



# Specification

## Hybrid Optic Cable (Powered Fiber Optic Cable)

## 1. SCOPE

### 1.1 Application

The powered fiber optic cable is a component of Connectivity's powered fiber cable system, a hybrid optical fiber/copper cable system for remote powering of network access devices. The cable combines electrical power conductors and optical fiber into one convenient package to speed installations and simplify power and communications delivery to devices.

When used along with the PoE extender, the powered fiber optic cable can supply optical fiber communications and PoE+ power at distances greater than 1km for network access and other low voltage DC devices such as small cells, ONT's, digital signage, HD security cameras, etc. This can be achieved with the full system while staying within NEC Class II and SELV requirements. Because these devices can be powered from remote locations, the need for negotiations between installers and local land owners, such as landlords, is greatly reduced.

The cable may also be used as a "standalone" hybrid cable for delivering power and fiber communications for a variety of applications where both power and optical fiber communications is required. Higher power and longer distances may also be supported by the cable.

### 1.2 Cable Description

- 250µm coated reduced bend radius fiber
- Single mode (G657.A2)
- Easy peel, stranded conductors for maximum cable flexibility and rapid access
- Riser/LSZH jacket for indoor/outdoor application or Polyethylene for duct or direct buried applications
- "Polarization" indentation along one side of the cable for polarity identification
- No special tools or mounting hardware required - utilizes standard "FTTH" pressure clamp style hardware for aerial installation.
- One standard wire stripper is the only tool needed to access the cable - both fiber and conductor elements
- Cable can easily split into three separate sections for separate routing in closures, as needed for installation

## 2. OPTICAL FIBER

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

Table 1. Performance of The Single Mode Fiber (ITU-T G. 657 A2)

Parameter	Specification
<b>Optical Characteristics</b>	
Attenuation coefficient(Cabled)	
@ 1310 nm	≤ 0,35 dB/km
@ 1383 nm	≤ @1310 nm dB/km loss↓
@ 1550 nm	≤ 0,25 dB/km
Attenuation vs. Wavelength	≤ 0,03dB/km at 1285 ~ 1330 nm

Max. $\alpha$ difference	$\leq 0.02$ dB/km at 1525 ~ 1575 nm
Zero-dispersion wavelength	1300 ~ 1324 nm
Zero-dispersion slope	$\leq 0.092$ ps/(nm <sup>2</sup> .km)
PMD Maximum Individual Fiber	$\leq 0.2$ ps/km <sup>1/2</sup>
Cable cut-off wavelength	$\leq 1260$ nm
Mode field diameter @ 1310 nm	$8.8 \pm 0.4$ $\mu$ m
<b>Geometrical Characteristics</b>	
Cladding diameter	$125.0 \pm 0.7$ $\mu$ m
Cladding non-circularity	$\leq 0.7$ %
Coating diameter	$245 \pm 5$ $\mu$ m
Coating-Cladding concentricity error	$\leq 12.0$ $\mu$ m
Coating Non-circularity error	$\leq 6.0$ %
Core-Clad concentricity error	$\leq 0.5$ $\mu$ m
Curl (Radius)	$\geq 4$ m
<b>Mechanical Specification</b>	
Proof test level	$\geq 100$ kpsi
Micro-bend induced attenuation 10 turns around a mandrel of 30mm diameter 10 turns around a mandrel of 30mm diameter 1 turn around a mandrel of 20mm diameter 1 turn around a mandrel of 20mm diameter 1 turn around a mandrel of 15mm diameter 1 turn around a mandrel of 15mm diameter	$\leq 0.03$ dB at 1550 nm $\leq 0.1$ dB at 1625 nm $\leq 0.1$ dB at 1550 nm $\leq 0.2$ dB at 1625 nm $\leq 0.2$ dB at 1550 nm $\leq 0.5$ dB at 1625 nm
Coating strip force Average force	1.7 N

### 3. CHARACTERISTICS

#### 3.1 Environmental Characteristics

Storage Temperature: -40° to 70°C

Operating Temperature: -40° to 70°C

Installation Temperature: -10° to 60°C

#### 3.2 Tensile Load

Short Term: 440 N

Long Term: 132 N

#### 3.3 Preferred Axis Bend Radius mm (in.)

Installed: 30 mm (1.2 inches)

Loaded: 50 mm (2.0 inches)

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**3.4 Impact (N-m)**

EIA/FOTP-25C: 4.4 N-m

**3.5 Crush (N/mm)**

EIA/FOTP-41A: 2200 N/mm

**3.6 Cable Dimensions**

Conductor Size (AWG)	Dimensions (Nominal, mm)		Weight (Nominal)
	Width	Height	kg/km
16	10.9	4	70
12	12	4.5	110

**4. Compliance**

- RoHS (2002/95/EC)
- REACH SVHC, 53 6/20/11
- California Prop 65 for safe drinking water and toxic enforcement act
- Telcordia GR-20-CORE Issue 3 May 2008, EIA/TIA FOTPS
- EIA/TIA 568-B
- Deca-BDE free
- Power limited circuit cable UL 13 (CL2R-OF AND CL3R-OF)
- Communication cable per UL 444 (CMR-OF)
- UL 1666 standard for test for flame propagation - Edition 5 - Revision date 2012/06/27
- IEC 60332-1-1, -2, 60332-3-24 Cat. C, 61034 60745-2
- Reduced bend radius single mode fiber fully complies with ITU-T G.657.A2/B2, and IEC 60793-2-50 type B.1.3 and B.6.A&B, and is backwards compatible with G.652.D optical fiber

**6. PACKING AND MARKING****6.1 Cable Marking**

6.1.1 Standard length of cable shall be 2,000m. Other cable length is also available if requested by customer.

6.1.2 Each length of the cable shall be wound on a separate MDF reels.

6.1.3 Both ends of the cable shall be sealed with suitable plastic caps to prevent the entry of moisture during shipping, handling and storage.

6.1.4 The cable ends shall be securely fastened to the reel to prevent the cable from becoming loose in transit or during placing operations.

6.1.5 Each reels shall be well packed in individual carton box.

**7. QUALITY CONTROL****7.1 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, suppliers' test report shall substitute for the raw material manufacturer's test.

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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.

## **7.2 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.

## **7.3 Final Cable Inspection**

Following quality properties of finished cable shall be tested to assure the field performances.

- ✓ Construction / Material
- ✓ Mechanical
- ✓ Optical characteristics

## **7.4 Quality System**

International Industrial Certification (IIC) applied ISO 9001 and ISO 14001 to assure the conformance to specified requirements during our production.

# **8. SAFETY**

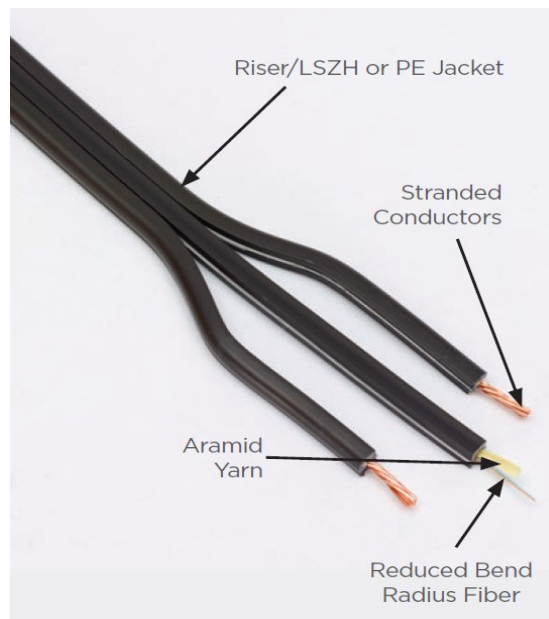
## **8.1 ROHS Directive**

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

## **8.2 ISPM 15 Directive**

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

# Cross-Sectional Drawing



= End of Specification =