Light Tunnel Generator

Overview:

The Light Tunnel Generator (LTG) is a new beam shaping technology to significantly improve the efficiency and quality of macro materials processing. The LTG is a thin wafer of fused silica glass with a unique freeform surface. When added to the optics of a process head, it creates a ring-shaped spot that is maintained over a long optical working distance, creating a "light tunnel". Under appropriate conditions, this long depth of focus light tunnel provides a new process parameter space for laser cutting and welding of thick metals. It can produce laser cut edges with a roughness and dross quality that rivals the most sophisticated multi-spot systems available today – with no loss of process speed and a less sensitive process window. More significant still, this process speed and quality can be achieved under certain conditions using approximately half the laser power of multi-spot systems.

The LTG is compatible with a wide range of lasers and processes, but the most notable gains and benefits arise when processing metal greater than 15mm thick. If you are considering using lasers for cutting thick metal, we recommend that you consider using the LTG. It can help improve the productivity, efficiency, effectiveness, and quality of your laser cutting operations.

Our unique design and manufacturing process makes it easy for variations of standard products to be created. We can readily modify designs to work for different beam diameters (up to 50mm) and/or to work in diverging (or converging) beams such as those found in single lens design process heads.

The PowerPhotonic effect:

~50%

Improved Laser Productivity

15mm

Through Focus Range

>100kW

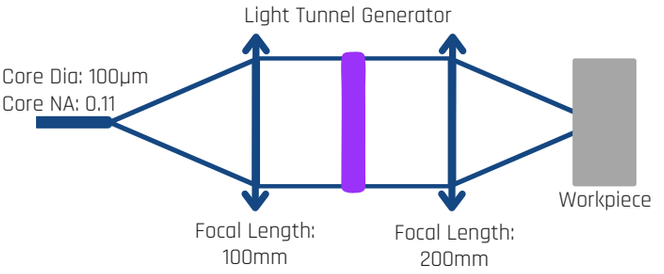
Power Handling Capability

How it Works:

The PowerPhotonic Light Tunnel Generator (LTG) 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. The light tunnel generator then re-distributes energy within the beam.
When the beam is focused with a lens, it creates a ring that extends many times longer along the optical axis than other ring generators.

Standard Optical Layout:



Key Features:

- Increase Laser Effectiveness
- Excellent Roughness
- Excellent Cut Burr
- High Power Handling

Target Applications:

- Laser Cutting
- Laser Welding
- Laser Drilling

Light Tunnel Generator

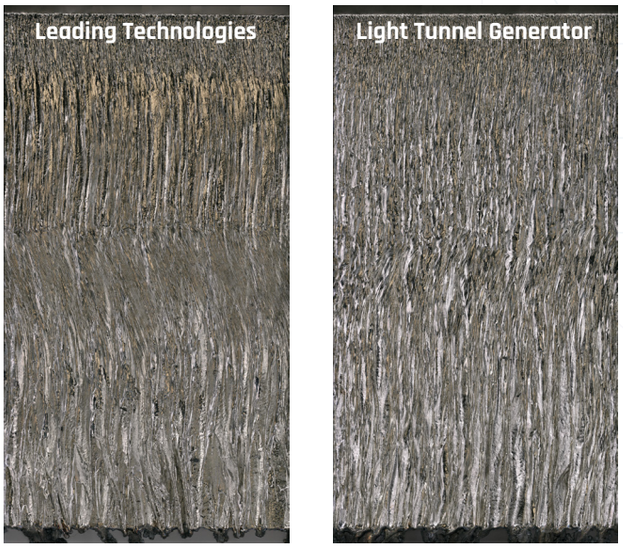
Standard Part List:

Part Number	Output Ring Diameter (µm)	Output Ring Thickness (µm)
PP-LTG-1064-500-AR	500	200
PP-LTG-1064-600-AR	600	200
PP-LTG-1064-1000-AR	1000	200

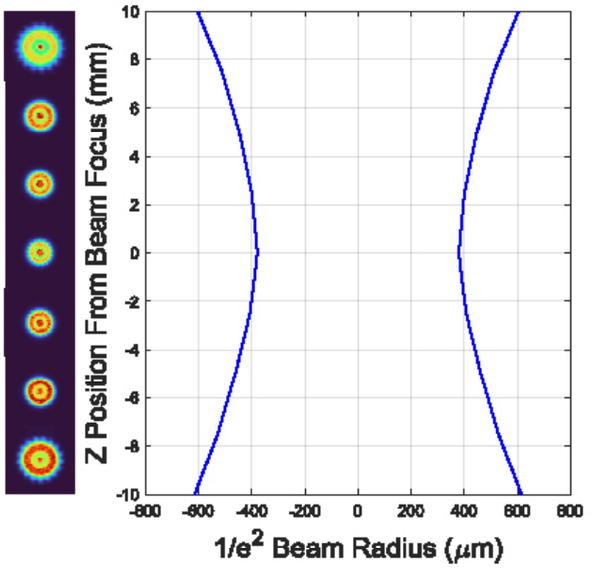
Standard Clear Aperture Diameter is 25mm
Designed for 1070-1080nm Wavelength
Output Ring Diameter Defined in Standard Optic Layout

General Specifications:

Parameter	Value
Part Diameter (mm)	30+0/-0.1
Part Thickness (mm)	3±0.05
Coating Wavelength Band (nm)	1025-1100
Coating Reflectance (%)	<0.5



20mm Stainless Steel Sample (IWS Fraunhofer)



Output Spot Data - PP-LTG-1064-100-AR

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.

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PowerPhotonic
Enhancing Beam Performance