Radiation-hard fibers

Multimode fiber G50/125, G62.5/125

Description

Radiation-hard MIL-Spec multimode and singlemode fibers were specially developed for applications in for example aerospace industries in order to withstand the hazards in radiation-threatened areas or under demanding environmental conditions.

All listed radiation-hard MIL-Spec fibers were tested and approved by the U.S. Defense Supply Center, Columbia (DSCC) according to MIL-PRF 49291. In addition these fibers meet and exceed the quality standards of the ITU G.651 and G.652 or IEC 60793-2-10 and IEC 60793-2-50.

Fiber quality assurance

- MIL-PRF-49291 U.S. Military Specification
- ITU Recommendation G.651 and G.652
- IEC 60793-2-10 and IEC 60793-2-50 (Optical Fiber Specifications)

Every fiber is subject to a 100 percent quality test according to the IEC 60793 standard. In addition, their resistance to radiation is tested according to TIA/EIA 455-64 (Procedure for Measuring Radiation-Induced Attenuation in Optical Fibers).

MIL specifications radiation-resistant multimode fibers

	50/125/245 µm	50/125/500 µm	62.5/125/245 µm	62.5/125/500 µm
	MIL-PRF-49291/1-01	MIL-PRF-49291/1-02	MIL-PRF-49291/6-03	MIL-PRF-49291/6-05
Optical properties				
Core Ø (±3) [µm]	50	50	62.5	62.5
Core ovality	≤ 6.0	≤ 6.0	≤ 6.0	≤ 6.0
Core/cladding concentricity error	≤ 1.5	≤ 1.5	≤ 4	≤ 4
Cladding Ø (±1) [µm]	125	125	125	125
Cladding ovality [µm]	≤ 2.0	≤ 2.0	≤ 2.0	≤ 4
Attenuation at 850 nm/1300 nm [dB/km]	3.5 / 1.0	3.5 / 1.0	3.5 / 1.0	3.5 / 1.0
Uniform attenuation at 1310 nm [dB]	≤ 0.2	≤ 0.2	≤ 0.2	0.2
Transient attenuation at 1310 nm [dB]	≤ 1.5	≤ 1.5	–	–
OFL bandwidth at 850 nm/1300 nm [MHz×km]	500/500	500/500	300/600	300/600
RML bandwidth at 850 nm/1300 nm [MHz×km]	N.A.	N.A.	385/700	385/700
Numerical aperture at 850 nm	0.200 ±0.015	0.200 ±0.015	0.275 ±0.015	0.275 ±0.015
Zero crossing of dispersion λ_0 [nm]	$1295 \le \lambda_0 \le 1340$	$1295 \le \lambda_0 \le 1340$	$1320 \le \lambda_0 \le 1365$	$1320 \le \lambda_0 \le 1365$
Slope at zero crossing of dispersion S_0 [ps/nm²×km]	≤ 0.11	≤ 0.11	≤ 0.11	≤ 0.11
Macrobending loss at 1300nm* [dB]	≤ 0.5	≤ 0.5	≤ 0.5	≤ 0.5
	Coating - Acrylate temperature range –55 °C to +85 °C			
Coating Ø [µm]	245 ± 10.0	500 ± 25	250 ± 15	500 ± 25
Core/cladding concentricity error [µm]	≤ 12.5	≤ 15.0	≤ 10.5	≤ 15.0
Overall coating concentricity ratio (OCCR)	≥ 0.70	≥ 0.84	≥ 0.70	≥ 0.84
Mechanical properties				
Length** [km]	≥ 1.1	≥ 1.1	≥ 1.1	≥ 1.1
Fiber weight [kg/km]	≤ 0.1	≤ 0.25	≤ 0.1	≤ 0.25
Proof test [MPa]	≥ 690	≥ 690	690	690
Dynamic tensile strength [GPa] unaged	≥ 3.2	≥ 3.2	≥ 3.2	≥ 3.2
aged	≥ 1.75	≥ 1.75	≥ 1.75	≥ 1.7
Operating temperature [°C]	–55 to +85	–55 to +85	–46 to +85	–46 to +85
Storage temperature [°C]	–62 to +85	–62 to +85	–62 to +85	–62 to +85
Coating strip force [N]	1.8 ≤ F ≤ 13.2	1.8 ≤ F ≤ 20.0	1.8 ≤ F ≤ 13.2	1.8 ≤ F ≤ 20.0

* Radius 3.8 ±0.05 cm, 100 turns

** Max. lengths of up to 17.6 km are available on request.

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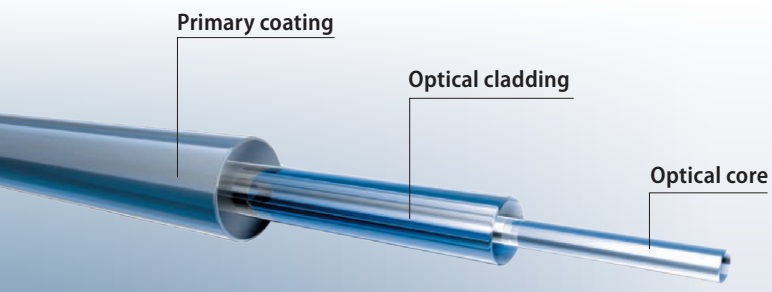
Singlemode fiber 09/125



MIL specifications for radiation-resistant singlemode fiber SMF

	09/125/245µm	09/125/245µm
	MIIL-PRF-49291/7-01	MIIL-PRF-49291/7-02

Optical properties		Specified values	
Core/cladding concentricity error		≤ 1.0	≤ 1.0
Cladding Ø (±1) [µm]		125	125
Cladding ovality [µm]		≤ 2.0	≤ 2.0
Attenuation at 1310 nm/1550 nm [dB/km]		0.4/0.3	0.4 / 0.3
Uniform attenuation at 1310 nm [dB]		≤ 0.1	≤ 0.1
Mode field Ø [µm]		8.5 ≤ MFD ≤ 10.0	8.5 ≤ MFD ≤ 10.0
Chromatic dispersion at 1310 nm/1550 nm [ps/nm²×km]		≤ 3.2/22	≤ 3.2/22
Macrobending loss at 1300nm* [dB]		≤ 0.5	≤ 0.5
Coating Ø [µm]		250 ± 15	500 ± 25
Coating/cladding concentricity error [µm]		≤ 10.5	≤ 15.0
Overall coating concentricity ratio (OCCR)		≥ 0.70	≥ 0.84

Mechanical properties			
Length [km]		≥ 1.1	≥ 1.1
Fiber weight [kg/km]		≤ 0.1	≤ 0.25
Proof test [MPa]		≥ 690	≥ 690
Dynamic tensile strength [GPa]	unaged	≥ 3.2	≥ 3.2
	aged	≥ 1.75	≥ 1.75
Operating temperature [°C]		–46 to +85	–46 to +85
Storage temperature [°C]		–55 to +85	–55 to +85
Coating strip force [N]		1.8 ≤ F ≤ 13.2	1.8 ≤ F ≤ 20.0

* Radius 3.8 ±0.05 cm, 100 turns