Semitron® ESD 420V PEI Polyetherimide electro static dissipative shapes possess high strength and stiffness, and are not subject to dimensional change as a result of exposure to moisture. This grade in particular offers a dissipative performance in the 10E5 to 10E8 ohms per square range, and a heat deflection temperature of 419°F / 215°C. Due to these characteristics, Semitron® ESD 420V PEI is an excellent solution for device handling and test applications within the semiconductor and electronics industries.

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**Thermal Properties**

- **Melting temperature (DSC, 10°C / 50°F) / min**: ISO 11357-1/-3 °C
- **Glass transition temperature (DMA, tan delta)**: DMA °C 220
- **Coefficient of linear thermal expansion (-40 to 150°C) / (-40 to 300°C)**: W/(K.m)
- **Coefficient of linear thermal expansion (23 to 100°C) / (73°F to 210°F)**: μm/(m.K)
- **Coefficient of linear thermal expansion (23 to 150°C) / (73°F to 300°F)**: μm/(m.K)
- **Coefficient of linear thermal expansion (>150°C) / (>300°F)**: μm/(m.K)

**Mechanical Properties**

- **Tensile strength**: ISO 527-1/-2 (7) MPa 70
- **Tensile strain (elongation) at yield**: ISO 527-1/-2 (7) %
- **Tensile strain (elongation) at break**: ISO 527-1/-2 (7) % 1.5
- **Tensile modulus of elasticity**: ISO 527-1/-2 (9) MPa 5,450
- **Shear Strength**: ASTM D732 MPa -
- **Compressive stress at 1 / 2 / 5 % nominal strain**: ISO 604 (10) MPa 44 / 89 / 169
- **Compressive strength**: ISO 1032-9 % 112
- **Charpy impact strength - unnotched**: ISO 179-1/1eU kJ/m² 14.0
- **Charpy impact strength - notched**: ISO 179-1/1eA kJ/m² 2.0
- **Izod Impact notched**: ISO 179-1/1eA kJ/m² -
- **Flexural strength**: ISO 178 (12) MPa -
- **Flexural modulus of elasticity**: ISO 178 (12) MPa -
- **Rockwell M hardness (14)**: ISO 2039-2 - 112
- **Rockwell R hardness (14)**: ISO 2039-2 -

**Electric Properties**

- **Electric strength**: IEC 60243-1 (15) kV/mm -
- **Volume resistivity**: IEC 62631-3-1 Ohm.cm -
- **Surface resistivity**: ANSI/ESD STM 11.11 Ohm/sq. 10E5 - 10E8
- **Dielectric constant at 1 MHz**: IEC 62631-2-1 -
- **Dielectric dissipation at 1 MHz**: IEC 62631-2-1 -

**Miscellaneous**

- **Colour**: ISO 1183-1 g/cm³ 1.48
- **Density**: Black
- **Specific Gravity**: ISO 62 (16) %
- **Water absorption after 24h immersion in water of 23°C (73°F)**: ISO 62 (16) %
- **Water absorption at saturation in water of 23 °C (73°F)**: % 1.4
- **Coefficient of linear thermal expansion (-40 to 150°C) / (-40 to 300°C)**: μm/(m.K)
- **Coefficient of linear thermal expansion (23 to 100°C) / (73°F to 210°F)**: μm/(m.K)
- **Coefficient of linear thermal expansion (23 to 150°C) / (73°F to 300°F)**: μm/(m.K)
- **Coefficient of linear thermal expansion (>150°C) / (>300°F)**: μm/(m.K)

This table, mainly to be used for comparison purposes, is a valuable help in the choice of a material. The data listed here fall within the normal range of product properties of dry material. However, they are not guaranteed and they should not be used to establish material specification limits nor used alone as the basis of design. See the remaining notes on the next page.

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- The figures given for these properties are for the most part derived from raw material supplier data and other publications.
- Values for this property are only given here for amorphous materials and for materials that do not show a melting temperature (PBI, PAI & PI). DMA settings, oscillation amplitude of 0.20 mm; a frequency of 1 Hz; heating rate of 2°C/min. Temperature resistance over a period of min. 20,000 hours. After this period of time, there is a decrease in tensile strength – measured at 23 °C – of about 50 % as compared with the original value. The temperature value given here is thus based on the thermal-oxidative degradation which takes place and causes a reduction in properties. Note, however, that the maximum allowable service temperature depends in many cases essentially on the duration and the magnitude of the mechanical stresses to which the material is subjected.
- Impact strength decreasing with decreasing temperature, the minimum allowable service temperature is practically mainly determined by the extent to which the material is subjected to impact. The value given here is based on unfavourable impact conditions and may consequently not be considered as being the absolute practical limit.
- These estimated ratings, derived from raw material supplier data and other publications, are not intended to reflect hazards presented by the material under actual fire conditions. There is no 'UL File Number' available for these stock shapes.
- Test speed: either 5 mm/min or 50 mm/min [chosen acc. to ISO 10350-1 as a function of the ductile behaviour of the material (tough or brittle)] using type 1B tensile bars
- Test speed: either 0.2"/min or 2"/min or [chosen as a function of the ductile behavior of the material (brittle or tough)] using Type 1 tensile bars
- Test speed: 1 mm/min, using type 1B tensile bars
- Test specimens: bars 4 mm (thickness) x 10 mm x 80 mm ; test speed: 2 mm/min ; span: 64 mm. All tests are done at room temperature (23° / 73°F)
- Test specimens: cylinders Ø 8 mm x 16 mm, test speed 1 mm/min
- Test specimens: cylinders Ø 0.5" x 1", or square 0.5" x 1", test speed 0.05"/min
- Test specimens: bars 4 mm (thickness) x 10 mm x 80 mm ; test speed: 2 mm/min ; span: 64 mm.
- Test specimens: bars 0.25" (thickness) x 0.5" x 5" ; test speed: 0.11"/min ; span: 4"
- Measured on 10 mm, 0.4" thick test specimens.
- Test specimens: bars 0.25" (thickness) x 0.5" x 5" ; test speed: 0.11"/min ; span: 4"
- Measured on 10 mm, 0.4" thick test specimens.
- Measured on discs Ø 50 mm x 3 mm.
- Measured on 1/8" thick x 2" diameter or square
- Test procedure similar to Test Method A: “Pin-on-disk” as described in ISO 7148-2, Load 3MPa, sliding velocity= 0.33 m/s, mating plate steel Ra= 0.7-0.9 μm, tested at 23°C, 50%RH.
- Test using journal bearing system, 200 hrs, 118 ft/min, 42 PSI, steel shaft roughness 16±2 RMS, hardness Brinell of 180-200
- Test using Plastic Thrust Washer rotating against steel, 20 ft/min and 250 PSI, Stationary steel washer roughness 16±2 RMS, hardness Rockwell C 20-24
- Test using Plastic Thrust Washer rotating against steel, Step by step increase pressure, Test ends when plastic begins to deform or if temperature increases to 300°F.

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