Freeform Micro-Optics

PowerPhotonic
Enhancing Beam Performance

Overview

PowerPhotonic's freeform micro-optic design and fabrication service is unique in the industry. Our patent pending direct write micro-machining process technology does not require generation of a mask set or mold, resulting in no up-front tooling charges for prototypes.

We have a complete portfolio of services from just fabrication to complete optic design, product development and system verification.

We can fabricate parts directly from a drawing, work with a customer to optimise an existing design, or provide an entirely new design to meet a customer's performance specification.

We can create complex optics integrating multiple aspheres and prisms or create any arbitrary freeform refractive surface. Unlike alternative approaches that use complex and costly manufacturing processes, our laser micro-machining process is capable of delivering results quickly and cost effectively.

Key Services

- Fabrication of customer-designed optic using PowerPhotonic's laser micro-machining process
- Optimization of customer's design to meet performance and cost targets
- Optical design and realisation based on customer's performance requirements

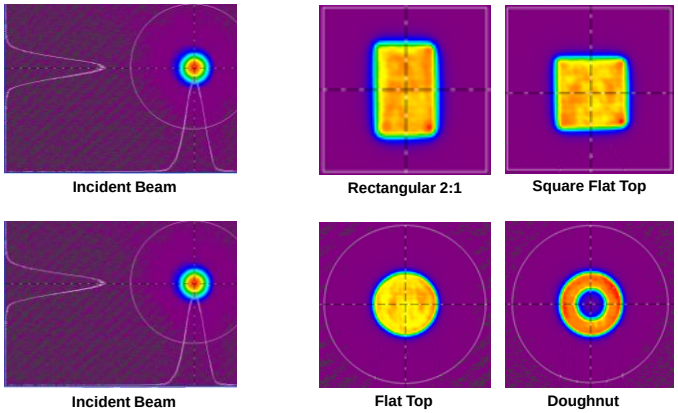
Target Applications

- Diode laser systems
- Fiber and solid state lasers
- Laser wavefront correction (phaseplates)
- Homogenizers and Diffusers
- Beam shapers and transformers (flat toppers and circularizers)
- Vortex generators
- Prisms
- Imaging systems

Benefits

- Complete flexibility to create freeform refractive optics, within the design rules of the PowerPhotonic laser micro-machining process
- Freedom to create functions such as homogenizers, diffusers, beam shapers, aberration compensators or generate a completely bespoke solution
- Suitable for high peak and average power applications

How it is Used

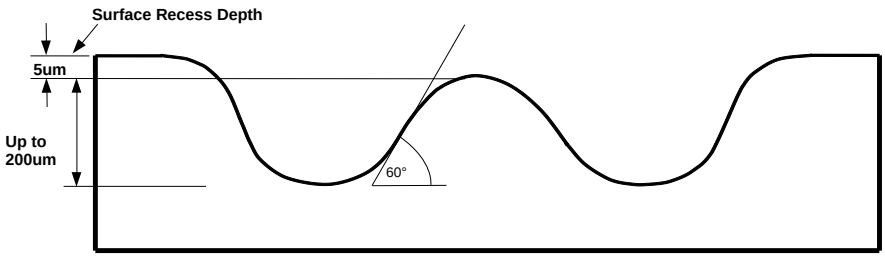


Freeform Micro-Optics Design Rules

Material Characteristics	Nominal Specification			
Material	UV-fused silica			
Specific Type	Corning 7980, Spectrosil 2000 or similar			
Transmission	>99% with standard ARC			
Refractive index	1.453 @ 808nm			
Mechanical Characteristics	**Min.**	**Typ.**	**Max.**	**Units**
Height (H)			120	mm
Width (W)			120	mm
Thickness (T)	0.25	1	10	mm
Surface properties over clear aperture	**Min**	**Typ**	**Max**	**Units**
Clear Aperture (x)			100	mm
Clear Aperture (y)			100	mm
Maximum Sag			200	micron
Maximum Slope			60	degree
Minimum Feature Size	100			micron
Surface Quality	**Min**	**Typ**	**Max**	**Units**
Roughness		<1nm		
Optical Performance Characteristics	**Min.**	**Typ.**	**Max.**	**Units**
Scaling Accuracy	1	2	3	%
Operating Conditions	**Min**	**Typ**	**Max**	**Units**
Design Wavelength	200		2000	nm

Available Options

- AR or HR Coatings
- Specific Surface Recess Depth
- Customer Markings
- Mountings



About Us

PowerPhotonic is a global leader in precision laser machined micro-optics products. Our business was founded with the objective of providing unsurpassed excellence in all aspects of micro-optics product design for laser and optical applications. Our world-class design skills are supported by an innovative and flexible manufacturing process that allows the company to design both a broad range of state-of-the art standard micro-optics products and uniquely, to offer a low cost and rapid fabrication service for creating completely freeform optical surfaces.

For Sales and Technical Support

United Kingdom

PowerPhotonic Ltd.
1 St. David's Drive
Dalgety Bay, Fife, KY11 9PF
United Kingdom

Tel: +44 1383 825 910
Fax: +44 1383 825 739

sales@powerphotonic.com

North America

PowerPhotonic, Inc.
4900 Hopyard Road, Suite 100
Pleasanton, CA 94588
USA

Tel: +1 925 463 4876
Fax: +1 925 475 7422

sales@powerphotonic-us.com

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