



**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 μm	OM2, MM 50/125 μm	OM3, MM 50/125 μm	OM4, MM 50/125 μm	OM5, MM 50/125 μm
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 $\mu\text{m}$ (OS2)
Max. / Typ. Attenuation	1310 nm	$\leq 0.35 / \leq 0.33$ dB/km
	1383 nm	$\leq 0.35 / \leq 0.31$ dB/km
	1550 nm	$\leq 0.21 / \leq 0.19$ dB/km
	1625 nm	$\leq 0.23 / \leq 0.20$ dB/km
Core	Mode Field Diameter	9.2 $\pm$ 0.4 $\mu\text{m}$ @ 1310 nm 10.4 $\pm$ 0.5 $\mu\text{m}$ @ 1550 nm
Cladding Diameter		125 $\pm$ 0.7 $\mu\text{m}$
Coating Diameter, Primary		242 $\pm$ 5 $\mu\text{m}$
Coating Diameter, Secondary		250 $\pm$ 5 $\mu\text{m}$
Cladding Non-circularity		$\leq 0.7$ %
Core/Cladding Concentricity error		$\leq 0.5$ $\mu\text{m}$
Coating/Cladding Concentricity error		$\leq 12$ $\mu\text{m}$
Attenuation (Homogeneity)		Max 0.1 dB/km
Zero Dispersion Wavelength		1300 ~ 1324 nm
Zero Dispersion Slope		$\leq 0.092$ ps/(nm <sup>2</sup> .km)
Cut-off Wavelength	$\lambda_0$ (Fiber)	1150 ~ 1330 nm
	$\lambda_\infty$ (Cable)	$\leq 1260$ nm
Proof Test Stress		100 Kpsi
Chromatic Dispersion	$\lambda$ ; 1285~1340 nm	$\leq 3.5$ ps/nm.km
	$\lambda = 1550$ nm	$\leq 18$ ps/nm.km
	$\lambda = 1625$ nm	$\leq 22$ ps/nm.km
Polarization mode dispersion (PMD)		$\leq 0.20$ ps/ $\sqrt{\text{km}}$
Fiber Curl		$\geq 4\text{M}$
Numerical Aperture		0.130 $\pm$ 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 $\mu\text{m}$ (OM2)	50/125 $\mu\text{m}$ (OM3)	50/125 $\mu\text{m}$ (OM4)	50/125 $\mu\text{m}$ (OM5)
Max./ Typ. Attenuation (dB/km)	850 nm	$\leq 2.7 / \leq 2.5$	$\leq 2.7 / \leq 2.3$	$\leq 2.7 / \leq 2.3$	$\leq 2.7 / \leq 2.3$
	1300 nm	$\leq 0.8 / \leq 0.7$	$\leq 0.8 / \leq 0.6$	$\leq 0.8 / \leq 0.6$	$\leq 0.8 / \leq 0.6$
	953 nm	N.A	N.A	N.A	$\leq 2.0 / \leq 1.8$
Bandwidth (MHz/km)	850 nm	$\geq 500$	$\geq 1500$	$\geq 3500$	$\geq 3500$
	1300 nm	$\geq 500$	$\geq 500$	$\geq 500$	$\geq 500$
	953 nm	N.A	N.A	N.A	$\geq 1850$
850nm Laser Bandwidth (MHz/km)		N.A	$\geq 2000$	$\geq 4700$	$\geq 4700$
953nm Laser Bandwidth (MHz/km)		N.A	N.A	N.A	$\geq 2470$
Core Diameter ( $\mu\text{m}$ )		50.0 $\pm$ 2.5	50.0 $\pm$ 2.5	50.0 $\pm$ 2.5	50.0 $\pm$ 2.5
Cladding Diameter ( $\mu\text{m}$ )		125 $\pm$ 1	125 $\pm$ 1	125 $\pm$ 1	125 $\pm$ 1
Core Non-circularity (%)		$\leq 5$	$\leq 5$	$\leq 5$	$\leq 5$
Cladding Non-circularity (%)		$\leq 1.0$	$\leq 1.0$	$\leq 1.0$	$\leq 1.0$
Core/Cladding Concentricity error ( $\mu\text{m}$ )		$\leq 1.5$	$\leq 1.5$	$\leq 1.5$	$\leq 1.5$
Coating Diameter, Primary ( $\mu\text{m}$ )		242 $\pm$ 5	242 $\pm$ 5	242 $\pm$ 5	242 $\pm$ 5
Coating Diameter, Secondary ( $\mu\text{m}$ )		250 $\pm$ 5	250 $\pm$ 5	250 $\pm$ 5	250 $\pm$ 5
Coating Non-Circularity (%)		$\leq 5$	$\leq 5$	$\leq 5$	$\leq 5$
Coating/Cladding Concentricity error ( $\mu\text{m}$ )		$\leq 12$	$\leq 12$	$\leq 12$	$\leq 12$
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)		$\leq 0.5$ dB	$\leq 0.5$ dB	$\leq 0.5$ dB	$\leq 0.5$ dB
Zero-Dispersion Wavelength		1295~1315nm	1295~1315nm	1295~1315nm	1295~1315nm
Zero-Dispersion Slope (ps/(nm <sup>2</sup> .km))		$\leq 0.101$	$\leq 0.101$	$\leq 0.101$	$\leq 0.101$
Numerical Aperture		0.200 $\pm$ 0.015	0.200 $\pm$ 0.015	0.200 $\pm$ 0.015	0.200 $\pm$ 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			
Number of fibers		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