



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

SUMITOMO PRODUCT SPECIFICATION

FutureFLEX[®]

**TC01TBX, TC01TCX, TC01TGX, TC01TXX and TC01T6M
FIRE AND NON-FIRE RETARDANT TUBES**



SUMITOMO ELECTRIC LIGHTWAVE CORP.
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1.0 GENERAL

This specification covers the design requirements and performance standards for FutureFLEX® Air-Blown Fiber® (ABF) non-flame-retardant, unjacketed single tubes. These tubes are designed for indoor single tube drops where fire rating is unnecessary. 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 Description

Sumitomo's FutureFLEX® TC01TBX, TC01TCX TC01TGX and TC01TXX tubes are designed for use in ABF cabling systems to: 1) interconnect jacketed tube cables, or 2) provide an optical fiber tube infrastructure in indoor ABF applications that do not require fire rating (i.e.: inside rigid steel conduit). The tubes are made of a High Density Polyethylene (HDPE) with the exception of TC01TGX which is made of Polyethylene (PE) and is a Fire Retardant, General Use (OFNG)/(OFN) rated tube. All Tubes have a 6mm inside diameter and 8mm outside diameter. These tubes are pulled or placed in indoor routes for the purpose of individual tube interconnection to establish pathways for FutureFLEX® fiber bundle installation.

Sumitomo's FutureFLEX® TC01T6M tube is designed for use in routing all fiber bundle types, (Section 2.1) in Equipment Rack Wire Management Systems to provide for a neat, organized, and protected installation. These tubes are made of a clear Fluorinated Ethylene Propylene (FEP) and have a 4.25mm inside diameter and 6mm outside diameter. The intended use of the TC01T6M tubes is to protect FutureFLEX® fiber bundles for the last few (1 - to - 6) feet prior to entry into a Fiber Termination Unit (FTU). TC01T6M tubes are used with an 8mm-to-6mm Reducing Coupling (SEL P/N DE06RC See Section 2.3). The Reducing Coupling and an appropriate length of TC01T6M tubing are carefully slid over the ABF fiber bundle. Final installation is achieved when the Reducing Coupling is connected to a standard 8mm tube. TC01T6M is **not** to be used for blowing operations.

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 DESIGN

2.1 General

Sumitomo’s FutureFLEX® TBX, TCX, TGX, TXX and T6M tubes provide a small diameter indoor 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 or 72 fiber strand counts. 72 strands apply to Single-mode PVS bundles only. One fiber bundle can be field-installed in each tube. (Refer SEL Drawing: SD-F04-011)

2.2 Construction

SEL Part Number	Product Description	Outside Diameter (in.)	Inside Diameter (in.)	Max. Weight (lbs./kft.)	Max. Tensile Load (lbs.)
TC01TBX	Single, black, unjacketed, HDPE tube	0.315 (8mm)	0.236 (6mm)	14	60
TC01TCX	Single, Clear / Transparent Unjacketed FEP tube	0.315 (8mm)	0.236 (6mm)	32	60
TC01TGX	Single, Black, Fire Retardant (PE) OFN Tube	0.315 (8mm)	0.236 (6mm)	17	60
TC01TXX	Single, semi-transparent / white, unjacketed, HDPE tube	0.315 (8mm)	0.236 (6mm)	14	60
TC01T6M	Single, Clear / Transparent Unjacketed FEP tube	0.236 (6mm)	0.167 (4.25mm)	24	35

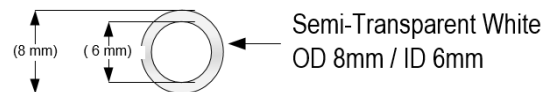
Drawing Not to Scale



TC01TBX

FutureFLEX - SINGLE

NON-FIRE RETARDANT (HDPE) TUBE

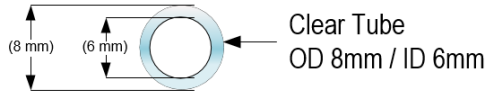


TC01TXX

FutureFLEX - SINGLE

NON-FIRE RETARDANT (HDPE) TUBE

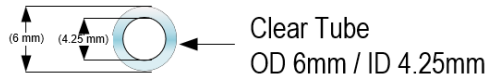
Drawings Not to Scale



TC01TCX
FutureFLEX - SINGLE
NON-FIRE RETARDANT (FEP) TUBE

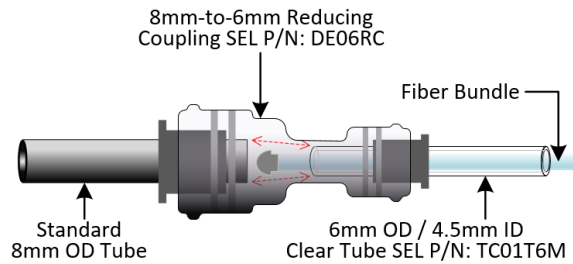


TC01TGX
FutureFLEX – SINGLE (PE) TUBE
FIRE RETARDANT - (OFN) Rated



TC01T6M
FutureFLEX - SINGLE
NON-FIRE RETARDANT (FEP) TUBE

2.3 Reducing Coupling - (DE06RC)



Not to Scale
(Refer Section 1.1)


3.0 TUBE CHARACTERISTICS

3.1 Performance

Property	Specification
Operation Temperature Range	-4°F to +158°F (-20°C to +70° C) (ICEA 596)
Minimum Bend Radius for 8mm OD Single Tubes	9" radius
Minimum Bend Radius for 6mm OD Single Tubes	2.5" radius

3.2 Tube Markings

The outside surface of each TBX, TCX, TGX and TXX tube is marked every two (2) feet with the following product identification information: The outside surface of the TC01T6M tube does **not** have any markings.

 **SEL FutureFLEX® TC01TXX Air-Blown Fiber, A-(Lot #-1, -2, -3, etc.) (Sequential Footage)**
1-877-356-FLEX WWW.SUMITOMOELECTRICLIGHTWAVE.COM←

3.3 Reel Markings

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

3.4 Tube Ends

Both ends of the tube are accessible on the reel. Each tube is sealed with a plastic cap or plug.

3.5 Tube Reel Data

SEL Part-No.	Reel Length (feet)	Reel F x W (inches)	Min Drum Diameter (in)	Empty Reel (lbs.)	Full Reel (lbs.)	Tube Weight (lbs. per Kft./Mtr.)
TC01TBX	1000	30 x 13.5	12	24	38	Kft. - 14lbs. Mtr. - 0.0233lb.
TC01TBX	3000	30 x 13.5	12	24	66	
TC01TXX	500	17 x 8	5	1	8	Kft. - 14lbs. Mtr. - 0.0233lb.
TC01TXX	3000	28 x 18	20	18	60	
TC01TCX	1000	30 x 13.5	12	24	56	Kft. - 32lbs. Mtr. - 0.0476lb.
TC01TCX	3000	30 x 13.5	12	24	120	
TC01TGX	1000	28 x 18	20	18	35	Kft. - 17lbs. Mtr. - 0.0251lb.
TC01TGX	3000	28 x 18	20	18	69	
TC01T6M	500	30 x 14	12	27	39	24lbs. / 0.0348lb.

Notes:

- All Reel Length tolerances are $\pm 5\%$.
- Cut Lengths are available. Contact FutureFLEX® Distributor for additional information.
- If tube cable is re-spoiled, 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.
- The material used to construct FEP Tubes - (TCX & T6M) adds more than 50% increased weight when compared to the PE / HDPE - (TBX, TGX & TXX) constructed tube weights.

4.0 TESTING

Each finished TBX, TCX, TGX, TXX tube is required to pass a 5mm diameter ball from end to end using 70 psi (+/-10 psi) gas pressure. The T6M requires a smaller 3mm diameter to pass this test.

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.