



SUMITOMO PRODUCT SPECIFICATION

FutureFLEX®

**TCxxMSOS-2 HIGH PERFORMANCE OSP TUBE CABLE SERIES
WITH GALVANIZED STEEL INTERLOCKING ARMOR**



SUMITOMO ELECTRIC LIGHTWAVE CORP.

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

Sumitomo Electric Lightwave reserves the right to improve or modify these specifications without notice.

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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 a very high degree of crush resistance. or may be exposed to drastic temperature changes. The tubes are made of a high performance black polyethylene and have a 6mm inside diameter and 8mm outside diameter. The tubes are wrapped with a non-conductive water-blocking tape. The inner jackets are made of a high performance black polyethylene. 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 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).

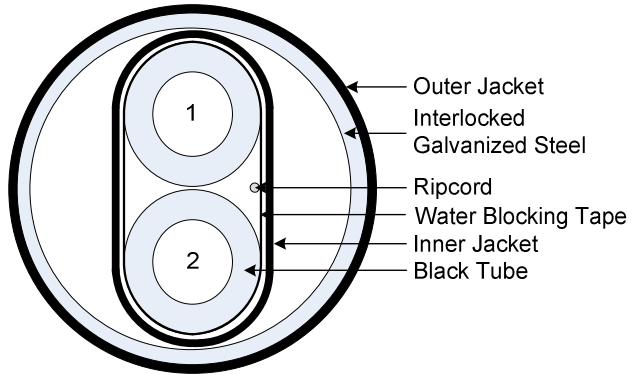
2.0 Tube Cable Design

2.1 General

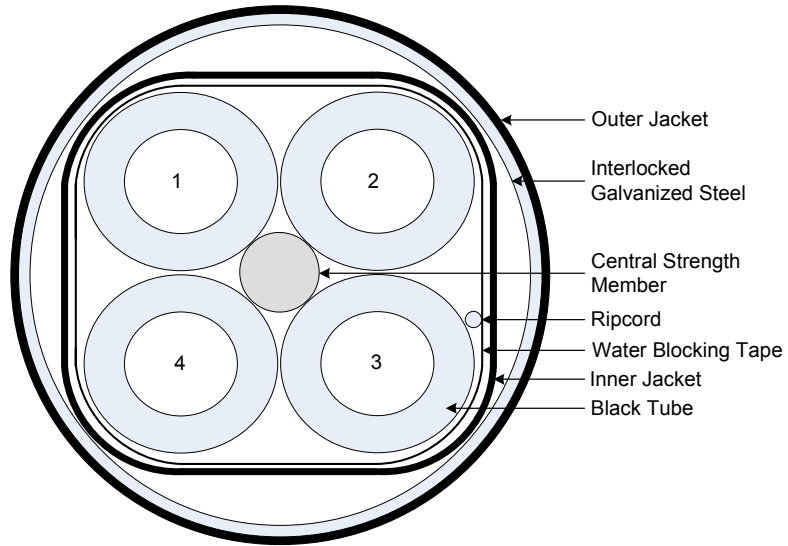
Sumitomo's FutureFLEX® TCxxMSOS-2 High Performance OSP series tube cables with galvanized steel interlocking armor provide a small diameter, outdoor pathway for FutureFLEX® fiber bundle installations. FutureFLEX® ABF fiber bundles are available in Single Mode, 50 micron and 62.5 micron Multimode versions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

2.2 Construction

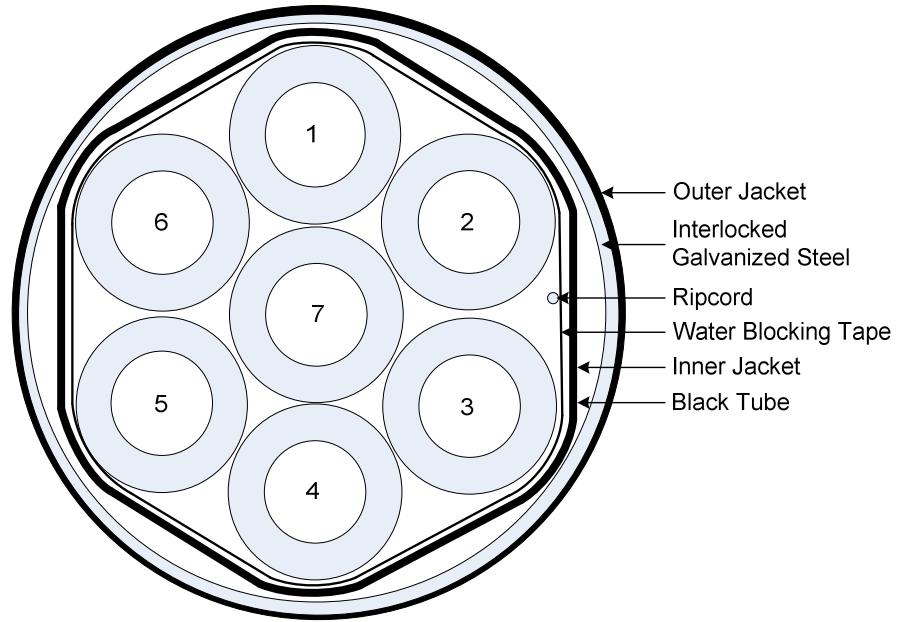
SEL Part Number	Product Description	Outside Diameter (in.)	Max. Weight (lbs./kft.)	Max. Tensile Load (lbs.)
TC02MSOS-2	2-tubes, black, high performance, wrapped with water-blocking tape, ripcord and black high performance inner polyethylene jacket encased in galvanized steel interlocking armor covered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



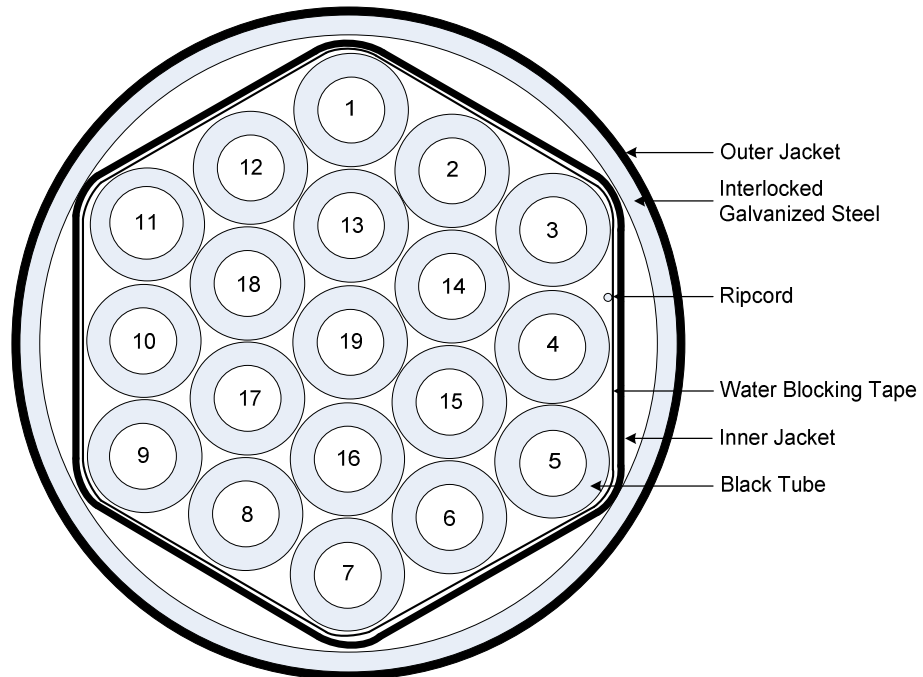
2-Tube
Interlocked Armor /
Dielectric Low Shrink
OSP Cable
TC02MSOS-2



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



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



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

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.

Standard Reel Lengths

Sumitomo Part No.	Std Reel Length (ft)	Std Reel H x W (in)	Minimum Drum Diameter (in)	Std Reel Weight (lbs) Empty	Std Reel Weight (lbs) Full
TC02MSOS-2	1000	50 x 39	40	308	897
TC04MSOS-2	1000	50 x 39	40	308	1015
TC07MSOS-2	1000	60 x 49	40	420	1245
TC19MSOS-2	1000	60 x 49	40	420	1572

Notes:

- Standard Reel Length tolerances are $\pm 5\%$
- All Reel Widths shown are approximate values only and measured across outside-of-flanges
- If tube cable is re-spoiled, the Minimum Drum Diameter of the new reel shall be as shown to avoid damaging tube cable product
- All Empty and Full Reel Weights shown are approximate values only

3.5 Maximum Reel Lengths

Sumitomo Part No.	Max Reel Length (ft)	Max Reel H x W (in)	Minimum Drum Diameter (in)	Std Reel Weight (lbs) Empty	Std Reel Weight (lbs) Full
TC02MSOS-2	3000	72 x 49	40	523	2290
TC04MSOS-2	3000	72 x 49	40	523	2644
TC07MSOS-2	3000	72 x 49	40	523	2998
TC19MSOS-2	2300	72 x 49	40	523	3173

Notes:

- Maximum Reel Length tolerances are $\pm 5\%$
- All Reel Widths shown are approximate values only and measured across outside-of-flanges
- If tube cable is re-spoiled, the Minimum Drum Diameter of the new reel shall be as shown to avoid damaging tube cable product
- All Empty and Full Reel Weights shown are approximate values only

4.0 Blowing Performance / Testing

Each finished tube cable on its reel 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 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

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.