Draka

FIBRE OPTICS

Single-Mode Fiber

TeraLight™ Ultra Optical Fiber

Optimized for long-haul and ultra-long transmission

Issue date: 08/10
Supersedes: 05/10

Draka's TeraLight™ Non-Zero Dispersion Shifted Fiber (NZDSF) has set the standard for high bit-rate, multi-wavelength transmission. Its unique optimization of effective area, chromatic dispersion and dispersion slope enables excellent distorsion management cost effective operation at 10 and 40 Gbps, tight channel spacing in C- and L-bands, compatibility with the future S-band.

TeraLight™ Ultra is further optimized for long-haul and ultra-long-haul applications. Its typical chromatic dispersion of 8 ps/nm.km at 1550 nm is optimized to be half that of standard single-mode fiber resulting in lower costs for dispersion compensation, but high enough to counter cross-channel non-linearities. Guaranteed PMD link design value of 0.04 ps/≤√km keeps distorsions within tolerable limits, permitting 3 to 5 times longer distances without regeneration at 40 Gbps than fibers with higher PMD values, resulting in cost savings. Low attenuation in the 1450 nm region ensures maximum efficiency of distributed Raman amplification systems. Channel spacing as low as 25 GHz at 10 Gbps in C- and L-bands allows future capacity expansion. Commercially available dispersion compensation devices provide near 100% chromatic dispersion and dispersion slope compensation.

The fiber complies with or exceeds the ITU-T Recommendations G.655.E/G.656, the IEC International Standard 60793-2-50 type B4/B5 and can be used in all cable constructions, including loose tube, tight buffered, ribbon and central tube designs. Draka's Advanced Plasma and Vapor Deposition (APVD™) manufacturing process and proprietary ColorLock-XS coating process further enhance fiber purity, reliability, and durability.

Features	Advantages
10 Gbps, 40 Gbps and higher data rates	Future capacity increase; future-proof
PMD link design value 0.04 ps/≤√km	Three to five times longer distance without regeneration at 40 Gbps than fibers with higher PMD values
Low attenuation, optimized effective area	Improve the optical signal-to-noise ratio, extending the link distance
More flat dispersion slope provides near 100% end-to-end compensation with commercially available dispersion compensation devices	• Potential cost savings from avoidance of costly channel-by-channel compensation at long distances or higher bit rates • Contact Draka for availability
More than 160 channels in C-band alone at 10 Gbps	Maximizing C-band utilization defers costly L-band deployment, providing significant cost savings
320 channels in C-, L- and S-bands at 10 Gbps	Higher capacity and more efficient bandwidth use

Key Industry Leading Milestones

1999	2002	2003	2005
Introduced TeraLight™	World record: 6.4 Tbps over 2100 km	World record: 6000 km 80 channels at 10 Gbps	World record: 4000 km 40 channels at 40 Gbps (EDFA only)

VALUE INNOVATION

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TeraLight™ Ultra Optical Fiber

Optimized for long-haul and ultra-long transmission

Product Type: G.655.E, G.656
Coating Type: ColorLock-XS and Natural

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Optical Specifications

Attenuation

Attenuation at 1383 nm*	≤ 0.7 dB/km
Attenuation at 1450 nm	≤ 0.26 dB/km
Attenuation at 1550 nm	≤ 0.22 dB/km
Attenuation at 1625 nm	≤ 0.25 dB/km

** 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 range (nm)	Reference λ (nm)	(dB/km)
1525 - 1575	1550	≤ 0.02
1550 - 1625	1550	≤ 0.03
1440 - 1550	1550	≤ 0.06

Point discontinuities

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

Attenuation with Bending

Number of Turns	Mandrel Radius (mm)	Wavelength (nm)	Induced Attenuation (dB)
1	16	1550	≤ 0.5
100	25	1550	≤ 0.05
100	30	1625	≤ 0.05

Cutoff Wavelength

Cable Cutoff wavelength (λccf)	≤ 1300 nm

Mode Field Diameter

Wavelength (nm)	MFD (µm)
1550	9.2 ± 0.5

Chromatic Dispersion

Wavelength (nm)	Chromatic Dispersion (ps/[nm.km])
1440	> 0.1
1530 – 1565	5.5 to 10
1565 – 1625	7.5 to 13.4
Zero Dispersion Wavelength (λ_0):	≤ 1425 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 1440 nm	2 ps/(nm.km)
Dispersion at 1550 nm	8 ps/(nm.km)
Dispersion at 1625 nm	12 ps/(nm.km)
Dispersion slope at 1550 nm	0.052 ps/(nm^2.km)
Effective area	63 µm^2
Effective group index @ 1550 nm	1.4683
Effective group index @ 1625 nm	1.4685
Rayleigh Backscatter Coefficient for 1 ns pulse width:	
@ 1550 nm	- 80.4 dB
@ 1625 nm	- 81.3 dB

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