

HB-G

The World's Number One Gyroscope Fiber

With service-environments ranging from the Arctic through to the desert and even into outer-space, all of the components of a high-grade Fiber Optic Gyroscope (FOG) must continue to deliver their best performance over the broadest possible temperature range.

The key component of any FOG is the fiber coil and the key measures of coil performance are the purity and stability of the polarization it maintains. In the past, these parameters have suffered in sub-zero conditions because the rigidity of the polymer coating used on optical fibers has tended to increase significantly at these temperatures. This abrupt change in modulus reduces the polarization maintaining performance of the coil by inducing unwanted stress into the fiber.

Conventional solutions to this problem have had limited success because they have often involved the use of soft, silicone-type coating materials. The low refractive index and poor strippability, inherent in these materials, has caused problems for design and production engineers alike. HB-G avoids these shortcomings by means of a special dual-layer acrylate coating.

Application Specific HB-G

Fibercore has enhanced the highly-successful HB-G range with three new, application-specific variants, providing even higher performance, just where you need it:

HB800G-SB

where a *shorter beatlength* is required for the very strongest polarization maintained guidance and lowest possible h-parameter. Equally effective in high-performance and small form-factor FOGs, HB800G-SB can also be deployed to enhance coil yields in standard-performance systems.

HB1500G-RT

where increased *radiation tolerance* is required for satellite or spacecraft applications

HB1500G-HI

where an extra *high index* core is required to enable the fabrication of ultra low-loss, small form-factor gyro coils

PM Gyroscope Fiber

Field-Proven – 25,000 km + Operational in FOGs Worldwide

All FOG Operating Wavelengths
830nm, 1310nm and 1550nm

Excellent PM Performance and Handling

'Bow-Tie' SAPs maximize birefringence whilst minimizing internal stress within the fiber by 'focusing' stress efficiently to the core – providing optimum H-parameter with good cleave-quality and fusion-splice yields

Extinction Ratio of -25 to -30 dB

Nominal PER in an idealized deployment of 100m wound at low tension (<5g) on a 60mm diameter spool

Enhanced Low-Temperature Performance

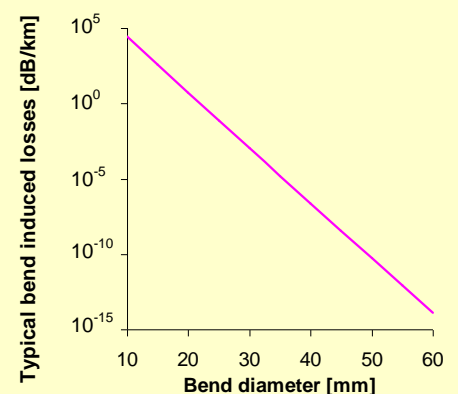
Ultra-low T_g modified-acrylate primary coating provides exceptional low-temperature buffering, preserving H-parameter to – 55°C

High Reliability and Packing Factor

80 μm glass diameter and high NA combine to give enhanced lifetime, increased packing-factor and low coil insertion-loss.

High Resistance to Macro and Micro-bend-induced Loss

High or ultra-high NA provides exceptional resistance to macro and micro-bending facilitating general handling and enabling deployment in small form-factor FOGs

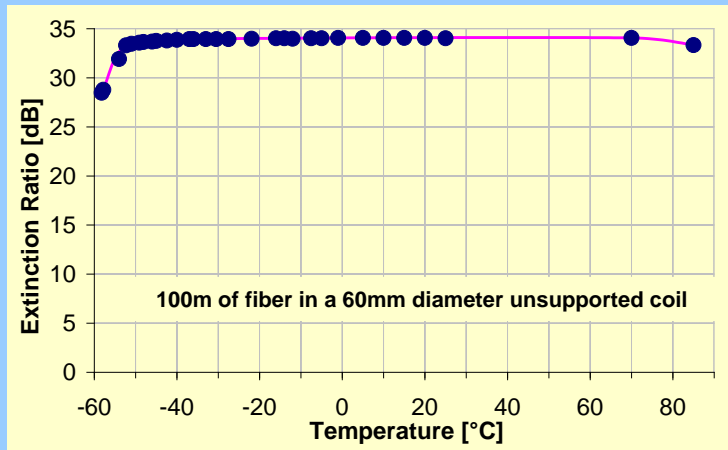


HB-G fibers

High Polarization Extinction to -55°C

Performance over wide temperature range

Under test conditions designed to simulate those encountered in a typical FOG coil, extinction ratios of better than 30 dB (h-parameter of $1 \times 10^{-5} \text{ m}^{-1}$) have been maintained down to -55°C, with extinction of over 28 dB demonstrated right down to -60°C.


Extinction Ratio of -25 to -30 dB

Nominal PER in an idealized deployment of 100m wound at low tension (<5g) on a 60mm diameter spool

Rugged and Easy to Handle

Dual-layer, modified acrylate coating provides excellent ruggedness, improved static fatigue resistance, optical mode stripping and simple mechanical or chemical removal.

Specifications

	HB800G	HB800G-SB Short Beatlength	HB1250G	HB1500G	HB1500G-RT Radiation Tolerant	HB1500G-HI High Index
Design Wavelength ¹ λ_{op} (nm)	830		1300	1550		
Cut-off Wavelength (nm)	660 - 800		1030 - 1270	1230 - 1520	1230 - 1500	1360 - 1520
Numerical Aperture	0.14 - 0.18					0.19 - 0.21
MFD ² @ λ_{op} (μm) <i>nominal</i>	4.2		6.6	7.9	7.8	6.4
Attenuation ³ @ λ_{op} (dB/km)	≤5		≤2	≤2	≤1.4	≤3
Beat length ⁴ (mm)	≤1.5	≤1.2	≤1.5			
Proof test (%)	1 (2% or greater on request)					
Fiber diameter (μm)	80 ± 1					
Core-cladding concentricity (μm)	≤1.0					
Coating type	Dual-Layer Acrylate					
Coating diameter (μm)	170 ± 5%			170 ± 2%		155 ± 5%

Notes:

- The Design Wavelength is the wavelength (or wavelengths) at which the fiber is typically used. In practice, the fiber will transmit the single mode at wavelengths of up to ~ 200 nm longer than the cut-off wavelength.
- The Mode Field Diameter is a nominal, calculated value, estimated at the operating wavelength(s) using typical values for numerical aperture and cut-off wavelength.
- Attenuation is a worst-case value, quoted for the shortest design wavelength.
- Beat length is measured at 633 nm for all HB fiber types. To a first approximation, beat-length scales directly with operating wavelength.