C28 : Properties of cabled Submarine LongLine™ SM fibre

G654B : For long distance data transport across oceans and continents

General and application

The optical fibres are made of a high grade doped silica core surrounded by a silica cladding;
They are coated with a dual layer, UV cured acrylate based coating.
The LongLine™ fiber exhibits an extremely high effective area of 120 µm2, 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-band and L-band further enhanced the distance capacity while preserving system margins. The trench assisted design keeps macro-bending and micro-bending to a very low level. 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 APVDTM) 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.

Standards and Norms

IEC / EN 60793-2-50 Category B.1.2	ITU-T Recommendation G.654.B

Attenuation (of cable with fibres) — IEC 60793-1-40

1550 nm	≤ 0.20 dB/km
1625 nm	≤ 0.22 dB/km
Max. attenuation change in the interval 1550 - 1625 nm (ref. 1550 nm)	≤ 0.03 dB/km
Max. attenuation change in the interval 1525 - 1575 nm (ref. 1550 nm)	≤ 0.02 dB/km
Point discontinuity at 1310 and 1550 nm	≤ ± 0.05 dB

Group index of refraction — IEC 60793-1-22

Effective group index at 1550 nm	1.467
Effective group index at 1625 nm	1.468

Fibre properties according to IEC — IEC 60793-1

Effective area	typical	µm²	120
Mode field diameter at 1550 nm	IEC / EN 60793-1-45	µm	11.6 – 12.4
Cladding diameter	IEC / EN 60793-1-20	µm	125.0 ± 0.7
Cladding non-circularity	IEC / EN 60793-1-20	%	≤ 0.7
Core - cladding concentricity error	IEC / EN 60793-1-20	µm	≤ 0.5
Primary coating diameter – Coloured	IEC / EN 60793-1-21	µm	245 ± 10
Primary coating non-circularity	IEC / EN 60793-1-21	%	≤ 5
Primary coating - cladding concentricity error	IEC / EN 60793-1-21	µm	≤ 12
Chromatic dispersion coefficient:	IEC / EN 60793-1-42		
In the interval 1530 nm – 1565 nm		ps/km • nm	≤ 23
In the interval 1565 nm – 1625 nm		ps/km • nm	≤ 27
Zero dispersion wavelength, λ_0		nm	≤ 1350
Dispersion slope at 1550 nm	typical	ps/(nm^2 • km)	≤ 0.062
Cut-off wavelength	IEC / EN 60793-1-44	λ_{cc} nm	≤ 1530 *
Macrobending loss 100 turns on a ø 30 mm mandrel at 1550 nm 100 turns on a ø 30 mm mandrel at 1625 nm	IEC / EN 60793-1-47	dB	 ≤ 0.03 ≤ 0.1
Polarisation mode dispersion (PMD) coefficient, max. uncabled	IEC / EN 60793-1-48	ps/√km	≤ 0.1
PMD_Q Link Design Value (calculated with Q=0.01%)	IEC / EN 60794-3	ps/√km	≤ 0.04
Proof stress level	IEC / EN 60793-1-30	Gpa	≥ 1.4 (≈ 2 % strain)
Strip force (peak)	IEC / EN 60793-1-32	N	1.2 ≤ Fpeak.strip ≤ 8.9
Dynamic fatigue resistance aged and unaged (N_d)	IEC / EN 60793-1-33		≥ 20
Static fatigue resistance (N_s)	IEC / EN 60793-1-33		≥ 23

** valeur garantie selon UIT-T (méthode ATM G650)*

Note: The Draka Comteq Cable Solutions policy of continuous improvement may cause in changed specifications without prior notice
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