

# ForTii® F11

## 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: 2024–09–17

ForTii® F11 has an excellent balance in flow, toughness and stiffness, enabling thin walls or complicated geometries for E&E applications. F11 is all–color VDE approved, has a high RTI electrical rating of 140°C at 0.75 mm and a CTI ≥800V rating to secure thermal ageing and electrical performance.

| PROPERTIES                    | TYPICAL DATA      | UNIT | TEST METHOD  |
|-------------------------------|-------------------|------|--------------|
| <b>RHEOLOGICAL PROPERTIES</b> |                   |      |              |
|                               | <b>DRY / COND</b> |      |              |
| Molding shrinkage (parallel)  | 0.35 / *          | %    | ISO 294–4    |
| Molding shrinkage (normal)    | 1.2 / *           | %    | ISO 294–4    |
| <b>MECHANICAL PROPERTIES</b>  |                   |      |              |
|                               | <b>DRY / COND</b> |      |              |
| Tensile modulus               | 11500 / 12000     | MPa  | ISO 527–1/–2 |
| Tensile modulus (–40°C)       | 12000 / –         | MPa  | ISO 527–1/–2 |
| Tensile modulus (40°C)        | 11300 / –         | 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               | 150 / 140         | MPa  | ISO 527–1/–2 |
| Stress at break (–40°C)       | 175 / –           | MPa  | ISO 527–1/–2 |
| Stress at break (40°C)        | 145 / –           | MPa  | ISO 527–1/–2 |
| Stress at break (80°C)        | 125 / 85          | MPa  | ISO 527–1/–2 |
| Stress at break (100°C)       | 115 / –           | MPa  | ISO 527–1/–2 |
| Stress at break (120°C)       | 100 / –           | MPa  | ISO 527–1/–2 |
| Stress at break (140°C)       | 80                | MPa  | 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> |
|--|---------------------|--------------------------|--------------------|
| Stress at break (160°C)                      | 70                  | MPa                      | ISO 527-1/-2       |
| Strain at break                              | 2 / 1.9             | %                        | ISO 527-1/-2       |
| Strain at break (-40°C)                      | 2.2 / -             | %                        | ISO 527-1/-2       |
| Strain at break (40°C)                       | 1.9 / -             | %                        | ISO 527-1/-2       |
| Strain at break (80°C)                       | 1.9 / 2.9           | %                        | ISO 527-1/-2       |
| Strain at break (100°C)                      | 2 / -               | %                        | ISO 527-1/-2       |
| Strain at break (120°C)                      | 2.6 / -             | %                        | ISO 527-1/-2       |
| Strain at break (140°C)                      | 3.3                 | %                        | ISO 527-1/-2       |
| Strain at break (160°C)                      | 3.8                 | %                        | ISO 527-1/-2       |
| Flexural modulus                             | 11000 / 11500       | MPa                      | ISO 178            |
| Flexural strength                            | 245 / 220           | MPa                      | ISO 178            |
| Flexural modulus (120°C)                     | 8200                | MPa                      | ISO 178            |
| Flexural modulus (160°C)                     | 5000                | MPa                      | ISO 178            |
| Charpy impact strength (+23°C)               | 50 / 50             | kJ/m <sup>2</sup>        | ISO 179/1eU        |
| Charpy notched impact strength (+23°C)       | 7.5 / 7.5           | kJ/m <sup>2</sup>        | ISO 179/1eA        |
| <b><i>THERMAL PROPERTIES</i></b>             |                     | <b><i>DRY / COND</i></b> |                    |
| 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 / *             | -                        | -                  |

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| <i>PROPERTIES</i>                       | <i>TYPICAL DATA</i> | <i>UNIT</i> | <i>TEST METHOD</i>     |
|---|---------------------|-------------|------------------------|
| Relative Temperature Index – electrical | 140                 | °C          | UL746B                 |
| RTI electrical (Thickness (1) tested)   | 0.75                | mm          | UL746B                 |
| Thermal Index 5000 hrs                  | 170                 | °C          | IEC 60216/ISO 527-1/-2 |

### ***ELECTRICAL PROPERTIES***

#### ***DRY / COND***

|   |               |       |                   |
|---|---------------|-------|-------------------|
| Volume resistivity                      | >1E13 / >1E13 | Ohm*m | IEC 62631-3-1     |
| Electric strength                       | 33 / 33       | kV/mm | IEC 60243-1       |
| Comparative tracking index              | 600 / 600     | V     | IEC 60112         |
| Comparative Tracking Index (above 600V) | 875           | 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   |

### ***OTHER PROPERTIES***

#### ***DRY / COND***

|                     |          |                   |                |
|---------------------|----------|-------------------|----------------|
| Humidity absorption | 1.6 / *  | %                 | Sim. to ISO 62 |
| Density             | 1460 / – | kg/m <sup>3</sup> | ISO 1183       |

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