**Description**
APTIV® 1000 series films are the unfilled semi-crystalline films made from VICTREX® PEEK polymer. The film provides a material solution for engineers in ultra-high performance applications.

APTIV films are a comprehensive range of versatile, high-performance films, the use of which can facilitate reduced systems costs, improved performance and enhanced design freedom.

APTIV 1000 has a unique combination of properties providing high temperature performance, lightweight, mechanical strength, durability, excellent radiation, hydrolysis and chemical resistance, electrical insulation, wear and abrasion resistance, excellent barrier properties with high purity, good flammability without the use of flame retardants, low toxicity of combustion products, and low moisture absorption in a film format. Inherently halogen-free and ease of processing makes APTIV films a technology enabler for our customers and end users.

**Availability**
The films are available in thicknesses from 8 microns up to 750 microns.

**Applications**
- Electrical insulation
- Pressure sensitive tapes
- Printed circuit substrates
- High temperature labels
- Washers in high speed motors
- Washers in mobile phone hinges
- Flexible surface heaters
- Aerospace insulation
- Pressure sensor membranes
- Acoustic speaker diaphragms
- Capacitors
- Composites
- Proven temperature resistance to use of lead free solders

**Certification**
APTIV film is FDA and EU approved for food contact and is RoHs and 3A Sanitary Standards compliant.

**Features**
- High heat resistance
- Excellent tribological properties
- Broad chemical resistance
- Low moisture absorption
- High strength and toughness
- Stable, excellent electrical insulation properties
- Good flammability performance without use of flame retardant additives
- Inherently halogen-free
- Radiation resistance
- Low smoke and toxic gas emission
- Excellent hydrolysis resistance
- Excellent barrier properties
- Excellent acoustic properties
- High purity
- Lightweight
- Recyclable
- Easy to process – can be laminated to other materials, thermoformed, metallised, coated, printed, stamped and die cut, welded and heat sealed and coated.
**Mechanical Properties at Various Thicknesses**

**ISO 527 at 23°C (73°F)**

<table>
<thead>
<tr>
<th>Property</th>
<th>Units</th>
<th>25µm</th>
<th>50µm</th>
<th>125µm</th>
<th>250µm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Modulus</td>
<td>GPa(kpsi)</td>
<td>2.6(377)</td>
<td>2.8(4.6)</td>
<td>2.5(363)</td>
<td>2.5(363)</td>
</tr>
<tr>
<td>Tensile Strength (at break)</td>
<td>MPa(kpsi)</td>
<td>140(20.3)</td>
<td>120(17.4)</td>
<td>130(18.9)</td>
<td>120(17.4)</td>
</tr>
<tr>
<td>Tensile Elongation (at break)</td>
<td>%</td>
<td>&gt;150</td>
<td>&gt;150</td>
<td>&gt;150</td>
<td>&gt;150</td>
</tr>
</tbody>
</table>

**Elastic Properties at Various Thicknesses**

**ATSM D149, 23°C (73°F), 6.25mm (0.25in) electrode**

<table>
<thead>
<tr>
<th>Property</th>
<th>Units</th>
<th>25µm</th>
<th>50µm</th>
<th>125µm</th>
<th>250µm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dielectric Strength</td>
<td>kV/mm (V/mil)</td>
<td>270 (6858)</td>
<td>190 (4826)</td>
<td>120 (3048)</td>
<td>70 (1778)</td>
</tr>
<tr>
<td>Breakdown Voltage</td>
<td>kV</td>
<td>6.75</td>
<td>9.5</td>
<td>15</td>
<td>17.5</td>
</tr>
</tbody>
</table>

**APTI** 1000 acts as an excellent electrical insulator across a wide range of temperatures and electrical frequencies.

**Packaging and Storage**

APTI film is supplied in roll form on high quality, resin coated and polished fibre cores with an inner diameter of 76mm (approx. 3in) or 152mm (approx. 6in). These cores are a Class A standard core. APTI film is very stable and will retain its properties for several years when stored in the original packaging in a frost free environment up to 50°C (122°F). APTI film is unaffected by humidity and is unaffected by moisture. The rolls should be stored in a weathertight facility so that the packaging is not damaged.

**Disposal**

APTI film is classed as a non-hazardous material and can be disposed of by landfill.

**Labelling of Products**

All products are packaged using robust and purpose designed packaging, and are fully labelled to comply with national and international standards. Labels indicating grade, unique batch number, roll length, roll width, product thickness, and net weight will be affixed to the outer packaging and the core.

**Units of Sale**

Orders for APTI film should be placed in kilograms or imperial pounds.
Compliances
APTIV 1000 film is approved for Food Contact Use:
• APTIV 1000 film is compliant with the compositional requirements of FDA 21 CFR 177.2415.
• APTIV 1000 film is compliant with the framework regulation (EC) No. 1935/2004/EC and commission directive 2002/72/EC and the amendments up to 2005/79/EC.
• APTIV 1000 film is fully compliant with the 3-A Sanitary Standards.

APTIV 1000 film complies with the requirements of RoHS European Directive 2002/95/EC and can be used to manufacture products compliant with the same directive.

APTIV 1000 film is inherently halogen-free in accordance with IEC61249-2-21.

Secondary Processes
APTIV 1000 film an easily be subjected to a range of secondary process operations, which allow designers and engineers to obtain the benefits of APTIV film properties in a variety of forms.

• Surface treatment
• Adhesion
• Coatings
• Heat welding and heat sealing
• Metallisation
• Laser marking and machining

• Slitting
• Die cutting and stamping
• Thermal lamination
• Thermoforming
• Printing

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>Test Condition</th>
<th>Units</th>
<th>1000-050G MD</th>
<th>1000-050G TD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Modulus</td>
<td>ISO 527</td>
<td>23°C (73°F)</td>
<td>GPa (kpsi)</td>
<td>2.5 (363)</td>
<td>2.5 (363)</td>
</tr>
<tr>
<td>Tensile Strength (at break)</td>
<td>ISO 527</td>
<td>23°C (73°F)</td>
<td>MPa (kpsi)</td>
<td>130 (18.9)</td>
<td>120 (17.4)</td>
</tr>
<tr>
<td>Tensile Elongation (at break)</td>
<td>ISO 527</td>
<td>23°C (73°F)</td>
<td>%</td>
<td>&gt;150</td>
<td>&gt;150</td>
</tr>
<tr>
<td>Puncture Strength</td>
<td>Def Stan 81-75</td>
<td>23°C (74°F)</td>
<td>kJ/m² (cal/ft²)</td>
<td>26 (577)</td>
<td></td>
</tr>
<tr>
<td>Tear Strength</td>
<td>ISO 6383-1</td>
<td>23°C (73°F)</td>
<td>N/mm (lb/in)</td>
<td>6 (34)</td>
<td>8 (45)</td>
</tr>
<tr>
<td>Shrinkage</td>
<td>TM-VX-84</td>
<td>200°C (392°F)</td>
<td>%</td>
<td>≤0.5</td>
<td>≤0.5</td>
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<tr>
<td>Water Absorption (50% RH)</td>
<td>ISO 62</td>
<td>23°C (73°F), 24h</td>
<td>%</td>
<td>0.04</td>
<td></td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>ISO 1183</td>
<td>23°C (73°F)</td>
<td></td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>Coefficient of Linear Thermal Expansion</td>
<td>ASTM D696</td>
<td>MD, below Tg</td>
<td>ppm/°C</td>
<td>47</td>
<td></td>
</tr>
<tr>
<td>Dielectric Strength</td>
<td>ASTM D149</td>
<td>23°C (73°F)</td>
<td>kV/mm (V/mil)</td>
<td>190 (4826)</td>
<td></td>
</tr>
<tr>
<td>Dielectric Constant</td>
<td>ASTM D150</td>
<td>23°C (73°F), 10 MHz</td>
<td></td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td>Loss Tangent</td>
<td>ASTM D150</td>
<td>23°C (73°F), 10 MHz</td>
<td></td>
<td>0.002</td>
<td></td>
</tr>
<tr>
<td>Volume Resistivity</td>
<td>ASTM D257</td>
<td>23°C (73°F), 100V</td>
<td>Ohm cm</td>
<td>4.00E+16</td>
<td></td>
</tr>
</tbody>
</table>
Victrex Polymer Solutions, a division of Victrex plc, is the world’s leading manufacturer of Polyaryletherketones, high performance polymers, which are sold under the brand names VICTREX® PEEK polymer, VICOTE® Coatings, APTIV® films and VICTREX Pipes™. With production facilities in the UK backed by sales and distribution centres serving more than 30 countries worldwide, our global market development, sales, and technical support services work hand-in-hand with OEMs, designers and processors offering assistance in the areas of processing, design and application development to help them achieve new levels of cost savings, quality, and performance.

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