

Tender No.	: : : LS Cable & System	Spec. No.	: LSSS-OC0113-03		
User / Customer	Ltd. :	Page No.	: 1 of 6		
Tender Title					
Bidder					
Document Title					
Specification For DROP OPTICAL FIBER CABLE					
03	Mar. 29, 2019	Fiber spec updated, tensile load 600N	Lee, Mansu	Jun, YoungHo	Lee, YuHyoung
02	Sep.17,2012	Multi mode fiber G.657.A2 added	Eun Kyung Min	Jun Young-Ho	Yu-Hyoung Lee
01	Jun. 21,2012	.Editorial Amendment	Jun Young-Ho	Yu-Hyoung Lee	Min, Son
00	Sep. 22. 2010	. Published	Jun Young-Ho	Yu-Hyoung Lee	Min, Son
Rev. No.	Date	Descriptions	Prepared By	Reviewed By	Approved By

1. SCOPE

This specification covers the general requirements for Optical Fiber Drop Cable for FTTX networks.

2. OPTICAL FIBER

The optical, geometrical and mechanical performance of the optical fiber shall be in accordance with Table 1 ~ Table 4.

Table 1. The Characteristics of the Single Mode Fiber (ITU-T G.652D)

ITEMS	UNITS	SPECIFICATION
Attenuation at 1310/1383/1550nm	dB/km	□ 0.4 / □ 0.4 / □ 0.3
Chromatic Dispersion	ps/nm.k	□ 3.5 at 1285nm ~
Zero Dispersion Wavelength	m	1330nm □ 18 at 1550nm
Zero Dispersion Slope	nm	1300 ~ 1322
Cable PMD (PMDQ)	ps/nm ² .km	□ 0.092
Cut-off wavelength (□cc)	ps/□km	□ 0.2 (20 section link)
MFD at 1310 / 1550nm	nm	□ 1260
Mode Field Concentricity	□m	9.2 □ 0.4 / 10.4 □ 1.0
Cladding Diameter	□m	□ 0.6
Cladding Non-circularity	□m	125 □ 1
Coating Diameter	%	□ 1.0
Proof Test	□m	245 □ 10
	Gpa	□ 0.69

Table 2. Performance of the Bend Insensitive Single Mode Fiber (G.657A)

ITEMS		UNITS	SPECIFICATION	
			G.657.A1	G.657.A2
Attenuation at 1310/1383/1550nm		dB/km	□ 0.4 / □ 0.4 / □ 0.3	
Chromatic Dispersion		ps/nm.k	□ 3.5 at 1285nm ~	
Zero Dispersion Wavelength		m	1330nm □ 18 at 1550nm	
Zero Dispersion Slope		nm	1300 ~ 1324	
Cable PMD (PMDQ)		ps/nm ² .km	□ 0.092	
Cut-off wavelength (□cc)		ps/□km	□ 0.2 (20 section link)	
		nm	□ 1260	
Attenuation vs . Bending at 1550 / 1625nm	R15mm x 10 turns	dB	□ 0.25 / □ 1.0	□ 0.03 / □ 0.1
	R10mm x 1turn	dB	□ 0.75 / □ 1.50	□ 0.1 / □ 0.2
	R7.5mm x 1turn	dB	-	□ 0.5 / □ 1.0
MFD at 1310nm		□m	8.9 □ 0.4	8.6 □ 0.4
Core-Clad Concentricity Error		□m	□ 0.5	
Cladding Diameter		□m	125 □ 0.7	
Cladding Non-circularity		%	□ 1.0	
Coating Diameter		□m	245 □ 10	
Proof Test		Gpa	□ 0.69	

Table 3. Performance of the Multi-Mode Fiber (OM1 & OM2)

ITEMS	UNITS	SPECIFICATION	
		OM1	OM2
Attenuation at 850/1300nm	dB/km	□ 3.5 / □ 1.0	□ 3.0 / □ 1.0
Overfilled Launch Bandwidth (LED based sources)	MHz.km	□ 200 at 850nm □ 500 at 1300nm	□ 500 at 850nm □ 500 at 1300nm
Gigabit Ethernet Max. Link Distance	m	□ 200 at 850nm □ 500 at 1300nm	□ 500 at 850nm □ 500 at 1300nm
Numerical Aperture	-	0.275 □ 0.015	0.20 □ 0.015
Core Diameter	□m	62.5 □ 3.0	50 □ 3.0
Core Non-circularity	%	□ 6.0	□ 6.0
Cladding Diameter	□m	125 □ 2.0	125 □ 2.0
Cladding Non-circularity	%	□ 2.0	□ 2.0
Core/Cladding Concentricity Error	□m	□ 3.0	□ 3.0
Coating Diameter	□m	245 □ 15	245 □ 15
Proof Test	Gpa	□ 0.69	

Table 4. Performance of the Multi-Mode Fiber (OM3 & OM4)

ITEMS	UNITS	SPECIFICATION	
		OM3	OM4
Attenuation at 850/1300nm	dB/km	□ 3.0 / □ 1.0	□ 3.0 / □ 1.0
Overfilled Launch Bandwidth (LED based sources)	MHz.km	□ 1500 at 850nm □ 50	□ 3500 at 850nm
Effective Modal Bandwidth (Laser based sources)	MHz.km	0 at 1300nm ≥2000 at 850nm	□ 500 at 1300nm
10 Gigabit Ethernet Maximum Link Distance	m	≥300 at 850nm	≥4700 at 850nm ≥550 at 850nm
Numerical Aperture	-	0.20 □ 0.015	0.20 □ 0.015
Core Diameter	□m	50 □ 3.0	50 □ 3.0
Core Non-circularity	%	□ 6.0	□ 6.0
Cladding Diameter	□m	125 □ 2.0	125 □ 2.0
Cladding Non-circularity	%	□ 2.0	□ 2.0
Core/Cladding Concentricity Error	□m	□ 3.0	□ 3.0
Coating Diameter	□m	245 □ 15	245 □ 15
Proof Test	Gpa	□ 0.69	

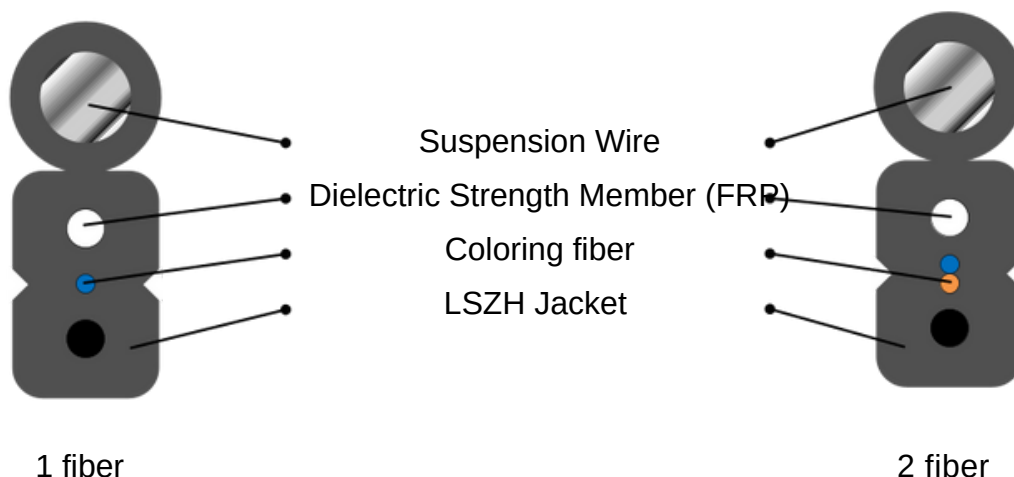
3. CABLE CONSTRUCTION

Table 5. Construction of the 1 fiber Cable

ITEMS	DESCRIPTION
Number of Fibers	1F or 2 F
Primary coating with color layer	250±15µm
Dielectric Strength Member	FRP, Nom. 0.4mm
Suspension Wire	Galvanized Steel Wires, Nom. 1.2mm
Outer Jacket	LSZH Compound
Cable Outer diameter	Nominal 2.0mm x 5.0mm
Approx. Cable Weight	25 Kg/km
Min. Bend Radius	No load : 30mm Under load : 60mm

* Actual values for cable weight and diameter may deviate from the calculated values given in the table above.

Figure 1. Drop cable optical fiber



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

4. IDENTIFICATION

4.1 The Color Code of the individual fibers

Table 6. The Color Code of the fiber

No. of Fibers	Color	No. of Fibers	Color
1	Blue	2	Orange

4.2 Outer jacket color : Black

5. PHYSICAL/MECHANICAL/ENVIRONMENTAL PERFORMANCE AND TESTS

5.1 Temperature Range

For the cables covered by this specification, the following temperature ranges apply:

- Storage/Shipping temperature range : -20 to 70°C
- Operating temperature range : -20 to 70°C

5.2 Mechanical and Environmental Performance of the Cable

The mechanical and environmental performance of the cable shall be in accordance with Table 7 below.

Table 7. The Mechanical and Environmental Performance of the Cable

ITEMS	TEST METHOD AND ACCEPTANCE CRITERIA
Tensile Performance	- Test method: IEC 60794-1-2 Method E1 - Mandrel diameter: 30D (D = cable diameter) - Length under tension: □ 50 m - Applied tensile load: 600 N - Duration: 5 minutes - Acceptance Criteria - Attenuation increment: □ 0.10 dB (SMF), □ 0.20 dB (MMF) - No jacket cracking and fiber breakage
Crush	- Test method: IEC 60794-1-2 Method E3 - Applied load: 100kg/50mm - Duration of loading: 5 minutes - Acceptance Criteria - Attenuation increment: □ 0.10 dB (SMF), □ 0.20 dB (MMF)
Impact	- Test method: IEC 60794-1-2 Method E4 - Height of impact: 1000mm - Drop hammer mass: 1kg - No. of impact : 10 point - Acceptance Criteria - Attenuation increment: □ 0.10 dB (SMF), □ 0.20 dB (MMF)
Repeated Bending	- Test method: IEC 60794-1-2 Method E6 - Sheave diameter: 20D (D = cable diameter) - No. of flexing cycles: 25 cycles - Flexing speed: 2 seconds/cycle - Acceptance Criteria - Attenuation Increment: □ 0.10 dB (SMF), □ 0.20 dB (MMF)
Temperature Cycling	- Test method: IEC 60794-1-2 Method F1 - Temperature cycling schedule 25°C → -10°C → 70°C → -10°C → 70°C → 25°C - Soak time at each temperature: 8hours - Acceptance Criteria - Attenuation Increment: ≤0.20dB/km (SMF), □ 0.30 dB (MMF)
Flammability test	The cable shall comply with IEC 60332-1
Smoke density test	The cable shall comply with IEC 61034
Non-halogen test	The cable shall comply with IEC 60754-1/2

6. PACKING AND MARKING

6.1 Cable Marking

The jacket shall be marked with white characters at intervals of one meter with the following information. Other marking is also available if requested by customer.

1) Length marking

- 2) Cable type and fiber counts
- 3) Manufacturer's name
- 4) Year of manufacture

Ex.1) For G.652D 1-fiber cable

0000M OPTICAL FIBER DROP CABLE G.652D SM1C LS Cable & System

2019

6.2 Cable Packing

- 6.2.1 Standard length of cable shall be 1km. 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 or plywood reel.
- 6.2.3 Both ends of the cable shall be sealed with a suitable plastic cap or a suitable plastic tape to prevent the entry of moisture during shipping, handling and storage.
- 6.2.4 Wood-fiber board or circumference battens shall be laid on cable between flanges and fixed by steel bands
- 6.2.5 The cable ends shall be securely fastened to the reel to prevent the cable from becoming loose in transit or during placing operations.

6.3 Cable Reel

- 6.3.1 The sticker information on the spool
 - 1) Cable type and fiber counts
 - 2) Length of cable in meters
 - 3) Gross weight in kilograms
 - 4) Reel number
 - 5) Year of manufacture
- 6.3.2 The cable shall be wound on the reel designed to prevent damages during shipment and installation.

7. SAFETY

7.1 ROHS Directive

All cables and any associated packing and labeling materials shall meet RoHS (Restriction of the Use of certain Hazardous Substances) regulations as appropriate.

7.2 ISPM 15 Directive

All wooden packing materials shall meet ISPM (International Standards for Phytosanitary Measures) regulations as appropriate.

