Fiber End Cap

for high power applications

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The end-capped fiber increases its power handling by reducing the laser power density to a level below the damage threshold through modification at the fiber end. Agiltron has developed a manufacturable fiber fusion process to integrate a coreless end-cap to the end face of optical fibers and precisely fiber polishing process to control the end cap length and surface quality. This end cap technology that expands laser beam inside the fiber is designed for output termination of high power fiber laser and fiber amplifier but it also a pigtail process to produce high power fiber collimators.

Features

- Low Loss
- High Optical Efficiency
- Low Internal Reflection
- Low Distortion
- Low Cost

Specifications

Parameter	Min	Typical	Max	Unit
End core diameter	5		30	µm
Fiber diameter	80		280	µm
End cap length	300		2000	µm
End cap diameter	125		250	µm
Facet angle	0		12	Deg
Insertion loss	0.1		0.3	dB
Return loss		50		dB
Output beam M^2		1.5		

Applications

- Fiber lasers and amplifiers
- Fiber Collimator
- Optical System
- Optical Coupling

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Rev 02/04/25

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Ordering Information (Part Number)

	☐	☐	☐	☐	☐	☐	☐	☐
Prefix	**Wavelength**	**Outer Diameter**	**End Cap Length**	**Angle**	**Fiber Type**	**Fiber Type**	**Fiber Length**	**Connector[1]**
FEND-	1310nm = 3 1550nm = 5 800nm = 8 980nm = 9 1060nm = 1 Special = 0	0.125mm = 1 0.250mm = 2	0.3mm = 1 0.4mm = 4 0.5mm = 5 0.6mm = 6 Special = 0	0° = 0 8° = 8 Special = 9	HI1060 = 1 SMF-28 = 2 Special = 0	Bare fiber = 1 900 µm = 9 3 mm = 3 Special = 9	0.25m = 1 0.5m = 2 1.0m = 3 Special = 0	None = 1 FC/PC = 2 FC/APC = 3 SC/PC = 4 SC/APC = 5 ST/PC = 6 LC/PC = 7 Special = 0

[1]. The default connector configuration uses fiber with 0.9 mm buffer protection. The connector cannot be installed directly onto bare fiber because the bare fiber is prone to damage during shipping. However, the connector can be assembled on bare fiber if a 3 cm protective loose tube is added for reinforcement. The customer may remove this protective tube after testing. The optical power handling of a standard connector is less than 0.5 W for SMF-28 fiber and decreases further for smaller-core fibers.

Application Notes

Fiber Core Alignment
Note that the minimum attenuation for these devices depends on excellent core-to-core alignment when the connectors are mated. This is crucial for shorter wavelengths with smaller fiber core diameters that can increase the loss of many decibels above the specification if they are not perfectly aligned. Different vendors' connectors may not mate well with each other, especially for angled APC.

Fiber Cleanliness
Fibers with smaller core diameters (<5 µm) must be kept extremely clean, contamination at fiber-fiber interfaces, combined with the high optical power density, can lead to significant optical damage. This type of damage usually requires re-polishing or replacement of the connector.

Maximum Optical Input Power
Due to their small fiber core diameters for short wavelength and high photon energies, the damage thresholds for device is substantially reduced than the common 1550nm fiber. To avoid damage to the exposed fiber end faces and internal components, the optical input power should never exceed 20 mW for wavelengths shorter 650nm. We produce a special version to increase the how handling by expanding the core side at the fiber ends.

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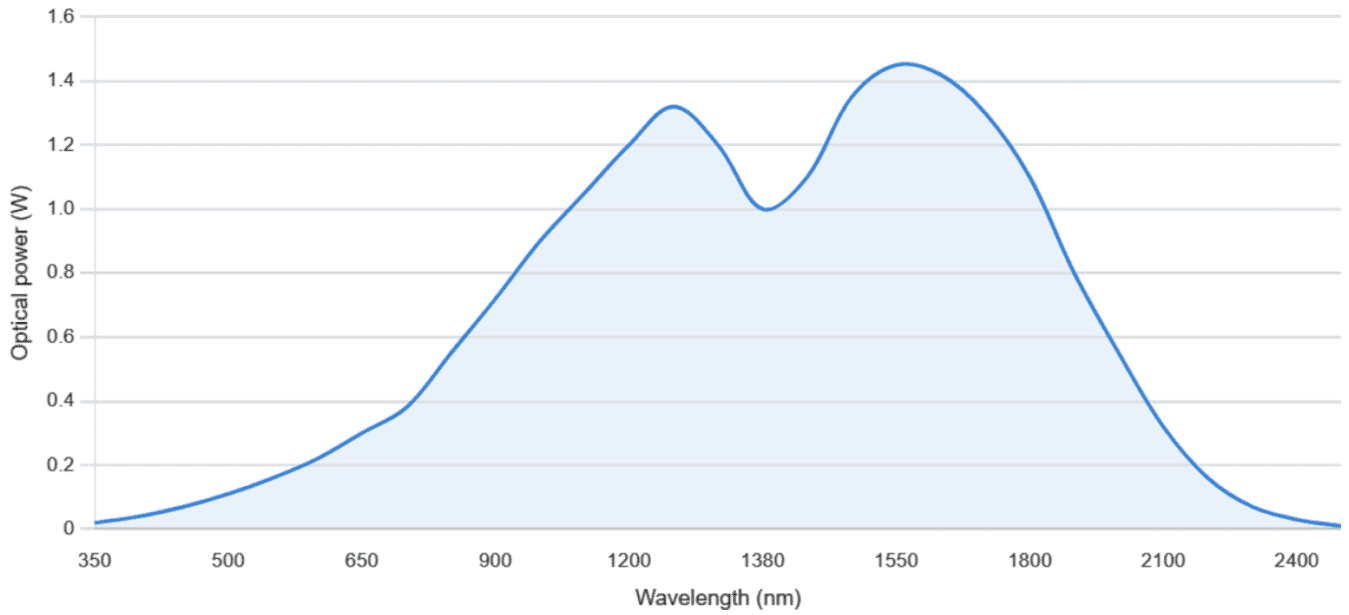
Regular Single Mode / Polarization Maintaining Fiber Optical Power Handing vs Wavelength



Single mode fiber optical power is limited by nonlinear effects in addition to absorption that increase loss and generate heat. The curve shows the approximate safe CW power envelope for standard single-mode fiber. Actual limits depend on fiber design, core size, length, and laser characteristics. Specialty fibers can significantly increase the power limit.

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