

# **Specification**

## **LA-ADSS-018**

**Loose Tube / Dry core / Single Jacket  
All Dielectric Self Supporting Optical Fiber Cable (ADSS)  
Short Span**

**[ LAC code: OJFPKP-018 / OJFYKP-018 ]  
[ Optical Fiber based on SM ]**

**LEXINGTON AMES LLC**

## 1. Scope

### 1.1 Application

This specification covers the general requirements for the optical fiber telecom. The cable intended for outdoor applications.

### 1.2 Cable Description

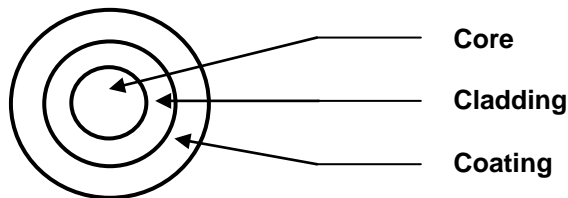
The cable core consists of color coded fibers, dry water swellable material, color coded loose tubes, PE filler (if necessary), SZ-stranded around the dielectric central strength member with water blocking yarn(s).

#### **All Dielectric / Single Jacket**

The cable structure is completed by the application of a core wrapping tape, and aramid yarn, which with the core, are 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 around 1310 & 1550nm.

### 2.3 Material of the Fibers

The fiber shall be made from high grade silica glasses and the coating shall be made from UV curable acrylate material. A protective UV cured acrylate coating shall be applied over the fiber cladding and it shall be able to removed mechanically or chemically.

- Core : Silica (SiO<sub>2</sub>) Doped with Germanium Dioxide (GeO<sub>2</sub>)
- Cladding : Silica (SiO<sub>2</sub>)
- 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 shall be in accordance with Table 1 (below).

Table 1. Characteristics for Single mode ITU-T G.652D Type fiber (The optical, geometrical and mechanical performance)

Items	Unit	Specification
Type of Fiber		ITU-T G.652D
Mode Field Diameter @1310nm	μm	9.2 ± 0.4
Mode Field Concentricity Error	μm	≤ 1.0
Cladding Diameter	μm	125 ± 1.0
Cladding Non-circularity	%	≤ 1.0
Coating Diameter	μm	245 ± 15
Attenuation (Max. 144C)	dB/km	≤ 0.35 @ 1310 nm ≤ 0.25 @ 1550 nm
Chromatic Dispersion	ps/nm.km	≤ 3.5 @ 1290 ~ 1330 nm ≤ 18 @ 1550 nm
Cable Cut-off Wavelength	nm	≤ 1260
Zero Dispersion Wavelength	nm	1300 ~ 1324
Zero Dispersion Slope	ps/nm <sup>2</sup> /km	≤ 0.092
Proof Test (Nom.)	kpsi	100

**3. Cable Construction**

3.1 The construction of the cable shall be in accordance with Table 2 (below).

Table 2.1 Construction of the cable

Items	Description
Fiber Type	See Table 1
No. of Fibers	Max. 144C
No. of Fiber per Tube	12C
Loose Buffer Tube	Made of PBTP (Polybutylene Terephthalate) or PP (Poly Propylene)
Type of Inner Jelly	Thixotropic type Jelly Compound (in L/T)
Filler	Natural color PE rod(s). If necessary, the PE filler for a circular-section core (for better core configuration)
Central Strength Member	FRP (If necessary, PE coating)
Water Blocking Material	Water blocking yarn(s) or tape 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 Wrapping Tape	Water blocking tape shall be applied. (to provide heat barrier & water tightness)
Auxiliary Strength Member	Aramid yarn
Rip Cord	One ripcord (for easy cable entry)
Outer Jacket	Black colored PE

Table 2.2 Sag &amp; Tension (up to 72C)

<b>Weather Condition</b>		NESC Light	NESC Medium	NESC Heavy
<b>Max. Rated Cable Load (MRCL)</b>		940lbs (426kgf)		
<b>Max. Span</b>		656ft (200m)	500ft (152m)	300ft (91m)
<b>Initial Sag</b>		1.0%	1.0%	1.0%
<b>Loaded</b>	<b>Vertical Sag</b>	0.7%	2.8%	3.8%
	<b>Horizontal Sag</b>	3.5%	3.2%	2.8%
	<b>Tension</b>	887lbs (402kgf)	921lbs (418kgf)	891lbs (404kgf)

Table 2.3 Sag &amp; Tension (96C)

<b>Weather Condition</b>		NESC Light	NESC Medium	NESC Heavy
<b>Max. Rated Cable Load (MRCL)</b>		1,090lbs (494kgf)		
<b>Max. Span</b>		600ft (182m)	500ft (152m)	300ft (91m)
<b>Initial Sag</b>		0.7%	2.8%	3.5%
<b>Loaded</b>	<b>Vertical Sag</b>	3.1%	2.7%	2.5%
	<b>Tension</b>	1,020lbs (462kgf)	1,085lbs (492kgf)	1,022lbs (463kgf)

Table 2.4 Sag &amp; Tension (144C)

<b>Weather Condition</b>		NESC Light	NESC Medium	NESC Heavy
<b>Max. Rated Cable Load (MRCL)</b>		1,280lbs (582kgf)		
<b>Max. Span</b>		500ft (200m)	400ft (152.4m)	300ft (91.4m)
<b>Initial Sag</b>		0.8%	2.4%	3.3%
<b>Loaded</b>	<b>Vertical Sag</b>	2.7%	2.2%	2.1%
	<b>Tension</b>	1,218lbs (552kgf)	1,180lbs (535kgf)	1,259lbs (571kgf)

#### 4. Fiber & Loose tube Identification

4.1 The color code of the loose tubes and the individual fibers within each loose tube shall be in accordance with the below table.

**Table 3. Color code of the fibers & 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 shall be in accordance with Table 4 (below). Unless otherwise specified, all attenuation measurements required in this section shall be performed at 1550 nm for single mode.

**Table 4. Mechanical & Environmental Performance of the cable**

Items	Description
<b>Tensile Strength</b>	<ul style="list-style-type: none"> <li>● Test method: IEC 60794-1-2 Method E1</li> <li>- Mandrel diameter: 40D (D: cable diameter)</li> <li>- Length under tension: <math>\geq 50</math> m</li> <li>- Applied Tensile load: 2,700 N</li> <li>- Duration of loading: 60 min.</li> <li>● Acceptance criteria</li> <li>- Attenuation increment: <math>\leq 0.15</math> dB</li> </ul>
<b>Crush Resistance (Compressive loading)</b>	<ul style="list-style-type: none"> <li>● Test method: IEC 60794-1-2 Method E3</li> <li>- Applied load: 1,100 N</li> <li>- No of points : 1 point</li> <li>- Plate size : 100 mm x 100 mm</li> <li>- Duration of loading: 10 min.</li> <li>● Acceptance criteria</li> <li>- Attenuation increment: <math>\leq 0.15</math> dB</li> </ul>
<b>Impact resistance</b>	<ul style="list-style-type: none"> <li>● Test method: IEC 60794-1-2 Method E4</li> <li>- Height of impact: 1000 mm</li> <li>- Drop hammer mass: 9.8 N</li> <li>- No. of impact per point: 1 time @ 3 points</li> <li>● Acceptance criteria</li> <li>- Attenuation increment: <math>\leq 0.15</math> dB</li> </ul>
<b>Cable bend</b>	<ul style="list-style-type: none"> <li>● Test method: IEC 60794-1-2 Method E11A</li> <li>- Mandrel diameter: 20D (D: cable diameter)</li> </ul>

	<ul style="list-style-type: none"> <li>- No. of bend cycles: 4 cycles</li> <li>- Bend angle: <math>\pm 90</math> degree</li> <li>● Acceptance criteria</li> <li>- Attenuation increment: <math>\leq 0.15</math> dB</li> </ul>
<b>Torsion</b>	<ul style="list-style-type: none"> <li>● Test method: IEC 60794-1-2 Method E7</li> <li>- Cable twisted length: 2 m</li> <li>- No. of twist cycles: 10 cycles</li> <li>- Twist angle: <math>\pm 180</math> degree</li> <li>- Twist load: 50 N</li> <li>- Twist rate: 12 sec per cycle</li> <li>● Acceptance criteria</li> <li>- Attenuation increment: <math>\leq 0.15</math> dB</li> </ul>
<b>Water penetration</b>	<ul style="list-style-type: none"> <li>● Test method: IEC 60794-1-2 Method F5</li> <li>- Length of specimen: 3 m</li> <li>- Height of pressure head: 1 m</li> <li>- Test time: 24 h</li> <li>● Acceptance criteria</li> <li>- No leakage through the open cable end</li> </ul>
<b>Temperature Cycling</b>	<ul style="list-style-type: none"> <li>● Test method: IEC 60794-1-2 Method F1</li> <li>- Cable length: <math>\geq 1,000</math> m</li> <li>- Test condition: <math>\geq 2</math> fibers shall be spliced</li> <li>- Temperature cycling schedule : <math>+23^{\circ}\text{C} \rightarrow -40^{\circ}\text{C} \rightarrow +70^{\circ}\text{C} \rightarrow +23^{\circ}\text{C}</math></li> <li>- Soak time at each temperature: 12 h</li> <li>- No. of cycles: 2</li> <li>● Acceptance criteria</li> <li>- Attenuation increment: <math>\leq 0.15</math> dB/km</li> </ul>

## 6. Packing and marking

### 6.1 Cable marking

The jacket shall be marked every two feet 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 8 fiber cable

**00002FT OJFPKP-018 SM 72C LEXINGTON AMES YYYY NNNNN 00004FT**

### 6.2 Cable packing

- 6.2.1 Standard length of cable shall be accordance with Appendix 2. Other cable length is also available if required by customer.
- 6.2.2 Each length of the cable shall be wound on a separate wooden reel.
- 6.2.3 Both ends of the cable shall be sealed with a suitable plastic cap to prevent the entry of moisture during shipping, handling and storage.
- 6.2.4 The cable ends shall be 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 number of rotations that there is a min. free space of 50mm between the upper layer and the edge of the flanges.
- 6.2.7** Circumference battens or Wood-fiber board shall be secured with steel band to protect the cable during normal handling and storage.

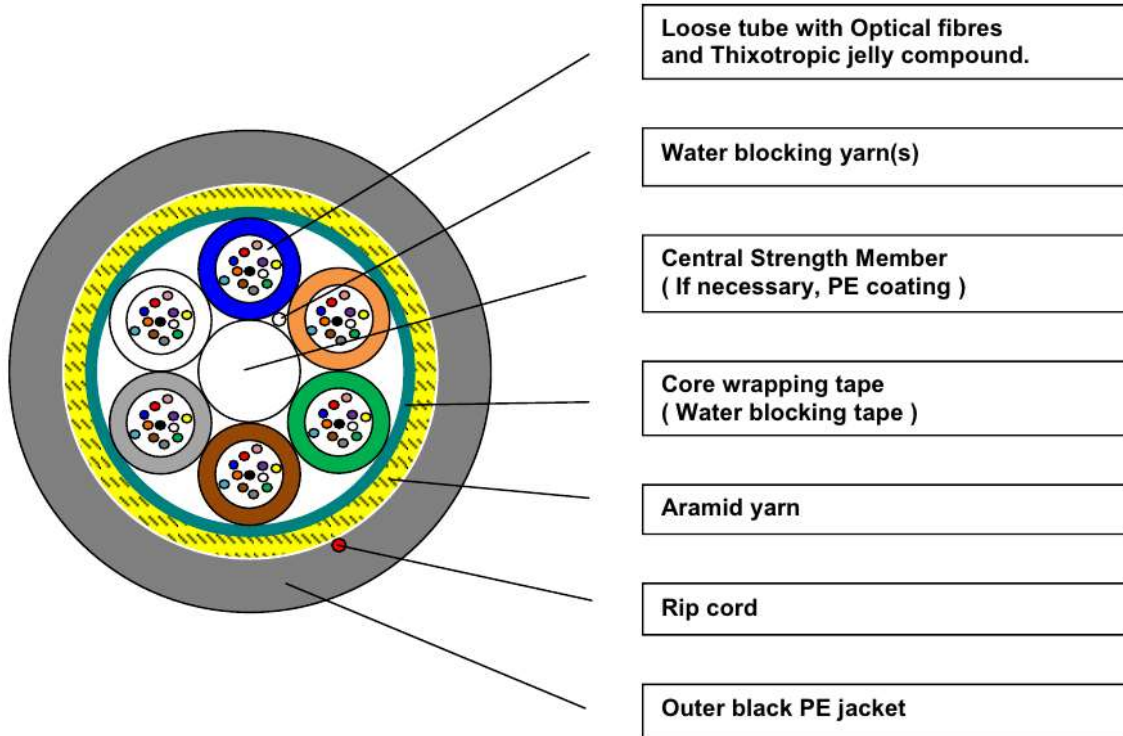
### **6.3 Cable reel**

- 6.3.1** Details given below shall be distinctly marked on a weather proof material on both 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\* Other shipping mark is also available if required by customer.
- 6.3.2** The cable shall be wound on the reel designed to prevent damages during shipment and installation.
- 6.3.3** The minimum barrel diameter of the cable drums shall 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 shall be reinforced with a bearing plate.



## Appendix 1

(Cable Cross-Sectional, drawing not to scale, 72 Fiber)



"The drawing appearing on this page may be subject to change or modification without any prior notice"

## Appendix 2

Diameter, Weight & Min. Bending radius

No. of Fiber	No. of Tube Position	Nom. Cable Diameter (inch)	Approx. Cable weight (lbs/ft)		Min. Bending Radius (mm)	
			PBT Tube	PP Tube	No Load	Under Load
~ 72	6	0.436 (11.0mm)	62 (90kg/km)	57 (85kg/km)	10 D	20 D
96	8	0.491 (12.5mm)	82 (125kg/km)	77 (115kg/km)	10 D	20 D
144	12	0.633 (16.0mm)	132 (195kg/km)	121 (180kg/km)	10 D	20 D