

Flat-top Diffusers



PowerPhotonic
Enhancing Beam Performance

Overview

PowerPhotonic's Pseudo Random Intensity Mapping Element (PRIME) flat-top diffusers use a unique freeform direct-write process to fabricate a highly non-uniform surface in fused silica.

These quasi-random optics are designed to impart a well-defined and tightly controlled divergence angle which can range from fractions of a degree up to 10 degrees (FWHM) with potential transmission efficiencies in excess of 99%.

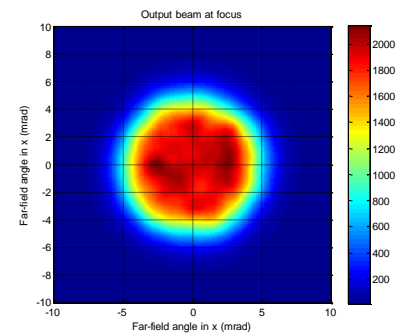
The edge steepness and flatness of the focused spot can be easily customized by supplying desired Supergaussian parameters to maximize system performance. Numerous spot shapes can be achieved including circular, square, annular and more.

Key Features

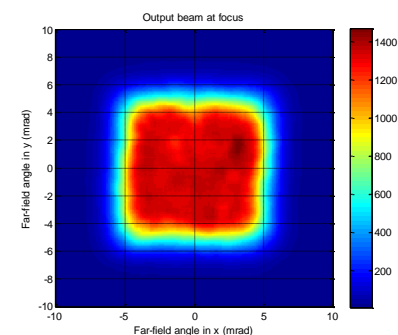
- All fused silica optics
- Customizable divergence ($<1^\circ$ to 10°)
- Customizable Supergaussian parameters
- Variable edge steepness
- Very low divergences achievable
- Suitable for multi-mode lasers ($M^2 > 5$)

Benefits

- Highest system efficiency possible $>98\%$
- Dramatic increase in beam uniformity
- High power handling, $>20\text{kW CW}$
- High laser damage threshold, $>100\text{J/cm}^2$
- Good through-focus performance
- Insensitive to input beam properties



5 mrad half angle

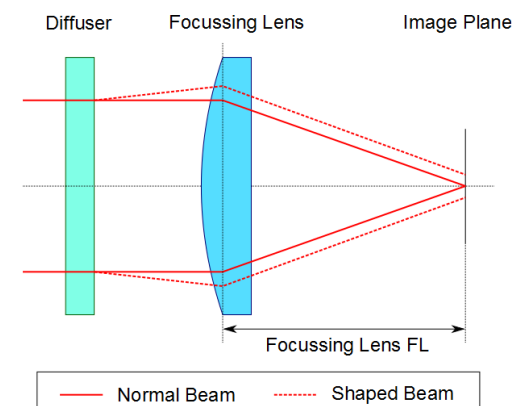


5 mrad half angle

Target Applications

- **Materials processing: high power**
 - Laser cutting
 - Conduction welding, cladding, brazing, soldering
 - Laser peening and heat treatment
- **Diode array and pump beam homogenization**
- **Ultrafast laser pulse homogenization**

How they are Used

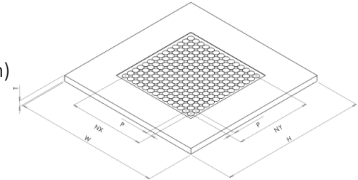


Standard Product Selection – Flat-top Diffusers

Part Number	Divergence Angle (FWHM - Degrees)	Clear Aperture H (mm)	Clear Aperture W (mm)	Height H (mm)	Width H (mm)	Thickness T (mm)
PP-FTD-D10-V1	1.00	15.0	15.0	25.40	25.40	1.00
PP-FTD-D30-V1	3.00	15.0	15.0	25.40	25.40	1.00
PP-FTD-D70-V1	7.00	15.0	15.0	25.40	25.40	1.00
PP-FTD-Dxx-Vx-ARx	Custom	Custom	Custom	Custom	Custom	Custom

Optical coating on request at extra cost
All custom parameters can be customer specified

W: Width (+/-0.10mm)
H: Height (+/- 0.10mm)
T: Thickness (+/- 0.02mm)



Customization Program

Due to the unique nature of the PowerPhotonic manufacturing process, our standard products can be easily modified to meet specific requirements. Please contact PowerPhotonic for additional information.

Options

- ④ Clear Aperture Width and Height
- ④ Substrate Width, Height and Thickness
- ④ Divergence Angle

About Us

PowerPhotonic is a global leader in precision micro-optics products. Our business was founded with the objective of providing unsurpassed excellence in all aspects of design and manufacture of micro-optics for optical and laser 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

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