

3M™ Heat Shrink Tubing FP-301

Flexible, Polyolefin

Data Sheet

May 2017

Description	<p>3M™ Heat Shrink Tubing 3M FP-301 offers an excellent balance of electrical, physical and chemical properties for a wide variety of industrial and military applications. Rated for 135°C continuous operation, all 3M FP-301 tubing is split resistant, mechanically tough, easily marked and resists cold flow.</p> <p>3M 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 3M FP-301 tubing is 100°C (212°F).</p>
Agency Approvals & Self Certifications	<p>Meets requirements of:</p> <ul style="list-style-type: none">• 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 <p>*Formerly MIL-I-23053/5 and MIL-DTL-23053/5</p> <p>For RoHS information, please visit www.3M.com/ROHS</p>
Applications	<p>3M 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.</p>
Shrink Ratio	<p>3M FP-301 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 is proportional to the degree of recovery.</p>

3M™ Heat Shrink Tubing FP-301

Standard Sizes and Dimensions

Ordering Size (Nominal)	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)

3M™ Heat Shrink Tubing FP-301

Typical Properties

Not for specifications. Values are typical, not to be considered minimum or maximum. Properties measured at room temperature 73°F (23°C) unless otherwise stated.

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

Electrical Property (Test Method)	Typical Value
Dielectric Strength	900 V/mil
Volume Resistivity	10 ¹⁵ ohm/cm

Chemical Property (Test Method)	Typical Value
Corrosion Resistance (Copper mirror)	Non-corrosive
Fungus Resistance	Non-nutrient
Water Absorption	0.2%
Solvent Resistance	Excellent

Standard Colors

Black, Clear

Also available in Blue, Green, Red, White and Yellow. Price, MOQ and Lead Time will vary for these colors. Please contact Local Sales Representative or Customer Service Representative for more information.

NOTE: The clear tubing is not flame retardant or UL listed.

3M™ Heat Shrink Tubing FP-301

Shelf Life & Storage

3M™ Heat Shrink Tubing FP-301 has a 10-year shelf life from date of manufacture when stored in a humidity controlled storage (10°C/50°F to 27°C/80°F and <75% relative humidity).

Availability**Standard Packaging**

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

Please contact your local distributor; available from 3M.com/oem [Where to Buy] or call 1-800-676-8381.

3M is a trademark of 3M Company.

Important Notice

All statements, technical information, and recommendations related to 3M's products are based on information believed to be reliable, but the accuracy or completeness is not guaranteed. Before using this product, you must evaluate it and determine if it is suitable for your intended application. You assume all risks and liability associated with such use. Any statements related to the product, which are not contained in 3M's current publications, or any contrary statements contained on your purchase order, shall have no force or effect unless expressly agreed upon, in writing, by an authorized officer of 3M.

Warranty; Limited Remedy; Limited Liability

This product will be free from defects in material and manufacture at the time of purchase. **3M MAKES NO OTHER WARRANTIES INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.** If this product is defective within the warranty period stated above, your exclusive remedy shall be, at 3M's option, to replace or repair the 3M product or refund the purchase price of the 3M product. **Except where prohibited by law, 3M will not be liable for any direct, indirect, special, incidental or consequential loss or damage arising from this 3M product, regardless of the legal theory asserted.**



Electrical Markets Division
6801 River Place Blvd.
Austin, TX 78726-9000
800 676.8381
FAX: 800 828 9329
www.3M.com/oem

Please recycle
© 3M 2017 All rights reserved
78-8131-7399-0 D

3M™ Heat Shrink Tubing FP-301

Flexible, Polyolefin

Data Sheet

May 2017

Description	<p>3M™ Heat Shrink Tubing 3M FP-301 offers an excellent balance of electrical, physical and chemical properties for a wide variety of industrial and military applications. Rated for 135°C continuous operation, all 3M FP-301 tubing is split resistant, mechanically tough, easily marked and resists cold flow.</p> <p>3M 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 3M FP-301 tubing is 100°C (212°F).</p>
Agency Approvals & Self Certifications	<p>Meets requirements of:</p> <ul style="list-style-type: none">• 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 <p>*Formerly MIL-I-23053/5 and MIL-DTL-23053/5</p> <p>For RoHS information, please visit www.3M.com/ROHS</p>
Applications	<p>3M 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.</p>
Shrink Ratio	<p>3M FP-301 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 is proportional to the degree of recovery.</p>

3M™ Heat Shrink Tubing FP-301

Standard Sizes and Dimensions

Ordering Size (Nominal)	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)

3M™ Heat Shrink Tubing FP-301

Typical Properties

Not for specifications. Values are typical, not to be considered minimum or maximum. Properties measured at room temperature 73°F (23°C) unless otherwise stated.

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

Electrical Property (Test Method)	Typical Value
Dielectric Strength	900 V/mil
Volume Resistivity	10 ¹⁵ ohm/cm

Chemical Property (Test Method)	Typical Value
Corrosion Resistance (Copper mirror)	Non-corrosive
Fungus Resistance	Non-nutrient
Water Absorption	0.2%
Solvent Resistance	Excellent

Standard Colors

Black, Clear

Also available in Blue, Green, Red, White and Yellow. Price, MOQ and Lead Time will vary for these colors. Please contact Local Sales Representative or Customer Service Representative for more information.

NOTE: The clear tubing is not flame retardant or UL listed.

3M™ Heat Shrink Tubing FP-301

Shelf Life & Storage	3M™ Heat Shrink Tubing FP-301 has a 10-year shelf life from date of manufacture when stored in a humidity controlled storage (10°C/50°F to 27°C/80°F and <75% relative humidity).
Availability	Standard Packaging Four-foot lengths, large spools (21" diameter) and small spools (8½" diameter). Please contact your local distributor; available from 3M.com/oem [Where to Buy] or call 1-800-676-8381.

3M is a trademark of 3M Company.

Important Notice	All statements, technical information, and recommendations related to 3M's products are based on information believed to be reliable, but the accuracy or completeness is not guaranteed. Before using this product, you must evaluate it and determine if it is suitable for your intended application. You assume all risks and liability associated with such use. Any statements related to the product, which are not contained in 3M's current publications, or any contrary statements contained on your purchase order, shall have no force or effect unless expressly agreed upon, in writing, by an authorized officer of 3M.
Warranty; Limited Remedy; Limited Liability	This product will be free from defects in material and manufacture at the time of purchase. 3M MAKES NO OTHER WARRANTIES INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. If this product is defective within the warranty period stated above, your exclusive remedy shall be, at 3M's option, to replace or repair the 3M product or refund the purchase price of the 3M product. Except where prohibited by law, 3M will not be liable for any direct, indirect, special, incidental or consequential loss or damage arising from this 3M product, regardless of the legal theory asserted.

3M
Electrical Markets Division
6801 River Place Blvd.
Austin, TX 78726-9000
800 676.8381
FAX: 800 828 9329
www.3M.com/oem

Please recycle
© 3M 2017 All rights reserved
78-8131-7399-0 D