

Small diameter, high shrink ratio, heat-shrinkable tubing

MicroFit tubing is micro-sized, heat-shrinkable tubing that offers a high shrink ratio (up to 3:1) and fits a range of diameters from .007" to .045". It is offered in a variety of materials including two medical-grade formulations from our Altera line of medical-grade, heat-shrinkable tubing products.

MicroFit tubing provides electrical insulation, mechanical protection, and strain relief in the smaller, more compact medical devices and commercial electronics products manufactured today. MicroFit tubing's high shrink ratio eases installation since the tubing's diameter is large enough to slide easily over the micro-sized substrate.

Yet, upon heating, the same tubing shrinks to fit tightly on a wide range of substrate diameters.

MicroFit tubing is offered in three materials: RW-175, MT1000, and MT2000. MT1000 and MT2000 meet the requirements of U.S. Pharmacopeia (USP) Class VI.

RW-175 and MT1000 tubings utilize a tough semirigid fluoropolymer. They are especially suitable for applications requiring high-temperature performance, outstanding resistance to abrasion and cut-through, and excellent resistance to a variety of fluids. RW-175 meets NASA requirements for

low-outgassing materials. MT1000 tubing may be sterilized by radiation, ethylene oxide, steam, and dry heat with no significant change in physical properties.

MT2000 tubing is made from a tough, modified polyolefin that offers flexibility, lubricity, and good electrical insulation performance. MT2000's low shrink temperature enables the tubing to shrink faster than other materials with similar attributes, thereby reducing the risk of damage to temperature-sensitive substrates. MT2000 tubing may be sterilized by gamma radiation or ethylene oxide with no significant change in physical properties.

**Temperature rating**

**RW-175, MT1000**

|   |                |
|---|----------------|
| Full recovery temperature:                                      | 175°C          |
| Continuous operating temperature:                               | -55°C to 175°C |
| Recommended maximum temperature for use as a primary insulator: | 135°C          |

**MT2000**

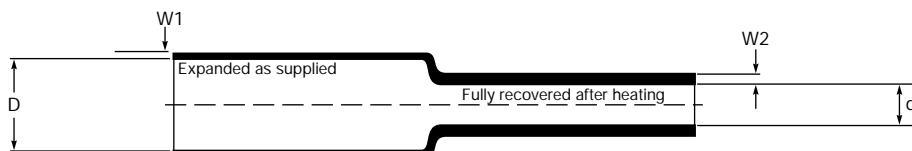
|                                   |                |
|-----------------------------------|----------------|
| Full recovery temperature:        | 140°C          |
| Continuous operating temperature: | -40°C to 105°C |

**Specifications\***

| Type           | Raychem             | Material     | Master File Number                 |
|----------------|---------------------|--------------|------------------------------------|
| RW-175         | RW-175 MicroFit SCD |              |                                    |
| MT1000, MT2000 | Altera MicroFit SCD | USP Class VI | MAF-444 (MT1000), MAF-727 (MT2000) |

\*When ordering, always specify latest issue.

**Dimensions (millimeters/inches)**



| Part number      | Inside diameter               |                                  | Wall thickness           |                                       |
|------------------|-------------------------------|----------------------------------|--------------------------|---------------------------------------|
|                  | D (min.) Expanded as supplied | d (max.) Recovered after heating | W1 As supplied (nominal) | W2 (max.) Recovered after heating**** |
| MFT**-No. 1-***  | 0.356 0.014                   | 0.178 0.007                      | 0.076 0.003              | 0.127 0.005                           |
| MFT**-No. 2-***  | 0.610 0.024                   | 0.305 0.012                      | 0.064 0.0025             | 0.152 0.006                           |
| MFT**-No. 33-*** | 1.143 0.045                   | 0.432 0.017                      | 0.064 0.0025             | 0.118 0.007                           |
| MFT**-No. 65-*** | 0.635 0.025                   | 0.254 0.010                      | 0.127 0.005              | 0.330 0.013                           |

\*\*Replace double asterisk with material number: RW-175, MT1000 or MT2000 \*\*\*Replace triple asterisk with color-code number. \*\*\*\*Wall thickness will be less if tubing recovery is restricted during shrinkage.

**Ordering information**

| Colors               | RW-175, MT1000   | MT2000                           |
|----------------------|--|----------------------------------|
| Standard             | Clear  | Black, clear                     |
| Nonstandard          | Black  | White, red, yellow, blue, orange |
| Size selection       | Always order the largest size that will shrink snugly over the component being covered. A variety of special order sizes may be made available upon request. |                                  |
| Standard packaging   | In 4-foot lengths (RW-175); on plastic spools, double-bagged (MT1000, MT2000)  |                                  |
| Ordering description | Specify product name, material type, size, and color; for example, MFT-MT2000-No.1-0 (0=Black).  |                                  |

**RW-175 MicroFit specification values**

|                   | Property  | Unit                          | Requirement                                | Method of test                              |
|-------------------|---|-------------------------------|--|---|
| <b>Physical</b>   | Dimensions  | mm ( <i>inches</i> )          | See reverse                                | ASTM D 2671                                 |
|                   | Tensile strength  | psi ( <i>MPa</i> )            | 5000 ( <i>34.5</i> ) minimum               | ASTM D 2671<br>2" per minute                |
|                   | Ultimate elongation                                     | percent                       | 150 minimum                                | ASTM D 2671<br>2" per minute                |
|                   | Secant modulus (expanded)                               | psi ( <i>MPa</i> )            | 1 x 10 <sup>5</sup> ( <i>690</i> ) minimum | ASTM D 2671                                 |
|                   | Heat shock<br>(4 hours at 300°C/572°F)                  |                               | No dripping, flowing<br>or cracking        | AMS-DTL-23053,<br>5/16" mandrel             |
|                   | Low temperature flexibility<br>(4 hours at -55°C/-67°F) |                               | No cracking after wrapping<br>on mandrel   | ASTM D 2671<br>Procedure C<br>5/16" mandrel |
| <b>Electrical</b> | Dielectric strength                                     | volts/mil ( <i>volts/mm</i> ) | 800 ( <i>31,500</i> ) minimum              | ASTM D 2671                                 |

**Altera MicroFit specification values**

|                 | Property   | Unit                                    | Requirement  | Method of test   |             |
|-----------------|--|---|--|--|-------------|
| <b>Physical</b> | Dimensions   | mm ( <i>inches</i> )                    | See reverse  | ASTM D 2671  |             |
|                 | Tensile strength<br>MT1000<br>MT2000                                       | psi ( <i>MPa</i> )                      | 5000 ( <i>34.5</i> ) minimum<br>3000 ( <i>20.7</i> ) minimum                                 | ASTM D 2671<br>2" per minute                                       |             |
|                 | Ultimate elongation<br>MT1000<br>MT2000                                    | percent                                 | 150 minimum<br>200 minimum   | ASTM D 2671<br>2" per minute                                       |             |
|                 | Secant modulus (expanded)<br>MT1000<br>MT2000                              | psi ( <i>MPa</i> )                      | 1.0 X 10 <sup>5</sup> ( <i>690</i> ) minimum<br>5.0 X 10 <sup>4</sup> ( <i>344</i> ) minimum | ASTM D 2671  |             |
|                 | <b>Electrical</b>  | Dielectric strength<br>MT1000<br>MT2000 | volts/mil ( <i>volts/mm</i> )  | 800 ( <i>31,500</i> ) minimum<br>1000 ( <i>39,360</i> ) minimum    | ASTM D 2671 |
|                 |  | Dielectric withstand<br>3000 V, 60 Hz   | seconds  | 60 minimum   | ASTM D 2671 |
| <b>Chemical</b> | Heavy metals analysis<br>Cadmium<br>Mercury<br>Lead<br>Bismuth<br>Antimony | ppm                                     | 1 maximum (total of all metals)  | USP XXII<br>Physiochemical<br>Tests - Plastics<br>(See note below) |             |

Note: Sample preparation and extraction is per USP XXII. Metals analysis may be colorimetric as described in USP XXII or by equivalent quantitative analytical method.

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**Users should independently evaluate the suitability of the product for their application.****Tyco Electronics Corporation**

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