Prysmian Elite

MIL RadHard Single-Mode Fibre

(MIL-PRF-49291/7-01)

APPLICABLE STANDARDS

- IEC / EN 60793-2-50 type B-652.D
- ITU-T Recommendation G.652.D

Issue Date: September 2024
Supersedes: January 2023

Prysmian Group's Singlemode Radhard fiber can be used in moderate irradiative environments (ex. Gamma rays, X-flash, Neutrons, and other high energy charged particles). The Germanium-doped RadHard SMF is qualified and approved by the U.S. Defense Supply Center (DSCC) in accordance with the U.S. Military MIL-PRF-49291/7-01 specification. Prysmian Group's fibre plant Draka Comteq Fibre B.V. in Eindhoven, Netherlands is MIL-STD-790 certified. The product can be used in all cable constructions, including loose tube, tight buffered, ribbon and central tube designs.

IRRADIATION TEST CONDITIONS – MIL 49291/7-01

Temperature	Dose Rate	Total Dose
-28°C / 25°C / 85°C	0.50 Gy/s	CLASSIFIED

IRRADIATION TEST REQUIREMENTS – MIL 49291/7-01

Max. induced attenuation at 1300 nm	Attenuation at specified recovery time	Specified recovery time
≤ 50 dB/km (Total dose classified)	≤ 15 @ -28°C ≤ 5 @ 25°C ≤ 5 @ 85°C	1000 s

OPTICAL SPECIFICATIONS
RADIATION INDUCED ATTENUATION (RIA)

Test Conditions	Units	RIA at 1550 nm
Dose = 10 kGy Dose Rate = 0.5 Gy/s Temperature ≈ 28°C	dB/100m	< 3 (typical)
Dose = 20 kGy Dose Rate = 2.5 Gy/s Temperature ≈ 25°C	dB/100m	< 4 (typical)

ATTENUATION

Attribute	Units	1310 nm	1550 nm
Attenuation	dB/km	≤ 0.36	≤ 0.25

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MODE FIELD DIAMETER

Wavelength (nm)	Units	MFD
1310	µm	9.0 ± 0.4
1550	µm	10.1 ± 0.5

Cutoff Wavelength	
Cable Cutoff Wavelength (λ_{ccf})	≤ 1260 nm

CHROMATIC DISPERSION

Wavelength (nm)	Units	Chromatic Dispersion
In the interval 1285 – 1330	ps/[nm.km]	≤ |3|
At 1550	ps/[nm.km]	≤ 18.0
At 1625	ps/[nm.km]	≤ 22.0
Zero Dispersion Wavelength, λ_0	nm	1300 - 1324
Slope (S_0) at λ_0	ps/(nm^2 · km)	≤ 0.092

POLARIZATION MODE DISPERSION (PMD)

Attribute	Units	Specified Values
PMD Link Design Value [1]	ps/√km	≤ 0.06
Max. individual Fiber	ps/√km	≤ 0.1

[1] According to IEC 60794 –3, Ed 3 (Q=0.01%)

ATTENUATION VARIATION VS. BENDING

Number of Turns	Wavelength (nm)	Induced Attenuation (dB)
100 turns on a R = 25 mm mandrel	1310 / 1550	≤ 0.05
100 turns on a R = 30 mm mandrel	1625	≤ 0.05

TYPICAL VALUES

Attribute	Units	1310 nm	1550 nm	1625 nm
Effective group index	-	1.467	1.468	1.468

GEOMETRICAL SPECIFICATIONS
GLASS GEOMETRY

Attribute	Units	Specified Values
Cladding Diameter	µm	125.0 ± 0.7
Cladding non-Circularity	%	≤ 0.7
Core - Cladding Concentricity Error	µm	≤ 0.5

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COATING GEOMETRY

Attribute	Units	Specified Values (MIL 49291/7-01)
Coating Diameter	µm	245 ± 10
Coating non-Circularity	%	≤ 5
Coating - Cladding Concentricity Error	µm	≤ 10

MECHANICAL SPECIFICATIONS

Proof Test [2]
The entire spool length is subjected to a tensile proof stress ≥ 0.7 GPa (100 kpsi) ; 1% strain equivalent

[2] Higher proof test available upon request

COATING PERFORMANCE

Attribute	Units	Typical Values
Average Coating Strip Force, unaged and aged [3]	N	1 to 3
Peak Coating Strip Force, unaged and aged [3]	N	1.8 to 13.2

[3] Aging at 23°C, 30 days

FIBRE STRENGTH

Attribute	Units	Specified Values
Dynamic Tensile Strength (0.5 meter gauge length), unaged and aged [4]	GPa	median > 3.8 (550 kpsi)
Dynamic Fatigue, unaged and aged [4]	-	$n_d \geq 20$

[4] Aging at 85°C, 85% RH, 30 days

ENVIRONMENTAL SPECIFICATIONS

Environmental test	Test Conditions	Induced attenuation at 15550, 1625 nm (dB/km)
Temperature Cycling	-60°C to +85°C	≤ 0.05
Temperature - Humidity Cycling	-10°C to +85°C, 4-98% RH	≤ 0.05
Water Immersion	30 days ; 23°C	≤ 0.05
Dry Heat	30 days ; 85°C	≤ 0.05
Damp Heat	30 days ; 85°C; 85% RH	≤ 0.05

OTHERS

Attribute	Specification
Length	Up to 25.2 km per spool
Coating	Standard Acrylate Coating (Clear)

All measurements in accordance with ITU-T G650 recommendations

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