



FutureFLEX[®]
AIR-BLOWN FIBER[®] SOLUTIONS

SUMITOMO PRODUCT SPECIFICATION

FutureFLEX[®]

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



**SUMITOMO ELECTRIC
LIGHTWAVE**

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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 interlocked, jacketed 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 interlocked, jacketed armor, are designed for use in direct buried installations, flooded environments, aerial and duct installation applications that require high crush resistance, or enhanced thermal stability. The tubes are made of black HDPE and have a 6mm inside diameter and 8mm outside diameter. Part-Number-TC04MSOS-2 only, the cable construction includes an HDPE Center Member. 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 interlocked armor wrap surrounds the inner jacket requiring Grounding and Bonding in accordance with EIA/TIA 607 Standards. 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

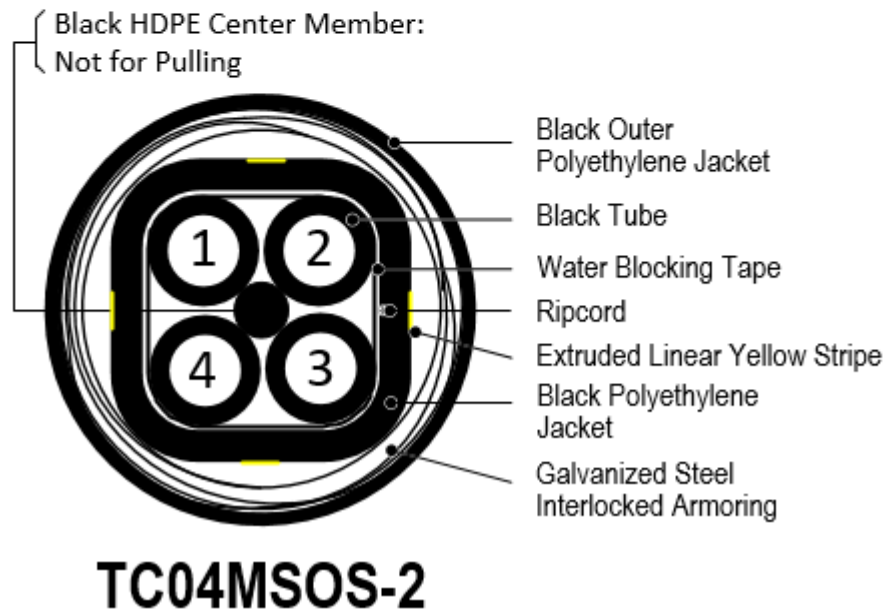
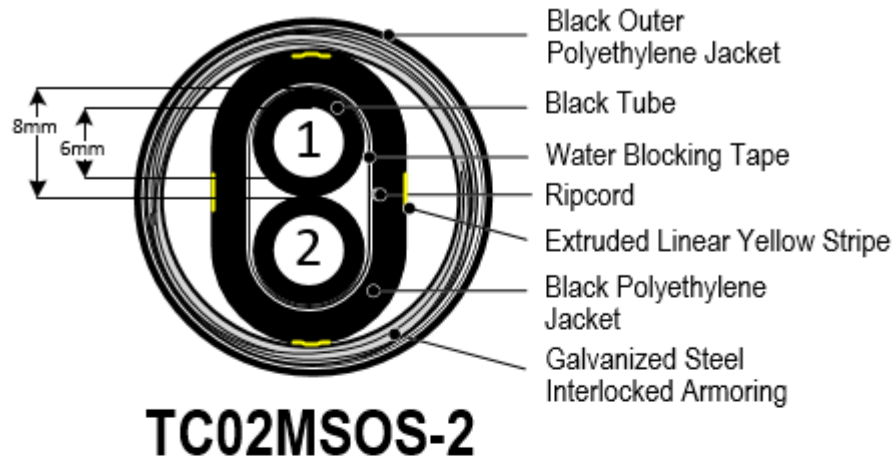
2.1 General

Sumitomo's FutureFLEX® TCxxMSOS-2 High Performance OSP series tube cables with galvanized steel interlocked armor provide a small diameter, outdoor pathway for FutureFLEX® fiber bundle installations. FutureFLEX® ABF fiber bundles are available in Single-mode OS2, 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 6, 12, 24, 48 fiber strand counts. 72 fiber strand bundles are available in single-mode only. One fiber bundle can be field-installed in each tube. (Refer SEL Drawing SD-F04-008)

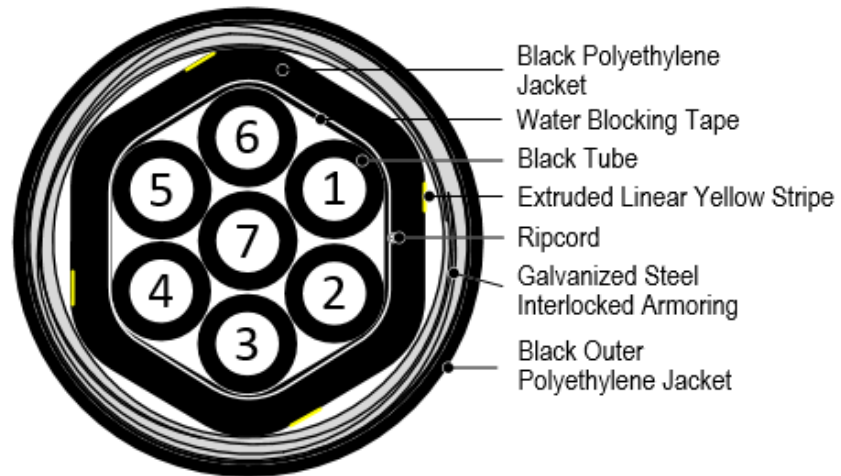
2.2 Construction

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 interlocked armor covered by an outer jacket of black polyethylene.	1.20	490	500
TC04MSOS-2	4 - tubes, HDPE Center Member, wrapped with water-blocking tape, ripcord and black high performance polyethylene jacket in a galvanized steel interlocked armor covered by an outer jacket of black polyethylene.	1.34	538	500
TC07MSOS-2	7 - tubes, wrapped with water-blocking tape, ripcord, and black high performance polyethylene jacket in a galvanized steel interlocked armor covered by an outer jacket of black polyethylene.	1.54	874	600
TC12MSOS-2	12 - tubes, wrapped with water-blocking tape, ripcord, and black high performance polyethylene jacket in a galvanized steel interlocked armor covered by an outer jacket of black polyethylene.	1.89	1089	600
TC19MSOS-2	19 - tubes, wrapped with water-blocking tape, ripcord, and black high performance polyethylene jacket in a galvanized steel interlocked armor covered by an outer jacket of black polyethylene.	2.20	1653	600

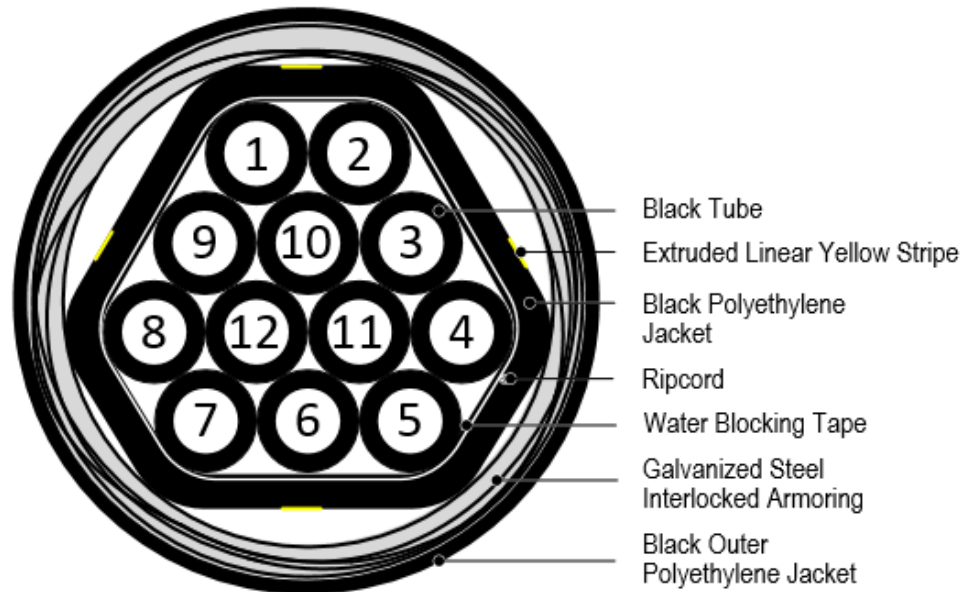
Drawings Not to Scale



Drawings Not to Scale

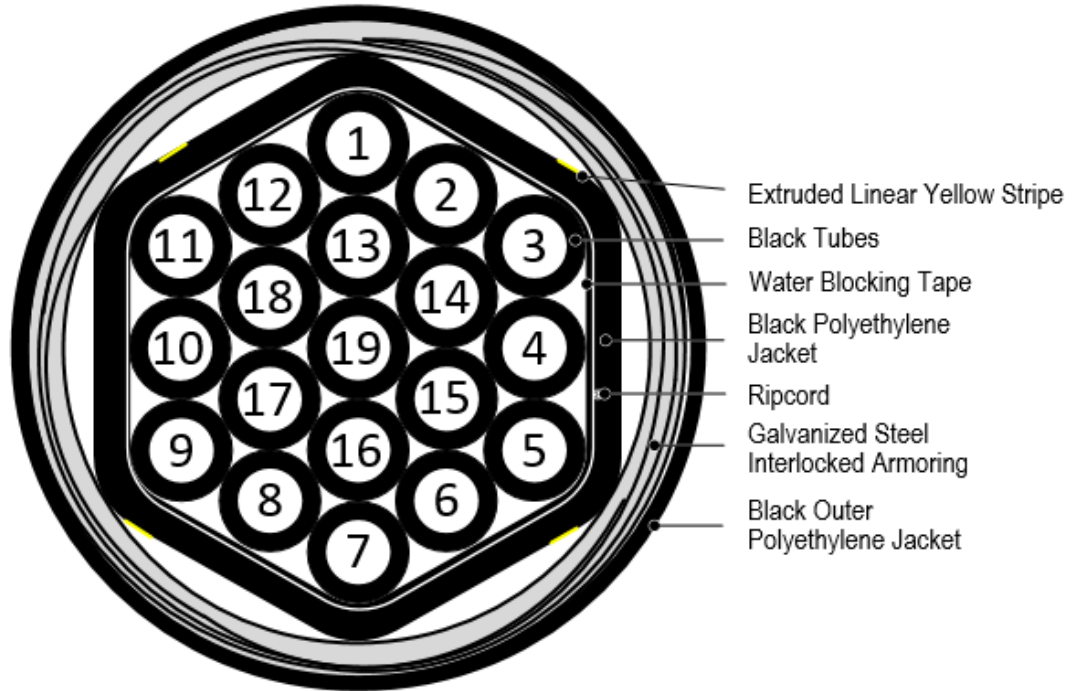


TC07MSOS-2



TC12MSOS-2

Drawing Not to Scale



TC19MSOS-2

3.0 TUBE CABLE CHARACTERISTICS

3.1 Performance

Property	Specification
Operation Temperature Range	-40° F to +158° F (-40° C to +70° C) (ICEA 640)
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:

 **SEL FutureFLEX® TCxxMSOS-2 (#)-Tube Armored OSP Optical Fiber Cable, A-(Lot #1, -2, -3, etc.) (Seq. Ftg.) 1-877-356-FLEX WWW.SUMITOMOELECTRICLIGHTWAVE.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 32	30	410	996
TC02MSOS-2	3000	60 x 32	30	410	2168
TC04MSOS-2	1000	60 x 32	30	410	1117
TC04MSOS-2	3000	60 x 32	30	410	2531
TC07MSOS-2	1000	72 x 42	36	652	1490
TC07MSOS-2	3000	72 x 42	36	652	3166
TC12MSOS-2	1000	84 x 54	42	930	1992
TC12MSOS-2	3000	84 x 54	42	930	4116
TC19MSOS-2	1000	84 x 54	42	930	2337
TC19MSOS-2	3000	84 x 54	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 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
201 South Rogers Lane
Suite 100, Raleigh, NC 27610
Attn: Customer Service Department
Phone: 800-358-7378
919-541-8100
Fax: 919-541-8265
E-mail: info@sumitomoelectric.com
URL: www.sumitomoelectriclightwave.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.