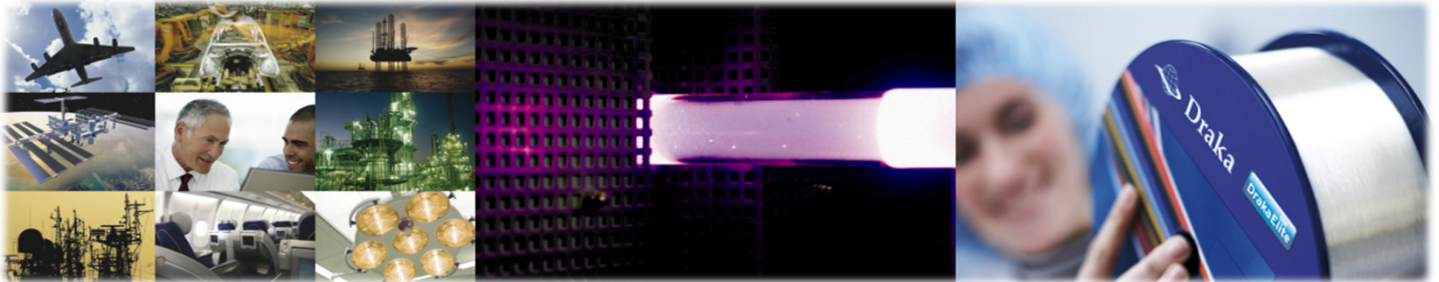


# RadHard 50 µm Multimode Fibre (MIL-PRF-49291/1)

Legacy radiation hardened 50 µm MMF for irradiative environments

**Product Type:** Legacy RadHard 50 µm GI-Multimode Fibre (MIL-PRF-49291/1)  
**Coating Type:** Dual Layer Primary Coating (DLPC9)

**Issue date:** 04-2013  
**Supersedes:** 01-2013



This **DrakaElite™ RadHard 50 µm core diameter multimode fibre** (MMF) can be used for high irradiative environments (e.g. gamma rays, X-flash, neutrons protons) up to a dose of about 10 kGy. For extreme irradiative environments (some MGy dose) **DrakaElite™ Super RadHard 50 µm core diameter MMF** is recommended.  
Note: 1 Gy = 100 Rad.

This Germanium-doped **50 µm core diameter RadHard MMF** has been qualified and approved by the U.S. Defense Supply Center, Columbus (DSCC) in accordance with the U.S. Military **MIL-PRF-49291/1**.

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.

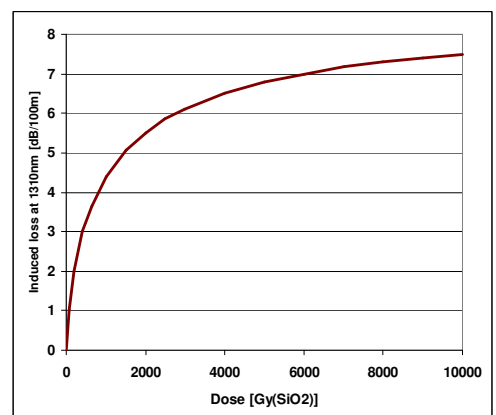
The **DrakaElite™ 50 µm core diameter RadHard MMF** can be used in all cable constructions, including loose tube, tight buffered, ribbon and central tube designs. This fibre complies with or exceeds IEC 60793-2-10 category A1a.1 Optical Fibre Specification, TIA-492AAAB and Telcordia GR-20-Core.

Prysmian Group' fibre plant **Draka Comteq Fibre B.V. in Eindhoven**, Netherlands, is **MIL-STD-790** certified.

Features	Advantages
RadHard behaviour	<ul style="list-style-type: none"> <li>Suitable for medium irradiative environments</li> </ul>
Coated with the dual layer UV Acrylate	<ul style="list-style-type: none"> <li>Optimized performance in tight-buffer cable applications</li> </ul>

Steady state gamma irradiation test conditions – MIL 49291-1		
Temperature	Dose rate	Total dose
- 28°C / 25°C / 85°C	0.50 Gy/s (SiO2)	Classified

Irradiation test requirements – MIL 49291-1		
Max. induced attenuation @1300nm	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



Typical RIA for Draka RH 50 µm MMF at 1300 nm; dose rate 1.67 Gy/s, T=28°C



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Characteristics	Conditions	Specified Values	Units
<b>OPTICAL SPECIFICATIONS (Uncabled fibre)</b>			
Attenuation Coefficient	850 nm 1300 nm	≤ 2.4 ≤ 0.6	dB/km
Overfilled Modal Bandwidth (min.) <sup>1</sup>	850 nm 1300 nm	500 500	MHz.km
Numerical Aperture		0.200 ± 0.015	
<b>Chromatic Dispersion</b>			
Zero Dispersion Wavelength, λ <sub>0</sub>		1295 ≤ λ <sub>0</sub> ≤ 1340	nm
Zero Dispersion Slope, S <sub>0</sub>	1295 nm ≤ λ <sub>0</sub> ≤ 1310 nm 1310 nm ≤ λ <sub>0</sub> ≤ 1340 nm	≤ 0.105 ≤ 0.000375 (1590 - λ <sub>0</sub> )	ps/nm <sup>2</sup> .km
Bending Loss	100 turns, D=75 mm; 850nm / 1300nm	≤ 0.5	dB
<b>Backscatter Characteristics<sup>2</sup></b>			
Point Discontinuity <sup>3</sup>	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	1.482 1.477	
<b>GEOMERICAL SPECIFICATIONS</b>			
Core Diameter		50 ± 2.5	µm
Core Non-Circularity		≤ 5	%
Core/Cladding Concentricity Error		≤ 1	µm
Cladding Diameter		125.0 ± 1.0	µm
Cladding Non-Circularity		≤ 0.7	%
Coating Diameter	M49291/1-01   M49291/1-02	242 ± 10   500 ± 15	µm
Coating Non-Circularity	M49291/1-01   M49291/1-02	≤ 5   ≤ 5	%
Coating/Cladding Concentricity Error	M49291/1-01   M49291/1-02	≤ 10   ≤ 20	µm
Length	Standard lengths	2.2 – 8.8   1.1 – 6.6	km
<b>MECHANICAL SPECIFICATIONS</b>			
Coating Strip Force	Average strip force, unaged and aged <sup>4</sup>	1 to 3	Not. Spec.
	Peak strip force, unaged and aged <sup>4</sup>	1.8 to 13.2	1.8 to 20
Proof Test	Off line	> 0.7 (100)	GPa (kpsi)
Dynamic Tensile Strength (median value)	0.5 meter gauge length, unaged and aged <sup>5</sup>	> 3.8 (550)	GPa (kpsi)
Fatigue Parameter (Typical)	Dynamic fatigue, unaged and aged <sup>5</sup>	n <sub>d</sub> > 18	
<b>ENVIRONMENTAL SPECIFICATIONS</b>			
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
Operating Temperature Range		-55 to +85	°C
Non-Operating + Storage Temperature Range		-62 to +85	°C
<b>TYPICAL RADIATION INDUCED ATTENUATION (RIA)</b>			
Radiation Induced Attenuation	Dose: 10 KGy; Dose rate: 1.67 Gy/s; T=28°C; 1300nm	~7.5	dB/100m

- 1). The modal bandwidth is linearly normalized to 1 km, according to IEC 60793-2-10.
- 2). OTDR measurement with 0.5 µs pulse width.
- 3). Mean of bi-directional measurement.
- 4). Aging at 23°C, 0°C and 45°C; 30 days at 85°C and 85% RH; 14 days water immersion at 23°C.
- 5). Aging at 85°C, 85% RH, 30 days.

