Single Mode Beam Shaper for Scanners

Overview:

Save costs by improving the efficiency and effectiveness of single-mode laser scanning applications. Use a PowerPhotonic component to optimize the spot on the workpiece.

Flat Top Beam Shapers from PowerPhotonic are thin glass windows with a precision freeform surface that are designed to be mounted at the entrance aperture of a scanner.

They are a perfect solution to the problem of creating a uniform intensity profile at the scanner focus AND keeping the spot size close to its diffraction limit. In our product range of flat top beam shapers there are optics that change just the beam profile, optics that change the just shape of the spot, and optics that change BOTH the profile and shape of the spot.

We have standard products compatible with single mode fiber lasers operating at 1070nm and for frequency doubled single mode lasers operating at 535nm. Our design and manufacturing process makes it easy for variations of standard products to be created.

The PowerPhotonic effect:

>90%

Shaping Efficiency

>20kW

CW Power Handling

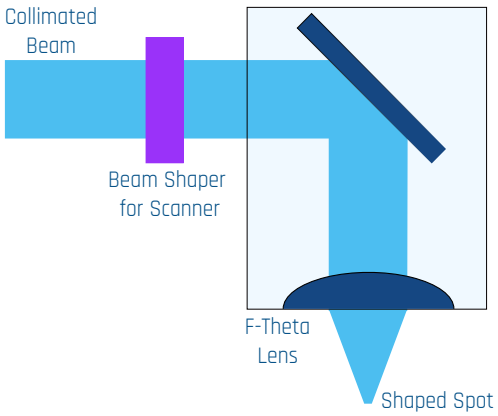
>100J

Pulsed Energy Handling

How it works:

The PowerPhotonic beam shaper is designed to work when it is located at the entrance aperture of a scanner. No other components are required.

The input beam (Gaussian & Single Mode) diameter needs to be matched to the design input beam diameter. The beam shaper then re-distributes energy within the beam, such that when the beam is focused with the scan lens, it has the required size, shape and profile at the scan lens focus.



Key Features:

- Efficient beam conversion
- High power handling
- Cost effective
- Customisable for wavelength
- Customisable for beam size

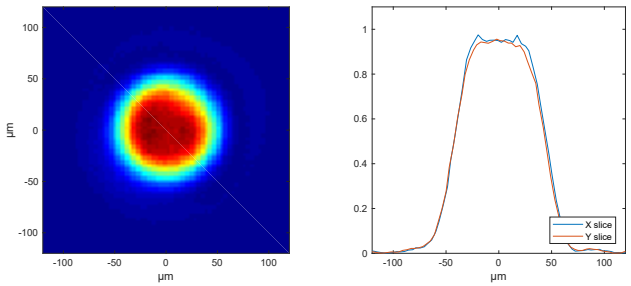
Target Applications:

- Laser Additive Manufacturing
- Remote Welding
- Remote Cutting
- Scribing
- Drilling

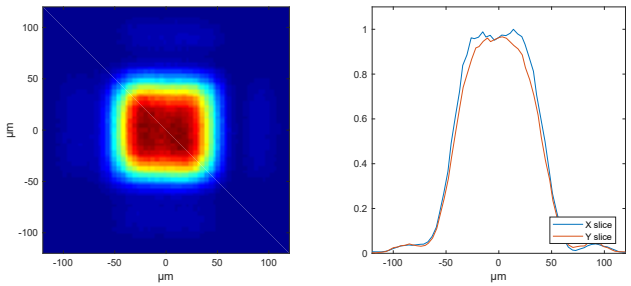
PowerPhotonic
Enhancing Beam Performance

Standard Product: Single Mode Beam Shaper For Scanners

Part Number	Flat Top Shape	Design Wavelength (mm)	Input Beam Diameter, $1/e^2$ (mm)	Output Spot Diameter
PP-SMRFT-1070-N-AR	Circle	1070	5.40	1.5 x diffraction limit
PP-SMSQFT-1070-N-AR	Square	1070	5.40	1.5 x diffraction limit
PP-SMRFT-535-N-AR	Circle	535	4.80	1.5 x diffraction limit
PP-SMSQFT-535-N-AR	Square	535	4.80	1.5 x diffraction limit



Circle Flat Top



Square Flat Top

General Specifications:

Parameter	Value
Part Diameter (mm)	25.4+0/-0.1
Part Thickness (mm)	1.01±0.05
Part Clear Aperture Diameter (mm)	12-13.5
Coating Reflectance (%)	<0.4

Functional Performance:

Parameter	Value
Power in the Bucket (%)+	>90
Flatness Factor, F_F^*	>0.9
Plateau Uniformity, U_p^*	<0.1

* As defined in ISO 13694:2018
\+ Defined as the fraction of power within the primary spot

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), larger flat top spot, different spot shape, different optic diameter & thickness.

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