



SUMITOMO PRODUCT SPECIFICATION

FutureFLEX®

TCxxTP2-1 PLENUM RATED TUBE CABLE SERIES WITH INTERLOCKING GALVANIZED STEEL ARMORING



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.

CONTENTS

1.0	GENERAL	3
1.1	Tube Cable Description	3
1.2	Quality	3
1.3	Reliability	3
2.0	Tube Cable Design	4
2.1	General	4
2.2	Construction	4-6
3.0	Tube Cable Characteristics	7
3.1	Performance	7
3.2	Tube and Jacket Markings	7
3.3	Reel Markings	7
3.4	Tube Cable Ends	7
3.5	Standard Reel Lengths	7
4.0	Blowing Performance / Testing	8
5.0	Installation / handling Practices	8
6.0	Ordering Information	8

1.0 GENERAL

This specification covers the design requirements and performance standards for FutureFLEX[®] Air-Blown Fiber[®] (ABF) interlocking galvanized steel armored, plenum rated, jacketed tube cables. These tube cables are designed for indoor 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[®] TP2-1 series tube cables are designed for use as an optical fiber cabling infrastructure in ABF applications that require an Optical Fiber Conductive Plenum (OFCP) fire rating plus armored protection. TP2-1 series tube cables may also be used in indoor applications where: 1) lesser fire ratings such as Optical Fiber Conductive Riser (OFCR) or Optical Fiber Conductive General Purpose (OFCG) apply or 2) no fire ratings apply but armored protection is required. The individual tubes have a 5.5 mm inside diameter and a 8 mm outside diameter, where the tubes and jacket are comprised of plenum rated PVC material. These tube cables are pulled or placed in indoor routes for the purpose of individual tube interconnection to establish pathways for FutureFLEX[®] fiber bundle installation. A ripcord is provided to aid in outer jacket removal.

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 Telcordia, 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

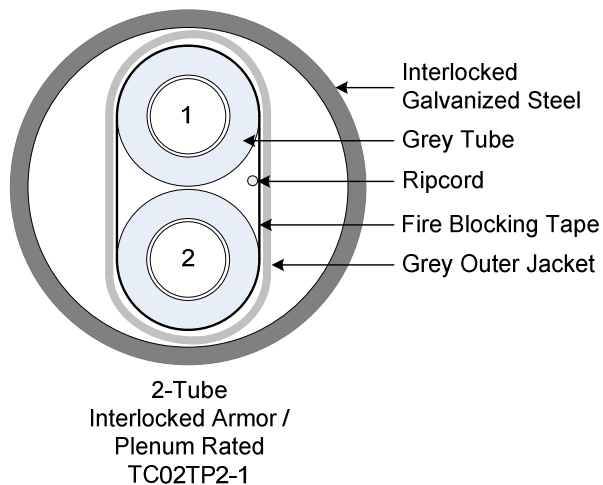
2.1 General

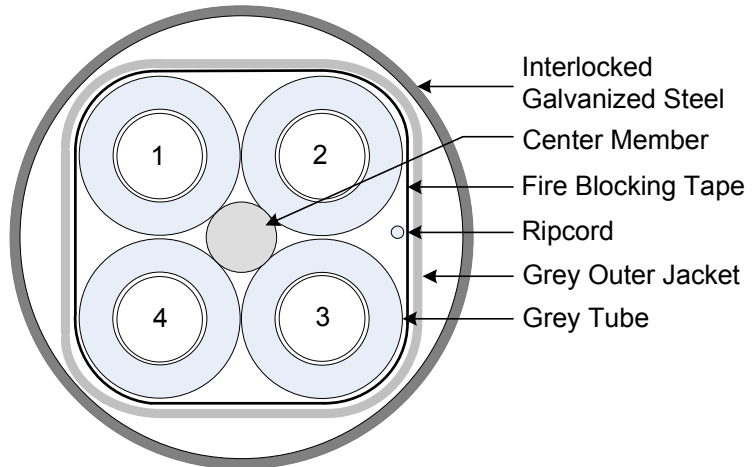
Sumitomo's FutureFLEX® TP2-1 series tube cables provide a small diameter, lightweight, indoor pathway for FutureFLEX® fiber bundle installations. FutureFLEX® ABF fiber bundles are available in Single Mode, 50 micron and 62.5 micron Multimode versions with 2, 4, 6, 12, or 18 fiber strand counts. One fiber bundle can be field-installed in each tube.

2.2 Construction

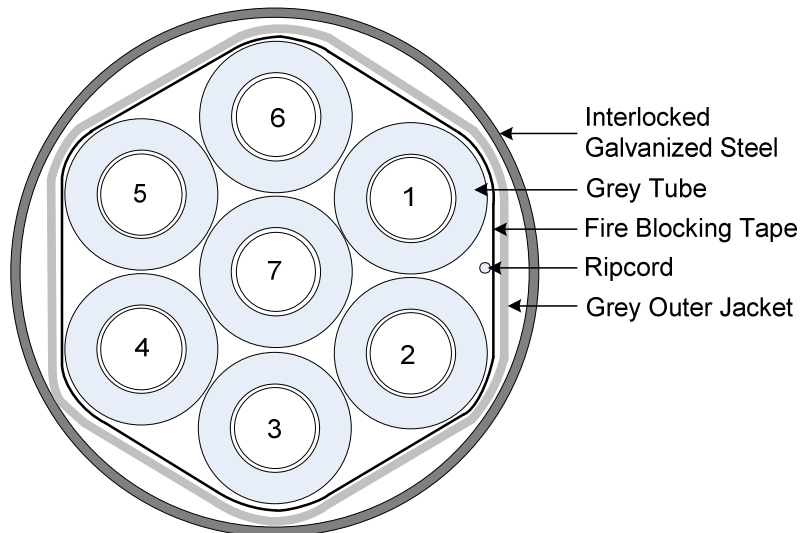
SEL Part Number	Product Description	Outside Diameter (in.)	Max. Weight Lbs. per foot	Max. Tensile Load (lbs.)
TC02TP2-1	2- tubes, plenum rated, grey jacketing, encased in a galvanized interlocking steel armor.	1.07	.502	500
TC04TP2-1	4- tubes, plenum rated, grey jacketing, encased in a galvanized interlocking steel armor.	1.17	.608	500
TC07TP2-1	7- tubes, plenum rated, grey jacketing, encased in a galvanized interlocking steel armor.	1.37	.887	600
TC19TP2-1	19- tubes, plenum rated, grey jacketing, encased in a galvanized interlocking steel armor.	2.02	1.541	600

Drawings Are Not To Scale

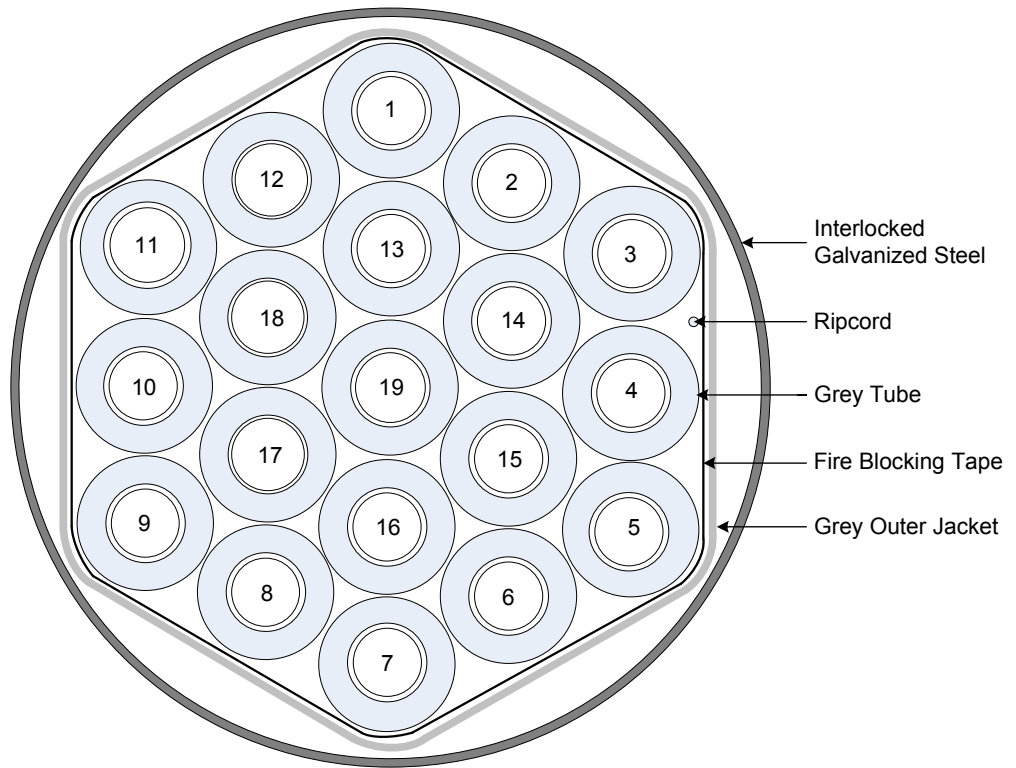




4-Tube
Interlocked Armor /
Plenum Rated
TC04TP2-1



7-Tube
Interlocked Armor /
Plenum Rated
TC07TP2-1



19-Tube
Interlocked Armor /
Plenum Rated
TC19TP2-1

3.0 TUBE CABLE CHARACTERISTICS

3.1 Performance

Property	Specification
Operation Temperature Range	-20°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 in multi-tube configurations is marked every two inches with a tube designation number (1 through 19).

In accordance with UL requirements, the outside surface of each cable jacket, under the armoring, is marked every two (2) feet with the following product identification information:

'Phone receiver' SEL FutureFLEX® (SEL Part No.) Type OFNP (UL) c(UL) E146200 Field Assembled Optical Fiber Cable CSA 238147 OFN FT6-(Manufacturing Lot #-) (Sequential footage) 1-877-356-FLEX WWW.FUTUREFLEX.COM ←

3.3 Reel Markings

The outside of each reel 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 Standard Reel Lengths

Sumitomo Part No.	Std Reel Length (ft)	Std Reel H x W (in)	Standard Drum Diameter (in)	Std Reel Weight (lbs) Empty	Std Reel Weight (lbs) Full
TC02TP2-1	1000	60 x 42	40	420	1490
TC04TP2-1	1000	60 x 42	40	420	1590
TC07TP2-1	1000	60 x 42	40	420	1790
TC19TP2-1	1000	60 x 42	40	420	2440

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

4.0 BLOWING PERFORMANCE / TESTING

Each finished tube cable on its reel is required to pass a 4.5mm 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.
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.