

Select material for optics

Different optical material have different characteristics, Selecting a proper glass material is very important for optical design. Following factors need be considered when selecting a material.



- ※ Transmission wavelength region
- ※ Index of refraction, abbe number
- ※ Thermal expansion
- ※ Density, Mechanical and chemical characteristics

- ※ Cost of material. Some of materials like Fused Silica are much expensive.

Below are basic information of optical glasses that are often used.

Glass name	Index (n _d)	Abbe (v _d)	Density (g/cm ³)	Coefficient of Thermal expansion (10 ⁻⁶ /k)	Transparency Range(μ m)
N-FK1	1.470	66.82	2.30	8.10	0.32--2.4
N-ZK7	1.508	61.06	2.43	4.55	0.35--2.4
N-BK7	1.517	64.20	2.52	7.10	0.33--2.4
B270	1.523	58.50	2.55	8.20	0.35--2.4
N-SK11	1.564	60.80	3.05	6.50	0.35--2.4
N-BAK4	1.569	56.04	2.83	7.00	0.37--2.4
N-SK12	1.583	59.46	3.28	6.65	0.35--2.4
N-F2	1.620	36.35	2.67	8.40	0.39--2.4
N-LAK22	1.651	55.89	3.73	8.00	0.34--2.4
N-SF2	1.647	33.87	3.86	8.10	0.38--2.4
N-SF5	1.672	32.22	4.09	7.55	0.38--2.4
N-LAF3	1.717	47.89	4.44	8.00	0.38--2.4
N-LAF7	1.749	34.98	4.22	5.40	0.38--2.4
N-SF11	1.785	25.80	5.41	6.20	0.40--2.4
N-LASF44	1.804	46.58	4.72	7.00	0.38--2.4
N-SFL6	1.805	25.39	3.37	9.00	0.39--2.4
N-SF57	1.846	23.80	3.52	9.80	0.40--2.4
Fused silica	1.458	67.70	2.20	0.55	0.19--2.5
Borosilicate	1.474	65.70	2.23	3.25	0.35--2.4
Silicon	1.472	65.70	2.33	3.25	1.2--7.0
CaF ₂	1.434	94.99	3.18	18.85	0.17--7.8
Sapphire	1.768	72.24	3.99	8.4	0.18--4.8
Ge	4.00@10 μ m			5.7	1.9--16.0
ZnSe	2.40@10 μ m			7.1	0.63--18.0

For more information of optical glass, please visit the website of material manufacturers: Schott, or CDGM Glass.

Windows

Windows are glass with parallel surfaces used to enable optical radiation to pass from one environment to another without allowing environments to mix.

Material, transmission, scattering, wavefront distortion, damage threshold and resistance to certain environments should be considered when selecting windows.

Materials:

- N-BK7
- UV Fused silica
- Borofloat, Pyrex
- CaF₂, BaF₂
- Sapphire
- Silicon
- Other optical glasses from Schott, CDGM

General Specifications

	Low Grade	Standard Grade	High grade
Dimensional tolerance:	± 0.15mm	± 0.1mm	± 0.05mm
Surface quality:	60-40 S/D	20-10 S/D	10-5 S/D
Parallelism:	3 arcmin	1 arcmin	30 arcsec
Flatness:	λ / 2 @ 633nm	λ / 4 @ 633nm	λ / 8 @ 633nm
Bevel:	Protective bevel	Protective bevel	Protective bevel

Typical Diameter(mm)

Round

φ 5.0	φ 10.0	φ 12.7	φ 15.0	φ 20.0
φ 25.4	φ 30.0	φ 38.1	φ 50.8	φ 76.2

Typical Width X Height (mm)

Square

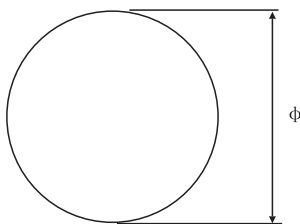
5.0x5.0	10.0x10.0	15.0x15.0
20.0x20.0	25.0x25.0	50.0x50.0

Typical Thickness(mm)

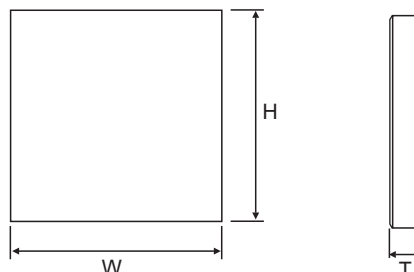
0.5	1.0	1.5	2.0	3.0
4.0	5.0	6.0	8.0	10.0

other sizes and shapes are available.

Round Shape



Square Shape



Choose Anti-reflective Coatings for windows

- Single layer MgF₂
- Multiple layers AR coating
 - R<0.25 % @ Laser line
 - R<0.5% @ Broadband Wavelength

How to order windows? Example:

Material: **N-BK7**
Diameter: **$\phi 25.4 \pm 0.1$ mm**
Thickness: **2 ± 0.1 mm**
Parallelism: **$\pm 3'$**
Polishing quality: **20-10 S/D, Flatness: $\lambda/4@633$ nm**

Coating: **AR @808nm on both surfaces R<0.25%, AOI=0°**

Price
on request

Custom
Design

Volume
Discount

