

PEEK Reinforced Optical Fiber

For Sensing and Communication

Overview-

We have optimized our 100% PEEK coating process to stabilize PEEK during extreme temperature fluctuations. This stabilization allows the optical fiber to retain PEEK's strain transfer and optical properties while being free of compression-induced attenuation in continuous lengths up to 15,000 ft (4.572 km). Our PEEK reinforced optical fiber is ruggedized to protect against abrasion and physical trauma to reduce failures and extend the life of the fiber.

PEEK possesses one of the highest strength-to-weight ratios of any thermoplastic, making it especially beneficial for the aerospace industry for fire detection systems. With an upper working temperature of 260 °C (500 °F), our PEEK reinforced optical fiber can go in many places where other fiber cannot. Chemicals and steam do not affect PEEK's performance, and PEEK is also radiation resistant for applications in the nuclear industry. PEEK's ability to tolerate multiple sterilization methods and cycles has also made it especially popular in medical applications.

Zeus PEEK reinforced optical fiber is available in multiple fiber types, including single-mode (SM) and multimode (MM) as well as SM and MM pure silica core (PSC) versions. Other polymer coatings are available for our optical fiber. Contact us for more information.



All PEEK reinforced optical fiber are provided with polyimide or High Temperature Acrylate (HTA) primary coating.

SINGLE-MODE POLYIMIDE (SMP+P) COATING

- Distributed temperature sensors
- Distributed acoustic sensors
- Distributed strain sensors
- Distributed pressure sensors
- Downhole sensors
- Embedded sensors

SINGLE-MODE HIGH TEMPERATURE ACRYLATE (SMHTA+P)

- Low loss and bend-insensitive
- Higher temperature and chemical resistance than standard HTA fiber

PURE SILICA CORE POLYIMIDE, MULTIMODE GRADED INDEX (PSCGIMMP+P)

- Distributed Temperature Sensors (DTS)
- Pipeline monitoring
- Fire detection systems



ABRASION RESISTANCE



CHEMICAL RESISTANCE



TEMPERATURE RESISTANCE



Single-Mode Polyimide and PEEK

Bend-insensitive Single-Mode (SM) fibers with polyimide primary and PEEK secondary coatings are specifically designed for use in harsh environments where bare fiber fails. The fibers target distributed sensing applications requiring chemical, abrasion, and radiation resistance.

Excellent for the following applications: pipeline monitoring, structural monitoring, embedded sensor, flexible risers, geotechnical risk monitoring, fracking micro-seismic sensors, enhanced oil recovery (EOR), haptic feedback, and biomedical in vivo sensors.

PEEK Reinforced Optical Fiber		
SPECIFICATIONS	SM9/125P+P	SM5.3/80P+P
Operating Wavelength (nm)	1520 - 1650	1520 - 1650
Cut-off Wavelength (nm)	1350 - 1520	1350 - 1520
Core Numerical Aperture (nom)	0.13 - .015	0.23 - .025
Mode Field Diameter (μm)	8.5 - 9.9@1550nm	5.0 - 5.6@1550nm
Attenuation (dB/km)* @ 1550 nm	≤ 1.0	≤ 2.0
Proof Test (%)	100 kpsi	100 kpsi
Cladding Diameter (μm)	125 ± 2	80 ± 2
Core Cladding Concentricity (μm)	≤ 0.4	≤ 0.5
Primary Coating Diameter (μm)	155 ± 5	102 ± 5
Primary Coating Type	polyimide	polyimide
Secondary Coating Diameter (μm)	300 - 900	225 - 800
Secondary Coating Type**	PEEK	PEEK

* Attenuation values are with secondary coating added

** Other polymer options and sizes available; contact Zeus for more information.



Single-Mode HTA and PEEK

Fiber designed for sensing, instrumentation, and light delivery that meets standards for G.657.A1 and G.652.D. This single-mode, low-loss, bend-insensitive fiber has a PEEK secondary coating which makes it adaptable to harsh chemical, abrasion, and temperature environments.

Tested for over 2,500 hours at 150°C with no change in attenuation.

PEEK Reinforced Optical Fiber	
SPECIFICATIONS	SM8.2/125HTA+P
Operating Wavelength (nm)	1310/1550
Cable Cutoff Wavelength (λ_{ccf})	≤ 1260 nm
Core Numerical Aperture (nom)	0.14
Mode Field Diameter (μm)	8.8 - 9.6 @ 1310
Mode Field Diameter (μm)	9.9 - 10.9 @1550
Attenuation @ 1310nm (dB/km)*	≤ 0.7
Attenuation @ 1550nm (dB/km)*	≤ 0.5
Proof Test (%)	100 kpsi
Core Diameter (μm)	8.2
Cladding Diameter (μm)	125 \pm 1
Core Cladding Concentricity (μm)	≤ 0.5
Primary Coating Diameter (μm)	242 \pm 5
Primary Coating Type:	Dual Acrylate
Secondary Coating Diameter (μm): nominal	325 - 900
Secondary Coating Type**	PEEK

* Attenuation values are with secondary coating added

** Other polymer options and sizes available; contact Zeus for more information.



Graded Index Multimode Pure Silica Core Polyimide and PEEK

Graded Index profile, high bandwidth, hydrogen resistant designed for distributed sensing and communication in long term hydrogen-rich environments and with reduced radiation induced attenuation and improved abrasion resistance.

Excellent for the following applications: distributed temperature sensing (DTS), pipeline monitoring, fire detection systems, production/injection monitoring, DTS in hydrogen, and DTS in radiation.

PEEK Reinforced Optical Fiber	
SPECIFICATIONS	PSCGIMM50/125P+P
Operating Wavelength (nm)	600-1750
Core Numerical Aperture (nom)	0.18 - 0.22
Attenuation @ 850nm (dB/km)*	≤ 4.0
Attenuation @ 1300nm (dB/km)*	≤ 2.0
Bandwidth (MHz.km)	300/300 @ 850/1310nm
Proof Test (%)	100 kpsi
Core Diameter (um) (nominal)	50
Cladding Diameter (μm)	125 ± 1
Core Cladding Concentricity (μm)	≤ 2.0
Primary Coating Diameter (μm)	155 ± 5
Primary Coating Type	Polyimide
Secondary Coating Diameter (μm): nominal	300 - 900
Secondary Coating Type**	PEEK

* Attenuation values are with secondary coating added.

**Other polymer options available; contact Zeus for more information.

