of MgF<sub>2</sub> crystal.

MgF<sub>2</sub> lenses, windows, mirrors, prisms are available upon request.



External transmission of MgF<sub>2</sub> window of 10 mm thickness

### PHYSICAL PROPERTIES

Crystal type	tetragonal
Lattice constant, Å	a = 4.60, c = 3.06
Density, g/cm <sup>3</sup>	3.177
Melting point, °C	1255
Refractive index @ 1.0 μm	n <sub>o</sub> = 1.3796, n <sub>e</sub> = 1.3852
Transmission range, μm	0.12 – 7

### SPECIFICATIONS

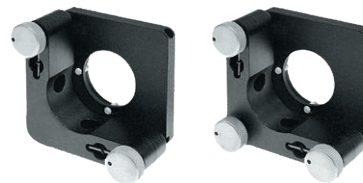
Material	optical quality MgF <sub>2</sub> crystal ( $\Delta n/cm < 0.5 \times 10^{-5}$ )
Spectral range	UV, IR
Surface quality	40 – 20 scratch & dig (MIL-PRF-13830B)
Clear aperture	90% of the diameter
Diameter tolerance	+0.0 / -0.1 mm
Thickness tolerance	±0.2 mm
Surface flatness	$\lambda/4$ @ 633 nm
Parallelism	< 3 arcmin
Maximum available size of optical components	up to 50 mm

Diameter, mm	Thickness, mm	Substrate	Catalogue number	Price, EUR
25.4	3.0	UV grade MgF <sub>2</sub>	<a href="#">520-5253</a>	130
38.1	5.0	UV grade MgF <sub>2</sub>	<a href="#">520-5385</a>	230
50.8	6.0	UV grade MgF <sub>2</sub>	<a href="#">520-5506</a>	370
25.4	3.0	IR grade MgF <sub>2</sub>	<a href="#">520-6253</a>	110
38.1	5.0	IR grade MgF <sub>2</sub>	<a href="#">520-6385</a>	215
50.8	6.0	IR grade MgF <sub>2</sub>	<a href="#">520-6506</a>	350

Please contact us for other size, shape or precision requirements.

### HOUSING ACCESSORIES

Kinematic  
Mirror / Beamsplitter  
Mounts 840-0032, 840-0033



## CALCIUM FLUORIDE (CaF<sub>2</sub>) COMPONENTS

### FEATURES

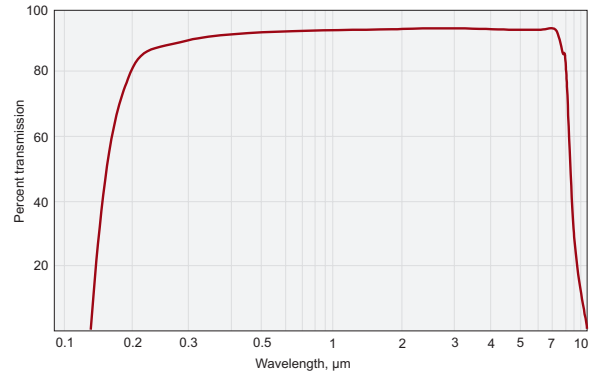
- › Useful transmission over the spectral range from 0.2 to 8.0 microns
- › Low solubility

Two grades of materials are available: one for UV and the other for IR applications. Low solubility and a wide transmission range makes it useful for many applications, including:

- mirror substrate for UV laser systems;
- substrate for manufacturing windows, lenses for UV, IR applications.

Due to its composition CaF<sub>2</sub> has a much longer useful life than most materials when used in a fluorine environment.

CaF<sub>2</sub> lenses, windows, mirrors, prisms, beamsplitters and beamselectors are available upon request.



External transmission of CaF<sub>2</sub> window of 10 mm thickness

### PHYSICAL PROPERTIES

Crystal type	cubic
Lattice constant, Å	a = 5.462
Density, g/cm <sup>3</sup>	3.18
Melting point, °C	1360
Refractive index @ 1.0 µm	n = 1.4289
Transmission range, µm	0.13 – 10

### CaF<sub>2</sub> WINDOWS

#### SPECIFICATIONS

Material	optical quality CaF <sub>2</sub> crystal ( $\Delta n/cm < 0.5 \times 10^{-5}$ )
Spectral range	UV, VIS, IR
Surface quality	40 – 20 scratch & dig (MIL-PRF-13830B)
Clear aperture	90% of the diameter
Diameter tolerance	+0.0 / -0.13 mm
Thickness tolerance	±0.2 mm
Surface flatness	$\lambda/4$ @ 633 nm
Parallelism	3 arcmin
Maximum available size of optical components up to dia	120 × 20 mm

Diameter, mm	Thickness, mm	Substrate	Catalogue number	Price, EUR
25.4	1.0	UV grade CaF <sub>2</sub>	<a href="#">530-6251</a>	80
25.4	2.0	UV grade CaF <sub>2</sub>	<a href="#">530-6252</a>	76
25.4	3.0	UV grade CaF <sub>2</sub>	<a href="#">530-5253</a>	70
38.1	5.0	UV grade CaF <sub>2</sub>	<a href="#">530-5385</a>	150
50.8	6.0	UV grade CaF <sub>2</sub>	<a href="#">530-5506</a>	250
25.4	3.0	IR grade CaF <sub>2</sub>	<a href="#">530-6253</a>	60
38.1	5.0	IR grade CaF <sub>2</sub>	<a href="#">530-6385</a>	99
50.8	6.0	IR grade CaF <sub>2</sub>	<a href="#">530-6506</a>	175
70.0	10.0	IR grade CaF <sub>2</sub>	<a href="#">530-6710</a>	230
75.0	6.0	IR grade CaF <sub>2</sub>	<a href="#">530-6756</a>	300

Please contact us for other size, shape or precision requirements.

### IR GRADE CaF<sub>2</sub> PROTECTIVE WINDOWS FOR SPECTROSCOPY APPLICATION (OPTICALLY POLISHED)

#### SPECIFICATIONS

Material	optical quality CaF <sub>2</sub> crystal ( $\Delta n/cm < 0.5 \times 10^{-5}$ )
Surface quality	80 – 50 scratch & dig (MIL-PRF-13830B)
Clear aperture	90% of the diameter
Diameter tolerance	+0.0 / -0.13 mm
Thickness tolerance	±0.2 mm
Surface flatness	optically polished
Parallelism	<10 arcmin

Diameter, mm	Thickness, mm	Substrate	Catalogue number	Price, EUR
12.0	1	IR grade CaF <sub>2</sub>	<a href="#">530-6121</a>	5

### HOUSING ACCESSORIES

Flipping Mirror / Beamsplitter Mounts 840-0155



## BARIUM FLUORIDE (BaF<sub>2</sub>) COMPONENTS

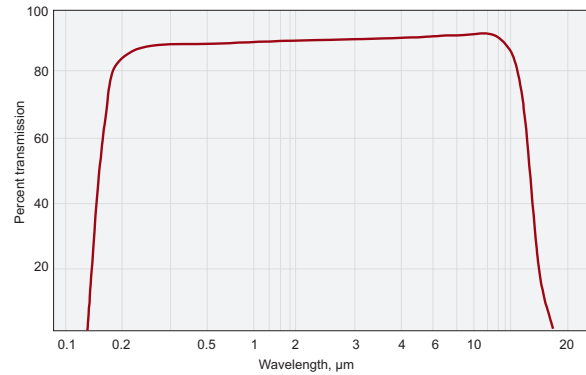
### FEATURES

- Useful transmission range covers 0.265 – 10 μm
- Most resistant to high energy radiation among fluorides listed in this catalogue

Barium fluoride is used for optical windows, prisms and lenses transmitting from ultraviolet into infrared, it can be used as an infrared laser window or lens. BaF<sub>2</sub> is recommended for use as a vacuum ultraviolet window where high radiation resistance is required.

BaF<sub>2</sub> is less soluble than LiF, but relatively more soluble than MgF<sub>2</sub> and CaF<sub>2</sub>.

BaF<sub>2</sub> lenses, Brewster windows, mirrors, prisms are available on request.



External transmission of BaF<sub>2</sub> window of 10 mm thickness

### PHYSICAL PROPERTIES

Crystal type	cubic
Density, g/cm <sup>3</sup>	4.89
Melting point, °C	1386
Refractive index	@ 0.265 μm, n = 1.51217 @ 10.3 μm, n = 1.39636
Transmission range, μm	0.15 – 12

### BaF<sub>2</sub> WINDOWS

#### SPECIFICATIONS

Material	BaF <sub>2</sub>
Surface quality	60 – 40 scratch & dig (MIL-PRF-13830B)
Clear aperture	90% of the diameter
Diameter tolerance	+0.0 / -0.25 mm
Thickness tolerance	± 0.2 mm
Surface flatness	1λ per inch @ 633 nm
Parallelism	3 arcmin

Diameter, mm	Thickness, mm	Catalogue number	Price, EUR
25.4	2	<a href="#">540-7252</a>	60
25.4	3	<a href="#">540-7251</a>	60
44.6	3.5	<a href="#">540-7445</a>	100
50.8	3	<a href="#">540-7503</a>	220

Please contact us for other size, shape, precision or coating requirements.

### BaF<sub>2</sub> LENSES

#### SPECIFICATIONS

Material	BaF <sub>2</sub>
Surface quality	60 – 40 scratch & dig (MIL-PRF-13830B)
Clear aperture	90% of the diameter
Diameter tolerance	+0.0 / -0.5 mm
Focal length	± 2% @ 3 μm
Surface irregularity	λ/4 @ 633 nm
Centration	3 arcmin
Maximum available size of optical components	up to Ø100 mm

Diameter, mm	Focal length, mm	Type	Catalogue number	Price, EUR
12.7	25	plano-convex	<a href="#">541-7105</a>	89
25.4	40	plano-convex	<a href="#">541-7204</a>	145
25.4	50	plano-convex	<a href="#">541-7205</a>	134
25.4	75	plano-convex	<a href="#">541-7207</a>	120
25.4	100	plano-convex	<a href="#">541-7210</a>	109
25.4	125	plano-convex	<a href="#">541-7212</a>	109
25.4	150	plano-convex	<a href="#">541-7213</a>	109
25.4	200	plano-convex	<a href="#">541-7214</a>	109
25.4	250	plano-convex	<a href="#">541-7225</a>	109
25.4	300	plano-convex	<a href="#">541-7230</a>	109
25.4	750	plano-convex	<a href="#">541-7275</a>	109
25.4	1000	plano-convex	<a href="#">541-7250</a>	109
12.7	-25	plano-concave	<a href="#">542-7105</a>	89
25.4	-50	plano-concave	<a href="#">542-7205</a>	134
25.4	-75	plano-concave	<a href="#">542-7207</a>	120
25.4	-100	plano-concave	<a href="#">542-7210</a>	109
25.4	-250	plano-concave	<a href="#">542-7225</a>	109
25.4	-1000	plano-concave	<a href="#">542-7250</a>	109
25.4	-2000	plano-concave	<a href="#">542-7270</a>	109

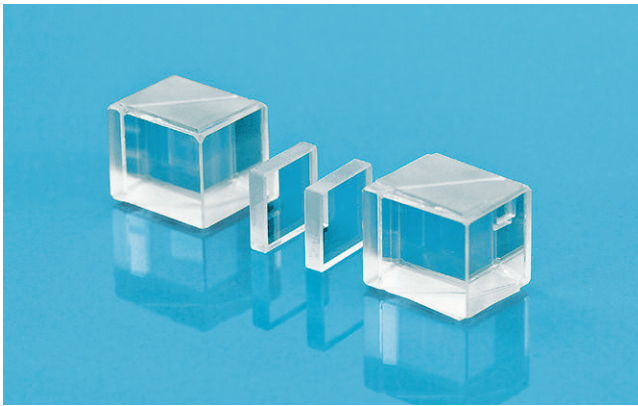
Please contact us for other size, shape or precision requirements.

#### HOUSING ACCESSORIES

Self-Centring Lens Mounts 830-0010



## BaF<sub>2</sub> OPTICAL CRYSTALS FOR CROSS POLARIZED WAVE GENERATION



### PHYSICAL PROPERTIES

Crystal type	cubic
Density, g/cm <sup>3</sup>	5.27
Melting point, °C	1525
Refractive index	@ 0.265 μm, n = 1.51217 @ 10.3 μm, n = 1.39636
Transmission range, μm	0.135 – 15

### SPECIFICATIONS

Material	BaF <sub>2</sub>
Surface quality	60 – 40 scratch & dig (MIL-PRF-13830B)
Clear aperture	90% of the diameter
Diameter tolerance	+0.0 / -0.25 mm
Thickness tolerance	± 0.2 mm
Surface flatness	λ/2 @ 633 nm
Parallelism	3 arcmin

### UNMOUNTED

Size, mm	Thickness, mm	Orientation	Catalogue number	Price, EUR
10x10	0.5	[011]	<b>540-7105</b>	180
10x10	1.0	[011]	<b>540-7110</b>	180
10x10	1.5	[011]	<b>540-7115</b>	180
10x10	2.0	[011]	<b>540-7120</b>	180
10x10	2.5	[011]	<b>540-7125</b>	180
10x10	3.0	[011]	<b>540-7130</b>	180

Cross-Polarized Wave (XPW) generation is a nonlinear third order process during which fundamental and generated waves have the same frequency; however, generated wave is perpendicularly polarized to pump wave polarization. Phase matching occurs over large bandwidth in XPW generation process. This means the same phase and group velocities for fundamental wave and XPW.

Cross-polarized wave (XPW) generation process is driven by the third order nonlinearity of the crystal,  $\chi_{xxxx}^{(3)}$  and the anisotropy  $\sigma = (\chi_{xxxx}^{(3)} - 3\chi_{xxyy}^{(3)}) / \chi_{xxxx}^{(3)}$  of the  $\chi^{(3)}$  tensor.

The typical optical material used for cross-polarized wave (XPW) generation is Barium Fluoride (BaF<sub>2</sub>) crystal with z ([001]) or holographic ([011]) crystallographic orientation. Theory predicts a maximum XPW energy conversion efficiency around 35% when using [011]-cut BaF<sub>2</sub> crystal with a concomitant pulse shortening factor of  $\sqrt{3}$  corresponding to a pure third-order nonlinear process [1].

EKSMA OPTICS offers [011] orientation BaF<sub>2</sub> optical crystals (XPW crystals) for Cross-Polarized Wave (XPW) generation. BaF<sub>2</sub> optical crystals with orientation [001] as well CaF<sub>2</sub> optical crystals are available on request.

### Characteristics of the different Cross Polarized Wave (XPW) crystals at 2.1 μm [2]

	BaF <sub>2</sub>	CaF <sub>2</sub>	CVD-Diamond
Orientation	h-cut [011]	h-cut [011]	z-cut [001]
Length, mm	2	2	1.2
n	1.464	1.426	2.383
$\chi_{xxxx}^{(3)} \cdot 10^{-22} \text{ m}^2/\text{V}^2$	1.53	0.94	11
σ	-1.2	-0.6	-1.8
GVD, fs <sup>2</sup> /mm	-6	-27	63

[1] L. Canova, S. Kourtev, N. Minkovski, A. Jullien, R. Lopez-Martens, O. Albert, and S.M. Saitiel, *Appl. Phys. Lett.* 92, 231102 (2008)

[2] Ricci, A., Silva, F., Jullien, A., Cousin, S. L., Austin, D. R., Biegert, J., Lopez-Martens, R. *Generation of High-Fidelity few-cycle pulses at 2.1 μm via cross-polarized wave generation. Optics Express* 9711, 2013.04.22. Vol. 21, No. 8. DOI:10.1364/OE.21.009711

### MOUNTED INTO OPEN RING HOLDER

Size, mm	Thickness, mm	Orientation	Catalogue number	Price, EUR
10x10	0.5	[011]	<b>540-7105M</b>	230
10x10	1.0	[011]	<b>540-7110M</b>	230
10x10	1.5	[011]	<b>540-7115M</b>	230
10x10	2.0	[011]	<b>540-7120M</b>	230
10x10	2.5	[011]	<b>540-7125M</b>	230
10x10	3.0	[011]	<b>540-7130M</b>	230

## SAPPHIRE (Al<sub>2</sub>O<sub>3</sub>) COMPONENTS

### FEATURES

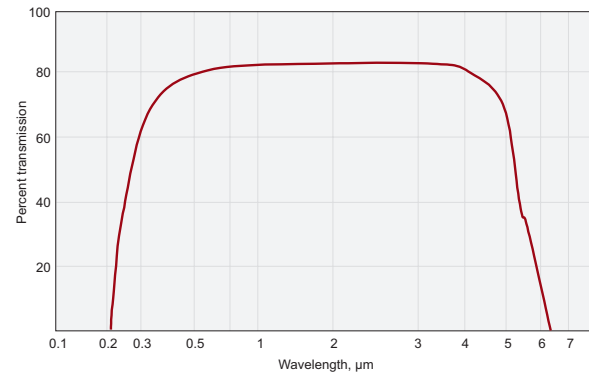
- › The hardest of the oxide crystals
- › Excellent transparency and thermal properties
- › Chemically inert and insoluble
- › Can be safely made much thinner than windows from glass or other crystals

Single crystal sapphire combines excellent optical, physical and chemical properties. Chemically inert and almost insoluble, sapphire in many ways is a superior material for windows. It is transparent from 150 nm up to 6 μm in the middle infrared.

Sapphire exhibits anisotropy in many optical and physical properties. Difference in the index of refraction in orthogonal directions is 0.008.

The high index of sapphire makes magnesium fluoride almost an ideal single layer anti-reflection coating.

Exact parameters depend on the orientation of optical axis or c-axis relative to the surface.



External transmission of Al<sub>2</sub>O<sub>3</sub> window of 1 mm thickness

### PHYSICAL PROPERTIES

Crystal type	Hexagonal
Density, g/cm <sup>3</sup>	3.97
Melting point, °C	2040
Refractive index	@ 0.3 μm, n = 1.814 @ 5 μm, n = 1.623
Transmission range, μm	0.17 – 5.5

### SPECIFICATIONS FOR SAPPHIRE WINDOWS

Material	Al <sub>2</sub> O <sub>3</sub>
Surface quality	60 – 40 scratch & dig (MIL-PRF-13830B)
Clear aperture	80% of the diameter
Diameter tolerance	+0.0 / -0.13 mm
Thickness tolerance	±0.2 mm
Surface flatness	1 λ per inch @ 633 nm
Parallelism	3 arcmin
Orientation	C-cut

Diameter, mm	Thickness, mm	Catalogue number	Price, EUR
12.7	0.5	<a href="#">550-7120</a>	26
12.7	1	<a href="#">550-7121</a>	25
12.7	2	<a href="#">550-7122</a>	25
12.7	3	<a href="#">550-7123</a>	25
12.7	4	<a href="#">550-7124</a>	27
12.7	6	<a href="#">550-7126</a>	30
20.0	0.5	<a href="#">550-7200</a>	35
20.0	1	<a href="#">550-7201</a>	35
20.0	2	<a href="#">550-7202</a>	35
25.4	0.5	<a href="#">550-7250</a>	45
25.4	1	<a href="#">550-7251</a>	45
25.4	2	<a href="#">550-7252</a>	45
25.4	3	<a href="#">550-7253</a>	45
25.4	4	<a href="#">550-7254</a>	45
25.4	5	<a href="#">550-7255</a>	50
38.1	2	<a href="#">550-7382</a>	109
50.0	2	<a href="#">550-7502</a>	157
50.0	3	<a href="#">550-7503</a>	165

Please contact us for other size, shape or precision requirements. Coatings are available upon request.

### HOUSING ACCESSORIES

Mirror / Beamsplitter  
Mount 840-0036



## ZINC SELENIDE (ZnSe) COMPONENTS

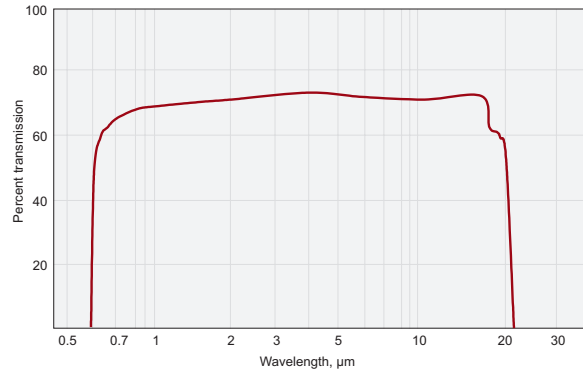
### FEATURES

- › Low absorption in the red end of the visible spectrum
- › Not hygroscopic
- › Quite stable in the laboratory environment

Zinc selenide is the most popular material for infrared applications. Due to a very wide transmission range covering 0.6–22 µm chemical vapor deposition grown ZnSe as a high optical quality material is used to manufacture optical components (windows, mirrors, lenses) for high power IR lasers.

Because of a high refractive index, single and double layer antireflection coatings can be unusually effective.

ZnSe Brewster windows, mirrors, prisms, beamsplitters and beamselectors are available upon request.



External transmission of ZnSe window of 10 mm thickness

### PHYSICAL PROPERTIES

Crystal type	cubic	
Density, g/cm <sup>3</sup>	5.27	
Melting point, °C	1525	
Refractive index	@ 8 – 13 µm	n = 2.417–2.385
	@ 10.6 µm	n = 2.403
Transmission range, µm	0.6 – 21	
Bulk absorption coefficient, cm <sup>-1</sup>	@ 10.6 µm	0.6 – 1.0×10 <sup>-3</sup>
Coefficient of linear thermal expansion, °C <sup>-1</sup>	8.56×10 <sup>-6</sup>	

### ZnSe WINDOWS

### SPECIFICATIONS

Material	ZnSe
Surface quality	40 – 20 scratch & dig (MIL-PRF-13830B)
Clear aperture	90% of the diameter
Diameter tolerance	+0.0 / -0.13 mm
Thickness tolerance	± 0.1 mm
Surface flatness	λ/40 per inch @ 10.6 µm over clear aperture
Parallelism	3 arcmin
Coating	both surfaces AR coated @ 10.6 µm, R≤0.5% per surface

#### UNCOATED

Diameter, mm	Thickness, mm	Catalogue number	Price, EUR
12.7	2.0	<a href="#">560-6120</a>	55
12.7	3.0	<a href="#">560-6121</a>	57
25.4	2.0	<a href="#">560-6250</a>	69
25.4	3.0	<a href="#">560-6251</a>	73
38.1	3.0	<a href="#">560-6381</a>	135
50.8	3.0	<a href="#">560-6501</a>	270
50.8	5.0	<a href="#">560-6503</a>	340

#### COATED AR/AR @ 10.6 µm, AOI=0°

Diameter, mm	Thickness, mm	Catalogue number	Price, EUR
12.7	2.0	<a href="#">560-6122</a>	85
25.4	3.0	<a href="#">560-6253</a>	130
38.1	3.0	<a href="#">560-6383</a>	205
50.8	5.0	<a href="#">560-6505</a>	410
76.2	6.4	<a href="#">560-6766</a>	995

Please contact us for other size, shape, precision or coating requirements.

### ZnSe PLANO-CONVEX LENSES

### SPECIFICATIONS

Material	ZnSe
Surface quality	40 – 20 scratch & dig (MIL-PRF-13830B)
Focal length tolerance	±2%
Diameter tolerance	+0.0 / -0.13 mm
Thickness tolerance	±0.1 mm
Coating	both surfaces AR coated @ 10.6 µm, R≤0.5% per surface

Diameter, mm	Focal length, mm	Catalogue number	Price, EUR
12.7	25.4	<a href="#">561-6122</a>	185
19.1	38.1	<a href="#">561-6192</a>	185
25.4	50	<a href="#">561-6251</a>	195
25.4	63.5	<a href="#">561-6252</a>	195
25.4	75	<a href="#">561-6253</a>	195
25.4	100	<a href="#">561-6254</a>	195
25.4	127	<a href="#">561-6255</a>	190
25.4	150	<a href="#">561-6256</a>	190

Diameter, mm	Focal length, mm	Catalogue number	Price, EUR
25.4	200	<a href="#">561-6257</a>	190
25.4	254	<a href="#">561-6258</a>	190
38.1	63.5	<a href="#">561-6382</a>	315
38.1	127	<a href="#">561-6385</a>	308
38.1	190.5	<a href="#">561-6388</a>	308
50.8	127	<a href="#">561-6502</a>	580
76.2	254	<a href="#">561-6765</a>	1390

Please contact us for other size, shape, precision or coating requirements.

## ZnSe MENISCUS LENSES

### SPECIFICATIONS

Material	ZnSe
Surface quality	40-20 scratch & dig (MIL-PRF-13830B)
Focal length tolerance	±2%
Diameter tolerance	+0.0 -0.13 mm
Thickness tolerance	±0.1 mm
Clear Aperture	90% of the diameter
Coating	both surfaces AR coated @ 10.6 µm, R≤0.5% per surface

Diameter, mm	Focal length, mm	Catalogue number	Price, EUR
12.7	38.1	<a href="#">565-6122</a>	215
25.4	25.4	<a href="#">565-6251</a>	224
25.4	38.1	<a href="#">565-6252</a>	224
25.4	50	<a href="#">565-6253</a>	217
25.4	63.5	<a href="#">565-6255</a>	217
25.4	75	<a href="#">565-6256</a>	217
25.4	100	<a href="#">565-6257</a>	217
25.4	127	<a href="#">565-6258</a>	217
38.1	63.5	<a href="#">565-6382</a>	345
38.1	127	<a href="#">565-6385</a>	345
38.1	254	<a href="#">565-6388</a>	345
50.8	127	<a href="#">565-6502</a>	612
76.2	254	<a href="#">565-6765</a>	1450

Please contact us for other size, shape, precision or coatings requirements.

### HOUSING ACCESSORIES

Variable Lens Holder  
830-0040



## SILICON (Si) COMPONENTS

Coated silicon substrates are most common used as mirrors for CO<sub>2</sub> lasers. Its advantages are good durability, thermal stability and relatively low cost.

The total reflectors are used as rear reflectors and fold mirrors and externally as beam benders in beam delivery systems.

### SPECIFICATIONS

Material	Si
Density, g/cm <sup>3</sup>	2.33
Operation wavelength	10.6 µm
Surface quality	40 – 20 scratch & dig (MIL-PRF-13830B)
Surface flatness	λ/4 @ 633 nm
Clear aperture	>80% of diameter
Diameter tolerance	+0.0 / -0.2 mm
Thickness tolerance	±0.25 mm

## SILICON (Si) MIRRORS

### SPECIFICATIONS

Coating	protected gold
Reflectivity for unpolarised radiation	> 99%

Diameter, mm	Thickness, mm	Catalogue number	Price, EUR
25.4	3	<a href="#">575-6250</a>	59
38.1	4	<a href="#">575-6380</a>	94
50.8	5	<a href="#">575-6500</a>	159

## SILICON (Si) WINDOWS

### SPECIFICATIONS

Coating	uncoated
Parallelism	3 arcmin

Diameter, mm	Thickness, mm	Catalogue number	Price, EUR
25.4	3	<a href="#">575-6250U</a>	95
50.8	3	<a href="#">575-6500U</a>	160



## GERMANIUM (GE) COMPONENTS

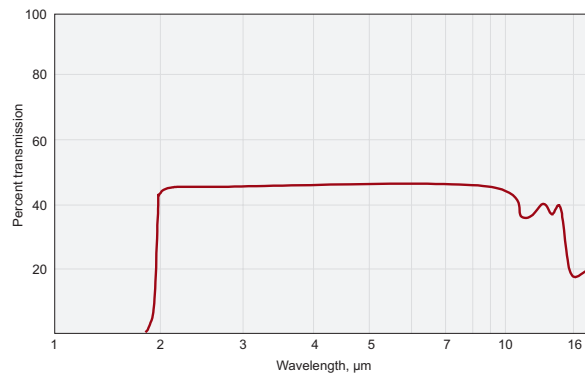
### FEATURES

- › Wide IR transmission range covering 1.8 – 16  $\mu\text{m}$
- › Opaque in the visible range

Ge based optical components are widely used for IR applications. Ge is well suited for manufacturing windows and lenses for IR applications in lasers and optical systems. Ge components are used with AR coatings because of high surface reflectivity of substrate.

The high refractive index ensures an exceptional single wavelength performance for a "best form" singlet constructed from germanium.

Ge lenses, Brewster windows, mirrors and beamsplitters are available upon request.



External transmission for Ge window of 10 mm thickness

### PHYSICAL PROPERTIES

Crystal type	cubic
Lattice constant, Å	a = 5.657
Density, g/cm <sup>3</sup>	5.33
Melting point, °C	936
Refractive index @ 10.6 $\mu\text{m}$	n = 4.0034
Transmission band, $\mu\text{m}$	1.8 – 17

### SPECIFICATIONS

Material	optical quality Ge crystal ( $\Delta n/\text{cm} < 0.5 \times 10^{-5}$ )
Surface quality	60 – 40 scratch & dig (MIL-PRF-13830B)
Clear aperture	80% of the diameter
Diameter tolerance	+0.0 / -0.1 mm
Thickness tolerance	$\pm 0.2$ mm
Surface flatness	$< 1.5 \lambda$ per inch @ 633 nm
Parallelism	$< 3$ arcmin

Coating	Diameter, mm	Thickness, mm	Catalogue number	Price, EUR
uncoated	25.4	3.0	<a href="#">580-6023</a>	99
	38.1	4.0	<a href="#">580-6034</a>	210
	50.8	5.0	<a href="#">580-6055</a>	299
AR/AR @ 10.6 $\mu\text{m}$	25.4	3.0	<a href="#">580-6123</a>	159
	38.1	4.0	<a href="#">580-6134</a>	269
	50.8	5.0	<a href="#">580-6155</a>	370

Please contact us for other sizes or required specifications of coating.

### HOUSING ACCESSORIES

Kinematic Mirror and Beamsplitter Mount 840-0020

