VITRON IG-9

- Discover the Original

Your Material Specialist

Our glass IG-9 features excellent transmittance and low thermal change in refractive index and dispersion.

IG-9 is ideal for applications in combination with other IR material for color corrected designs and infrared optical systems without thermal defocusing in the 1-12 µm spectrum.

IG-9 is an arsenic-free alternative to IG-6. Molding, classical polishing or Single-Point-Diamond-Machining permits the production of optical components with flat, spherical and/or aspherical shaped surfaces. The index drop of IG-9 during molding is reduced compared to IG-6.

Antireflection coatings further improve transmission by reducing the reflection at the air-glass interfaces.

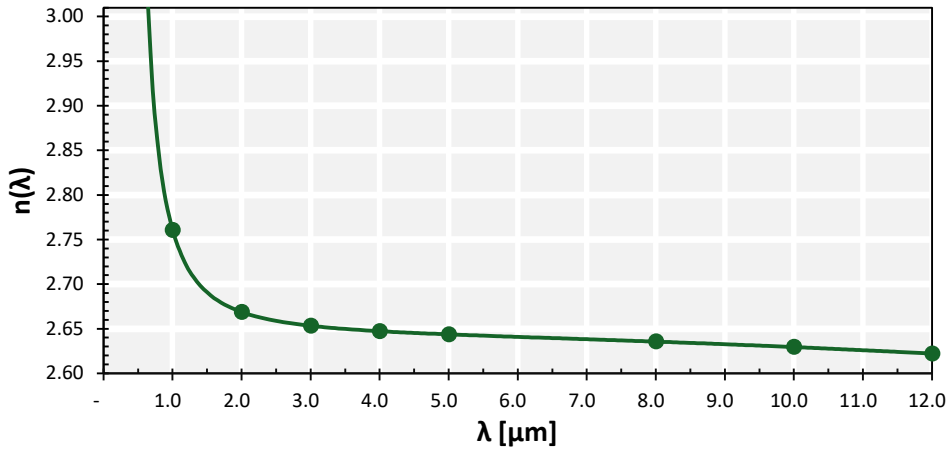
VITRON currently produces 6 different types of Chalcogenide Glasses that are applicable to optics and optoelectronics system design.

Typical delivery in form of blanks:

Ø	*5 – 150 mm*
☐	*5 – 100 mm*
ct	*0.8 – 150 mm*

Index of Refraction (@ 20°C)

λ [µm]	n(λ)
1.00	2.7606
1.50	2.6908
2.00	2.6689
3.00	2.6534
4.00	2.6474
5.00	2.6439
6.00	2.6410
7.00	2.6384
8.00	2.6357
9.00	2.6328
10.00	2.6297
11.00	2.6261
12.00	2.6223



Sellmeier-Formula (@ 20°C)

A	3.6428
B_1	3.3443
C_1	0.3993
B_2	1.2785
C_2	41.8588

$$n^2(\lambda;20) = \boldsymbol{A} + \frac{\boldsymbol{B_1}\lambda^2}{\lambda^2 - \boldsymbol{C_1^2}} + \frac{\boldsymbol{B_2}\lambda^2}{\lambda^2 - \boldsymbol{C_2^2}}$$

Thermo-Optical Coefficient (@ 20°C)

λ_{TK}	$4.93 \cdot 10^{-1}$
D_0	$1.78 \cdot 10^{-5}$
E_0	$2.71 \cdot 10^{-5}$

$$\frac{dn(\lambda)_{abs}}{dT} = \frac{n^2(\lambda;20) - 1}{2n(\lambda;20)} \cdot \left[\boldsymbol{D_0} + \frac{\boldsymbol{E_0}}{\lambda^2 - \boldsymbol{\lambda_{TK}^2}}\right]$$

λ [µm]	dn/dT [K^{-1}]
3.4	$23.0 \cdot 10^{-6}$
7.0	$20.7 \cdot 10^{-6}$
10.6	$20.3 \cdot 10^{-6}$

Dispersion (@ 20°C)

λ [µm]	ν_λ
4.00	173
10.00	121

$$\nu_4 = \frac{n_4 - 1}{n_3 - n_5} \qquad \nu_{10} = \frac{n_{10} - 1}{n_8 - n_{12}}$$

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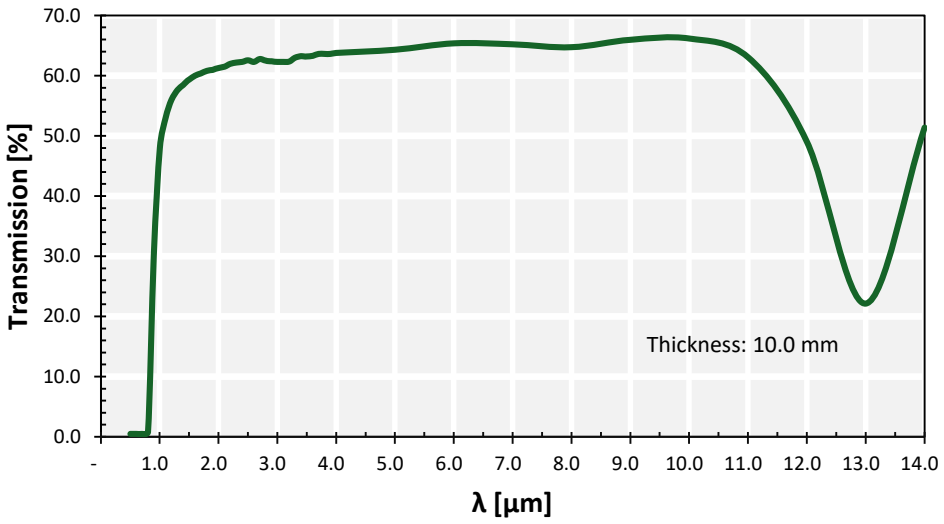
Transmission

λ [µm]	T(λ) [%]
1.00	48.0
1.50	59.4
2.00	61.3
3.00	62.3
4.00	63.8
5.00	64.3
6.00	65.4
7.00	65.3
8.00	64.7
9.00	66.6
10.00	66.2
11.00	63.1
12.00	49.1
13.00	22.2
14.00	51.4



*Material Properties**

Composition	Ge Sb Se	
Density	4.74	$g \cdot cm^{-3}$
Thermal Expansion (20°C – 100°C)	22.3	$x\ 10^{-6}\ K^{-1}$
Specific Heat Capacity	0.48	$J \cdot g^{-1} \cdot K^{-1}$
Thermal Conductivity	0.42	$W \cdot m^{-1} \cdot K^{-1}$
Transition Temperature	189	°C
Softening Point	221	°C
Young's Modulus	18.7	GPa
Modulus of Rupture	similar IG6	MPa
Shear Modulus	7.3	GPa
Hardness (Knoop)	similar IG6	GPa

*Preliminary data, subject to change

Chemical Properties

VITRON chalcogenide glasses are insoluble in water. Under normal circumstances, no reactions are observed between glass and organic solvents.

Typical Forms of Supply

Our chalcogenid glasses are fine-annealed with 3.75 K/h. Variability of the index of refraction: between batches ≤ 10^{-3}; within a batch ≤ 10^{-4}

Semi-finished:	Boules, Blanks in disk and rectangular shapes, Rods Other shapes by customer request
Optical components:	Windows, Lenses, Prisms and other optical parts according to customer specification AR/AR coatings on customer request

VITRON
Spezialwerkstoffe GmbH
Maua
Am Naßtal 5
D-07751 Jena

Phone: +49-(0)3641-2 88 1-30
Fax: +49-(0)3641-2 88 1-55
Email: kontakt@vitron.de
Internet: www.vitron.de

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