

Super RadHard Single-Mode Optical Fibre

Extremely low sensitivity for radiation effects in irradiative environments

Product Type: Super RadHard Single-Mode Fibre
Coating Type: Dual Layer Primary Coating (DLPC9)

Issue date: 04-2013
Supersedes: 05-2012



Prysmian Group has developed a revolutionary new product as part of its **DrakaElite™** specialty radiation hardened (RadHard) fibres portfolio. This Draka **Super RadHard single-mode fibre (SMF)** shows extremely low sensitivity for radiation effects in irradiative environments (e.g. gamma rays, X-flash, neutrons protons) while simultaneously offering high bandwidth.

By combining the excellent performance of the proprietary deposition process (PCVD) with a full Fluorine-doped design, the Radiation Induced Attenuation (RIA) response of this **DrakaElite™ Super RadHard SMF** is significantly improved.

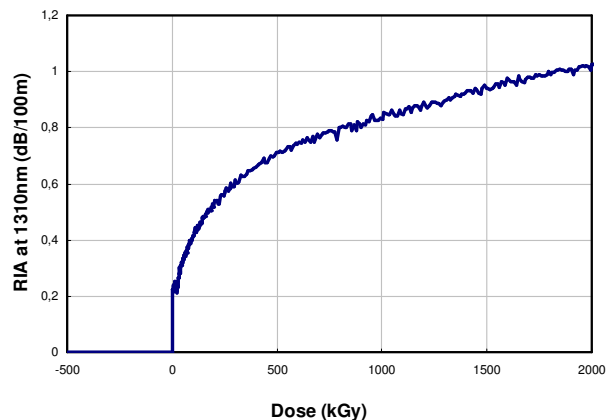
It allows much more tolerance than standard MIL-PRF-49291 approved Germanium-doped SMF particularly for dose levels exposure above 10 kGy. In addition, this **Super RadHard SMF** exhibits a faster recovery time as compared to standard RadHard SMFs. The benefit of this Fluorine-doped **Super RadHard SMF** compared to the standard Germanium-doped RadHard SMF increases with the total dose from a factor 8 at 20 kGy to a factor 22 at 2 MGy for an operating wavelength of 1310nm. (Note: 1 Gy = 100 Rad).

Because Radiation Induced Attenuation (RIA) is a strong function of time after dose, dose rate, temperature, system operational wavelength, and system operational power, assessing the RIA performance of different fibres should be conducted as close to conditions in the final application as possible.

The **DrakaElite™** Fluorine-doped **Super RadHard SMF** can be used in all cable constructions, including loose tube, tight buffered, ribbon and central tube designs. This fibre complies with or exceeds ITU-T Recommendation G.652.B, IEC 60793-2-50 type B1.1 Optical Fibre Specification and Telcordia GR-20-Core.

Features	Advantages
Super RadHard behaviour	<ul style="list-style-type: none"> Optimized for use in highly irradiative environments Strongly improved performance compared to regular Germanium-doped fibres
Coated with the dual layer UV Acrylate	<ul style="list-style-type: none"> Optimized performance in tight-buffer cable applications High resistance to micro-bending

Example of RIA for Draka SRH-SMF at 1310nm under dose rate of 1.25 Gy/s up to 2 MGy at 45°C



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Characteristics	Conditions	Specified Values	Units
OPTICAL SPECIFICATIONS (Uncabled fibre)			
Attenuation Coefficient	1310 nm 1550 nm	≤ 0,4 ≤ 0.3	dB/km
Point Discontinuity	1310 nm / 1550 nm	≤ 0.05	dB
Bending Loss	100 turns, R=25 mm; 1310 nm 100 turns, R=25 mm; 1550 nm 100 turns, R=30 mm; 1625 nm	≤ 0.05 ≤ 0.05 ≤ 0.05	dB
Cabled Cutoff Wavelength		≤ 1260	nm
Mode Field Diameter	1310 nm 1550 nm	9.0 ± 0.4 10.1 ± 0.5	µm
Chromatic Dispersion	Zero Dispersion Wavelength Slope at Zero Dispersion Wavelength	1300 - 1324 ≤ 0,092	nm ps/(nm ² .km)
Group Index of Refraction (Typ.)	1310 nm 1550 nm	1.457 1.458	
GEOMERICAL SPECIFICATIONS			
Cladding Diameter		125.0 ± 1.0	µm
Core/Cladding Concentricity Error		≤ 0.6	µm
Cladding Non-Circularity		≤ 1.0	%
Coating Diameter		242 ± 10	µm
Coating Non-Circularity		≤ 5	%
Coating/Cladding Concentricity Error		≤ 12	µm
Length	Standard lengths	1.1, 2.2, 3.3, 4.4	km
MECHANICAL SPECIFICATIONS			
Coating Strip Force	Average strip force, unaged and aged ¹ Peak strip force, unaged and aged ¹	1 to 3 1.2 to 8.9	N N
Proof Test	Off line	> 0.7 (100)	GPa (kpsi)
Dynamic Tensile Strength (median value)	0.5 meter gauge length, unaged and aged ²	> 3.8 (550)	GPa (kpsi)
Fatigue Parameter (Typical)	Dynamic fatigue, unaged and aged ²	n _d > 18	
ENVIRONMENTAL SPECIFICATIONS			
Temperature Cycling	850 nm, 1310 nm; -60°C to +85°C	≤ 0.05	dB/km
Temperature-Humidity Cycling	850 nm, 1310 nm; -10°C to +85°C, 4-98% RH	≤ 0.05	dB/km
Water Immersion	850 nm, 1310 nm; 23°C, 30 days	≤ 0.05	dB/km
Dry Heat	850 nm, 1310 nm; 85°C, 30 days	≤ 0.05	dB/km
Damp Heat	850 nm, 1310 nm; 85°C; 85% RH, 30 days	≤ 0.05	dB/km
TYPICAL RADIATION INDUCED ATTENUATION (RIA)			
Radiation Induced Attenuation	Dose: 10 kGy; Dose rate: 0.2 Gy/s; T=24°C; 1310 nm Dose: 100 kGy; Dose rate: 1.6 Gy/s; T=24°C; 1310 nm Dose: 2 MGy; Dose rate: 1.25 Gy/s; T=45°C; 1310 nm	~0,25 ~0.5 ~1	dB/100m

1). Aging at 23°C, 0°C and 45°C; 30 days at 85°C and 85% RH; 14 days water immersion at 23°C.
 2). Aging at 85°C, 85% RH, 30 days.