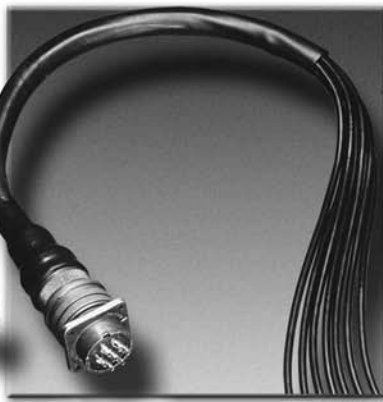
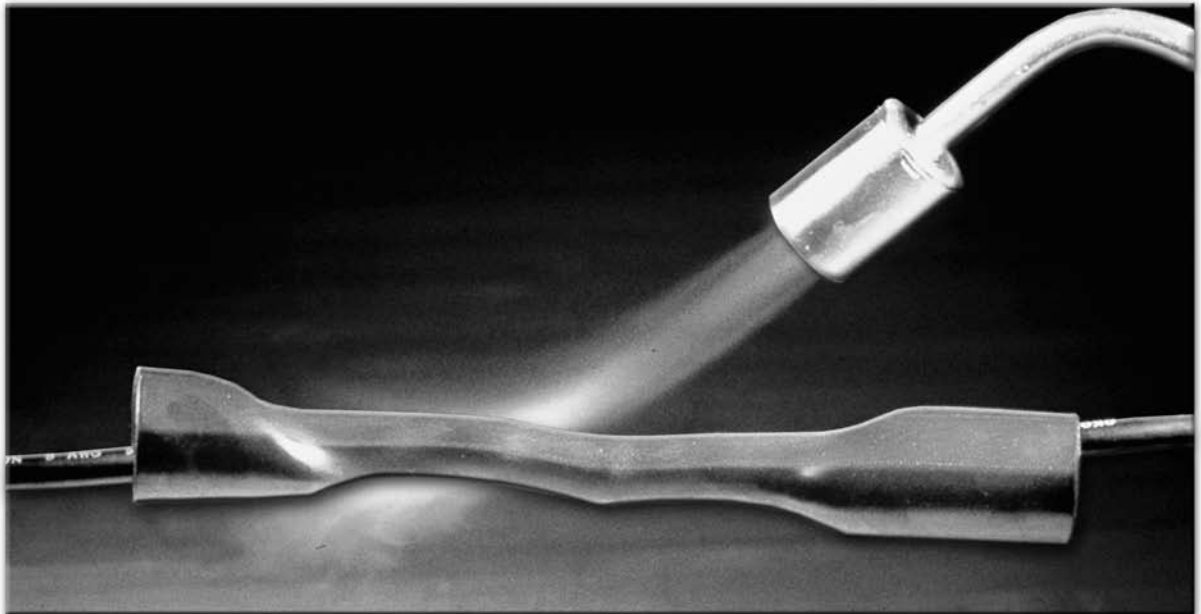


3M

Heat Shrink Tubing Selection Guide

HEAT SHRINK TUBING



3M™ Heat Shrink Tubing Selection Guide

| 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 |
| SFTW-202 GYS | Green and Yellow Striped. 2:1 very flexible polyolefin, primarily used for ground wire identification. | -55°C to +135°C | 212°F 100°C | 2:1 | 1/8" to 3/4" | 700 | 10 ¹⁴ | 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 | | | | | | | | |
| KYNAR® | Polyvinylidene Fluoride Heat-resistant transparent insulation to and marking for electronic and appliance applications. | -55°C to +175°C | 347°F 175°C | 2:1 to 2" | 3/64" | 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 |
| CCT | Adhesive-lined, 3:1 flexible polyolefin for sealing and insulating CATV connections. | -55°C to +110°C | 250°F 121°C | 3:1 | .400" to 3.00" | 500 | 10 ¹⁴ | 2000 |
| 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 |

| 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. | AMS-DTL-23053/5*, Class 1, 2; AMS-3636 & 3637; 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. | 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. | 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. | AMS-DTL-23053/5*, Class 1; UL File E-48398; CSA LR38227 |
| 400 | 5 | 1.29 | Self-Extinguish | Non-Corrosive | Good | 3 | Good | Good | Exc. | AMS-DTL-23053/5*, Class 1; UL File E-48398; CSA LR38227 |
| 400 | +1, -10 | 1.0 | Non-Flame Retardant | Non-Corrosive | Good | 7 | Good | Good | Exc. | AMS-DTL-23053/4*, Class 1; AMS-3634; UL File E-157227 |
| 450 | +1, -5 | 1.3 | Self-Extinguish meets UL 224 All-Tubing Flame Test (jacket) | Non-Corrosive | Good | 3 | Good | Good | Exc. | AMS-DTL-23053/4*, Class 2; UL File E-39100 |
| 450 | +1, -15 | 1.3 | Self-Extinguish meets UL 224 All-Tubing Flame Test (jacket) | Non-Corrosive | Good | 3 | Good | Good | Exc. | AMS-DTL-23053/4*, Class 3; UL File E-157227; ABS |
| 400 | +1, -10 | 1.25 | Self-Extinguish | Non-Corrosive | Good | 7 | Good | Good | Exc. | UL File E-157227 |
| 400 | +1, -10 | 1.0 | Non-Flame Retardant | Non-Corrosive | Good | 7 | Good | Good | Exc. | UL File E-157227 |
| 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. | AMS-DTL-23053/18*, Class 1; AMS-DTL-23053/8*; AMS-3632; UL File E-39100, VW-1, CSA LR38227 OFT |
| 500 | +1, -10 | 1.3 | Self-Extinguish | Non-Corrosive | Exc. | 1 | Exc. | Good | Exc. | AMS-R-46846, Type I, Class 1; AMS-DTL-23053/11*, Class 1, 2; AMS-3623 |
| 450 | +1, -10 | 1.7 | Self-Extinguish | Non-Corrosive | Exc. | 4 | Exc. | Exc. | Exc. | AMS-R-46846, Type III, Class 1; 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 AMS-DTL-23053/16* |
| 475 | +1, -10 | 1.28 | Self-Extinguish | Non-Corrosive | Good | 8 | Good | Good | Exc. | AMS-DTL-23053/15*, Class 2; ABS |
| 475 | +1, -10 | 1.28 | Self-Extinguish | Non-Corrosive | Good | 9 | Good | Good | Exc. | AMS-DTL-23053/15*, Class 1; ABS |
| 400 | +1, -10 | 1.30 | Self-Extinguish | Non-Corrosive | Good | 8 | Good | Good | Exc. | |
| 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.

Note: The materials are rated on a scale of 1–10 for flexibility: 1 = most flexible and 10 = most rigid.
*Material characteristics only. See page 13.

For your nearest 3M distributor, or to order, see back cover.

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Please recycle. Printed in USA.
80-6109-4340-1D(06053.0)LP
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