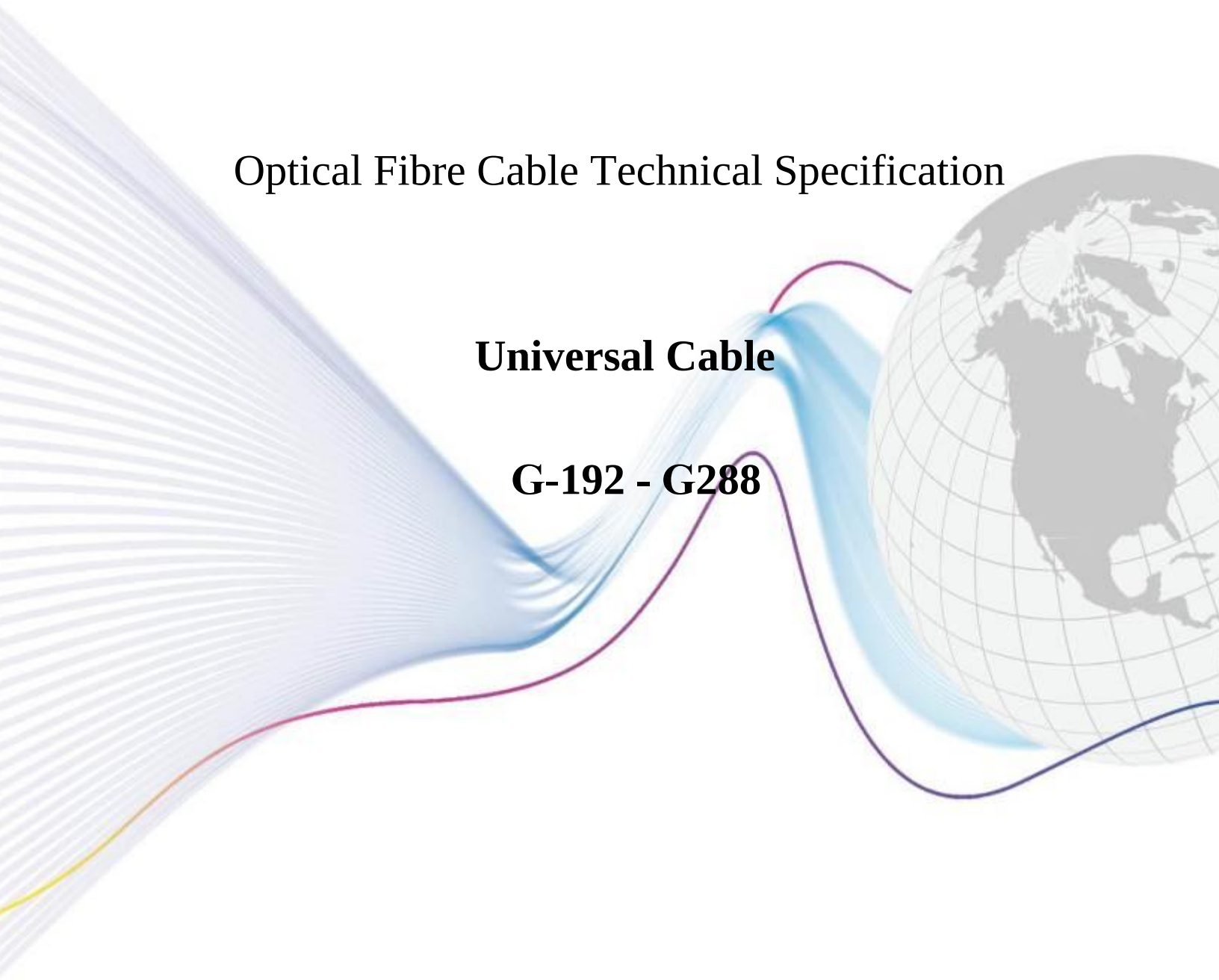
Optical Fibre Cable Technical Specification



Universal Cable

G-192 - G288

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-192~288B6a1	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:

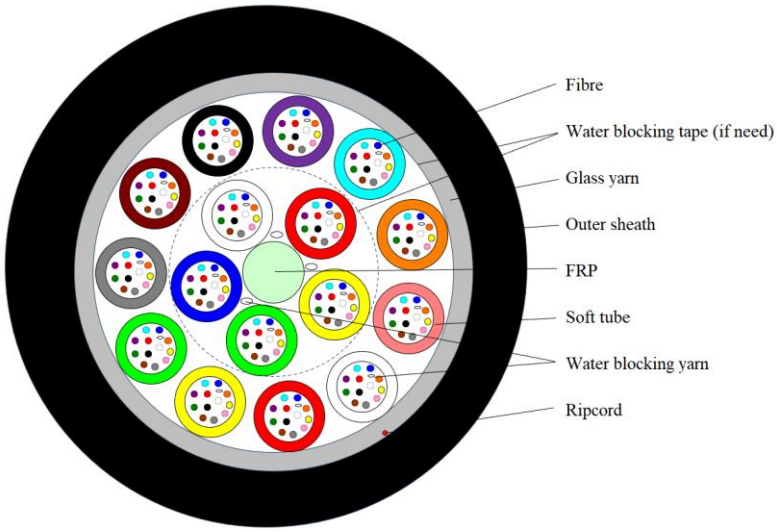
Category	Description	Specification
Geometric characteristic	Cladding diameter	125.0 ±0.7μm
	Cladding non-circularity	≤0.7 %
	Core-cladding concentricity error	≤ 0.5μm
	Coating diameter (uncolored)	245±10μm
	Coating diameter (colored)	250±15μm
	Coating-cladding concentricity error	≤ 12μm
Transmission characteristic	Attenuation coefficient at 1310 nm	≤0.38dB/km
	Attenuation coefficient at 1550 nm	≤0.25dB/km
	Attenuation coefficient at 1625 nm	≤0.30dB/km
	Mode filed diameter at 1310nm	8.4~9.2μm
	Cable cutoff wavelength (λcc)	≤ 1260 nm
	Zero Dispersion Wavelength (λ0)	1300 ≤ λ0 ≤ 1324 nm
	Zero Dispersion Slope (S0)	≤0.092 ps/(nm2.km)
	Dispersion coefficient at（1285nm-1330nm）	≤ 3.5ps/(nm.km)
	Dispersion coefficient at 1550 nm	≤ 18ps/(nm.km)
	Macro-bend loss (10 turns, 15mm,radius)	≤0.25 dB at 1550nm ≤ 1.0 dB at 1625nm
	Macro-bend loss (1 turn, 10mm radius)	≤0.75 dB at 1550nm ≤ 1.5 dB at 1625nm
Mechanical characteristic	Proof stress level	≥ 100kpsi (0.69Gpa)
	Fibre curl radius	≥4 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



GJFH-192B6a1

(Schematic for reference only)

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
	13	14	15	16	17	18	19	20	21	22	23	24
	White	Red	Yellow	Green	Blue	Grey	Brown	Black	Violet	Turquoise	Orange	Pink

Expected service life, provided the installation is carried out in accordance with the manufacturer's specifications and applicable standards: 30 years

3.4 Cable structure and relevant properties

Item	Contents		Value	
			192	288
Soft tube	Fiber count per tube		12	
	Tube counts	Inner layer	5	9
		Outer layer	11	15
	Color		According to 3.3	
	Material		LSZH	
	Water blocking material		Water blocking yarn	
	Diameter(±0.1mm)		1.6	
Strength member	Assemble		FRP and/or glass yarns	
Outer sheath	Material		LSZH with UV resistance	
	Color		Black	
	Thickness(mm)		Minimum 1.0	
Cable diameter(±0.5mm)			11.5	13.5
Cable weight(kg/km) Approx.			115	154
Tensile load(N)	Long term(Tl)		500	500
	Short term(Ts)		2000	2000
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: ≥50m. Duration of load sustain: 10 min.	Fibre strain≤0.6% Δa≤0.05dB. No damage to outer jacket.
4.2	Crush	IEC 60794-1-21-E3 Load: 1000N for 1min	Δa≤0.05dB 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.	Δa≤0.05dB after test. No damage to outer jacket.
4.4	Repeated bending	IEC 60794-1-21-E6 Bending radius: 20*D Cycles: 30 Load: 20N	Δa≤0.05dB after test. No damage to outer jacket.
4.5	Torsion	IEC 60794-1-21-E7 Test length=1m Load=20N Turns=±180° Number of cycles: 10	Δa≤0.05dB 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	Δa≤0.05dB after test. No damage to outer jacket.
4.7	Temperature cycling	IEC 60794-1-22-F1 Temperature range: T_{A1}: -30℃, T_{A2}: -40℃, T_{B1}:+70℃, T_{B2}: +70℃ Cycles: 2 Dwell time: 8h	During test: $\Delta\alpha \leq 0.05$ dB/km for T_{A1} and T_{B1} $\Delta\alpha \leq 0.15$ dB/km for T_{A2} and T_{B2} After test: Δα 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-s1 d2 a1	

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.