

ForTii® T11

PPA–GF30 FR(40)

30% Glass Reinforced, PA4T, Electro–friendly, Halogen free and free of red phosphorous, Certified V–0 at 0.2mm

Print Date: 2024–06–20

ForTii® T11 has optimal toughness and is the best solution for (automotive) electrical components in harsh environments to minimize the risk of cracking and to provide design freedom and product reliability in terms of thermal shock ageing >1000 cycles. T11 passes JEDEC MSL 1 reflow performance (for specified thickness), reaches CTI ≥800V for heavy duty components, is all–color VDE approved and has electrical RTI rating of 140°C at 0,75 mm.

| PROPERTIES | TYPICAL DATA | UNIT | TEST METHOD |
|-------------------------------|---------------|------|--------------|
| RHEOLOGICAL PROPERTIES | | | |
| <i>DRY / COND</i> | | | |
| Molding shrinkage (parallel) | 0.3 / * | % | ISO 294–4 |
| Molding shrinkage (normal) | 1.2 / * | % | ISO 294–4 |
| MECHANICAL PROPERTIES | | | |
| <i>DRY / COND</i> | | | |
| Tensile modulus | 11500 / 12000 | MPa | ISO 527–1/–2 |
| Tensile modulus (–40°C) | 12000 / – | MPa | ISO 527–1/–2 |
| Tensile modulus (80°C) | 10800 / 7600 | MPa | ISO 527–1/–2 |
| Tensile modulus (100°C) | 10000 / – | MPa | ISO 527–1/–2 |
| Tensile modulus (120°C) | 8000 / – | MPa | ISO 527–1/–2 |
| Tensile modulus (140°C) | 5700 | MPa | ISO 527–1/–2 |
| Tensile modulus (160°C) | 5000 | MPa | ISO 527–1/–2 |
| Stress at break | 160 / 150 | MPa | ISO 527–1/–2 |
| Stress at break (–40°C) | 180 / – | MPa | ISO 527–1/–2 |
| Stress at break (80°C) | 130 / 90 | MPa | ISO 527–1/–2 |
| Stress at break (100°C) | 120 / – | MPa | ISO 527–1/–2 |
| Stress at break (120°C) | 105 / – | MPa | ISO 527–1/–2 |
| Stress at break (140°C) | 80 | MPa | ISO 527–1/–2 |
| Stress at break (160°C) | 70 | MPa | ISO 527–1/–2 |
| Strain at break | 2.2 / 2.1 | % | ISO 527–1/–2 |

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Property Data

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| <i>PROPERTIES</i> | <i>TYPICAL DATA</i> | <i>UNIT</i> | <i>TEST METHOD</i> |
|--|---------------------|-------------------|--------------------|
| Strain at break (-40°C) | 2.3 / - | % | ISO 527-1/-2 |
| Strain at break (80°C) | 2.1 / 3.2 | % | ISO 527-1/-2 |
| Strain at break (100°C) | 2.1 / - | % | ISO 527-1/-2 |
| Strain at break (120°C) | 2.9 / - | % | ISO 527-1/-2 |
| Strain at break (140°C) | 3.6 | % | ISO 527-1/-2 |
| Strain at break (160°C) | 4.5 | % | ISO 527-1/-2 |
| Flexural modulus | 11000 / 11500 | MPa | ISO 178 |
| Flexural strength | 255 / 230 | MPa | ISO 178 |
| Flexural modulus (120°C) | 8200 | MPa | ISO 178 |
| Flexural modulus (160°C) | 5000 | MPa | ISO 178 |
| Charpy impact strength (+23°C) | 60 / - | kJ/m ² | ISO 179/1eU |
| Charpy notched impact strength (+23°C) | 8 / - | kJ/m ² | ISO 179/1eA |

THERMAL PROPERTIES

DRY / COND

| | | | |
|--|----------|--------|------------------------|
| Melting temperature (10°C/min) | 325 / * | °C | ISO 11357-1/-3 |
| Temp. of deflection under load (1.80 MPa) | 305 / * | °C | ISO 75-1/-2 |
| Coeff. of linear therm. expansion (parallel) | 0.2 / * | E-4/°C | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion (normal) | 0.65 / * | E-4/°C | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion (parallel) | 0.3 | E-4/°C | ASTM D696 |
| Coeff. of linear therm. expansion (normal) | 0.35 | E-4/°C | ASTM D696 |
| Burning Behav. at 1.5 mm nom. thickn. | V-0 / * | class | IEC 60695-11-10 |
| Thickness tested | 1.5 / * | mm | IEC 60695-11-10 |
| UL recognition | Yes / * | - | - |
| Burning Behav. at 3.0 mm nom. thickn. | V-0 / * | class | IEC 60695-11-10 |
| Thickness tested | 3 / * | mm | IEC 60695-11-10 |
| UL recognition | Yes / * | - | - |
| Relative Temperature Index – electrical | 140 | °C | UL746B |
| RTI electrical (Thickness (1) tested) | 0.35 | mm | UL746B |
| Thermal Index 5000 hrs | 170 | °C | IEC 60216/ISO 527-1/-2 |

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|---|--------------------------|-------------------|--------------------|
| <i>ELECTRICAL PROPERTIES</i> | | | |
| | <i>DRY / COND</i> | | |
| Volume resistivity | >1E13 / >1E13 | Ohm*m | IEC 62631-3-1 |
| Electric strength | 33 / 33 | kV/mm | IEC 60243-1 |
| Comparative tracking index | 600 / - | V | IEC 60112 |
| Comparative Tracking Index (above 600V) | ≥800V | V | Sim. to IEC 60112 |
| Relative permittivity (100Hz) | 4.2 / 4.2 | - | IEC 62631-2-1 |
| Relative permittivity (1 MHz) | 3.9 / 3.9 | - | IEC 62631-2-1 |
| Relative permittivity (1GHz) | 3.8 / 3.9 | - | IEC 61189-2-721 |
| Relative permittivity (10GHz) | 3.8 / 3.9 | - | IEC 61189-2-721 |
| <i>OTHER PROPERTIES</i> | | | |
| | <i>DRY / COND</i> | | |
| Humidity absorption | 1.6 / * | % | Sim. to ISO 62 |
| Density | 1460 / - | kg/m ³ | ISO 1183 |

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