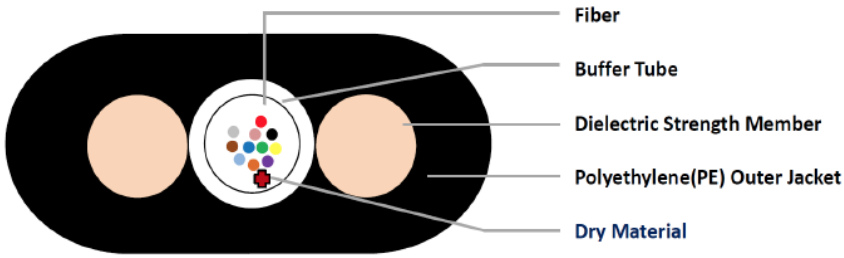
FLAT DROP CABLE (DRY)



Scope

Drop FTTP offers the most flexible solution for fiber to the premise applications. The Drop cable unit allows for easy location after installation. The small profile reduces cost and increases both ease of use and access to small conduits. This product is the low cost solution to the network's last 100 meters. The durable design incorporates two dielectric rigid rods for tensile and crush protection, bracketing a single enhanced loose tube containing up to 12 optical fibers.

Optical Fiber

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

SPECIFICATIONS - SINGLEMODE FIBER (SMF-28 ULTRA OPTICAL FIBER)

Fiber Curl	≥4.0m radius of curvature
Cladding Diameter	125±0.7μm
Core-Clad Concentricity Error	≤0.5μm
Cladding Non-Circularity	≤0.7%
Coating Diameter	242±5 μm
Coating-Cladding Concentricity	< 12 μm
Mode Field Diameter	9.2±0.4 μm@1310nm 10.4±0.5 μm@1550nm
Cable Cutoff Wavelength	≤1260 nm
PMD Link Design Value	≤0.04ps/√km
Maximum Individual Fiber PMD	≤0.1ps/√km
Attenuation (Maximum)	≤ 0.32 dB/km @1310nm ≤ 0.32 dB/km @1383nm ≤ 0.21 dB/km @1490nm ≤ 0.18 dB/km @1550nm ≤ 0.20 dB/km @1625nm
Dispersion	1550 nm ≤ 18 ps/nm.km
	1625 nm ≤ 22 ps/nm.km
Attenuation vs. Wavelength (Maximum)	0.03 dB/km @1285 -1330nm 0.02 dB/km @1525 -1575nm
Point Discontinuity	≤ 0.05 dB/km @1310 nm ≤ 0.05 dB/km @1550 nm
Micro-bend Loss **10 turns around a mandrel of 15mm Radius** **10 turns around a mandrel of 15mm Radius** **1 turn around a mandrel of 10mm Radius** **1 turn around a mandrel of 10mm Radius** **100 turns around a mandrel of 25mm Radius**	≤0.05 dB Max. at 1550nm ≤0.30 dB Max. at 1625nm ≤0.50 dB Max. 1550nm ≤1.5 dB Max. at 1625nm ≤0.01 dB Max. at 1310,1550,1625nm

FLAT DROP CABLE (DRY)

SPECIFICATIONS - SINGLEMODE FIBER (SMF-28 ULTRA OPTICAL FIBER)

Environmental Test **Temperature Dependence(-60°C to +85°C)** **Temperature Humidity Cycling (-10°C to +85°C up to 98% RH)**	≤0.05 dB/km(1310,1550,1625nm) ≤0.05 dB/km(1310,1550,1625nm)
Water immersion(23°C±2°C) **Heat Aging(85°C±2°C)** **Damp Heat(85°C at 85% RH)**	≤0.05 dB/km(1310,1550,1625nm) ≤0.05 dB/km(1310,1550,1625nm) ≤0.05 dB/km(1310,1550,1625nm)

* Reference temperature = +23°C
* Operating Temperature Range: -60°C to +85°C

SPECIFICATIONS - PERFORMANCE CHARACTERIZATIONS

Core Diameter	8.2 μm
Numerical	0.14 NA is measured at the one percent power Level of a one-dimensional far-field scan at 1310 nm.
Effective Group Index of Refraction(Neff)	1310nm : 1.4676 1550nm : 1.4682
Fatigue Resistance Parameter (Nd)	20
Coating Strip Force	Dry : 0.6 lbs.(3N) Wet, 14-day room temperature: 0.6 lbs.(3N)
Rayleigh Backscatter Coefficient **(for 1 ns Pulse Width)**	1310nm : -77 dB 1550nm : -82 dB

SPECIFICATIONS - CABLE CONSTRUCTION

Number of Fibers	1	2	6	12
Central Tube	PBT (Polybutylene Terephthalate) Diameter : 3.0mm±0.1			
Dry material	Water blocking aramid yarn			
Dielectric Strength Member	FRP (Fiberglass Reinforced Plastic) Diameter : 1.5mmx2			
Outer Jacket	Polyethylene(PE)			
Cable Outer diameter	Nominal 8.0mm x 4.5mm			
Cable Weight (Nominal)	28 kg/km			

SPECIFICATIONS - IDENTIFICATION

The Color Code of the individual fibers

Fiber	1	2	3	4	5	6	7	8	9	10	11	12
12	Blue	-	-	-	-	-	-	-	-	-	-	-
2F	Blue	Orange	-	-	-	-	-	-	-	-	-	-
6F	Blue	Orange	Green	Brown	Slate	White	-	-	-	-	-	-
12F	Blue	Orange	Green	Brown	Slate	White	Red	Black	Yellow	Violet	Pink	Aqua

Outer jacket color

The outer jacket shall be an extruded layer of HDPE
The color of outer jacket shall be UV stable black

PHYSICAL / MECHANICAL / ENVIRONMENTAL PERFORMANCE AND TESTS

Temperature Range

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

- Storage & Operation range : -40 to 70°C
- Installation range : -30 to 70°C

Mechanical Characteristics

Items	**TEST METHOD AND ACCEPTANCE CRITERIA**	
	Method Description	Acceptance Criteria
Tensile Performance	**IEC 60794-1-2 Method E1** - Mandrel diameter: min 1m but not less than cable specific bending diameter - Length under tension: 50 m - Applied tensile load: 1350N	Permissible change in attenuation at 1550 nm wavelength less than 0.2dB.
Repeated Bending	**IEC 60794-1-2 Method E6** - Bending radius: 20 x cable diameter - Applied load: 40N - No. of flexing cycles: 25 cycles - Cycle duration: 2 seconds	Permissible change in attenuation at 1550 nm wavelength less than 0.2 dB.
Impact resistance	**IEC 60794-1-2 Method E4** - Impact Radius: 10mm or 300mm - Impact Energy: 5,0J of 10mm impact - No. of impact: minimum 3 times	No visible damage to the coating. Permissible change in attenuation at 1550 nm wavelength less than 0.2 dB.
Torsion resistance	**IEC 60794-1-2 Method E7** - No. of cycles: 10 cycles - Distance between fixed and rotary handle: 2m - Tensioning force: 50N - Twist angle: ±180°	No visible damage to the coating. Permissible change in attenuation at 1550 nm wavelength less than 0.2 dB.
Crush resistance	**IEC 60794-1-2 Method E3** - Crushing force: 500N - Length of crushing element: 50mm - Duration of loading: 5 minutes	Permissible change of attenuation at 1550 nm wavelength less than 0.2 dB, no visible damage to any element of the cable.
Resistance to temperature changes	IEC 60794-1-2 Method F1 - Cable length: 500m - T_{A1}: -40°C, T_{B1}: +70°C, T_{A2}:-40°C, T_{B2}:+70°C, - Duration of 1 cycle t_1: 12hours - Speed of temperature changes: 20°C/h	No visible damage to the coating. Permissible change in attenuation at 1550 nm wavelength less than 0.3 dB.

QUALITY CONTROL

Incoming Inspection

All the raw materials that are used for optical fiber cable shall be inspected by the raw material testing methods that are specified by the manufacturerr.

In some cases, suppliers' test report shall substitute for the raw material manufacturer's test.
Any materials that do not meet the manufacturer's raw material specification shall be rejected or scrapped, and the passed materials only shall be used in the process. Some raw material specifications and subsequent raw material test method may be changed without notice, if and only if the new specification and the new test method do not affect the quality of optical fiber cable.

In-Process Inspection

Semi-final goods shall be inspected in accordance with specified manufacturer's testing method. The testing method may be changed without notice, if it does not affect quality of optical fiber cable.

Final Cable Inspection

Following quality properties of finished cable shall be tested to assure the field performances.
- Construction/Material
- Mechanical characteristics
- Optical characteristics

Quality System - Passed Telcordia Standards

FOTP 37 – Low/High Temperature Cable Bend
FOTP 25 – Impact Resistance
FOTP 41 – Compressive Load
FOTP 85 – Cable Twist

PACKING AND MARKING

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

Cable Packing

Standard lengths of cable shall be 1km and 4km. Other cable length is also available if required by Customer.(Maximum lengths : 6km)
Each length of the cable shall be wound on a separate wooden reel or plywood reel.
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.
Wood-fiber board or circumference battens shall be laid on cable between flanges and fixed by steel bands.
The cable ends shall be securely fastened to the reel to prevent the cable from becoming loose in transit or during placing operations.
Cable Reel
The sticker information on the spool

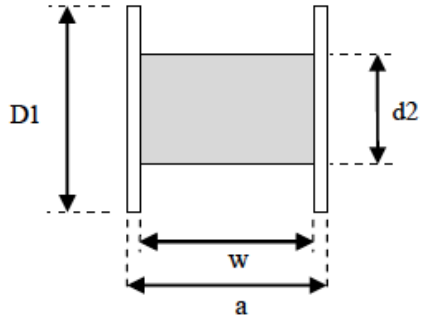
(1) Cable type and fiber counts
(2) Length of cable in meters
(3) Gross weight in kilograms
(4) Reel number
(5) Year of manufacture

The cable shall be wound on the reel designed to prevent damages during shipment and installation.

FLAT DROP CABLE (DRY)

SPECIFICATIONS - PACKING DETAIL

Items	Dimension				Cable Length	Weight (kg / EA)
	D1	d2	W	a		
Dry Flat Drop - Up to 12F	850mm	425mm	420mm	460mm	4.0km	17kg



SPECIFICATIONS - CONTAINER PACKING

Items	Length (km/drum)	Weight (drum)		Container (40ft)	
		NET	Gross	Packing	Gross Weight
Dry Flat Drop - Up to 12F	4.0km	112.0kg	129.0kg	5x14 = 70 Bobbins (280km)	9,030kg

SAFETY

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.

ISPM 15 Directive

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