Draka

Single-Mode Fiber

LongLine™ Optical Fiber

For long distance data transport across oceans and continents

Issue date: 08/10
Supersedes: 11/09

How we can help our customers do more, make more, save more and achieve more. With the Draka LongLine™ fiber, Draka is offering the benefit of its trench assisted design for ultra-long-haul applications, allowing increased distance without regeneration and easy cabling ability.

The LongLine™ fiber exhibits an extremely high effective area of 120 µm^2, 50 % higher than standard single-mode fiber. It dramatically reduces the non-linear effects offering the possibility of higher power and consequently higher distance. The very low attenuation in the C- and L- bands further enhanced the distance capacity while preserving system margins. The trench assisted design keeps macro-bending and micro-bending to a very low level making it suitable for any cable design. In addition the LongLine™ fiber has chromatic properties compatible with commercially available chromatic dispersion modules or reverse dispersion fibers, like used in submarine applications.

The fiber complies with or exceeds ITU-T Recommendation G.654 and IEC Int. Standard 60793-2-50, type B1.2, which has the zero-dispersion wavelength around 1300 nm wavelength, shows a cut-off shift at a wavelength around 1500 nm, is loss-minimized and is optimized for use in the 1530-1625 nm region.

It benefits of the Draka's proprietary plasma process technologies (PCVD and APVD™) and coating technologies (DLPC9). The Draka LongLine™ fiber is available at different screen test tensile stress according to application and customer request, 2 % strain equivalent notably available for submarine applications.

Features	Advantages
Ultra large core	• Limits the non-linear effects • Permits the launch of high power increasing the path length between repeaters • Reduces the numbers of repeaters • Minimizes CAPEX and OPEX
Very low attenuation	• Further enhanced distances • Increase system margins
Trench assisted design	• Low sensitivity to macro and micro-bending losses • Suitable for any cable design
Standard dispersion over slope ratio	Allows a perfect compensation of chromatic dispersion either by dispersion compensating module (DCM) or by reverse dispersion fibers (RDF) as used in submarine systems
Very low PMD	10, 40, 100 Gbps capability

Key Industry Leading Milestones

1999	2002	2003	2006
Introduced TeraLight™ NZ-DSF for LH and ULH	World record: 6.4 Tbps over 2100 km	World record: 6000 km 80 channels at 10 Gbps	BendBright-XS: 1st truly bend-insensitive SMF

VALUE INNOVATION

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Product Type: G.654.B
Coating Type: Natural

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Optical Specifications

Attenuation

Attenuation at 1550 nm	≤ 0.19 dB/km
Attenuation at 1625 nm	≤ 0.21 dB/km

Attenuation vs. Wavelength

Maximum attenuation change over the window from reference

Wavelength range (nm)	Reference λ (nm)	(dB/km)
1525 - 1575	1550	≤ 0.02
1550 - 1625	1550	≤ 0.03

Point discontinuities

No point discontinuity greater than 0.05 dB at 1550 nm.

Attenuation with Bending

Number of Turns	Mandrel Radius (mm)	Wavelength (nm)	Induced Attenuation (dB)
100	30	1550	≤ 0.03
100	30	1625	≤ 0.1

Cutoff Wavelength

Cable Cutoff wavelength (λccf)	≤ 1530 nm

Mode Field Diameter

Wavelength (nm)	MFD (µm)
1550	11.6 - 12.4

Chromatic Dispersion

Wavelength (nm)	Chromatic Dispersion (ps/[nm.km])
1530 – 1565	≤ 23
1565 – 1625	≤ 27
Zero Dispersion Wavelength (λ_0):	≤ 1350 nm

Polarization Mode Dispersion (PMD)

PMD Link Design Value* (ps√km)	≤ 0.04
Max. Individual Fiber (ps√km)	≤ 0.1

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

Geometrical Specifications

Glass Geometry

Cladding Diameter	125.0 ± 0.7 µm
Core/Cladding Concentricity Error	≤ 0.5 µm
Cladding Non-Circularity	≤ 0.7 %
Fiber Curl (Radius)	≥ 4 m

Coating Geometry

Coating Diameter	242 ± 7 µm
Coating/Cladding Concentricity Error	≤ 12 µm
Coating Non-Circularity	≤ 5 %
Length	Standard lengths up to 25.2 km

Mechanical Specifications

Proof Test

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

Tensile Strength

Dynamic tensile strength (0.5 meter gauge length):

Aged** and unaged:	median > 3.8 GPa (550 kpsi)

*** Aging at 85°C, 85% RH, 30 days*

Dynamic and Static Fatigue

Dynamic fatigue, unaged and aged**	$n_d \geq 20$
Static fatigue, aged**	$n_s \geq 23$

Coating Performance

Coating strip force unaged and 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*
- *14 days water immersion at 23°C*
- *Wasp spray exposure (Telcordia)*

Environmental Specifications

Attenuation

Environmental Test	Test Conditions	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, 4-98% RH	≤ 0.05
Water Immersion	14 days; 23°C	≤ 0.05
Dry Heat	30 days; 85°C	≤ 0.05
Damp Heat	30 days; 85°C; 85% RH	≤ 0.05

Typical Values

Miscellaneous

Dispersion at 1550 nm	20.3 ps/(nm.km)
Dispersion at 1625 nm	24.9 ps/(nm.km)
Dispersion slope at 1550 nm	0.062 ps/(nm^2.km)
Effective area	120 µm^2
Effective group index @ 1550 nm	1.4671
Effective group index @ 1625 nm	1.4676
Rayleigh Backscatter Coefficient for 1 ns pulse width:	
@ 1550 nm	- 83.6 dB
@ 1625 nm	- 84.2 dB
Median Dynamic Tensile Strength	5.3 GPa (750 kpsi)

(Aged at 85°C, 85% RH, 30 days; 0,5 m gauge length)

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The Draka Communications policy of continuous improvement may cause in changed specifications without prior notice