

Mid-Infrared Fiber Patch Cables



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 | $\lambda \geq 5 \mu\text{m}$ | $\lambda \geq 8 \mu\text{m}$ | $\lambda \geq 12 \mu\text{m}$ | --- | --- | - |
| Output Divergence ½ Angle‡ | 50 mRad | 40 mRad | 30 mRad | 30 mRad | 30 mRad | 30 mRad |
| Minimum Bend Radius | 5 cm | 5 cm | 10 cm | 20 cm | 50 cm | 5 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 radius (R) as $1/R$.

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

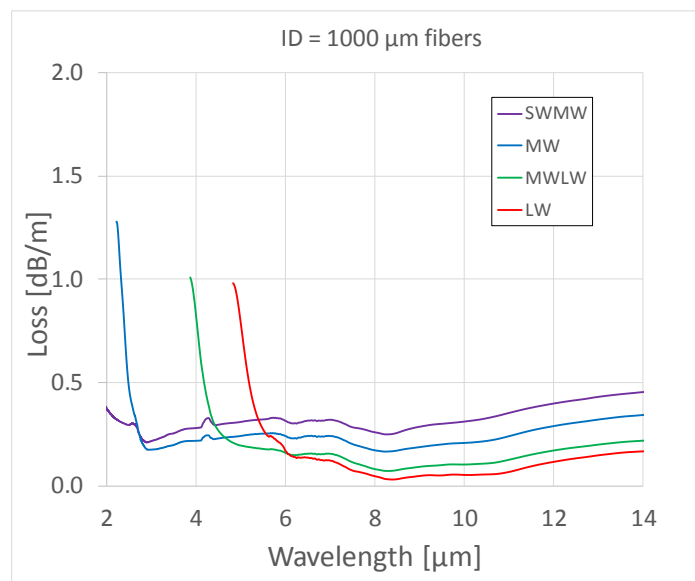
* CW power rating assuming proper coupling and alignment. Initial alignment should always be done at reduced power.

Fiber Internal Diameter (ID)

Transmission depends strongly on the internal diameter (ID). Theoretically, loss can be described by Hybrid HE_{1m} 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

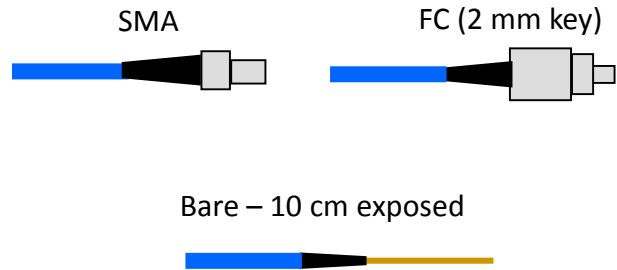
The relative spectral transmission of hollow fibers depends on the thickness of the dielectric layer deposited inside the hollow fiber. We offer 4 standard coating options covering the entire Mid-IR. Additional options are also available for other wavelength regions including UV, Visible, and THz.



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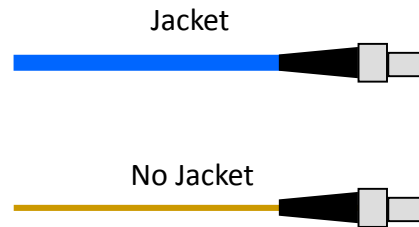
Connector Options

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.



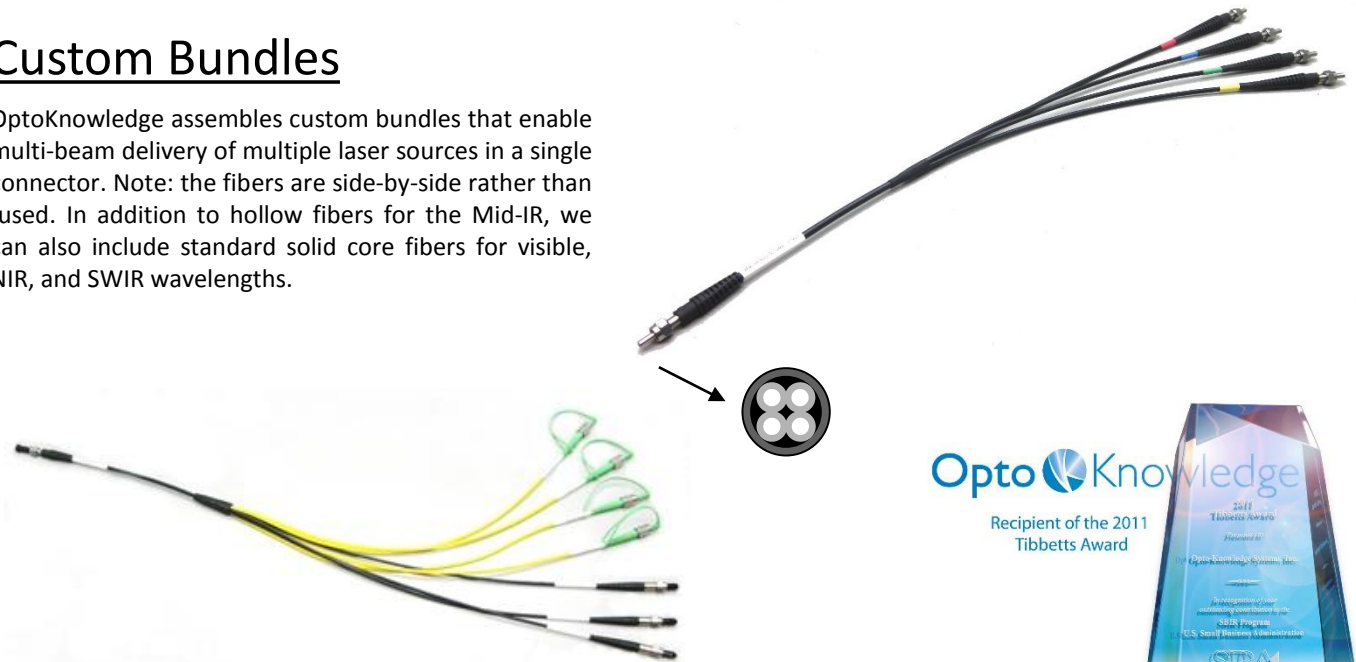
Jacket Options

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

OptoKnowledge 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.



Opto Knowledge

Recipient of the 2011
Tibbets Award

