

FAST-AXIS COLLIMATION OPTICS

FAST-AXIS IMAGING OPTICS

Precision – Brilliance - Performance



# Fast-Axis Collimation / Fast-Axis Imaging

## FAC and FAI Lenses

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### GENERAL DESCRIPTION

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The most important optical component in the beam shaping systems in high-power diode lasers is the Fast-Axis Collimation optic. The lenses are manufactured from high-quality glass and have an acylindrical surface. Their high numerical aperture permits the entire diode output to be collimated with outstanding beam quality. The high transmission and excellent collimation characteristics guarantee the highest levels of beam shaping efficiency for diode lasers.

By means of an FAI lens, the emitter can be directly imaged into a fiber or a target plane. The design of INGENERIC's FAI lenses is optimized for this specific application and allows an efficient and aberration-free imaging of the emitter.

### ADVANTAGES

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- application-optimized design
- high numerical aperture (NA 0.8)
- diffraction-limited collimation
- transmission up to 99%
- highest level of precision and uniformity
- manufacturing process is highly economical for large quantities
- reliable and stable quality

### PRODUCT SPECTRUM

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In order to offer the best solution for your application INGENERIC provides a broad spectrum of Fast-Axis Collimation optics from the shelf. Years of development allow us to provide optimized acylindrical lenses for different applications. Based on our sophisticated technologies and substantial experience we are further able to provide FAC lenses with 90° deflection.

With respect to length or support structures the lenses can be tailored to your specific needs. For details please refer to the technical specifications on the following pages.

### QUALITY

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We operate a strict quality policy. The beam profile, residual divergence and geometry along the longitudinal axis is characterized as it moves along the production line. By conducting measuring operations along the beam path, we ensure that there will be no deviation from these measured beam characteristics when the optic is subsequently used in industrial practice. In conjunction with our advanced manufacturing technology, this guarantees that our lenses are free of side lobes or smile.

Details are available on request.



## SPECIFICATION DATA

Lens Type FAC	NA	EFL [mm]	BFL [mm]	L [mm]	H [mm]	CT [mm]		XB	D [mrad]
<b>Material</b> K-VC89 / Standard Optics									
FAC06-150	0.60	0.15	0.03	tbd.	0.70	0.22		x	4.60
FAC07-300	0.70	0.30	0.08	tbd.	0.49	0.40		x	2.30
FAC07-360	0.70	0.36	0.11	tbd.	0.70	0.45		x	1.90
FAC07-400	0.70	0.40	0.11	tbd.	0.70	0.50		x	1.73
FAC07-500	0.70	0.50	0.11	tbd.	0.90	0.70		x	1.34
FAC08-600	0.80	0.60	0.14	tbd.	1.00	0.83		x	1.20
FAC07-700	0.70	0.70	0.14	tbd.	1.00	1.00		x	1.00
FAC08-900	0.80	0.90	0.09	tbd.	1.50	1.50		x	0.80
FAC08-920	0.80	0.92	0.18	tbd.	1.50	1.30		x	0.80
FAC08-1000*	0.75	1.00	0.15	tbd.	1.50	1.50		x	0.70
FAC06-1100	0.60	1.10	0.16	tbd.	1.50	1.69		x	0.65
FAC06-1200	0.60	1.20	0.10	tbd.	1.50	1.97		x	0.60
FAC08-1200	0.80	1.20	0.10	tbd.	1.90	1.97		x	0.60
FAC05-1500	0.50	1.50	0.09	tbd.	1.50	2.47		x	0.48
FAC08-1500	0.80	1.50	0.09	tbd.	2.30	2.47		x	0.48
FAC07-2500	0.65	2.50	1.10	tbd.	3.50	2.47		x	0.29
<b>Material</b> K-VC89 / Special Solutions									
FAC08-600	0.80	0.60	0.16	tbd.	1.00	0.80		x	1.20
FAC06-1500	0.60	1.50	0.97	tbd.	2.30	0.95		x	0.48
FAC053-1500	0.53	1.50	0.92	tbd.	2.00	1.05		x	0.48
FAC03-2300**	0.30	2.30	0.97	tbd.	1.50	1.00		x	0.40

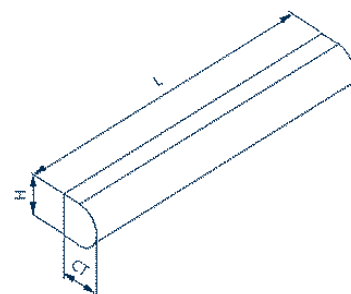
\* available as of 2019

\*\* Collimation of SA for Single Emitter

Lens Type FAC	NA	EFL [mm]	BFL [mm]	L [mm]	H [mm]	CT [mm]	HB	XB	D [mrad]
<b>Material</b> N-LaF21									
FAC08-1000	0.75	1.00	0.15	tbd.	1.50	1.50	x	x	0.70
FAC07-2000	0.65	2.00	0.10	tbd.	2.80	3.37	x	x	0.36
FAC08-2800	0.75	2.80	0.09	tbd.	4.00	4.78	x	x	0.26

Lens Type Special Products	NA	EFL [mm]	BFL [mm]	L [mm]	H [mm]	CT [mm]	Mag.	Image Dist. [mm]	D [mrad]
<b>Material</b> N-LaF21									
PriFAC-06-1200-TIR	0.60	1.20	0.15	14.0	1.93	2.25			0.60
<b>Material</b> K-VC89									
FAI065-M200-80	0.60	0.38	0.075	tbd.	1.00	0.55	200	80	0.48

NA: Numerical aperture  
 EFL: Effective focal length @ 808 nm  
 BFL: Back focal length @ 808 nm  
 Coating: Standard AR 780-1020 nm  
 Transmission: > 99%  
 L: Length [+/-0.10 mm] according to customer specification  
 maximum length: 14.0 mm  
 H: Height (N-LaF21: +/- 0.01 mm; K-VC89: +/- 0.02 mm)  
 CT: Center Thickness (N-LaF21: +/- 0.01 mm; K-VC89: +/- 0.02 mm)  
 Material: K-VC89, N-LaF21  
 Refractive Index n @ 808 nm: 1.77584  
 Quality specification for laser bar with divergence of 35° (FWHM)



## Fast-Axis Collimation / Fast-Axis Imaging

FAC and FAI lenses

### QUALITY STANDARDS

INGENERIC offers Fast-Axis Collimation optics with different quality levels. Due to our frequent development efforts to optimize our processes, we manage to constantly enhance the quality of our products. Based on these developments, today we offer several of our products solely in the premium quality grades – and thanks to our sound manufacturing process without cost impact for our customers.

HB	High Brightness	power within an angle of +/- D [mrad]	> 85%
XB	Extra-High Brightness	power within an angle of +/- D [mrad]	> 90%

On request – Contact us to learn more!

XXB	Super-High Brightness	power within an angle of +/- D [mrad]	> 95%
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### SERVICE

We also design, develop and manufacture customized FAC lenses, which have been optimized to meet the specific requirements of your application.

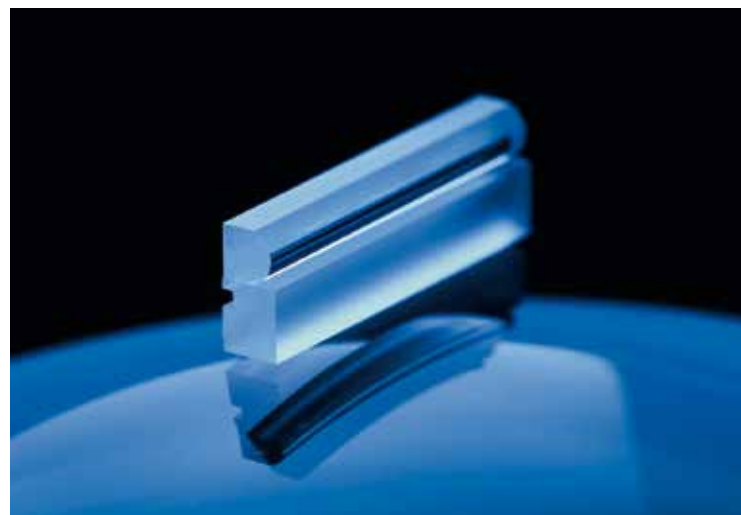
- customized numerical aperture, focal length and back focal length
- customized length (max. 14.0 mm)
- customized coating (app. 400 nm ... 2100 nm, broad or small band)

### AUTOMATED ASSEMBLY

In order to simplify mounting, we also offer the FAC lenses with additional surfaces for mounting and/or support structures. Benefit from our automated assembly process

#### Advantages

- highest precision and reproducibility by using a camera system
- no damage risk by manual handling process
- no damage risk by assembly devices used during manual handling process
- position accuracy in micrometer range
- assembly and packaging in clean environment
- 100% measurement of dimension
- package usable for automated parts-removal

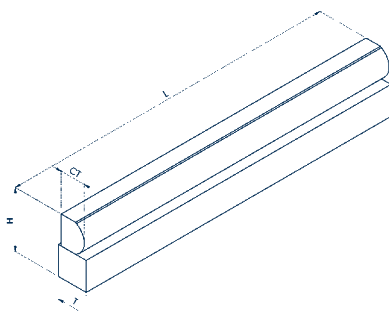


#### Example Products

##### FAC08-600 on BT

Dimension of module

- L: 11.00 mm
- T: 1.00 mm
- H: 2.00 mm



##### FAC08-600 on BT

Dimension of module:

- L: 10.30 mm
- T: 1.00 mm
- H: 1.50 mm

