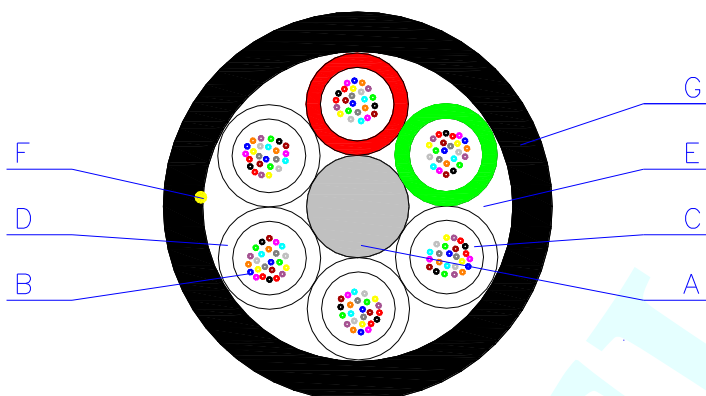


OPTICAL CABLES for TELECOMMUNICATION.

Miniaturized optical cables for installation into miniducts, using blowing technique, containing from 24 to 144 Single Mode fibres.

1. Cable cross-section, diameter, weight



- A) Dielectric central element and strength member
- B) Colored optical fibres: 12 or 24 fibres per tube
- C) Tube filling compound: synthetic jelly
- D) Loose buffer tube: special tecnopolymer
- E) Core filling: dry with water blocking elements
- F) Rip-cord
- G) Outer jacket: Polyethylene High/Medium density, black

Cable designation according to CEI standard	Number of optical fibres	Number of fibres per tubes	Nominal outer diameter (mm)	Nominal weight (kg/km)
TOL6D 24 2(12SMR) T/E	24	2 x 12	6,4	45
TOL6D 48 4(12SMR) T/E	48	4 x 12		
TOL6D 60 5(12SMR) T/E	60	5 x 12		
TOL6D 72 4(12SMR) T/E	72	6 x 12		
TOL6D 96 4(24SMR) T/E	96	4 x 24	7,4	65
TOL6D 120 5(24SMR) T/E	120	5 x 24		
TOL6D 144 6(24SMR) T/E	144	6 x 24		

2. Mechanical and environmental characteristics

Characteristic	24 to 72 fibres	96 to 144 fibres
Maximum tensile strength	1000 N	1000 N
Minimum bending radius – dynamic	130 mm	150 mm
Temperature range – operation	-30 ÷ 60°C	-30 ÷ 60°C

3. Marking

Marking on the outer jacket in contrasting colour, with the following text:

“Manufacturer – Manufacturing year – OPTICAL CABLE – Cable identification according to CEI standards (see point 1) – Length marking – Number identifying the cable length”

Example:

0001 1234 ECO.TEL. - 2012 - OPTICAL CABLE – TOL6D 144 6(24SMR) T/E 0002 1234

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4. Colour code

Colour of optical fibres inside loose tubes						
Optical Fibres	Fibre n° 1	Fibre n° 2	Fibre n° 3	Fibre n° 4	Fibre n° 5	Fibre n° 6
	Red	Green	Yellow	Brown	Blue	Violet
	Fibre n° 7	Fibre n° 8	Fibre n° 9	Fibre n° 10	Fibre n° 11	Fibre n° 12
	Black	Pink	Orange	Cyan	White	Grey
	Fibra n° 13	Fibra n° 14	Fibra n° 15	Fibra n° 16	Fibra n° 17	Fibra n° 18
	Red / black ring	Green / black ring	Yellow / black ring	Brown / black ring	Blue / black ring	Violet / black ring
	Fibra n° 19	Fibra n° 20	Fibra n° 21	Fibra n° 22	Fibra n° 23	Fibra n° 24
Natural / black ring	Pink / black ring	Orange / black ring	Cyan / black ring	White / black ring	Grey / black ring	
Colour of loose tubes						
Tubes	Tube n° 1	Tube n° 2	Tube n° 3	Tube n° 4	Tube n° 5	Tube n° 6
	Red	Green	White	White	White	White

5. Delivery lengths

Standard delivery length: 3100 m with tolerance ± 100 m.

Delivery lengths other than the standard can be produced upon special request.

Short lengths, minimum 500 m, can be supplied, in quantity not exceeding the 7% of the total ordered lengths, with a minimum of 2.

6. Mechanical and environmental tests on finished cable

Test	Test method	Test parameters	Conditions
Tensile	IEC 60794-1-2-E1 EN 187000 met.501	Tensile load : 1000 N	Fibre elongation $\leq 0.5\%$ No permanent attenuation increase
Crush	IEC 60794-1-2-E3 EN 187000 met.504	Load : 1000 N/10 cm	No fibre breaks
Impact	IEC 60794-1-2-E4 EN 187000 met.505	Energy: 3 N*m	No fibre breaks
Temperature cycling	IEC 60794-1-2-F1 EN 187000 met.601	Range : -30 °C / 60° C	No attenuation increase at 1550 nm (≤ 0.1 dB/km)
Water penetration	IEC 60794-1-2-F5 EN 187000 met.605B	Length : 3 m Time : 24 h	No water leakage

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7. Characteristics of Single Mode fibres, according to Recommendation ITU-T G.652, type D

Material Constituents

- Fiber core: SiO₂ doped with GeO₂
- Fiber cladding: pure SiO₂
- Coating: double layer UV-cured acrylate
- Design: step index profile, matched cladding

Optical Specifications

Attenuation Coefficient (cabled fibers)

at 1310 nm	≤ 0.37 dB/km
at 1550 nm	≤ 0.24 dB/km
at 1383 ± 3 nm	≤ 0.37 dB/km

Cable cut-off Wavelength λ_{ccf} ≥ 1260 nm

Mode Field Diameter (Petermann II Definition)

at 1310 nm 9.2 ± 0.4 μm

Chromatic Dispersion

at 1285 nm to 1330 nm	≤ 3.5 ps/(nm*km)
at 1550 nm	≤ 18 ps/(nm*km)

Zero Dispersion Wavelength λ_o

1310 nm to 1324 nm

Zero Dispersion Slope S_o ≤ 0.092 ps/(nm²*km)

Polarization Mode Dispersion coefficient PMD

Link Design Value ≤ 0.06 ps/√km *

Cabled fibers ≤ 0.2 ps/√km **

Geometrical Specifications

- Cladding Diameter 125.0 ± 1.0 μm
- Core/Cladding Concentricity Error ≤ 0.5 μm
- Cladding Non-Circularity ≤ 1.0 %
- Coating Diameter 245 ± 5 μm

Mechanical Specifications

- All fibers are proof tested over the whole length to a level of 100 kpsi or 0.7 GN/m² or 1% elongation.
- Coating Stripping Force (mechanically strippable) 1.0 ÷ 8.9 N

* This value is guaranteed by the fiber manufacturer. Complies with IEC 60794-3:2000, Method 1, March 2000.

** PMD on cabled fibers is tested on a sampling plane basis, sufficient to assure that the product respects the stated characteristics.

0	28/09/2012	Emissione	G. Maiorani	G. Di Censo
Rev.	Data	Commenti	Emesso	Approvato