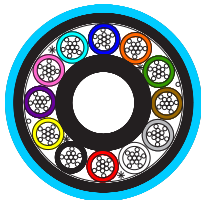


## MINI LOOSETUBE - OM4

### External Mini Loose Tube Optical Cable for use in micro ducts

#### DESCRIPTION

This loose tube dielectric optical cable is designed for external underground installations in (micro) ducts by pulling, blowing or floating techniques. Polyamide provides anti-termite protection. Optimised for blowing in mini ducts of 10mm diameter (internal).



MaxCap BendBright® OM4 fibres are laser-optimised, bend-insensitive, graded-index multimode fibres engineered for transmission speeds of 10 Gb/s and higher. They are ideal for systems operating at wavelengths of 850 nm and 1300 nm. Featuring BendBright® technology, these fibres offer superior macro-bending performance.

#### FEATURES

- Multi-loose tube construction – Single layer 2 to 144 fibres
- Central strength member (CSM): Glass fibre reinforced plastic material (GRP) with or without over-sheathing
- Tube: Thermoplastic material, containing up to 12 optical fibres filled with a low viscosity, thixotropic, non-melting gel fully compatible with fibre coating and tube material
- Stranding: The required numbers of elements (tubes and fillers) are SZ stranded around the central strength member
- 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

#### STANDARDS

- IEC 60793-2-10: type A1a.3
- ISO / IEC 11801 Category OM4
- ITU G.651.1

#### TECHNICAL DATA

Number of Fibres		2 to 72	96	114
Number of elements		6	8	12
Tube / Filler diameter	mm	1.55		1.35
Cable nominal diameter	mm	6.3	7.4	8.4
Cable nominal weight	kg/km	33	49	62
Max. installation tension	kN	1.0	2.0	2.0
Max. crush resistance	kN/100mm	2.0	2.0	2.0
Min. bending radius	mm			
At full load		130	220	220
At no load		65	110	110
Temperature range	°C	Installation -0 -> +50	Transport & Storage -20 -> +70	Operation -10 -> +70

#### IDENTIFICATION

##### Fibre and Buffer Tube 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

Fillers are either natural (opaque) or black.

**Sheath Colour:**

The outer sheath colour is blue.

**MAIN MECHANICAL CHARACTERISTICS**

Parameter	Test method	Test conditions	Acceptance criteria*
Tensile strength	IEC 60794-1-21-E1	Load: As per cable maximum installation tension in technical data table above	Fibre strain $\leq 0.6\%$ . No physical damage and no change in attenuation after test.
Crush	IEC 60794-1-21-E3	Load: As per maximum crush resistance in technical data table above Duration: 10 min	No physical damage. No change in attenuation after test.
Impact	IEC 60794-1-21-E4	Impact energy: 1 J Anvil radius: 300 mm	No physical damage. No change in attenuation after test.
Torsion	IEC 60794-1-21-E7	Sample length: 1 m Rotation: $\pm 180$ degree, 10 cycles	No physical damage. No change in attenuation after test.
Bend	IEC 60794-1-21-E11	Mandrel radius: As per Min. bending radius at no load in technical data table above No. of turns/helix: 4, No. of cycles: 3	No physical damage. No change in attenuation after test.
Bend under tension	Concurrent to tensile test	Mandrel radius: As per Min. bending radius at full load in technical data table above Bend: $360^\circ$ , 1 turn	No physical damage. No change in attenuation after test.
Temperature cycling	IEC 60794-1-22-F1	Sample length: 1000 m (minimum) Temperature range: As per Operation temperature range in technical data table above	No change in attenuation between $10^\circ\text{C}$ & $30^\circ\text{C}$ . Max. change in attenuation $\leq 0.15\text{dB/km}$ between Min. & Max. operation temperatures.
Cable aging	IEC 60794-1-22-F9	$85^\circ\text{C}$ for 168 h followed by Temperature cycling	Max. change in attenuation $\leq 0.10\text{dB/km}$ after test
Water penetration	IEC 60794-1-22-F5C	Sample length=3m, Water height=1m	No water leakage after 24 hours
* All optical measurements for singlemode fibres performed at 1550 nm.			

## CABLE PROPERTIES

### Attenuation & Optical properties

Attribute	Measurement	Units	Limits
Attenuation @ 850 nm	IEC 60793-1-40	dB/km	$\leq 2.5$
Attenuation @ 1300 nm		dB/km	$\leq 0.7$
Point discontinuity @ 850 nm & 1300 nm		dB/km	$\leq 0.1$
Numerical aperture	IEC 60793-1-43	-	$0.200 \pm 0.015$

### Bandwidth

Attribute	Measurement	Units	Limits
Overfilled launch modal bandwidth (OFL) @ 850 nm	IEC 60793-1-41	MHz.km	$\geq 3500$
Overfilled launch modal bandwidth (OFL) @ 1300 nm		MHz.km	$\geq 500$
Effective modal bandwidth (EMB) @ 850 nm	IEC 60793-1-49	MHz.km	$\geq 4700$

### Group index of refraction

Attribute	Measurement	Units	Limits
Typical group index of refraction @ 850 nm	IEC 60793-1-22	-	1.482
Typical group index of refraction @ 1300 nm		-	1.477

### Geometrical properties

Attribute	Measurement	Units	Limits
Core diameter	IEC 60793-1-20	$\mu\text{m}$	$50 \pm 2.5$
Core non-circularity		%	$\leq 5$
Cladding diameter		$\mu\text{m}$	$125.0 \pm 1.0$
Cladding non-circularity		%	$\leq 1.0$
Core-cladding concentricity error		$\mu\text{m}$	$\leq 1.5$
Primary coating diameter	IEC 60793-1-21	$\mu\text{m}$	$245 \pm 10$
Primary coating non-circularity		%	$\leq 5$
Primary coating-cladding concentricity error		$\mu\text{m}$	$\leq 10$

## Bending Loss

Attribute	Measurement	Units	Limits
2 turns on a R= 7.5 mm mandrel @ 850 nm	IEC 60793-1-40	dB	$\leq 0.2$
2 turns on a R= 7.5 mm mandrel @ 1300 nm		dB	$\leq 0.5$
2 turns on a R= 15 mm mandrel @ 850 nm		dB	$\leq 0.1$
2 turns on a R= 15 mm mandrel @ 1300 nm		dB	$\leq 0.3$

## Mechanical properties

Attribute	Measurement	Units	Limits
Proof stress level	IEC 60793-1-30	GPa	$\geq 0.7$ ( $\approx 1\%$ )
Average strip force ( $F_{ave}$ )	IEC 60793-1-32	N	$1.0 \leq F_{ave} \leq 3.0$
Peak strip force ( $F_{peak}$ )		N	$1.3 \leq F_{peak} \leq 8.9$