

Overview

ESMF (Enhanced Single-Mode Fiber) provides improved performance across the entire 1260 nm to 1625 nm wavelength spectrum for use in metro, access, and longhaul networks. It has low dispersion in the 1310 nm window and low attenuation in the 1383 nm water-peak region to allow use of the extended band (1360 nm to 1460 nm). With its wide operating spectrum, ESMF expands the future growth capability of the fiber and allows flexible configuration of voice, data, and video services within the fiber. It can be used in all cable constructions, including loose lube, tight buffered, ribbon, and central tube designs.

The tighter geometrical, attenuation and PMD specifications of ESMF enable superior performance in long-haul, metropolitan, access and premises applications in telecommunications, CATV and utility networks. ESMF is completely interchangeable with standard single-mode fiber.

Prysmian's Advanced Plasma Vapor Deposition (APVD™) manufacturing process ensures the highest quality and purity of fibers. Proprietary ColorLock™ coating process further enhances the performance, durability and reliability of the fiber, even in the harshest environments.

The fiber complies with or exceeds the ITU-T Recommendation G.652.D, the IEC International Standard 60793-2-50 type B-652.D Optical Fiber Specification, Telcordia GR-20-CORE, ANSI/ICEA S-87-640 and RUS 7CFR 1755.900.

Features and Benefits

Low 1383 nm (Water-Peak) Attenuation

- Provides expanded fiber capacity and cost savings through use of cheaper lasers in the entire 1260 to 1625 nm range, multiplexing filters and higher number of channels.

Low hydrogen sensitivity

- Low attenuation in the 1383 nm region even as fiber ages, for improved performance and long life.

Lower PMD of 0.06 ps/km Link Design Value

- Extends the PMD distance performance, reducing regeneration costs.

Proprietary PCVD and APVD™ Manufacturing Process

- Superior geometry, uniformity and purity.

Revolutionary ColorLock-XS Coating Process

- Increased reliability, durability, and superior aging performance, resulting in lower maintenance and replacement costs. Makes color a component of the coating, thus enhancing fiber identification and colored fiber reliability. Consistent, vibrant color for ease-of-use and flexibility .



ESMF Enhanced Single-Mode Optical Fiber - North America

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Performance Specifications (Uncabled Fiber)

Maximum Attenuation	(dB/km)*
@ 1310 nm	0.34
@ 1383 nm **	0.31 - 0.34
@ 1490 nm	0.24
@ 1550 nm	0.20
@ 1625 nm	0.23

* Other values on request.

** Including H2-aging according to IEC 60793-2-50, type B.1.3.

Attenuation vs. Wavelength	
1285 nm to 1330 nm	= $\alpha_{1310} \pm 0.03$ dB/km
1525 nm to 1575 nm	= $\alpha_{1550} \pm 0.02$ dB/km

Point Discontinuities
No point discontinuity greater than 0.05 dB at 1310 nm and 1550 nm

Attenuation with Bending			
Mandrel Radius (mm)	Number of Turns	Wavelength (nm)	Attenuation (dB)
25	100	1310	≤ 0.03
25	100	1550	≤ 0.03
30	100	1625	≤ 0.03

Cutoff Wavelength	
Cable Cutoff Wavelength (λ_{ccf})	≤ 1260 nm

Mode Field Diameter	
1310 nm	8.8 to 9.6 μ m
1550 nm	9.9 to 10.9 μ m

Chromatic Dispersion	
1285-1330 nm	≤ 3 ps/(nm*km)
1550 nm	≤ 18.0 ps/(nm*km)
1625 nm	≤ 22.0 ps/(nm*km)
Zero Dispersion Wavelength (λ_0)	1304-1324 nm
Slope (S_0) at λ_0	≤ 0.092 ps/(nm ² *km)

Polarization Mode Dispersion (PMD)	
PMD Link Design Value**	≤ 0.06 ps/ \sqrt km
Max. Individual Fiber	≤ 0.1 ps/ \sqrt km

** According to IEC 60794-3, Ed 3 (Q=0.01%)

Geometrical Specifications	
Glass Geometry	
Core/Cladding Concentricity Error	≤ 0.5 μ m
Cladding Diameter	125.0 ± 0.7 μ m
Cladding Non-Circularity	≤ 0.7%
Fiber Curl	≥ 4.0 m radius
Coating Geometry	
Coating/Cladding Concentricity Error	≤ 12 μ m
Coating Diameter	242 ± 7 μ m
Coating Non-Circularity	≤ 6%
Lengths	Up to 50.4 km

Mechanical Performance	
Minimum Proof Test	100 Kpsi (0.7 GPa); 1% strain equivalent
Tensile Strength	Median > 3.8 GPa (550 kpsi)
Dynamic Fatigue	Dynamic: Unaged & Aged*** $n_0 > 20$
Coating Performance Unaged & Aged***	Average Strip Force: 1 N to 3 N Peak Strip Force: 1.2 N to 8.9 N

***Aging: 0°C and 45°C, 30 days at 85°C and 85% RH, 30 days water immersion at 23°C, Wasp spray exposure (Telcordia)

Environmental Performance	
Environmental Test	Induced Attenuation at 1310, 1550 nm (dB/km)
Temperature Cycling (-60°C to +85°C)	≤ 0.05
Temperature Humidity Cycling (-10°C to +85°C, up to 98% RH)	≤ 0.05
Water Immersion (23°C ± 2°C)	≤ 0.05
Accelerated Heat Aging (85°C ± 2°C)	≤ 0.05
Damp Heat (85°C, 85% RH)	≤ 0.05

Typical Specifications	
Effective Group Index	@ 1310 nm 1.467 @ 1550 nm 1.468 @ 1625 nm 1.468
Rayleigh Backscatter Coefficient (1 ns = pulse width)	@ 1310 nm: -79.4 dB @ 1550 nm: -81.7 dB @ 1625 nm: -82.5 dB

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4 Tesseneer Drive, Highland Heights, KY 41076
+1-859-572-8000 / na.prysmiangroup.com
TLS-DS-F-001-1120