GYFTY NON-ARMORED FIBER OPTIC OUTDOOR CABLE

1.1 SCOPE

This specification covers the design requirements and performance standard for the supply of optical fiber cable. This specification covers the general requirements and performance of cable which our offering including optical characteristics, mechanical characteristics and geometrical characteristics.

1.2 Cable Description

GYFTY fiber optic cable is a non-metallic cable used for power transmission system, excessive thunder areas and high electromagnetic interface. The cable tubes, which are filled with filling compound, are stranded around the FRP strength member. Then the aramid yarn is applied over water proof material, the cable is completed with a PE sheath. GYFTY cables are available from 2 core to 144 core. It is used in high-voltage area for long distance aerial or duct application..

1.3 Quality

We ensures a continuing level of quality in our cable products through several quality control programs including ISO 9001 and all the materials have passed REACH and ROHS.

1.4 Reliability

We ensure product reliability through rigorous qualification testing of each product family. Both initial and periodic qualification testing are performed to assure the cable's performance and durability in the field environments.

1.5 Reference

The cable which Our offering are designed, manufactured and tested according to international standards as follows:

IEC 60794-1-1	Optical fiber cables. Part 1: Generic specification
IEC 60794-1-2	Generic specification- basic optical cable test procedures
IEC 60793-3	Outer cables- sectional specification
EIA/TIA 598 B	Color code of fiber optic cables
ITU-T G.650	Definition and test methods for the relevant parameters of single-mode fibers
ITU-T G.652	Characteristics of a single-mode optical fiber cable
ITU-T G.655	Characteristics of a non-zero dispersion-shifted single-mode optical fiber and cable

2. Optical Fiber

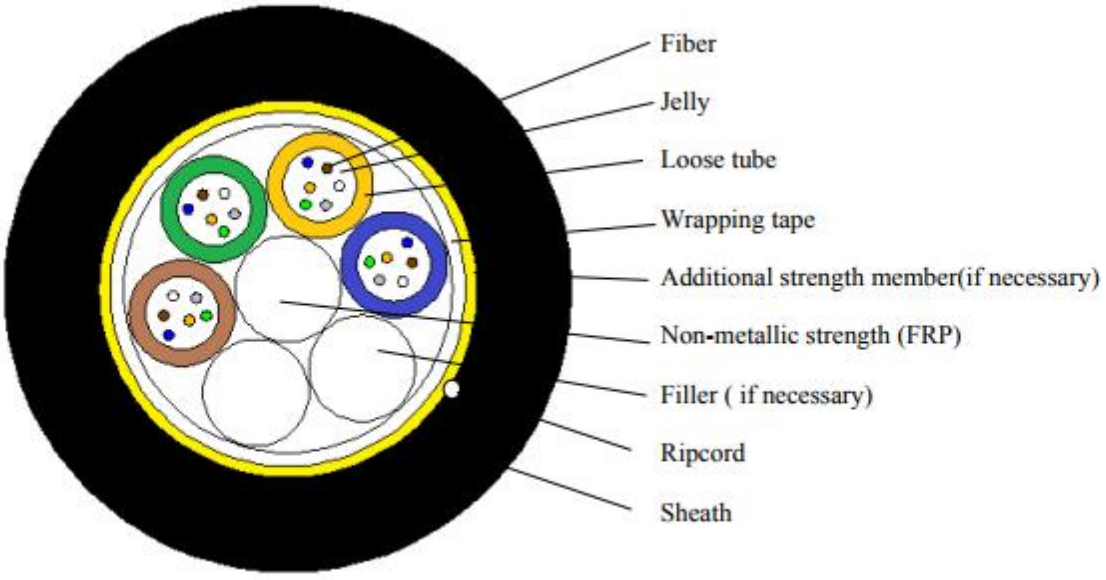
Optical fiber characteristics (G.652 FIBER)

ITEM		Construction
Mode field diameter	@1310nm	9.2±0.4μm
Cladding diameter		125±1μm
Core concentricity error		≤0.5μm
Cladding non-circularity		≤1.0%
Cut-off wavelength (λcc) (for cable)		≤1260nm
Cut-off wavelength (λc) (for fiber)		1180nm~1330nm
Primary coating diameter	(Not included color layer)	245±5μm
	(Included color layer)	245±10μm
Coating-cladding concentricity error		≤12.5μm
Fiber curl radius		≥4m

Transmission characteristics

Item		Performance
Attenuation	At 1310nm	≤0.36dB/km(max.)
	At 1383nm	≤0.35dB/km(max.)
	At 1550nm	≤0.22dB/km(max.)
Macro bending loss	Φ=60mm, 100turns at 1550nm	≤0.1dB
Chromatic dispersion	Within 1288~1339nm	≤3.5ps/nm·km
	At 1550nm	≤18ps/nm·km
Zero dispersion wavelength		1300~1324nm
Zero dispersion slope		≤0.090ps/nm2·km
Cut off wavelength		≤1260nm

3 Cable Structure



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3.1.1 Dimension and Properties		
General properties	**Unit**	**Value**
Fiber count (G.652)		2-144
Max. No of loose tube		12
Fiber No. per tube		MAX 24
Loose tube	mm	2.0-2.5
Strength member	material	FRP
Outer sheath material	mm	MDPE

Remark: The weight of zinc coating of steel wire surface shall be no less than 20 g/m^2. Strand shall have a left lay.

3.1.2 Working conditions		
Temperature range	Transport and storage:- 4℃ to +70℃	Min Bending Radius
	Installation:-10℃ to +60℃	Installation: 20 x OD
	Operation:-40℃ to +70℃	Operation: 10 x OD

Note: 1. the nominal outer diameter may vary by ± 5%. 2. The nominal cable weight may vary by ±10%.

3.1.3. FIBERS AND TUBE COLOR CODE SCHEME: according to EIA/TIA 598B												
Fiber color	Blue	Orange	Green	Brown	Grey	White	Red	Black	Yellow	Violet	Pink	Aqua
Tube color	Blue	Orange	Green	Brown	Grey	White	Red	Black	Yellow	Violet	Pink	Aqua

4. TEST REQUIREMENTS

The cable is in accordance with applicable standard of cable and requirement of customer.

The following test items are carried out according to corresponding reference.

No	Item	Reference
Tests of Optical Fiber		
1	Attenuation coefficient	IEC 60793-1-40
2	Chromatic dispersion	IEC 60793-1-42
3	Mode field diameter	IEC 60793-1-45
4	Cladding diameter	IEC 60793-1-20
5	Cladding non-circularity	IEC 60793-1-20
6	Core/clad concentricity error	IEC 60793-1-20
7	Cable cutoff wavelength	IEC 60793-1-44

Tests of Outdoor cable (After cabling)			
1	Tensile Test	IEC-60794-1-E1	-Max. allowable pulling force: installation tensile; sample length: no less than 50 meters, time: 10 minutes; - Fiber strain at max. load : max. 0.33 % No damage to the outer jacket and inner elements. Reversible
2	Crush test	IEC-60794-1-E3	-Load: short time crush strength, time: 5 minutes, length: 100 mm, number of tests: 3; No damage to the outer jacket and inner elements. Reversible
3	Impact test	IEC-60794-1-E4	-Impact energy: 3J , radius: 10.0 mm, impact points: 3 -Number of impacts: 1 -No breakage of the optical fiber, No splits or cracks in the outer jacket. -Attenuation increase ≤0.1dB, reversible
4	Repeated bending test	IEC-60794-1-E6	1m cable length, bending radius: 20 times cable's diameter. 25 cycles, duration of cycle: 2s. No damage to the outer jacket and inner elements. Reversible
5	Torsion test	IEC-60794-1-E7	2m cable length, ±180 degrees, 5cycles; no damage to the outer jacket -Attenuation increase ≤0.1dB, reversible
6	Bending test	IEC-60794-1-E11	- Diameter of mandrel: 20xD ,number of turns/helix: 4 number of cycles: 3 , No damage to the outer jacket and inner elements (20 ^{o}C). reversible
7	Temperature cycling test	IEC-60794-1-F1	-Temperature step: +20^{o}C →-40^{o}C →+70^{o}C →-40^{o}C →+70^{o}C →+20^{o}C, time per each step: 12 hrs, number of cycles: 2 cycles -they shall be no change in attenuation variation for reference value (the attenuation to be measured before test at +20±3 ^{o}C) - reversible
8	Water penetration test	IEC-60794-1-F5	-Water height: 1 m, sample length: 3m, duration of test: 24 hrs. - No water leakage at the end of the sample
9	Drip test	IEC-60794-1-E14	Three 0.3m samples suspended vertically in a climate chamber, raised temperature to +70°C. no filling compound shall drip from tubes after 24 hr

5. PACKING AND DRUM

5.1 Our cables are packed in carton, coiled on Bakelite & wooden reel. During transportation, right tool should be used to avoid damaging the package, and handle carefully. Cables should be protected from moisture; Cables should be kept away from high temperature condition and spark; Cables should be protected from over bending and crushing; Cables should be protected from mechanical damage.

5.The color of marking is white.(At every meter, the outer sheath of the fiber cable shall be printed)

The inner end of cable is sealed with heat shrinkable end cap to prevent ingress of water and is made available for testing.

The outer end of cable is equipped with heat shrinkable end cap.

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