

# MIL-Spec Radiation Hard Fibers

## MIL-PRF-49291/7C SMF 09/125/500

MMF 09/125/500µm MIL-Spec Radiation Hard Singlemode Fiber (PIN MIL-PRF-49291/7-02) is part of j-fiber's series of radiation hard singlemode fibers which have been qualified and approved by the U.S. Defense Supply Center, Columbia (DSCC) in accordance with the U.S. Military MIL-PRF-49291 standard. These fibers have been specifically designed to withstand the hazards of radiation threatened and harsh environments in military and aerospace applications.

### Features and Benefits

- Lowest attenuation changes under radiation exposure
- Fastest recovery time compared to other commercial singlemode fiber
- Specified for use in 1310nm and 1550nm applications
- Easy handling and splicing

### MIL-Specification

In compliance with MIL-PRF-49291/7-02 (SMF 09/125/500)

### Performance Characteristics

	MIL-PRF-49291/7-02	Explanation
Type	II	Singlemode
Class	5	Dispersion unshifted
Size	II	09/125µm
Composition	A	Glass & Glass Silica
Wavelength	D	1300 & 1550

### Optical Characteristics

Parameter	Specified Values	Typical values	Unit
Attenuation @ 1310/1550nm	0.4/0.3	0.4/0.3	dB/km
Attenuation uniformity @ 1310nm	≤ 0.1	≤ 0.05	dB
Mode Field Diameter	8.5 ≤ MFD ≤ 10,0	9.2 ± 4	µm
Chromatic Dispersion @ 1310/1550nm	≤ 3.2/22	≤ 3.2/18.0	ps/nm/km
Macrobending Attenuation @ 1310nm <sup>1</sup>	≤ 0.5	≤ 0.05	dB

<sup>1</sup>Radius 3.8 ± 0.05 cm, 100 turns

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

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## Geometrical Characteristics

Parameter	Specified Values	Typical values	Unit
Core/Clad Concentricity Error	≤ 1.0	≤ 1.0	μm
Clad Diameter	125 ± 1	125 ± 1	μm
Cladding Non-Circularity	≤ 2.0	≤ 1.0	%
Coating Diameter	500 ± 25	500 ± 15	μm
Coating /Clad Concentricity Error	≤ 15.0	≤ 15.0	μm
Overall Coating Concentricity Ratio (OCCR)	≥ 0.84	≥ 0.90	

## Mechanical Characteristics

Parameter	Specified Values	Typical values	Unit
Length	≥ 1.1	1.1-8.8 <sup>1</sup>	km
Fiber mass/unit length	≤ 0.25	≤ 0.25	kg/km
Tensile Proof	≥ 690	≥ 690	MPa
Dynamic Tensile Strength			
Initial	≥ 3.2	≥ 3.8	GPa
Aged	≥ 1.75	≥ 3.03	GPa
Operating Temperature Range	-46 to +85	-60 to +85	°C
Nonoperating Temperature Range	-55 to +85	-60 to +85	°C
Storage Temperature Range	-55 to +85	-60 to +85	°C
Coating Strip Force	1.8 ≤ F ≤ 20.0	5.0	N

<sup>1</sup> Lengths up to 12.6 km available upon request

## Performance under Irradiation

Steady state gamma radiation test conditions		
Test temperature [°C]	Dose rate	Total dose (rad (Si))
-28 ± 2	(50 +0, -20) rad (Si)/sec	Classified
25 ± 2		
85 ± 2		

Radiation test requirements		
Max. induced attenuation (dB/km)	Attenuation @ specified recovery time (dB/km)	Specified recovery time (sec)
≤ 50 <sup>1</sup>	≤ 15 @ -28°C	1,000
	≤ 5 @ 25°	
	≤ 5 @ 85°	

<sup>1</sup> The irradiation loss for a given threat. The total dose associated with the threat is classified and not necessarily equal to the test total dose.

## Environmental Characteristics

Parameter	Specified Values	Typical values	Unit
Change in optical transmittance @	1310	1310	nm
Change of Temperature Attenuation increase, -60°C to +85°C	≤ 0.3	≤ 0.05	dB/km
Dry Heat Attenuation increase, 30 days at 85°C	≤ 0.3	≤ 0.05	dB/km
Damp Heat Attenuation increase, 30 days at 85°C/85% R.H.	≤ 0.3	≤ 0.05	dB/km
Water Immersion Attenuation increase, 30 days in 23°C water	≤ 0.3	≤ 0.05	dB/km

## Fiber Qualification

All j-fiber MIL-Spec Radiation Hard fibers comply with or exceed the MIL-PRF-49291 U.S. Military Specification, the ITU recommendation G.652, or the IEC 60793-2-50 Optical Fiber Specifications. Each fiber is 100% quality measured according to IEC 60793. The irradiation performance of the fiber has been tested according to TIA/EIA 455-64, Procedure for Measuring Radiation-Induced Attenuation in Optical Fibers.

## Ordering Information

To order j-fiber MIL-Spec Radiation Hard Singlemode optical fiber please call, fax or email us and specify the following parameters:

Fiber Type:	j-fiber MIL-Spec Radiation Hard Singlemode Fiber 09/125/500μm
MIL-Spec:	PRF-49291/7-02
Desired Attenuation	
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 when required from the Qualification Authority (DSCC).

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