Prysmian Group

DrakaElite Specialty Fibre

PRYSMIAN Draka

RadHard Single-Mode Fibre (MIL-PRF-49291/7)

Legacy radiation hardened SMF for irradiative environments

Product Type: Legacy RadHard Single-Mode Fibre (MIL-PRF-49291/7)
Coating Type: Dual Layer Primary Coating (DLPC9)

Issue date: 10-2013
Supersedes: *04-2013*

This **DrakaElite™ RadHard single-mode fibre** (SMF) 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 SMF** is recommended. Note: 1 Gy = 100 Rad.

This Germanium-doped **RadHard SMF** has been qualified and approved by the U.S. Defense Supply Center, Columbus (DSCC) in accordance with the U.S. Military **MIL-PRF-49291/7** specification. (Note: 500 µm coating is not qualified).

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 fibres should be conducted as close to conditions in the final application as possible.

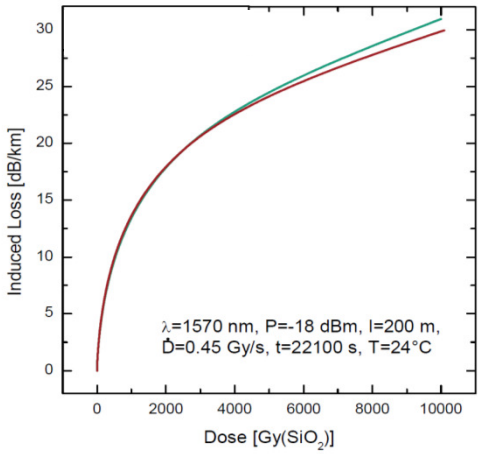
The **DrakaElite™** Germanium-doped **RadHard SMF** can be used in all cable constructions, including loose tube, tight buffered, ribbon and central tube designs. This fibre complies with or exceeds ITU-T Recommendation G.652.D, IEC 60793-2-50 category B1.3 Optical Fibre Specification and Telcordia GR-20-Core.

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

Features	Advantages
RadHard behaviour	• Suitable for medium irradiative environments
Coated with the dual layer UV Acrylate	• Optimized performance in tight-buffer cable applications

Steady state gamma irradiation test conditions – MIL 49291-7		
Temperature	**Dose rate**	**Total dose**
- 28°C / 25°C / 85°C	0.50 Gy/s (SiO2)	Classified

Irradiation test requirements – MIL 49291-7		
Max. induced attenuation @1310nm	**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



RIA reproducibility for Draka RH-SMFs (5 years difference in production date at 1570 nm; dose rate 0.45 Gy/s

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Characteristics	Conditions	Specified Values	Units
OPTICAL SPECIFICATIONS (Uncabled fibre)			
Attenuation Coefficient	1310 nm 1385 nm 1550 nm	≤ 0,4 ≤ 0,4 ≤ 0.3	dB/km
Point Discontinuity	1310 nm / 1550 nm	≤ 0.05	dB
Bending Loss	100 turns, R=38mm; 1310nm 100 turns, R=38mm; 1550nm	≤ 0.1 ≤ 1.0	dB
Cabled Cutoff Wavelength		≤ 1260	nm
Mode Field Diameter	1310 nm 1550 nm	9.0 ± 0.4 10.1 ± 0.5	µm
Chromatic Dispersion	1310 nm 1550 nm	< 3.2 < 22	ps/nm/km
Group Index of Refraction (Typ.)	1310 nm 1550 nm	1.467 1.468	
GEOMERICAL SPECIFICATIONS			
Cladding Diameter		125.0 ± 1.0	µm
Core/Cladding Concentricity Error		≤ 0.6	µm
Cladding Non-Circularity		≤ 1.0	%
Coating Diameter	M49291/7-01 / M49291/7-02	242 ± 10 / 500 ± 15	µm
Coating Non-Circularity	M49291/7-01 / M49291/7-02	≤ 5 / ≤ 5	%
Coating/Cladding Concentricity Error	M49291/7-01 / M49291/7-02	≤ 10 / ≤ 20	µm
Length	Standard lengths	2.2 – 8.8 / 1.1 – 6.6	km
MECHANICAL SPECIFICATIONS			
Coating Strip Force	Average strip force, unaged and aged[1]	1 to 3 / Not. Spec.	N
	Peak strip force, unaged and aged[1]	1.8 to 13.2 / 1.8 to 20	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
Operating Temperature Range		-46 to +85	°C
Non-Operating + Storage Temperature Range		-55 to +85	°C
TYPICAL RADIATION INDUCED ATTENUATION (RIA)			
Radiation Induced Attenuation	Dose: 10 KGy; Dose rate: 0.45 Gy/s; T=24°C; 1570 nm	~3	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.

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