Fluon® ETFE Rotational Molding & Lining Resins

DESCRIPTION

Fluon® ETFE is a melt-processable copolymer of tetrafluoroethylene and ethylene. Fluon ETFE possesses a unique combination of desirable properties such as higher resistance to heat and chemical attack and outstanding physical toughness. Rotational molding and lining grades are designed to be free-flowing powders with particle morphologies necessary to uniformly coat the most challenging and complex parts.

BENEFITS

- High resistance to heat: Fluon ETFE has a continuous use temperature of 150°C.
- Excellent chemical resistance
- Outstanding physical toughness: Fluon ETFE has better physical properties than most other fluoropolymers.
- Low smoke and flame characteristics: Fluon ETFE is rated 94 V-0 by Underwriters Laboratories Inc.
- Outstanding resistance to weather and aging
- Good dielectric properties
- Non-stick characteristics

APPLICATIONS

- Rotational lined Chemical Process Industry (CPI) components for fluid handling such as valves, pumps, pipes, fittings, tanks and other complex design parts.

FDA COMPLIANCE


Fluon ETFE is the only ETFE resin in the world that is FDA compliant, permitting use as base resins or coatings in repeat use applications in contact with all food types at temperatures up to 150°C in listed applications.
**FLUON® ETFE ROTATIONAL MOLDING & LINING GRADES AVAILABLE**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Characteristics &amp; Usage</th>
<th>Particle Size (µm)</th>
<th>Thickness (µm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZL-522F</td>
<td>Rotomolding &amp; Rotolining – clear, high erosion resistance, thermally stabilized for severe anticorrosion in reaction vessels, storage tanks, pipes, pumps, tank trucks, etc.</td>
<td>100 to 200</td>
<td>&gt;2000</td>
</tr>
<tr>
<td>TL-581</td>
<td>Rotomolding &amp; Rotolining – clear, thermally stabilized, abrasion resistant, high fluidity, stress-crack resistant, for severe anticorrosion in reaction vessels, storage tanks, pipes, pumps, etc.</td>
<td>200 to 300</td>
<td>&gt;2000</td>
</tr>
<tr>
<td>TL-584</td>
<td>Rotomolding &amp; Rotolining – clear, improved thermal stability, high fluidity, stress-crack resistant, chemical resistant linings for reaction vessels, storage tanks, pipes, pumps, etc.</td>
<td>200 to 300</td>
<td>&gt;2000</td>
</tr>
<tr>
<td>LM2300N</td>
<td>Rotomolding &amp; Rotolining – clear, low melting temperature, top coat (smooth surface), chemical resistant linings for reaction vessels, storage tanks, pipes, pumps, etc.</td>
<td>300 to 500</td>
<td>&gt;2000</td>
</tr>
<tr>
<td>LM2300K</td>
<td>Rotomolding &amp; Rotolining – clear, low melting temperature, low metals for semiconductor applications such as pipes, tanks, and pumps, etc.</td>
<td>300 to 500</td>
<td>&gt;2000</td>
</tr>
</tbody>
</table>

**PROCESSING**

It is strongly recommended that process equipment exposed to molten resin be made of corrosion-resistant metals such as Monel®, Inconel®, or Hastelloy®.

Your AGC Chemicals Americas, Inc. technical service representative can provide specific recommendations for process equipment and process conditions.

**FLUON® ETFE ROTATIONAL MOLDING & LINING GRADES TYPICAL PROPERTIES**

<table>
<thead>
<tr>
<th>Property</th>
<th>Units</th>
<th>Test Method</th>
<th>ZL-522F</th>
<th>TL-581</th>
<th>TL-584</th>
<th>LM2300N</th>
<th>LM2300K</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melt Flow Rate (as raw material)</td>
<td>grams/10 minutes</td>
<td>ASTM D-3159</td>
<td>7.0~14.0</td>
<td>20~30</td>
<td>20~30</td>
<td>20~30</td>
<td>20~30</td>
</tr>
<tr>
<td>Melting Point</td>
<td>°C</td>
<td>ASTM D-3418</td>
<td>265 +/-10</td>
<td>265 +/-10</td>
<td>265 +/-10</td>
<td>230 +/-10</td>
<td>230 +/-10</td>
</tr>
<tr>
<td>Bulk Density</td>
<td>g/cm³</td>
<td>ASTM D-3159</td>
<td>0.6~0.9</td>
<td>0.75~0.95</td>
<td>0.7~0.9</td>
<td>0.6~0.9</td>
<td>0.6~0.9</td>
</tr>
<tr>
<td>Average Particle Diameter (D50)</td>
<td>microns</td>
<td>Laser Diffraction</td>
<td>100~140</td>
<td>230~310</td>
<td>230~310</td>
<td>300~500</td>
<td>300~500</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>-</td>
<td>ASTM D792</td>
<td>1.74</td>
<td>1.73</td>
<td>1.73</td>
<td>1.76</td>
<td>1.76</td>
</tr>
<tr>
<td>Tensile Strength (23°C)</td>
<td>psi</td>
<td>ASTM D-638</td>
<td>7400</td>
<td>6700</td>
<td>NA</td>
<td>5685 MIN.</td>
<td>5685 MIN.</td>
</tr>
<tr>
<td>Tensile Elongation (23°C)</td>
<td>%</td>
<td>ASTM D-638</td>
<td>420</td>
<td>465</td>
<td>350 MIN.</td>
<td>350 MIN.</td>
<td>350 MIN.</td>
</tr>
<tr>
<td>Flexural Modulus (23°C)</td>
<td>psi</td>
<td>ASTM D-790</td>
<td>145,000</td>
<td>128,000</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

**NOTE:** The data listed here represents typical values for the stated grades of Fluon® ETFE. This information should be used as a guide only and not to establish specification limits or design criteria. AGC Chemicals Americas assumes no obligation or liability for any advice furnished by us or for results obtained with respect to this product. All such advice is provided free of charge and the buyer assumes sole responsibility for results obtained in reliance thereon.
HANDLING PRECAUTIONS

Heating Fluon products in excess of 750°F (399°C) can produce toxic fumes. It is, therefore, necessary to provide local exhaust ventilation in areas where Fluon products are exposed to high temperatures. Avoid breathing fumes or contaminating smoking tobacco with fumes, powder, or dust.

Thermal decomposition of this product will generate hydrogen fluoride, which is corrosive. Corrosion resistance materials are required for prolonged contact with molten resin.

For additional information and handling instructions read AGC Chemicals Americas, Inc. Material Safety Data Sheet. It is also recommended that the user consult the latest edition of the “Guide to the Safe Handling of Fluoropolymer Resins” published by the Fluropolymers Division of the Society of the Plastics Industry (SPI) for important handling and ventilation recommendations. Both publications are available from your AGC Chemicals Americas representative.

SAFE HANDLING INFORMATION

The properties of Fluon ETFE are not impacted by storage time. Storage and handling facilities should be designed to minimize contact with airborne contamination and the formulation of condensation on the resin. Fluoropolymers are not hydroscopic and will not typically need to be dried prior to use.

FREIGHT CLASSIFICATION

Fluon ETFE when shipped by rail or express is classified “Plastics, Synthetic, O.T.L., NOIBN.” Resin shipped by truck is classified “Plastics, Materials O.T.F.C.E. or S. Granules.”

ASTM CLASSIFICATIONS

Fluon ETFE grade ZL-522F is ASTM D-3159 type I, grade 1. ETFE grade TL-581 and TL-584 are ASTM D 3159 type I, grade 3. Fluon LM-ETFE grades LM2300N and LM2300K are ASTM D-3159 type IV, grade 1.

Your AGC Chemicals Americas Inc. representative can advise you of the ASTM classifications of the other ETFE materials.

UL YELLOW CARDS

Fluon ETFE resins are listed under the QMFZ2.GuideInfo Plastics - Component section in the Underwriters Laboratories, Inc. certification directory. See File E54077 under Asahi Glass Co LTD for specific information on ETFE resins. Copies of UL Yellow Cards for Fluon ETFE resins are available online from the UL Online Certifications Directory at http://database.ul.com/.

For more information and samples contact

AGC Chemicals Americas, Inc.
55 E. Uwchlan Avenue, Suite 201
Exton, PA 19341
Phone: (800) 424-PTFE (7833)
Fax: (610) 423-4301

Fluon® is a registered trademark of AGC Chemicals Americas, Inc. ETFE Rotational Molding & Lining Product Information Sheet.DOC Rev. 4/04/11