# DUCT CABLE 48 LSZH RATPROOF
# GYFTY68-6B1.3

## 1. GENERAL

### SCOPE

This specification covers the design requirements and performance standard for the supplyof optical fiber cable in the industry. It also includes Maintronics premium designed cable with optical, mechanical and geometrical characteristics.

### Cable Description

Optical fibers are housed in loose tubes that are made of high-modulus plastic and filled with waterproof compounds.

FRP is applied as central strength member.
Loose tubes are SZ stranded around the central strength member.
Water blocking yarn and tape are used in and over the cable core to prevent it from water ingress.
Stranding wire is used as the messenger wire.
Polyethylene sheath is applied as outer sheath.

### Reference

| | |
|---|---|
| **ITU-T G.652** | Characteristics of a single-mode optical fiber |
| **IEC 60794-1-1** | Optical fiber cables-part 1-1: Generic specification-General |
| **IEC 60794-1-2** | Optical fiber cables-part 1-2: Generic specification-Basic optical cable test procedure |
| **IEC 60794-3** | Optical fiber cables-part 3: Sectional specification-Outdoor cables |
| **IEC 60794-3-20** | Optical fiber cables-part 3-20: Outdoor cables- Family specification for optical self-supporting aerial communication cables |

# 2. OPTICAL FIBER

## G. 652D Type

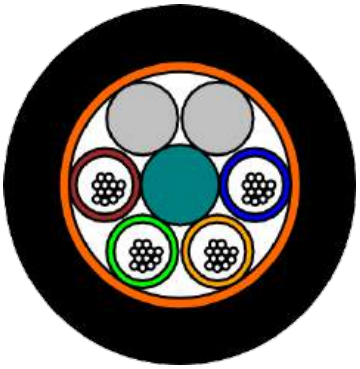
The optical fiber shall be made of high pure silica and germanium doped silica. UV curable acrylate material is applied over fiber cladding as optical fiber primary protective coating. The detail data of optical fiber performance are shown in the following table:

| Category | Description | Specifications | |
|---|---|---|---|
| **Optical Characteristics** | Attenuation Coefficient: | Before Cabling | After Cabling |
| | at 1310 nm Max: | ≤ 0.35 dB/km | ≤ 0.36 dB/km |
| | Average: | ≤ 0.35 dB/km | ≤ 0.36 dB/km |
| | at 1550 nm Max: | ≤ 0.21 dB/km | ≤ 0.22dB/km |
| | Chromatic Dispersion:<br>at 1310nm<br>at 1550nm | <br>≤ 3.5 ps/nm·km<br>≤ 18 ps/nm·km | |
| | Point Discontinuity:<br>at 1310nm<br>at 1550 nm | <br>≤ 0.1 dB<br>≤ 0.1 dB | |
| | Polarization Mode Dispersion (PMD) | ≤ 0.2 ps/√km | |
| | Cable Cut off Wavelength ($\lambda_{cc}$) | ≤ 1260 nm | |
| **Geometrical Characteristics** | Mode Field Diameter:<br>at 1310nm<br>at 1550 nm | <br>9.2 ± 0.4μm<br>10.4 ± 0.5μm | |
| | Cladding Diameter | 125 ±1.0μm | |
| | Mode field (Core/clad) concentricity error | ≤ 0.5 μm | |
| | Cladding Non-Circularity | ≤0.7% | |
| | Coating Diameter | 242 ± 5μm | |
| | Coating / Cladding Concentricity error | ≤ 0.6μm | |
| | Coating-Cladding Concentricity | ≤ 12um | |
| | Effective Group Index of Refraction:<br>at 1550 nm | <br>1.4675 | |
| **Environmental Characteristics** | Temperature Cycling Induced Attenuation:<br>at 1550nm and 1625 nm (-60ºC to +85ºC) | 0.05dB/km | |
| | Macro bending Loss:<br>at 1550nm and 1625 nm (100 turns; Φ 60 mm) | ≤ 0.1dB | |

# Optical Cable
## Technical Data sheet

**Type:** **GYFTY48B1**

**Structure:**



| | Structure Data | | | |
|---|---|---|---|---|
| 1 | FRP | Diameter | 2.20 | mm |
| 2 | PBT Loose tube | Outer/Inne | 2.0/1.4 | mm |
| 3 | Optical fiber | No.s | 48 | |
| 4 | Filler | No.s | 2 | |
| 5 | Jelly | | | |
| 7 | Filling compound | | | |
| 8 | LSZH outer sheath | Thickness | 1.50 | mm |
| 9 | WB Glass yarn(600T) | | | |

**Fiber: 48x G.652D**

| | |
|---|---|
| Tube/Fibers | 4 / 12 |
| Color of Optical fiber | Blue,Orange,Green,Brown,Gray,White,Red,Black,Yellow,Violet,Pink,Turquoise |
| Color of buffer tube | Blue,Orange,Green,Brown |

| | | | |
|---|---|---|---|
| Diameter of Optical cable: | | 9.8±0.3 | mm |
| Weight: | | 102±10% | kg/km |

| | | | |
|---|---|---|---|
| **Tech. Data：** | Standard: IEC 60794 | | |
| | Features: Water blocking,Moisture proof,Tensile resistant, Crushing resistant | | |
| | Allowable tensile strength | short term 2000 | N |
| | Water ingress resistance | 1meter, 24hours, 3samples | |
| | Minimun bending radius(Dynamic) | 20 | D |
| | Minimun bending radius(Static) | 10 | D |
| | Life span of Optical cable | ⩾25 | years |
| **TEMP.CAPABILITY:** | -40℃ ~ +70℃ | △α⩽0.05 | dB/km |

**Note：** All dimetion and data are nominal value

Cable Ducto Armado con capa de hilo de vidrio, apto para la protección antiroedor

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# 4. COLOR IDENTIFICATION OF FIBER IN Duct Cable

### 4.1 Fiber color code

Each fiber will be identifiable throughout the length of the cable in accordance with the following color sequence. Fiber color in each tube starts from No. 1 Blue.

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

### 4.2 Color Codes for Loose Tube

The loose tubes will be identifiable in accordance with the following color sequence. If there are fillers, the color is Black.

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

# 5. TEST REQUIREMENTS FOR DUCT CABLE

**GYTC8S** shall be accordance with applicable standard of **GYTC8S** and requirement of customer. The following test items shall be carried out according to corresponding reference.

| Items | Test Method | Requirements |
|---|---|---|
| **Tension** | **IEC 60794-1-2-E1**<br>Load: According to 3.5<br>Sample length: Not less than 50m.<br>Duration time: 1min. | Additional attenuation: ≤0.1dB after test<br>No damage to outer jacket and inner elements |
| **Crush** | **IEC 60794-1-2-E3**<br>Load: According to 3.5<br>Duration of load: 1min | Additional attenuation: ≤0.1dB after test<br>No damage to outer jacket and inner elements |
| **Impact** | **IEC 60794-1-2-E4**<br>Radius: 300 mm<br>Impact energy: 10 J<br>Impact number: 1<br>Impact points: 3 | Additional attenuation: ≤0.1dB<br>No damage to outer jacket and inner elements |
| **Bend** | **IEC 60794-1-2-E11A**<br>Mandrel radius: 10*D<br>Turns:4 | Additional attenuation: ≤0.1dB<br>No damage to outer jacket and inner elements |
| **Repeated bending** | **IEC 60794-1-2-E6**<br>Bending radius: 20*D<br>Cycles: 25<br>Load: 150N | Additional attenuation: ≤0.1dB<br>No damage to outer jacket and inner elements |
| **Torsion** | **IEC 60794-1-2-E7**<br>Cycles:10<br>Length under test: 1m<br>Turns: | Additional attenuation: ≤0.1dB<br>No damage to outer jacket and inner elements |
| **Water Penetration** | **IEC 60794-1-2-F5B**<br>Time: 24 hours<br>Sample length: 3m | No water leakage， except the part of strande wire |
| **Temperature cycling** | **IEC 60794-1-2-F1**<br>Sample length: at least 1000m<br>Temperature range: -40℃~+70℃<br>Cycles: 2<br>Temperature cycling test dwell | The change in attenuation coefficient shall be less than 0.1dB/km. |
| **Other parameters** | According to **IEC 60794-1** | |

## 6. PACKING AND DRUM FOR DUCT CABLE

Duct cable shall be wound on a non-returnable wooden drum or metal drum. Both ends of Duct cable shall be securely fastened to drum and sealed with a shrinkable cap. The required marking shall be printed with a weather-proof material on the outsides of drum according to customer's requirement.

**EXAMPLE:**