

MIL RadHard 50 µm BendBright™ Multimode Fibre (MIL-PRF-49291/1-01)



APPLICABLE STANDARDS

- IEC / EN 60793-2-10: type A1-OM2/OM3/OM4/OM5
- ISO / IEC 11801: Category OM2/OM3/OM4/OM5
- TIA / EIA 492 AAAF

Issue Date: September 2024

Prysmian Group's 50 µm MIL RadHard MMF can be used in moderate irradiative environments (ex. Gamma rays, X-flash, Neutrons, and other high energy charged particles). The bend-insensitive RadHard MMF has a Germanium-doped core and with its outstanding bending performance, the fibre provides improved fibre and cable performance. The product is qualified and approved by the U.S. Defense Supply Center (DSCC) in accordance with the U.S. Military MIL-PRF-49291/1-01 specification. Prysmian Group's fibre plant Draka Comteq Fibre B.V. in Eindhoven, Netherlands is MIL-STD-790 certified. The 50 µm RadHard MMF can be used in all cable constructions, including loose tube, tight buffered, ribbon and central tube designs.

IRRADIATION TEST CONDITIONS – MIL 49291/1-01

Temperature	Dose Rate	Total Dose
CLASSIFIED	CLASSIFIED	CLASSIFIED

IRRADIATION TEST REQUIREMENTS – MIL 49291/1-01

Max. induced attenuation at 1300 nm	Attenuation at specified recovery time	Specified recovery time
CLASSIFIED	CLASSIFIED	CLASSIFIED

OPTICAL SPECIFICATIONS
RADIATION INDUCED ATTENUATION (RIA)

Test Conditions	Units	RIA at 1300 nm
Dose = 10 kGy	dB/100m	< 7.5 (typical)
Dose Rate = 1.67 Gy/s		
Temperature ≈ 28°C		
Dose = 20 kGy	dB/100m	< 8 (typical)
Dose Rate = 2.5 Gy/s		
Temperature ≈ 25°C		

ATTENUATION

Attribute	Units	Specified Values
Attenuation coefficient at 850 nm	dB/km	≤ 2.4
Attenuation coefficient at 1300 nm	dB/km	≤ 0.6

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BANDWIDTH (OFL)

Attribute	Units	OM2	OM3	OM4
Overfilled Modal Bandwidth at 850 nm	MHz·km	≥ 500	≥ 1500	≥ 3500
Overfilled Modal Bandwidth at 1300 nm	MHz·km	≥ 500	≥ 500	≥ 500

Attribute	Units	OM3	OM4
Effective Modal Bandwidth at 850 nm	MHz·km	≥ 2000	≥ 4700

Numerical Aperture

Numerical aperture	0.200 ± 0.015
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MACROBENDING LOSS

Conditions	Wavelength	Units	Specified Values
Mandrel Radius = 7.5 mm, 2 Turns	850 / 1300 nm	dB	≤ 0.2 / ≤ 0.5
Mandrel Radius = 15 mm, 2 Turns	850 / 1300 nm	dB	≤ 0.1 / ≤ 0.3
Mandrel Radius = 37.5 mm, 100 Turns	850 / 1300 nm	dB	≤ 0.5 / ≤ 0.5

CHROMATIC DISPERSION

Attribute	Units	Specified Values
Zero Dispersion Wavelength, λ_0	nm	1297 ≤ λ_0 ≤ 1328

BACKSCATTER CHARACTERISTICS ¹

Attribute	Conditions	Units	Specified Values
Point Discontinuity ²	850 nm, 1300 nm	dB	≤ 0.1
Irregularities over fibre length	850 nm, 1300 nm	dB	≤ 0.1
Reflections	-	-	Not allowed
Group Index of Refraction	850 nm	(Typical)	1.482 (typical)
Group Index of Refraction	1300 nm	-	1.477 (typical)

¹ OTDR measurement with 0.5 μs pulse width.

² Mean of bi-directional measurement

GEOMETRICAL SPECIFICATIONS

GLASS GEOMETRY

Attribute	Units	Specified Values
Core Diameter	μm	50 ± 2.5
Core non-Circularity	%	≤ 5
Core-Cladding Concentricity Error	μm	≤ 1.5
Cladding Diameter	μm	125.0 ± 1.0
Cladding non-Circularity	%	≤ 1

COATING GEOMETRY

Attribute	Units	Specified Values
Coating Diameter	μm	245 ± 10
Coating non-Circularity	%	≤ 5
Coating-Cladding Concentricity Error	μm	≤ 10

MECHANICAL SPECIFICATIONS

Proof Test ³

The entire spool length is subjected to a tensile proof stress ≥ 0.7 GPa (100 kpsi) ; 1% strain equivalent

³ Higher proof test available upon request

COATING PERFORMANCE

Attribute	Units	Typical Values
Average Coating Strip Force, unaged and aged ⁴	N	1 to 3
Peak Coating Strip Force, unaged and aged ⁴	N	1.3 to 8.9

⁴ Aging at 23°C, 30 days

FIBRE STRENGTH

Attribute	Units	Specified Values
Dynamic Tensile Strength (0.5 meter gauge length), unaged and aged ⁵	GPa	median > 3.8 (550 kpsi)
Dynamic Fatigue, unaged and aged ⁵	-	n _d ≥ 20

⁵ Aging at 85°C, 85% RH, 30 days

ENVIRONMENTAL SPECIFICATIONS

Environmental test	Test Conditions	Induced attenuation at 850, 1300 nm (dB/km)
Temperature Cycling	-60°C to +85°C	≤ 0.1
Temperature - Humidity Cycling	-10°C to +85°C, 4-98% RH	≤ 0.1
Water Immersion	30 days ; 23°C	≤ 0.1
Dry Heat	30 days ; 85°C	≤ 0.1
Damp Heat	30 days; 85°C; 85% RH	≤ 0.1

OTHERS

Attribute	Specification
Length	Multiples of 2.2 km per spool
Coating	Standard Acrylate Coating (Clear)

All measurements in accordance with ITU-T G650 recommendations

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