



- **IEC 60794-3-11**
- **Central loose tube construction**
- **Tube:** Thermoplastic material, containing up to 24 optical fibres filled with a low viscosity, thixotropic, non-melting gel fully compatible with fibre coating and tube material
- **Peripheral strength members:** Glass fibre reinforced plastic with super absorbent coating material
- **Longitudinal water tightness:** Water swellable elements (dry-core)
- **Sheath:** UV stabilised polyethylene in compliance with AS 1049. Two ripcords provided beneath the sheath for easy removal
- **Outer jacket:** UV stabilised polyamide (Nylon) in compliance with AS 1049 integrally bonded to PE sheath

1. Application and Installation

This loose tube dielectric optical cable is designed for external underground installations in ducts by pulling, jetting or floating techniques or by direct burial in open-cut trenches. Mainly used for distribution and access network. Polyamide provides anti-termite protection.

2. Cable Technical Specifications

Technical data

Number of Fibres		2 to 24		
Number of elements		1		
Tube/ Filler diametre	mm	3.7		
Cable nominal diametre	mm	8.4		
Cable nominal weight	kg/km	59		
Max. installation tension	kN	2		
Max. crush resistance	kN/100mm	2.0 (Short term) / 1.0 (Long term)		
Min. bending radius	mm	At full load 180 At no load 90		
Temperature range	°C	Installation -0 -> +50	Transport & Storage -20 -> +70	Operation -10 -> +70

Optical Characteristics

See the attached cabled optical fibre data sheet.

Identification

Fibre Colours

No.	1	2	3	4	5	6	7	8	9	10	11	12
Colour	blue	orange	green	brown	grey	white	red	black	yellow	violet	pink	aqua
No.	13	14	15	16	17	18	19	20	21	22	23	24
Colour	blue	orange	green	brown	grey	white	red	black	yellow	violet	pink	aqua

Sheath Colour:

The outer sheath colour is blue.

Main mechanical characteristics

Parametre	Test method	Test conditions	Acceptance criteria*
Tensile strength	IEC 60794-1-21-E1 Figure 2	Load: As per cable maximum tensile strength in table above	After 30 minutes the maximum strain on the fibre should not exceed 0.6% and no attenuation increase occurs after test
Crush	IEC 60794-1-21-E3	Short time: 10min Long time: 120min Load: As per maximum crush resistance in table above Number of positions: 3 adjacent sections (ensuring one over tube and one over lay reversal)	No damage to the sheath or to the core structure and no attenuation increase occurs after test
Impact	IEC 60794-1-21-E4	Weight: 1.5 kg Height: 1.0 m Anvil radius: 300mm Impacts: 3	After 5 minutes no fibre breaks, no damage to the sheath or to the core structure and no attenuation increase occurs after test
Torsion	IEC 60794-1-21-E7	Sample length: 1m Rotation: a) 180° clockwise, b) return to starting position, c) 180° anticlockwise d) return to starting position. Four movements constitute one cycle. Complete 10 cycles (a to d) in one minute maximum	During the final tenth cycle at a), c) and after completion (no rotation) check transmitting fibres. No fibre breaks, no damage to the sheath or to the core structure and no attenuation change throughout test
Bend	IEC 60794-1-21-E11	Mandrel radius: As per Min. bending radius at no load stated in technical data Bend: 360°, 5 turns, 3 cycles	No attenuation change throughout test
Bend under tension	Concurrent to tensile test IEC 60794-1-21-E18A	Mandrel radius: As per Min. bending radius at full load state in technical data Bend: 360°, 1 turn	After 1 minute no fibre breaks, no damage to the sheath or to the core structure and no attenuation change throughout test
Temperature cycling	IEC 60794-1-22-F1	Sample length: 1000 m (minimum) Temperature range: -10°C to + 70°C	There should be no average attenuation increase at the temperature extremes when compared to the attenuation at ambient temperatures. No individual fibre should measure an attenuation greater than 0.15 dB/km
Water penetration	IEC 60794-1-22-F5B	Sample length = 3m, Water height = 1m	No water leakage after 24 hours

*All optical measurements for singlemode fibres performed at 1550 nm.

3. Fibres Technical Specifications

Standards and Norms

IEC 60793-2-50 Category B.1.3	ISO/IEC 11801 and ISO / IEC 24702: Cat. OS2 and OS1
AS/NZS 3080	ITU-T Recommendation G.652 D (Including A, B and C)

Attenuation of cabled fibre

Attribute	Measurement method	Units	Limits
Maximum attenuation value of cable @ 1310 nm	IEC 60793-1-40	dB/km	0.35
Maximum attenuation value of cable @ 1383 nm		dB/km	0.35
Maximum attenuation value of cable @ 1550 nm		dB/km	0.21
Maximum attenuation value of cable @ 1625 nm		dB/km	0.24

Group index of refraction

Attribute	Measurement method	Values
Effective group index at 1310 and 1383 nm	IEC 60793-1-22	1.467
Effective group index at 1550 and 1625 nm		1.468

Optical properties

Attribute	Measurement method	Units	Limits
Mode field diametre at 1310 nm at 1550 nm	IEC 60793-1-45	μm μm	9.2 ± 0.4 10.4 ± 0.5
Chromatic dispersion coefficient: In the interval between 1285 nm and 1330 nm @ 1550 nm @ 1625 nm	IEC 60793-1-42	ps/km.nm ps/km.nm ps/km.nm	≤ 3.5 ≤ 18 ≤ 22
Zero dispersion wavelength		nm	1302 to 1322
Zero dispersion slope		ps/(nm ² .km)	≤ 0.092
Cut-off wavelength	IEC 60793-1-44	nm	$\leq 1260^*$
Polarisation mode dispersion (PMD) coefficient	IEC 60793-1-48	ps/ $\sqrt{\text{km}}$	≤ 0.1
PMDQ Link value (calculated with Q=0.01%;m=20)	IEC 60794-3	ps/ $\sqrt{\text{km}}$	≤ 0.07

*guaranteed value according to the ITU-T (ATM G650) method