

# APTIV™ FILMS 1102

## General Information

### Product Description

APTIV 1100 series films are the mineral filled 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 1100 has a unique combination of properties providing high temperature performance, mechanical strength, durability, excellent radiation, hydrolysis and chemical resistance, electrical insulation, 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. APTIV 1100 series provides a higher modulus and lower coefficient of linear thermal expansion over the APTIV 1000 series.

## Material Properties

| Physical                                  | Nominal Value | Unit              | Test Method |
|-------------------------------------------|---------------|-------------------|-------------|
| Density (23°C)                            | 1.45          | g/cm <sup>3</sup> | ISO 1183    |
| Water Absorption <sup>1</sup>             |               |                   | ISO 62      |
| Equilibrium, 23°C, 0.0500 mm, 50% RH      | 0.080         | %                 |             |
| ShrinkageMD <sup>2</sup> (200°C, 50.0 µm) | < 0.50        | %                 |             |
| ShrinkageTD <sup>2</sup> (200°C, 50.0 µm) | < 0.50        | %                 |             |
| Films                                     | Nominal Value | Unit              | Test Method |
| Film Thickness - Recommended / Available  | 12 to 125     | µm                |             |
| Tensile Modulus                           |               |                   | ISO 527-3   |
| MD : 23°C, 25 µm                          | 5000          | MPa               |             |
| TD : 23°C, 25 µm                          | 4500          | MPa               |             |
| MD : 23°C, 50 µm                          | 4800          | MPa               |             |
| TD : 23°C, 50 µm                          | 4300          | MPa               |             |
| MD : 23°C, 100 µm                         | 4500          | MPa               |             |
| TD : 23°C, 100 µm                         | 4200          | MPa               |             |
| Tensile Stress                            |               |                   | ISO 527-3   |
| MD : Break, 23°C, 25 µm                   | 100           | MPa               |             |
| TD : Break, 23°C, 25 µm                   | 80.0          | MPa               |             |
| MD : Break, 23°C, 50 µm                   | 100           | MPa               |             |
| TD : Break, 23°C, 50 µm                   | 80.0          | MPa               |             |
| MD : Break, 23°C, 100 µm                  | 100           | MPa               |             |
| TD : Break, 23°C, 100 µm                  | 80.0          | MPa               |             |
| Tensile Elongation                        |               |                   | ISO 527-3   |
| MD : Break, 23°C, 25 µm                   | > 100         | %                 |             |
| TD : Break, 23°C, 25 µm                   | > 10          | %                 |             |
| MD : Break, 23°C, 50 µm                   | > 100         | %                 |             |
| TD : Break, 23°C, 50 µm                   | > 10          | %                 |             |
| MD : Break, 23°C, 100 µm                  | > 100         | %                 |             |
| TD : Break, 23°C, 100 µm                  | > 10          | %                 |             |

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| Films                                          | Nominal Value | Unit              | Test Method     |
|------------------------------------------------|---------------|-------------------|-----------------|
| Trouser Tear Resistance <sup>3</sup>           |               |                   | ISO 6383-1      |
| MD : 50 µm                                     | 6.00          | N/mm              |                 |
| TD : 50 µm                                     | 7.00          | N/mm              |                 |
| Puncture Resistance (23°C, 50.0 µm)            | 5             | kJ/m <sup>2</sup> | Internal Method |
| Thermal                                        | Nominal Value | Unit              | Test Method     |
| CLTE - Flow <sup>4</sup> (0.0500 mm)           | 3.5E-5        | cm/cm/°C          | ASTM D696       |
| Thermal Conductivity                           |               |                   | ASTM E1461      |
| -- <sup>5</sup>                                | 0.43          | W/m/K             |                 |
| -- <sup>6</sup>                                | 0.91          | W/m/K             |                 |
| Electrical                                     | Nominal Value | Unit              | Test Method     |
| Volume Resistivity <sup>7</sup> (23°C, 50 µm)  | 1.0E+16       | ohms·cm           | ASTM D257       |
| Dielectric Strength <sup>8</sup> (23°C, 50 µm) | 200           | kV/mm             | ASTM D149       |
| Dielectric Constant (23°C, 50 µm, 10 MHz)      | 3.6           |                   | ASTM D150       |
| Dissipation Factor (23°C, 50 µm, 10 MHz)       | 1.0E-3        |                   | ASTM D150       |

## Notes

<sup>1</sup> 24 hrs

<sup>2</sup> TM-VX-84

<sup>3</sup> 23°C

<sup>4</sup> below T<sub>g</sub>

<sup>5</sup> Through Plane

<sup>6</sup> In-Plane

<sup>7</sup> 100 V

<sup>8</sup> 0.25 inch electrode

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