

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



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

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

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

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 · 10 ⁻⁶
E ₀	1.77 · 10 ⁻⁵
λ _{TK}	6.04 · 10 ⁻²

Material Properties	
Composition	As ₂ S ₃
Density	3.20 g/cm ³
Thermal Expansion	22.5 · 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

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

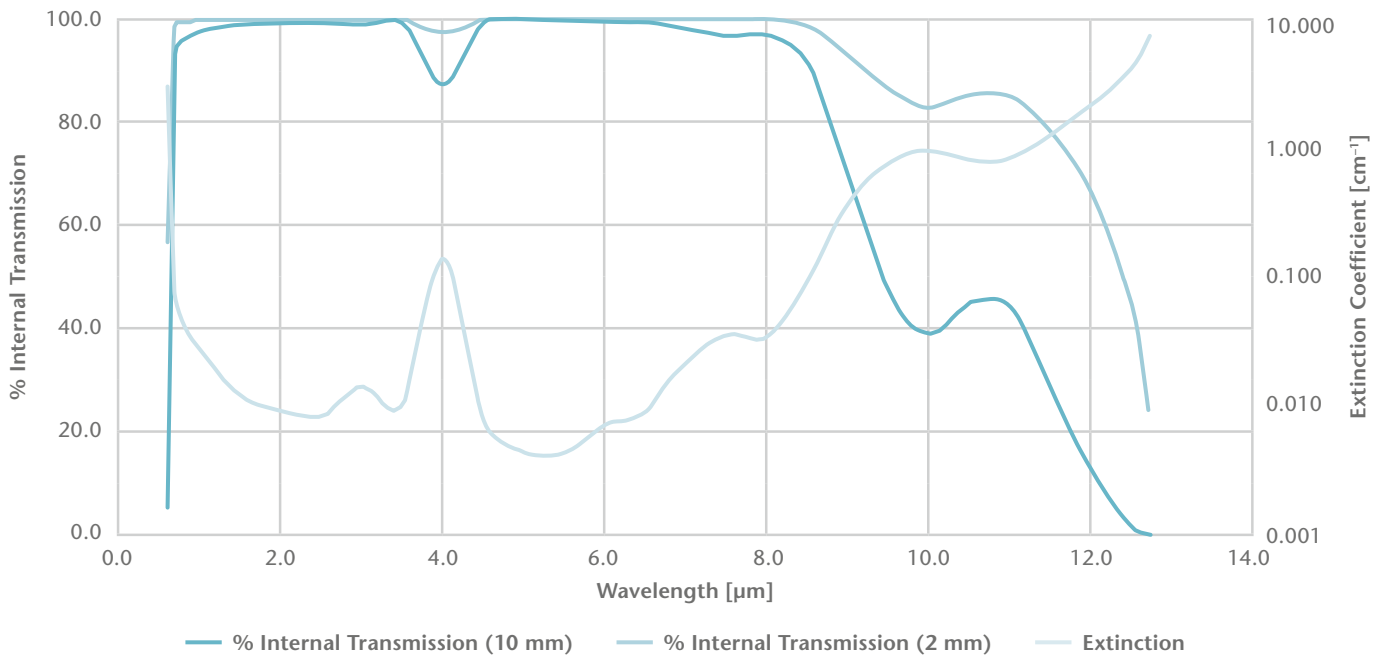
Refractive index tolerance at 10 μm wavelength: ±0.001

*For more information and questions please contact us



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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 North America, Inc.
 400 York Avenue
 Duryea, PA 18642
 USA
 Phone +1 570/457-7485
 Fax +1 570/457-7330
 info.optics@us.schott.com

www.us.schott.com/advanced_optics

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