

# 3M<sup>TM</sup> Heat Shrink Tubing FP-301

## Flexible Polyolefin

Data Sheet

November 2008

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### Description

3M<sup>TM</sup> Heat Shrink Tubing FP-301 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 is rated for continuous operation at -55°C (-67°F) to 135°C (275°F), and is designed to withstand elevated temperatures to 300°C (572°F) for short periods. Minimum shrink temperature for all FP-301 tubing is 100°C (212°F).

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### Agency Approvals, Self Certifications, MIL Specs

Meets requirements of:

- SAE-AMS-DTL-23053/5, Class 1, Class 2 (Clear)
- AMS-3636, AMS-3637
- UL Recognized, File E-39100, at 600 volts maximum @ 125°C
- CSA Certified, CSA LR38227, at 600 volts maximum @ 125°C
- ABS

**\*Formerly MIL-I-23053/5 and MIL-DTL-23053/5**

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### 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.

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## Typical Properties

Data is not for specifications. Values are typical and should not be considered minimum or maximum. Properties measured at room temperature 73° F (~23° C) unless otherwise stated.

### Physical

Property	Typical Value US units (metric)
<b>Tensile Strength</b>	2400 psi
<b>Elongation (% at break)</b>	400%
<b>Longitudinal change</b>	±5%
<b>Specific Gravity</b>	1.3 (Opaque) .93 (Clear)
<b>Operating Temperature</b>	-67° to 275°F (-55° to +135°C)
<b>Shrink Temperature (minimum)</b>	212°F (100°C)
<b>Heat Aging (336 hrs. @ 175° C)</b>	Elongation 175%
<b>Heat shock (4 hrs. @ 250° C)</b>	No dripping, flowing, cracking, passes mandrel wrap test
<b>Low Temperature Flexibility (4 hrs @ -55° C)</b>	No cracking
<b>Scant Modules (2%)</b>	13,000 psi
<b>Flammability</b> Self-extinguish, Meets UL 224 All-Tubing Flame Test (Except Clear)	Pass

### Electrical

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

### Chemical

Property	Typical Value
<b>Corrosive Resistance</b>	Non-corrosive
<b>Solvent Resistance</b>	Excellent
<b>Water Absorption</b>	0.2%
<b>Fungus Resistance</b>	Non-nutrient

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**Standard Sizes and Dimensions**

Ordering Size	Expanded I.D. (Minimum)		Recovered I.D. (Maximum)		Recovered 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)

**Shrink Ratio**

3M™ Heat Shrink Tubing FP-301 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 is proportional to the degree of recovery.

**Shelf Life & Storage**

This product has a 10-year shelf life from date of manufacture when stored in a humidity controlled storage (50°F/10°C to 80°F/27°C and <75% relative humidity).

**Availability**

**Standard Packaging:**

Four-foot lengths, large spools (21" diameter) and small spools (8½" diameter).

**Standard Colors:**

FP-301 tubing, Class 1 (flame retardant) – black, white, red, blue, green (3/64" – 1" green only) and yellow.

FP-301 tubing, Class 2 (non-flame retardant) –clear.

\*Other colors available are subject to factory quotation.

For availability, please contact your local distributor. Names and addresses are available from [3M.com/electrical](http://3M.com/electrical) [Where to Buy], or call 1-800-676-8381.

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### Electrical Markets Division

6801 River Place Blvd.  
Austin, TX 78726-9000  
800 676 8381  
FAX 800 828 0329  
[www.3M.com/oem](http://www.3M.com/oem)

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