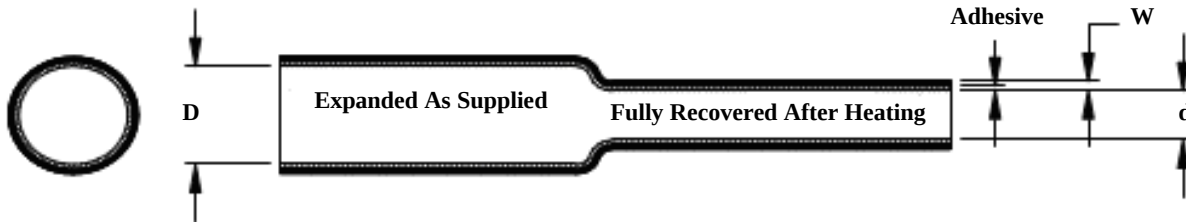


**DWFR**  
**Highly Flame-Retardant, Dual Wall Polyolefin Heat-Shrinkable Tubing**



**Table 1: Dimensions: mm (in)**

| Shrink Ratio | Size  | Minimum Inside Diameter as supplied (D)<br>mm (in) | Maximum Inside Diameter after recovery (d)<br>mm (in) | Total Wall Thickness after recovery (W)<br>mm (in) | Minimum Inner Meltable Wall Thickness after recovery<br>mm (in) |
|--------------|-------|----------------------------------------------------|-------------------------------------------------------|----------------------------------------------------|-----------------------------------------------------------------|
| <b>3:1</b>   | 3/1   | 3.0 (0.118)                                        | 1.0 (0.039)                                           | 1.12 ± 0.25 (.044 ± .010)                          | 0.25 (0.010)                                                    |
|              | 6/2   | 6.0 (0.236)                                        | 2.0 (0.079)                                           | 1.14 ± 0.25 (.045 ± .010)                          | 0.25 (0.010)                                                    |
|              | 9/3   | 9.0 (0.354)                                        | 3.0 (0.118)                                           | 1.40 ± 0.25 (.055 ± .010)                          | 0.56 (0.022)                                                    |
|              | 12/4  | 12.0 (0.472)                                       | 4.0 (0.157)                                           | 1.78 ± 0.36 (.070 ± .014)                          | 0.58 (0.023)                                                    |
|              | 19/6  | 19.0 (0.748)                                       | 6.0 (0.236)                                           | 2.25 ± 0.50 (.088 ± .020)                          | 0.58 (0.023)                                                    |
|              | 24/8  | 24.0 (0.945)                                       | 8.0 (0.315)                                           | 2.54 ± 0.50 (.100 ± .020)                          | 0.79 (0.031)                                                    |
|              | 40/13 | 40.0 (1.575)                                       | 13.0 (0.512)                                          | 2.54 ± 0.50 (.100 ± .020)                          | 0.86 (0.034)                                                    |
| <b>4:1</b>   | 4/1   | 4.0 (0.157)                                        | 1.0 (0.039)                                           | 1.12 ± 0.25 (.044 ± .010)                          | 0.25 (0.010)                                                    |
|              | 8/2   | 8.0 (0.315)                                        | 2.0 (0.079)                                           | 1.14 ± 0.25 (.045 ± .010)                          | 0.25 (0.010)                                                    |
|              | 12/3  | 12.0 (0.472)                                       | 3.0 (0.118)                                           | 1.40 ± 0.25 (.055 ± .010)                          | 0.56 (0.022)                                                    |
|              | 16/4  | 16.0 (0.630)                                       | 4.0 (0.157)                                           | 1.78 ± 0.36 (.070 ± .014)                          | 0.58 (0.023)                                                    |
|              | 24/6  | 24.0 (0.945)                                       | 6.0 (0.236)                                           | 2.25 ± 0.50 (.088 ± .020)                          | 0.58 (0.023)                                                    |
|              | 32/8  | 32.0 (1.260)                                       | 8.0 (0.315)                                           | 2.54 ± 0.50 (.100 ± .020)                          | 0.79 (0.031)                                                    |
|              | 52/13 | 52.0 (2.047)                                       | 13.0 (0.512)                                          | 2.54 ± 0.50 (.100 ± .020)                          | 0.86 (0.034)                                                    |

**Material:**

The tubing shall be fabricated from a modified irradiated polyolefin compounded to produce a homogeneous, uniform product whose outside surface is essentially free from flaws, defects, pinholes, seams, cracks, or inclusions. The interior wall is coated with a thermoplastic adhesive. The standard color is black.

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**Customer Drawing**

|                                                                                                                                                  |                |            |                                                                                        |  |                                                                                                 |                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------|----------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------|------------------|
|                                                               |                |            | <b>Tubing</b><br>TE CONNECTIVITY<br>300 Constitution Drive<br>Menlo Park, CA 94025 USA |  | Title:<br><b>DWFR</b><br>Highly Flame-Retardant, Dual Wall Polyolefin<br>Heat-Shrinkable Tubing |                  |
| TE Connectivity reserves the right to amend this drawing at any time. Users should evaluate the suitability of the product for their application |                |            | Document No :<br><b>DWFR</b>                                                           |  |                                                                                                 |                  |
| Cage Code:<br>06090                                                                                                                              | Scale:<br>None | Size:<br>A | Rev. Date:<br>28-January-16                                                            |  | Rev. E                                                                                          | Sheet:<br>1 of 2 |

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**Properties:**

| PROPERTY                                                                                                                                                                     | UNIT                          | REQUIREMENT                                                                  | TEST METHOD           |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------------------------------------------------------|-----------------------|
| <b>PHYSICAL</b>                                                                                                                                                              |                               |                                                                              |                       |
| *Dimensions                                                                                                                                                                  | mm ( <i>in</i> )              | In accordance with Table 1                                                   | ASTM D 2671           |
| Longitudinal Change                                                                                                                                                          | Percent                       | 0, -15%                                                                      | ASTM D 2671           |
| *Tensile Strength                                                                                                                                                            | psi ( <i>MPa</i> )            | 1500 minimum ( <i>10.3</i> )                                                 | ASTM D 2671           |
| *Ultimate Elongation                                                                                                                                                         | Percent                       | 200 minimum                                                                  |                       |
| Secant Modulus (Expanded)                                                                                                                                                    | psi ( <i>MPa</i> )            | $2.5 \times 10^4$ maximum ( <i>172</i> )                                     | ASTM D 882, 2% strain |
| Cold Bend Test<br>at $-30 \pm 1.0^\circ\text{C}$ ( $-22 \pm 1.8^\circ\text{F}$ ) for 1 hour                                                                                  | ---                           | No cracking                                                                  | UL 224, section 5.9   |
| *Heat Shock<br>4 hours at $250.0 \pm 1.0^\circ\text{C}$ ( $482 \pm 1.8^\circ\text{F}$ )                                                                                      | ---                           | No dripping, flowing or cracking of outer wall                               | UL 224, section 5.8   |
| Heat Resistance<br>168 hours at $158.0^\circ\text{C} \pm 1.0^\circ\text{C}$ ( $316.4 \pm 1.8^\circ\text{F}$ )<br>Followed by test for:<br>- Tensile Strength<br>- Elongation | psi ( <i>MPa</i> )<br>Percent | Min. 70% of original<br>100% minimum                                         | UL 224                |
| Sealing Efficiency                                                                                                                                                           |                               | No openings on reheat                                                        | AMS-DTL 23053/4       |
| <b>ELECTRICAL</b>                                                                                                                                                            |                               |                                                                              |                       |
| Dielectric Strength                                                                                                                                                          | Volts/mil<br>(volts/mm)       | 300 minimum ( <i>11,811 min</i> )<br>on dual wall specimen                   | ASTM D 2671           |
| Volume Resistivity                                                                                                                                                           | ohm-cm                        | $10^{14}$ minimum on dual wall specimen                                      | ASTM D 2671           |
| <b>CHEMICAL</b>                                                                                                                                                              |                               |                                                                              |                       |
| Corrosion of the bare copper<br>168 hours at $158.0^\circ\text{C} \pm 1.0^\circ\text{C}$ ( $316.4 \pm 1.8^\circ\text{F}$ )                                                   | ---                           | No pitting or blackening of copper                                           | UL 224, section 5.16  |
| Copper stability<br>168 hours at $158.0^\circ\text{C} \pm 1.0^\circ\text{C}$ ( $316.4 \pm 1.8^\circ\text{F}$ )<br>Followed by test for:<br>- Elongation                      | Percent                       | Show no sign of degradation<br><br>100% minimum                              | UL 224, section 5.17  |
| Flammability                                                                                                                                                                 | ---                           | Self-extinguishing within 1 minute, 25% maximum flag burn and 0% cotton burn | UL 224, VW-1          |
| Water Absorption<br>24 hours at $23^\circ\text{C}$ ( $73^\circ\text{F}$ )                                                                                                    | Percent                       | 0.5 maximum                                                                  | ASTM D 2671           |

\* Denotes Lot Acceptance Test

**Customer Drawing**

|                             |            |                             |                  |
|-----------------------------|------------|-----------------------------|------------------|
| Rev. Date:<br>28-January-16 | Rev.:<br>E | Document No.<br><b>DWFR</b> | Sheet:<br>2 of 2 |
|-----------------------------|------------|-----------------------------|------------------|

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