

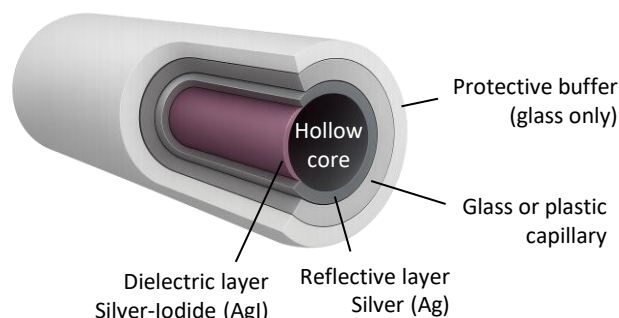


Mid-Infrared Fiber Patch Cables

Patch Cables



Fiber Structure



Single mode and multi mode patch cables are available for the entire Mid-IR wavelength range from $\lambda = 2$ to $16 \mu\text{m}$ including both off-the-shelf and made-to-order assemblies.

	Glass					Plastic
Internal Diameter (ID)	200 μm	300 μm	500 μm	750 μm	1000 μm	1500 μm
Typical Loss (straight) [†]	4 dB/m	1 dB/m	0.5 dB/m	0.2 dB/m	0.1 dB/m	0.2 dB/m
Single Mode Range	$\lambda \geq 4 \mu\text{m}$	$\lambda \geq 8 \mu\text{m}$	$\lambda \geq 12 \mu\text{m}$	---	---	-
Output Divergence $\frac{1}{2}$ Angle [‡]	50 mRad	40 mRad	30 mRad	30 mRad	30 mRad	30 mRad
Minimum Bend Radius	5 cm	5 cm	10 cm	20 cm	30 cm	10 cm
Maximum Power [*]	5 W	10 W	30 W	50 W	100 W	30 W
Patch Cable Length	0.1 - 1.0 m	0.1 - 2.0 m	0.1 - 5.0 m	0.1 - 5.0 m	0.1 - 5.0 m	0.1 - 5.0 m

[†] Additional loss on bending, which scales with bending radius (R) as $1/R$.

[‡] Value listed is for $\lambda = 10 \mu\text{m}$, and generally scales linearly with wavelength

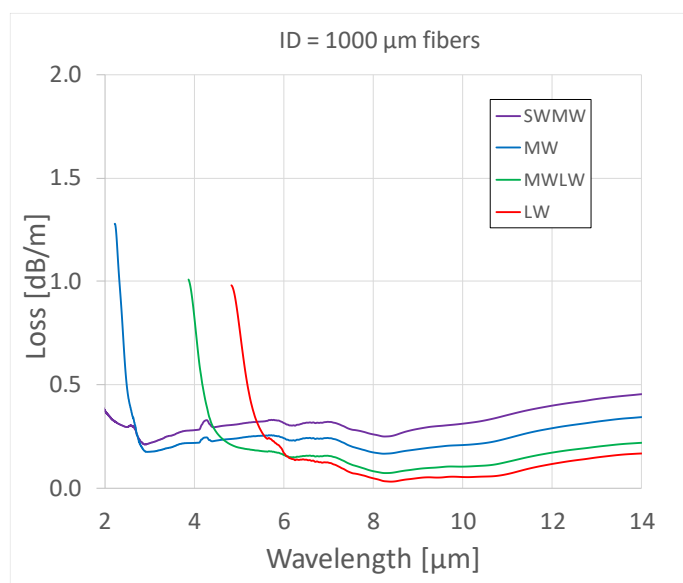
^{*} CW power rating assuming proper coupling and alignment. Initial alignment should always be done at reduced power.

Fiber Internal Diameter (ID)

Transmission depends strongly on the fiber internal diameter (ID). Theoretically, loss can be described by Hybrid HE_{lm} modes with attenuation coefficients scaling as $1/(\text{ID})^3$. Larger ID fibers have lower loss, but support more modes (i.e., multi-mode). Smaller ID fibers have higher loss, but heavily damp out the higher order modes, and can thus deliver single mode output.

Internal Dielectric Coating

The relative spectral transmission of hollow fibers depends on the thickness of the dielectric layer deposited inside the hollow fiber. We offer 4 standard coating options covering the entire Mid-IR. Additional options are also available for other wavelength regions including UV, Visible, and Near-Infrared.

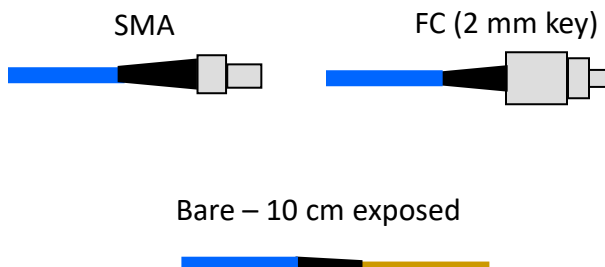




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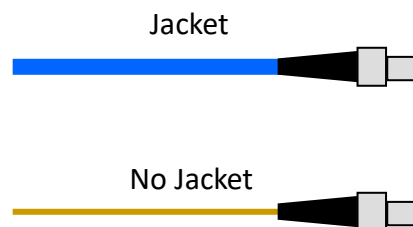
Connector Options

Fibers can be packaged with standard SMA 905, FC/PC type connectors, or left bare. The FC connectors have a 2 mm key, which mates to most FC/PC and FC/APC receptacles. Due to size constraints, the FC connectors are NOT available for the plastic 1500 μm fibers. With the “bare” fiber option, there is no connector on the end of the fiber.



Jacket Options

Fibers can be packaged with or without a protective jacket. We use standard furcation tubing, the fiber sits in an inner tube, surrounded by aramid fibers, with a PVC jacket on the outside. The jacket comes in a choice of different colors. For fibers with an ID < 750 μm , the jacket diameter is 3.0 mm, and for fibers with an ID $\geq$ 750 μm , the jacket diameter is 3.8 mm.



Custom Bundles

Guiding assembles custom bundles that enable multi-beam delivery of multiple laser sources in a single connector. Note: the fibers are side-by-side rather than fused. In addition to hollow fibers for the Mid-IR, we can also include standard solid core fibers for visible, NIR, and SWIR wavelengths.



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