Draka

Draka Comteq | Optical Fibre

Issue date: 11/05
Supersedes: 01/05

TeraLight™ Metro Optical Fibre

Product Type: G.655.C / G.656
Coating Type: ColorLock™ and Natural

Draka Comteq TeraLight™ Non-Zero Dispersion Shifted Fibre (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 distortion management, cost effective operation at 10 and 40 Gbps, tight channel spacing in C- and L-bands, compatibility with the future S-band and provides full compliance with the ITU G.656 recommendation.

TeraLight™ Metro fibre is further optimized for metropolitan backbone applications. It supports 10 Gbps transmission without dispersion compensation for distances of about 200 km, resulting in cost savings compared to standard singlemode fibre. For longer distances or 40 Gbps operation, commercially available compensating devices can be used. The same fiber also supports short-length metro systems, providing additional cost savings.

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

Features	Benefits
• Optimized for 2.5 and 10 Gbps operation without dispersion compensation in Metropolitan area networks	• Cost savings compared to standard single mode fibre (DCU + potentially EDFA) • Simplifies network design and management • Increase network flexibility • Allows use of cheap transmitters
• 40 Gbps operation with commercially available dispersion compensating devices	• Future safe investment • Close to 100% dispersion slope compensation • Contact Draka Comteq for availability
• Compatibility with long-haul NZDSF	• Easy extension of route distances • Consistent fibre type minimizes network complexity
• Guaranteed 1310 nm operation with low dispersion and cabled cutoff wavelength below 1260 nm	• Supports short-length, lower-cost 1310 nm systems on same fibre as 1550 nm systems, resulting in cost savings
• 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
• S-band compatibility	• Future capacity increase • Efficiently supports 1460-1625 nm 8 channels CWDM cheap transmission systems

Key Industry Leading Milestones	
1999	Introduced TeraLight™
2002	World record transmission – 6.4 Tbps over 2100km with 149 channels at 40 Gbps
2002	Introduction of dispersion compensation modules that compensate both dispersion and dispersion slope. Contact Draka Comteq for availability
2003	World record transmission – 80 channels at 10 Gbps over 6,000km

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Netherlands:
Tel: +31 (0)40 29 58 700
Fax: +31 (0)40 29 58 710

France:
Tel: +33 (0)3 21 79 49 00
Fax: +33 (0)3 21 79 49 33

USA:
Tel: +1 800 869 3355
Fax: +1 828 459 8444

Email: fibresales@draka.com

Website: www.drakafibre.com | www.draka.com

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Optical Specifications (Uncabled fibre)

Attenuation	Max. Value (dB/km)
Attenuation at 1310 nm	0.40
Attenuation at 1550 nm	0.25
Attenuation at 1625 nm	0.28
Attenuation at 1383 nm	1.0

Other values available on request

Attenuation vs. Wavelength

Maximum attenuation change over the window from reference

Wavelength range (nm)	Reference λ (nm)	Difference (dB/km)
1525 - 1575	1550	≤ 0.03
1550 - 1625	1550	≤ 0.05
1285 - 1330	1310	≤ 0.05

Point discontinuities

No point discontinuity greater than 0.05 dB at 1550 nm.

Attenuation with Bending

Number of Turns	Mandrel Diameter (mm)	Wavelength (nm)	Induced Attenuation (dB/km)
1	32	1550	≤ 0.5
100	50	1310	≤ 0.05
100	50	1550	≤ 0.05
100	60	1625	≤ 0.05

Cutoff Wavelength

Cable Cutoff wavelength (λ_{ccf})	≤ 1260 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 10.0
1565 - 1625	7.5 to 13.8
1285 - 1330	-10.0 to -3.0

Zero Dispersion Wavelength (λ_0):	≤ 1440

Polarization Mode Dispersion (PMD)

	(√km)
PMD Link Design Value*	0.08
Max. Individual Fibre	0.20

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

Geometrical Specifications

Glass Geometry

Cladding Diameter	125.0 ± 1.0 µm
Core/Cladding Concentricity	≤ 0.6 µm
Cladding Non-Circularity	≤ 1.0 %
Fibre Curl (radius)	≥ 4 m

Coating Geometry

Coating Diameter	242 ± 7 µm
Coating / Cladding Concentricity	≤ 12 µm
Coating Non-Circularity	≤ 5 %

Lengths Standards 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**	$n_d > 20$
Static fatigue, aged**	$n_s > 23$

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

*** 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

Environmental Test	Test Conditions	Induced Attenuation at 1550 nm, 1625 (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 Characterisation Values

Dispersion at 1310 nm	-6 ps/(nm.km)
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)
Mode Field Diameter @ 1310 (typical)	8 µm
Effective area	63 µm^2
Effective group index @ 1310 nm	1.4690
Effective group index @ 1550 nm	1.4692
Effective group index @ 1625 nm	1.4694

Rayleigh Backscatter Coefficient for 1 ns pulse width:

• 1310 nm	–77.5 dB
• 1550 nm	–80.5 dB
• 1625 nm	–81.4 dB

Median Dynamic Tensile Strength (Aged at 85ºC, 85% RH, 30 days; 0,5 m gauge length)	750 kpsi / 5.3 GPa