



JENOPTIK | Optical Systems

JENOPTIK Optical Systems, Inc. · 16490 Innovation Drive · Jupiter, FL · USA

Polished Element Tolerances (Typical)

Tolerance of Optical Elements	Commercial	Standard	Precision
Index of refraction accuracy (nd)	0.001	0.0005	0.0002
Stress Birefringence	10 nm/cm	6 nm/cm	< 4 nm/cm
Stress Birefringence - Schott designation	N	NSK	NSSK
Stress Birefringence - ISO 10110 (code 0)	0 / 10	0 / 6	0 / 4
Dispersion accuracy - ISO 10110	+/- 0.8%	+/- 0.5%	+/- 0.3%
Homogeneity of index	0.0001	0.00002	0.000005
Bubble quality (total bubble cross section in mm ² per 100cm ³)	> 0.25 to 0.50	> 0.10 to 0.25	> 0.03 to 0.10
Bubble quality - Schott	B3	B2	B1
Bubble quality - ISO 10110 (code 1)	1 / 1 x 1.0	1 / 1 x 0.25	1 / 4 x 0.025
Diameter (mm)	0	0	0
Center thickness (mm)	0.15	0.1	0.05
Sag (mm)	+/- 0.050	+/- 0.025	+/- 0.010
Radius (%)	0.40%	0.20%	0.10%
Surface figure saggita error - (power in fringes at 546 nm))	3	2	1
Surface figure irregularity - (fringes at 546 nm)	2 fringes	1 fringe	0.5 fringe
Surface figure - ISO 10110 (code 3)	3 / 3 (2)	3 / 2 (1)	3 / 1 (0.5)
Surface imperfections (scratch-dig)	80-50	60-40	40-10
Lens Centering (R1-R2)	0.05 mm TIR	0.025 mm TIR	0.01 mm TIR
ISO specification (code 4)	4 / 2'	4 / 1'	4 / 0.5'
Bevels	0.5 mm face width	0.25 mm face width	0.1 mm face width
Surface microroughness			
-Fused Silica	< 15 Angstroms rms	< 10 Angstroms rms	< 6 angstroms rms
-Zerodur	< 15 Angstroms rms	< 10 Angstroms rms	< 8 angstroms rms
- Optical glass	< 15 Angstroms rms	< 10 Angstroms rms	< 8 angstroms rms
ISO "Surface Texture" (Rq)	0.0015	0.001	.0006 / .0008

Assembly Tolerances (Typical)

Tolerance by Element diameter	200 mm	50 mm	5 mm
Element decentration (mm)	0.100 mm	0.050 mm	0.010 mm
Element tilt (arcminutes)	0.5 arcminute	1 arcminute	2 arcminutes
Airspace tolerance (mm)	0.20 mm	0.10 mm	0.05 mm