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LINK AMERICAN CABLING



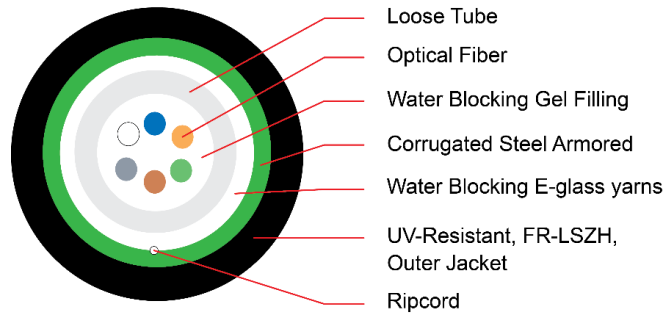
## F.O. OUTDOOR/INDOOR, ARMORED, FR-LSZH, SINGLE TUBE

### Scope of Application

This specification covers the general requirements for fiber optic telecommunication cables used for campus backbone, building backbone, indoor and outdoor in duct, lash aerial or direct buried 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 OUTDOOR/INDOOR, ARMORED, FR-LSZH, fiber optic cable, Singlemode and Multimode color coded fibers, single loose tube, the interstices between the optical fibers filled with a suitable waterproof compound. The water blocking E-glass yarns provide for tensile strength and water blocking, corrugated steel tape armored for rodent protection and ripcord for easy to strip. The outer sheath is UV-Resistant black PE with FR-LSZH.

### Drawing



### Technical Standard

- |  |                            |
|--|----------------------------|
| • ANSI/TIA-568.3-E                             | ISO/IEC 11801:2011         |
| • ANSI/TIA-568.3-D                             | ISO/IEC 11801:2017         |
| • ANSI/ICEA 696, ANSI/ICEA 596, ANSI/ICEA 640  | IEC 60332-1-2, IEC 60332-3 |
| • Telcordia (Bellcore) GR-20-CORE, GR-409-CORE | IEC 61034-2, IEC60754-2    |
| • ITU-T G.652D (Singlemode)                    | IEC 60793, IEC 60794-1-2   |
| • ITU-T G.651 (Multimode)                      | EN 50173-1, TIS 2165-2561  |
| • RoHS Compliant                               |                            |





## OPTICAL FIBER

Items		Specifications
Fiber Type		9/125 $\mu\text{m}$ (OS2)
Max. / Typ. Attenuation	1310 nm	$\leq 0.35/0.33$ dB/km
	1383 nm	$\leq 0.35/0.31$ dB/km
	1550 nm	$\leq 0.21/0.19$ dB/km
	1625 nm	$\leq 0.23/0.20$ 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 Singlemode Fiber (The specification conforms to the requirement of ISO/IEC11801, ANSI/TIA-568.3-E, IEC 60793-2B1.3, ITU-T G.652D)



## OPTICAL FIBER

Items		Specifications			
		50/125 $\mu$ m (OM2)	50/125 $\mu$ m (OM3)	50/125 $\mu$ m (OM4)	50/125 $\mu$ m (OM5)
Fiber Type	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	$\leq 2.3 / \leq 2.0$
Max./ Typ. Attenuation (dB/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 ( $\mu$ m)		$50.0 \pm 2.5$	$50.0 \pm 2.5$	$50.0 \pm 2.5$	$50.0 \pm 2.5$
Cladding Diameter ( $\mu$ 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 ( $\mu$ m)		$\leq 1.5$	$\leq 1.5$	$\leq 1.5$	$\leq 1.5$
Coating Diameter, Primary ( $\mu$ m)		$242 \pm 5$	$242 \pm 5$	$242 \pm 5$	$242 \pm 5$
Coating Diameter, Secondary ( $\mu$ 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 ( $\mu$ 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,		$\leq 0.5$ 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-568.3-E, IEC 60793-2A1a, IEC 60793-2A1b, ITU -T G.651)



## CABLE CONSTRUCTION

The construction of the cable shall be in accordance with Table 3 below.

Items		Specifications	
Number of fiber		2, 4, 6, 8	12
Loose tube	Material	PBT (Polybutylene Terephthalate)	
	Color	White	
	Filling Compound	Thixotropic jelly compound	
Additional Strength Member	Water blocking E-Glass yarns (To provide the required tensile strength and water blocking)		
Rip Cord	Material	Plastic thread	
Armored	Material	Corrugated chrome steel tape coated with polymer on both sides	
Outer Jacket	Material	UV-Resistant, Black PE with FR-LSZH (Flame Retardant Low Smoke Zero Halogen)	
	Thickness (Approx.)	1.6 mm.	
Cable Diameter (Approx.)		7.9 ± 0.5 mm.	8.4 ± 0.5 mm.
Cable Weight (Approx.)		75 ± 5 kg./km.	82 ± 5 kg./km.

**Table 3** Construction of OUTDOOR/INDOOR, DUCT, All-Dielectric, FR-LSZH, Fiber optic cable.

## 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

## MECHANICAL SPECIFICATION

Item	Specification
Maximum Tensile load	Installation 1,800 N.
	Operation 1,000 N.
Maximum Crush resistance	2,200 N./10 cm.
Minimum bending Radius	Installation 15 x Cable Diameter
	Operation 10 x Cable Diameter

**Table 4** Mechanical Specification of the cable.



## 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 TIA/EIA-598-C (Rev. TIA/EIA-598-A) and EIA-359-A Color Code for Fiber and Loose tube Identification.

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

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

## 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

## ORDER INFORMATION

OUTDOOR/INDOOR, ARMORED, FR-LSZH, SINGLE TUBE, FIBER OPTIC CABLE.

Descriptions	OS2, SM 9/125 $\mu$ m	OM2, MM 50/125 $\mu$ m	OM3, MM 50/125 $\mu$ m	OM4, MM 50/125 $\mu$ m	OM5, MM 50/125 $\mu$ m
4 Core	UFC9304A	UFC5304A	UFC4304A	UFC3304A	UFC2304A
6 Core	UFC9306A	UFC5306A	UFC4306A	UFC3306A	UFC2306A
8 Core	UFC9308A	UFC5308A	UFC4308A	UFC3308A	UFC2308A
12 Core	UFC9312A	UFC5312A	UFC4312A	UFC3312A	UFC2312A

Specifications subject to change without notice.

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