ETFE – Ethylene Tetrafluoroethylene

Overview-
A copolymer of ethylene and tetrafluoroethylene, ETFE resins make products with excellent resistance to abrasion and stress cracking. ETFE, also known as *Tefzel®* possesses superior toughness, stiffness, and durability all while being chemically inert. The material can be extruded in multiple forms and offers products with high-energy radiation resistance. ETFE can operate in wide temperature ranges, has low water absorption, and performs well with ETO (ethylene oxide), autoclave, and gamma sterilizations.

Due to ETFE’s characteristics, when extruded it can be made into durable components for a wide variety of markets. Medical industries value extrusions from this material due to its ability to be gamma sterilized or autoclaved while maintaining its mechanical integrity. Automotive markets value the low moisture absorption properties when made into a heat shrink for sensor protection, while aerospace and fiber optic markets value its abrasion resistance and stability at wide temperature ranges. *Tefzel® is a registered trademark of DuPont.*

Fillers available with FEP extrusions:
• Carbon
• Pigments
• More available upon request

Applications
• Electrical component insulation
• Jacketing for abrasion reduction
• Wire/cable insulation
• Medical components

Available Products
• Extruded tubing
• Coated optical fiber
• Convoluted tubing
• Co-extrusions
• Drawn fiber
• Multi-lumens and custom profiles

Quick Summary of Properties

<table>
<thead>
<tr>
<th>Chemical</th>
<th>Mechanical</th>
<th>Physical</th>
<th>Electrical</th>
<th>Thermal</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
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</tbody>
</table>

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## ETFE - Ethylene Tetrafluoroethylene

The information presented in this publication is believed to be accurate and is not intended to constitute a specification. Property characteristics are dramatically impacted by geometry and processing method, thus properties of extruded parts may vary. In some instances, data may not be available for publication and will be notated as “na” where applicable.

These tables are meant to serve as a general guideline only. Users should evaluate the material to determine suitability for their own particular application.

### PHYSICAL

<table>
<thead>
<tr>
<th>Property</th>
<th>ASTM</th>
<th>ETFE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density (g/cm³)</td>
<td>D792</td>
<td>1.73 - 1.74</td>
</tr>
<tr>
<td>Water Absorption (%)</td>
<td>D570</td>
<td>&lt; 0.03</td>
</tr>
<tr>
<td>Oxygen Index (%)</td>
<td>D2863</td>
<td>32</td>
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</tbody>
</table>

### MECHANICAL

<table>
<thead>
<tr>
<th>Property</th>
<th>ASTM</th>
<th>ETFE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardness, Shore D</td>
<td>D2240</td>
<td>67</td>
</tr>
<tr>
<td>Ultimate Tensile Strength (MPa)</td>
<td>D638</td>
<td>48 - 52</td>
</tr>
<tr>
<td>Elongation at Break (%)</td>
<td>D638</td>
<td>382 - 415</td>
</tr>
<tr>
<td>Flexural Modulus (MPa)</td>
<td>D790</td>
<td>890 - 960</td>
</tr>
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</table>

### ELECTRICAL

<table>
<thead>
<tr>
<th>Property</th>
<th>ASTM</th>
<th>ETFE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume Resistivity (Ω - cm)</td>
<td>D257</td>
<td>&gt; 1.0 x 10¹⁷</td>
</tr>
<tr>
<td>Dielectric Constant 1 MHz</td>
<td>D150</td>
<td>2.6</td>
</tr>
<tr>
<td>Dielectric Strength (V/mil)</td>
<td>D149</td>
<td>1800</td>
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</tbody>
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### THERMAL

<table>
<thead>
<tr>
<th>Property</th>
<th>ASTM</th>
<th>ETFE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Service Temp, Air (°C)</td>
<td>na</td>
<td>150</td>
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<tr>
<td>Melt Temp (°C)</td>
<td>D3418</td>
<td>260 - 265</td>
</tr>
<tr>
<td>Coefficient of Thermal Expansion, Linear 20° (µm/m.°C)</td>
<td>D696</td>
<td>131.4</td>
</tr>
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