

RadHard 50 µm BendBright™ Multimode Fibre



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Prysmian Group's RadHard MMF can be used in irradiative environments (ex. Gamma rays, X-flash, Neutrons Protons) up to a dose of 10 kGy. The bend-insensitive RadHard MMF has a Germanium-doped core and with its outstanding bending performance, the fibre provides improved fibre and cable management.

The RadHard MMF can be used in all cable constructions, including loose tube, tight buffered, ribbon and central tube designs.

Applicable Standards

- IEC / EN 60793-2-10: type A1-OM2/OM3/OM4/OM5
- ISO / IEC 11801: Category OM2/OM3/OM4/OM5
- TIA / EIA 492 AAAF

Optical Specifications

Radiation Induced Attenuation (RIA)

| Test Conditions | Units | RIA at 1300 nm |
|--|---------|----------------|
| Dose = 10 kGy Dose Rate = 1.67 Gy/s Temperature ≈ 28°C | dB/100m | ≤ 7.5 |

Attenuation

| Attribute | Units | Specified Values |
|------------------------------------|-------|------------------|
| Attenuation coefficient at 850 nm | dB/km | ≤ 2.4 |
| Attenuation coefficient at 1300 nm | dB/km | ≤ 0.6 |

Bandwidth (OFL)

| Attribute | Units | OM2 | OM3 | OM4 | OM5 |
|---------------------------------------|--------|-------|--------|--------|--------|
| Overfilled Modal Bandwidth at 850 nm | MHz•km | ≥ 500 | ≥ 1500 | ≥ 3500 | ≥ 3500 |
| Overfilled Modal Bandwidth at 1300 nm | MHz•km | ≥ 500 | ≥ 500 | ≥ 500 | ≥ 500 |
| Overfilled Modal Bandwidth at 953 nm | MHz•km | - | - | - | ≥ 1850 |

Numerical Aperture

| | |
|--------------------|---------------|
| Numerical aperture | 0.200 ± 0.015 |
|--------------------|---------------|

Macrobending Loss

| Conditions | Wavelength | Units | Specified Values |
|-------------------------------------|---------------|-------|------------------|
| Mandrel Radius = 7.5 mm, 2 Turns | 850 / 1300 nm | dB | ≤ 0.2 / ≤ 0.5 |
| Mandrel Radius = 15 mm, 2 Turns | 850 / 1300 nm | dB | ≤ 0.1 / ≤ 0.3 |
| Mandrel Radius = 37.5 mm, 100 Turns | 850 / 1300 nm | dB | ≤ 0.5 / ≤ 0.5 |

Chromatic Dispersion

| Attribute | Units | OM2/OM3/OM4 | OM5 |
|---|-------|---------------------------|---------------------------|
| Zero Dispersion Wavelength, λ_0 | nm | 1295 ≤ λ_0 ≤ 1340 | 1297 ≤ λ_0 ≤ 1328 |

Backscatter characteristics ¹

| Attribute | Conditions | Units | Specified Values |
|----------------------------------|-----------------|-----------|------------------|
| Point Discontinuity ² | 850 nm, 1300 nm | dB | ≤ 0.1 |
| Irregularities over fibre length | 850 nm, 1300 nm | dB | ≤ 0.1 |
| Reflections | - | - | Not allowed |
| Group Index of Refraction | 850 nm | (Typical) | 1.482 (typical) |
| Group Index of Refraction | 1300 nm | - | 1.477 (typical) |

¹ OTDR measurement with 0.5 μ s pulse width.

² Mean of bi-directional measurement

Geometrical Specifications

Glass Geometry

| Attribute | Units | Specified Values |
|-----------------------------------|---------|------------------|
| Core Diameter | μ m | 50 ± 2.5 |
| Core non-Circularity | % | ≤ 5 |
| Core-Cladding Concentricity Error | μ m | ≤ 1.5 |
| Cladding Diameter | μ m | 125 ± 1 |
| Cladding non-Circularity | % | ≤ 1 |

Coating Geometry

| Attribute | Units | Specified Values |
|--------------------------------------|---------|------------------|
| Coating Diameter | μ m | 242 ± 7 |
| Coating non-Circularity | % | ≤ 5 |
| Coating-Cladding Concentricity Error | μ m | ≤ 10 |

Mechanical Specifications

Proof Test ³

The entire spool length is subjected to a tensile proof stress ≥ 0.7 GPa (100 kpsi) ; 1% strain equivalent

³ Higher proof test available upon request

Coating Performance

| Attribute | Units | Typical Values |
|---|-------|----------------|
| Average Coating Strip Force, unaged and aged ⁴ | N | 1 to 3 |
| Peak Coating Strip Force, unaged and aged ⁴ | N | 1.3 to 8.9 |

⁴ Aging at 23°C, 30 days

Fibre Strength

| Attribute | Units | Specified Values |
|---|-------|-------------------------|
| Dynamic Tensile Strength (0.5 meter gauge length), unaged and aged ⁵ | GPa | median > 3.8 (550 kpsi) |
| Dynamic Fatigue, unaged and aged ⁵ | - | $n_d \geq 18$ |

⁵ Aging at 85°C, 85% RH, 30 days

Environmental Specifications

| Environmental test | Test Conditions | Induced attenuation at 850, 1300 nm (dB/km) |
|--------------------------------|--------------------------|---|
| Temperature Cycling | -60°C to +85°C | ≤ 0.2 |
| Temperature - Humidity Cycling | -10°C to +85°C, 4-98% RH | ≤ 0.2 |
| Water Immersion | 30 days ; 23°C | ≤ 0.2 |
| Dry Heat | 30 days ; 85°C | ≤ 0.2 |
| Damp Heat | 30 days; 85°C; 85% RH | ≤ 0.2 |

Others

| | |
|---------|---|
| Length | Multiples of 2.2 km per spool |
| Coating | Standard Acrylate Coating; Coloured (ink) and Clear |

All measurements in accordance with ITU-T G650 recommendations