



Highly flame-retardant, low recovery temperature, heat-shrinkable tubing

Versafit heat-shrinkable tubing is a cost-effective choice for many commercial and military applications. Versafit tubing is made from a specially formulated, crosslinked polyolefin to provide high flame-retardance (VW-1), excellent flexibility, and a low shrink temperature (to reduce installation time).

Versafit tubing performs a variety of functions in commercial and military applications:

- Electrically insulates and protects in-line components, disconnect terminals, and splices.
- Bundles wires for very flexible light-duty harnesses.
- Identifies or color-codes wires, cables, terminals, and components. Versafit tubing hot-stamps extremely well.

Compared to noncrosslinked materials, Versafit tubing has a higher temperature rating and exhibits better

thermal stability and resistance to physical abuse.

Unlike other typical flame-retardant tubings, Versafit tubing is free of polybrominated biphenyls (PBBs) and polybrominated biphenyl oxides and ethers (PBBOs/PBBEs). In Europe, these chemicals are classified as environmentally hazardous substances.

Temperature rating

| | |
|-----------------------------------|----------------|
| Full recovery temperature: | 90°C |
| Continuous operating temperature: | -55°C to 135°C |

Specifications*

| Type | Raychem | UL | CSA | Military |
|----------|---------|----------------------------|-----------------------------|------------------------------------|
| Versafit | RW-3009 | E35586 VW-1 600V, 125°C | LR31929 VW-1 600V, 125°C | AMS-DTL-23053/5 Classes 1 and 3 |

*When ordering, always specify latest issue.

Dimensions (millimeters/inches)



| Size | Inside diameter | | d (max.) | | Wall thickness | |
|-------|---------------------------|---------------|-------------------------|-------|--------------------------------|---------------|
| | D Expanded as supplied | | Recovered after heating | | W Recovered after heating** | |
| 3/64 | 1.63 ± 0.2 | 0.064 ± 0.008 | 0.6 | 0.023 | 0.40 ± 0.08 | 0.016 ± 0.003 |
| 1/16 | 1.85 ± 0.2 | 0.073 ± 0.007 | 0.8 | 0.031 | 0.43 ± 0.08 | 0.017 ± 0.003 |
| 3/32 | 2.79 ± 0.2 | 0.110 ± 0.007 | 1.2 | 0.046 | 0.51 ± 0.08 | 0.020 ± 0.003 |
| 1/8 | 3.43 ± 0.2 | 0.135 ± 0.007 | 1.6 | 0.062 | 0.51 ± 0.08 | 0.020 ± 0.003 |
| 3/16 | 5.21 ± 0.3 | 0.205 ± 0.010 | 2.4 | 0.093 | 0.51 ± 0.08 | 0.020 ± 0.003 |
| 1/4 | 7.11 ± 0.3 | 0.280 ± 0.010 | 3.2 | 0.125 | 0.64 ± 0.08 | 0.025 ± 0.003 |
| 3/8 | 10.16 ± 0.4 | 0.400 ± 0.015 | 4.8 | 0.187 | 0.64 ± 0.08 | 0.025 ± 0.003 |
| 1/2 | 13.72 ± 0.4 | 0.540 ± 0.015 | 6.4 | 0.250 | 0.64 ± 0.08 | 0.025 ± 0.003 |
| 5/8 | 16.90 ± 0.4 | 0.665 ± 0.015 | 8.0 | 0.315 | 0.76 ± 0.08 | 0.030 ± 0.003 |
| 3/4 | 20.45 ± 0.4 | 0.805 ± 0.015 | 9.5 | 0.375 | 0.76 ± 0.08 | 0.030 ± 0.003 |
| 1 | 25.53 ± 0.4 | 1.055 ± 0.015 | 12.7 | 0.500 | 0.89 ± 0.13 | 0.035 ± 0.005 |
| 1 1/4 | 33.40 ± 0.7 | 1.315 ± 0.025 | 15.9 | 0.625 | 1.02 ± 0.15 | 0.040 ± 0.006 |
| 1 1/2 | 39.88 ± 0.8 | 1.570 ± 0.030 | 19.1 | 0.750 | 1.02 ± 0.15 | 0.040 ± 0.006 |
| 2 | 52.83 ± 1.0 | 2.080 ± 0.040 | 25.4 | 1.000 | 1.14 ± 0.16 | 0.045 ± 0.007 |
| 3 | 78.49 ± 1.0 | 3.090 ± 0.040 | 38.1 | 1.500 | 1.27 ± 0.20 | 0.050 ± 0.008 |
| 4 | 104.14 ± 1.3 | 4.100 ± 0.050 | 50.8 | 2.000 | 1.40 ± 0.23 | 0.055 ± 0.009 |

**Wall thickness will be less if tubing recovery is restricted during shrinkage.

Ordering information

| | | |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------|
| Colors | Standard | Black, white, red, blue, yellow and green |
| | Nonstandard | Brown, orange, violet, and gray |
| Size selection | Always order the largest size that will shrink snugly over the component being covered. A variety of special order sizes are available. | |
| Standard packaging | On spools. | |
| Ordering description | Specify product name, size, and color; for example, Versafit 1/4-0 (0=Black). | |

Specification values

| | Property | Unit | Requirement | Method of test |
|---------------------|---------------------------------------------------------|-----------------------------|-----------------------------------------------------------------------------------------------------------------|---------------------|
| Physical | Dimensions | mm (<i>inches</i>) | See reverse | ASTM D 2671 |
| | Longitudinal change | | | |
| | ASTM D 2671 | percent | +1, -5 | ASTM D 2671 |
| | UL 224 | percent | +3, -3 | UL224 |
| | Eccentricity (recovered) | percent | 30 maximum | ASTM D 2671 |
| | Tensile strength | psi (<i>MPa</i>) | 1500 (<i>10.3</i>) minimum | ASTM D 2671 |
| | Ultimate elongation | percent | 200 minimum | ASTM D 2671 |
| | Secant modulus (expanded) | psi (<i>MPa</i>) | 2.5 X 10 ⁴ (<i>172</i>) maximum | ASTM D 2671 |
| | Low-temperature flexibility (1 hour at -45°C/-49°F) | | No cracking | UL 224 |
| | Heat shock (1 hour at 136°C/277°F) | | No cracking | UL 224 |
| | Heat resistance (7 days at 158°C/316°F) | | | ASTM D 2671 |
| | Followed by tests for: | | | |
| | Tensile strength | psi (<i>MPa</i>) | 70% minimum of unaged specimens | UL 224 |
| | Ultimate elongation | percent | 100 minimum | UL 224 |
| | Flexibility | | No cracking | UL 224 |
| | Dielectric withstand at 2500 V | seconds | 60 minimum | UL 224 |
| | Dielectric breakdown | volts | 50% minimum of unaged specimens | ASTM D 2671 |
| | Dielectric strength | volts/mil (<i>kV/mm</i>) | 500 (<i>19.7</i>) minimum | ASTM D 2671 |
| | Restricted shrinkage | | Pass | UL 224 |
| Electrical | Dielectric strength | volts/mil (<i>kV/mm</i>) | 500 (<i>19.7</i>) minimum | ASTM D 2671 |
| | Dielectric withstand at 2500 V | seconds | 60 minimum | UL 224 |
| | Volume resistivity | ohm-cm | 10 ¹⁴ minimum | ASTM D 2671 |
| Chemical | Corrosive effect (7 days at 158°C/316°F) | | No corrosion | ASTM D 2671 |
| | Copper stability (7 days at 158°C/316°F) | | No brittleness, glazing, cracking, or severe discoloration of tubing. No pitting or blackening of copper. | ASTM D 2671 |
| | Followed by test for: | | | |
| | Ultimate elongation | percent | 100 minimum | ASTM D 2671 |
| | Flammability | | Pass | UL 224, VW-1 |
| | Water absorption (recovered) (24 hours at 23°C/73°F) | percent | 0.5 maximum | ASTM D 2671 |
| | Fungus resistance | | | ISO 846 Method B |
| | Followed by tests for: | | | |
| | Tensile strength | psi (<i>MPa</i>) | 1500 (<i>10.3</i>) minimum | ASTM D 2671 |
| | Ultimate elongation | percent | 200 minimum | ASTM D 2671 |
| Dielectric strength | volts/mil (<i>kV/mm</i>) | 500 (<i>19.7</i>) minimum | ASTM D 2671 | |

Note: Consult RW-3009 for specific details about test procedures.

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Users should independently evaluate the suitability of the product for their application.

Tyco Electronics Corporation

300 Constitution Drive
Menlo Park, CA 94025-1164
USA
Tel: (800) 926-2425 (US & Canada)
Tel: +1 (650) 361-3860 (All other countries)

Faraday Road
Dorcan, Swindon, SN3 5HH
United Kingdom
Tel: +44 1793 528171

3816 Noborito, Tama-ku
Kawasaki, Kanagawa 214-8533
Japan
Tel: +81 44 900 5102

Asia Pacific Headquarters
26 Ang Mo Kio, Industrial Park 2
Singapore 569507
Tel: +65 4866 151

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Как с нами связаться

Телефон: 8 (812) 309 58 32 (многоканальный)

Факс: 8 (812) 320-02-42

Электронная почта: org@eplast1.ru

Адрес: 198099, г. Санкт-Петербург, ул. Калинина, дом 2, корпус 4, литера А.