SCHOTT, your reliable solutions provider in the IR industry

Infrared Chalcogenide Glass IRG 27

Product Information

IRG 27 exhibits excellent transmission from 680 nm in the visible range through the SWIR, MWIR and LWIR wavelengths. The chalcogenide composition of IRG 27 does not contain germanium (Ge) and therefore offers transmission with minimal absorption at 12.5 µm. One major advantage is the near zero dn/dT across the entire SWIR (starting at 1.5 µm) through the MWIR and LWIR range. In addition, there is very low dispersion for SWIR and MWIR applications. IRG 27 can act as a flint material in achromatic doublets for multi-band IR applications. Furthermore, IRG 27 can be processed by conventional grinding and polishing, single point diamond turning or molding. Its similar thermal and mechanical characteristic (expansion, modulus, hardness, etc.) allow it to process like IRG 26.

Typical Forms of Supply

Typical forms of supply are upon customer request.
Maximum sizes up to Ø 95 mm and 150 mm length.
For sample parts we offer you the following polished blanks:

- Diameter: 10 to 95 mm
- Thickness: 5 to 30 mm

Constants of Dispersion Formulas	
B_1	1.4005
B_2	3.4429
B_3	1.0394
C_1	0.0000
C_2	0.0871
C_3	805.5
D_0	$-3.89 \cdot 10^{-6}$
E_0	$1.77 \cdot 10^{-5}$
λ_{TK}	$6.04 \cdot 10^{-2}$

Material Properties	
Composition	As_2S_3
Density	3.20 g/cm³
Thermal Expansion	$22.5 \cdot 10^{-6}$/K
Thermal Conductivity (25 °C)	0.35 W/(m · K)
Transition Temperature	197 °C
Hardness (Knoop)	1.11 GPa
Fracture Toughness	0.29 MPa · $m^{1/2}$
Young's Modulus	16.8 GPa

*For more information and questions please contact us

Calculation Formula: Refractive index as a function of wavelength and temperature

$$n(\lambda,T) = \sqrt{1 + \frac{B_1\lambda^2}{\lambda^2 - C_1} + \frac{B_2\lambda^2}{\lambda^2 - C_2} + \frac{B_3\lambda^2}{\lambda^2 - C_3}} + \frac{dn}{dT}(T - 20\,°C)$$

$$\frac{dn}{dT} = \frac{n^2(\lambda, 20\,°C) - 1}{2n(\lambda, 20\,°C)}\left[D_0 + \frac{E_0}{\lambda^2 - \lambda_{TK}}\right]$$

Wavelength [µm]	Refractive Index (@ 20 °C)	Temperature Coefficients of Refractive Index –50 to 75 °C* [10^{-6}/K]
0.6	2.6347	62.2
0.7	2.5665	40.6
0.8	2.5268	28.4
0.9	2.5014	20.7
1.0	2.4841	15.6
1.5	2.4452	4.3
2.0	2.4320	0.6
2.5	2.4257	–1.0
3.0	2.4218	–1.9
4.0	2.4169	–2.8
5.0	2.4129	–3.2
6.0	2.4090	–3.4
7.0	2.4046	–3.5
8.0	2.3997	–3.6
9.0	2.3939	–3.6
10.0	2.3873	–3.7
11.0	2.3795	–3.7
12.0	2.3705	–3.7

Refractive index tolerance at 10 µm wavelength: ±0.001

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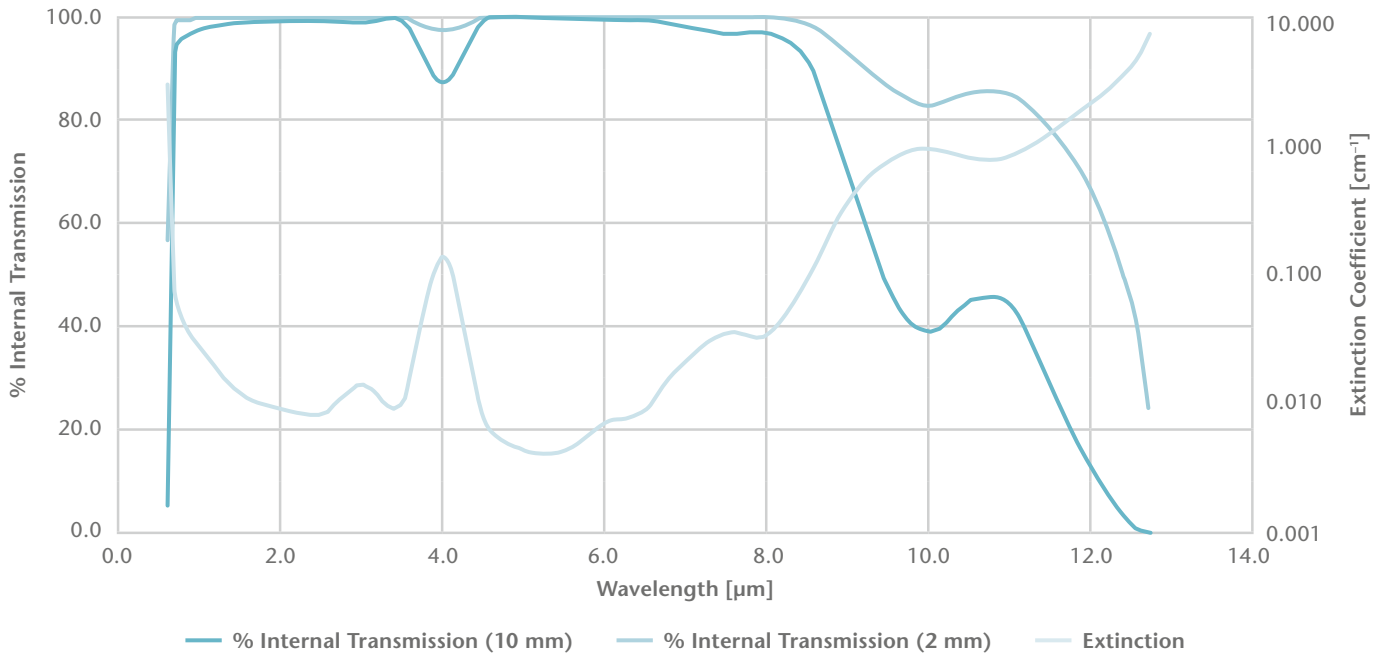
IRG 27 Extinction and Internal Transmission



Wavelength [µm]	% Internal Transmission (10 mm)	% Internal Transmission (2 mm)	Extinction [cm^{-1}]
0.6	5.8	56.5	2.855
0.7	93.3	98.6	0.070
0.8	95.7	99.1	0.043
1.0	97.3	99.5	0.028
1.5	98.8	99.8	0.012
2.0	99.1	99.8	0.009
2.5	99.2	99.8	0.008
3.0	98.6	99.7	0.014
3.5	99.0	99.8	0.010
4.0	87.2	97.3	0.137
4.5	99.2	99.8	0.008
5.0	99.6	99.9	0.004
5.5	99.6	99.9	0.004
6.0	99.3	99.9	0.007

Wavelength [µm]	% Internal Transmission (10 mm)	% Internal Transmission (2 mm)	Extinction [cm^{-1}]
6.5	99.1	99.8	0.009
7.0	97.8	99.6	0.022
7.5	96.5	99.3	0.035
8.0	96.6	99.3	0.035
8.5	91.0	98.1	0.094
9.0	69.3	92.9	0.366
9.5	46.8	85.9	0.759
10.0	38.8	82.8	0.946
10.5	44.9	85.2	0.801
11.0	44.0	84.8	0.822
11.5	28.3	77.7	1.263
12.0	11.8	65.2	2.137
12.5	1.6	43.5	4.158
12.7	0.1	24.5	7.025

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Advanced Optics
SCHOTT AG
Hattenbergstrasse 10
55122 Mainz
Germany
Phone +49 (0)6131/66-1812
Fax +49 (0)3641/2888-9047
info.optics@schott.com

www.schott.com/advanced_optics

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