

Version GYDXY-V2.0

Optical Fibre Cable Technical Specification

Duct Cable GYDXY(ALL DRY)-n B1.3&B6a1

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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
GYDXY(ALL DRY)-nB1.3&B6a1	Duct installation

n represent the number of fibres in the cable.

1.1 Cable Description

Optical fiber ribbon are housed in loose tube.

Water blocking tape are used in and over the loose tube to prevent it from water ingress.

FRP is used as the strength member.

Polyethylene outer sheath is extruded around the tube.

1.2 Reference

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

ITU-T G.652	Characteristics of a single-mode optical fibre
ITU-T G.657	Characteristics of a single-mode optical fibre
IEC 60794-1-1	Optical fibre cables-part 1-1: Generic specification-General
IEC 60794-1-2	Optical fibre cables-part 1-2: Generic specification-Basic optical cable test procedure
IEC 60794-3	Optical fibre cables-part 3: Sectional specification-Outdoor cables
IEC 60794-3-10	Optical fibre cables-part 3-10: Outdoor cables-Family specification for duct and direct buried optical communication cables
IEC 60794-3-11	Optical fibre cables-Part 3-11: Outdoor cables-Detailed specification for duct and directly buried single-mode optical fibre telecommunication 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 twenty-five (25) years without detriment to the operation characteristics of the cable.

2. Optical Fibre

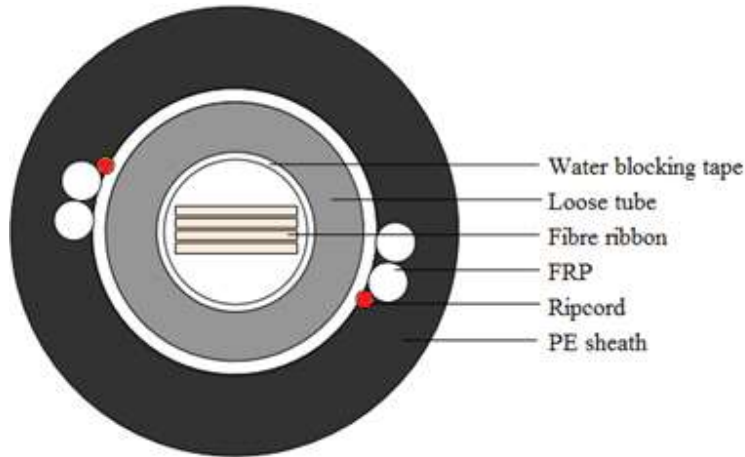
2.1 Optical Fibres supplied in this specification meet the requirements of ITU-T G652D&G657A1

YOFC G.652.D			
Category	Description	Specification	
		Before cable	After cable
Geometrical Characteristics	Cladding diameter	125.0 ± 1.0 μm	
	Cladding non-circularity	≤ 1.0 %	
	Core concentricity error	≤ 0.6 μm	
	Coating diameter	235~255 μm (Before Colored)	
		250+/-15 μm (Colored)	
Coating/cladding concentricity error	≤ 12.0 μm		
Optical Characteristics	Mode field diameter at 1310 nm	8.7 ~ 9.5 μm	
	Attenuation at 1310 nm	≤ 0.34 dB/km	≤ 0.40 dB/km
	Attenuation at 1383 nm	≤ 0.34 dB/km	≤ 0.40 dB/km
	Attenuation at 1550 nm	≤ 0.20 dB/km	≤ 0.30 dB/km
	Point discontinuity at 1310nm and 1550nm	≤ 0.05dB	
	Zero dispersion wavelength	1300 ~ 1324 nm	
	Zero dispersion slope	≤0.092 ps/(nm ² ·km)	
	Cable cut-off wavelength (λ _{cc})	≤ 1260 nm	
	Polarization mode dispersion individual fiber	≤ 0.2 ps/√km	
	Polarization mode dispersion design link value (M=20, Q=0.01%)	≤ 0.1 ps/√km	
	Macro-bend loss (100 turns, 30mm radius)	1550&1625nm: ≤ 0.05 dB	
Mechanical Specification	Proof stress level	≥100kpsi (0.69 GPa)	
	Coating strip force (peak value)	1.3~8.9N	
	Dynamic Fatigue Parameter (nd)	≥20	
	Fiber curl (Radius)	≥2 m	

YOFC G.657.A1			
Category	Description	Specification	
		Before cable	After cable
Geometrical Characteristics	Cladding diameter	125.0 ± 0.7 μm	
	Cladding non-circularity	≤ 0.7 %	
	Core concentricity error	≤ 0.5 μm	
	Coating diameter	235~255 μm (Before Colored)	
		250+/-15 μm (Colored)	
Coating/cladding concentricity error	≤ 12.0 μm		
Optical Characteristics	Mode field diameter at 1310 nm	8.4 ~ 9.2 μm	
	Attenuation at 1310 nm	≤ 0.35 dB/km	≤ 0.40 dB/km
	Attenuation at 1383 nm	≤ 0.35 dB/km	≤ 0.40 dB/km
	Attenuation at 1550 nm	≤ 0.21 dB/km	≤ 0.30 dB/km
	Point discontinuity at 1310nm and 1550nm	≤ 0.05dB	
	Zero dispersion wavelength	1300 ~ 1324 nm	
	Zero dispersion slope	≤ 0.092 ps/(nm ² ·km)	
	Cable cut-off wavelength (λ _{cc})	≤ 1260 nm	
	Polarization mode dispersion individual fiber	≤ 0.2 ps/√km	
	Polarization mode dispersion design link value (M=20, Q=0.01%)	≤ 0.1 ps/√km	
	Macro-bend loss (10 turns, 15mm radius)	1550nm: ≤ 0.25 dB; 1625nm: ≤ 1.0 dB;	
	Macro-bend loss (10 turns, 10mm radius)	1550nm: ≤ 0.75 dB; 1625nm: ≤ 1.5 dB;	
Mechanical Specification	Proof stress level	≥ 100kpsi (0.69 GPa)	
	Coating strip force (peak value)	1.3~8.9N	
	Dynamic Fatigue Parameter (nd)	≥ 20	
	Fiber curl (Radius)	≥ 2 m	

3. Optical Cable

3.1 Cross Section of Cable



GYDXY(ALL DRY)
Not to scale

3.2 Tension Performance and Structure Descriptions

3.3.1 Main mechanical performance:

Tensile performance(N)		Short term Crush(N/100mm)	
Short term	Long term	Short term	Long term
2700	900	2200	1100

3.3.2 The standard structure of GYDXY cable is shown in the following table.

Item	contents	12-24	48-72	96-144	192-216	288-432
Ribbons	Size: nominal (mm)	3.2*0.32				6.4*0.38
Fibers per ribbon		12				24
Loose tube	Material	PP				
	Color	WHITE				
	Inner diameter (±0.5mm)	5.2	6.0	7.2	9.8	12.2
	Outer diameter (±0.5mm)	6.6	8.0	9.2	11.8	14.2
Water Blocking Material		Water Blocking Yarns and Tape				
Messenger	Material	FRP with EAA				
	diameter(mm)	1.6				
	Number	4				
Ripcord	Number	2				

	Material	polyester				
	Color	Red				
	Denier	6000D				
Sheath	Material	HDPE or MDPE				
	Color	Black				
	Thickness (mm)	Nominal :2.4				
Cable diameter(± 0.3 mm)	12.0	13.4	14.5	17.0	19.8	
Cable weight(kg/km) Approx.	110	127	160	185	215(225)	
Environmental Temperature	-40~+70°C					

3.3 Fibre Identification

The color code of fibres will be identification in accordance with the following color sequence.

Fiber color code	1	2	3	4	5	6
	Blue	Orange	Green	Brown	Slate	White
	7	8	9	10	11	12
	Red	Black	Yellow	Purple	Pink	Aqua

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.

Items	Test Method	Requirements
Tension	<u>IEC 60794-1-2-E1</u> Load: According to 3.3 Sample length: Not less than 50m. Duration time: 1min.	Additional attenuation: ≤ 0.1 dB after test No damage to outer jacket and inner elements
Crush	<u>IEC 60794-1-2-E3</u> Load: According to 3.3 Duration of load: 1min	Additional attenuation: ≤ 0.1 dB after test No damage to outer jacket and inner elements
Impact	<u>IEC 60794-1-2-E4</u> Radius: 300 mm Impact energy: 10 J Impact number: 1 Impact points: 10	Additional attenuation: ≤ 0.1 dB after test No damage to outer jacket and inner elements
Bend	<u>IEC 60794-1-2-E11A</u> Mandrel radius: 10*D Turns:4 Cycles:3	Additional attenuation: ≤ 0.1 dB after test No damage to outer jacket and inner elements
Repeated bending	<u>IEC 60794-1-2-E6</u> Bending radius: 20*D Cycles: 25 Load: 100N	Additional attenuation: ≤ 0.1 dB after test No damage to outer jacket and inner elements

Torsion	<u>IEC 60794-1-2-E7</u> Cycles:10 Length under test: 1m Turns: $\pm 90^\circ$ Load: 150N	Additional attenuation: ≤ 0.1 dB after test No damage to outer jacket and inner elements
Water Penetration	<u>IEC 60794-1-2-F5B</u> Time : 24 hours Sample length : 3m Water height : 1m	No water leakage.
Temperature cycling	<u>IEC 60794-1-2-F1</u> Sample length: at least 1000m Temperature range: $-40^\circ\text{C} \sim +70^\circ\text{C}$ Cycles: 2 Temperature cycling test dwell time: 12 hours	The change in attenuation coefficient shall be less than 0.1 dB/km.
Other parameters	According to <u>IEC 60794-1</u>	

5. Packaging and Drum

5.1 Cable Sheath Marking

- Unless otherwise specified, the cable sheath marking shall be as follows:
- Color: white
- Contents: YOFC, the year of manufacture, the type of cable, cable number, length marking
- Interval: $1 \pm 1\%$ m
- Outer sheath marking legend can be changed according to user's requests.

5.2 Reel Length

Standard reel length: 4 km/reel, other length is available upon discussion.

5.3 Cable Drum

The cables are packed in fumigated 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. The inner end is available for testing.