

# SCHOTT, your reliable solutions provider in the IR industry

## Infrared Chalcogenide Glass IRG 24

### Product Information

IRG 24 has excellent transmission in the SWIR, MWIR, & LWIR and has the lowest dn/dT of the IR series glasses. Physical properties such as low dn/dT and low dispersion enable optical engineers to design color corrected optical systems without thermal defocusing. IRG 24 is optimized for pairing within the family of IR glasses and with other IR materials to support cost effective and high performance optical designs. Furthermore, IRG 24 can be processed by conventional grinding and polishing, single point diamond turning, or molding to support low to high volume component level fabrication.



### 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 would like to 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 <sub>1</sub>	2.8965
B <sub>2</sub>	2.9567
B <sub>3</sub>	0.9461
C <sub>1</sub>	0.0000
C <sub>2</sub>	0.16201
C <sub>3</sub>	1939.1
D <sub>0</sub>	1.67 · 10 <sup>-5</sup>
E <sub>0</sub>	6.74 · 10 <sup>-5</sup>
λ <sub>TK</sub>	-2.05

### Material Properties

Composition	Ge <sub>10</sub> As <sub>40</sub> Se <sub>50</sub>
Density	4.47 g/cm <sup>3</sup>
Thermal Expansion	20.4 · 10 <sup>-6</sup> /K
Specific Heat	0.37 J/(g · K)
Thermal Conductivity	0.18 W/(m · K)
Transition Temperature	225 °C
Hardness (Knoop)	1.12 GPa
Fracture Toughness	0.347 MPa · m <sup>1/2</sup>
Shear Modulus	8.5 GPa
Young's Modulus	20.5 GPa

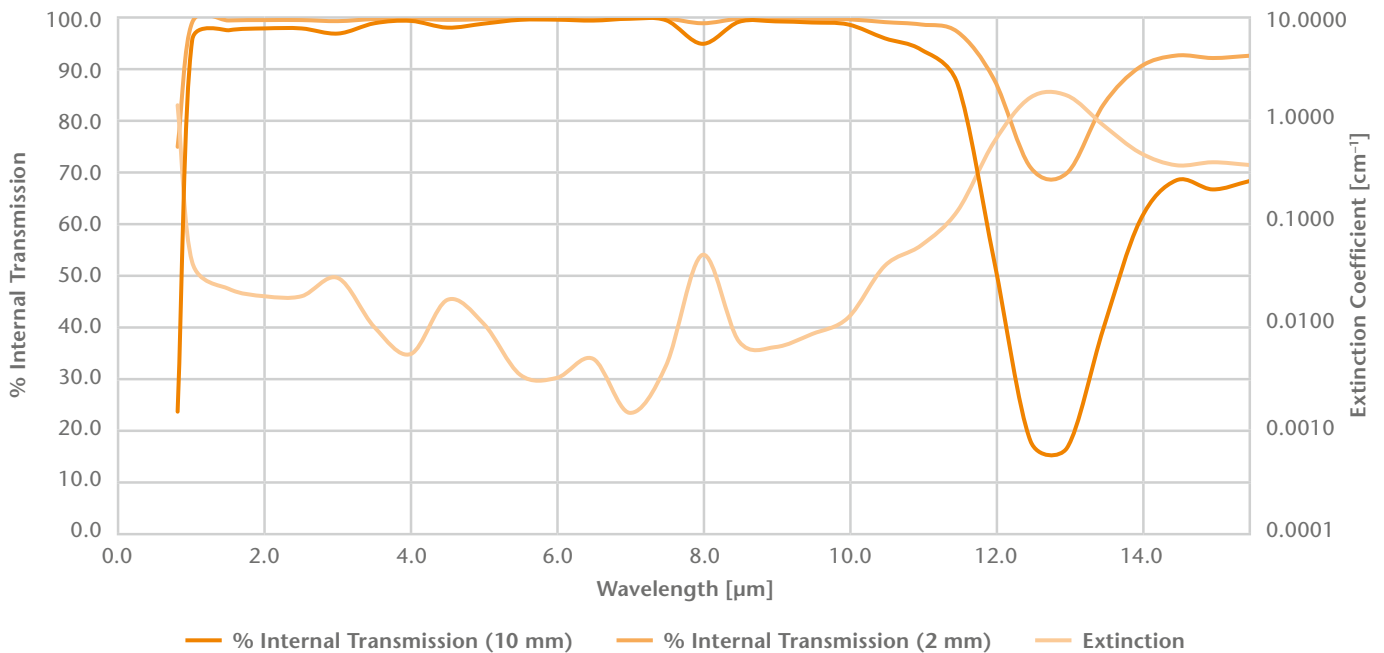
Wavelength [μm]	Refractive Index (@ 20 °C)	Temperature Coefficients of Refractive Index -50 to 75 °C* [10 <sup>-6</sup> /K]
0.8	2.8027	51.1
0.9	2.7554	48.2
1.0	2.7248	45.7
1.5	2.6611	37.0
2.0	2.6412	31.5
3.0	2.6274	25.6
4.0	2.6221	22.9
5.0	2.6192	21.5
6.0	2.6170	20.6
7.0	2.6150	20.1
8.0	2.6131	19.8
9.0	2.6111	19.5
10.0	2.6089	19.3
11.0	2.6066	19.2
12.0	2.6040	19.0

Refractive index tolerance at 10 μm wavelength: ± 0.001

\*For more information and questions please contact us

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## IRG 24 Extinction and Internal Transmission



Wavelength [μm]	% Internal Transmission (10 mm)	% Internal Transmission (2 mm)	Extinction [cm <sup>-1</sup> ]
0.8	23.9	75.1	1.432
1.0	95.7	99.1	0.044
1.5	97.6	99.5	0.024
2.0	98.0	99.6	0.020
2.5	98.0	99.6	0.020
3.0	97.0	99.4	0.031
3.5	99.0	99.8	0.010
4.0	99.4	99.9	0.006
4.5	98.1	99.6	0.019
5.0	98.9	99.8	0.011
5.5	99.6	99.9	0.004
6.0	99.7	99.9	0.003
6.5	99.5	99.9	0.005
7.0	99.8	100.0	0.002
7.5	99.6	99.9	0.004
8.0	95.0	99.0	0.051

Wavelength [μm]	% Internal Transmission (10 mm)	% Internal Transmission (2 mm)	Extinction [cm <sup>-1</sup> ]
8.5	99.3	99.9	0.007
9.0	99.3	99.9	0.007
9.5	99.1	99.8	0.009
10.0	98.7	99.7	0.013
10.5	96.1	99.2	0.040
11.0	93.9	98.7	0.063
11.5	87.2	97.3	0.137
12.0	53.2	88.1	0.632
12.5	18.2	71.1	1.704
13.0	16.9	70.0	1.781
13.5	40.0	83.2	0.917
14.0	60.8	90.5	0.498
14.5	68.6	92.7	0.377
15.0	66.8	92.3	0.403
15.5	68.5	92.7	0.379

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