

## 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

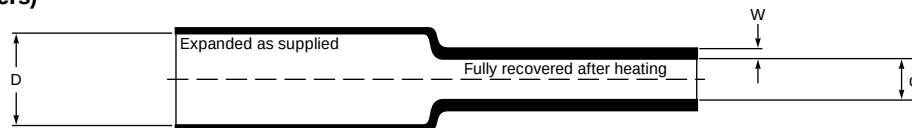
|                                   |                |
|-----------------------------------|----------------|
| Full recovery temperature:        | 90°C           |
| Continuous operating temperature: | -45°C to 125°C |

### Specifications\*

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

\* When ordering, always specify latest issue.

### Dimensions (millimeters)



| As supplied |            |           | Fully recovered |             | As supplied |            |           | Fully recovered |             |
|-------------|------------|-----------|-----------------|-------------|-------------|------------|-----------|-----------------|-------------|
|             | D          | Wall      | d (max.)        | W (min.)    |             | D          | Wall      | d (max.)        | W (min.)    |
|             | Inside     | thickness | Inside          | Wall        |             | Inside     | thickness | Inside          | Wall        |
| Size        | diameter   | (nominal) | diameter        | thickness** | Size        | diameter   | (nominal) | diameter        | thickness** |
| 1.0         | 1.6 ± 0.2  | 0.20      | 0.50            | 0.33        | 11.0        | 11.4 ± 0.3 | 0.30      | 5.5             | 0.56        |
| 1.5         | 2.1 ± 0.2  | 0.20      | 0.75            | 0.35        | 12.0        | 12.7 ± 0.3 | 0.30      | 6.0             | 0.56        |
| 2.0         | 2.6 ± 0.2  | 0.25      | 1.00            | 0.43        | 13.0        | 13.5 ± 0.3 | 0.35      | 6.5             | 0.66        |
| 2.5         | 3.1 ± 0.2  | 0.25      | 1.25            | 0.43        | 14.0        | 14.4 ± 0.4 | 0.35      | 7.0             | 0.68        |
| 3.0         | 3.6 ± 0.2  | 0.25      | 1.50            | 0.43        | 15.0        | 15.7 ± 0.4 | 0.35      | 7.5             | 0.68        |
| 3.5         | 4.1 ± 0.3  | 0.25      | 1.75            | 0.43        | 16.0        | 16.9 ± 0.4 | 0.35      | 8.0             | 0.68        |
| 4.0         | 4.6 ± 0.3  | 0.25      | 2.00            | 0.43        | 18.0        | 19.0 ± 0.4 | 0.40      | 9.0             | 0.76        |
| 5.0         | 5.6 ± 0.3  | 0.30      | 2.50            | 0.56        | 20.0        | 21.4 ± 0.4 | 0.40      | 10.0            | 0.76        |
| 6.0         | 6.6 ± 0.3  | 0.30      | 3.00            | 0.56        | 22.0        | 23.2 ± 0.4 | 0.45      | 11.0            | 0.89        |
| 7.0         | 7.6 ± 0.3  | 0.30      | 3.50            | 0.56        | 25.0        | 26.8 ± 0.4 | 0.45      | 12.5            | 0.89        |
| 8.0         | 8.6 ± 0.3  | 0.30      | 4.00            | 0.56        | 27.0        | 28.2 ± 0.5 | 0.45      | 12.5            | 0.89        |
| 9.0         | 9.6 ± 0.3  | 0.30      | 4.50            | 0.56        | 28.0        | 30.0 ± 0.5 | 0.45      | 14.0            | 0.89        |
| 10.0        | 10.4 ± 0.3 | 0.30      | 5.00            | 0.56        | 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               | <b>Standard</b> Black<br><b>Nonstandard</b> 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      |
|-------------------|---------------------------------------------------------|----------------------------|--------------------------------------------------------------------------------------------------------------------|---------------------|
| <b>Physical</b>   | 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 <sup>4</sup> ) maximum                                                                               | ASTM D 2671         |
|                   | Low-temperature flexibility<br>(1 hour at -30°C/-22°F)  |                            | No cracking                                                                                                        | UL 224              |
|                   | Heat shock<br>(4 hours at 250°C/482°F)                  |                            | No cracking                                                                                                        | UL 224              |
|                   | Heat aging<br>(7 days at 158°C/316°F)                   |                            |                                                                                                                    | UL 224              |
|                   | Followed by tests for:                                  |                            |                                                                                                                    |                     |
|                   | Tensile strength                                        | MPa ( <i>psi</i> )         | 70% minimum<br>of unaged specimens                                                                                 | UL 224              |
|                   | Ultimate elongation                                     | percent                    | 100 minimum                                                                                                        | UL 224              |
|                   | Flexibility                                             |                            | No cracking                                                                                                        | UL 224              |
| <b>Electrical</b> | Dielectric withstand<br>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 <sup>14</sup> minimum                                                                                           | ASTM D 2671         |
| <b>Chemical</b>   | Corrosive effect<br>(7 days at 158°C/316°F)             |                            | No corrosion                                                                                                       | ASTM D 2671         |
|                   | Copper stability<br>(7 days at 158°C/316°F)             |                            | No brittleness, glazing,<br>cracking, or severe<br>discoloration of tubing.<br>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)<br>(24 hours at 23°C/73°F) | percent                    | 0.5 maximum                                                                                                        | ASTM D 2671         |
|                   | Fungus resistance                                       |                            |                                                                                                                    | ISO 846<br>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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