



## SUMITOMO PRODUCT SPECIFICATION

FutureFLEX®

### TCxxMSOS-2 HIGH PERFORMANCE OSP TUBE CABLE SERIES WITH GALVANIZED STEEL INTERLOCKED ARMORING



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SEL is a Member of the Sumitomo Electric Industries, Ltd. Group

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## **1.0 GENERAL**

This specification covers the design requirements and performance standards for FutureFLEX® Air-Blown Fiber® (ABF) high performance, outside plant tube cables with galvanized steel interlocking armor. These tube cables are designed for outdoor tube cable infrastructures. The features described in this document are intended to provide information on the performance of Sumitomo Electric's FutureFLEX® tubes and aid in handling and use.

### **1.1 Tube Cable Description**

Sumitomo's FutureFLEX® TCxxMSOS-2 high performance, Outside Plant (OSP) series tube cables with galvanized steel interlocking armor, are designed for use in direct buried installations, flooded environments, applications that require crush resistance, or enhanced thermal stability. The tubes are made of black HDPE and have a 6mm inside diameter and 8mm outside diameter. The tubes are wrapped with a non-conductive water-blocking tape. The inner jacket is also made of black HDPE. A ripcord is provided to aid in inner jacket removal. A galvanized steel interlocking armor wrap surrounds the inner jacket. The outer jacket is made of a low density black polyethylene. These tube cables are pulled, hung or placed in routes for the purpose of individual tube connections to establish pathways for FutureFLEX® fiber bundle installation.

### **1.2 Quality**

Sumitomo ensures a continuing high level of quality through ISO / TL9000 registered Quality Management Systems and our commitment to continuous improvement. Guaranteed, high quality products have been manufactured at Sumitomo's facility in Research Triangle Park, North Carolina since 1984.

### **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 tube cables' performance and durability in a field environment.

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

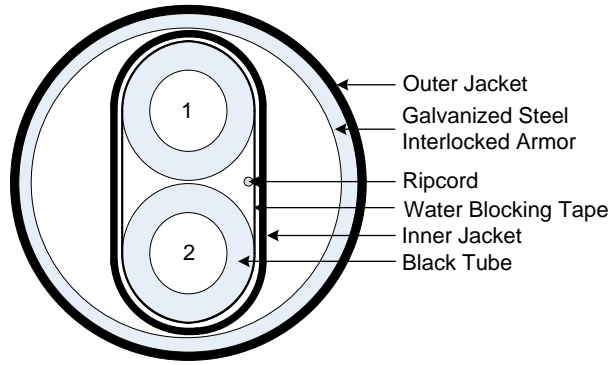
## 2.0 Tube Cable Design

### 2.1 General

Sumitomo's FutureFLEX® TCxxMSOS-2 High Performance OSP series tube cables with galvanized steel interlocking armor provide a small diameter, outdoor pathway for FutureFLEX® fiber bundle installations. FutureFLEX® ABF fiber bundles are available in Single-mode OS1, 62.5 micron Multimode OM1, 1-Gigabit 50 micron Multimode OM2, Laser Optimized 10-Gigabit 50 micron Multimode OM3, and Laser Optimized 10-Gigabit 50 micron Multimode OM4 versions with 2, 4, 6, 12, 18, or 24 fiber strand counts. One fiber bundle can be field-installed in each tube.

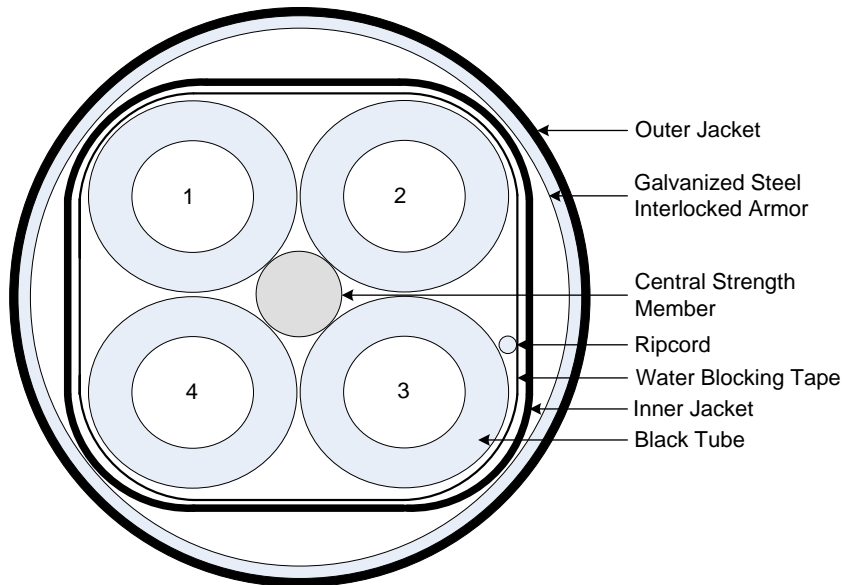
### 2.2 Construction

SEL Part Number	Product Description	Outside Diameter (in.)	Max. Weight (lbs./kft.)	Max. Tensile Load (lbs.)
TC02MSOS-2	2 - tubes, wrapped with water-blocking tape, ripcord and black high performance polyethylene jacket in a galvanized steel interlocking armor covered by an outer sheath of polyethylene.	1.2	589	500
TC04MSOS-2	4 - tubes, wrapped with water-blocking tape, ripcord and black high performance polyethylene jacket in a galvanized steel interlocking armor covered by an outer sheath of polyethylene.	1.3	707	500
TC07MSOS-2	7 - tubes, wrapped with water-blocking tape, ripcord, and black high performance polyethylene jacket in a galvanized steel interlocking armor covered by an outer sheath of polyethylene.	1.5	825	600
TC19MSOS-2	19 - tubes, wrapped with water-blocking tape, ripcord, and black high performance polyethylene jacket in a galvanized steel interlocking armor covered by an outer sheath of polyethylene.	2.1	1152	600



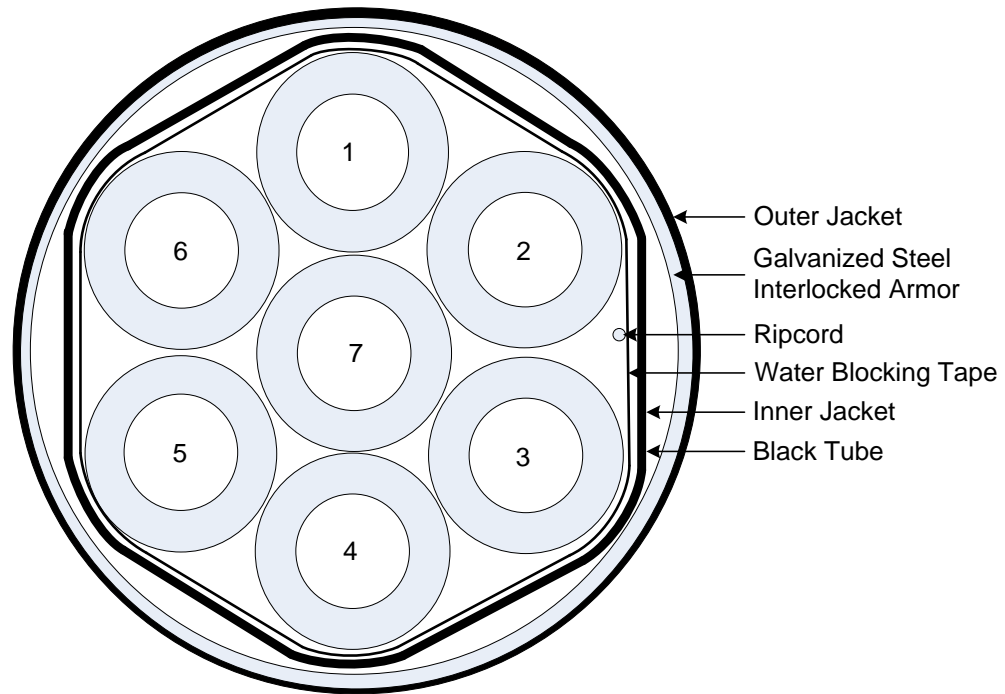
2-Tube  
Interlocked Armor /  
Dielectric Low Shrink  
OSP Cable  
TC02MSOS-2

Drawing Not to Scale



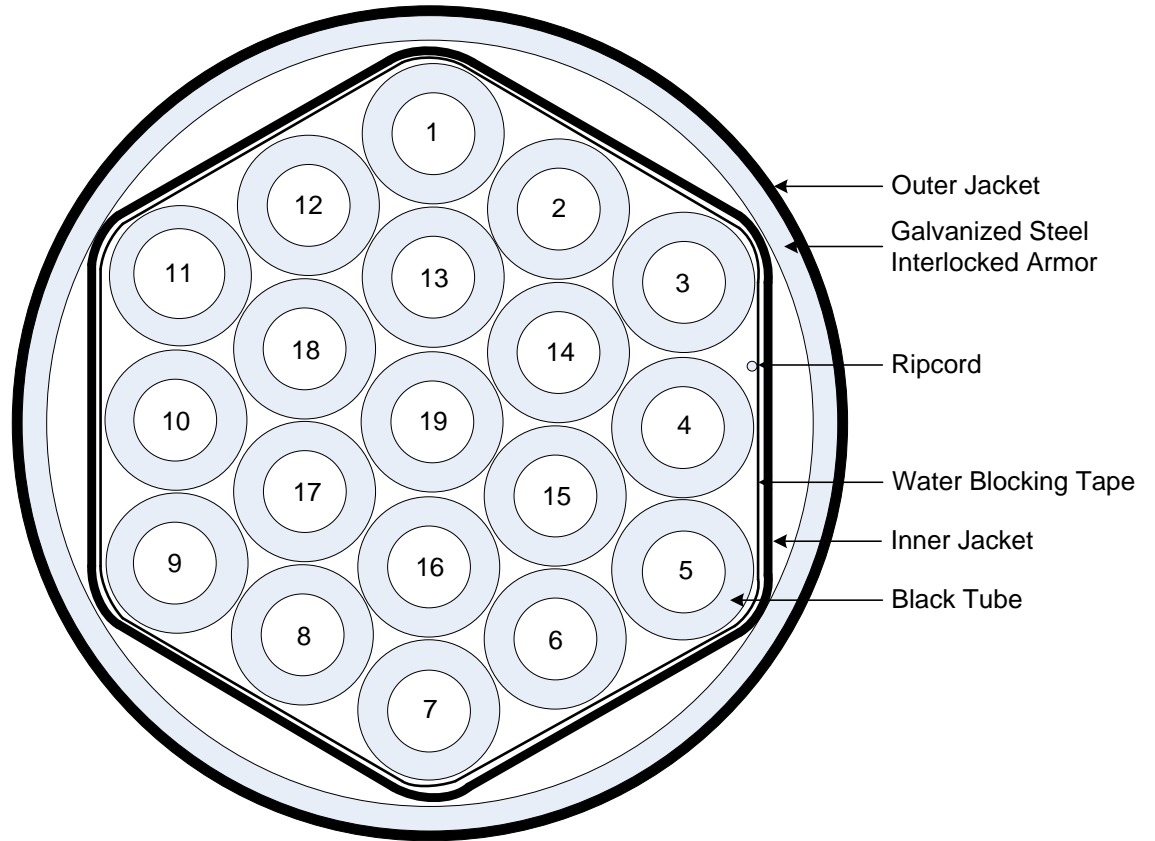
4-Tube  
Interlocked Armor /  
Dielectric Low Shrink  
OSP Cable  
TC04MSOS-2

Drawing Not to Scale



7-Tube  
Interlocked Armor /  
Dielectric Low Shrink  
OSP Cable  
TC07MSOS-2

Drawing Not to Scale



19-Tube  
Interlocked Armor /  
Dielectric Low Shrink  
OSP Cable  
TC19MSOS-2

Drawing Not to Scale

### 3.0 TUBE CABLE CHARACTERISTICS

#### 3.1 Performance

Property	Specification
Operation Temperature Range	-65° to +158° F
Minimum Bend Radius (During / After Installation)	20 / 10 x tube cable outside diameter

#### 3.2 Tube and Jacket Markings

The outside surface of each tube is marked every two (2) inches with the tube designation number (1 through 19).

The outside surface of each jacketed cable is marked every two (2) feet with the following information:

**'Phone Receiver' SEL FutureFLEX® TCxxMSOS-2 (#)-Tube Armored OSP Optical Fiber Cable, A-(Lot #-1, -2, -3, etc.) (Seq. Ftg.) 1-877-356-FLEX WWW.FUTUREFLEX.COM →**

#### 3.3 Reel Markings

The outside of each flange is marked with the Sumitomo Electric Lightwave Corp. product part number, the tube cable manufactured length in feet, and the text "Do Not Lay Flat."

#### 3.4 Tube Cable Ends

Both ends of the tube cable are accessible on the reel. Each tube is sealed with a plastic cap or plug. Tube cable ends are sealed with a heat shrink end cap.



**3.5 Tube Cable Reel Data**

Sumitomo Part No.	Reel Length (ft)	Reel F x W (in)	Minimum Drum Diameter (in)	Reel Weight (lbs) Empty	Reel Weight (lbs) Full
TC02MSOS-2	1000	60 x 39	30	410	996
TC02MSOS-2	1500	60 x 39	30	410	1289
TC02MSOS-2	2000	60 x 39	30	410	1582
TC02MSOS-2	2500	60 x 39	30	410	1875
TC02MSOS-2	3000	60 x 39	30	410	2168
TC04MSOS-2	1000	60 x 39	30	410	1117
TC04MSOS-2	1500	60 x 39	30	410	1471
TC04MSOS-2	2000	60 x 39	30	410	1824
TC04MSOS-2	2500	60 x 39	30	410	2178
TC04MSOS-2	3000	60 x 39	30	410	2531
TC07MSOS-2	1000	60 x 39	30	410	1248
TC07MSOS-2	1500	60 x 39	30	410	1667
TC07MSOS-2	2000	60 x 39	30	410	2086
TC07MSOS-2	2500	72 x 49	36	652	2747
TC07MSOS-2	3000	72 x 49	36	652	3166
TC19MSOS-2	1000	72 x 49	36	652	2059
TC19MSOS-2	1500	72 x 49	36	652	2763
TC19MSOS-2	2000	84 x 61	42	930	3744
TC19MSOS-2	2500	84 x 61	42	930	4448
TC19MSOS-2	3000	84 x 61	42	930	5151

**Notes:**

- Dash -2 Outdoor Armored Tube Cable Designs are available in Reel Lengths of 1,000-, 1,500-, 2,000-, 2,500-, and 3,000-feet unless otherwise noted.
- All Reel Length tolerances are  $\pm 5\%$ .
- Cut Lengths are available. Contact FutureFLEX® Distributor for additional information.
- If tube cable is re-spooled, the minimum Drum Diameter of the new reel SHALL be no less than that specified herein to avoid damaging tube cable product.
- All Reel Widths shown are approximate values only and measured from outside-of-flange to outside-of-flange plus an allowance for fastener hardware protrusions.
- All Empty and Full Reel Weights shown are approximate values only.

#### **4.0 TESTING**

Each finished tube cable is required to pass a 5mm diameter steel ball from end to end using 70 psi (+/- 10 psi) gas pressure.

#### **5.0 INSTALLATION / HANDLING PRACTICES**

Sumitomo has incorporated a wide range of technical support and training services for our tube 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. Please contact Sumitomo's Customer Service department for more information.

#### **6.0 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 CORPORATION**

201 South Rogers Lane

Suite 100 Raleigh, NC 27610

Attn: Customer Service Department

Phone: 800-358-7378

919- 541-8100

Fax: 919- 541-82265

E-mail: info@sumitomoelectric.com

Sumitomo Electric Lightwave 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.