

Guided Wave Fiber Optic Cable

Signal stability and low noise in remote spectroscopy depend upon fiber optics with high transmission. The transmission must be affected very little by environmental influences such as temperature, vibration, and ambient light levels. From a patented fiber design to our emphasis on high-quality materials, Guided Wave spectroscopic grade optic cable is designed for the highest performance in transmission efficiency and durability. A polyimide coating and a patented silicone based buffer protect the fiber. Some of our fiber optic cable products also receive a tough outer jacket made of Tefzel™ and inner Kevlar™ strands for strength.



Guided Wave Fiber is designed specifically for spectroscopy

Unprotected silica fiber is quite fragile. To improve the fiber's strength and flexibility, it is coated with a polyimide material during the drawing process. Then, another protective layer is added, a carbon-loaded buffer of silicone RTV (U.S. Patent #5,381,505). The buffer reduces stray light, both external ambient light that "leaks" through the jacket and internal stray light or "cladding" modes. Finally, we add an outer protective jacket. Our "process fiber" – fiber optic cable for harsh environment applications or applications requiring long cable runs – receives a multi-layer jacket made of Tefzel™ and Kevlar™. Our "laboratory fiber" – intended for short laboratory-bench runs – can be supplied in PVC-coated steel monocoil jacket, steel armored BX jacket, or PVC-zip tubing.

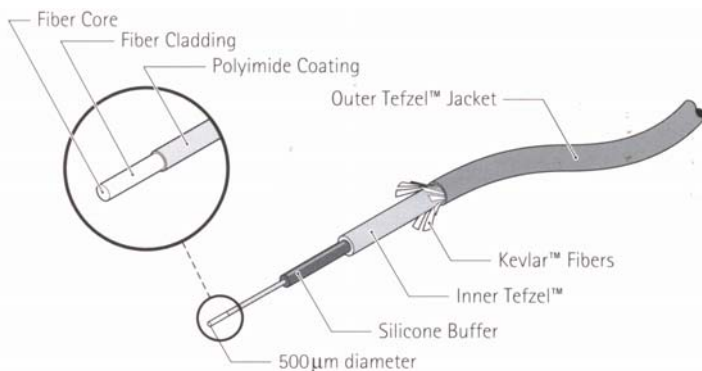
Manufacturing High Performance Fiber

All Guided Wave optical fiber is constructed as a core-and-cladding composite. The core – the filament that guides the light – consists of a thin strand of high-transmissivity fused silica. The cladding is an outer layer of doped, lower refractive index fused silica. This two-layer design keeps the light tightly confined to the central core of the fiber thus delivering a maximum amount of light at the far end. The diameter is tightly controlled during the drawing process. This produces a fiber that centers extremely well in connectors and has a very low loss rate per kilometer.

Two Kinds of Fiber Cable

Presently, Guided Wave offers two different kinds of optical fiber optimized for your spectral region of interest. Each type can be jacketed as outlined above and terminated in SMA, ST, or FC style connectors. Cables and bare fiber are available in a variety of core diameters from 100 μm to 1000 μm. The type of cable you'll choose depends on your application:

- Ultra Low-OH fiber provides the lowest possible amount of internal light attenuation. It is appropriate for visible or near-infrared (Vis/NIR) spectroscopy. It is especially effective for applications that require increased sensitivity in the spectral region near 1385 nm or where very long cables are necessary (> 150 m). This cable is effective over the spectral range from 400 nm to 2100 nm.
- High-OH fiber is intended for spectroscopy in the ultraviolet and visible (UV/Vis) regions – 250 nm to 800 nm. Typically, to avoid high attenuation, cable length is kept short, < 50 m.



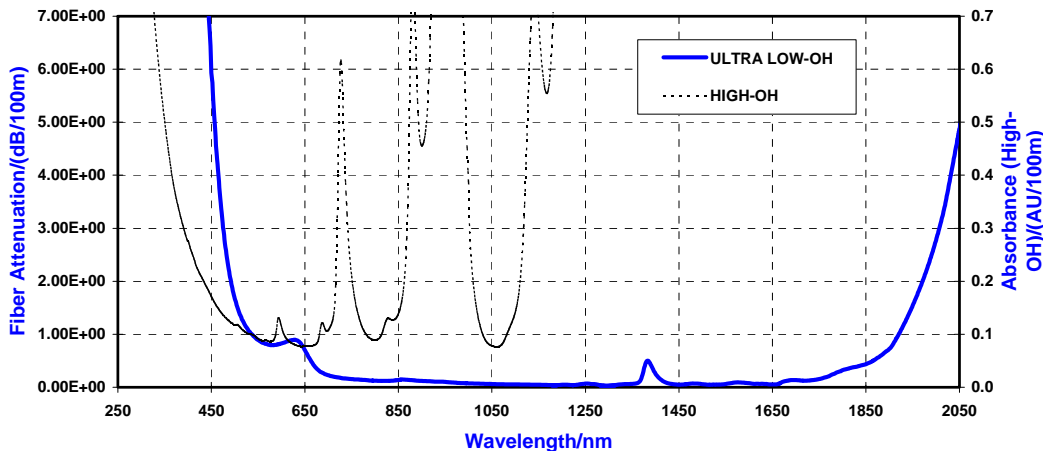
Detail: Guided Wave Process Jacketed Fiber Optic Cable

Specifications

	Ultra Low-OH Fiber	High-OH Fiber
Spectral (Wavelength) range	400-2100 nm	250-850 nm
Typical Application	Vis/NIR	UV/Vis/NIR
Typical Fiber Run (Length)	10 to 250 m	< 50 m
Maximum Temperature (Bare or Armored)	315 °C*	315 °C*
Maximum Temperature (Tefzel Jacket)	155 °C*	155 °C*
Maximum Temperature (PVC)	105 °C*	105 °C*
Core to Cladding Ratio		
Core ϕ < 200 μ m	1:1.2	1:1.2
Core ϕ \geq 200 μ m	1:1.1	1:1.1
Numerical Aperture (NA)	0.22 \pm 0.02	0.22 \pm 0.02
Core Diameter Tolerance		
Core ϕ < 200 μ m	\pm 3% x Cladding ϕ	\pm 3% x Cladding ϕ
Core ϕ \geq 200 μ m	\pm 1.5% x Cladding ϕ	\pm 1.5% x Cladding ϕ
Total Diameter Tolerance (Polyimide)	\pm 10 μ m	\pm 20 μ m
Baseline Attenuation (Unjacketed)	< 3 dB/km @ 1550 nm	< 50 dB/km @ 380 nm
Attenuation Difference (1385 nm – 1550 nm)	< 5 dB/km	NA

* - If High-Temp Epoxy is used for termination.

Performance Characteristics of GUIDED WAVE Fiber



Fiber Jacketing Options

- Process fiber cable: Tefzel™-Kevlar™
- Laboratory fiber cable: PVC-coated, steel monocoil jacket
- Armored fiber cable: Steel BX Armor

Available Diameters – Core/Cladding/Polyimide

- 200/220/239 μ m
- 300/330/370 μ m
- 400/440/480 μ m
- 500/550/590 μ m
- 600/660/710 μ m
- 1000/1100/1300 μ m (not available in HOH grade)

Fiber Termination Options

- SMA 905
- FC
- Custom (call)
- Bifurcated (call)
- Unterminated

Optional Accessories

- SMA 905 and FC Bulkhead Unions
- SMA 905 to FC Adapter
- Fiber Termination Kit and accessories
- Calibrated torque wrench for SMA 905 connectors

For more information contact gwinfo@guided-wave.com or visit our web site at <http://www.guided-wave.com>

Specifications subject to change without notice.

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