



## 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%.

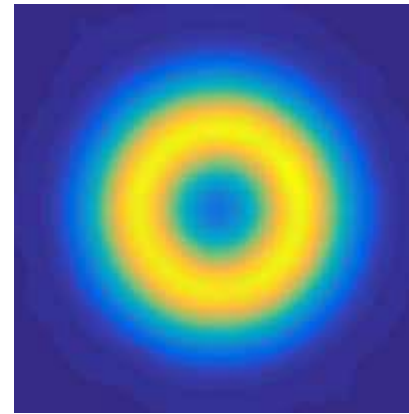
Customised diffusers can be used to create highly arbitrary intensity distributions specific to an application. Examples include of intensity distributions include tridents, ramps and skewed Gaussians while spatial distributions can include triangles, arcs and more.

## Key Features

- All fused silica optics
- Customizable divergence (<math><1^\circ</math> to - Customizable intensity and spatial distributions
- Highly variable edge steepness
- Very low divergences achievable
- Suitable for multi-mode lasers (

## Benefits

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

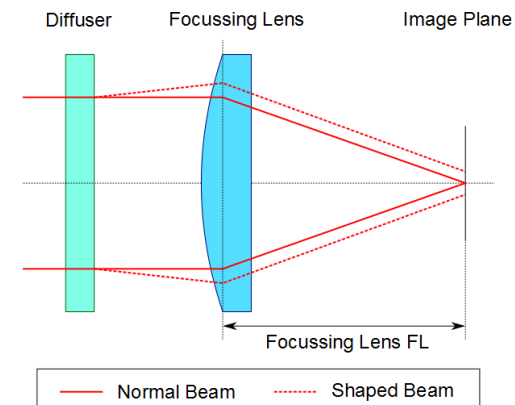


Gaussian Annulus

## Target Applications

- **Materials processing: high power**
  - Laser cutting
  - Laser peening and slow cool annealing
  - Active seam track welding and brazing
  - Metal polishing
- **Diode array and pump beam homogenization**
- **Ultrafast laser pulse homogenization**

## How they are Used



## Customization Program – Custom Diffusers

Due to the unique nature of the PowerPhotonic manufacturing process, most aspects of the product can be easily modified to meet specific requirements. The divergence angle can be adjusted from fractions of a degree up to 10 degrees (FWHM) and the intensity distribution modified to include tridents, ramps and skewed Gaussians while spatial distributions can include triangles, arcs and more. The mechanical properties of the optic can also be modified to include the clear aperture width and height. Please contact PowerPhotonic for additional information.

### Options

- ☉ Clear Aperture Width and Height
- ☉ Substrate Width, Height and Thickness
- ☉ Divergence Angle
- ☉ Intensity Distribution
- ☉ AR Coatings
- ☉ Customer Markings

### 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

### 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](mailto: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.com](mailto:sales@powerphotonic.com)



**PowerPhotonic**  
Enhancing Beam Performance

All specifications are correct at the time of production. We reserve the right to change our specifications without notice. © PowerPhotonic Ltd. 2016.