



Gooch & Housego

Precision Optical Engineering



Products:

- Prisms
- Windows
- Mirrors
- Flats and Master angles
- Sight Glasses

Key Features:

- Prisms (Contacted, Cemented, AR coated, Mounted)
- Windows (Flat, wedged, curved, drilled, recessed, AR coated)
- Flats and Master angles (Up to 500mm, coated, zero expansion materials, traceable).
- Sights (Optical, borosilicate and soda glass, curved surfaces, thermally or chemically toughened, AR coated)

Compliance:

- ISO 9001

This datasheet presents the non polarising optics category of components made by Gooch and Housego, this category encompasses devices of various geometrical shapes and sizes which are employed for folding, inverting, reverting, displacing, and deviating a beam of light, where this beam may be converging, diverging or collimated.

Gooch and Housego produces several types of prisms, which depending on the prism's intended application can be classified as right angle, Porro, Abbe, Dove, Amici, Schmidt, Leman, Penta, Zeiss, Rhomboid, etc. Windows produced by Gooch and Housego are made of optical glass with ground and polished faces. The faces may be parallel, wedged or of a custom geometrical aspect. Windows are generally employed as a transparent interface between two physical environments, therefore window selection considerations include: material transmission, thickness, scattering, wave front distortion, parallelism and resistance to certain environments such as high temperature or pressure.

Optical flats are used to check the flatness of reflective surfaces in combination with a monochromatic light source. Gooch and Housego manufacture optical flats from Zerodur®, Pyrex, or customer specified material in sizes up to 500mm with flatness to $\lambda/20$.

Gooch and Housego also manufactures mirrors and sights to special requirements to the highest quality for a range of materials including customer specific traceable metallic or multilayer coatings.

As part of our policy of continuous product improvement we reserve the right to change specifications at any time
PO8001 Rev 1



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<http://www.optoscience.com>

東京本社 〒160-0014 東京都新宿区内藤町1番地 内藤町ビルディング
TEL: 03 (3356) 1064 FAX: 03 (3356) 3466 E-mail: info@optoscience.com
大阪支店 〒532-0011 大阪市淀川区西中島7-7-2 新大阪ビル西館
TEL: 06 (6305) 2064 FAX: 06 (6305) 1030 E-mail: osk@optoscience.com
名古屋営業所 〒450-0002 名古屋市中村区名駅2-37-21 東海ソフトビル
TEL: 052 (569) 6064 FAX: 052 (569) 8064 E-mail: ngo@optoscience.com



General product specifications (Windows, Mirrors, Prisms, Flats, Master angles)

Parameter	Specification / Requirement
Material	Zerodur, Pyrex, All customer specific glasses
Size / thickness /Geometry	To drawing
Surface Quality	10/5 scratch/dig or better
Parallelism	0.5 arc seconds
Wavefront Distortion	Generally to $\leq \lambda/20$ @ 633nm
Dimensional Tolerance	Sub micron
Angular Tolerance	Arc second
Clear aperture dimensions ¹	Up to 500mm
Mounted/unmounted	Specify
Wavelength range	Specify
Damage Threshold	10J/cm ² @ 3ns pulse (1064nm)
Coating	Specify
Operating & storage conditions	Specify

1.

Customer specific enquiries

The majority of our customers require custom components manufactured and coated to their own demanding specifications. Please send your specification to sales@goochandhousego.com or contact your local sales representative do discuss your requirements.

We also do:

- Acousto-Optics
- Electro-Optics
- Non Linear Optics & Infra Red Optics
- Fibre Optics
- RF drives
- Coatings



高精度オプティクス

Optics

Manufacturing Services

- Crystal optics & custom optics
- Value added services
- Coatings

MATERIALS

Optical Glasses
Fused Silica / Quartz
Sapphire
Crystal Quartz
Calcite
Lithium Niobate
Other Crystalline Materials
Zerodur®
Borosilicate Glass
Thin Substrate Glasses
Alumina Ceramics
Ferrite

GLASS ENGINEERING

Multi-Axis CNC Machining
Drilling And Polishing Of Holes
Very Small / Thin Components
Toughening
Acid Etching
Ground / Lapped Surfaces

COATINGS

Anti-Reflection - *broadband, v-coat*
Reflectors - *metals Al, Ag, Au, platinum, HR dielectric*
Beamsplitters

ASSOCIATED PRODUCTS

Ceramic Components
Piezo-Electric Crystals - *quartz, tourmaline, (lithium niobate)*
Transducers

OPTICS

Windows
Lenses - *spherical*
Lenses - *cylindrical*
Lens Assemblies
Prisms - *all types: roofs, penta, Schmidt etc*
Beamsplitters
Filters
Optical Flats
Mirrors - *most types*
Custom-Made Items

POLARISING / LASER OPTICS

Waveplates - *any order*
Waveplate Assemblies
Birefringent Filters
Rotators
Calcite Prisms *e.g. Glan-Laser*
Quartz Prisms *e.g. Wollaston*

MEASUREMENT

Angular - *to sub arc second*
Zygo Interferometer
Co-Ordinate Meas. Machine
X-Ray Goniometer
Spectrophotometers: 200 to 1800nm

SERVICES

Mounting
Sub-Assembly
Painting



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TEL:03(3356)1064 FAX:03(3356)3466 E-mail:info@optoscience.com
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Precision Optics Capabilities sheet

	<u>Non Polarizing Optics</u>	<u>Polarizing and Laser Optics</u>
Optics	Windows, Spherical and cylindrical lenses, Lens assemblies, Prisms -all types: Roofs, Penta, Schmidt etc, Beamsplitters, Filters, Optical flats, mirrors, Superpolished mirror substrates, Laser gyroscope mirrors and frames, Solid Etalons.	Waveplates (any order), Waveplate assemblies, Birefringent filters, Rotators, Polarizing prisms eg Glan-Laser, Wollaston etc, X-ray and synchrotron optics, Laser rods.
Materials	Fused silica, Borosilicate glass, Thin substrate glasses, Zerodur, Silicon and majority of optical glasses.	Quartz, Sapphire, Calcite, Other crystalline materials,
	Ceramic components, Piezo-Electric Crystals, Alumina, Ferrites, Tourmaline, Lithium Niobate, Silicon Carbide.	
Coatings	AR and HR coatings, Broadband, V-coat Reflectors, Metal coatings such as Al, Ag, Au, Platinum, Rhodium.	
Material Processing	Multi-Axis CNC Machining, Drilling and polishing of holes, Micro-optics and thin components, Toughening, Acid Etching, Ground / Lapped Surfaces, Polished surfaces, Magnetorheological surface form correction.	
Metrology	Angular -to sub arc second, Zygo Interferometry, Coordinate measuring machines, X-Ray Goniometry, Ellipsometry, Spectrophotometers: 190nm to 3200nm.	
Value Added Services	Mounting, Sub-assembly, Painting, Optomechanical design, Coating design.	

Product table



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東京本社 〒160-0014 東京都新宿区内藤町1番地 内藤町ビルディング
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	Manufacturing tolerance Limits
Surface quality Scratch-dig MIL-PRF-13830B ISO 10110	10-5 5/L1x0.001, 5/1x0.05
Surface Roughness (Å, R _a)	1
Flatness irregularity (waves, P-V@ 633nm)	0.025
Spherical irregularity (waves, P-V@ 633nm)	0.025
Spherical Radius (fringes)	3

Surface tolerances

	Volumetric tolerances	Manufacturing tolerance Limits
Diameter (mm)	Up to 500mm	+0.000/-0.025
Length (mm)		+0.000/-0.025
Thickness (mm)		±0.025
Centration (mm)		0.01
Wedge		≤ 1 arc sec
Clear Aperture (%)		90

Dimensional fabrication tolerances

	E-beam	Ion Assisted Deposition	Ion Beam Sputtering
Absorption (%)	< 0.2	< 0.02	< 0.02
Scatter (%)	< 0.1	< 0.15	< 0.1
Surface Roughness (Å rms)	5	7	< 5
Wet/Dry Shift (range) (%)	< 0.8	< 0.3	0
Laser Damage threshold	15 J/cm ² (3ns)	> 15 J/cm ²	> 27 J/cm ²

Coating tolerances