

# **$\pi$ Shaper NA0.1 / 0.2**

***Refractive beam shaping optics  
for multimode fiber-coupled high-power  
solid-state and diode lasers***



*$\pi$ Shaper NA0.1 / NA0.2:*

- *combine collimating and focusing optics,*
- *are optimized to operate with multimode high power fiber-coupled diode lasers in 910-980nm and solid state-lasers in 1050-1080nm spectral bands,*
- *to be connected directly to fiber,*
- *converts with near 100% efficiency a divergent Gaussian-like beam into a beam with Donut or Flat-top intensity profile,*
- *provides round or linear spots depending on optical design.*

*Applications:*

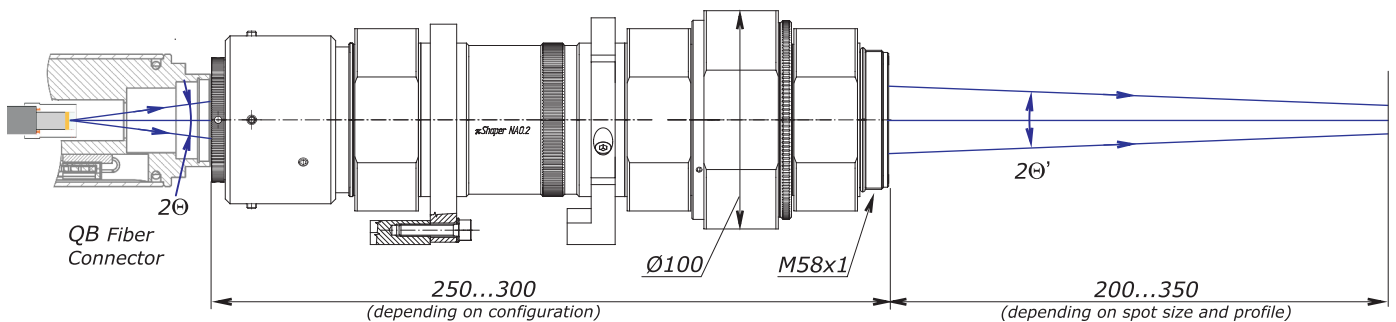
- *Welding*
- *Brazing*
- *Technologies where Flat-top or Donut spot required*
- *Cladding*
- *Hardening*

***Beam Shaping never was so easy!***

# No more energy loss!

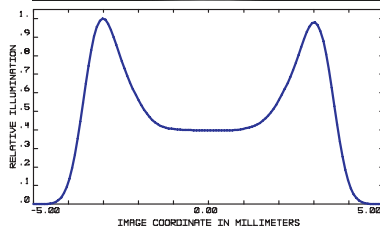
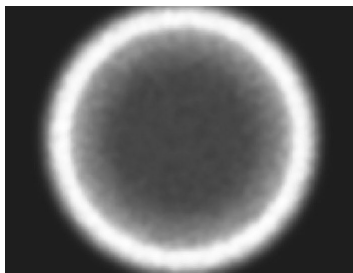
## Technical Specifications

Type	Combined Collimator+Focusing Lens, without internal focus, to be connected to multimode fiber	
Input beam	- multimode with Gaussian-like intensity profile - divergent	
Output beam	- convergent - divergence $2\theta' = 0.04 - 0.07$ rad	
Working distance	200 – 350 mm depending on spot size and intensity profile	
Resulting spot	- donut or flat-top intensity distribution depending on working plane - round spot – diameter in range 4 – 12 mm depending on working plane - linear spot – length in range 6 – 12 mm depending on working plane	
Laser power	up to 6 kW (CW)	
Other features	- Water cooling - Other wavelengths on request - Extended depth of field	
Overall dimensions	- Diameter 100 mm - Length 250 - 300 mm, depending on configuration for round or linear spot	
Weight	< 3 kg	
	$\pi$ Shaper NA0.2_910-980	$\pi$ Shaper NA0.1_1064
Multimode fiber	- NA0.22 - fiber core diameter 100 - 1000 $\mu\text{m}$ - beam divergence $2\theta=0.38-0.4$ rad ( $1/e^2$ )	- NA0.13 - fiber core diameter 50 - 400 $\mu\text{m}$ - beam divergence $2\theta=0.15-0.18$ rad ( $1/e^2$ )
Spectral band, nm	910 - 980	1050 - 1080
Applications based on	fiber-coupled diode lasers	fiber and fiber-coupled solid-state lasers



### Examples of resulting profiles

Round Donut spot  
FWHM  $\varnothing$  7.5 mm



Linear Flat-top spot  
length 8 mm

