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Sumitomo Cable Specification

**SE-\*LI**

**Self-Supporting Figure-8 Sheath  
Optical Fiber Service Drop Cable with  
Stranded Steel Messenger**

*Central Tube Cables with 1 - 12 Optical Fibers*

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## 1. General

This specification covers the design requirements and performance standards for the supply of optical fiber cables as described below. The features described in this document are intended to provide information on the performance of Sumitomo Electric Lightwave's optical cable and aid in handling and installation. Please refer to the separate fiber specification for details regarding the optical fiber.

### 1.1 Cable Description

Sumitomo's Figure-8 Optical Fiber Service Drop Cable with a stranded steel messenger, contains 1 to 12 optical fibers. The optical fibers are housed inside a standard 3 mm gel filled plastic buffer tube. The buffer tube, dielectric strength members, and the 3 mm stranded steel messenger are then co-extruded with a flame retardant sheath.

The stranded steel messenger Figure-8 Drop Cable is designed for self-supporting outside plant installations to the home or business with maximum allowable span lengths of up to 750 feet.

### 1.2 Quality

Sumitomo ensures a continuing level of quality in our cable products through multiple programs including TL 9000, and our own Kaizen system of continuous improvement. Quality product is guaranteed and is evident in the optical fiber cable products manufactured at Sumitomo's facility in Research Triangle Park, North Carolina for over two decades.

### 1.3 Reliability

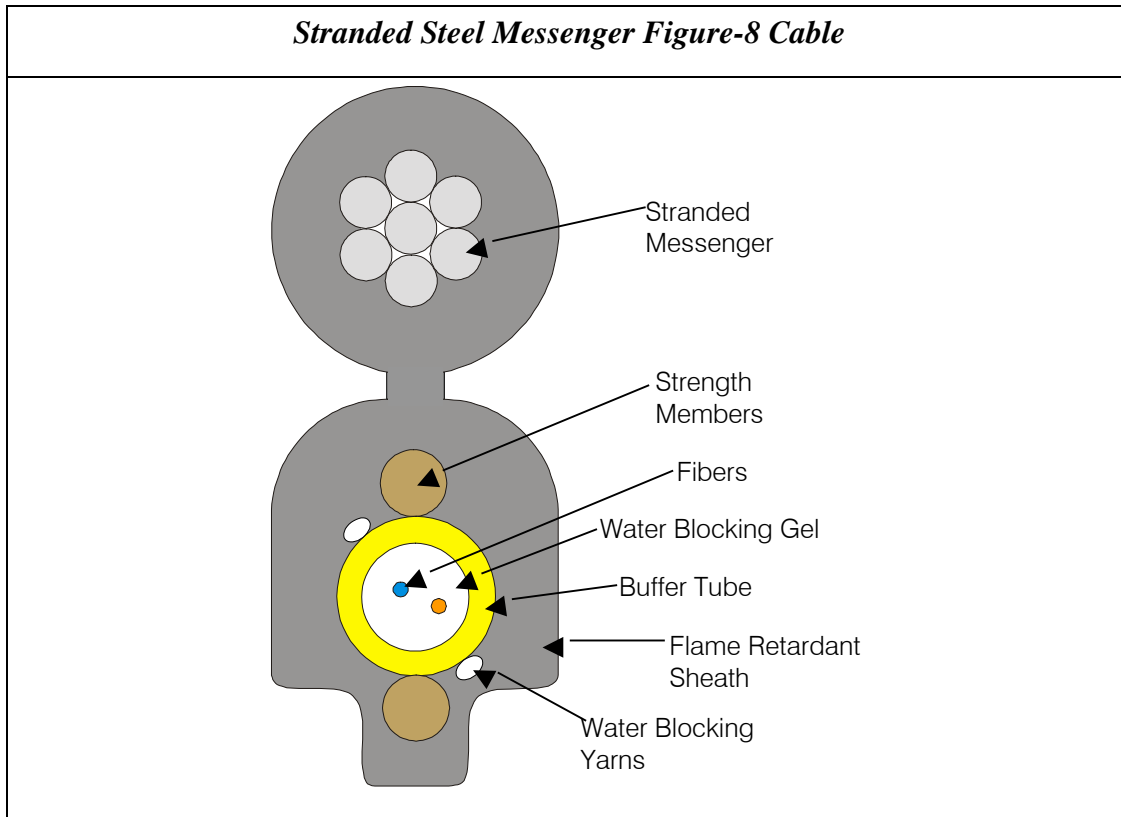
Sumitomo ensures product reliability through rigorous qualification testing of each product family to meet or exceed industry standards. Both initial and periodic qualification testing are performed to assure the cable's performance and durability in the field environment.

Sumitomo supports industry standards organizations such as Bell Communications Research (Telcordia), Telecommunications Industry Association (TIA), Insulated Cable Engineers Association (ICEA), International Telecommunications Union (ITU), International Electrotechnical Commission (IEC), American Society for Testing and Materials (ASTM), Rural Utilities Service (RUS), and The Institute of Electrical and Electronics Engineers (IEEE).

## 2. Cable Design

### 2.1 General

Sumitomo's Figure-8 optical fiber drop cable contains 1 - 12 fibers inside a 3 mm buffer tube to provide a small diameter, lightweight drop cable. The integrated 3 mm stranded steel messenger allows longer aerial spans installations. The flame-retardant PVC sheath with optimized integral web permits easy and tool less separation of the messenger and cable core for the craftsman.



### 2.2 Fiber Types

The following fiber types are available in this cable design. Please refer to the appropriate fiber specification document for fiber details.

<b>APPLICABLE FIBER TYPES</b>		
FIBER TYPE	TIA CLASS	SUMITOMO SPEC. #
PureBand™ Single Mode	Type IVa	SE-5**
PureAccess™ Single Mode	Type IVa	SE-9**

## 2.3 Optical Fiber Color Code

The UV acrylate coated fibers are color coded with highly distinguishable, vibrant colors according to the following table. All colors meet Munsell standards as specified in TIA-359 and TIA-598.

<b><i>FIBER COLOR CODE</i></b>	
<b>FIBER #</b>	<b>COLOR</b>
1	Blue
2	Orange
3	Green
4	Brown
5	Slate
6	White
7	Red
8	Black
9	Yellow
10	Violet
11	Rose
12	Aqua

## 2.4 Buffer Tubes

Fibers are housed inside a standard 3 mm (0.12 in) gel-filled buffer tube manufactured with industry standard polybutylene terephthalate (PBT). Water blocking gel fills the tube to prevent migration of water through the tube. Industry standard tools and practices can be used to enter the buffer tube.

## 2.5 Strength Elements

Two Fiber Reinforced Plastic (FRP) rods provide tensile strength to the cable core for routing the core without the messenger.

## 2.6 Cable Water Blocking

Water blocking yarns are applied around the outside of the buffer tube to prevent water ingress.

## 2.7 Cable Sheath

A black flame retardant and UV resistant jacket is extruded over the cable core and a 3 mm stranded steel messenger as the sheath. The jacket material is PVC and the cable is UL listed and OFCG rated. The messenger and core are joined together by a web, which has been designed for easy messenger separation during installation with out tools. The tab sheath design further eases core entry with the use of lineman pliers or knife.

## 2.8 Cable Dimensions

<b><i>DROP CABLE DIMENSIONS</i></b>		
<b>FIBER COUNT</b>	<b>NOMINAL DIAMETER (W X H)</b>	<b>NOMINAL WEIGHT</b>
1 - 12	5.0 mm (0.20 in) x 13.0 mm (0.51 in)	104 Kg/km (70 lbs./kft)

## 2.9 Sheath Marking

The entire length of each cable is marked with the following items:

- "SUMITOMO OPTICAL CABLE"
- Month and Year of Manufacture
- Number of Optical Fibers
- Sequential Length Markings in feet
- UL Marking

All length markings are placed at two-foot intervals. The actual cable length will be within +1%, -0% of the marked length. All markings will be ink-jet permanent orange characters.

## 3. Cable Performance

### 3.1 Mechanical Characteristics

The finished cables can be subjected to the following mechanical conditions without a permanent increase in attenuation or damage to the cable

<b><i>MECHANICAL PERFORMANCE</i></b>			
<b>PROPERTY</b>		<b>TEST PROCEDURE</b>	<b>SPECIFICATION</b>
Low and High Temperature Cable Bend		EIA/TIA-455-37	20 x cable O.D. @ -30°C and 60°C
Impact Resistance		EIA/TIA-455-25	25 impact cycles
Compressive Strength		EIA/TIA-455-41	220 N/cm (124 lbs/in.)
Cable Twist		EIA/TIA-455-85	2 meter length $\pm$ 180°
Cable Cyclic Flexing		EIA/TIA-455-104	20 x cable O.D. 25 cycles
Minimum Bend Radius	During Installation	EIA/TIA-455-37	10 cm (3.9 in)
	During Service		7 cm (1.9 in)
Maximum Span Length @ Sag $\geq$ 1.0%		NESC Heavy	300 ft
		NESC Medium	500 ft
		NESC Light	750 ft

### 3.2 Environmental Characteristics

The finished cables can be subjected to the following environmental conditions without a permanent increase in attenuation or damage to the cable.

<b>ENVIRONMENTAL PERFORMANCE</b>			
PROPERTY	TEST PROCEDURE		SPECIFICATION
Temperature:	Operation	EIA/TIA-455-3	-40 to +70 °C (-40 to +158 °F)
	Installation		-30 to +60 °C (-22 to +140 °F)
	Storage / Shipping		-40 to +75 °C (-40 to +167 °F)
Cable Aging	EIA/TIA-455-3		168 hours @ 85°C
Water Penetration	EIA/TIA-455-82		1 meter for 24 hours
Compound Drip Temperature	EIA/TIA-455-81		70 °C (158 °F)
Wasp Spray Exposure	Telcordia GR-20		No Deterioration
Color Coding Permanence	Bellcore GR-20		Colors Remain Discernible
Flammability	UL – 1666 Riser		UL Listed UL OFCG CUL FT-4

### 4. Testing and Inspection

The optical properties of all fibers are measured prior to cable manufacturing and remain traceable throughout the manufacturing process and the lifetime of the cable.

After cabling, we use statistical process control techniques along with periodic verification to insure 100% compliance to attenuation requirements in each length of cable with bi-directional OTDR. The attenuation for each fiber is recorded. Cable dimensional measurements are also made at final inspection and recorded.

### 5. Packaging and Shipping

Cable is supplied in lengths specified at the time of purchase. Each length will be shipped on a separate non-returnable wooden reel or if specified, returnable steel reel. The minimum barrel diameter of the reel will not be less than 30 times the cable diameter. Cable reels will be suitably packaged to protect product from damage. Each reel is marked with the manufacturer's name and address, cable type, fiber count, attenuation specs, and cable length. A final inspection test report with attenuation performance data for each fiber is attached to the reel flange along with shipping labels.

A final inspection test report with attenuation performance data for each fiber is provided with each cable. The cable ends will be easily accessible for testing.

<b>REEL DIMENSIONS</b>						
REEL TYPE	REEL CODE	FLANGE DIAMETER		REEL WIDTH		REEL WEIGHT
Wood	L-3	850 mm	(34 in)	580 mm	(23 in)	32 Kg (70 lbs)
	L-8	1050 mm	(41 in)	760 mm	(30 in)	61 Kg (134 lbs)
	L-11	1250 mm	(49 in)	760 mm	(30 in)	91 Kg (200 lbs)

Steel	414	1270 mm (50 in)	810 mm (32 in)	109 Kg (240 lbs)
	415	1420 mm (56 in)	810 mm (32 in)	130 Kg (285 lbs)
	416	1680 mm (66 in)	810 mm (32 in)	155 Kg (340 lbs)

NOTE: Actual reel size used will depend on production capacity, net weight, and reel availability. Check with your sales representative for more details.

## **6. Installation / Handling Practices**

Sumitomo has incorporated a wide range of technical support and training services for our fiber optic cable products into our Technical Support Services (TSS) program. TSS offers training in the areas of cable installation, sheath entry, splicing, testing, and system troubleshooting. The services are available in a variety of media formats and can be customized to better accommodate individual training needs. The TSS program consists of an extensive series of recommended procedure documents, training courses with classroom and hands-on instruction, as well as demonstrational videotapes. Please contact Sumitomo's Customer Service department for more information.

### **6.1 Properties**

Aerial cables can experience two different types of vibratory motion due to wind conditions. The first is *aeolian vibration*. This is a high frequency, low amplitude motion. Theoretical modeling predicts that the Figure-8 style cables will be less likely to initiate aeolian vibration than concentric cables.

The shape of the Figure-8 cable does lead to more drag and lift which can cause *galloping* or *dancing*, the second type of vibratory motion. This is a low frequency, high amplitude motion that can be minimized by selecting higher tensions, lower sags, and limited span lengths. Also by placing a twist every 3 to 5 meters in a standard Figure-8 cable, these oscillations can be neutralized.

### **6.2 Hardware**

Dead-end grips are commonly available for attaching to the steel messenger. Reliable Power Products manufactures a product (Wirewise® #5058) specifically for a drop cable with a 3 mm messenger. Suspension (tangent) clamps are also available.

## **7. Ordering Information**

To learn more about Sumitomo's cables or to place an order, call, fax, e-mail, or write us at:

Sumitomo Electric Lightwave Corp.  
78 Alexander Drive  
Research Triangle Park, NC 27709  
Attn: Customer Service Department

Phone: 800-358-7378  
919-541-8100  
Fax: 919-541-8265  
E-mail: [info@sumitomoelectric.com](mailto:info@sumitomoelectric.com)

Sumitomo Electric Lightwave Corp. reserves the right to improve, enhance, or modify the cable's features and specifications. For special requirements different than those shown above, please contact our Inside Sales Department. Each Sumitomo Electric Lightwave Corp. optic cable and/or its manufacture may be covered by one or more of the following US Patents: 4,715,677 4,729,629 4,763,983 4,770,489 4,828,349 4,953,945 5,043,037 5,082,347 5,165,003 D331,567 5,247,599 5,410,901 5,471,555 5,642,452. Cable and/or its manufacture may be covered by one or more of the following US Patents: 4,715,677 4,729,629 4,763,983 4,770,489 4,828,349 4,953,945 5,043,037 5,082,347 5,165,003 D331,567 5,247,599 5,410,901 5,471,555 5,642,452.