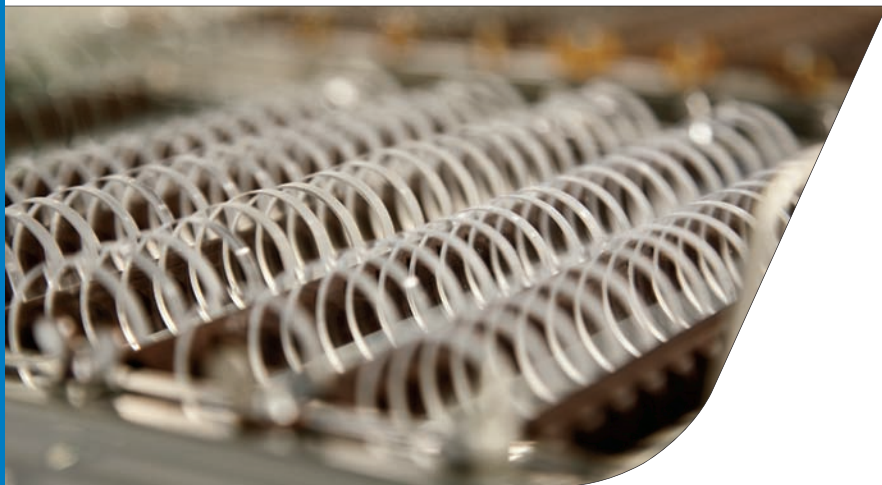


Optics | WINDOWS - UV TO NIR

Surface Tolerances	Precision	Laser Grade	Manufacturing Limit
Surface quality (scratch-dig)	40-20	10-5	5-2
Surface roughness (Å, RMS)	20	5	1
Transmitted Wavefront Error (waves, P-V @ 633 nm)	$\lambda/2$	$\lambda/10$	$\lambda/25$
Dimensional Tolerances	Commercial	Precision	Manufacturing Limit
Diameter (mm)	+0.000/-0.250	+0.000/-0.025	+0.000/-0.005
Length & Width (mm)	± 0.050	+0.000/-0.025	+0.000/-0.010
Thickness (mm)	± 0.250	± 0.050	± 0.005
Parallelism	≤ 5 arc min	≤ 1 arc sec	≤ 0.5 arc sec
Clear aperture (%)	85	90	100

- High laser damage threshold
- Low scattering, low absorption
- Single V, broadband, and dual band AR coatings available
- High volume capacity available
- Manufacturing dimensions from 3 mm to 600 mm
- For materials see pgs 6-7



The general tolerance specifications above provide a guideline regarding manufacturing capabilities for uncoated optics ranging in size from 3-100 mm. The manufacturing limits are not absolute and may vary depending on material; tighter tolerances may be possible. Part specific tolerances may vary. All specifications do not need to be from single column.

WINDOWS - INFRARED | Optics

	Silicon		Zinc Selenide		Germanium	
	Typical	Mfg Limit	Typical	Mfg Limit	Typical	Mfg Limit
Surface Tolerances						
Surface quality (scratch-dig)	40-20	10-5	40-20	20-10	40-20	10-5
Surface flatness (waves, P-V @ 633 nm)	$\lambda/4$	$\lambda/20$	$\lambda/4$	$\lambda/20$	$\lambda/4$	$\lambda/20$
Surface irregularity (waves, P-V @ 633 nm)	$\lambda/4$	$\lambda/20$	$\lambda/4$	$\lambda/20$	$\lambda/4$	$\lambda/20$
Transmitted Wavefront Error (waves, P-V @ 633 nm)	$\lambda/2$	$\lambda/8$	$\lambda/2$	$\lambda/8$	$\lambda/2$	$\lambda/8$
Dimensional Tolerances						
Diameter (mm)	± 0.1	+0.00/-0.013	± 0.1	+0.00/-0.013	± 0.1	+0.00/-0.013
Center Thickness (mm)	± 0.1	± 0.01	± 0.1	± 0.01	± 0.1	± 0.01
Wedge (arc seconds)	30	1	30	1	30	1
Clear aperture (%)	90	98	90	98	90	98

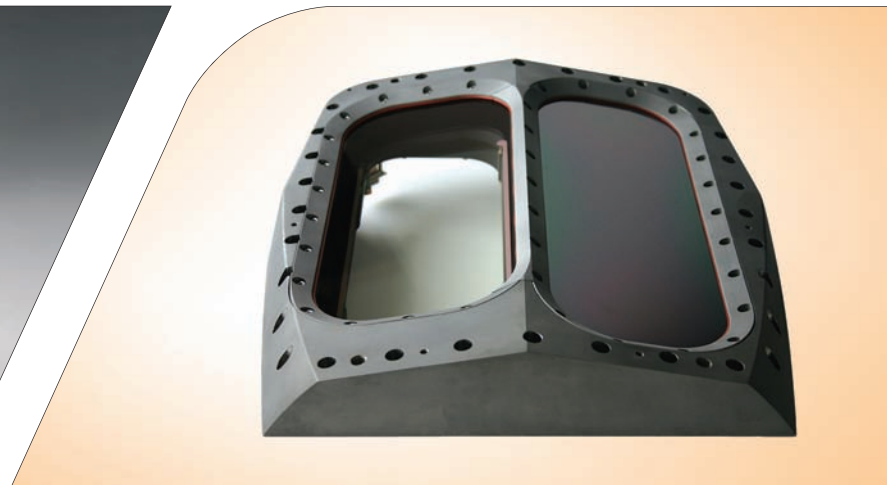
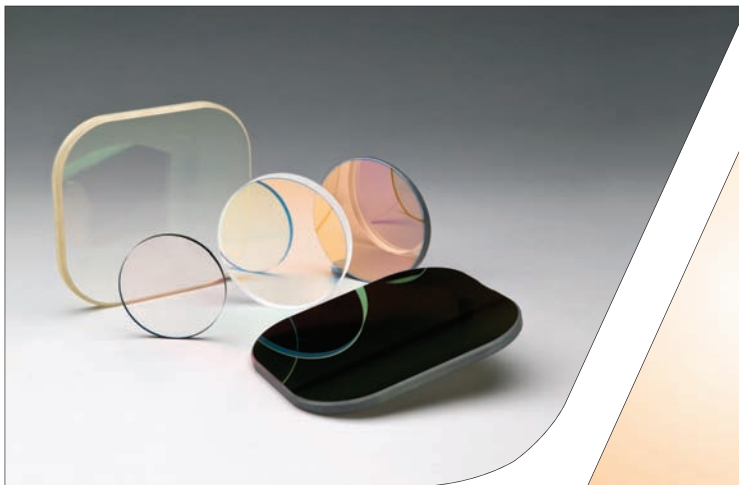
- Durable BBAR coatings
- Metalization
- Filters
- ITO

Window Types

External windows and Domes
 Detector windows
 Heated windows
 EMI shielded windows

Material Types

MgF ₂	ZnS & ZnS (MS)
CaF ₂	ZnSe
Sapphire	Ge
Si	



The general tolerance specifications above provide a guideline regarding manufacturing capabilities for uncoated optics ranging in size from 3- 430 mm. The manufacturing limits are not absolute and may vary depending on material; tighter tolerances may be possible. Part specific tolerances may vary. All specifications do not need to be from single column.