# AMCOM

## Single Mode Optical Fiber Cables

**TECHNICAL SPECIFICATION**

**FOR**

**Single Mode Optical Fiber Cable**

**for Aerial Application**

***(SM 4, 12, Fibers)***

**AMITY SATELLITE SYSTEMS, INC.**

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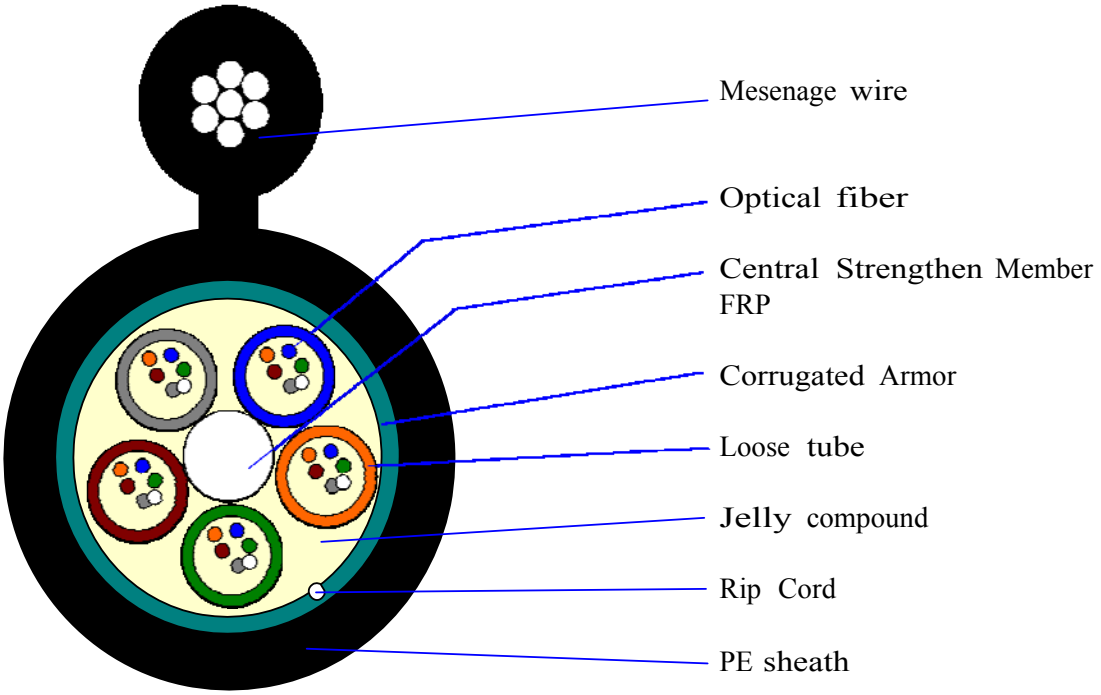
## Single Mode Optical Fiber Cables

### 1. Cable Cross-section




### 2. Cable Specification

2.1 Sheath marking

| AMCOM | GYFTC8S | XXB1 | 2012XXXX | XXXXM |
|---|---|---|---|---|

**AMCOM** : Manufacturer's name
**GYFTC8S** : Cable type
**XXB1** : Cable size
**2012XXXX** : Manufacturing date
**XXXXM** : Mark of meters
**The marking is printed every 1 meter*

2.2 The color of marking is white, but if the re-printing is necessary, the yellow color marking shall be printed newly on a different position.

2.3 Each cable ends are sealed with heat shrinkable end caps to prevent water ingress.

2.4 Fiber color code

| No. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Color | Blue | Orange | Green | Brown | Gray | White |
| No. | 7 | 8 | 9 | 10 | 11 | 12 |
| Color | Red | Black | Yellow | Violet | Pink | Aqua |

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2.5 Loose tube (LT) & filler rod (FR) color code

| Fiber number | Element no. | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 4,12 | LT | LT | LT | LT | LT | LT | LT | LT | LT | LT | LT | LT |

2.6 Cable structure and parameter

| Fiber number | fiber number per tube | Total unit number (LT + FR) | Sheath thickness (nominal*) | Outer diameter (nominal**) | Weight (approx.) | CSM diameter |
|---|---|---|---|---|---|---|
| | | | mm | mm | kg/km | mm |
| 4 | 6 | 1 LT+4FR | 2.0 | 10.8 | 227 | 1.5 |
| 12 | 6 | 2 LT+3FR | 2.0 | 10.8 | 227 | 1.5 |

| Fiber number | Loose tube diameter | Loose tube thickness | Corrugated Armor (Width*Height) | Messenger wire diameter without PE | Messenger wire diameter with PE |
|---|---|---|---|---|---|
| | mm | mm | mm | mm | mm |
| 4 | 2.0 | 0.35 | 23*0.25 | 3 .6(1.2*7) | 8.6 |
| 12 | 2.0 | 0.35 | 23*0.25 | 3 .6(1.2*7) | 8.6 |

** The nominal sheath thickness may have a tolerance with ±0.2mm.*

** * The nominal diameter may have a tolerance with ±0.4mm.*

## 3. Performance of Cabled Optical Fiber

The performance of cabled single mode optical fiber (ITU-T Rec. G.652B)

| **Item** | **Specification** |
|---|---|
| Type of fiber | Single mode |
| Fiber material | Doped silica |
| Attenuation coefficient @ 1310 nm @ 1550 nm | ≤ 0.36 dB/km ≤ 0.22 dB/km |
| Point discontinuity @ 1310 & 1550 nm | ≤ 0.05 dB |
| Cable cut-off wavelength | ≤ 1260 nm |
| Zero-dispersion wavelength | 1300 ~ 1324 nm |
| Zero-dispersion slope | ≤ 0.093 ps/(nm$^2$.km) |
| Chromatic dispersion @ 1288 ~ 1339 nm @ 1271 ~ 1360 nm @ 1550 nm | ≤3.5 ps/(nm. km) ≤5.3 ps/(nm. km) ≤18 ps/(nm. km) |
| $PMD_Q$ (Quadrature average*) | ≤ 0.2 ps/km$^{1/2}$ |
| Mode field diameter @ 1310 nm | 9.2±0.4 um |

| | |
|---|---|
| Core/Clad concentricity error | ≤ 0.5 um |
| Cladding diameter | 125.0 □ 0.7 um |
| Cladding non-circularity | ≤ 1.0% |
| Primary coating diameter | 245 □ 10 um |
| Proof test level | 100 kpsi (=0.69 Gpa), 1% |
| Temperature dependence 0ºC~ +70ºC @ 1310 & 1550nm | ≤ 0.1 dB/km |

** $PMD_Q$ is a link of 20 cable sections (M) and a probability level of 0.01% (Q).*

## 4. Performance of Optical Cable

4.1 Cable bending radius: 10 x cable diameter (static)
20 x cable diameter (dynamic)

4.2 Application temperature range

| | |
|---|---|
| Operating temperature range | :-40°C to +60°C |
| Storage / Transport temperature range | :-50°C to +60°C |
| Installation temperature range | :-20°C to +50°C |

4.3 Main mechanical & environmental performance test

| S/N | Item | Test Method | Acceptance Condition |
|---|---|---|---|
| 1 | Tensile Strength IEC 794-1-E1 | -Load:2,500 N -Length of cable under load: 50 m | -Loss change ≤ 0.1 dB @1550 nm -No fiber break and no sheath damage. |
| 2 | Crush Test IEC 794-1-E3 | -Load: 1,000 N/100 mm -Load time: ≧ 1min. | -Loss change ≤ 0.1 dB @1550 nm -No fiber break and no sheath damage. |
| 3 | Impact Resistance IEC 794-1-E4 | -Points of impact: 5 -Times of per point: 5 - Impact energy: 4.5 N.m -Radius of hammer head: 12.5mm - Impact rate: 2 sec/cycle | -Loss change ≤ 0.1 dB @1550 nm -No fiber break and no sheath damage. |
| 4 | Repeated Bending IEC 794-1-E6 | -Bending radius.: 20 x cable diameter -Load: 150 N -Flexing rate: 3 sec/cycle -No. of cycle: 30 | -Loss change ≤ 0.1 dB @1550 nm -No fiber break and no sheath damage. |

| | | | |
|---|---|---|---|
| 5 | Torsion IEC 794-1-E7 | -Length: 1 m -Load: 150 N -Twist rate: 1 min/cycle -Twist angle: ±180°-No. of cycle: 10 | -Loss change ≤ 0.1 dB @1550 nm -No fiber break and no sheath damage. |
| 6 | Water Penetration Test IEC 794-1-F5B | -Height of water: 1 m -Sample length: 3 m -Test time: 24 hours | -No water shall have leaked from the opposite end of cable. |
| 7 | Temperature Cycling Test IEC 794-1-F1 | -Temperature step: +20oC→-40oC→ +70oC →+20oC -Time per each step: 12 hrs -Number of cycle: 2 | -Loss change ≤ 0.05 dB/km@1550 nm -No fiber break and no sheath damage. |
| 8 | Compound Flow IEC 794-1-E14 | -Sample length: 30 cm -Temp: 70℃ □ 2℃ -Time: 24 hours | -No compound flow |
| 9 | Sheath High Voltage Test | -On line test -9t KV (t-sheath thickness) | -No sheath breakdown |

## 5. Packing and Marking

5.1 Packing

5.1.1 Each single length of cable shall be wound on an iron stand-wooden or pure wooden drum.

5.1.2 Standard drum length is 4000m ±1% or 2000m±1% or according to customer requirement.

5.1.3 Covered by plastic buffer sheet.

5.1.4 Sealed by strong wooden battens.

5.1.5 At least 1m of inner end of cable should be reserved for testing.

5.2 Drum marking

- Manufacturing year and month;
- Roll-direction arrow;
- Cable outer end position indicating arrow;
- The word "**OPTICAL FIBER CABLE**";
- Cable type and size;
- Drum number;

- Drum length;
- Gross / net weight;
- Origin, The word “**MADE IN CHINA**”;
- Caution plate indicating the correct method for loading, unloading and convey the cable;
- *Other customer information such as contract no., project no., and delivery destination. (if needed)*

5.3 Cable quality certificate documents

- Quality certificate;
- Test report.

**SPEC. END**