

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



Versafit V2 heat-shrinkable tubing is a cost-effective, environmentally friendly choice for many commercial applications. V2 tubing is made from a specially formulated, crosslinked polyolefin with low recovery temperature, excellent flexibility, and high flame-retardance (VW-1).

Unlike other typical flame-retardant tubings, V2 tubing is free of polybrominated biphenyls (PBBs) and poly-brominated biphenyl oxides (PBBOs). In Europe, these chemicals

are classified as environmentally hazardous substances.

Compared to noncrosslinked materials, V2 tubing has a higher temperature rating and exhibits better thermal stability and resistance to physical abuse.

V2 tubing performs a variety of functions in commercial applications:

- Electrically insulates and protects in-line components, disconnect terminals, and splices.

- Bundles wires for very flexible light-duty harnesses.
- Strain-relieves electrical wire connections for long-term reliability.

V2 tubing offers a faster, easier, more reliable replacement for molding in place, dip coating, and tape wrapping.

V2 is UL-recognized and CSA-certified at 125°C, 600 V, with UL VW-1 and CSA OFT flame-retardancy ratings.

Temperature rating

| | |
|-----------------------------------|----------------|
| Full recovery temperature: | 90°C |
| Continuous operating temperature: | -45°C to 125°C |

Specifications*

| Type | Raychem | UL | CSA |
|----------|---------|-------------|--------------|
| Versafit | RW-3023 | E35586 VW-1 | LR31929 VW-1 |

* When ordering, always specify latest issue.

Dimensions (millimeters)



| Size | As supplied | | Fully recovered | |
|------|-------------------|--------------------------|--------------------------|---------------------------|
| | D Inside diameter | Wall thickness (nominal) | d (max.) Inside diameter | W (min.) Wall thickness** |
| 1.0 | 1.6 ± 0.2 | 0.20 | 0.50 | 0.33 |
| 1.5 | 2.1 ± 0.2 | 0.20 | 0.75 | 0.35 |
| 2.0 | 2.6 ± 0.2 | 0.25 | 1.00 | 0.43 |
| 2.5 | 3.1 ± 0.2 | 0.25 | 1.25 | 0.43 |
| 3.0 | 3.6 ± 0.2 | 0.25 | 1.50 | 0.43 |
| 3.5 | 4.1 ± 0.3 | 0.25 | 1.75 | 0.43 |
| 4.0 | 4.6 ± 0.3 | 0.25 | 2.00 | 0.43 |
| 5.0 | 5.6 ± 0.3 | 0.30 | 2.50 | 0.56 |
| 6.0 | 6.6 ± 0.3 | 0.30 | 3.00 | 0.56 |
| 7.0 | 7.6 ± 0.3 | 0.30 | 3.50 | 0.56 |
| 8.0 | 8.6 ± 0.3 | 0.30 | 4.00 | 0.56 |
| 9.0 | 9.6 ± 0.3 | 0.30 | 4.50 | 0.56 |
| 10.0 | 10.4 ± 0.3 | 0.30 | 5.00 | 0.56 |

| Size | As supplied | | Fully recovered | |
|------|-------------------|--------------------------|--------------------------|---------------------------|
| | D Inside diameter | Wall thickness (nominal) | d (max.) Inside diameter | W (min.) Wall thickness** |
| 11.0 | 11.4 ± 0.3 | 0.30 | 5.5 | 0.56 |
| 12.0 | 12.7 ± 0.3 | 0.30 | 6.0 | 0.56 |
| 13.0 | 13.5 ± 0.3 | 0.35 | 6.5 | 0.66 |
| 14.0 | 14.4 ± 0.4 | 0.35 | 7.0 | 0.68 |
| 15.0 | 15.7 ± 0.4 | 0.35 | 7.5 | 0.68 |
| 16.0 | 16.9 ± 0.4 | 0.35 | 8.0 | 0.68 |
| 18.0 | 19.0 ± 0.4 | 0.40 | 9.0 | 0.76 |
| 20.0 | 21.4 ± 0.4 | 0.40 | 10.0 | 0.76 |
| 22.0 | 23.2 ± 0.4 | 0.45 | 11.0 | 0.89 |
| 25.0 | 26.8 ± 0.4 | 0.45 | 12.5 | 0.89 |
| 27.0 | 28.2 ± 0.5 | 0.45 | 12.5 | 0.89 |
| 28.0 | 30.0 ± 0.5 | 0.45 | 14.0 | 0.89 |
| 30.0 | 32.1 ± 0.5 | 0.45 | 15.0 | 0.89 |

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

Ordering information

| | |
|----------------------|--|
| Colors | Standard Black Nonstandard Red, blue, yellow, green, white, orange, brown, violet, gray |
| Size selection | Always order the largest size that will shrink snugly over the component being covered. |
| Standard packaging | On spools |
| Marking | Marked with UL, CSA, and Japan -F- Mark legends. |
| Ordering description | Specify product name, size, and color; for example, V2 2.0-0 (0=Black). |

Specification values

| | Property | Unit | Requirement | Method of test |
|----------------------|---|----------------------------|--|---------------------|
| Physical | Dimensions | mm | See reverse | ASTM D 2671 |
| | Longitudinal change | | | |
| | ASTM D 2671 | percent | +1, -5 | ASTM D 2671 |
| | UL 224 | percent | +3, -3 | UL 224 |
| | Eccentricity (recovered) | percent | 30 maximum | ASTM D 2671 |
| | Tensile strength | MPa (<i>psi</i>) | 10.3 (1500) minimum | ASTM D 2671 |
| | Ultimate elongation | percent | 200 minimum | ASTM D 2671 |
| | Secant modulus (as supplied) | MPa (<i>psi</i>) | 172 (2.5 x 10 ⁴) maximum | ASTM D 2671 |
| | Low-temperature flexibility (1 hour at -30°C/-22°F) | | No cracking | UL 224 |
| | Heat shock (4 hours at 250°C/482°F) | | No cracking | UL 224 |
| | Heat aging (7 days at 158°C/316°F) | | | UL 224 |
| | Followed by tests for: | | | |
| | Tensile strength | MPa (<i>psi</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 | ASTM D 2671 |
| | Dielectric breakdown | volts | 50% minimum of unaged specimens | ASTM D 2671 |
| Dielectric strength | kV/mm (<i>volts/mil</i>) | 19.7 (500) minimum | ASTM D 2671 | |
| Restricted shrinkage | | Pass | UL 224 | |
| Electrical | Dielectric withstand at 2500 V | seconds | 60 minimum | ASTM D 2671 |
| | Dielectric strength | kV/mm (<i>volts/mil</i>) | 19.7 (500) minimum | ASTM D 2671 |
| | 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 | MPa (<i>psi</i>) | 10.3 (1500) minimum | ASTM D 2671 |
| Ultimate elongation | percent | 200 minimum | ASTM D 2671 | |
| Dielectric strength | kV/mm (<i>volts/mil</i>) | 19.7 (500) minimum | ASTM D 2671 | |

Note: Consult RW-3023 for specific details about test procedures.
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Users should independently evaluate the suitability of the product for their application.

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