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# Zytel® HTNFE350064 BK544

## HIGH PERFORMANCE POLYAMIDE RESIN

Zytel® HTN high performance polyamide resins feature high retention of properties upon exposure to elevated temperature, to high moisture, and to harsh chemical environments. Polymer families and grades of Zytel® HTN are tailored to optimize performance as well as processability.

Typical applications with Zytel® HTN include demanding applications in the automotive, electrical and electronics, domestic appliances, and construction industries.

Zytel® HTNFE350064 BK544 is a carbon fiber reinforced, toughened, heat stabilised, conductive high performance polyamide resin developed for static dissipative applications. It is also a PPA resin.

## Product information

| | | |
|---|---|---|
| Resin Identification | PA-ICF15 | ISO 1043 |
| Part Marking Code | >PA-ICF15< | ISO 11469 |
| Part Marking Code | >PPA-ICF< | SAE J1344 |
| ISO designation | ISO 16396-PA-I,CF,M1CGHRSZ,S10-100 | |

## Rheological properties

| | dry/cond. | | |
|---|---|---|---|
| Temperature | 325 / * | °C | |
| Load | 5 / * | kg | |
| Melt mass-flow rate | 40 / * | g/10min | ISO 1133 |
| Viscosity number | 105 / * | $cm^3/g$ | ISO 307, 1628 |
| Moulding shrinkage, parallel | 0.2 / - | % | ISO 294-4, 2577 |
| Moulding shrinkage, normal | 0.5 / - | % | ISO 294-4, 2577 |

## Typical mechanical properties

| | dry/cond. | | |
|---|---|---|---|
| Tensile modulus | 10400 / 11000 | MPa | ISO 527-1/-2 |
| Tensile stress at break, 5mm/min | 168 / 162 | MPa | ISO 527-1/-2 |
| Tensile strain at break, 5mm/min | 2.4 / 2.3 | % | ISO 527-1/-2 |
| Flexural modulus | 8700 / - | MPa | ISO 178 |
| Flexural strength | 240 / - | MPa | ISO 178 |
| Charpy impact strength, 23°C | 48 / - | $kJ/m^2$ | ISO 179/1eU |
| Charpy notched impact strength, 23°C | 6 / - | $kJ/m^2$ | ISO 179/1eA |
| Charpy notched impact strength, -40°C | 3 / - | $kJ/m^2$ | ISO 179/1eA |
| Poisson's ratio | 0.34 / 0.34 | | |

## Thermal properties

| | dry/cond. | | |
|---|---|---|---|
| Melting temperature, 10°C/min | 305 / * | °C | ISO 11357-1/-3 |
| Temperature of deflection under load, 1.8 MPa | 258 / * | °C | ISO 75-1/-2 |
| Coeff. of linear therm. expansion, parallel, -40-23°C | 17 / * | E-6/K | ISO 11359-1/-2 |
| Coefficient of linear thermal expansion (CLTE), parallel | 14 / * | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, parallel, 55-160°C | 15 / * | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, normal, -40-23°C | 80 / * | E-6/K | ISO 11359-1/-2 |
| Coefficient of linear thermal expansion (CLTE), normal | 83 / * | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, normal, 55-160°C | 85 / * | E-6/K | ISO 11359-1/-2 |
| Thermal conductivity, flow | 0.46 | W/(m K) | ISO 22007-2 |
| Specific heat capacity of melt | 2600 | J/(kg K) | ISO 22007-4 |

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| | | | |
|---|---|---|---|
| Specific heat capacity solid | 1120 | J/(kg K) | ISO 22007-4 |
| TGA curve | available | | ISO 11359-1/-2 |

## Flammability

| | | | |
|---|---|---|---|
| FMVSS Class | B | | ISO 3795 (FMVSS 302) |
| Burning rate, Thickness 1 mm | <80 | mm/min | ISO 3795 (FMVSS 302) |

## Electrical properties

| | dry/cond. | | |
|---|---|---|---|
| Volume resistivity | 1000 / - | Ohm.m | IEC 62631-3-1 |
| Comparative tracking index | - / 175 | | IEC 60112 |
| Volume resistivity, conductive plastics | 1000 / - | Ohm.m | ASTM D 4496 |

## Physical/Other properties

| | dry/cond. | | |
|---|---|---|---|
| Density | 1200 / - | kg/m³ | ISO 1183 |

## Injection

| | | |
|---|---|---|
| Drying Recommended | yes | |
| Drying Temperature | 100 | °C |
| Drying Time, Dehumidified Dryer | 6 - 8 | h |
| Processing Moisture Content | ≤0.1 | % |
| Melt Temperature Optimum | 325 | °C |
| Min. melt temperature | 320 | °C |
| Max. melt temperature | 330 | °C |
| Mold Temperature Optimum | 95 | °C |
| Min. mould temperature | 85 | °C |
| Max. mould temperature | 105 | °C |
| Ejection temperature | 263 | °C |

## Characteristics

| | |
|---|---|
| Processing | Injection Moulding |
| Delivery form | Pellets |
| Additives | Release agent |
| Special characteristics | Increased electrical conductivity, Static dissipative, Heat stabilised or stable to heat |

## Additional information

| | |
|---|---|
| Injection molding | During molding, use proper protective equipment and adequate ventilation. Avoid exposure to fumes and limit the hold up time and temperature of the resin in the machine. Purge degraded resin carefully with HDPE. |

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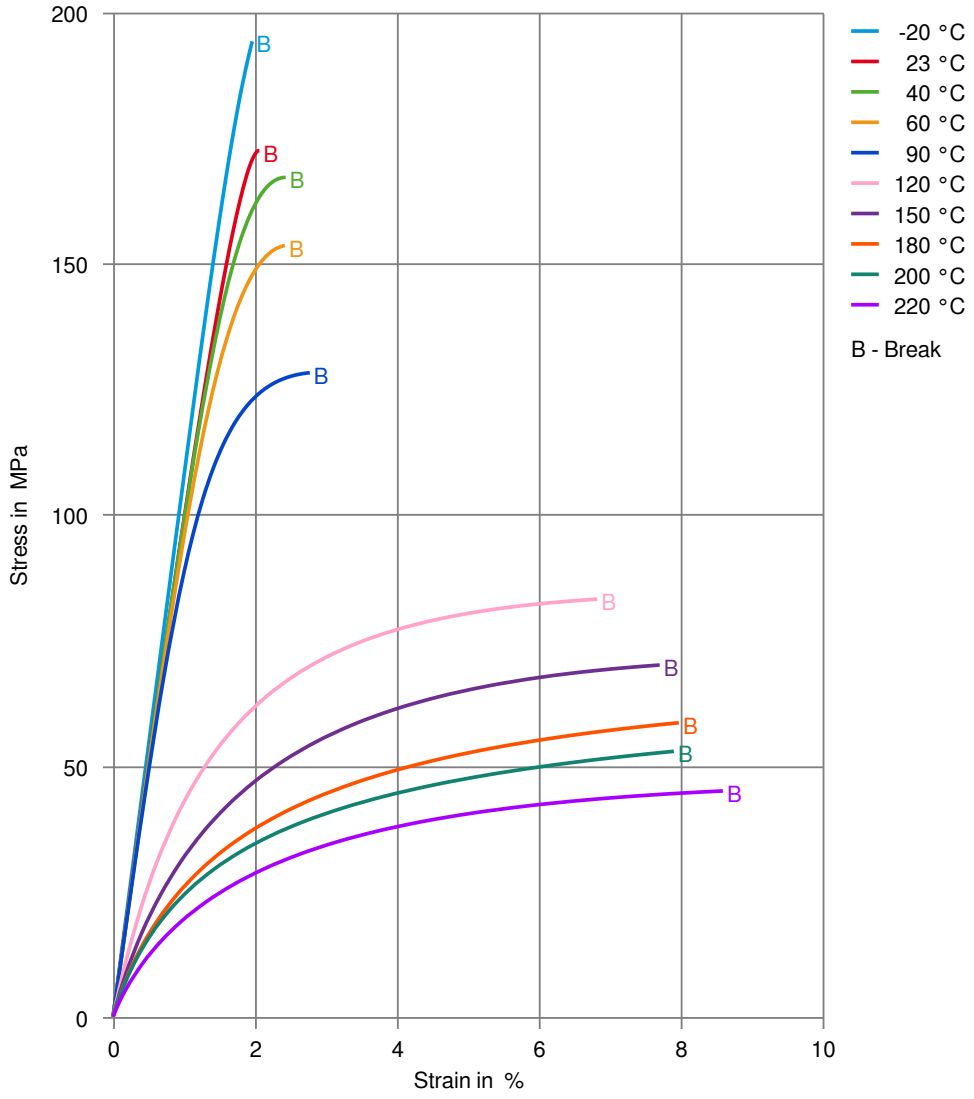
### Automotive

| OEM | STANDARD |
|---|---|
| Ford | WSS-M98P14-A3 |

### Stress-strain (dry)



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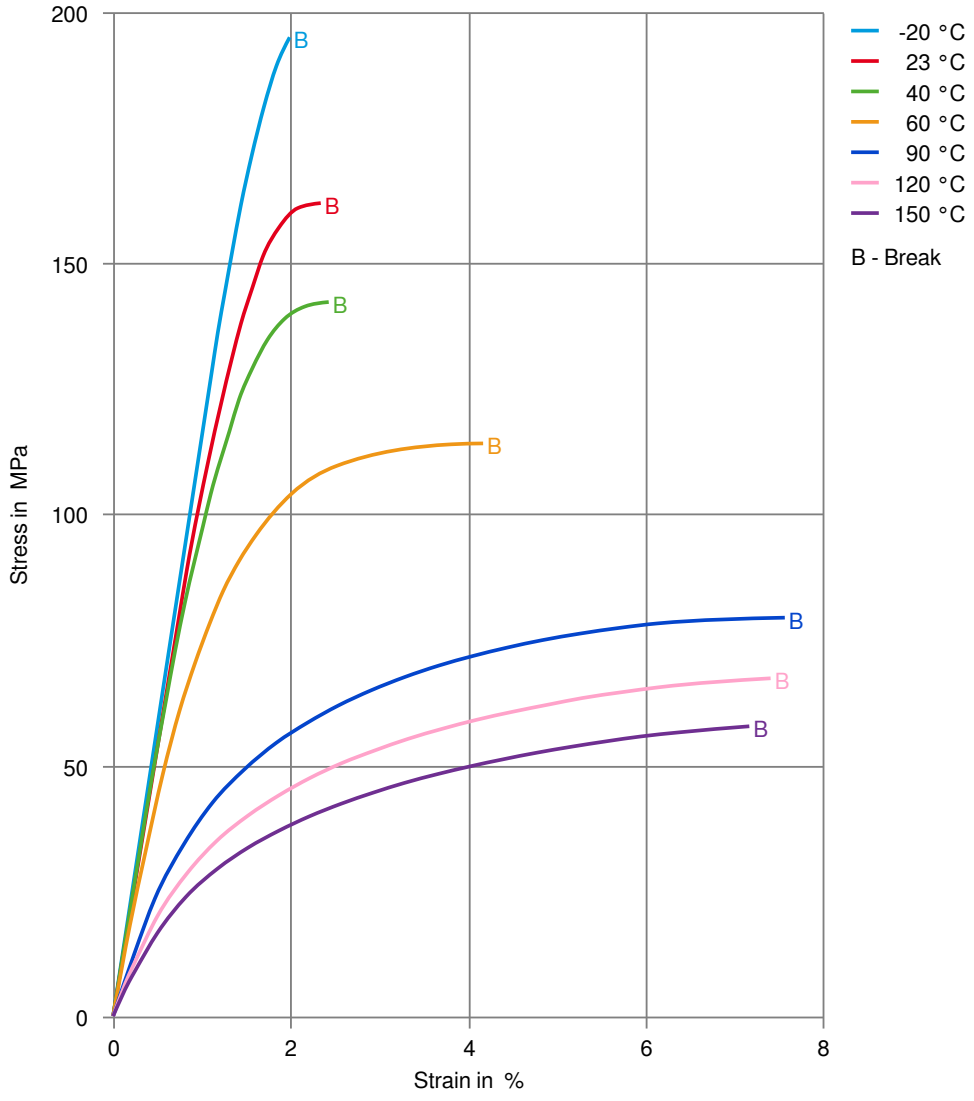
## HIGH PERFORMANCE POLYAMIDE RESIN

### Stress-strain (cond.)



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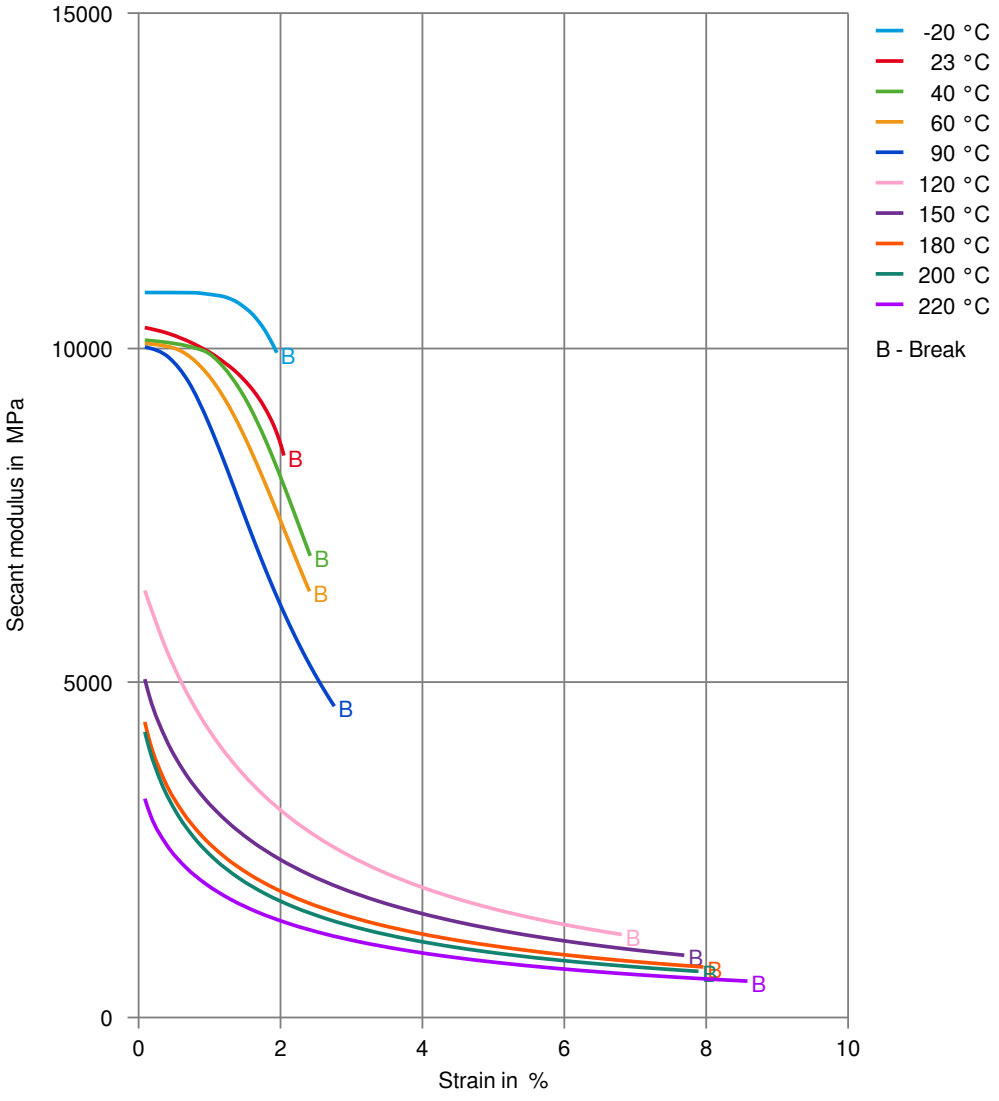
## HIGH PERFORMANCE POLYAMIDE RESIN

### Secant modulus-strain (dry)



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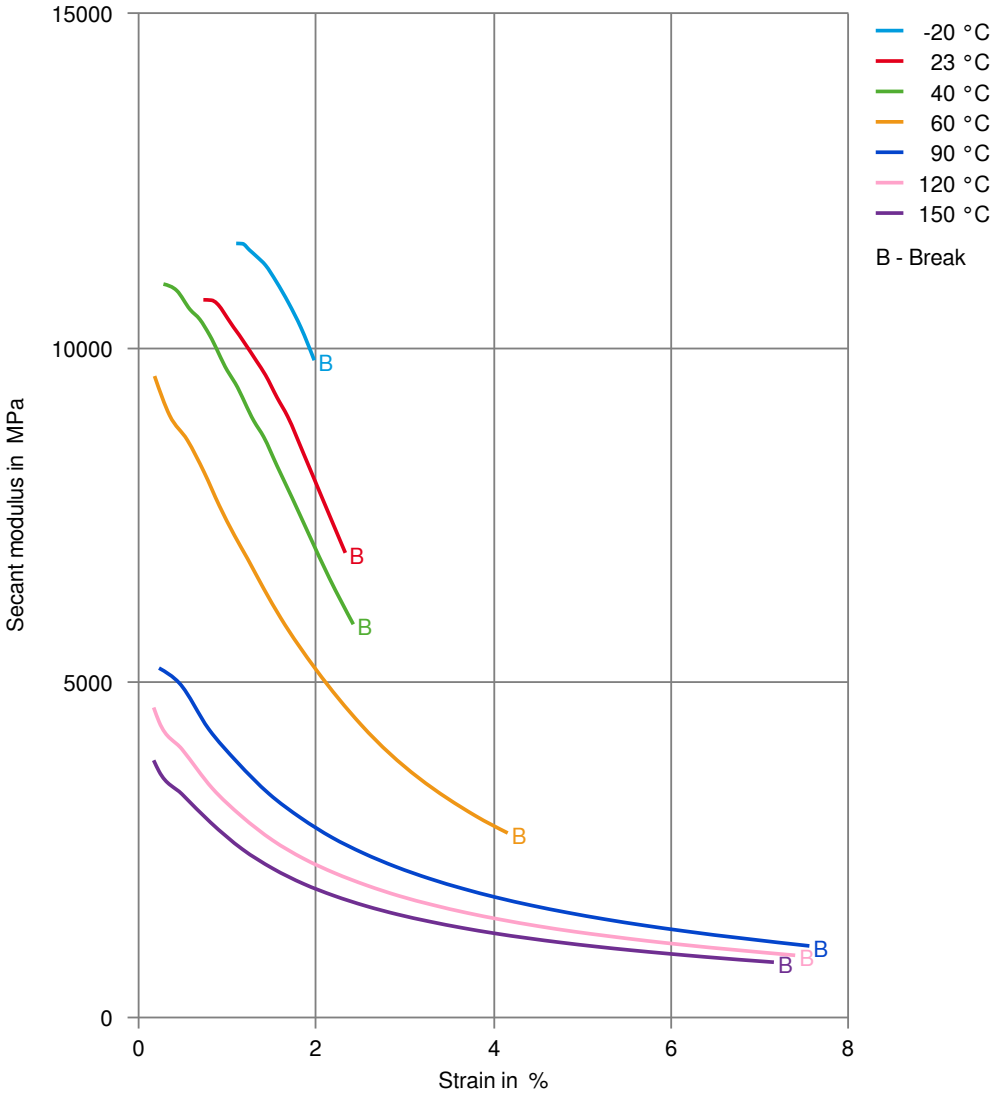
## HIGH PERFORMANCE POLYAMIDE RESIN

### Secant modulus-strain (cond.)



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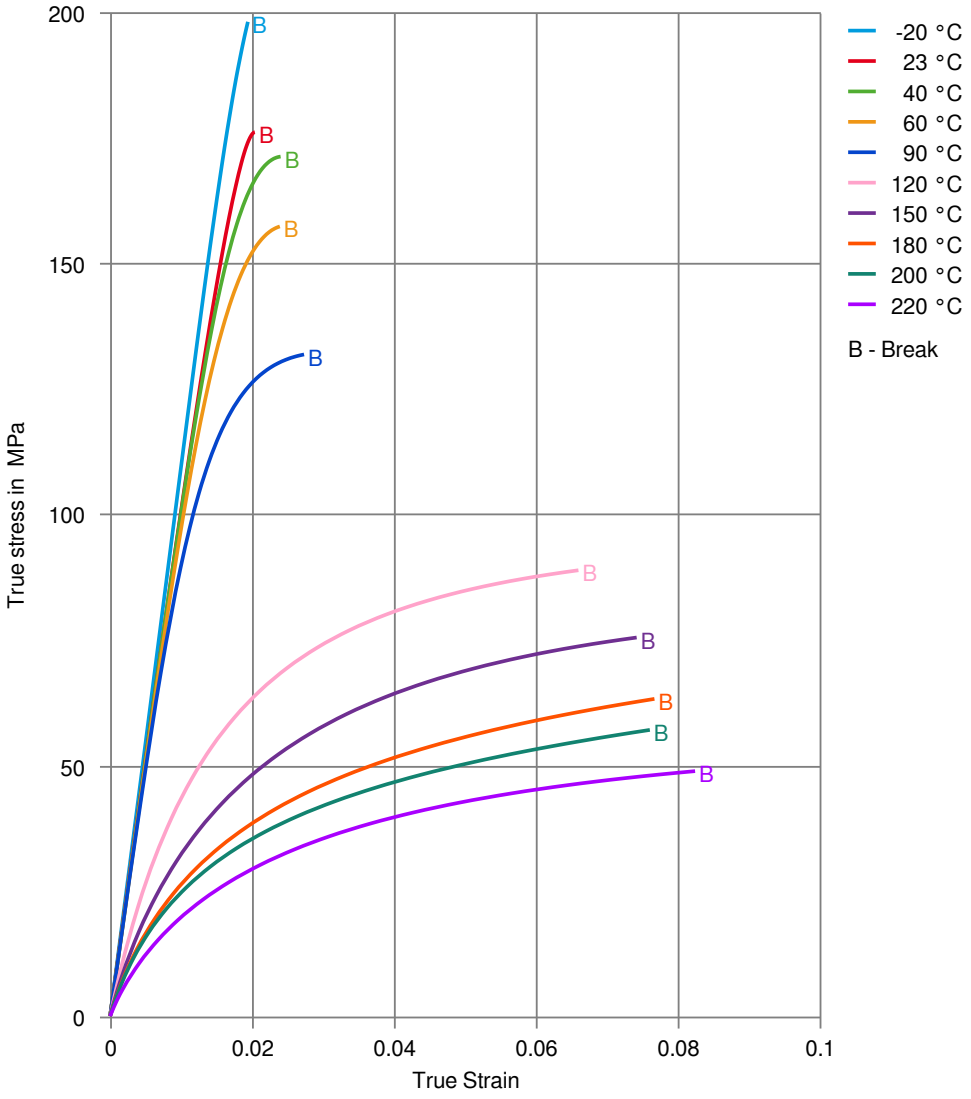
## HIGH PERFORMANCE POLYAMIDE RESIN

### True stress-strain (dry)



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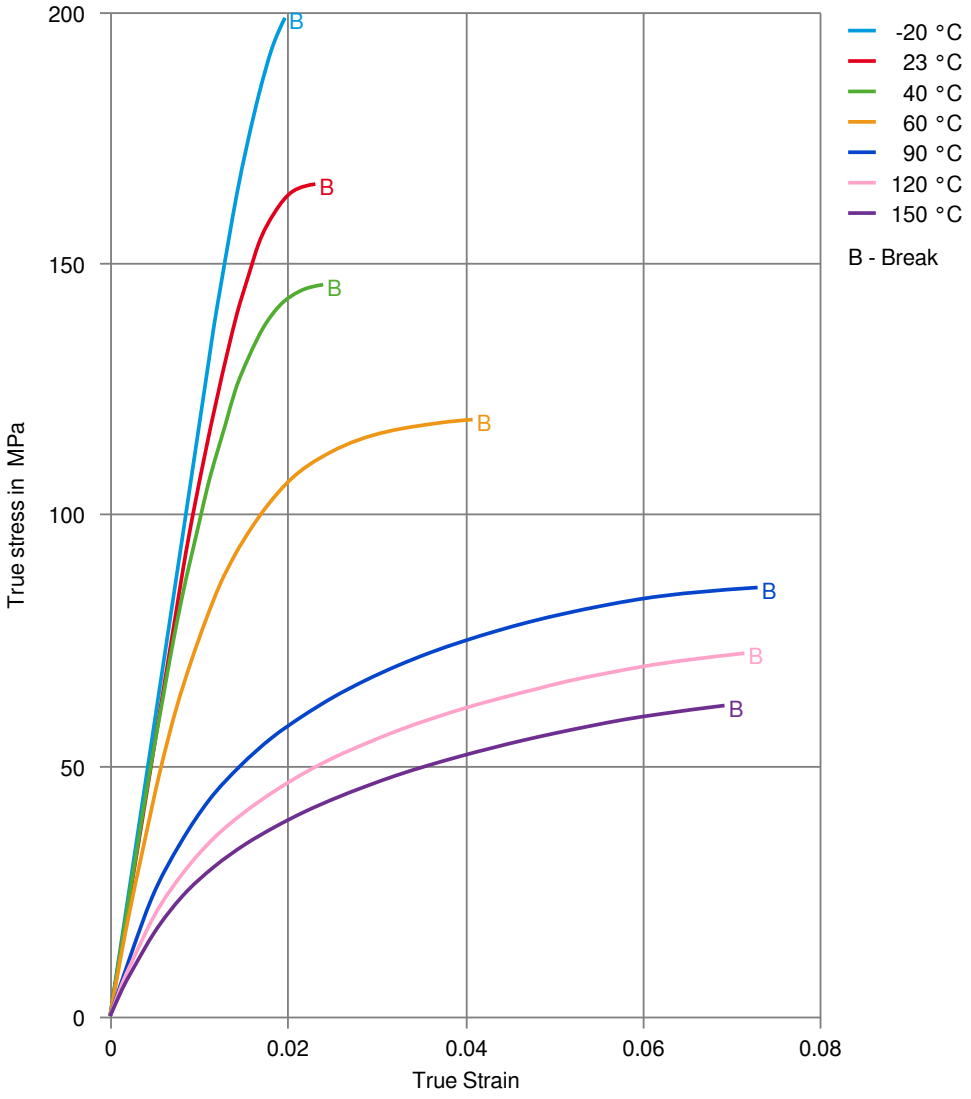
## HIGH PERFORMANCE POLYAMIDE RESIN

### True stress-strain (cond.)



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## HIGH PERFORMANCE POLYAMIDE RESIN

## Mineral oils

### Mineral oils

- ✔ SAE 10W40 multigrade motor oil, 130 °C

### Standard Fuels

- ✔ Diesel fuel (pref. ISO 1817 Liquid F), 23 °C
- ✔ Diesel fuel (pref. ISO 1817 Liquid F), 90 °C
- ✔ Diesel fuel (pref. ISO 1817 Liquid F), >90 °C
- ✔ Diesel EN 590, 100 °C

**Symbols used:**

✔ possibly resistant
Defined as: Supplier has sufficient indication that contact with chemical can be potentially accepted under the intended use conditions and expected service life. Criteria for assessment have to be indicated (e.g. surface aspect, volume change, property change).

✘ not recommended - see explanation
Defined as: Not recommended for general use. However, short-term exposure under certain restricted conditions could be acceptable (e.g. fast cleaning with thorough rinsing, spills, wiping, vapor exposure).