



- **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	white	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 60793-2-10 Category A1_a	ISO/IEC 11801 Category OM3	AS / NZS 3080
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Attenuation of cabled fibre

Attribute	Measurement method	Units	Limits
Maximum attenuation value of cable @ 850 nm	IEC 60793-1-40	dB/km	2.7
Maximum attenuation value of cable @ 1300 nm		dB/km	0.8
Inhomogeneity of OTDR trace for any two 1000 m fibre lengths		dB/km	Max. 0.2

Bandwidth

Attribute	Measurement method	Units	Values
850 nm	IEC 60793-1-41	MHz.km	1500
1300 nm		MHz.km	500
Effective laser bandwidth @850 nm		MHz.km	2000

Group index of refraction

Attribute	Measurement method	Values
Effective group index at 850 nm	IEC 60793-1-22	1.482
Effective group index at 1300 nm		1.477

Optical properties

Attribute	Measurement method	Units	Limits
Core diametre	IEC 60793-1-22	µm	50 ± 2.5
Cladding diametre		µm	125 ± 1.0
Cladding non-circularity		%	≤ 1.0
Core non-circularity		%	≤ 5
Core cladding concentricity error		µm	≤ 1.5
Primary coating diametre		µm	245 ± 10
Primary coating non-circularity		%	≤ 5
Primary coating-cladding concentricity error		µm	≤ 10
Proof stress level	IEC 60793-1-30	Gpa	≥ 0.7 (= 1 %)
Typical average strip force	IEC 60793-1-32	N	1.7
Strip force peak (F)		N	1.2 ≤ F ≤ 8.9
Numerical aperature	IEC 60793-1-43	µm	0.200 ± 0.015