

FEMTO *Plus*[®] Grating in Pure Core Polyimide Fiber



KEY FEATURES

FEMTO *Plus*[®] Gratings eliminate the negative polarization effects for best measurement results and show only very low scattering losses for extra-long array configurations in addition to high temperature stability and very good tensile strength.

The type FFT.FBG.P.01.01/2 are FBGs inscribed in polyimide coated pure core fiber. These are well suited for very high temperature and strain measurements up to 300°C (400°C short term). Due to their good strain transfer, this type of FBGs provide high performance for elevated temperature ranges and more demanding strain measurement. The pure core fiber shows extreme resistance against high temperatures and against hydrogen darkening and radiation. Therefore this fiber is preferred for very harsh environment applications.

FEMTO *Plus*[®] Gratings eliminates negative polarization effects on measurement accuracy that result from polarized light sources or from vibrations and movements within the sensing/cabling system.

Different FBG reflectivity levels are available depending on the requirements of the interrogation unit.

ABOUT THE TECHNOLOGY

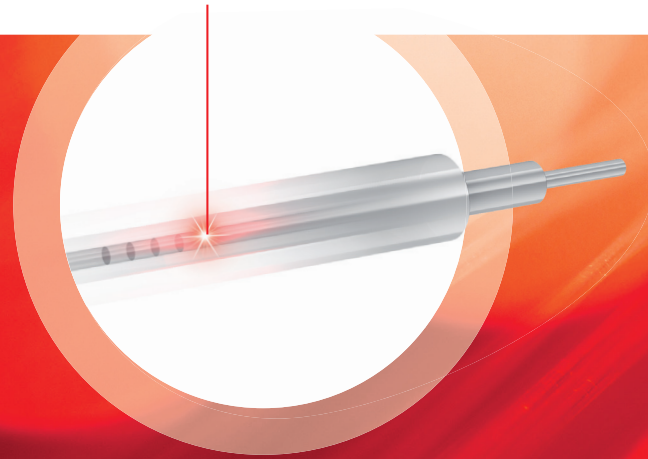
FemtoFiberTec uses a special inscription technology for FBGs, based on infrared fs-laser technology. The laser is focused into the core of the fiber and induces local refractive index changes in a point-by-point writing process. The process is highly nonlinear and therefore basically independent of the fiber material, which means that doping the fiber is not required. The FBGs can be written in radiation insensitive fibers and special pure core fibers for harsh environments.

The gratings are type II gratings with temperature stability up to 400°C. As the process is applied through the coating, no stripping and recoating of the fiber is required.

GENERAL BENEFITS

compared to conventional FBGs

- Temperature stability up to 400°C
- Cost efficient arrays compared to strip and recoat gratings
- Immunity to humidity and radioactivity
- Significantly higher tensile strength compared to strip and recoat technology
- FEMTO *Plus*[®] Gratings with low polarization (0-5pm) for high resolution measurements compared to draw tower gratings and very low scattering losses (< 0,2dB)
- Significantly higher reflectivity and lower fiber cost compared to draw tower technology
- Direct writing process into customer specific fibers
- Realization of customer individual specifications
- Highly cost competitive large volume manufacturing process



FBG Specification

Parameter	Low reflectivity	Medium reflectivity
Order number	FFT.FBG.P.02.01	FFT.FBG.P.02.02
Item description	Single FBG-20%-PC-PI	Single FBG-50%-PC-PI
Wavelength	1500-1600	
Wavelength accuracy	+/- 0,3nm	
Reflectivity	>20%	>50%
FWHM	<0,3nm	<0,2nm
SLRS	>15 dB	
Length	6mm	12mm
Polarization	~2pm	<5pm
Scattering loss	< 0,2dB	
Tensile strength	> 3%	
Fiber length	2m	
FBG position	center	

Fiber Specification

Parameter	Pure Core Polyimide
Attenuation @1550nm	<0,8dB/km
Cutoff wavelength	<1290nm
Mode field diameter @1550nm	9,0µm
Numerical aperture	0,13
Cladding diameter	125µm
Coating type	Polyimide
Coating diameter	155µm
Max temperature	300°C (short term 400°C)

FEMTO Grating arrays and FEMTO^{Plus}® Grating arrays

are produced according to customer specifications. FBG spacing from 0,1mm to several 100m.

In co-operation with FemtoFiberTec's sister company Loptek GmbH & Co.KG, which is specialized in the assembly of fiber optic light guides and sensors, calibrated and assembled sensors and complete sensing solutions, including the sensor and interrogation system, can be provided.