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# Crastin® FR684NH1 NC010

## THERMOPLASTIC POLYESTER RESIN

Crastin® FR684NH1 is a 25% Glass Reinforced, Flame Retardant, Non-Halogenated, Polybutylene Terephthalate

## Product information

| | | |
|---|---|---|
| Resin Identification | PBT-GF25 FR(40+30) | ISO 1043 |
| Part Marking Code | >PBT-GF25 FR(40+30)< | ISO 11469 |

## Rheological properties

| | | | |
|---|---|---|---|
| Melt mass-flow rate | 7 | g/10min | ISO 1133 |
| Melt mass-flow rate, Temperature | 250 | °C | |
| Melt mass-flow rate, Load | 2.16 | kg | |
| Moulding shrinkage, parallel | 0.5 | % | ISO 294-4, 2577 |
| Moulding shrinkage, normal | 1.2 | % | ISO 294-4, 2577 |
| Flow length | 280 | mm | |
| Flow length - pressure | 110 | MPa | |
| Flow length - width/thickness | 2 | mm | |

## Typical mechanical properties

| | | | |
|---|---|---|---|
| Tensile modulus | 9400 | MPa | ISO 527-1/-2 |
| Tensile stress at break, 5mm/min | 95 | MPa | ISO 527-1/-2 |
| Tensile strain at break, 5mm/min | 2.5 | % | ISO 527-1/-2 |
| Flexural modulus | 8000[1] | MPa | ISO 178 |
| Flexural strength | 140[1] | MPa | ISO 178 |
| Flexural strain at failure | 2.5[1] | % | ISO 178 |
| Charpy impact strength, 23°C | 43 | kJ/m² | ISO 179/1eU |
| Charpy impact strength, -30°C | 46 | kJ/m² | ISO 179/1eU |
| Charpy notched impact strength, 23°C | 7.5 | kJ/m² | ISO 179/1eA |
| Charpy notched impact strength, -30°C | 6.8 | kJ/m² | ISO 179/1eA |
| Poisson's ratio | 0.34 | | |

[1]: Report from SR 01650498 - EATON CORPORATION on Crastin® FR684NH1 NC010. Date ; 2024-DH-111. Lot: ACCSKZ2101; Report#: 24DEH083

## Thermal properties

| | | | |
|---|---|---|---|
| Melting temperature, 10°C/min | 223 | °C | ISO 11357-1/-3 |
| Glass transition temperature, 10°C/min | 60 | °C | ISO 11357-1/-3 |
| Temperature of deflection under load, 1.8 MPa | 205 | °C | ISO 75-1/-2 |
| Ball pressure test | 220 | °C | IEC 60695-10-2 |
| Coeff. of linear therm. expansion, parallel, -40-23°C | 23 | E-6/K | ISO 11359-1/-2 |
| CLTE, Parallel, 23-55°C(73-130°F) | 29 | E-6/K | ASTM E 831 |
| Coeff. of linear therm. expansion, parallel, 55-160°C | 20 | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, normal, -40-23°C | 66 | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, normal, 55-160°C | 127 | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, Normal,23-55°C (73-130°F) | 122 | E-6/K | ASTM E 831 |
| RTI, electrical, 0.75mm | 130 | °C | UL 746B |
| RTI, electrical, 1.5mm | 130 | °C | UL 746B |
| RTI, electrical, 3.0mm | 130 | °C | UL 746B |

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| | | | |
|---|---|---|---|
| RTI, impact, 0.75mm | 125 | °C | UL 746B |
| RTI, impact, 1.5mm | 125 | °C | UL 746B |
| RTI, impact, 3.0mm | 125 | °C | UL 746B |
| RTI, strength, 0.75mm | 140 | °C | UL 746B |
| RTI, strength, 1.5mm | 140 | °C | UL 746B |
| RTI, strength, 3.0mm | 140 | °C | UL 746B |
| TGA curve | available | | ISO 11359-1/-2 |

## Flammability

| | | | |
|---|---|---|---|
| Burning Behav. at 1.5mm nom. thickn. | V-0 | class | IEC 60695-11-10 |
| Thickness tested | 1.5 | mm | IEC 60695-11-10 |
| UL recognition | yes | | UL 94 |
| Burning Behav. at thickness h | V-0 | class | IEC 60695-11-10 |
| Thickness tested | 0.4 | mm | IEC 60695-11-10 |
| UL recognition | yes | | UL 94 |
| Oxygen index | 40 | % | ISO 4589-1/-2 |
| Glow Wire Flammability Index, 0.4mm | 960 | °C | IEC 60695-2-12 |
| Glow Wire Flammability Index, 0.75mm | 960 | °C | IEC 60695-2-12 |
| Glow Wire Flammability Index, 1.0mm | 960 | °C | IEC 60695-2-12 |
| Glow Wire Flammability Index, 1.5mm | 960 | °C | IEC 60695-2-12 |
| Glow Wire Flammability Index, 3.0mm | 960 | °C | IEC 60695-2-12 |
| Glow Wire Ignition Temperature, 0.75mm | 750 | °C | IEC 60695-2-13 |
| Glow Wire Ignition Temperature, 0.4mm | 750 | °C | IEC 60695-2-12 |
| Glow Wire Ignition Temperature, 1.0mm | 750 | °C | IEC 60695-2-13 |
| Glow Wire Ignition Temperature, 1.5mm | 750 | °C | IEC 60695-2-13 |
| Glow Wire Ignition Temperature, 3.0mm | 800 | °C | IEC 60695-2-13 |
| Railway classification | R22 | | EN 45545-2 |
| Railway classification rating | HL1 | | EN 45545-2 |

## Electrical properties

| | | | |
|---|---|---|---|
| Volume resistivity | >1E13 | Ohm.m | IEC 62631-3-1 |
| Surface resistivity | >1E15 | Ohm | IEC 62631-3-2 |
| Electric strength | 42 | kV/mm | IEC 60243-1 |
| Comparative tracking index | 600 | | IEC 60112 |
| Comparative tracking index, 23 °C | 0 | PLC | UL 746A |

## Physical/Other properties

| | | | |
|---|---|---|---|
| Humidity absorption, 2mm | 0.1[DS] | % | Sim. to ISO 62 |
| Water absorption, 2mm | 0.25[DS] | % | Sim. to ISO 62 |
| Density | 1520 | kg/m³ | ISO 1183 |

[DS]: Derived from similar grade

## VDA Properties

| | | | |
|---|---|---|---|
| Emission of organic compounds | 39 | µgC/g | VDA 277 |

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## Injection

| | | |
|---|---|---|
| Drying Recommended | yes | |
| Drying Temperature | 120 | °C |
| Drying Time, Dehumidified Dryer | 2 - 4 | h |
| Processing Moisture Content | ≤0.02 | % |
| Melt Temperature Optimum | 250 | °C |
| Min. melt temperature | 240 | °C |
| Max. melt temperature | 260 | °C |
| Mold Temperature Optimum | 80 | °C |
| Min. mould temperature | 60 | °C |
| Max. mould temperature | 130 | °C |
| Hold pressure range | ≥60 | MPa |
| Hold pressure time | 3 | s/mm |
| Back pressure | As low as possible | MPa |
| Ejection temperature | 170 | °C |

## Characteristics

| | |
|---|---|
| Processing | Injection Moulding |
| Delivery form | Pellets |
| Additives | Release agent, Flame retardant, Non-halogenated/Red phosphorous free flame retardant |
| Special characteristics | Flame retardant |

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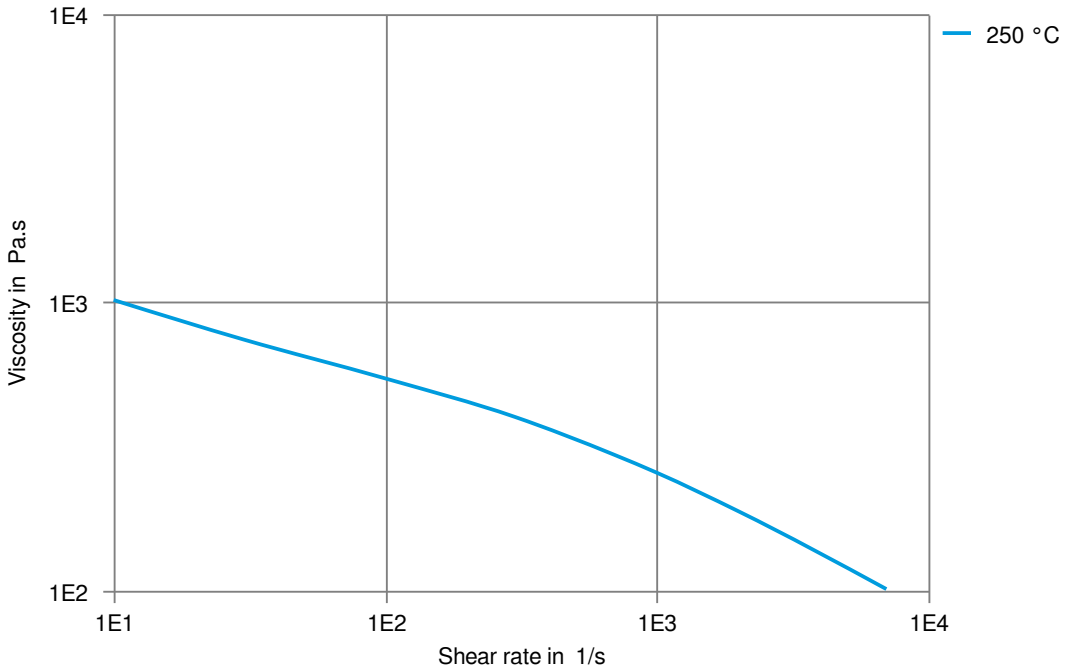
## Viscosity-shear rate



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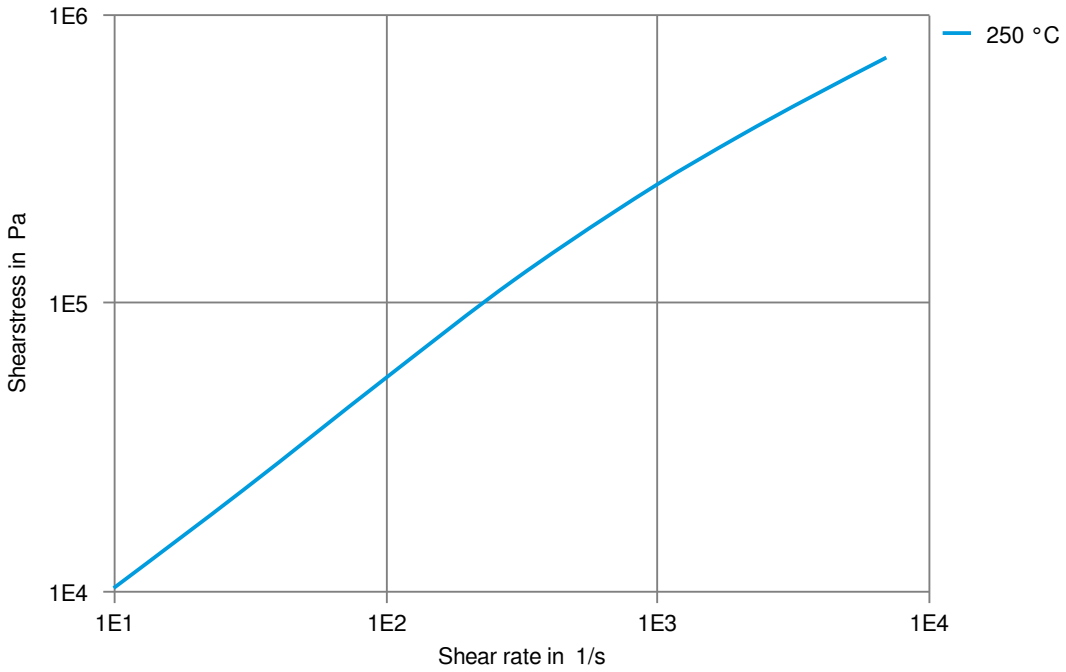
## Shearstress-shear rate



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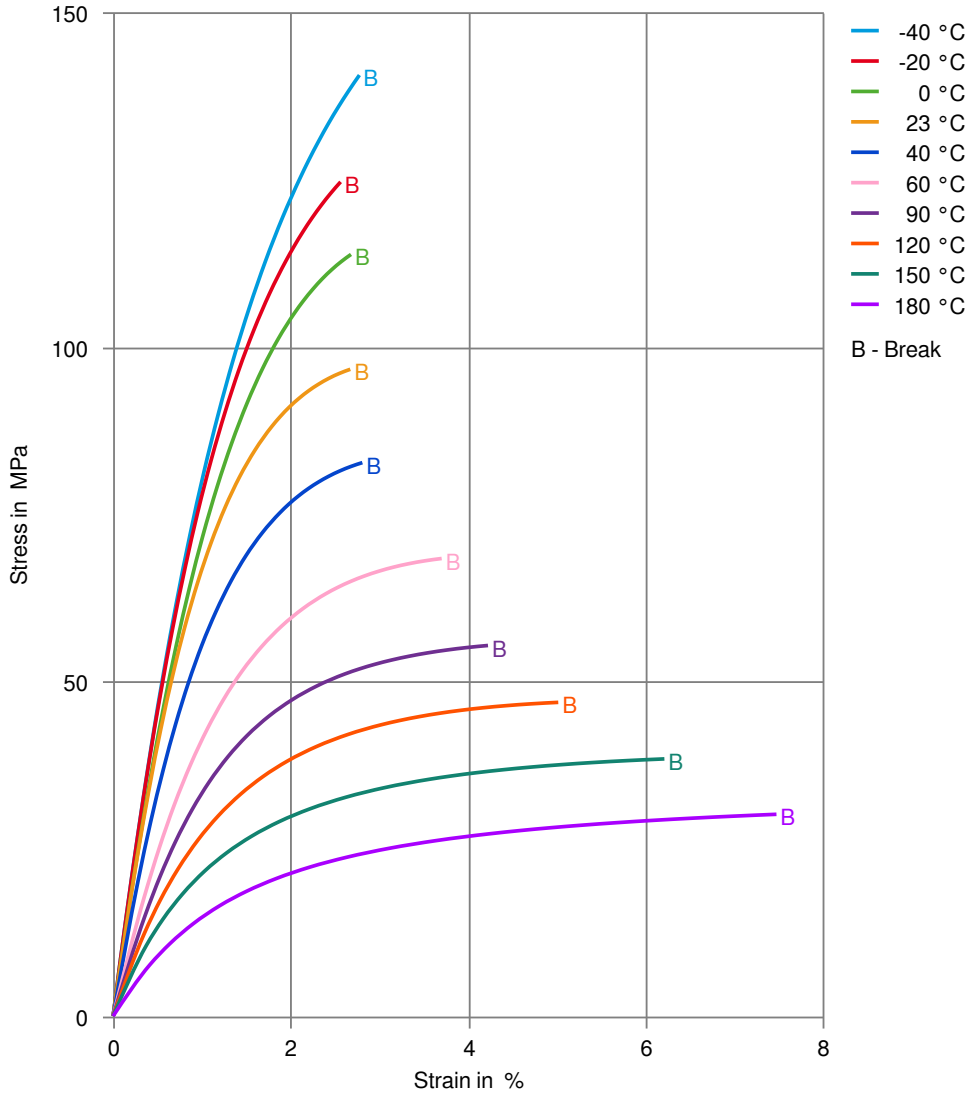
## Stress-strain



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## Secant modulus-strain