

Optical Fibre Cable Technical Specification

Universal Cable

G48 - G96 - G144

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1. General

1.1 Scope

This Specification covers the design requirements and performance standard for the supply of optical fibre cable in the industry. YOFC ensures a stable quality control system for our cable products through several programs including ISO 9001, ISO 14001 and OHS.

Cable type	Application
GJFH-48,96,144B6a1	Universal cable

1.2 Reference

The cable offered by YOFC are designed, manufactured and tested according to the standards as follows:

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 fibre cables-part 1-1: Generic specification-General
IEC 60794-1-21	Optical fiber cables- part1-21-Generic specification-Basic optical cable test procedure-Mechanical test methods
IEC 60794-1-22	Optical fiber cables- part1-22-Generic specification-Basic optical cable test procedure-Environmental test methods
IEC 60794-2	Optical fibre cables – Part 2: Indoor cables – Sectional specification
IEC 60794-2-20	Optical fibre cables - Part 2-20 Indoor cables - Family specification for multi-fibre optical cables

1.3 Life Time

Optical fibre cables supplied in compliance with this specifications is capable to withstand the typical service condition for a period of 25 years without detriment to the operation characteristics of the cable.

1.4 Application

Item	Value
Installation temperature	-5℃～+50℃
Operation temperature	-30℃～+70℃
Storage temperature	-40℃～+70℃
Bending radius(Installation)	15D(D: Cable diameter)
Bending radius(Operation)	10D(D: Cable diameter)

2. Optical Fibre

Optical properties of the SM fiber are achieved through a germanium doped silica based core with a pure silica cladding which meets ITU-T G657A1, 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:

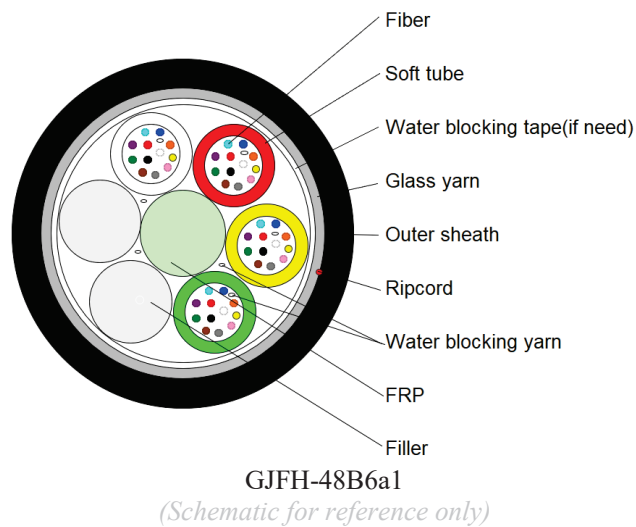
Category	Description	Specification
Geometric characteristic	Cladding diameter	$125.0 \pm 0.7\mu\text{m}$
	Cladding non-circularity	$\leq 0.7\%$
	Core-cladding concentricity error	$\leq 0.5\mu\text{m}$
	Coating diameter (uncolored)	$245 \pm 10\mu\text{m}$
	Coating diameter (colored)	$250 \pm 15\mu\text{m}$
	Coating-cladding concentricity error	$\leq 12\mu\text{m}$
Transmission characteristic	Attenuation coefficient at 1310 nm	$\leq 0.38\text{dB/km}$
	Attenuation coefficient at 1550 nm	$\leq 0.25\text{dB/km}$
	Attenuation coefficient at 1625 nm	$\leq 0.30\text{dB/km}$
	Mode field diameter at 1310nm	$8.4\sim 9.2\mu\text{m}$
	Cable cutoff wavelength (λ_{cc})	$\leq 1260\text{ nm}$
	Zero Dispersion Wavelength (λ_0)	$1300 \leq \lambda_0 \leq 1324\text{ nm}$
	Zero Dispersion Slope (S_0)	$\leq 0.092\text{ ps}/(\text{nm}^2.\text{km})$
	Dispersion coefficient at (1285nm-1330nm)	$\leq 3.5\text{ps}/(\text{nm.km})$
	Dispersion coefficient at 1550 nm	$\leq 18\text{ps}/(\text{nm.km})$
	Macro-bend loss (10 turns, 15mm,radius)	$\leq 0.25\text{ dB at }1550\text{nm}$ $\leq 1.0\text{ dB at }1625\text{nm}$
	Macro-bend loss (1 turn, 10mm radius)	$\leq 0.75\text{ dB at }1550\text{nm}$ $\leq 1.5\text{ dB at }1625\text{nm}$
Mechanical characteristic	Proof stress level	$\geq 100\text{kpsi (0.69Gpa)}$
	Fibre curl radius	$\geq 4\text{ m}$
Other Characteristics	Conform to IEC 60793-2-50	

3. Optical Cable

3.1 Technical Characteristics

- Several optical fibres are housed in a soft tube.
- A FRP is applied as the central strength member and the soft tubes are stranded around the FRP.
- Glass yarns are used in the cable core as the strength member.
- LSZH sheath with UV resistance is applied over the cable core.

3.2 Cross Section of Cable



3.3 Fibre Identification

The color code of fibres will be identification in accordance with the following color sequence, other sequence also is available.

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 code of soft tube will be identification in accordance with the following color sequence, other sequence also is available.

Soft tube 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

3.4 Cable structure and relevant properties

Item	Contents	Value		
		48	96	144
Soft tube	Fiber count per tube	12		
	Tube counts	4	8	12
	Color	According to 3.3		
	Material	LSZH		
	Water blocking material	Water blocking yarn		
	Diameter($\pm 0.1\text{mm}$)	1.6		
Filler	Count	2	0	0
	Material	LSZH		
Strength member	Assemble	FRP and/or glass yarns		
Outer sheath	Material	LSZH with UV resistance		
	Color	Black		
	Thickness(mm)	Minimum 1.0		
Cable diameter($\pm 0.5\text{mm}$)		8.4	9.4	11.0
Cable weight(kg/km) Approx.		78	95	128
Tensile load(N)	Long term(Tl)	500	700	1000
	Short term(Ts)	2000	2200	3000
Crush(N)	Long term(Tl)	300		
	Short term(Ts)	1000		

4. Mechanical, Physical and Environmental Test Characteristics

The mechanical and environmental performance of the cable are in accordance with the following table.

Unless otherwise specified, all attenuation measurements required in this section shall be performed at 1550nm.

No.	Items	Test Method	Requirements
4.1	Tensile performance	IEC 60794-1-21-E1 Load: according to 3.4 Cable length under tension: $\geq 50\text{m}$. Duration of load sustain: 10 min.	Fibre strain $\leq 0.6\%$ $\Delta a \leq 0.05\text{dB}$. No damage to outer jacket.
4.2	Crush	IEC 60794-1-21-E3 Load: 1000N for 1min	$\Delta a \leq 0.05\text{dB}$ after test. No damage to outer jacket.
4.3	Impact	IEC 60794-1-21-E4 Hammer radius: 12.5mm Number of impacts: One in 3 different places spaced not less than 500 mm apart. Impact energy: 3J.	$\Delta a \leq 0.05\text{dB}$ after test. No damage to outer jacket.

4.4	Repeated bending	IEC 60794-1-21-E6 Bending radius: 20*D Cycles: 30 Load: 20N	$\Delta\alpha \leq 0.05\text{dB}$ after test. No damage to outer jacket.
4.5	Torsion	IEC 60794-1-21-E7 Test length=1m Load=20N Turns= $\pm 180^\circ$ Number of cycles: 10	$\Delta\alpha \leq 0.05\text{dB}$ after test. No damage to outer jacket.
4.6	Bend	IEC 60794-1-21-E11A Radius $r=10D$ (D: cable diameter) Number of turns: 4 Number of cycles: 3	$\Delta\alpha \leq 0.05\text{dB}$ after test. No damage to outer jacket.
4.7	Temperature cycling	IEC 60794-1-22-F1 Temperature range: $T_{A1}: -30^\circ\text{C}$, $T_{A2}: -40^\circ\text{C}$, $T_{B1}: +70^\circ\text{C}$, $T_{B2}: +70^\circ\text{C}$ Cycles: 2 Dwell time: 8h	During test: $\Delta\alpha \leq 0.05\text{ dB/km}$ for T_{A1} and T_{B1} $\Delta\alpha \leq 0.15\text{ dB/km}$ for T_{A2} and T_{B2} After test: $\Delta\alpha$ reversible
4.8	Water penetration	IEC 60794-1-22-F5C Time: 24 hours Sample length: 3m Water height: 1m	No water leakage.
4.8	CPR	Dca	

5. Packaging and Drum

5.1 Cable Sheath Marking

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

Color: White

Interval: 1m

Outer sheath marking legend can be changed according to user's requests.

5.2 Reel Length

Standard reel length: 2km/reel, other length is also available.

5.3 Cable Drum

The cables are packed in wooden drums.

5.4 Cable Packing

Both ends of the cable will be sealed with suitable plastic caps to prevent the entry of moisture during shipping, handling and storage.