Technical Data Sheet for Underground Traditional Non-metallic Fiber Optic Cable [GYFTY-2,4,12,24,48,96B1.3]

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GYFTY-2/4/12/24/48/96F

Traditional underground unarmored cable with up to 96 fibres for pipeline/duct installations

1. General

1.1 The specification covers the construction and properties of optical fiber cable.

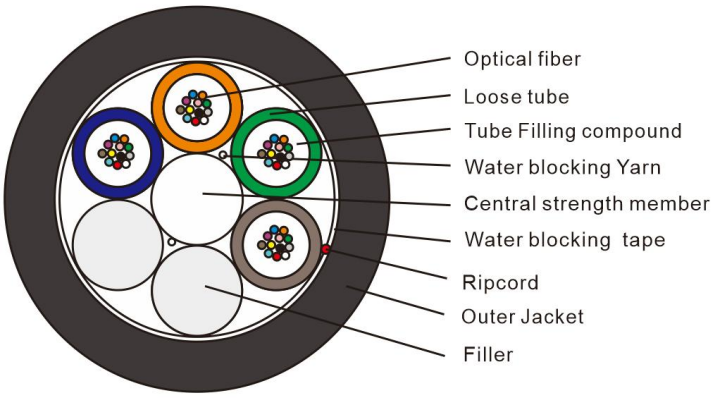
1.2 The cable shall be direct use in aerial access network.

1.3 The cable generally meets any latest relevant IEC, ITU-T Recommendation or better.

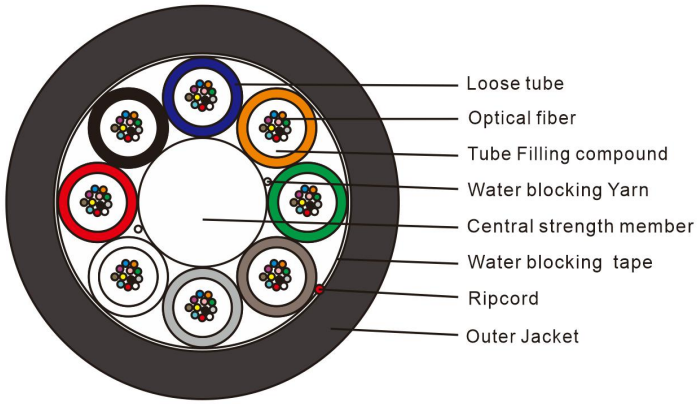
1.4 The single mode fiber shall operate in 1310nm and 1550nm.

1.5 The cable could serve for 40 years without any significant deterioration.

2. Cross Section of Cable



GYFTY-48B1.3



GYFTY-96B1.3

3. Optical Fiber in the Cable

3.1 Construction

Fiber	Type	Single mode type ITU-T G.652D
	Material	Ge doped fused silica
Mode field diameter	1310 nm	9.2 ±0.4μm
Core concentricity error		≤ 0.5μm
Cladding diameter		125±0.7μm
Cladding non-circularity		≤ 1.0%
Coating	Material	UV curable acrylic
	diameter	≤250±10μm(Colored)

3.2 Optical characteristics

Attenuation	@1310 nm	≤ 0.35 dB/km
	@1383 nm	≤ 0.35 dB/km
	@1550 nm	≤ 0.20 dB/km
	@1625nm	≤ 0.25 dB/km
Zero-dispersion Wavelength		1300~1324 nm
Zero-dispersion slope		≤ 0.092ps/(nm^2/km)
Chromatic Dispersion Coefficient	1330 nm	≤ 3.5 (ps/nm.km)
	1550 nm	≤ 18(ps/nm.km)
Cable Cut-off Wavelength (λ_{cc})		≤ 1260nm
Polarization Mode Dispersion(PMD)		≤ 0.2 ps/km$^{1/2}$
Macrobend Loss (Before Cable)	G.652D	30mm radius x 100turn: ≤0.1dB (at1550)
Fiber proof-tested		0.69 GPa

4. Optical Cable

4.1 Construction

Cable Type		GYFTY
Number of Fibers		2/F/4F/12F/24F/48F/96F
Fiber	Construction	Consult 3.1
Central Strength Member	Material	FRP
Water Blocking Member	Material	Water Blocking Tape & Yarn
Tube	Material	PBT
	Filling Compound Material	Water Blocking Thixotropic Gel
Filler	Material	PP
Rip Cord	Material	Polyester
	No.	2
	Tear Strength	15 kg
Outer Sheath	Material	HDPE
	Thickness	1.5 ± 0.1 mm

4.3 Buffer Tube Stranding, cable size and weight

Fiber Counts	Fiber number per tube	Number of tube/filler	Tube Diameter (±0.1mm)	CSM Diameter (±0.1mm)	Cable Diameter (±0.3mm)	Approx.Weight (kg/km)
2F	2	1/5	2.0	2.0	9.1mm	62
4F	4	1/5	2.0	2.0	9.1mm	62
12F	6	2/4	2.0	2.0	9.1mm	62
24F	6	4/2	2.0	2.0	9.1mm	63
48F	12	4/2	2.2	2.0	9.3mm	65
96F	12	8/0	2.3	3.3	10.5mm	100

4.4 Identification

Color Code for Fiber

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

Color Code for Tube

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

5. Optical Fiber Cable Characteristic

5.1 Mechanical Properties

Item	Test Method	Specification at 1550nm
Tensile	IEC 60794-1-2-E1 Tensile Force Short Term(N): 1500N Tensile Force Long Term (N): 600N	Attenuation change ≤0.05 dB δL load ≤ 0.5% δL rest ≤ 0.05%
Bending	IEC 60794-1-2-E11A Mandrel Radius. : 20×cable Dia. No. of turn : 4 No. of cycle : 3	Attenuation change ≤0.05 dB No fiber break and no sheath damage

Crush	IEC 60794-1-2-E3 Load: 1000N/100mm Time: 1 mins, 100mm distance	Attenuation change ≤0.05 dB No fiber break and no sheath damage
Cyclic Flexing	IEC-60794-1-2-E8 100 cycles, 2 cycles per min. D=20xOD	Attenuation change ≤0.05 dB
Torsion	IEC 60794-1-2-E7 Length : 1 m Twist angle :±180° No. of cycles : 10	Attenuation change ≤0.05 dB No fiber break and no sheath damage
Impact	IEC 60794-1-2-E4 Impact energy: 10J Radius: 300 mm, 3 points No. of impacts : 2 points (1 time/point)	Attenuation change ≤0.05 dB No fiber break and no sheath damage
Temperature Cycling	IEC 60794-1-2-F1 No. of cycles : 1 Temperature: -20 to +70℃ Soak time: 12 hours (4km/drum)	Attenuation change ≤ 0.1 dB/km No fiber break and no sheath damage
Drip test	IEC-794-1-2-E14 Sample length: 30 cm Temp: 60 ±5°C Time: 24 hours	No filling compound drip
Sheave test	IEC-794-1-2-E18 D=40*OD, 1400 N	Attenuation change ⩽ 0.1 dB/km

5.2 Material Test

Test	Test Method	Detail Specifications	Acceptance Criteria
Filling gel drip	IEC-60794-1-2 Method E14	80°C	≤0.05 gr
Filling material OIT	ASTM D 3895 and GR-20 Clause 6.3.1		≥20 min
Cable material compatibility:	GR-20 Clause 6.3.4	85°C, 30 days	
-Fiber stripping force	IEC 60793-1-32	30 mm	1.0 ≤ Fstip ≤ 9.0 N
-PBT tube properties	Tube wrapping around a 75 mm mandrel	Per GR-20 Clause 6.3.4	No cracks or delamination
Jacket material			
-Carbon black contents			2.6 + 0.25%
-Yield strength (un-aged)	FOTP 89 or IEC 60811	**HDPE**	18 N/mm2
-Elongation (un-aged)			300%
-Elongation (aged)		100°C/240 hrs	300%
-OIT	ASTM D 3895 and GR-20 Clause 6.4.1		≥20 min

5.3 Cable Environmental Properties

Item	Test Method	Specification at 1550nm
Cable Cold and Hot Bend	IEC 60794-1-2 method E11 Lowest Temperaute = -20°C Highest Temperaute = +70°C Dmandrel 15 xDcable	Attenuation change ≤0.05 dB
Temperature Cycling	IEC 60794-1-2 method F1 No. of cycles : 1 Temperature: -20 to +70℃ Soak time: 12 hours (4km/drum)	Attenuation change ≤ 0.1 dB/km No fiber break and no sheath damage
Water Penetration (un-aged cable)	IEC 60794-1-2 method F5A Head of water : 1 m Time : 24 hours Sample length: 1m	No water penetration. Report water penetration depth.
Water Penetration (aged cable)	IEC 60794-1-2 method F5A after aging Height of water : 1 m Time : 24 hours Sample length: 1m	No water penetration. Report water penetration depth.

5.4 Fiber Performance Test

All attenuations of all the fibers in the cable shall be tested (100%) by OTDR at 1310 nm, 1550 nm and 1625 nm. The maximum attenuation shall be :

Max attenuation @ 1310 nm 0.35 dB/km
Max attenuation @ 1550 nm 0.22 dB/km
Max attenuation @ 1625 nm 0.22 dB/km

6. Cable sheath Marking

- Marking Color：White
- Interval：1m
- Method: Ink-jet printing
- Contents(for example for GYFTY 48 fibers)：

  0000M XXXXX GYFTY-48B1.3 FO Cable 4 x 12 SM G.652D FIBEST 2024

Explain:
******M:** Length marking ,starting number is 0000M
GYFTY-48B1.3: Part Number
XXXXX : The name of brand.
FO Cable 4 x 12 : – Where 4 is the number of tubes and 12 is the number of fibers in a tube.
SM G.652D : Fiber type code.
FIBEST : The name of manufacturer.
2024: The year of manufacture

- The sheath marking can be changed with customer's requirement.

7.Packing and shipping

7.1 Cable Drum: Wooded drum

Standard reel length：4,000m
(Other length is available according to user's request)

7.2 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.