

Optical Fibre Cable Technical Specification

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Micro duct Cable for Installation by Blowing

1031017-4,12B6a1



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1. General

This specification covers the design and performance of the single mode optical cables to be used in air blown micro duct application.

1.1 Cable Description

- 4,12 B6a1 SM-fibers.
- Central tube structure.
- Suitable for air blown cable in micro-duct installation.

1.2 Quality

YOFC ensures a continuing level of quality in our cable products through several programs including ISO 9001.

1.3 Reliability

YOFC ensures product reliability through rigorous qualification testing of each product family. Both initial and periodic qualification testing are performed to assure the cable's performance and durability in the field environment.

1.4 Reference

ITU-T G.657	Characteristics of a bending-loss insensitive single-mode optical fibre and cable for the access network
IEC 60794-1-1	Optical fiber cables- part1-1-Generic Specification-General
IEC 60794-1-2	Optical fiber cables- part1-2-Generic Specification-Basic optical cable test procedure
IEC 60794-3	Optical fiber cables- part3-Sectional specification- Outdoor cables
IEC 60794-5	Optical fiber cables- part5-Sectional specification- Micro duct cabling for installation by blowing

1.5 Working Condition

Transportation and storage temperature: -40°C~+70°C

Installation temperature: -5°C~+60°C

Operation temperature: -20°C~+70°C

1.6 Minimum Allowable Bending Radius

Static: 15D

Dynamic: 20D

1.7 Life Time

Optical fiber cables supplied in compliance with the specifications can be capable of withstanding the typical service condition for a period of 25 years without detriment to the transmission or operation and maintenance characteristics of the cable.

2. Optical Fiber in Cable (ITU-G.657A1)

Optical properties of the SM fiber are achieved through a germanium doped silica-based core with a pure silica cladding which meets ITU-T G.657A1, UV curable acrylate protective coating is applied over the glass cladding to provide the necessary maximum fiber lifetime.

Geometrical, optical, and mechanical characteristics of fiber in cable as the following table:

Category	Description	Specification
Geometrical Characteristics	Cladding diameter	$125.0 \pm 0.7 \mu\text{m}$
	Cladding non-circularity	$\leq 0.7 \%$
	Core concentricity error	$\leq 0.5 \mu\text{m}$
	Coating/cladding concentricity error	$\leq 12 \mu\text{m}$
	Coating diameter(uncolored)	$245 \pm 10 \mu\text{m}$
	Coating diameter(colored)	$250 \pm 15 \mu\text{m}$
Optical Characteristics	Mode field diameter at 1310 nm	8.4~9.2 μm
	Point discontinuity	$\leq 0.05 \text{ dB}$
	Attenuation at 1310 nm	$\leq 0.36 \text{ dB/km}$
	Attenuation at 1550 nm	$\leq 0.23 \text{ dB/km}$
	Dispersion at 1550 nm	$\leq 18 \text{ ps}/(\text{nm} \cdot \text{km})$
	Zero dispersion wavelength	1300 – 1324 nm
	Zero dispersion slope	$\leq 0.092 \text{ ps}/(\text{nm}^2 \cdot \text{km})$
	Cable cut-off wavelength	$\leq 1260 \text{ nm}$
	Polarization mode dispersion individual fiber	$\leq 0.2 \text{ ps}/\sqrt{\text{km}}$
	Polarization mode dispersion design link value (M=20, Q=0.01%)	$\leq 0.1 \text{ ps}/\sqrt{\text{km}}$
	Macro-bend loss (10 turns, 15 mm, radius)	$\leq 0.25 \text{ dB at } 1550\text{nm}$ $\leq 1.0 \text{ dB at } 1625\text{nm}$
	Macro-bend loss (1 turn, 10 mm radius)	$\leq 0.75 \text{ dB at } 1550\text{nm}$ $\leq 1.5 \text{ dB at } 1625\text{nm}$
Mechanical Specification	Proof stress level	$\geq 100 \text{ kpsi (0.69 GPa)}$
	Coating strip force (peak value)	1.3~8.9 N
	Fiber curl (Radius)	$\geq 4 \text{ m}$

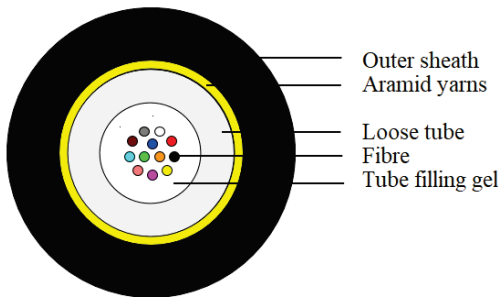
3. Optic Cable

3.1 General Design

- Optical fibers are housed in central loose tube that is made of high-modulus plastic and filled with waterproof compounds.
- Aramid yarn as strength member.
- Polyethylene sheath is applied over the cable core.

3.2 Construction

3.2.1 Cross Section of Cable



3.2.2 Dimensions and Descriptions of Cable Constructions

Item	contents	Value	
Fibre	number	4	12
Loose tube	Color	Natural or white	
	Water blocking material	Tube filling compound	
Outer sheath	Material	HDPE	
	Color	Black	
Cable diameter($\pm 0.1\text{mm}$)		2.3	2.5
Cable weight approx.(kg/km).		5 ± 1	

3.2.3 Mechanical Performance of Cable

Tensile performance(N)		Crush(N/100mm)	
Short term	Long term	Short term	Long term
0.5G	0.15G	500	200

3.2.4 Color Code of the Fiber

Each fiber can be identifiable throughout the length of the cable in accordance with the following color sequence.

Fibre color code	1	2	3	4	5	6	7	8	9	10	11	12
	White	Red	Yellow	Green	Blue	Grey	Brown	Black	Violet	Turquoise	Orange	Pink

*The color of tube is natural or white.

* Different color code available upon customer's requirement.

3.3 Mechanical, Electrical and Environmental Test Characteristics

The finished cables can be subjected to the following mechanical, electrical and environmental conditions.

Item	Test Method	Requirements
Tensile performance	IEC 60794-1-21-E1 0.5G, 5min, 50m	$\Delta\alpha \leq 0.05\text{dB}$, no damage.
Crush	IEC 60794-1-21-E3A 500N/10cm, 10min, 3 times	$\Delta\alpha \leq 0.05\text{dB}$, no damage.
Impact	IEC 60794-1-21-E4 1J, 3 impacts, R=300mm	$\Delta\alpha \leq 0.05\text{dB}$, no damage.
Repeated bending	IEC 60794-1-21-E6 R=20D, 25 cycles	$\Delta\alpha \leq 0.05\text{dB}$, no damage.
Bend	IEC 60794-1-21-E11 R=15D, 3 cycles, 4 turns.	$\Delta\alpha \leq 0.05\text{dB}$, no damage.
Torsion	IEC 60794-1-21-E7 10 cycles, $\pm 180^\circ$	$\Delta\alpha \leq 0.05\text{dB}$, no damage.
Temperature cycling	IEC 60794-1-22-F1 -20°C ~ +70°C; 2 cycles; 6h / cycle	$\Delta\alpha \leq 0.1\text{dB/km}$, no damage.
Water penetration	IEC 60794-1-22-F5B 3m sample, 1m height, 24h	No water leakage.
Drip test	IEC 60794-1-2-E14 70 °C, length 300mm	No drip
Jet performance	Conform to IEC 60794-5-10	

4. Cable Sheath Marking

Unless otherwise specified, the cable sheath marking shall be as follows:

- Color: white
- Interval: 1m

5.1 Reel Length

Standard reel length: 3 km/reel, other length is also available.

5.2 Cable Drum

The cables are packed in wooden drums.

5.3 Cable Packing

Both cable ends are provided with protections against water penetration and firmly secured to the drum, so the cable cannot move and the turns cannot slide when it is moved, handled or laid. the inner end has at least 1m of accessible length to perform reception tests in the cables.