

Specification

LA-ADSS-028

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

[LAC code: OJFPPKP-028]
[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

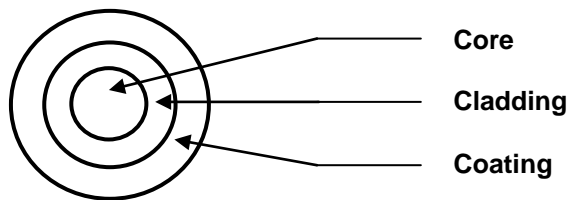
The cable core consists of color coded fibers, dry water swellable material, color coded loose tubes, PE filler (if necessary), SZ-stranded around the dielectric central strength member with water blocking yarn(s).

All Dielectric / Double Jacket

The cable structure is reinforced by the application of a core wrapping tape, inner PE jacket and aramid yarns 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 ITU-T G.652D fiber
(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 @ 1285 ~ 1330 nm ≤ 18 @ 1550 nm
Cable Cut-off Wavelength	nm	≤ 1260
Zero Dispersion Wavelength	nm	1300 ~ 1324
Zero Dispersion Slope	ps/nm ² /km	≤ 0.092
Proof Test (Nom.)	kpsi	100

3. Cable Construction

3.1 The physical construction of the cable is shown in Table 2.1 (below).

Table 2.1 Construction of the cable

Items	Description
Fiber Type	See Table 1
No. of Fibers	Max. 288C
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 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)
Rip Cord	One ripcord (for easy cable entry)
Inner jacket	Black colored MDPE
Auxiliary Strength Member	Aramid yarn
Rip Cord	One ripcord (for easy cable entry)
Outer Jacket	Black colored MDPE

Table 2.2 NESC Light Load

No. of fibers	Max. Span (ft)	Installation		Loaded		
		Initial sag (%)	Tension (lbs)	Horizontal sag (%)	Vertical sag (%)	Tension (lbs)
~60	800 (244m)	1.5	573 (259kgf)	4.2	0.9	1,048 (475kgf)
72	800 (244m)	1.5	667 (302kgf)	4.1	1.0	1,137 (515kgf)
96	800 (244m)	1.5	855 (387kgf)	3.9	1.0	1,356 (614kgf)
144	600 (183m)	1.5	981 (444kgf)	3.3	1.1	1,437 (651kgf)
216	600 (183m)	1.5	1,007 (456kgf)	3.2	1.1	1,519 (688kgf)
288	600 (183m)	1.5	1,315 (596kgf)	2.9	1.1	1,873 (849kgf)

Table 2.3 NESC Medium Load

No. of fibers	Max. Span (ft)	Installation		Loaded		
		Initial sag (%)	Tension (lbs)	Horizontal sag (%)	Vertical sag (%)	Tension (lbs)
~60	600 (183m)	1.5	430 (195kgf)	3.5	3.3	1,048 (475kgf)
72	600 (183m)	1.5	504 (227kgf)	3.3	3.3	1,113 (504kgf)
96	600 (183m)	1.5	641 (290kgf)	3.0	3.2	1,281 (580kgf)
144	500 (152m)	1.5	816 (370kgf)	2.5	3.0	1,411 (639kgf)
216	500 (152m)	1.5	838 (380kgf)	2.4	2.9	1,491 (676kgf)
288	500 (152m)	1.5	1,096 (497kgf)	2.1	2.7	1,801 (816kgf)

Table 2.4 NESC Heavy Load

No. of fibers	Max. Span (ft)	Installation		Loaded		
		Initial sag (%)	Tension (lbs)	Horizontal sag (%)	Vertical sag (%)	Tension (lbs)
~60	400 (122m)	1.5	287 (130kgf)	3.1	4.5	1,093 (495kgf)
72	400 (122m)	1.5	334 (151kgf)	3.0	4.4	1,144 (518kgf)
96	400 (122m)	1.5	427 (193kgf)	2.8	4.2	1,289 (584kgf)
144	400 (122m)	1.5	655 (297kgf)	2.4	4.0	1,562 (708kgf)
216	400 (122m)	1.5	671 (304kgf)	2.4	3.9	1,659 (752kgf)
288	400 (122m)	1.5	877 (397kgf)	2.0	3.6	1,957 (887kgf)

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	7	Red
2	Orange	8	Black
3	Green	9	Yellow
4	Brown	10	Violet
5	Gray	11	Pink
6	White	12	Aqua

Table 3-2 Color code of the loose buffer tubes

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

* White could be replaced by Yellow.

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	<ul style="list-style-type: none"> ● Test method: IEC 60794-1-2 Method E1 <ul style="list-style-type: none"> - Mandrel diameter: 40D (D: cable diameter) - Length under tension: ≥ 50 m - Applied Tensile load: 2,700 N - Duration of loading: 60 min. ● Acceptance criteria <ul style="list-style-type: none"> - Attenuation increment: ≤ 0.15 dB
Crush Resistance (Compressive loading)	<ul style="list-style-type: none"> ● Test method: IEC 60794-1-2 Method E3 <ul style="list-style-type: none"> - Applied load: 1,100 N - No of points: 1 point - Plate size: 100 mm x 100 mm - Duration of loading: 10 min. ● Acceptance criteria <ul style="list-style-type: none"> - Attenuation increment: ≤ 0.15 dB
Impact resistance	<ul style="list-style-type: none"> ● Test method: IEC 60794-1-2 Method E4 <ul style="list-style-type: none"> - Height of impact: 1000 mm - Drop hammer mass: 9.8 N - No. of impact per point: 1 time @ 3 points ● Acceptance criteria <ul style="list-style-type: none"> - Attenuation increment: ≤ 0.15 dB
Cable bend	<ul style="list-style-type: none"> ● Test method: IEC 60794-1-2 Method E11A <ul style="list-style-type: none"> - Mandrel diameter: 20D (D: cable diameter) - No. of bend cycles: 4 turns - Bend angle: ± 180 degree ● Acceptance criteria <ul style="list-style-type: none"> - Attenuation increment: ≤ 0.15 dB
Torsion	<ul style="list-style-type: none"> ● Test method: IEC 60794-1-2 Method E7 <ul style="list-style-type: none"> - Cable twisted length: 2 m - No. of twist cycles: 10 cycles - Twist angle: ± 180 degree - Twist load: 50 N - Twist rate: 12 sec per cycle ● Acceptance criteria <ul style="list-style-type: none"> - Attenuation increment: ≤ 0.15 dB
Water penetration	<ul style="list-style-type: none"> ● Test method: IEC 60794-1-2 Method F5 <ul style="list-style-type: none"> - Length of specimen: 3 m - Height of pressure head: 1 m - Test time: 24 h ● Acceptance criteria <ul style="list-style-type: none"> - No leakage through the open cable end

Temperature Cycling	<ul style="list-style-type: none"> ● Test method: IEC 60794-1-2 Method F1 <ul style="list-style-type: none"> - Cable length: $\geq 1,000$ m - Test condition: ≥ 2 fibers shall be spliced - Temperature cycling schedule <ul style="list-style-type: none"> : +23°C → -40°C → +70°C → +23°C - Soak time at each temperature: 12 h - No. of cycles: 2 ● Acceptance criteria <ul style="list-style-type: none"> - Attenuation increment: ≤ 0.15 dB/km
----------------------------	--

6. Packing and marking

6.1 Cable marking

The jacket shall be 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 72 fiber cable

00002FT DJ-ADSS-028 SM 72C 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.

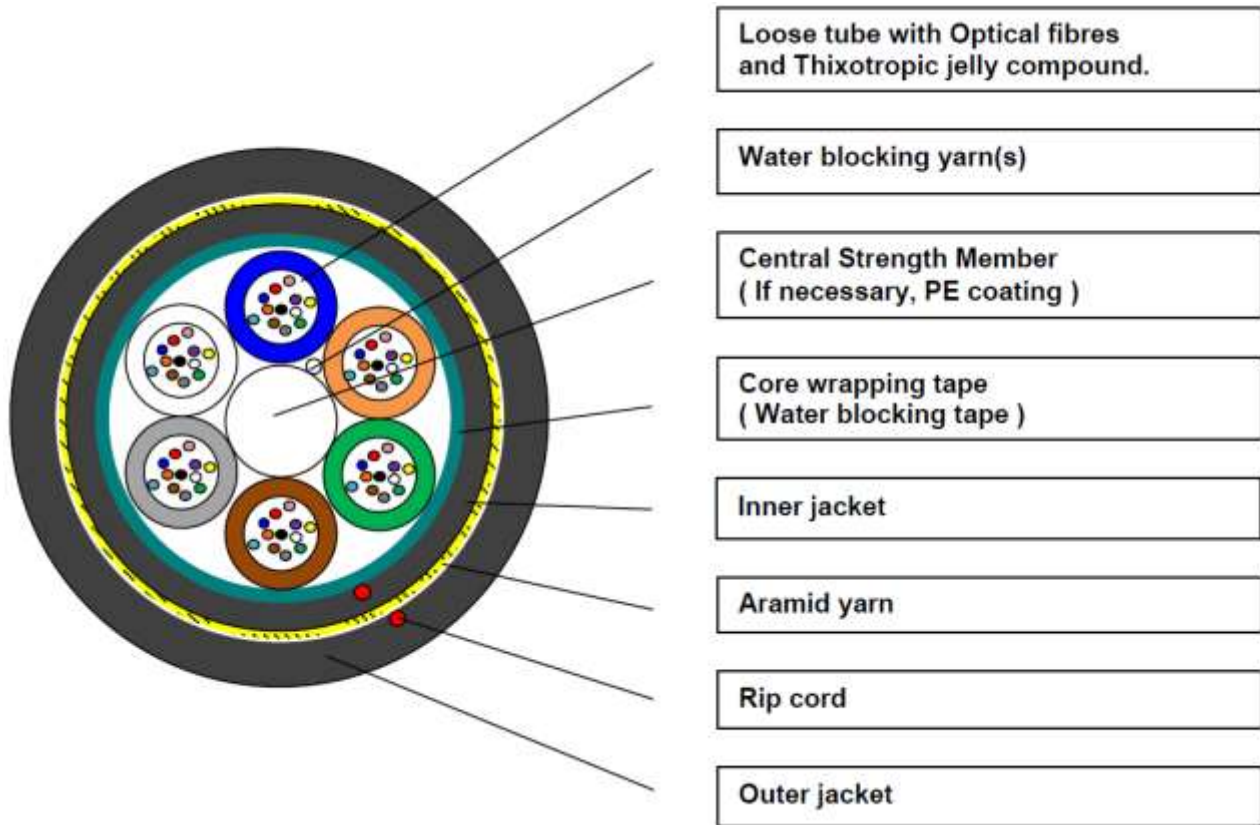
6.3 Cable reel

- 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, 72 Fiber)



“The illustration on this page is subject to change or modification without any prior notice”

Appendix 2

Diameter, Weight & Min. Bending radius

No. of fiber	No. of loose tube positon	Nom. Cable diameter (inch)	Nom. Cable weight (lbs/kft)	Min. Bending radius (mm)	
				No Load	Under Load
~60	5	0.520 (13.2mm)	86 (130kg/km)	10 D	20 D
72	6	0.551 (14.0mm)	100 (150kg/km)	10 D	20 D
96	8	0.630 (16.0mm)	130 (195kg/km)	10 D	20 D
144	12	0.783 (20.0mm)	198 (295kg/km)	10 D	20 D
216	18 (6+12)	0.803 (20.5mm)	201 (300kg/km)	10 D	20 D
288	24 (9+15)	0.915 (23.0mm)	263 (390kg/km)	10 D	20 D