Prysmian Group

DrakaElite Specialty Fibre

PRYSMIAN Draka

Super RadHard 50/125 µm Multimode Optical Fibre

Most radiation insensitive, high bandwidth GI-multimode fibre available in the market

Product Type: Super RadHard 50 / 125 / 242 µm GI-Multimode Fibre (SRH-MMF)
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 50µm core diameter **Super RadHard multimode fibre** (MMF) shows extremely low sensitivity for radiation effects in irradiative environments (e.g. gamma rays, X-flash, neutrons protons) while simultaneously offering high bandwidth.

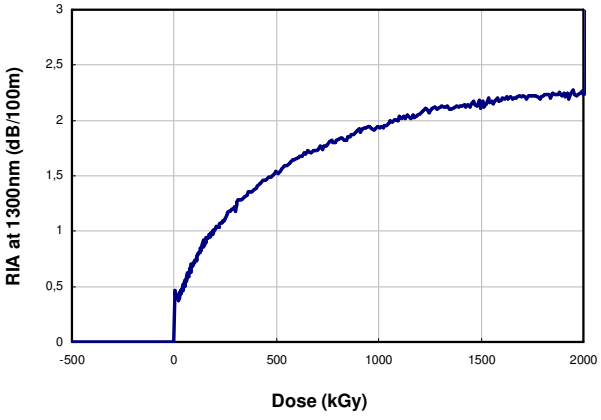
By combining the excellent performance of the proprietary deposition process (PCVD) with a full Fluorine-doped design, the Radiation Induced Attenuation (RIA) response of this **DrakaElite™ Super RadHard MMF** is significantly improved.
It allows much more tolerance than standard MIL-PRF-49291 approved Germanium-doped 50µm core diameter MMF particularly for dose levels exposure above 10 kGy. In addition, this **Super RadHard MMF** exhibits a faster recovery time as compared to standard RadHard MMFs. The benefit of this Fluorine-doped **Super RadHard MMF** compared to the standard Germanium-doped RadHard MMF increases with the total dose, for example by a factor 20 at 1300nm for a cumulated dose of 10kGy. (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 MMF** can be used in all cable constructions, including loose tube, tight buffered, ribbon and central tube designs. This fibre complies with or exceeds IEC 60793-2-10 type A1a.1 Optical Fibre Specification, with exception of the Zero-Dispersion wavelength, which is much lower than for regular Germanium-doped GI-MMFs, resulting in strongly reduced chromatic dispersion at 850nm.

Features	Advantages
Super RadHard behaviour	• Optimized for use in highly irradiative environments • Strongly improved performance compared to regular Germanium-doped fibres
Coated with the dual layer UV Acrylate	• Optimized performance in tight-buffer cable applications • High resistance to micro-bending

Example of RIA for Draka SRH-MMF at 1300 nm under dose rate of 1.25 Gy/s up to 2 MGy at 45°C



DrakaElite

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Characteristics	Conditions	Specified Values	Units
OPTICAL SPECIFICATIONS (Uncabled fibre)			
Attenuation Coefficient	850 nm 1300 nm	≤ 2.5 (Typical ≤ 2.2) ≤ 0.5	dB/km
Overfilled Modal Bandwidth (min.)[1]	850 nm 1300 nm	500 [2] 500 [2]	MHz.km
Numerical Aperture		0.200 ± 0.015	
Chromatic Dispersion			
Zero Dispersion Wavelength, λ_0	typical	1275	nm
Zero Dispersion Slope, S_0		≤ 0.105	ps/nm².km
Bending Loss	100 turns at R=37.5 mm; 850 nm, 1300 nm	≤ 0.5	dB
Backscatter Characteristics[3]			
Point Discontinuity[4]	850 nm, 1300 nm	≤ 0.1	dB
Irregularities over fibre length	850 nm, 1300 nm	≤ 0.1	dB
Reflections		Not allowed	
Group Index of Refraction (Typ.)	850 nm 1300 nm	1.472 1.466	
GEOMERICAL SPECIFICATIONS			
Core Diameter		50 ± 2.5	µm
Core Non-Circularity		≤ 6	%
Core/Cladding Concentricity Error		≤ 1.5	µm
Cladding Diameter		125.0 ± 1.0	µm
Cladding Non-Circularity		≤ 1	%
Coating Diameter		242 ± 5	µm
Coating Non-Circularity		≤ 5	%
Coating/Cladding Concentricity Error		≤ 12.5	µm
Length	Standard lengths	Multiples of 2.2	km
MECHANICAL SPECIFICATIONS			
Proof Test	Off line	> 0.7 (100)	GPa (kpsi)
Dynamic Tensile Strength (median value)	0.5 meter gauge length, unaged and aged[5]	> 3.8 (550)	GPa (kpsi)
Fatigue Parameter (Typical)	Dynamic fatigue, unaged and aged[5]	n_d > 18	
Coating Strip Force	Average strip force, unaged and aged[6]	1 to 3	N
	Peak strip force, unaged and aged[6]	1.3 to 8.9	N
ENVIRONMENTAL SPECIFICATIONS			
Temperature Cycling	850 nm, 1300 nm; -60°C to +85°C	≤ 0.2	dB/km
Temperature-Humidity Cycling	850 nm, 1300 nm; -10°C to +85°C, 4-98% RH	≤ 0.2	dB/km
Water Immersion	850 nm, 1300 nm; 23°C, 30 days	≤ 0.2	dB/km
Dry Heat	850 nm, 1300 nm; 85°C, 30 days	≤ 0.2	dB/km
Damp Heat	850 nm, 1300 nm; 85°C; 85% RH, 30 days	≤ 0.2	dB/km
TYPICAL RADIATION INDUCED ATTENUATION (RIA)			
Radiation Induced Attenuation	dose=2 MGy / dose rate =1.25 Gy/s 1300 nm / ~45°C	~2.2	dB/100m

1). The modal bandwidth is linearly normalized to 1 km, according to IEC 60793-2-10.
2). Higher modal bandwidth values (e.g. 1000/1000 MHz.km) are under development.
3). OTDR measurement with 0.5 µs pulse width.
4). Mean of bi-directional measurement.
5). Aging at 85°C, 85% RH, 30 days.
6). Aging: 23°C, 0°C and 45°C;
30 days at 85°C and 85% RH;
14 days water immersion at 23°C.

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