

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 Defense Logistic Agency (DLA) 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 ¹	≤ 0.5	≤ 0.05	dB

¹Radius 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 ¹	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

¹ 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 ¹	≤ 15 @ -28°C	1,000
	≤ 5 @ 25°	
	≤ 5 @ 85°	

¹ 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 (DLA).

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j-fiber GmbH is a MIL-STD 790 certified facility.