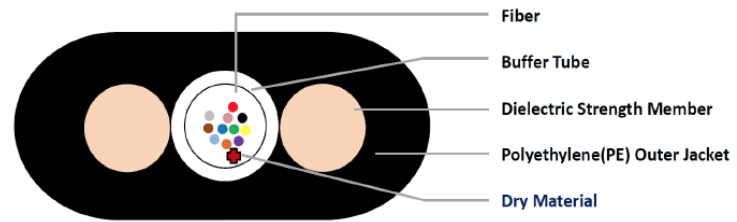


## SCOPE

Flat Drop Cables offers the most flexible solution for fiber to the premise (FTTP) 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. This is available in an all dielectric or toneable versions, with 250um or 900um buffer (2 fiber maximum for 900um).

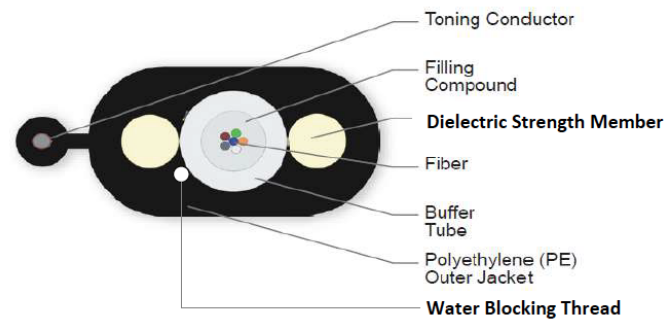
## Specifications for Singlemode Fiber (SMF-28 Ultra Optical Fiber)



## OPTICAL FIBER CHARACTERISTICS

Fiber Curl	≥ 4.0 m radius of curvature
Cladding Diameter	125 μm ± 0.7 μm
Core-Clad Concentricity Error	≤ 0.5 μm
Cladding Non-Circularity	≤ 0.7%
Coating Diameter	242 μm ± 5 μm
Coating-Cladding Concentricity	< 12 μm
Mode Field Diameter	9.2 μm ± 0.4 μm @ 1310 nm 10.4 μm ± 0.5 μm @ 1550 nm
Cable Cutoff Wavelength	≤ 1260 nm
PMD Link Design Value	≤ 0.04 ps/√km
Max Individual Fiber PMD	≤ 0.1 ps/√km
Attenuation (Max)	≤ 0.32 dB/km @ 1310 nm ≤ 0.32 dB/km @ 1383 nm ≤ 0.21 dB/km @ 1490 nm ≤ 0.18 dB/km @ 1550 nm ≤ 0.20 dB/km @ 1625 nm
Dispersion	1550 nm ≤ 18 ps/nm.km 1625 nm ≤ 22 ps/nm.km
Attenuation vs Wavelength (Max)	0.03 dB/km @ 1285 nm to 1330 nm 0.02 dB/km @ 1525 nm to 1575 nm
Point Discontinuity	≤ 0.05 dB/km @ 1310 nm ≤ 0.05 dB/km @ 1550 nm
Micro-bend Loss	
10 Turns around a Mandrel of 15 mm Radius	≤ 0.05 dB max @ 1550 nm
10 Turns around a Mandrel of 15 mm Radius	≤ 0.30 dB max @ 1625 nm
1 Turn around a Mandrel of 10 mm Radius	≤ 0.50 dB max @ 1550 nm
1 Turn around a Mandrel of 10 mm Radius	≤ 1.5 dB max @ 1625 nm
100 Turns around a Mandrel of 25 mm Radius	≤ 0.01 dB max @ 1310 nm, 1550 nm, 1625 nm
Environmental Test	
Temperature Dependence (-60 °C to +85 °C)	≤ 0.05 dB/km (1310 nm, 1550 nm, 1625 nm)
Temperature Humidity Cycling (-10 °C to +85 °C up to 98% RH)	≤ 0.05 dB/km (1310 nm, 1550 nm, 1625 nm)
Water Immersion (23 °C ± 2 °C)	≤ 0.05 dB/km (1310 nm, 1550 nm, 1625 nm)
Heat Aging (85 °C ± 2 °C)	≤ 0.05 dB/km (1310 nm, 1550 nm, 1625 nm)
Damp Heat (85 °C at 85% RH)	≤ 0.05 dB/km (1310 nm, 1550 nm, 1625 nm)

\*Reference Temperature = +23 °C  
\*Operating Temperature Range: -40 °C to +85 °C



## Color Code of Individual Fibers

	Blue	12, 2F, 6F, 12F
	Orange	2F, 6F, 12F
	Green	6F, 12F
	Brown	6F, 12F
	Slate	6F, 12F
	White	6F, 12F
	Red	12F
	Black	12F
	Yellow	12F
	Violet	12F
	Pink	12F
	Aqua	12F

## PERFORMANCE CHARACTERISTICS

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

## CABLE CONSTRUCTION

Number of Fibers	1, 2, 6, 12
Central Tube	PBT (polybutylene terephthalate) Diameter: 3.0 mm ± 0.1 mm
Dry Material	Water blocking aramid yarn
Dielectric Strength Member	FRP (fiberglass reinforced plastic) Diameter: 1.5 mm x 2
Outer Jacket	Polyethylene (PE)
Outer Jacket Color	Black, UV stable extruded layout of HDPE
Cable Outer Diameter	Nom 8.0 mm x 4.5 mm
Cable Weight (Nom)	28 kg/km
Optional Tone Version	24 AWG Copper Conductor

## MECHANICAL CHARACTERISTICS

Tensile Performance	<b>IEC 60794-1-2 Method E1</b> - Mandrel diameter: min 1 m, but not less than cable specific bending diameter - Length under tension: 50 m - Applied tensile load: 1350 N	Permissible change in attenuation at 1550 nm wavelength less than 0.2 dB.
Repeated Bending	<b>IEC 60794-1-2 Method E6</b> - Bending radius: 20 x cable diameter - Applied load: 40 N - Number of flexing cycles: 25 cycles - Cycle duration: 2 seconds	Permissible change in attenuation at 1550 nm wavelength less than 0.2 dB.
Impact Resistance	<b>IEC 60794-1-2 Method E4</b> - Impact Radius: 10 mm or 300 mm - Impact Energy: 5.0 J of 10 mm impact - Number of impact: 3 times min	No visible damage to the coating. Permissible change in attenuation at 1550 nm wavelength less than 0.2 dB.
Torsion Resistance	<b>IEC 60794-1-2 Method E7</b> - Number of cycles: 10 cycles - Distance between fixed and rotary handle: 2 m - Tensioning force: 50 N - Twist angle: ± 180°	No visible damage to the coating. Permissible change in attenuation at 1550 nm wavelength less than 0.2 dB.
Crush Resistance	<b>IEC 60794-1-2 Method E3</b> - Crushing force: 500 N - Length of crushing element: 50 mm - 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	<b>IEC 60794-1-2 Method F1</b> - Cable length: 500 m - T <sub>A1</sub> : -40 °C, T <sub>B1</sub> : +70 °C, T <sub>A2</sub> : -40 °C, T <sub>B2</sub> : +70 °C - Duration of 1 cycle t <sub>i</sub> : 12 hours - 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.
Temperature Range (For Cables Covered by this Specification)	Storage and Operation Installation	-40 °C to 70 °C -30 °C to 70 °C

## 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 manufacturer and that are based on 'Korea Standard' or 'ASTM.'

In some cases, supplier's 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

Korea Standards Association applied ISO 9001 and ISO 14001 to assure the conformance to specified requirements during our production.

## 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.

## 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 1 km and 4 km. Other cable length is also available if required by customer (maximum lengths: 6 km). 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

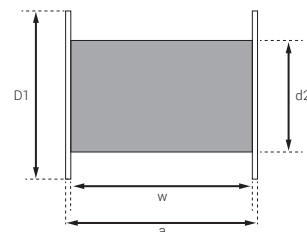
The sticker information on the spool:

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.

## PACKING DETAIL

Dry Flat Drop	Dimension				Cable Length	Weight (kg / ea)
	D1	d2	w	a		
Up to 12F	850 mm	425 mm	420 mm	460 mm	4 km	17 kg



## CONTAINER PACKING

Dry Flat Drop	Length (km / drum)	Weight (drum)		Container (40 ft)	
		Net	Gross	Packing	Gross Weight
Up to 12F	4 km	112 kg	129 kg	5 x 14 = 70 Bobbins (280 km)	9030 kg