

# Optical Components

## Product Information

SCHOTT Advanced Optics masters the entire value chain – from material development and its production to the final high precision optical component. Leveraging its extensive portfolio of optical and special materials (optical glass, ZERODUR® zero expansion glass ceramic, IR materials, Sapphire, more), Advanced Optics applies various processing steps – CNC-machining, polishing, coating, assembling, measuring – till providing the custom specific component. The following details describe our manufacturing possibilities and represent our capabilities. Further details can be found at: [www.us.schott.com/advanced\\_optics/overview-optical-components](http://www.us.schott.com/advanced_optics/overview-optical-components)

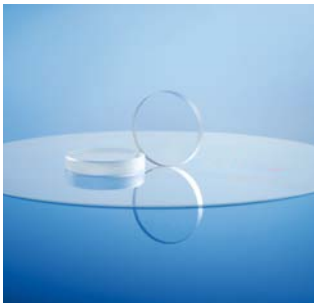
**Prisms:** right angle prisms, rhomboid prisms, penta prisms, light guides, and others



### Manufacturing Capabilities

Attribute	Commercial Quality	Precision Quality	Ultra Precision Quality
Size*	10 to 200 mm	10 to 200 mm	10 to 200 mm
Size Tolerance*	± 0.2 mm	± 0.1 mm	± 0.05 mm
Angle Tolerance*	< 1.5 arc minutes	< 1 arc minutes	< 10 arc seconds
Surface Accuracy*	1 $\lambda$	$\lambda/4$	$\lambda/10$
Surface Quality (Scratch & Dig)*	80/50	40/20	20/10

**Windows & Substrates:** plane parallel windows, protective windows, laser windows, ultra thin windows, optical flats, substrates for coating, and others



Attribute	Commercial Quality	Precision Quality	Ultra Precision Quality
Diameter*	From 2 mm to 625 mm		
Diameter Tolerance*	± 0.25 mm	± 0.050 mm	± 0.005 mm
Thickness Tolerance*	± 0.20 mm	± 0.040 mm	± 0.020 mm
Parallelism*	< 3 arc minutes	< 1 arc minutes	< 10 arc seconds
Surface Accuracy*	2 $\lambda$	$\lambda/4$	$\lambda/10$
Surface Quality (Scratch & Dig)*	80/50	60/40	10/5
Surface Roughness*	5 nm	2 nm	8Å

**Spherical & Achromatic Lenses:** singlets, doublets, triplets in different forms: plano-convex, plano-concave, meniscus, and others



Attribute	Commercial Quality	Precision Quality	Ultra Precision Quality
Diameter*	From 3 mm to 150 mm	From 3 mm to 150 mm	From 3 mm to 150 mm
Diameter Tolerance*	+ 0.0/0.25 mm	+ 0.0/0.1 mm	+ 0.0/0.5 mm
Thickness Tolerance*	± 0.20 mm	± 0.040 mm	± 0.020 mm
Centering Tolerance*	< 3 arc minutes	< 1 arc minutes	< 30 arc seconds
Surface Accuracy*	2 $\lambda$	$\lambda/4$	$\lambda/10$
Surface Quality (Scratch & Dig)*	80/50	60/40	10/5

\* Depending on geometry. Please call sales representative to discuss your project.

**Aspherical Lenses:** 2 technologies are mastered by SCHOTT: CNC-machining and molding; different forms are offered: plano-convex, plano-concave, convex-convex, and others



Attribute	CNC-machining and polishing			Molded (Low Tg glasses only)
	Commercial	Precision	High Precision	
Diameter*	15–180 mm	15–160 mm	15–140 mm	1.5–35 mm
Diameter tolerance*	± 0.1 mm	± 0.05 mm	± 0.02 mm	± 0.05 mm
Center thickness*	3–40 mm	3–40 mm	5–40 mm	0.5–10 mm
Radius of curvature convex*	> 10 mm	> 20 mm	> 30 mm	> 3 mm
Tolerance on radius of curvature*	± 0.5 %	± 0.1 %	± 0.05 %	± 0.5 %
Surface flatness (PV, asph. side)*	2 µm	0.5 µm	0.2 µm	< 0.5 µm
Tilt from asph. side to other side*	< 6 arc min	< 3 arc min	< 1 arc min	< 1 arc min
Surface roughness*	< 5 nm	< 3 nm	< 1.5 nm	< 15 nm
Surface quality (scratch & dig) (5/NxA)*	60/40 5/6 x 0.25	40/20 5/3 x 0.25	10/5 5/3 x 0.025	40/20 5/3 x 0.16
Typical volume*	From 1 piece to series production			> 200 pcs

**Cylindrical Lenses** are offered in various shapes: plano-convex, meniscus, bi-convex, rectangular or square, and others



Attribute	Commercial Quality	Precision Quality	Precision Quality
Dimensions*	From 5 mm to 200 mm		
Radius*	From 8 mm to 2000 mm		
Dimensional Tolerance*	+ 0,0/0,25 mm	+ 0,0/0,1 mm	+ 0,0/0,05 mm
Thickness Tolerance*	± 0,20 mm	± 0,10 mm	± 0,05 mm
Centering Tolerance*	< 15 arc minutes	< 6 arc minutes	< 2 arc minutes
Surface Accuracy*	2λ	λ	λ/2
Surface Roughness*	< 25 nm	< 15 nm	< 5 nm
Surface Quality*	80/50	40/20	10/5

\* Depending of geometry. Please call sales representative to discuss your project.

### Different technologies used by SCHOTT to serve our customer



Precision  
CNC-machined  
parts



High precision  
polishing



Precision glass  
molding for  
aspheres, DOEs,  
lens arrays



Coatings



Sub-assembly



Measurement  
systems:  
Interferometers,  
profilometers...



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