# MATERIAL PROPERTIES

Pultex® Fiber Reinforced Polymer Structural Profiles
Rectangular Tubes, Channels, Angles, Square Tubes, Round Tubes

**Includes all angles except 102 x 6, 102 x 10, 102 x 13, 152 x 10 and 152 x 13 which are SuperStructurals.**

Please consult the Pultex® Fiber Reinforced Polymer Structural Profiles Angles Material Properties

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## Metric Version

1500 Series - Thermoset Polyester – Olive Green
1525 Series - Thermoset Polyester Class 1 FR – Slate Gray (Dark Gray)
1625 Series - Thermoset Vinyl Ester Class 1 FR – Beige

The following data was derived from ASTM coupon and full section testing. The results are average values based on random sampling and testing of production lots. Composite materials are not homogeneous; and therefore, the location of the coupon extraction can cause variances in the coupon test results. Creative Pultrusions publishes an average value of random samples from production lots.

<table>
<thead>
<tr>
<th>Property</th>
<th>ASTM Test</th>
<th>Units</th>
<th>1500/1525 Series</th>
<th>1625 Series</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mechanical</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tensile Strength (LW)</td>
<td>D638</td>
<td>MPa</td>
<td>226.9</td>
<td>257.8</td>
</tr>
<tr>
<td>Tensile Strength (CW)</td>
<td>D638</td>
<td>MPa</td>
<td>51.6</td>
<td>55.0</td>
</tr>
<tr>
<td>Tensile Modulus (LW)</td>
<td>D638</td>
<td>GPa</td>
<td>17.2</td>
<td>20.6</td>
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<tr>
<td>Tensile Modulus (CW)</td>
<td>D638</td>
<td>GPa</td>
<td>5.5</td>
<td>6.9</td>
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<tr>
<td>Compressive Strength (LW)</td>
<td>D695</td>
<td>MPa</td>
<td>226.9</td>
<td>257.8</td>
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<tr>
<td>Compressive Strength (CW)</td>
<td>D695</td>
<td>MPa</td>
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<td>137.5</td>
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<tr>
<td>Compressive Modulus (LW)</td>
<td>D695</td>
<td>GPa</td>
<td>20.6</td>
<td>20.6</td>
</tr>
<tr>
<td>Compressive Modulus (CW)</td>
<td>D695</td>
<td>GPa</td>
<td>6.9</td>
<td>8.2</td>
</tr>
<tr>
<td>Flexural Strength (LW)</td>
<td>D790</td>
<td>MPa</td>
<td>226.9</td>
<td>257.8</td>
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<tr>
<td>Flexural Strength (CW)</td>
<td>D790</td>
<td>MPa</td>
<td>75.6</td>
<td>85.9</td>
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<tr>
<td>Flexural Modulus (LW)</td>
<td>D790</td>
<td>GPa</td>
<td>11.0</td>
<td>13.7</td>
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<tr>
<td>Flexural Modulus (CW)</td>
<td>D790</td>
<td>GPa</td>
<td>5.5</td>
<td>6.9</td>
</tr>
<tr>
<td>Modulus of Elasticity (Channels)</td>
<td>Full Section²</td>
<td>GPa</td>
<td>19.2-22.0</td>
<td>19.2-22.0</td>
</tr>
<tr>
<td>(Square and Rectangular Tubes)</td>
<td>Full Section²</td>
<td>GPa</td>
<td>19.2</td>
<td>19.2</td>
</tr>
<tr>
<td>Shear Modulus</td>
<td>Full Section²</td>
<td>GPa</td>
<td>22.0</td>
<td>22.0</td>
</tr>
<tr>
<td>Interlaminar Shear (LW)³</td>
<td>D2344</td>
<td>MPa</td>
<td>31.0</td>
<td>31.0</td>
</tr>
<tr>
<td>Shear Strength By Punch (PF)</td>
<td>D732</td>
<td>MPa</td>
<td>37.8</td>
<td>41.2</td>
</tr>
<tr>
<td>Notched Izod Impact (LW)</td>
<td>D256</td>
<td>J/m</td>
<td>1494.6</td>
<td>1601.4</td>
</tr>
<tr>
<td>Notched Izod Impact (CW)</td>
<td>D256</td>
<td>J/m</td>
<td>213.5</td>
<td>266.9</td>
</tr>
<tr>
<td>Maximum Bearing Strength (LW)</td>
<td>D953</td>
<td>MPa</td>
<td>206.2</td>
<td>206.2</td>
</tr>
<tr>
<td>Maximum Bearing Strength (CW)</td>
<td>D953</td>
<td>MPa</td>
<td>123.7</td>
<td>123.7</td>
</tr>
<tr>
<td>Poisson’s Ratio (LW)</td>
<td>D3039</td>
<td>mm/mm</td>
<td>0.35</td>
<td>0.35</td>
</tr>
<tr>
<td>Poisson’s Ratio (CW)</td>
<td>D3039</td>
<td>mm/mm</td>
<td>0.15</td>
<td>0.15</td>
</tr>
<tr>
<td>In-Plane Shear (LW)</td>
<td>Modified D2344⁴</td>
<td>MPa</td>
<td>48.3</td>
<td>48.3</td>
</tr>
</tbody>
</table>

LW = lengthwise  
CW = crosswise  
PF = perpendicular to laminate face  
Additional properties located on page back

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# MATERIAL PROPERTIES

## Pultex® Fiber Reinforced Polymer Structural Profiles
Rectangular Tubes, Channels, Angles, Square Tubes, Round Tubes

**Metric Version**

<table>
<thead>
<tr>
<th>Property</th>
<th>1500/1525 Series</th>
<th>1625 Series</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physical</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barcol Hardness(^1)</td>
<td>D2583</td>
<td>45</td>
</tr>
<tr>
<td>Water Absorption</td>
<td>D570</td>
<td>% Max</td>
</tr>
<tr>
<td>Density</td>
<td>D792</td>
<td>Mg/m(^3)</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>D792</td>
<td></td>
</tr>
<tr>
<td>Coefficient of Thermal Expansion (LW)</td>
<td>D696</td>
<td>10^-6K^-1</td>
</tr>
<tr>
<td>Thermal Conductivity (PF)</td>
<td>C177</td>
<td>W/mK</td>
</tr>
<tr>
<td><strong>Electrical</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arc Resistance (LW)</td>
<td>D495</td>
<td>seconds</td>
</tr>
<tr>
<td>Dielectric Strength (LW)</td>
<td>D149</td>
<td>kV/mm</td>
</tr>
<tr>
<td>Dielectric Strength (PF)</td>
<td>D149</td>
<td>kV/mm</td>
</tr>
<tr>
<td>Dielectric Constant (PF)</td>
<td>D150</td>
<td>@60Hz</td>
</tr>
</tbody>
</table>

\(^1\) Pultex® uses a synthetic surface veil that reduces the Barcol Hardness, but does not reflect lack of cure.

\(^2\) Full section testing based on a 3-point bend with simply supported end conditions (Reference *The New and Improved Pultex® Pultrusion Global Design Manual*, Appendix B, for details).

\(^3\) Tested on a 3:1, span to depth ratio.

\(^4\) Follow ASTM D2344, but rotate coupon 90° (cut section of coupon length faces up).

\(^5\) In-plane Shear (CW) values for square tubes and rectangular tubes = 17.2 MPa; angles = 26.2 MPa

<table>
<thead>
<tr>
<th>Property</th>
<th>ASTM Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Flammability Classification</strong></td>
<td>UL94</td>
<td>(VO)</td>
</tr>
<tr>
<td><strong>Tunnel Test</strong></td>
<td>ASTM E-84</td>
<td>25 Max</td>
</tr>
<tr>
<td><strong>Flammability Extinguishing</strong></td>
<td>ASTM D635</td>
<td>Self extinguishing</td>
</tr>
<tr>
<td><strong>NBS Smoke Chamber</strong></td>
<td>ASTM E662</td>
<td>650</td>
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</table>

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