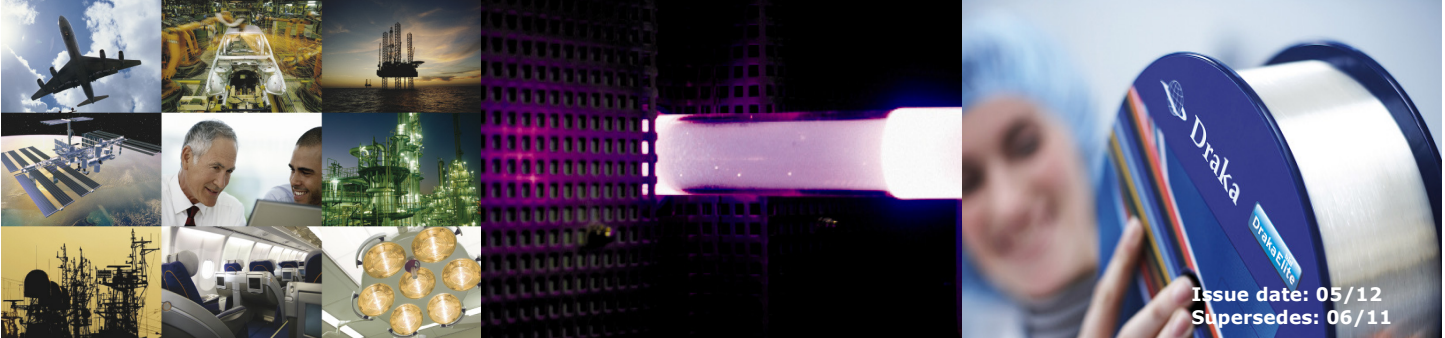


## Super RadHard Single-Mode Optical Fibre

Extremely low sensitivity for radiation effects in irradiative environments



Prysmian Group has developed a revolutionary new product as part of its 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 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 Gy. 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.

Because each end-user application is defined by specific radiation exposure conditions, assessing RIA performance of different fibres shall be conducted for the same test conditions.

The Draka 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

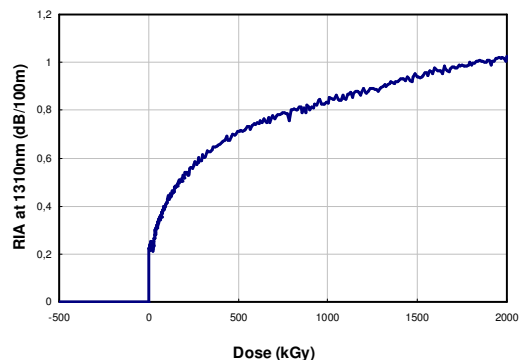
Super RadHard behaviour

Coated with the dual layer UV Acrylate

### Advantages

- Optimized for use in highly irradiative environments
- Strongly improved performance compared to regular Germanium-doped fibres
- 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 1.25Gy/s up to 2MGy at 45°C



## Super RadHard Single-Mode Optical Fibre

Extremely low sensitivity for radiation effects in irradiative environments

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

Issue date: 05/12  
Supersedes: 06/11

### Optical Specifications

#### Attenuation

Attenuation at 1310 nm	≤ 0.4 dB/km
Attenuation at 1550 nm	≤ 0.3 dB/km

#### Point discontinuities

No point discontinuities greater than 0.05 dB at 1310 and 1550nm

#### Macro-bending loss

Number of Turns	Mandrel Radius (mm)	Wavelength (nm)	Induced Attenuation (dB)
100	25	1310	≤ 0.05
100	25	1550	≤ 0.05
100	30	1625	≤ 0.05

#### Cutoff Wavelength

Cable Cutoff Wavelength (Accf)	≤ 1260 nm
--------------------------------	-----------

#### Mode Field Diameter

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

#### Chromatic Dispersion

Wavelength (nm)	Chromatic Dispersion (ps/[nm.km])
1285 – 1330	≤  3
1550	≤ 18
1625	≤ 22

Zero Dispersion Wavelength ( $\lambda_0$ ): 1300 – 1324 nm  
Slope ( $S_0$ ) at  $\lambda_0$ : ≤ 0.092 ps/(nm<sup>2</sup>.km)

#### Polarization Mode Dispersion (PMD)

PMD Link Design Value\* ≤ 0.20

\* According to IEC60794-3, Ed3 (Q=0.01%, N=20)

### Geometrical Specifications

#### Glass Geometry

Cladding Diameter	125.0 ± 0.7 µm
Core/Cladding Concentricity Error	≤ 0.5 µm
Cladding Non-Circularity	≤ 0.7 %
fibre Curl (Radius)	≥ 4m

#### Coating Geometry

Coating Diameter	242 ± 10 µm
Coating/Cladding Concentricity Error	≤ 12 µm
Coating Non-Circularity	≤ 5 %
Lengths	1.1; 2.2km and multiples

### Mechanical Specifications

Proof Test ≥ 0.7 GPa

#### Dynamic tensile strength (0.5m gauge length)

Aged\*\* and unaged median: > 3.8 GPa (550 kpsi)

Dynamic fatigue, unaged and aged\*\*  $n_d \geq 20$   
Static fatigue, aged\*\*  $n_s \geq 23$

\*\* Aging at 85°C, 85% RH, 30 days

#### Coating strip force unaged and aged\*\*\*

- Average strip force: 1 N to 3 N  
- Peak strip force: 1.3 N to 8.9 N

\*\*\* Aging: • 0°C and 45°C

• 30 days at 85°C and 85% RH

• 14 days water immersion at 23°C

### Environmental Specifications

Environmental Test	Test conditions	Induced Attenuation at 1310, 1550nm (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	14 days; 23°C	≤ 0.05
Dry heat	30 days; +85°C	≤ 0.05
Damp heat	30 days; +85°C; 85%RH	≤ 0.05

### Typical Radiation Induced Attenuation (RIA)

	Test Conditions	Induced Attenuation at 1310nm (dB/km)
RIA	Total dose: 10 kGy Dose rate: 0.2 Gy/s T=24°C	~ 2.5
RIA	Total dose: 100 kGy Dose rate: 1.6 Gy/s T=24°C	~ 5
RIA	Total dose: 2 MGy Dose rate: 1.25 Gy/s T=45°C	~ 10

