# TECAFIL PEI 9085 natural - 1.75 mm - Filament

**Chemical Designation**
PEI (Polyetherimide)

**Colour**
beige opaque

**Density**
1.34 g/cm$^3$ (*2)

**Main features**
- inherent flame retardant
- high dimensional stability
- high thermal and mechanical capacity
- resistance against high energy radiation

**Target Industries**
- electronics
- automotive industry
- mechanical engineering
- aircraft and aerospace interiors
- aircraft and aerospace technology

| General material information | condition | value | unit | test method | | comment |
|---|---|---|---|---|---|---|
| Diameter | | 1,75 +/- 0,05 | mm | - | | (1) standard spool body<br>(2) do not dry spool >120°C<br>(3) Ø 1,75mm |
| Spool measurements | holder | Ø 52 | mm | - | | |
| Spool measurements | width | 55 | mm | - | | |
| Spool measurements | outer diameter | Ø 200 | mm | - | 1) | |
| Spool Material | | Polycarbonate | | - | 2) | |
| Filament Load per Spool | | 500 | g | - | | |
| Filament Length per Spool | | 147 | m | - | 3) | |

| Mechanical properties | condition | value | unit | test method | | comment |
|---|---|---|---|---|---|---|
| Tensile strength | 5mm/min, Orientation XY | 83,7 | MPa | DIN EN ISO 527-2 | 1) | (1) (*5) , (*6)<br>(2) (*5) , (*6)<br>(3) (*5) , (*6)<br>(4) (*5) , (*6)<br>(5) (*5) , (*6)<br>(6) (*5) , (*6)<br>(7) (*5) , (*6)<br>(8) (*5) , (*6)<br>(9) (*5) , (*6)<br>(10) (*5) , (*6)<br>(11) (*5) , (*6)<br>(12) (*5) , (*6)<br>(13) (*5) , (*6)<br>(14) (*5) , (*6)<br>(15) (*5) , (*6)<br>(16) (*5) , (*6)<br>(17) (*5) , (*6)<br>(18) (*5) , (*6) |
| Tensile strength | 5mm/min, Orientation XZ | 88,1 | MPa | DIN EN ISO 527-2 | 2) | |
| Tensile strength | 5mm/min, Orientation ZX | 49,3 | MPa | DIN EN ISO 527-2 | 3) | |
| Modulus of elasticity (tensile test) | 5mm/min, Orientation XY | 2512,0 | MPa | DIN EN ISO 527-2 | 4) | |
| Modulus of elasticity (tensile test) | 5mm/min, Orientation XZ | 2568,0 | MPa | DIN EN ISO 527-2 | 5) | |
| Modulus of elasticity (tensile test) | 5mm/min, Orientation ZX | 2452,0 | MPa | DIN EN ISO 527-2 | 6) | |
| Elongation at yield (tensile test) | 5mm/min, Orientation XY | 6,5 | % | DIN EN ISO 527-2 | 7) | |
| Elongation at yield (tensile test) | 5mm/min, Orientation XZ | 6,9 | % | DIN EN ISO 527-2 | 8) | |
| Elongation at yield (tensile test) | 5mm/min, Orientation ZX | 2,6 | % | DIN EN ISO 527-2 | 9) | |
| Elongation at break (tensile test) | 5mm/min, Orientation XY | 9,7 | % | DIN EN ISO 527-2 | 10) | |
| Elongation at break (tensile test) | 5mm/min, Orientation XZ | 20,8 | % | DIN EN ISO 527-2 | 11) | |
| Elongation at break (tensile test) | 5mm/min, Orientation ZX | 2,6 | % | DIN EN ISO 527-2 | 12) | |
| Flexural strength | 2mm/min, Orientation XY | 91,0 | MPa | DIN EN ISO 178 | 13) | |
| Flexural strength | 2mm/min, Orientation ZX | 93,0 | MPa | DIN EN ISO 178 | 14) | |
| Modulus of elasticity (flexural test) | 2mm/min, Orientation XY | 2120,0 | MPa | DIN EN ISO 178 | 15) | |
| Modulus of elasticity (flexural test) | 2mm/min, Orientation ZX | 2500,0 | MPa | DIN EN ISO 178 | 16) | |
| Elongation at break (flexural test) | 2mm/min, Orientation XY | no break | % | DIN EN ISO 178 | 17) | |
| Elongation at break (flexural test) | 2mm/min, Orientation ZX | 4,1 | % | DIN EN ISO 178 | 18) | |

| Thermal properties | condition | value | unit | test method | | comment |
|---|---|---|---|---|---|---|
| Glass transition temperature | | 180 | °C | ASTM D 3418 | 1) | (1) (*2)<br>(2) (*2)<br>(3) (*2)<br>(4) (*2)<br>(5) (*2)<br>(6) (*2) |
| Melting temperature | | - | °C | DIN EN ISO 11357 | 2) | |
| Deflection temperature | HDT-A | 153 | °C | ISO-R 75 Method A | 3) | |
| Service temperature | short term | 170 | °C | - | 4) | |
| Service temperature | long term | 150 | °C | - | 5) | |
| Thermal expansion (CLTE) | | - | $10^{-5}$ K$^{-1}$ | DIN EN ISO 11359-1;2 | 6) | |

| Other properties | condition | value | unit | test method | | comment |
|---|---|---|---|---|---|---|
| Moisture absorption | | 0,39 | % | DIN EN ISO 62 | 1) | (1) (*2)<br>(2) (*2)<br>(3) (*5) , (*6)<br>(4) (*5) , (*6)<br>(5) (*5) , (6*)<br>(6) (*5) , (6*)<br>(7) (*5) , (*6)<br>(8) (*5) , (*6)<br>(9) (*2) |
| Flammability (UL94) | 125x13x1,5mm | V0 | | DIN IEC 60695-11-10; | 2) | |
| Flammability | 60 sec. Vertical Bunsen Burner test, FAR §25.853 (a) and Appendix F, Part I, para. (a)(1)(i) | 1,5 | mm | FAR 25.853 | 3) | |
| Flammability | 12 sec. Vertical Bunsen Burner test, FAR §25.853 (a) and Appendix F, Part I, para. (a)(1)(ii) | 1,5 | mm | FAR 25.853 | 4) | |
| Flammability | 15 sec. Horizontal Bunsen Burner test, FAR §25.853 (a) and Appendix F, Part I, para. (a)(1)(iv) | 1,5 | mm | FAR 25.853 | 5) | |
| Flammability | Heat Release, as per FAR §25.853 (d) and Appendix F, Part IV | 1,5 | mm | FAR 25.853 | 6) | |
| Flammability | Smoke density, as per FAR §25.853 (d) and Appendix F, Part V | 1,5 | mm | FAR 25.853 | 7) | |
| Flammability | Gas Toxicity, as per Boeing BSS 7239 | 1,5 | mm | - | 8) | |
| Melt flow index (MFI) | 295°C / 6,6kg | 8,9 | g/10 min | DIN EN ISO 1133 | 9) | |

| *Processing parameter* | *condition* | *value* | *unit* | *test method* | | *comment* |
|---|---|---|---|---|---|---|
| Nozzle temperature | | 360 - 390 | °C | - | | (1) required |
| Max. melt temperature | | 410 | °C | - | | |
| Print bed temperature | | 160 - 190 | °C | - | | |
| Build chamber temperature | | 150 - 170 | °C | - | 1) | |
| Nozzle diameter | | 0,4 | mm | - | | |
| Print speed | | 30 - 40 | mm/s | - | | |
| Fan speed | | 0 | % | - | | |

| *Predrying* | *condition* | *value* | *unit* | *test method* | | *comment* |
|---|---|---|---|---|---|---|
| Drying temperature | | 120 | °C | - | 1) | (1) (*4) |
| Drying time | | 8 | h | - | | |

- To achieve optimum mechanical properties, it is recommended to pre-dry the material with the above mentioned parameters.
  (*1) Values measured on injection moulded test specimens
  (*2) Values measured on the raw material
  (*3) The exact parameters depend on the printer used.
  (*4) Do not exceed maximum drying temperature of 120°C
  (*5) Properties tested on printed specimens
  (*6) Specimens printed on Minifactory Ultra

- The filament should preferably be stored in dry, normal temperature rooms and protected from direct sunlight.

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