

TECHNICAL SPECIFICATION

OPTICAL FIBER CABLE DIRECT BURIED CABLE 48F

1) SCOPE

This specification covers the general requirements and performance of OFC which Maintronics offered including optical characteristics, mechanical characteristics, geometrical characteristics.

| Cable type | Application |
|-------------------------|---------------|
| SOTERRADA [GYTY53-48B1] | Direct burial |

2) REFERENCES

The OFC which Maintronics offered shall be designed, manufactured and tested according to international standards as follows:

| | |
|-----------------|---|
| ISO 9001 | Quality Management Systems |
| ISO 14001 | Environmental Management Systems |
| IEEE Std P.1222 | IEEE Standard construction of composite fiber for use on electric utility power lines |
| IEC 60793-1 | Optical fiber Part 1: Generic specifications |
| IEC 60793-2 | Optical fiber Part 2: Product specifications |
| IEC 60794-1-2 | Optical fiber cables – Part 4: Sectional specification – Aerial optical cables along electrical power lines |
| EIA/TIA 598 | 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 cable |

3) OPTICAL FIBER

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:

G. 652D Fiber in Cable

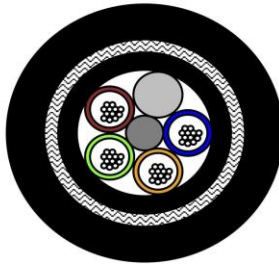
| Category | Description | Specifications |
|-------------------------------|--|---------------------------------------|
| Optical Characteristics | Attenuation Coefficient: at 1310 nm Max : at 1550 nm Max : | ≤ 0.35 dB/km ≤ 0.21 dB/km |
| | Chromatic Dispersion: at 1310nm at 1550nm | ≤ 3.5 ps/nm·km ≤ 18 ps/nm·km |
| | Attenuation Non-uniformity: at 1310nm at 1550 nm | ≤ 0.03dB ≤ 0.03dB |
| | Point Discontinuity: at 1310nm at 1550 nm | ≤ 0.1 dB ≤ 0.1 dB |
| | Polarization Mode Dispersion (PMD) | ≤ 0.2 ps/√km |
| | Cable Cut off Wavelength (λ_{cc}) | ≤ 1260 nm |
| Geometrical Characteristics | Mode Field Diameter : at 1310nm at 1550 nm | 9.2 ± 0.4μm 10.4 ± 0.5μm |
| | Cladding Diameter | 125 ± 1.0μm |
| | Mode field (Core/clad) concentricity error | ≤ 0.6 μm |
| | Cladding Non-Circularity | ≤ 1.0% |
| | Coating Diameter | 245 ± 7μm |
| | Coating non-circularity | ≤ 6.0% |
| | Coating-Cladding Concentricity | ≤ 12μm |
| Mechanical Characteristics | Effective Group Index of Refraction: at 1310 nm at 1550 nm | 1.466 1.467 |
| | Proof Test | ≥ 1.0%, 1 sec. ≥ 0.69Gpa (100kpsi) |
| Environmental Characteristics | Temperature Cycling Induced Attenuation: at 1550nm and 1625 nm (-60°C to +85°C) | 0.05dB/km |
| | Macro bending Loss : at 1550nm and 1625 nm (100 turns; Φ 60 mm) | ≤ 0.05 dB |

4) Drawing and Datasheet of OFC

| | | |
|-------------|---|-------------|
| MAINTRONICS | Optical Fiber Cable Specifications | MAINTRONICS |
|-------------|---|-------------|

Cable type: **GYTY53-48B1.3**

Cable structure:



Fiber: **48xG652D**

| Structure Data | | | | |
|----------------|-----------------------|------------------|---------|----|
| 1 | Steel wire | Diameter | 1.6 | mm |
| 2 | PBT Loose tube | Outer/inner Dia. | 2.1/1.5 | mm |
| 3 | Optical fiber | No.s | 48 | |
| 4 | Jelly | | | |
| 5 | Filling compound | | | |
| 6 | Filler | No.s | 1 | |
| 7 | MDPE inner sheath | Thickness | 0.8 | mm |
| 8 | Corrugated Steel Tape | | | |
| 9 | MDPE outer sheath | Thickness | 1.6 | mm |

| | |
|------------------------|--|
| Tube/Fibers | 4/12 |
| Color of Optical fiber | blue,orange,green,brown,gre,white,red,black,yellow,violet,pink,turquoise |
| Color of buffer tube | blue,orange,green,brown |

| | |
|----------------------------|---------------|
| Diameter of Optical cable: | 11.8±0.3 mm |
| Weight: | 150±10% kg/km |

| | | |
|---------------------|---|---------------------------------------|
| Tech. Data: | Standard: IEC-60794 | |
| | Features: Moisture resistant,Tensile resistant,Crushing resistant | |
| | Allowable tensile strength | short term(fiber strain<0.33%) 3000 N |
| | Water ingress resistance | 1meter, 24hours, 3samples |
| | Minimum bending radius(Dynamic) | 25 D |
| | Minimum bending radius(Static) | 12.5 D |
| Temperature: | Life span of Optical cable | ≥25 years |
| | Installation | -10°C ~ +60°C |
| | Transportation and operation | -40°C ~ +70°C |

Note: All dimension and data are nominal value

| | | | |
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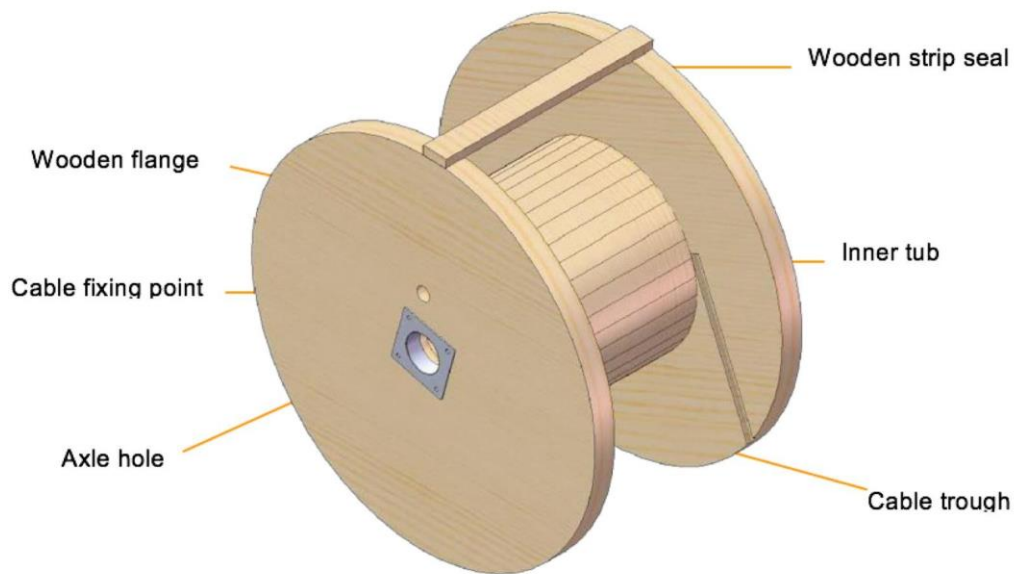
5) TEST REQUIREMENTS FOR OFC

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

| No | Item | Standard 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 | Coating diameter | IEC 60793-1-20 |
| 8 | Coating non-circularity | IEC 60793-1-20 |
| 9 | Cable cutoff wavelength | IEC 60793-1-44 |
| Tests of Completed Optical Fiber Cable | | |
| 1 | Tension Loading Test | IEC 60794-1-2 E1 |
| 2 | Crush Test | IEC 60794-1-2 E3 |
| 3 | Impact Resistance Test | IEC 60794-1-2 E4 |
| 4 | Repeated Bending Test | IEC 60794-1-2 E6 |
| 5 | Torsion/Twist Test | IEC 60794-1-2 E7 |
| 6 | Temperature cycling Test | IEC 60794-1-2 F1 |
| 7 | Water penetration Test | IEC 60794-1-2 F5 |

6) PACKING AND DRUM FOR OFC

6.1) OFC shall be wound on a non-returnable wooden drum. Both ends of OFC 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. Cables should be protected from moisture; kept away from high temperature and fire sparks; protected from over bending and crushing; protected from mechanical stress and damage.



6.2) Drum lengths:

Standard delivery lengths of 4km/drum, other length is also available.

6.3) Marking:

The sheath shall be marked with white characters at intervals of one meter with following information. Other marking is also available if requested by customer.

- (1) Name of the manufacturer
- (2) Cable type and fiber counts
- (3) Year of manufacture
- (4) Length marking
- (5) requested by customer