F.O. OUTDOOR/INDOOR,

DUCT, ALL-DIELECTRIC, FR-LSZH, MULTI-TUBE

UFC9304M
UFC9306M
UFC9312M

UFC5304M
UFC5306M
UFC5312M

UFC4304M
UFC4306M
UFC4312M

UFC3304M
UFC3306M
UFC3312M

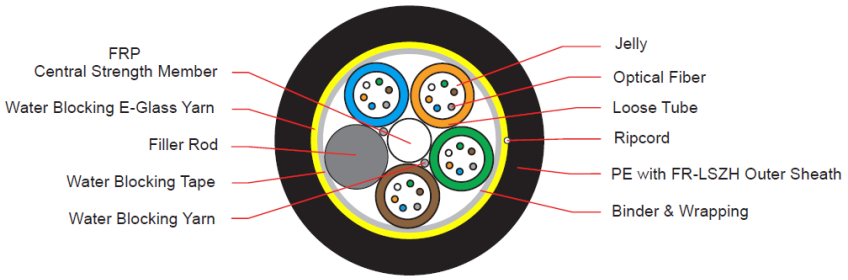
UFC2304M
UFC2306M
UFC2312M

Scope of Application

This specification covers the general requirements for fiber optic telecommunication cables used for campus backbone (inter-building), building backbone (intra-building), indoor and outdoor in duct or lash aerial installation. LINK fiber optic cable supports application such as 25/40/50/100/200/400Gbps Ethernet, IEEE802.3ae 10G Ethernet, IEEE802.3z Gigabit Ethernet, IEEE802.3u Fast Ethernet, 52/155/622Mbps, 1.2Gbps ATM, FDDI, Fiber channel, FTTx, CATV, CCTV and others.

LINK OUTDOOR/INDOOR, Duct, All-Dielectric, FR-LSZH, Multi-Tube, fiber optic cable. Singlemode and Multimode color coded fibers, multi loose tube, central strength member, filled color coded loose tube, PE filler, SZ-Stranded around the central strength member (FRP), the interstices between the optical fiber filled with a suitable waterproof compound. The filling compound is non -hygroscopic, electrically nonconductive, water-blocking tape, rip-cord, E-glass yarns for additional strength member and rodent protection, black PE with LSZH jacket for UV-Resistant and flame retardant.

Drawing



Technical Standard

- ANSI/TIA-568.3-D
- ANSI/TIA-568-C.3
- ANSI/ICEA 696, ANSI/ICEA 596
- Telcordia (Bellcore) GR-20-CORE, GR-409-CORE
- ITU-T G.651 (Multimode)
- ITU-T G.652D (Single mode)

ISO/IEC 11801:2017, EN 50173-1
IEC 60332-1-2
IEC 61034-2, IEC60754-2
IEC 60793, IEC60794-1-2
TIS 2165-2561
RoHS Compliant

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 ± 0.7μm
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 Singlemode Fiber (The specification conforms to the requirement of ISO/IEC11801, ANSI/TIA-568.3-D, IEC 60793-2B1.3, ITU-T G.652D)

OPTICAL FIBER

Items		Specifications			
Fiber Type		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	≤ 2.3 / ≤ 2.0
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,		≤ 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-568.3-D, 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.

Item		Description		
Number of fibers		6-24	36-60	72
Loose Tube	Material	PBT (Polybutylene Terephthalate) with color coding		
	Filling Compound	Thixotropic Jelly Compound		
	Fiber per Tube	6	12	
	Number	1-4	3-5	6
Filler Rod	Material	Plastic rod, natural color		
	Number	4-1	2-0	0
Stranding	Method	Reverse oscillating lay (ROL) technique (SZ Direction)		
Central Strength Member	Material	FRP (Fiberglass Reinforce with Plastic)		
	Color	Natural		
Water Blocking Yarn	Material	Suitable Water Swellable Materials (Dry-Core Technology)		
Binder & Wrapping	Material	Polyester yarns		
Water Blocking Tape	Thickness	0.3 ± 0.05 mm.		
Ripcord	Material	Plastic thread		
	Number	1		
Additional Strength	Material	Water blocking E-glass yarn (aramid yarn is available on request)		
Outer Sheath	Material	UV-resistant, Black PE with FR-LSZH (Flame Retardant Low Smoke Zero Halogen)		
	Thickness (Approx.)	1.6 mm.		
Cable Diameter (Approx.)		9.2 ± 1 mm.	9.6 ± 1 mm.	9.9 ± 1 mm.
Cable Weight (Approx.)		85 ± 10 kg./km.	90 ± 10 kg./km.	105 ± 10 kg./km.

The construction of the cable shall be in accordance with Table 4 below.

Item		Description		
Number of fibers		96	120	144
Loose Tube	Material	PBT (Polybutylene Terephthalate) with color coding		
	Filling Compound	Thixotropic Jelly Compound		
	Fiber per Tube	12		
	Number	8	10	12
Filler Rod	Material	Plastic rod, natural color		
	Number	0	0	0
Stranding	Method	Reverse oscillating lay (ROL) technique (SZ Direction)		
Central Strength Member	Material	FRP (Fiberglass Reinforce with Plastic)		
	Color	Natural		
Water Blocking Yarn	Material	Suitable Water Swellable Materials (Dry-Core Technology)		
Binder & Wrapping	Material	Polyester yarns		
Water Blocking Tape	Thickness	0.3 ± 0.05 mm.		
Ripcord	Material	Plastic thread		
	Number	1		
Additional Strength Member	Material	Water blocking E-glass yarn (aramid yarn is available on request)		
Outer Sheath	Material	UV-resistant, Black PE with FR-LSZH (Flame Retardant Low Smoke Zero Halogen)		
	Thickness (Approx.)	1.6 mm.		
Cable Diameter (Approx.)		11.4 ± 1 mm.	12.6 ± 1 mm.	13.8 ± 1 mm.
Cable Weight (Approx.)		115 ± 10 kg./km.	145 ± 10 kg./km.	180 ± 10 kg./km.

Table 3 and 4 Construction of OUTDOOR/INDOOR, All-Dielectric, FR-LSZH, Multi-Tube, 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	20 x Cable Diameter
	Operation	10 x Cable Diameter

Table 5 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 6 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 6 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, DUCT, ALL-DIELECTRIC, FR-LSZH, MULTI-TUBE, 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
4 Core	UFC9304M	UFC5304M	UFC4304M	UFC3304M	UFC2304M
6 Core	UFC9306M	UFC5306M	UFC4306M	UFC3306M	UFC2306M
12 Core	UFC9312M	UFC5312M	UFC4312M	UFC3312M	UFC2312M
24 Core	UFC9324M	UFC5324M	UFC4324M	UFC3324M	UFC2324M
36 Core	UFC9336M	UFC5336M	UFC4336M	UFC3336M	UFC2336M
48 Core	UFC9348M	UFC5348M	UFC4348M	UFC3348M	UFC2348M
60 Core	UFC9360M	UFC5360M	UFC4360M	UFC3360M	UFC2360M
72 Core	UFC9372M	UFC5372M	UFC4372M	UFC3372M	UFC2372M
96 Core	UFC9396M	UFC5396M	UFC4396M	UFC3396M	UFC2396M
120 Core	UFC93120M	UFC53120M	UFC43120M	UFC33120M	UFC23120M
144 Core	UFC93144M	UFC53144M	UFC43144M	UFC33144M	UFC23144M