

Light Tunnel Generator

Overview:

Save costs by improving the efficiency and effectiveness of high power laser cutting. Use the PowerPhotonic Light Tunnel Generator to create a ring shaped spot that is maintained over such a long distance that it creates a light tunnel.

Light Tunnel Generators from PowerPhotonic are thin glass windows with a unique (patent applied for) precision freeform surface that are designed to be mounted inside a cutting or welding head.

They are a perfect solution to the problem of creating a ring shaped

intensity profile that persists over 10's of mm - far into metal that is being laser cut (or welded).

We have standard products for collimated high power fiber lasers operating at 1070nm up to 20kW CW power.

Our design and manufacturing process makes it easy for variations of standard products to be created. We can quickly modify designs to work for different beam diameters up to 50mm and/or to work in diverging (or converging) beams.

The PowerPhotonic effect:

>95%

Shaping Efficiency

>20kW

CW high power handling

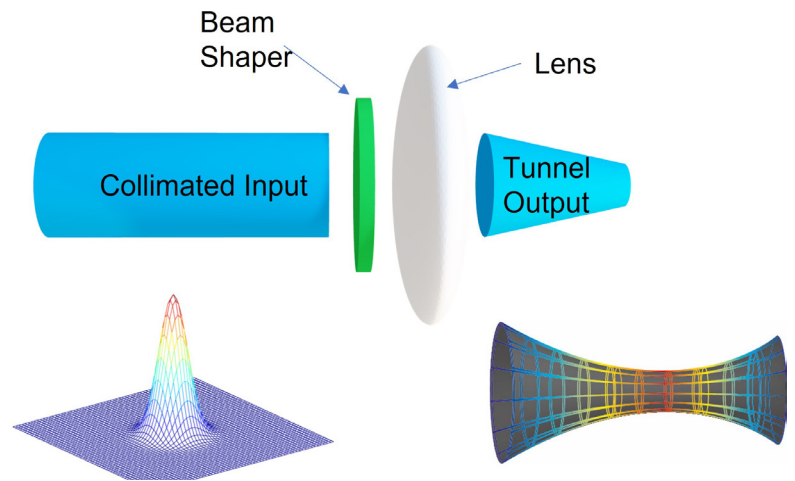
3X DOF

Comparing Rayleigh Range of axicon

How it works:

The PowerPhotonic Light Tunnel Generator is designed to work in a collimated beam, within an existing laser cutting (or welding) head.

The input beam is assumed to be super-Gaussian in profile and to be matched to the design input diameter. The beam shaper then redistributes energy within the beam, such that when the beam is focussed with a lens, it creates a ring, that extends many times longer along the optical axis than other ring generators (such as an axicon).



Key Features

- Efficient beam conversion
- High power handling
- Cost effective
- Customizable for diverging beam
- Customizable for beam size

Target Applications

- Laser Cutting
- Laser Welding
- Laser Drilling



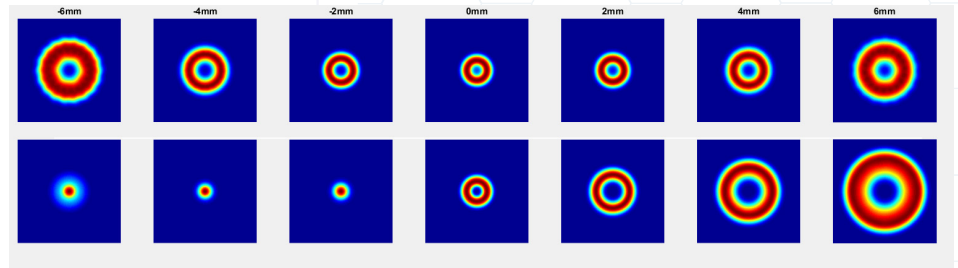
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Standard Products - Collimated Input Beam

Part Number	Function	Wave-length (nm)	Thru-focus range (mm)	Collimated Beam Dia. (mm)	Output Ring Diameter to unshaped diameter (112 mm focus lens)	Ring Wall Thickness (μm)
PP-LTG-400	ring/tunnel	1070	15	15	2.7	150
PP-LTG-600	ring/tunnel	1070	13	15	4	150
PP-LTG-1000	ring/tunnel	1070	15	15	6.7	150

Light Tunnel Generator
PP-LTG-400
profile at Z (axial) planes

Equivalent Axicon -
profile at Z (axial) planes



Note: ring wall thickness at focus = unshaped spot diameter at focus

Functional Performance

Parameter	Value
Shaping efficiency	>95%
ring size error*	+/- 3%

Custom Options

Standard product designs can be readily modified for specific applications. Custom options include: different input beam diameter, different wavelength (in the window between 350nm and 2μm) and different optic diameter & thickness. Designs to work in diverging or converging beams are available.

Sales and Technical Support

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General Specifications

Parameter	Value
Part diameter	25.4 mm +0/-0.1
Part thickness	1.01 mm +/- 0.05
Transmission	> 99.5 %

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