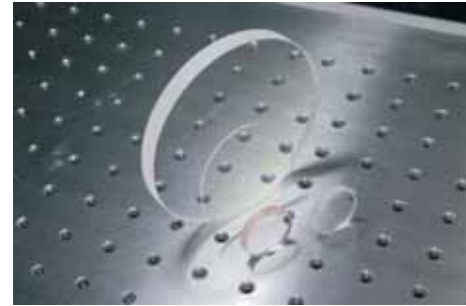


Window

Windows are optical glass with polished faces that are relatively parallel. They are used to protect laser output. Always windows are AR coated to eliminate reflection, so AR coated windows offer improved transmission when used in industrial displays or computer monitors. Their high transmission makes them ideal for most industrial and laser protecting applications.



Union Optic offers all types of windows made of different materials. Special size and materials are also available upon request. In addition, we provide various coatings on optical windows.

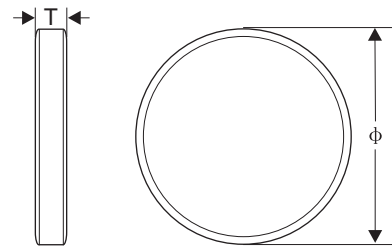
Windows we can supply are listed below:

Material	Properties	Application
BK7	Transmission Range: 330-2100nm Refractive Index: 1.5164@588nm	Excellent material for most application over visible and near IR spectrum.
Fused Silica	Transmission Range: 185-2500nm Refractive Index: 1.4858@308nm Low Thermal Expansion Coefficient: $0.58 \times 10^{-6}K$	It is the best choice for resistance thermal application. Better transmission from UV to IR spectrum.
Sapphire	Transmission Range: 180-4500nm Refractive Index: 1.755@1000nm Strong Hardness	Better transmission over the wide range spectrum, high scratch resistance, can be used in application where scratch resistance required.
Calcium Fluoride	Transmission Range: 170-7800nm Refractive Index: 1.399@ 5000nm Little Hygroscopic Susceptibility High Thermal Expansion Coefficient: $18.85 \times 10^{-6}K$	It has wide range spectrum, and it is particularly useful for IR laser and also excimer laser application.
Magnesium Fluoride	Transmission Range: 120-7000nm Refractive Index: 1.376@700nm	It has wide range spectrum, and it is particularly useful for excimer laser application.
Silicon	Transmission Range: 1200-7000nm Refractive Index: 3.422@5000nm	It is applicable for middle Infrared application.
Germanium	Transmission Range: 1900-16000nm Refractive Index: 4.003@10000nm	It is applicable for middle and far infrared application.

Note: **Union Optic** can offer other high quality windows upon customer's request, for detail information, please contact us.

Standard Window-BK7 Series

- Material BK7 grade A optical glass
- Dimension Tolerance +0.0/-0.2mm
- Thickness Tolerance ± 0.2 mm
- Clear Aperture >80%
- Parallelism 1 arc minute for standard
10 arc seconds for high precision
- Surface Quality 60/40 for standard
20/10 for high precision
- Wavefront Distortion λ for standard per 25mm@633nm
 $\lambda/10$ for precision per 25mm@633nm
- Chamfer Protected <0.35mm x 45deg
- Coating Uncoated, available



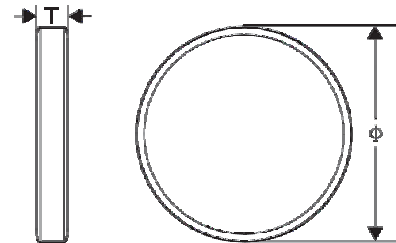
Standard				High Precision			
Part No.	Φ(mm)	T(mm)	Unit Price	Part No.	Φ(mm)	T(mm)	Unit Price
WIN0110	10.0	3.0	\$5.5	WIN0010	10.0	6.0	\$11.0
WIN0112	12.7	3.0	\$5.5	WIN0012	12.7	6.0	\$11.0
WIN0115	15.0	3.0	\$5.5	WIN0015	15.0	6.0	\$11.0
WIN0120	20.0	3.0	\$6.0	WIN0020	20.0	6.0	\$13.0
WIN0125	25.4	3.0	\$6.0	WIN0025	25.4	6.35	\$14.0
WIN0130	30.0	3.0	\$6.5	WIN0030	30.0	6.35	\$15.0
WIN0150	50.8	6.35	\$10.0	WIN0050	50.8	10.0	\$32.0

Note: Other sizes and coatings are available upon request.

Window

Standard Window-Fused Silica Series

- Material UV grade fused silica
- Dimension Tolerance +0.0/-0.2mm
- Thickness Tolerance ± 0.2 mm
- Clear Aperture >80%
- Parallelism 1 arc minute for standard
10 arc seconds for high precision
- Surface Quality 60/40 for standard
20/10 for high precision
- Wavefront Distortion λ for standard per 25mm@633nm
 $\lambda/10$ for precision per 25mm@633nm
- Chamfer Protected <0.35mm x 45deg
- Coating Uncoated, available

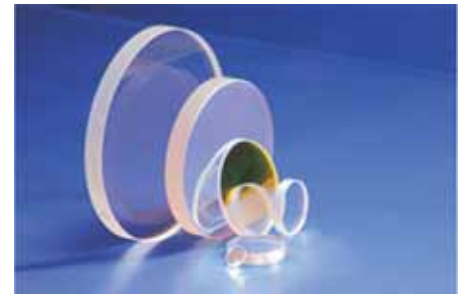


Standard				High Precision			
Part No.	Φ(mm)	T(mm)	Unit Price	Part No.	Φ(mm)	T(mm)	Unit Price
WIN1110	10.0	3.0	\$14.0	WIN1010	10.0	6.0	\$24.0
WIN1112	12.7	3.0	\$14.0	WIN1012	12.7	6.0	\$25.0
WIN1115	15.0	3.0	\$15.0	WIN1015	15.0	6.0	\$26.0
WIN1120	20.0	3.0	\$16.0	WIN1020	20.0	6.0	\$28.0
WIN1125	25.4	3.0	\$20.0	WIN1025	25.4	6.35	\$32.0
WIN1130	30.0	3.0	\$22.0	WIN1030	30.0	6.35	\$35.0
WIN1150	50.8	6.35	\$33.0	WIN1050	50.8	10.0	\$80.0

Note: Other sizes and coatings are available upon request.

Laser Protection Window

Union Optic offers laser protection window for applications which require protecting laser output. High damage threshold ($>15\text{J}/\text{cm}^2$) AR coating on both sides can minimize the reflections. These windows are used in front of lasers for material processing in order to protect the laser optics from hot material drops.



Specifications

Material	UV grade fused silica
Dimension Tolerance	+0.0/-0.2mm
Thickness Tolerance	$\pm 0.2\text{mm}$
Clear Aperture	$>80\%$
Parallelism	<1 arc minute
Surface Quality	60/40 scratch and dig
Transmitted Wavefront Distortion	$< \lambda$ @633nm
Chamfer	$<0.5\text{mm} \times 45\text{deg}$
Coating	High damage threshold AR coating for YAG laser on both sides, $>15\text{J}/\text{cm}^2$, 20ns, 20Hz, @1064nm

Part Number	Diameter (mm)	Thickness (mm)
LPW1110	10.0	3.0
LPW1112	12.7	3.0
LPW1115	15.0	3.0
LPW1120	20.0	3.0
LPW1125	25.4	3.0
LPW1130	30.0	6.35
LPW1150	50.8	6.35
LPW1175	75.0	6.35

Note: Custom size can be provided upon request.

Special Flatness Window

Always we need a window with special flatness like $\lambda/2$ to $\lambda/5$ concave in our applications. For example, if we make dielectric mirror coating on a very flat window, after coating the flatness will be changed from very flat to a little convex, mainly because the deposited coating layers have big stress. Of course this change is not welcome. We have a solution to solve this problem. We can make the substrate a little concave before coating, then it will become very flat after coated as the stress work.

Before Coating



After Coating



Material	UV grade fused silica, BK7
Dimension Tolerance	+0.0/-0.2mm
Thickness Tolerance	± 0.2 mm
Clear Aperture	>90%
Parallelism	Up to <5 arc seconds
Surface Quality	Up to 20/10 scratch and dig
Flatness	Like $\lambda/2$ to $\lambda/3$ concave, < $\lambda/5$ concave or special flatness per your requirement