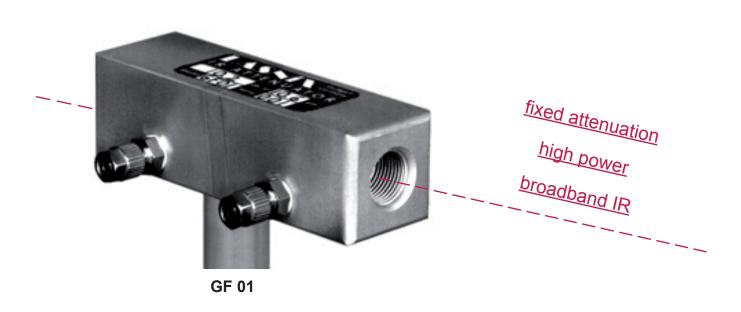
## NEUTRAL DENSITY FILTERS for INFRARED LASER BEAMS

THz QCL CO, FEL OPO HF Telcom Nd:YAG Ti:S

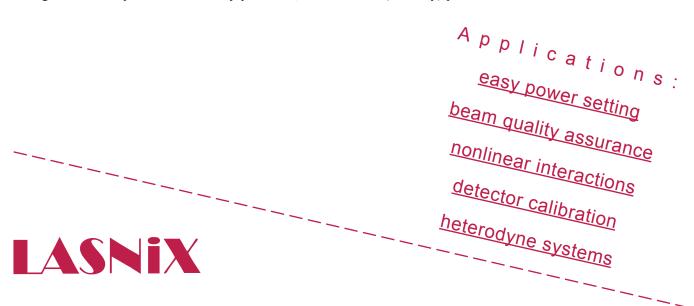


LASNIX neutal density filters are precision components to reduce laser beam power. All beam parameters apart from power stay unaffected. The filters are designed for simple alignment and ease of use.

The attenuation principle is based on proprietary free-standing metal grid technology introduced by LASNIX in 1984. Originally developed for high-power  $CO_2$  lasers, these grids have been tailored to accomodate the complete infrared spectrum from 0.7 to 1200  $\mu$ m. Remarkably high power handling up to 30 kW c.w. has been achieved.

Since the grids are freely suspended, i.e. have **no substrate**, they can not deviate or offset the beam—in contrast to usual, substrate-based optical elements. Dispersion and phase effects on femtosecond pulses are negligible.

In the filter, a precision fabricated metal grid diffracts a calibrated percentage of power out of the beam. The rejected power is absorbed in the walls of the water-coolable housing. The attenuated output beam passes undeviated (in diffraction terms, this beam represents the zeroth order). The mode structure and all other beam properties, including the divergence and M<sup>2</sup> parameters are fully preserved, as well as the (arbitrary) polarization.



## LASNIX NEUTRAL DENSITY FILTERS

## beam quality guarantee:

angular beam deviation < 5	µrac
wavefront distortion < 1/100	λ
beam offset < 1	μm
mode distortion < 0.2	db
polarization distortion< 0.05	db
back reflection< -30	db

Standard filters cover wide infrared bands between 0.7 and  $1200~\mu m$ .

The power loss of a standard filter is 10 db, corresponding to a transmittance between of 10%. Other values between 3 db and 10 db can be supplied on a custom basis.

Input powers up to 200 W c.w. (or quasi-c.w.) are allowed. The specified limits apply to relatively wide beams which fill at least half the specified aperture area in a smooth manner. This corresponds to a fundamental mode having a  $1/e^2$  beam width of about 2/3 of the aper-

## attenuator specifications:

•	spectral flatness +/- 0.5	db
•	resettability of step +/- 0.05	db
•	additivity of steps +/- 0.03	db

ture diameter. For narrower beams the power limits scale down linearly. For example, a limit of 200 W reduces to 100 W when the 1/e<sup>2</sup> width narrows from 2/3 to 1/3 of the aperture diameter.

The angular alignment within the clear aperture is uncritical. The laser beam input can be from either side.

A tapped hole M8 is provided at the base. We also supply a transition post with 1/4-20 thread.

Cooling water flow is necessary only when the input power exeeds 10 W.

Model No.	Wavelength Range	Attenuation (nom.) per element	Attenuation total	Power Limit		Clear Aperture	Length	Weight
	μm	db	db	W	J/cm²	mm	mm	kg
GF 01	8 - 36*	10	10	200	20	11	83	0.1

<sup>\*</sup> inquire for other wavelength ranges

For ordering write or call

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