

Radiation Resistant Singlemode Fiber

Made by j-fiber - Your individual Solution

Making fibers is our business and our competence. In the global data and telecommunication industries the name j-fiber Jena is associated with the manufacturing of high performance optical fibers for standard as well as specialty applications.

j-fiber offers Specialty Singlemode fiber capabilities for military, aerospace, and industrial applications. Designed to withstand hazards of radiation threatened environments, j-fiber's radiation resistant Specialty Singlemode fiber is offered in conventional Singlemode configurations and specified for use in 1310nm and 1550nm applications.

Applications

- Military
- Aerospace
- Sensor
- Industrial

Features

- Lowest attenuation changes under radiation exposure
- Fastest recovery time compared to other commercial Singlemode fiber
- Specified for use in 1310nm and 1550nm applications
- Features low dispersion at 1310nm and low PMD values, ideal for high transmission rate applications
- Effective use with TDM and WDM systems operating in 1550nm wavelengths region
- Available in standard Singlemode fiber design
- Optional larger coating of 500 μ m available for harsh environments

Fiber Qualification

j-fiber's radiation hardened Singlemode fiber complies with or exceeds the ITU recommendation G.652.B, IEC 60793-2-50 and GR-20-Core optical fiber specifications. Each fiber is 100% quality measured according to ITU recommendations G.650 and IEC 60793-1. The radiation resistance of the fiber has been tested according to TIA/EIA 455-64, Procedure for Measuring Radiation-Induced Attenuation in Optical Fibers.

Coating

j-fiber's radiation hardened Singlemode fiber is protected with FCC, an enhanced coating material that guarantees long-term performance and reliability. This dual layer acrylate material is user friendly and compatible in all cable constructions, such as tight buffering, loose tube, ribbon and slotted core designs with low bending loss. The coating is mechanically strippable without leaving residue.

Outside Diameter

Standard: 245 μ m

Optional: 500 μ m

For further information about our Singlemode Fiber and other j-fiber products and services, please contact us:

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Optical Characteristics

		Spec. Values	Unit
Attenuation Coefficient ¹	1310nm	≤ 0.40	dB/km
	1550nm	≤ 0.25	dB/km
Attenuation Variance Range ²	1285 – 1330nm	≤ 0.05	dB/km
	1530 – 1570nm	≤ 0.05	dB/km
Attenuation at the Water Peak	1383nm ± 3nm	≤ 1.00	dB/km
Mode Field Diameter	1310nm	9.2 ± 0.4	μm
	1550nm	10.5 ± 0.8	μm
Point Discontinuity (tp=1 μs)	1310nm	≤ 0.10	dB
	1550nm	≤ 0.10	dB
Attenuation Uniformity		≤ 0.05	dB
Macrobending Loss Bend Induced attenuation, 100 turns around a mandrel of 50mm diameter	1310nm	≤ 0.05	dB
	1550nm	≤ 0.10	dB
	1 turn around a mandrel of 32mm diameter	≤ 0.50	dB
Fiber Cut-off Wavelength λ _c		1190 – 1330	nm
Zero Dispersion Wavelength λ ₀		1300 ≤ λ ₀ ≤ 1324	nm
Zero Dispersion Slope S ₀		≤ 0.092	ps/nm ² ·km
Chromatic Dispersion	1270 – 1340nm	≤ 5.00	ps/nm·km
	1285 – 1330nm	≤ 3.50	ps/nm·km
	1550nm	≤ 18.00	ps/nm·km
Effective Group Index of Refraction	1310nm	1.467	
	1550nm	1.467	
Polarization Mode Dispersion Individual Fiber ³		≤ 0.50	ps/√km

¹ Special attenuation cells available upon request

² Fiber attenuation in specified ranges doesn't exceed nominal values @ 1310/1550nm by more than this values.

³ Individual values may change when cabled, smaller values available upon request

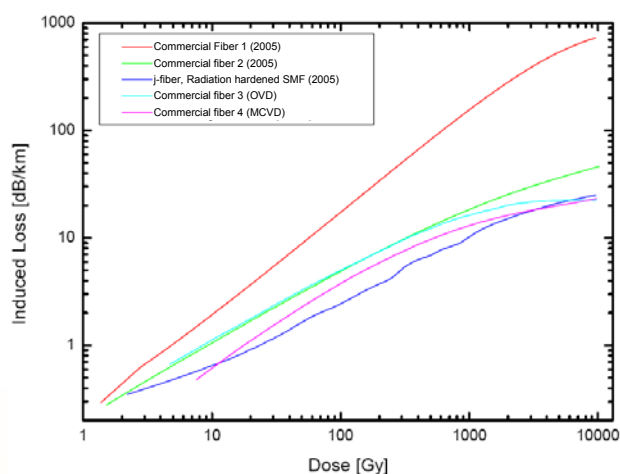
Radiation Resistance

Pulsed Irradiation	Spec. Values
Irradiation dose	2700rad/27Gy
Pulse duration	50ns
Wavelength	1310nm
Temperature range	room temperature
Light power	about 1μW
Induced attenuation (1min after irradiation)	< 1.0 dB/km

Continuous Irradiation	Spec. Values
Irradiation dose rate	73 rad/s / 0.73 Gy/s
Max. dose	1·10 ⁶ rad/1·10 ⁴ Gy
Temperature Range	room temperature
Light Power	About 1μW
Induced attenuation Wavelength 1550 nm	< 30 dB/km

The test reports done by Fraunhofer INT Euskirchen, Germany are available upon request.

Radiation induced loss during continuous gamma irradiation



Source: Radiation Hard Optical Fibers, Henning Henschel, Jochen Kuhnenn, Udo Weinand; Fraunhofer-INT, Germany, OFC 2005, Anaheim, California

Geometrical Characteristics

	Spec. Values	Unit
Core/Clad Concentricity Error	≤ 0.8	μm
Cladding Diameter	125 ± 1.0 ¹	μm
Cladding Non-Circularity	≤ 1.0	%
Coating Diameter	245 ± 5.0	μm
Coating/Clad Concentricity Error	≤ 10.0	μm
Fiber Curl Radius	≥ 2.0	m
Standard Lengths	2.2 - 50.4	km

¹ other tolerances are available upon request

Mechanical Characteristics

	Spec. Values	Unit	
Proof Test	≥ 100	kpsi	
	≥ 8.8	N	
	≥ 0.7	GPa	
Dynamic Tensile Strength Unaged Fiber (0.5m)	≥ 3.8	GPa	
			Median Tensile Strength
			15th Percentile Tensile Strength
Aged Fiber (0.5m)	≥ 3.03	GPa	
			Median Tensile Strength
			15th Percentile Tensile Strength
Dynamic Fatigue Stress Corrosion Parameter n_d	≥ 20		
Operating Temperature Range	-60°C to +85°C		
Coating Strip Force (typical)	1.9	N	

Environmental Characteristics

	Spec. Values	Unit
	at 1310/1550nm	
Change of Temperature Attenuation increase, -60°C to +85°C	≤ 0.05	dB/km
Dry Heat Attenuation increase, 30 days at 85°C	≤ 0.05	dB/km
Damp Heat Attenuation increase, 30 days at 85°C/85% R.H.	≤ 0.05	dB/km
Water Immersion Attenuation increase, 30 days in 23°C water	≤ 0.05	dB/km

Environmental Friendly Packaging

The shipping spool is designed to safeguard j-fiber optical fiber not only during shipping but also during subsequent handling in the customer's plant. It features smooth inside surfaces to ensure that the fiber is wound on and off the reel without the risk of breaking. The reel barrel is isolated via a polyethylene cover. The inside end of the fiber can be accessed for various measurements while still on the shipping spool. Each spool carries product information, including fiber type, measurement data and peel-off bar coding to assist with inventory control. All reels and transport boxes are designed to take advantage of our recycling program.

Spool Sizes

	small	large
Fiber length	≤ 25.2km	> 25.2km
Spool diameter	9.25"/23.5cm	10.4"/26.4cm
Spool width	4.21"/10.7cm	6.65"/16.9cm
Spindle	1"/2.54cm	1"/2.54cm
Traverse width	3.75"/9.5cm	5.9"/15.0cm

Ordering Information

To order j-fiber radiation resistant Singlemode optical fiber please call, fax or email us and specify the following parameters:

Fiber Type:	j-fiber radiation resistant Singlemode Fiber
Desired Coating:	245μm/500μm
Desired Attenuation:	at 1310/1550nm
Fiber Quantity:	kms
Other:	desired ship date, reel length, special requests

All fibers and preforms are subject to j-fiber's ongoing process and quality improvement programs ensuring excellent performance and high reliability. We reserve the right to make changes to the above specification without notice.

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