



# FP-301 Tubing

Flexible Polyolefin

## Data Sheet

### Product Description

3M™ FP-301 Tubing offers an outstanding balance of electrical, physical and chemical properties for a wide variety of industrial and military applications. Rated for 135°C continuous operation, all FP-301 Tubing is split resistant, mechanically tough, easily marked and resists cold flow.

FP-301 Tubing meets MIL-DTL-23053/5 Class 1 & 2 and AMS-3636, AMS-3637 requirements. It is UL Recognized and CSA Certified at 600 volts @ 125°C (UL File Nos. E-39100 and E-69751; CSANo. 38227).

FP-301 Tubing is rated for continuous operation from –55°C (–67°F) to 135°C (275°F) and withstands elevated temperatures to 300°C (572°F) for short periods. Minimum shrink temperature for all FP-301 Tubing is 100°C (212°F).

### Typical Applications

FP-301 Tubing is typically used as a shrink-fit electrical insulation over cable splices and terminations. It is also used for lightweight wire harness covering, wire marking, wire bundling, component packaging and fire-resistant covering.

### Shrink Ratio

FP-301 polyolefin tubing has a 2:1 shrink ratio. When freely recovered, the tubing will shrink to 50% of its as-supplied internal diameter. The recovered wall thickness of the tubing is proportional to the degree of recovery.

High expansion-ratio FP-301 Tubing meeting MIL-DTL-23053/5 Class 1 requirements for overexpansion is available subject to factory quotation.

### Standard Colors

FP-301, Class 1 (flame retardant)—black, white, red, blue, green (1/16 "-1" green only) and yellow. FP-301, Class 2 (non-flame retardant)—clear. Other colors available subject to factory quotation.

### Standard Packaging

Four-foot lengths, large spools (21" diameter) and small spools (8-1/2" diameter).

### Ordering Information

Order FP-301 by product name, size equivalent to expanded inside diameter, package type and color. Always order the largest size that will shrink snugly over the item to be covered.

Example: FP-301, 1/4", 4 ft., white.

### Standard Sizes and Dimensions

Ordering Size	Expanded ID Minimum		Recoverd ID Maximum		Recoverd Wall Thickness (Nominal)	
	in.	(mm)	in.	(mm)	in.	(mm)
3/64	.046	(1,17)	.023	(0,58)	.016	(0,41)
1/16	.063	(1,60)	.031	(0,79)	.017	(0,43)
3/32	.093	(2,36)	.046	(1,17)	.020	(0,51)
1/8	.125	(3,18)	.062	(1,57)	.020	(0,51)
3/16	.187	(4,75)	.093	(2,36)	.020	(0,51)
1/4	.250	(6,35)	.125	(3,18)	.025	(0,64)
3/8	.375	(9,53)	.187	(4,75)	.025	(0,64)
1/2	.500	(12,70)	.250	(6,35)	.025	(0,64)
3/4	.750	(19,05)	.375	(9,53)	.030	(0,76)
1	1.000	(25,40)	.500	(12,70)	.035	(0,89)
1-1/2	1.500	(38,10)	.750	(19,05)	.040	(1,02)
2	2.000	(50,80)	1.000	(25,40)	.045	(1,14)
3	3.000	(76,20)	1.500	(38,10)	.050	(1,27)
4	4.000	(101,60)	2.000	(50,80)	.055	(1,40)

### Typical Properties

#### Applicable Specification

**MIL-DTL-23053/5, Class 1, 2; AMS-3636, AMS-3637; UL File E-39100, E-69751; CSALR38227; ABS**

#### Physical

Tensile Strength 2400 PSI  
Ultimate Elongation 400%  
Longitudinal Change ±5%  
Secant Modulus (2%) 13,000 PSI  
Specific Gravity 1.3 (Black)  
.93 (Clear)  
Heat Aging (336 hrs. @ 175°C) Elongation 175%  
Heat Shock (4 hrs. @ 250°C) No dripping, cracking, passes mandrel wrap test  
Low Temperature Flexibility (4 hrs. @ –55°C) No cracking  
Flammability Self-extinguish meets UL 224  
All-Tubing Flame Test (Class 1 only)

#### Electrical

Dielectric Strength 900 V/mil  
Volume Resistivity 10<sup>15</sup> ohm-cm

#### Chemical

Corrosive Effect Non-corrosive  
Solvent Resistance Tensile Strength 1000 PSI  
Dielectric Strength 400 V/mil  
Water Absorption 0.2%  
Fungus Resistance Non-nutrient

Technical information provided consists of typical product data and should not be used for specification purposes. Unless otherwise noted, all tests are performed at room temperature.

**Limited Warranty** – 3M expressly warrants that for a period of ninety days from the date of purchase, 3M static control products will be free of defects in materials (parts) and workmanship (labor). Defects occurring during the warranty period will be repaired or products will be replaced at 3M's option and expense, if 3M receives notice during the warranty period. Defective products must be returned to 3M with proof of purchase date.

**Warranty Exclusions** – THE FOREGOING EXPRESS WARRANTY IS MADE IN LIEU OF ALL OTHER PRODUCT WARRANTIES, EXPRESS AND IMPLIED, INCLUDING FITNESS AND MERCHANTABILITY. The express warranty will not apply to defects or damage due to accidents, neglect, misuse, alterations, operator error, or failure to properly maintain, clean, or repair products.

**Limit of Liability** – In no event will 3M or Seller be responsible or liable for special, incidental, or consequential losses or damages, whether based in tort or contract. Fulfillment of 3M's warranty obligations will be Customer's exclusive remedy and 3M's and Seller's limit of liability for any breach of warranty or otherwise.

**For your nearest distributor or to order, call 1-800-328-1368**

**3M Electrical Specialties Division**

6801 River Place Blvd.  
Austin, TX 78726-9000

© 3M March 1997