

## Enhanced Single Mode Optical Fibre (ESMF)

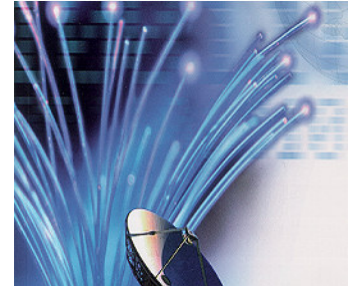
Product Type: G.652.D  
Coating Type: Natural

Draka Comteq Enhanced Singlemode (ESMF) fibre provides improved performance across the entire 1260 nm to 1625 nm wavelength spectrum. It has a 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 tube, ribbon, central tube and tight buffered designs.

The tighter geometrical, attenuation and PMD specifications of ESMF enables superior performance in long haul, metropolitan, access and premises applications in telecommunications, CATV and utility networks. ESMF is completely interchangeable with standard singlemode fibre.

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



The fibre complies with or exceeds the ITU-T Recommendation G.652.D, the IEC Int. Standard 60793-2-50 type B.1.3 Optical Fibre Specification, Telcordia GR-20-CORE, ANSI/ICEA S-87-640 and RUS 7CFR 1755.900.

Features	Benefits
Low 1383 nm (water peak) attenuation	> Provides expanded fiber capacity and cost savings through use of cheaper lasers in the entire 1260 nm to 1625 nm range, multiplexing filters, and higher number of channels
Low hydrogen sensitivity	> Low attenuation in the 1383 nm region even as fibre 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
Lower 1460 nm attenuation (<0.25 dB/km)	> Easy design of low cost laser and filter based systems over a wide wavelength range > Ensure efficient Raman pumping for c-band amplification
Proprietary APVD™ manufacturing process	> Superior geometry, uniformity and purity
Revolutionary ColorLock™ 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

### Draktel Optical Fibre

Brasil:  
Tel: + 55 15 3212-6801  
Fax: +55 15 3212-6814

Email: [draktelsales@draktel.com.br](mailto:draktelsales@draktel.com.br)  
Website: [www.draktel.com.br](http://www.draktel.com.br)

# Enhanced Single Mode Optical Fibre (ESMF)

 Product Type: G.652.D  
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## Optical Specifications (uncabled fiber)

Attenuation (dB/km)	Max Value Range
Attenuation at 1310 nm	0.33 – 0.35
Attenuation at 1383 nm*	0.32 – 0.35
Attenuation at 1460 nm	0.25
Attenuation at 1550 nm	0.19 – 0.21
Attenuation at 1625 nm	0.20 – 0.23

\* Including H2-aging according to IEC 60793-2-50, type B.1.3  
 Other values available on request

## Attenuation vs. Wavelength

Maximum attenuation change over the window from reference

Wavelength (nm)	Reference $\lambda$ (nm)	Change (dB/km)
1285-1330	1310	$\leq 0.03$
1525-1575	1550	$\leq 0.02$
1460-1625	1550	$\leq 0.04$

## Point discontinuities

No point discontinuity greater than 0.05 dB at 1310 nm or 1550 nm

## Attenuation with Bending

100 turns, 50mm diameter @ 1310 nm	$\leq 0.05$ dB
100 turns, 50mm diameter @ 1550 nm	$\leq 0.05$ dB
100 turns, 60mm diameter @ 1625 nm	$\leq 0.05$ dB

## Cutoff Wavelength

Cable Cutoff wavelength ( $\lambda_{ccl}$ )	$\leq 1260$
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## Mode Field Diameter

Wavelength (nm)	MFD ( $\mu$ m)
1310	$9.2 \pm 0.4$
1550	$10.3 \pm 0.5$

## Chromatic Dispersion

Wavelength (nm)	Dispersion (ps/nm <sup>2</sup> km)
1285-1330	$\leq  3 $
1550	$\leq 18.0$
1625	$\leq 22.0$
Zero dispersion wavelength ( $\lambda_0$ )	1300 – 1322 nm
Slope ( $S_0$ ) at $\lambda_c$	$\leq 0.090$ ps/(nm <sup>2</sup> km)

## Polarization Mode Dispersion (PMD)

PMD link design value**	$\leq 0.06$ ps/ $\sqrt$ km
Max individual fiber	$\leq 0.1$ ps/ $\sqrt$ km

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

## Geometrical Specifications

### Glass Geometry

Cladding diameter	$125.0 \pm 0.7$ $\mu$ m
Core/Cladding Concentricity	$\leq 0.5$ $\mu$ m
Cladding non-circularity	$\leq 0.7$ %
Fibre Curl (radius)	$\geq 4$ m

### Coating Geometry

Coating Diameter	$242 \pm 7$ $\mu$ m
Coating/Cladding Concentricity	$\leq 12$ $\mu$ m
Coating non-circularity	$\leq 5$ %

### Lengths

Standard lengths up to 50.4 km

## Mechanical Specifications

### Proof Test

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

### Tensile Strength

 Dynamic tensile strength (0.5 meter gauge length):  
 Aged\*\*\* and unaged median  $\geq 3.8$  GPa (550 kpsi)  
 \*\*\* Aging at 85 °C, 85% RH, 30 days

### Dynamic and Static Fatigue

Dynamic fatigue	$N_d \geq 20$ unaged and aged***
Static Fatigue	$N_s \geq 23$ aged***

### Coating Performance

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

- Average strip force: 1 N to 3 N
- Peak strip force: 1.3 N to 8.9 N (0.2 lbf to 2.0 lbf)

\*\*\*\* Aging:

- 0 °C and 45 °C
- 30 days at 85 °C and 85% RH
- 14 days water immersion at 23 °C
- Wasp spray exposure (Telcordia)

## Environmental Specifications

Induced attenuation @ 1310, 1550 nm	(dB/km)
Temperature cycling performance (-60 °C to 85 °C)	$\leq 0.05$
Temperature humidity cycling (-10 °C to 85 °C, 4-98% RH)	$\leq 0.05$
Water immersion (23 °C, 14 days)	$\leq 0.05$
Dry heat (85 °C, 30 days)	$\leq 0.05$
Damp heat (85 °C, 85% RH, 30 days)	$\leq 0.05$

## Typical Characterization Values

Nominal zero dispersion slope	$0.085$ ps/nm <sup>2</sup> km	
Effective group index	@ 1310 nm	1.467
	@ 1550 nm	1.468
	@ 1625 nm	1.468
Backscatter coefficient (1 NS pulse width)	@ 1310 nm	- 79.4 dB
	@ 1550 nm	- 81.7 dB
	@ 1625 nm	- 82.5 dB

 Median dynamic tensile strength  $750$  kpsi (5.3 GPa)  
 (aged at 85 °C, 85% RH, 30 days, 0.5 m gauge length)