



FIG.8, OUTDOOR, MULTI-TUBE, ARMORED, DOUBLE JACKET, FIBER OPTIC CABLE

1. APPLICATION

This specification covers the construction and properties of Fig.8, Outdoor/Multi-tube, Armored, Double Jacket, fiber optic cable for aerial installation. LINK fiber optic cable supports application such as 40/100Gbps Ethernet, IEEE802.3ae, 10G Ethernet, IEEE802.3z, Gigabit Ethernet, Fast Ethernet, Ethernet, 100BASE-F, 52/155/622Mbps and 1.2Gbps ATM, FDDI, Fiber channel and others.

LINK Fig.8, Outdoor/Multi-tube, Armored, Double Jacket, fiber optic cable. Singlemode and Multimode color coded fibers are housed in multiple color coded plastic buffer tubes which are stranded around a central strength member. Dry water blocking tapes or yarns, wrapped around the core, provide protection against water ingress. These user friendly elements replace the sticky cable filling gel used in traditional loose tube cable designs. The cable inner sheath is Medium Density Polyethylene (MDPE). Corrugated steel tape for rodent protection, self-supporting provided by strand extra high strength galvanized steel wire. The cable outer sheath is high density polyethylene jacket.

LINK fiber optic cable in accordance with

| | |
|---------------------------------|--------------------------|
| ANSI/TIA-568.3-D | ISO/IEC 11801:2011 |
| ANSI/TIA/EIA-568-C.3 | ISO/IEC 11801:2017 |
| ANSI/ICEA 640 | IEC 60793, IEC 60794-1-2 |
| Telcordia (Bellcore) GR-20-CORE | EN 50173-1 |
| ITU-T G.652D (Singlemode) | TIS 2166-2548 |
| ITU-T G.651 (Multimode) | RoHS Compliant |

2. ORDER INFORMATION

FIG.8, OUTDOOR, MULTI-TUBE, ARMORED, DOUBLE JACKET, FIBER OPTIC CABLE

| Descriptions | OS2, SM 9/125 μ m | OM2, MM 50/125 μ m | OM3, MM 50/125 μ m | OM4, MM 50/125 μ m | OM5, MM 50/125 μ m |
|--------------|--------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| 6 Core | UFC9806MAD | UFC5806MAD | UFC4806MAD | UFC3806MAD | UFC2806MAD |
| 12 Core | UFC9812MAD | UFC5812MAD | UFC4812MAD | UFC3812MAD | UFC2812MAD |
| 24 Core | UFC9824MAD | UFC5824MAD | UFC4824MAD | UFC3824MAD | UFC2824MAD |
| 36 Core | UFC9836MAD | UFC5836MAD | UFC4836MAD | UFC3836MAD | UFC2836MAD |
| 48 Core | UFC9848MAD | UFC5848MAD | UFC4848MAD | UFC3848MAD | UFC2848MAD |
| 72 Core | UFC9872MAD | UFC5872MAD | UFC4872MAD | UFC3872MAD | UFC2872MAD |
| 96 Core | UFC9896MAD | UFC5896MAD | UFC4896MAD | UFC3896MAD | UFC2896MAD |
| 120 Core | UFC98120MAD | UFC58120MAD | UFC48120MAD | UFC38120MAD | UFC28120MAD |
| 144 Core | UFC98144MAD | UFC58144MAD | UFC48144MAD | UFC38144MAD | UFC28144MAD |

3. OPTICAL FIBER

| Items | | Specifications |
|--------------------------------------|------------------------|---|
| Fiber Type | | 9/125 μm (OS2) |
| Max. / Typ. Attenuation | 1310 nm | ≤ 0.35 / ≤ 0.33 dB/km |
| | 1383 nm | ≤ 0.35 / ≤ 0.31 dB/km |
| | 1550 nm | ≤ 0.21 / ≤ 0.19 dB/km |
| | 1625 nm | ≤ 0.23 / ≤ 0.20 dB/km |
| Core | Mode Field Diameter | 9.2 ± 0.4 μm @ 1310 nm 10.4 ± 0.5 μm @ 1550 nm |
| Cladding Diameter | | 125 ± 0.7 μm |
| Coating Diameter, Primary | | 242 ± 5 μm |
| Coating Diameter, Secondary | | 250 ± 5 μm |
| Cladding Non-circularity | | ≤ 0.7 % |
| Core/Cladding Concentricity error | | ≤ 0.5 μm |
| Coating/Cladding Concentricity error | | ≤ 12 μm |
| Attenuation (Homogeneity) | | Max 0.1 dB/km |
| Zero Dispersion Wavelength | | 1300 ~ 1324 nm |
| Zero Dispersion Slope | | ≤ 0.092 ps/(nm ² .km) |
| Cut-off Wavelength | λ _o (Fiber) | 1150 ~ 1330 nm |
| | λ _∞ (Cable) | ≤ 1260nm |
| Proof Test Stress | | 100 Kpsi |
| Chromatic Dispersion | λ ; 1285~1340 nm | ≤ 3.5 ps/nm.km |
| | λ = 1550 nm | ≤ 18 ps/nm.km |
| | λ = 1625 nm | ≤ 22 ps/nm.km |
| Polarization mode dispersion (PMD) | | ≤ 0.20 ps/√km |
| Fiber Curl | | ≥ 4M |
| Numerical Aperture | | 0.130 ± 0.010 |
| Group refractive index | 1310 nm | 1.4676 |
| | 1550 nm | 1.4682 |

Table 1 The optical, Geometrical Performance of the Multimode Fiber (The specification conforms to the requirement of ISO/IEC11801, ANSI/TIA-568-C.3, IEC 60793-2A1a, IEC 60793-2A1b, ITU -T G.651)

| Items | | Specifications | | | |
|---|---------|--------------------|--------------------|--------------------|--------------------|
| | | 50/125 μm (OM2) | 50/125 μm (OM3) | 50/125 μm (OM4) | 50/125 μm (OM5) |
| Max./ Typ. Attenuation (dB/km) | 850 nm | ≤ 2.7 / ≤ 2.5 | ≤ 2.7 / ≤ 2.3 | ≤ 2.7 / ≤ 2.3 | ≤ 2.7 / ≤ 2.3 |
| | 1300 nm | ≤ 0.8 / ≤ 0.7 | ≤ 0.8 / ≤ 0.6 | ≤ 0.8 / ≤ 0.6 | ≤ 0.8 / ≤ 0.6 |
| | 953 nm | N.A | N.A | N.A | ≤ 2.0 / ≤ 1.8 |
| Bandwidth (MHz/km) | 850 nm | ≥ 500 | ≥ 1500 | ≥ 3500 | ≥ 3500 |
| | 1300 nm | ≥ 500 | ≥ 500 | ≥ 500 | ≥ 500 |
| | 953 nm | N.A | N.A | N.A | ≥ 1850 |
| 850nm Laser Bandwidth (MHz/km) | | N.A | ≥ 2000 | ≥ 4700 | ≥ 4700 |
| 953nm Laser Bandwidth (MHz/km) | | N.A | N.A | N.A | ≥ 2470 |
| Core Diameter (μm) | | 50.0 ± 2.5 | 50.0 ± 2.5 | 50.0 ± 2.5 | 50.0 ± 2.5 |
| Cladding Diameter (μm) | | 125 ± 1 | 125 ± 1 | 125 ± 1 | 125 ± 1 |
| Core Non-circularity (%) | | ≤ 5 | ≤ 5 | ≤ 5 | ≤ 5 |
| Cladding Non-circularity (%) | | ≤ 1.0 | ≤ 1.0 | ≤ 1.0 | ≤ 1.0 |
| Core/Cladding Concentricity error (μm) | | ≤ 1.5 | ≤ 1.5 | ≤ 1.5 | ≤ 1.5 |
| Coating Diameter, Primary (μm) | | 242 ± 5 | 242 ± 5 | 242 ± 5 | 242 ± 5 |
| Coating Diameter, Secondary (μm) | | 250 ± 5 | 250 ± 5 | 250 ± 5 | 250 ± 5 |
| Coating Non-Circularity (%) | | ≤ 5 | ≤ 5 | ≤ 5 | ≤ 5 |
| Coating/Cladding Concentricity error (μm) | | ≤ 12 | ≤ 12 | ≤ 12 | ≤ 12 |
| Attenuation (Homogeneity) | | Max 0.1 dB/km | Max 0.1 dB/km | Max 0.1 dB/km | Max 0.1 dB/km |
| Proof Test Stress (kpsi) | | 100 | 100 | 100 | 100 |
| Bending Loss @ 850 & 1300 nm (100 turns, D=75 mm) | | ≤ 0.5 dB | ≤ 0.5 dB | ≤ 0.5 dB | ≤ 0.5 dB |
| Zero-Dispersion Wavelength | | 1295~1315nm | 1295~1315nm | 1295~1315nm | 1295~1315nm |
| Zero-Dispersion Slope (ps/(nm ² .km)) | | ≤ 0.101 | ≤ 0.101 | ≤ 0.101 | ≤ 0.101 |
| Numerical Aperture | | 0.200 ± 0.015 | 0.200 ± 0.015 | 0.200 ± 0.015 | 0.200 ± 0.015 |
| Group refractive index | 850 nm | 1.482 | 1.482 | 1.482 | 1.482 |
| | 1300 nm | 1.477 | 1.477 | 1.477 | 1.477 |

Table 2 The optical, Geometrical Performance of the Multimode Fiber (The specification conforms to the requirement of ISO/IEC11801, ANSI/TIA-568-C.3, IEC 60793-2A1a, IEC 60793-2A1b, ITU -T G.651)

4. CABLE CONSTRUCTION

| Item | | Description | | | |
|----------------------------|---------------------|--|----------------|----------------|----------------|
| | | 6-24 Fibers | 48-60 Fibers | 72 Fibers | 96 Fibers |
| Loose Tube | Material | PBT(Polybutylene Terephthalate) with color coding | | | |
| | Filling Compound | Thixotropic Jelly Compound | | | |
| | Fiber per Tube | 6 | 12 | | |
| | Number | 1-5 | 4-5 | 6 | 8 |
| Filler Rod | Material | Plastic rod, natural color | | | |
| | Number | 4-0 | 1-0 | 0 | 0 |
| Stranding | Method | Reverse oscillating lay (ROL) technique (SZ Direction) | | | |
| Central Strength Member | Material | High Strength Steel Wire (FRP is available on request) | | | |
| Water Blocking Yarn | Material | Suitable Water Swellable Materials (Dry-Core Technology) | | | |
| Binder & Wrapping | Material | Polyester yarn | | | |
| Water Blocking Tape | Thickness | 0.3 ± 0.05 mm | | | |
| Ripcord 1 | Material | Plastic thread | | | |
| | Number | 2 | | | |
| Inner Sheath | Material | Black Medium Density Polyethylene | | | |
| | Thickness (Approx.) | 1±0.2 mm. | | | |
| Ripcord 2 | Material | Plastic thread | | | |
| | Number | 2 | | | |
| Armored | Material | Corrugated chrome steel tape coated with polymer | | | |
| | Thickness | Steel & Polymer coating : 0.25 mm. | | | |
| Outer Sheath | Material | UV-Proof, Black High Density Polyethylene | | | |
| | Thickness (Approx.) | 1.6 mm. | | | |
| Web | Thickness | 2 x 2 mm. (HxW) | | | |
| Messenger Wire | Material | Extra High Strength Galvanize steel wire | | | |
| | Diameter | 7 x 1.0 mm. | | | |
| Cable Diameter (Approx.) | | 12.2±1.0 mm. | 12.5±1.0 mm. | 13.0±1.0 mm. | 14.4±1.0 mm. |
| Overall Diameter (Approx.) | | 19.0±1.0 mm. | 19.5±1.0 mm. | 20.0±1.0 mm. | 21.4±1.0 mm. |
| Cable Weight (Approx.) | | 195±10 kg./km. | 210±10 kg./km. | 235±10 kg./km. | 265±10 kg./km. |

Table 3 Construction of Fig.8, Outdoor/Multi-tube, Armored, Double Jacket, Fiber optic cable.

5. TEMPERATURE RANGE

For the cables covered by this specification, the following temperature ranges apply.

- Operation Temperature : -40°C to +70°C
- Installation Temperature : -40°C to +70°C
- Storage/Shipping Temperature : -40°C to +75°C

6. MECHANICAL SPECIFICATION

| Item | | Specification |
|--------------------------|--------------|---------------------------------|
| Maximum Span Length | | 100 m. |
| Sag | | 1% of span length |
| Maximum Wind Velocity | | 126 km. /hr. |
| Maximum Tensile load | | 6,000 N. |
| Maximum Crush resistance | | 4,400 N. /10 cm. |
| Minimum bending Radius | Installation | 20 x External Diameter of Cable |
| | Operation | 10 x External Diameter of Cable |

Table 4 Mechanical Specification of the cable

7. FIBER AND LOOSE TUBE IDENTIFICATION

The color code of the loose tubes and the individual fibers within each loose tube shall be in accordance with Table 5 below TIA/EIA-598-C (Rev. TIA/EIA-598-A) and EIA-359-A Color Code for Fiber and Loose tube Identification.

| No. | Fiber color | Loose Tube color |
|-----|-------------|------------------|
| 1 | Blue | Blue |
| 2 | Orange | Orange |
| 3 | Green | Green |
| 4 | Brown | Brown |
| 5 | Slate | Slate |
| 6 | White | White |
| 7 | Red | Red |
| 8 | Black | Black |
| 9 | Yellow | Yellow |
| 10 | Violet | Violet |
| 11 | Rose | Rose |
| 12 | Aqua | Aqua |

Table 5 TIA/EIA-598-C Color Code for Fiber and Loose tube Identification.

8. MECHANICAL PERFORMANCE TEST

- Tensile loading Test TIA/EIA-455-33A and IEC 60794-1-2-E1A
- Compression Test TIA/EIA-455-41A and IEC 60794-1-2-E3
- Repeated Bending Test TIA/EIA-455-104A and IEC 60794-1-2-E6
- Impact Test TIA/EIA-455-25B and IEC 60794-1-2-E4
- Cable Bending Test IEC 60794-1-2-E11B
- Cable Twist or Torsion Test TIA/EIA-455-85A and IEC 60794-1-2-E7
- Temperature Cycling Test TIA/EIA-455-3A and IEC 60794-1-2-F1
- Water Penetration Test TIA/EIA-455-82B and IEC 60794-1-2-F5