

# MIL-Spec Radiation Hard Fibers

## MIL-PRF-49291/6C MMF 62.5/125/500

MMF 62.5/125/500 $\mu$ m MIL-Spec Radiation Hard Multimode Fiber (PIN MIL-PRF-49291/6-05) is part of j-fiber's series of radiation hard multimode 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. j-fiber's series of MIL-Spec Radiation Hard Multimode fibers are offered in graded index configurations and in core sizes of 50 $\mu$ m and 62.5 $\mu$ m.

### Features and Benefits

- Lowest attenuation changes under radiation exposure
- High bandwidth, suitable for high data rates
- Easy handling and splicing

### MIL-Specification

In compliance with MIL-PRF-49291/6-05 (MMF 62.5/125/500)

### Performance Characteristics

	MIL-PRF-49291/6-05	Explanation
Type	I	Multimode
Class	I	graded index
Size	IV	62.5/125
Composition	A	Glass & Glass Silica
Wavelength	B	850 & 1300

### Optical Characteristics

Parameter	Specified Values	Typical values	Unit
Attenuation @ 850/1300nm	3.5/1.0	2.8/0.7	dB/km
Attenuation uniformity @ 1300nm	0.2	$\leq 0.1$	dB
OFL Bandwidth @ 850/1300nm	300/600	300/600	MHz·km
RML Bandwidth @ 850/1300nm	385/700	385/700	MHz·km
Numerical Aperture @ 850nm	$0.275 \pm 0.015$	$0.275 \pm 0.015$	
Zero Dispersion Wavelength $\lambda_0$	$1320 \leq \lambda_0 \leq 1365$	$1320 \leq \lambda_0 \leq 1365$	nm
Zero Dispersion Slope $S_0$	$\leq 0.11$	$\leq 0.10$	ps/nm <sup>2</sup> ·km
Macrobending Attenuation @ 1300nm	$\leq 0.5$	$\leq 0.1$	dB

<sup>1</sup>Radius  $3.8 \pm 0.05$  cm, 100 turns

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

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## Geometrical Characteristics

Parameter	Specified Values	Typical values	Unit
Core Diameter	62.5 ± 3	62.5 ± 2.5	μm
Core Non-Circularity	≤ 6.0	≤ 5.0	%
Core/Clad Concentricity Error	≤ 4	≤ 1.5	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
Non-operating Temperature Range	-62 to +85	-62 to +85	°C
Storage Temperature Range	-62 to +85	-62 to +85	°C
Coating Strip Force	1.8 ≤ F ≤ 20.0	4.0	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		

The test reports are available upon request.

j-fiber 62.5/125/500 MIL-Spec Radiation Hard Fibers are certified to meet the US Navy and Army irradiation performance requirements.

## Environmental Characteristics

Parameter	Specified Values	Typical values	Unit
Change in optical transmittance @	1300	850/1300	nm
Change of Temperature Attenuation increase, -46°C to +85°C	≤ 0.5	≤ 0.20	dB/km
Dry Heat Attenuation increase, 30 days at 85°C	≤ 0.5	≤ 0.20	dB/km
Damp Heat Attenuation increase, 30 days at 85°C/85% R.H.	≤ 0.5	≤ 0.20	dB/km
Water Immersion Attenuation increase, 30 days in 23°C water	≤ 0.5	≤ 0.20	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.651, or the IEC 60793-2-10 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 Multimode optical fiber please call, fax or email us and specify the following parameters:

Fiber Type:	j-fiber MIL-Spec Radiation Hard Multimode Fiber 62.5/125/500μm
MIL-Spec:	PRF-49291/6-05
Desired Attenuation, Bandwidth:	@ 850nm/1300nm
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).

DB-FKR-101-00-0608

Issued June 2008

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