Specification

LA-ABC-001

Loose Tube / Dry Core / Single Jacket
Air Blown Optical Fiber Cable

[LAC code: OJFPP-LT-ABC]
[Optical Fiber based on SM]

LEXINGTON AMES LLC

1. Scope

1.1 Application

This specification covers the general requirements for outdoor optical fiber applications.

1.2 Cable Description

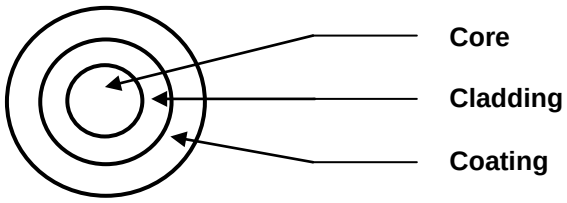
The cable core consists of color coded fibers, dry water swellable material, color coded loose tubes, PE filler (if necessary), SZ-stranded around the dielectric central strength member with water blocking yarn(s).

Non-Armor / Single Jacket

The cable structure is reinforced by the application of a core binder yarn(s) and covered by an outer PE jacket.

2. Optical Fiber

2.1 Construction of the fibers



2.2 The operating wavelength region of single-mode is 1310 & 1550nm.

2.3 Fiber Material

The fiber is made from high grade silica glasses coated by a UV curable acrylate material. A protective UV cured acrylate coating is applied over the fiber cladding and it can be removed mechanically or chemically.

- Core : Silica (SiO2) Doped with Germanium Dioxide (GeO2)
- Cladding : Silica (SiO2)
- Coating : Dual Layers of UV curable acrylate (or equivalent)

2.4 Environmental conditions; up to 100 % non-condensing humidity

- Operation : - 40 to 158 °F (- 40 to 70 °C)
- Installation : - 22 to 158 °F (- 30 to 70 °C)
- Storage : - 40 to 158 °F (- 40 to 70 °C)

2.5 The optical, geometrical and mechanical performance of the optical fiber is reflected in Table 1 (below).

Table 1-1. Characteristics for Single mode fiber
(Optical, geometrical, and mechanical performance)

Items	Unit	Specification	
Type of Fiber		G.652D	G.657A1
Mode Field Diameter @1310nm	μm	9.2 ± 0.4	8.9 ± 0.4
Cladding Diameter	μm	125 ± 1.0	
Cladding Non-circularity	%	≤ 1.0	
Attenuation	dB/km	≤ 0.35 @ 1310 nm ≤ 0.35 @ 1383 nm ≤ 0.25 @ 1550 nm	
Zero Dispersion Wavelength	nm	1300 ~ 1324	
Chromatic Dispersion	ps/nm.km	≤ 3.5 @ 1285 ~ 1330 nm ≤ 18 @ 1550 nm	
Zero Dispersion Slope	$ps/nm^2/km$	≤ 0.092	
Cut-off Wavelength (λcc, cabled fiber)	μm	≤ 1260	
Mode Field Concentricity Error	μm	≤ 0.6	
Coated Diameter	μm	250 ± 15	
Proof Test (Nom.)	kpsi	100	

3. Cable Construction

3.1 The physical construction of the cable is shown in Table 2 (below).

Table 2-1. Construction of the cable

Items	Description
Fiber Type	See Table 1
No. of Fibers	Max. 144C
Loose Buffer Tube	Made of PBTP (Polybutylene Terephthalate)
Type of Inner Jelly	Thixotropic type jelly compound (in loose tube)
Filler	Natural color PE rod(s). If necessary, the PE filler(s) shall be used for circular-section core(s) (for better core configuration).
Central Strength Member	FRP (PE coating if necessary)
Water Blocking Material	Water blocking yarn(s) around the CSM (to prevent the ingress of water)
S-Z Stranding (Cable Core)	The required numbers of loose tube and filler rod are S-Z stranded tightly around the CSM.
Core Binder Yarn	Water blocking core binder yarn(s)
Rip Cord	One ripcord (for easy cable entry)
Outer Jacket	Black colored PE

Table 2-2 Construction of the cable in detail

Items	Description										
Cable type	Standard (SD), Micro (MC)						Micro (MC)		High density (HD)		
No. of fibers	12	24	36	48	60	72	96	144	96	144	288
No. of fibers per tube	12	12	12	12	12	12	12	12	24	24	24
No. of loose tube	1	2	3	4	5	6	8	12	4	6	12
No. of filler	5	4	3	2	1	0	0	0	2	0	0
Tube diameter (Nom. mm)	1.7 (SD), 1.45 (MC)						1.45		2.2		
Cable diameter	See Appendix 2										
Cable weight	See Appendix 2										

4. Fiber & Loose tube Identification

4.1 The loose tubes and the individual fibers are color coded as reflected in Table 3 (below).

Table 3-1. Color code of the fibers

No	Color	No	Color
1	Blue	13	Blue + Single dot marking
2	Orange	14	Orange + Single dot marking
3	Green	15	Green + Single dot marking
4	Brown	16	Brown + Single dot marking
5	Gray	17	Gray + Single dot marking
6	White	18	White + Single dot marking
7	Red	19	Red + Single dot marking
8	Black	20	Natural + Single dot marking
9	Yellow	21	Yellow + Single dot marking
10	Violet	22	Violet + Single dot marking
11	Pink	23	Pink + Single dot marking
12	Aqua	24	Aqua + Single dot marking

Table 3-2. Color code of the loose buffer tubes

No	Color	No	Color
1	Blue	7	Red
2	Orange	8	Black
3	Green	9	Yellow
4	Brown	10	Violet
5	Gray	11	Pink
6	White	12	Aqua

5. Mechanical / Environmental Performance & Tests

5.1 The mechanical & environmental performance of the cable is in accordance with Table 4 (below). Unless otherwise specified, all attenuation measurements required in this section are performed at 1550 nm. The measurement equipment error will be no more than 0.02dB.

Table 4. Mechanical & Environmental Performance of the cable

Items	Description
Tensile Strength	● Test method: IEC 60794-1-2 Method E1 -. Mandrel diameter: 40D (D: cable diameter) -. Length under tension: ≥ 50m -. Applied Tensile load: 1W (W: cable weight) -. Duration of loading: 60 min. ● Acceptance criteria -. Attenuation increment: reversible
Crush Resistance (Compressive loading)	● Test method: IEC 60794-1-2 Method E3 -. Applied load: 500N -. No of points: 1 point -. Plate size: 100mm x 100mm -. Duration of loading: 1min. ● Acceptance criteria -. Attenuation increment: reversible
Impact Resistance	● Test method: IEC 60794-1-2 Method E4 -. Drop hammer mass: 1J -. Striking surface radius: 300mm -. No. of impact per point: 3 point (500mm interval) ● Acceptance criteria -. Attenuation increment: ≤0.1 dB
Repeated Bend	● Test method: IEC 60794-1-2 Method E6 -. Mandrel diameter: 20D (D: cable diameter) -. Applied load: 50N -. No. of bend cycles: 25 cycles -. Bend angle: ±90 degree ● Acceptance criteria -. No damage to the sheath and the cable elements
Torsion	● Test method: IEC 60794-1-2 Method E7 -. Cable twisted length: 2 m -. No. of twist cycles: 10 cycles -. Applied load: 50N -. Twist angle: ±180 degree

	● Acceptance criteria -. Attenuation increment: reversible
Kink	● Test method: IEC 60794-1-2 Method E10 -. Mandrel diameter: 40D (D: cable diameter) ● Acceptance criteria: No kink
Cable Bend	● Test method: IEC 60794-1-2 Method E11A -. Bend radius: 20D (D: cable diameter) -. Bend angle: ±180 degree -. No. of turns: 4 turns -. No. of cycles: 3 cycles ● Acceptance criteria -. Attenuation increment: reversible
Water Penetration	● Test method: IEC 60794-1-2 Method F5 -. Length of specimen: 3 m -. Height of pressure head: 1 m -. Test time: 24 h ● Acceptance criteria -. No leakage through the open cable end
Temperature Cycling	● Test method: IEC 60794-1-2 Method F1 -. Cable length: ≥ 1,000m -. Test condition: ≥ 2 fibers shall be spliced -. Temperature cycling schedule : +23℃ → -15℃ → +30℃ → +60℃ → +23℃ (Soak time: 8 h) -. No. of cycles: 2 ● Acceptance criteria -. Attenuation increment: reversible (step 1& 2) ≤0.15 dB/km (step 2)

6. Packing and marking

6.1 Cable marking

The jacket is marked every two feet or one meter with following information.

1) Cable type & counts
2) Name of the manufacturer
3) Year of manufacture (YYYY)
4) Serial number (NNNNN)
5) Length marking (FT)

● Ex) For SM 144 fiber cable HD

00002FT ABC-HD SM 144C LEXINGTON AMES YYYY NNNNN 00004FT

6.2 Cable packing

6.2.1 Standard length of cable is in accordance with Appendix 2. Other cable lengths are available per customer demand.

6.2.2 Each length of the cable is wound on a separate wooden reel.

6.2.3 Both ends of the cable are sealed with a suitable plastic cap to prevent the entry of moisture during shipping, handling and storage.

6.2.4 The cable ends are securely fastened to the reel to prevent the cable from becoming loose in transit or during placing operations.

6.2.5 The inner end of the cable is housed into a slot on the side of the reel without extra cable length for testing.

6.2.6 The reels must have a minimum of 50mm of free space between the upper layer and the edge of the flanges.

6.2.7 Circumference battens or Wood-fiber board is secured with a steel band to protect the cable during normal handling and storage.

6.3 Cable reel

6.3.1 The following details are indicated on the outer sides of the reel flange;

1) Customer's name
2) Contract Number
3) Type & fiber counts of cable
4) Length of cable in meter/feet
5) Drum number & Gross & Net weight in kilograms/pounds
6) Year of manufacture and the manufacturer
7) Arrow showing the direction the drum shall be rolled

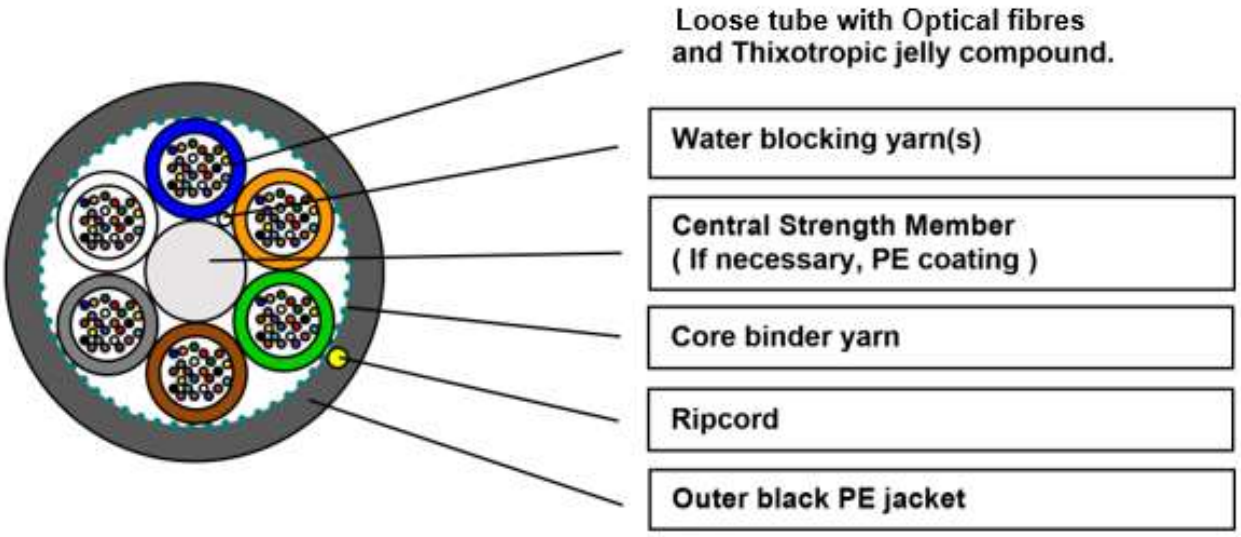
6.3.2 The cable is wound on the reel specifically to prevent damage during shipment and installation.

6.3.3 The minimum barrel diameter of the cable drums will be at least 30 times the overall cable diameter.

6.3.4 The arbor holes provided in the reels shall be 75 ~ 125 mm in diameter. The arbor hole on each flange is reinforced with a bearing plate.

Appendix 1

(Cable Cross-Sectional, drawing not to scale, 144 Fiber)



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Appendix 2

Diameter, Weight & Min. Bending radius

Type (option)	No. of Fiber	Tube Position	No. of Fiber per Tube	Cable Diameter (Nom. mm)	Cable Weight (Nom. kg/km)	Min. Bending Radius (mm)	
						No Load	Under Load
Standard (SD)	~72	6	12	6.5 (0.256 inch)	35 (24 lbs/kft)	10D	20D
Micro (MC)	~72	6	12	5.5 (0.217 inch)	25 (16 lbs/kft)	10D	20D
	96	8	12	6.5 (0.256 inch)	35 (25 lbs/kft)	10D	20D
	144	12	12	8.0 (0.315 inch)	55 (37 lbs/kft)	10D	20D
High density (HD)	~144	6	24	8.0 (0.315 inch)	50 (34 lbs/kft)	10D	20D
	~288	12	24	12.5 (0.492 inch)	125 (84 lbs/kft)	10D	20D