Electrical Markets
3M™ Heat Shrink Tubing
Product Selection Guide

Protect your Connection

3M

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Product	Material/Typical Applications	Operating Temperature Range	Shrink Temp. (Min.)	Shrink Ratio	Standard Sizes Expanded Diameter	Dielectric Strength (V/mil)	Volume Resistivity (ohm-cm)	Tensile Strength (PSI)
Single-Wall Polyolefin Tubing								
FP-301	**Flexible Polyolefin** General purpose flame retardant insulation for UL, CSA and MIL-DTL-23053/5 applications; cable and component covering. Class 1 = opaque colors; Class 2 = clear.	–55°C to +135°C	212°F 100°C	2:1	3/64" to 4"	900	10^{15}	2400
FP-301VW	**Highly Flame-Retardant, Flexible Polyolefin** Insulation applications, flame-retardant applications requiring UL VW-1 and CSA OFT, fire-resistant wiring.	–55°C to +135°C	212°F 100°C	2:1	3/64" to 4"	900	10^{15}	2400
VFP-876	**Very Flexible Polyolefin** Terminal insulation, low shrink-temperature applications.	–55°C to +135°C	212°F 100°C	2:1	3/64" to 2"	800	10^{14}	2100
SFTW-203	**Very Flexible Polyolefin** Shrink-fit jacketing and insulation of flexible wire bundles and temperature-sensitive components.	–55°C to +135°C	212°F 100°C	3:1	1/16" to 1 1/2"	700	10^{15}	2600
Adhesive-Lined, Polyolefin Tubing								
MW	**Multiple Wall Polyolefin** Insulation, strain relief and sealing of electrical connections, wire splices and components.	–55°C to +110°C	275°F 135°C	2.5:1	1/8" to 1"	900	10^{15}	2200
EPS-200	**Environmental Protection Sleeve** Insulation, strain relief and environmental protection of electrical wire bundles and components.	–55°C to +110°C	250°F 121°C	2:1	1/8" to 2"	800	10^{14}	2100
EPS-300	**Environmental Protection Sleeve** Insulation, strain relief and environmental protection for automotive and marine wire bundles and splices.	–55°C to +110°C	250°F 121°C	3:1	1/8" to 1-1/2"	700	10^{14}	2100
EPS-400	**Environmental Protection Sleeve** Insulation, strain relief and environmental protection for sealing voids in multiple wire bundles for automotive and marine applications.	–55°C to +110°C	250°F 121°C	4:1	.300" to .700"	700	10^{14}	1900
TMW	**Semi-Rigid Multiple Wall Terminal Protection Sleeve** Insulation, strain relief and environmental protection. Uses include the manufacture of heat shrink butt connectors, ring terminals and fork terminals.	–55°C to +110°C	275°F 135°C		.183" to .330"	900	10^{14}	2500
TES **SMS**	All-Weather, Heat-Shrinkable, Dual Wall, Polyolefin Tubing for Automotive Wire Harnesses.	–55°C to +110°C	250°F 121°C	4:1 4:1	.220" to .700"	500	10^{14}	2450 1900
Special Purpose Tubing								
MFP	**Polyvinylidene Fluoride** Heat-resistant transparent insulation and marking for electronic and appliance applications.	–55°C to 175°C	347°F 175°C	2:1	3/64" to 2"	900	10^{14}	5500
NST	**Modified Neoprene** Insulation and abrasion resistant covering of wiring and cable harnesses. Oil resistant coverings.	–70°C to +121°C	275°F 135°C	2:1	1/8" to 3"	800	10^{12}	2100
VTN-200	**Fluoroelastomer** Synthetic fuel and hydraulic oil resistant applications, high-temperature coverings.	–55°C to +200°C	347°F 175°C	2:1	1/8" to 2"	500	10^{12}	2400
PSTH	**Flexible Elastomeric Polyester** Designed for harsh operating conditions.	–55°C to +150°C	338°F 170°C	2:1	3/16" to 2 1/2"	500	10^{14}	2200
Heavy-Duty Tubing								
MDT	**Medium-Duty** Excellent abrasion, corrosion and environmental protection. Flame retardant.	–55°C to +110°C	250°F 121°C	3:1	.400" to 4.30"	500	10^{14}	2400
HDT	**Heavy-Duty** Fabricated from specially formulated cross-linked polyolefin, assuring long-term environmental protection. Highly chemical, abrasion and split resistant.	–55°C to +110°C	250°F 121°C	3:1	.300" to 7.00"	500	10^{14}	2400
BBI	**Bus Bar Tubing**, Designed for insulating rectangular, square, or round bus bar rated 5 kV through 35 kV.	–55°C to +110°C	250°F 121°C		2.38" to 10.28"	550	10^{13}	2200

Note: The materials are rated on a scale of 1–10 for flexibility:
1 = most flexible and 10 = most rigid.
*Material characteristics only.

Ultimate Elongation (%)	Longitudinal Change (± %)	Specific Gravity	Flammability	Corrosive Effect	Abrasion Resistance	Flexibility (see note below)	Fuel & Oil Resistance	Solvent Resistance	Resistance To Acids and Alkalis	Applicable Specifications
400	5	1.3	Self-Extinguish meets UL 224 All-Tubing Flame Test (except clear)	Non-Corrosive	Good	3	Good	Exc.	Exc.	SAE-AMS-DTL-23053/5*, Class 1, 2; UL File E-39100; CSA LR38227; ABS
400	+1, –10	1.5	Self-Extinguish meets UL 224 VW-1 Test	Non-Corrosive	Good	3	Good	Exc.	Exc.	SAE-AMS-DTL-23053/5*, Class 3; UL File E-39100, VW-1; CSA LR38227, OFT
450	5	1.3	Self-Extinguish meets UL 224 All-Tubing Flame Test	Non-Corrosive	Good	2	Good	Exc.	Exc.	SAE-AMS-DTL-23053/5*, Class 1; UL File E-39100; CSA LR38227
400	5	1.29	Self-Extinguish	Non-Corrosive	Good	3	Good	Good	Exc.	UL File E-48398; CSA LR38227 Meets functional requirements of SAE-AMS-DTL-28053/5, Class 1,3
400	+1, –10	1.0	Non-Flame Retardant	Non-Corrosive	Good	7	Good	Good	Exc.	SAE-AMS-DTL-23053/4*, Class 1; UL File E-157227; CSA LR38227
450	+1, –5	1.3	Self-Extinguish meets UL 224 All-Tubing Flame Test (jacket)	Non-Corrosive	Good	3	Good	Good	Exc.	SAE-AMS-DTL-23053/4*, Class 2; UL File E-39100; CSA LR38227
450	+1, –15	1.3	Self-Extinguish meets UL 224 All-Tubing Flame Test (jacket)	Non-Corrosive	Good	3	Good	Good	Exc.	UL File E-157227; ABS; CSA LR38227
400	+1, –10	1.25	Self-Extinguish	Non-Corrosive	Good	7	Good	Good	Exc.	UL File E-157227; CSA LR38227
400	+1, –10	1.0	Non-Flame Retardant	Non-Corrosive	Good	7	Good	Good	Exc.	UL File E-157227; CSA LR38227
450 350	+0, -10 +0, -10	0.97 1.25	TES Non-Flame Retardant SMS Self-Extinguish	Non-Corrosive Non-Corrosive	Good Good	TES 5 SMS 3	Good Good	Good Good	Exc. Exc.	ESB-M99D56-Ford MS-DB56-Chrysler
350	+1, –10	1.7	Self-Extinguish meets UL 224 VW-1 Test	Non-Corrosive	Exc.	10	Exc.	Exc.	Exc.	Meets performance claims of SAE-AMS-DTL-23053/18*, Class 1; SAE-AMS-DTL-23053/8*; UL File E-39100, VW-1, CSA LR38227 OFT
500	+1, –10	1.3	Self-Extinguish	Non-Corrosive	Exc.	1	Exc.	Good	Exc.	SAE-AMS-DTL-23053/1*, Class 1, 2; UL File E-39100; SC-X-15112
450	+1, –10	1.7	Self-Extinguish	Non-Corrosive	Exc.	4	Exc.	Exc.	Exc.	SAE-AMS-DTL-23053/13*
350	+2, –8	1.6	Self-Extinguish	Non-Corrosive	Exc.	4	Exc.	Exc.	Exc.	SC-X15111C; meets the functional requirements of SAE-AMS-DTL-23053/16*
475	+1, –10	1.28	Self-Extinguish	Non-Corrosive	Good	8	Good	Good	Exc.	SAE-AMS-DTL-23053/15*, Class 2; ABS
475	+1, –10	1.28	Self-Extinguish	Non-Corrosive	Good	9	Good	Good	Exc.	SAE-AMS-DTL-23053/15*, Class 1; ABS
575	+0, –10	1.20	Self-Extinguish	Non-Corrosive	Good	8	Good	Good	Exc.	ASTM-D-257, 149, 150, 2303; IEC 216; ANSI/IEEE Std C37.20

*Formerly MIL+23053 and MIL-DTL-23058 for sheet number noted after slash mark.

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.

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