

Optical Fibre Cable Technical Specification

Duct Cable

GYTS-nB1.3

Yangtze Optical Fibre and Cable Joint Stock Limited Company

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Customer Approval			
	Name	Signature	Date
Approved by			

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
GYTS-nB1.3	Duct installation

n represents the fibre counts of the cable.

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
IEC 60794-1-1	Optical fibre cables-part 1-1: Generic specification-General
IEC 60794-1-21	Optical fiber cables- part1-2-Generic specification-Basic optical cable test procedure-Mechanical test methods
IEC 60794-1-22	Optical fiber cables- part1-2-Generic specification-Basic optical cable test procedure-Environmental test methods
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.

1.4 Application

Item	Value
Operation temperature	-40 °C~+70 °C
Installation temperature	-40 °C~+70 °C
Storage temperature	-40 °C~+70 °C
Static bending radius	10 times the cable diameter
Dynamic bending radius	20 times the cable diameter

2. Optical Fibre

Optical Fibres supplied in this specification meet the requirements of ITU-T G.652.D

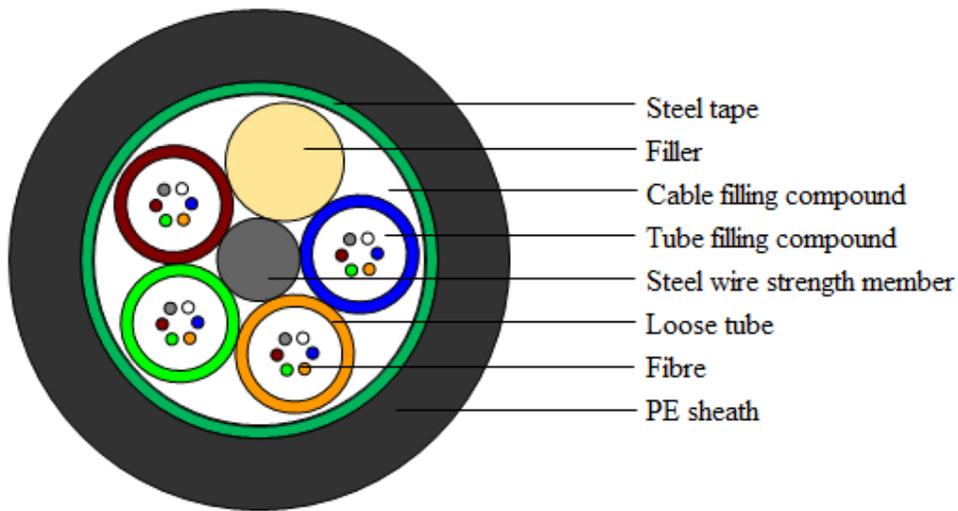
Parameter	Specification
MFD (1310nm)	8.7~9.5 μm
Cladding diameter	125 \pm 1.0 μm
Fiber diameter	235~255 μm , with UV coating, and colored to : 250 \pm 15 μm
Core/cladding concentricity error	$\leq 0.6\mu\text{m}$
Coating/cladding concentricity error	$\leq 12.0\mu\text{m}$
Cladding non circularity	$\leq 1.0\%$
Cut off wavelength	$\lambda_{cc} \leq 1260\text{nm}$
Attenuation coefficient	1310nm: 0.35dB/km max after cabling 1550nm: 0.21dB/km max after cabling
Bending-loss performance of optical fiber @ 1310nm&1550nm	$\leq 0.05\text{dB}$ (100 turns around a mandrel of 50mm diameter)
Polarization mode dispersion maximum individual fibre	$\square \leq 0.2\text{ps}/\sqrt{\text{km}}$
Polarization mode dispersion link value	$\square \leq 0.1\text{ps}/\sqrt{\text{km}}$
Zero-dispersion wavelength	1300~1324nm
Zero-dispersion slope	$\leq 0.092\text{ps}/\text{nm}^2 \cdot \text{km}$

3. Optical Cable

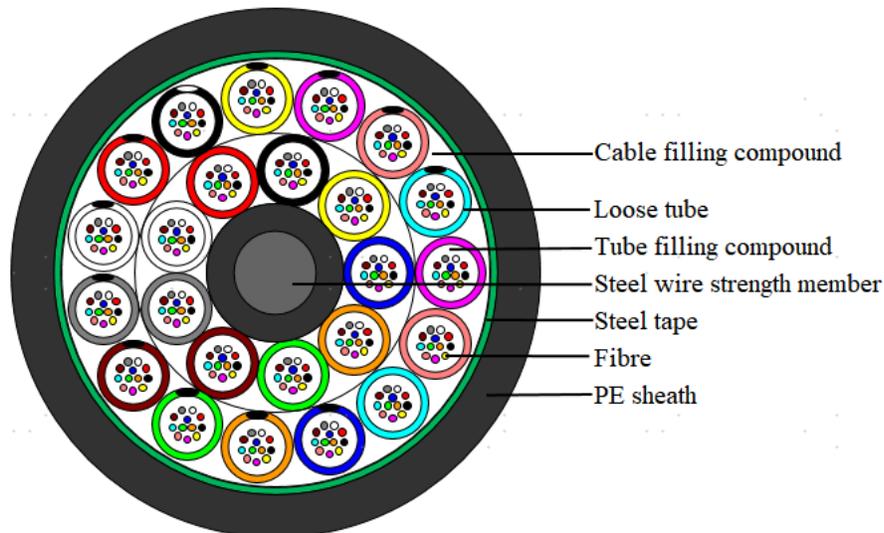
3.1 Technical Characteristics

- The unique second coating and stranding technology provide the fibres with enough space and bending endurance, which ensure good optical property of the fibres in the cable
- Accurate process control ensures good mechanical and temperature performance
- High quality raw material guarantees the long service life of cable

3.2 Cross Section of Cable



GYTS-24B1.3



GYTS-288B1.3

Structure of other fibre counts refer to 3.4

Schematic for reference only

3.3 Fibre and Loose Tube Identification

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

Fibre Color Code	1	2	3	4	5	6
	Blue	Orange	Green	Brown	Grey	White
	7	8	9	10	11	12
	Red	Black	Yellow	Purple	Pink	Aqua

Tube Color Code	1	2	3	4	5	6
	Blue	Orange	Green	Brown	Grey	White
	7	8	9	10	11	12
	Red	Black	Yellow	Purple	Pink	Aqua
	13	14	15	16	17	18
	Blue with black stripe	Orange with black stripe	Green with black stripe	Brown with black stripe	Grey with black stripe	White with black stripe
	19	20	21	22	23	24
	Red with black stripe	Black with white stripe	Yellow with black stripe	Purple with black stripe	Pink with black stripe	Aqua with black stripe

The color of the fillers will be natural.

3.4 Dimensions and Descriptions

The standard optical cable structure is shown in the following table, other structure and fibre count are also available according to customer requirements.

Item	Contents	Value				
		4/8/16	12/24	48	96	288
Structure	Type	1+5		1+5	1+8	1+9+15
Loose tube	Max Fiber counts/tube	4	6	12	12	12
	Outer diameter (mm)	1.6		1.8	1.8	2.0
Central strength member	Material	Steel wire				
	Diameter (mm)	1.4		1.4	2.0	2.0
	PE layer diameter(mm)	--		--	3.2	4.0
Water blocking	Material	Cable filling compound				
Armor	Material	Steel tape				
Sheath	Material	HDPE				
	Color	Black				
	Thickness (mm)	Nominal: 1.8				
Cable diameter(mm) Approx.		9.0		9.2	11.8	16.6
Cable weight(kg/km) Approx.		85		95	140	245

3.5 Main Mechanical Performance

Item	Tension(N)	Crush(N/100mm)	
		Short term	Long term
4/8/12/16/24/48	1500	1500	750
96/288	2000		

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 60794-1-21-E1</u> Load: According to 3.5 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 60794-1-21-E3A</u> Load: According to 3.5 Duration of load: 1min	Additional attenuation: ≤ 0.1 dB after test No damage to outer jacket and inner elements
Impact	<u>IEC 60794-1-21-E4</u> Radius: 300 mm Impact energy: 10 J Impact number: 1 Impact points: 3	Additional attenuation: ≤ 0.1 dB No damage to outer jacket and inner elements
Repeated bending	<u>IEC 60794-1-21-E6</u> Bending radius: 20*D Cycles: 25 Load: 150N	Additional attenuation: ≤ 0.1 dB No damage to outer jacket and inner elements
Torsion	<u>IEC 60794-1-21-E7</u> Cycles:10 Length under test: 1m Turns: $\pm 180^\circ$ Load:150N	Additional attenuation: ≤ 0.1 dB No damage to outer jacket and inner elements
Water Penetration	<u>IEC 60794-1-22-F5B</u> Time : 24 hours Sample length : 3m Water height : 1m	No water leakage.
Temperature cycling	<u>IEC 60794-1-22-F1</u> Sample length: at least 1000m Temperature range:-40 °C~+70 °C Cycles:2 Temperature cycling test dwell time: 12 hours	The change in attenuation coefficient shall be less than 0.05 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 m

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

5.2 Reel Length

Standard reel length: 2/3 km/reel, other length is also available.

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.