

# Zytel® XT70G50HSL BK044A (PRELIMINARY)

## ZYTEL® PLUS & XT NYLON RESIN

Zytel® XT70G50HSL BK044A is a 50% glass fiber reinforced, heat stabilized polyamide 66 resin for injection molding.

### Product information

|                      |                                    |           |
|----------------------|------------------------------------|-----------|
| Resin Identification | PA66-GF50                          | ISO 1043  |
| Part Marking Code    | >PA66-GF50<                        | ISO 11469 |
| ISO designation      | ISO 16396-PA66,GF50,M1CGHR,S14-160 |           |

### Rheological properties

|                                        |                        |         |                     |
|----------------------------------------|------------------------|---------|---------------------|
|                                        | dry/cond.              |         |                     |
| Melt mass-flow rate                    | 9 / *                  | g/10min | ISO 1133            |
| Melt mass-flow rate, Temperature       | 275 / *                | °C      |                     |
| Melt mass-flow rate, Load              | 5 / *                  | kg      |                     |
| Viscosity number                       | 145 <sup>[1]</sup> / * | cm³/g   | ISO 307, 1157, 1628 |
| Moulding shrinkage, parallel           | 0.2 / -                | %       | ISO 294-4, 2577     |
| Moulding shrinkage, normal             | 0.8 / -                | %       | ISO 294-4, 2577     |
| Moulding shrinkage, parallel, annealed | 0.3 / *                | %       | ISO 294-4           |
| Moulding shrinkage, normal, annealed   | 1 / *                  | %       | ISO 294-4           |

[1]: sulfuric acid 96% (132 cm³/g in formic acid 90%)

### Typical mechanical properties

|                                       |               |       |              |
|---------------------------------------|---------------|-------|--------------|
|                                       | dry/cond.     |       |              |
| Tensile Modulus                       | 17000 / 12000 | MPa   | ISO 527-1/-2 |
| Stress at break, 5mm/min              | 240 / 170     | MPa   | ISO 527-1/-2 |
| Strain at break, 5mm/min              | 2.6 / 5       | %     | ISO 527-1/-2 |
| Flexural Modulus                      | 15000 / -     | MPa   | ISO 178      |
| Flexural Strength                     | 340 / -       | MPa   | ISO 178      |
| Charpy impact strength, 23°C          | 90 / 100      | kJ/m² | ISO 179/1eU  |
| Charpy notched impact strength, 23°C  | 15 / 19       | kJ/m² | ISO 179/1eA  |
| Charpy notched impact strength, -30°C | 13 / -        | kJ/m² | ISO 179/1eA  |
| Poisson's ratio                       | 0.33 / 0.33   |       |              |

### Thermal properties

|                                             |           |       |                |
|---------------------------------------------|-----------|-------|----------------|
|                                             | dry/cond. |       |                |
| Melting temperature, 10°C/min               | 259 / *   | °C    | ISO 11357-1/-3 |
| Glass transition temperature, 10°C/min      | 70 / 20   | °C    | ISO 11357-1/-3 |
| Temp. of deflection under load, 1.8 MPa     | 240 / *   | °C    | ISO 75-1/-2    |
| Coeff. of linear therm. expansion, parallel | 19 / *    | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, normal   | 65 / *    | E-6/K | ISO 11359-1/-2 |
| TGA curve                                   | available |       | ISO 11359-1/-2 |

### Flammability

|                              |        |        |                      |
|------------------------------|--------|--------|----------------------|
| FMVSS Class                  | SE / B |        | ISO 3795 (FMVSS 302) |
| Burning rate, Thickness 1 mm | 22     | mm/min | ISO 3795 (FMVSS 302) |



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### Other properties

|                          |           |                   |                |
|--------------------------|-----------|-------------------|----------------|
| Humidity absorption, 2mm | dry/cond. |                   |                |
| Density                  | 1.2 / *   | %                 | Sim. to ISO 62 |
|                          | 1590 / -  | kg/m <sup>3</sup> | ISO 1183       |

### Injection

|                                 |         |          |
|---------------------------------|---------|----------|
| Drying Recommended              | yes     |          |
| Drying Temperature              | 80 °C   |          |
| Drying Time, Dehumidified Dryer | 2 - 4 h |          |
| Processing Moisture Content     | ≤0.2 %  |          |
| Melt Temperature Optimum        | 285 °C  | Internal |
| Min. melt temperature           | 275 °C  |          |
| Max. melt temperature           | 295 °C  |          |
| Mold Temperature Optimum        | 100 °C  |          |
| Min. mould temperature          | 70 °C   |          |
| Max. mould temperature          | 120 °C  |          |
| Ejection temperature            | 200 °C  | Internal |

### Characteristics

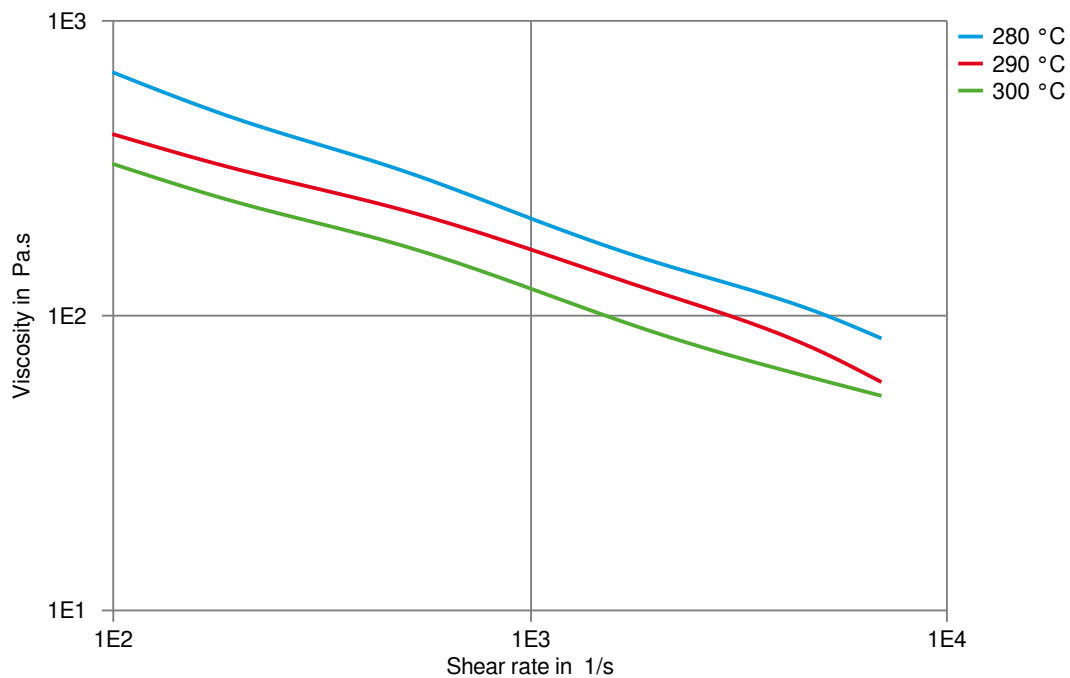
|           |               |
|-----------|---------------|
| Additives | Release agent |
|-----------|---------------|



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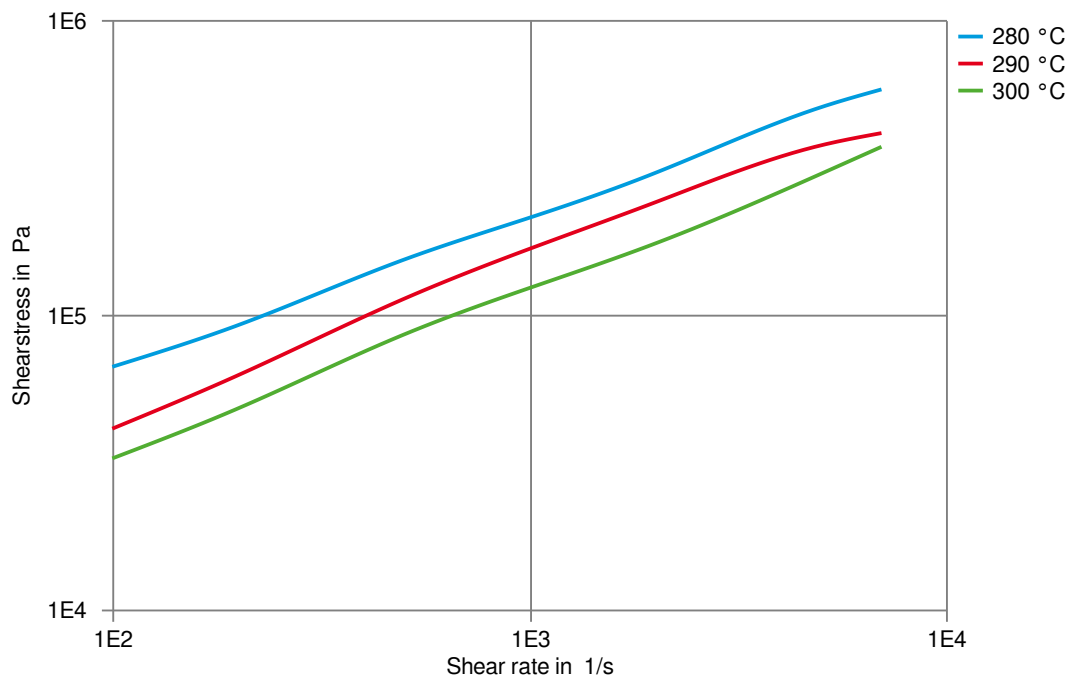
### Viscosity-shear rate



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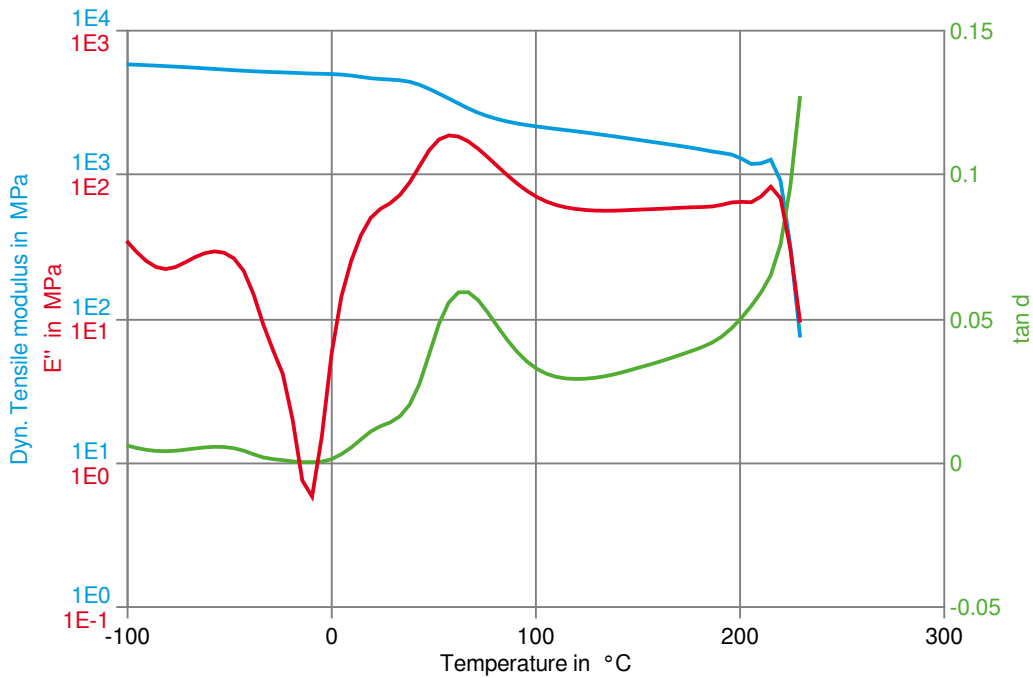
### Shearstress-shear rate



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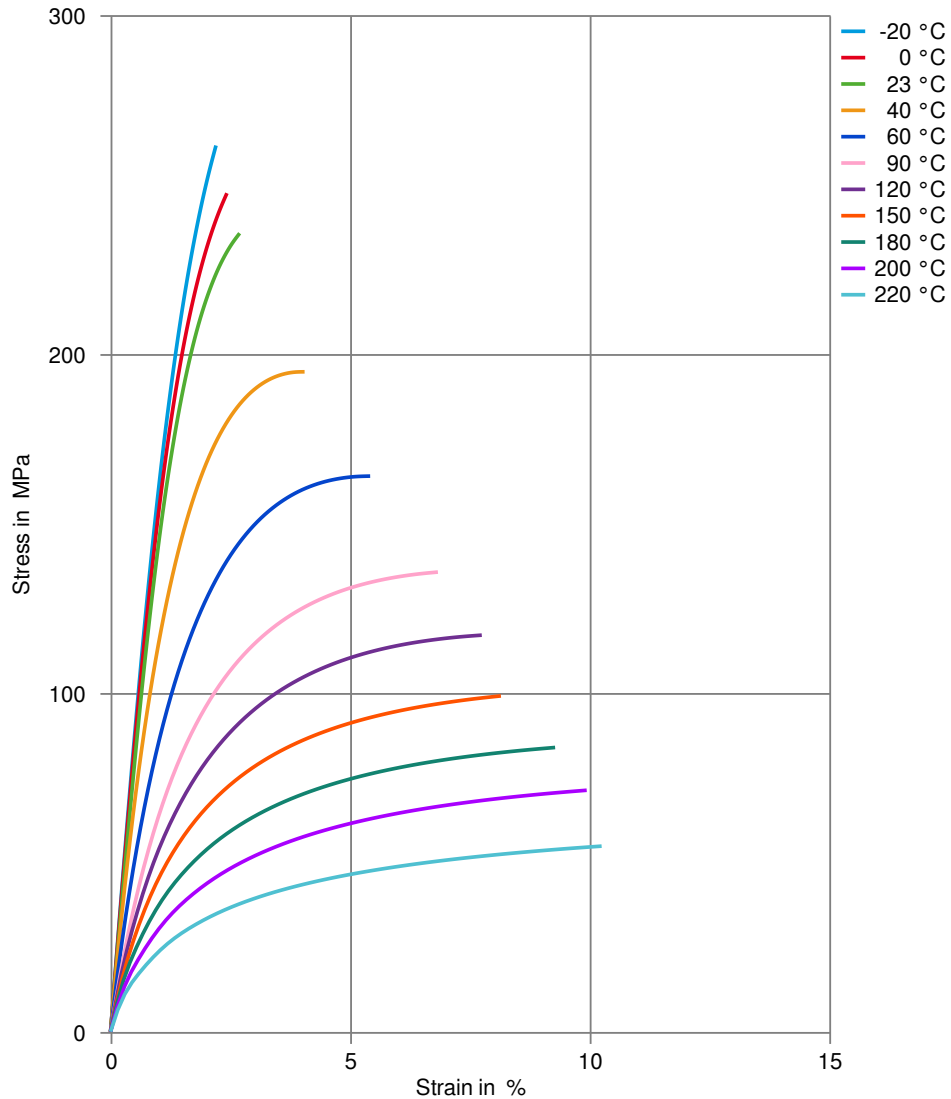
Dynamic Tensile modulus-temperature (dry)



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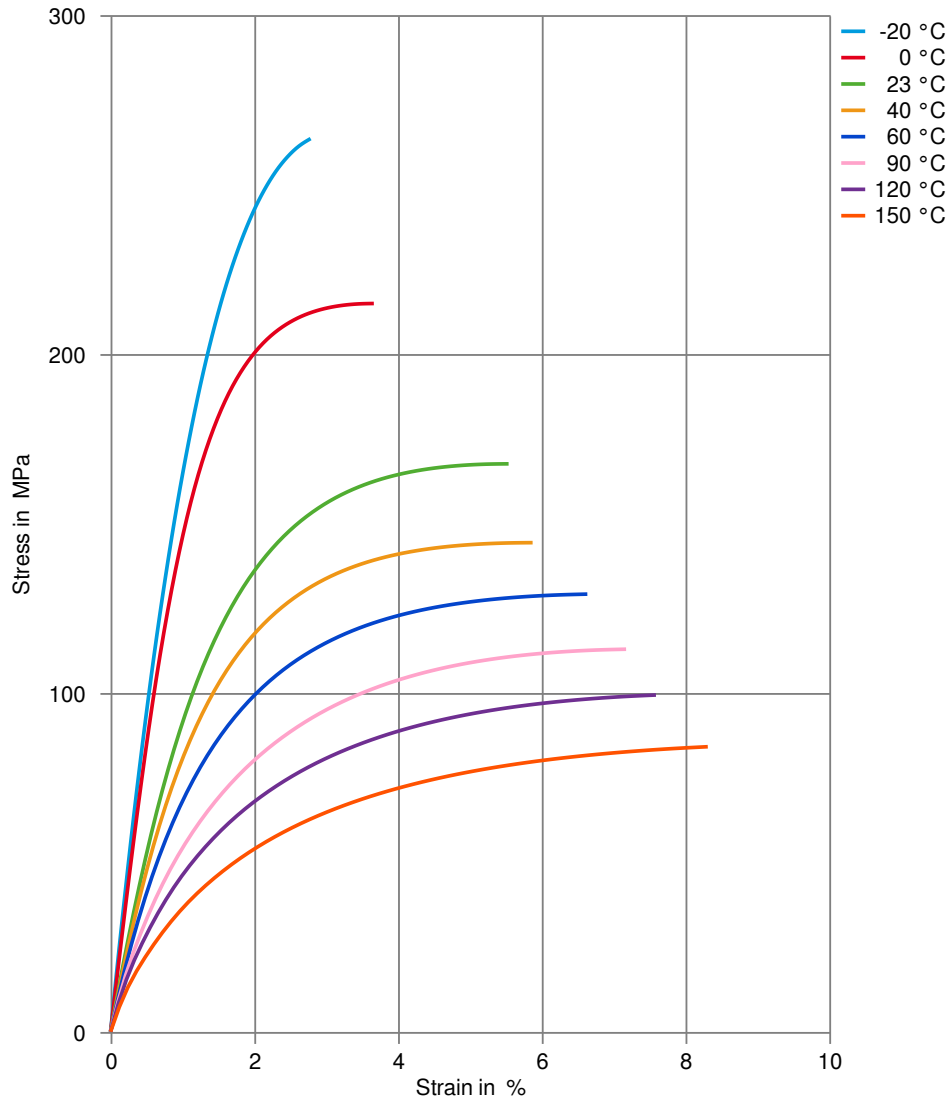
### Stress-strain (dry)



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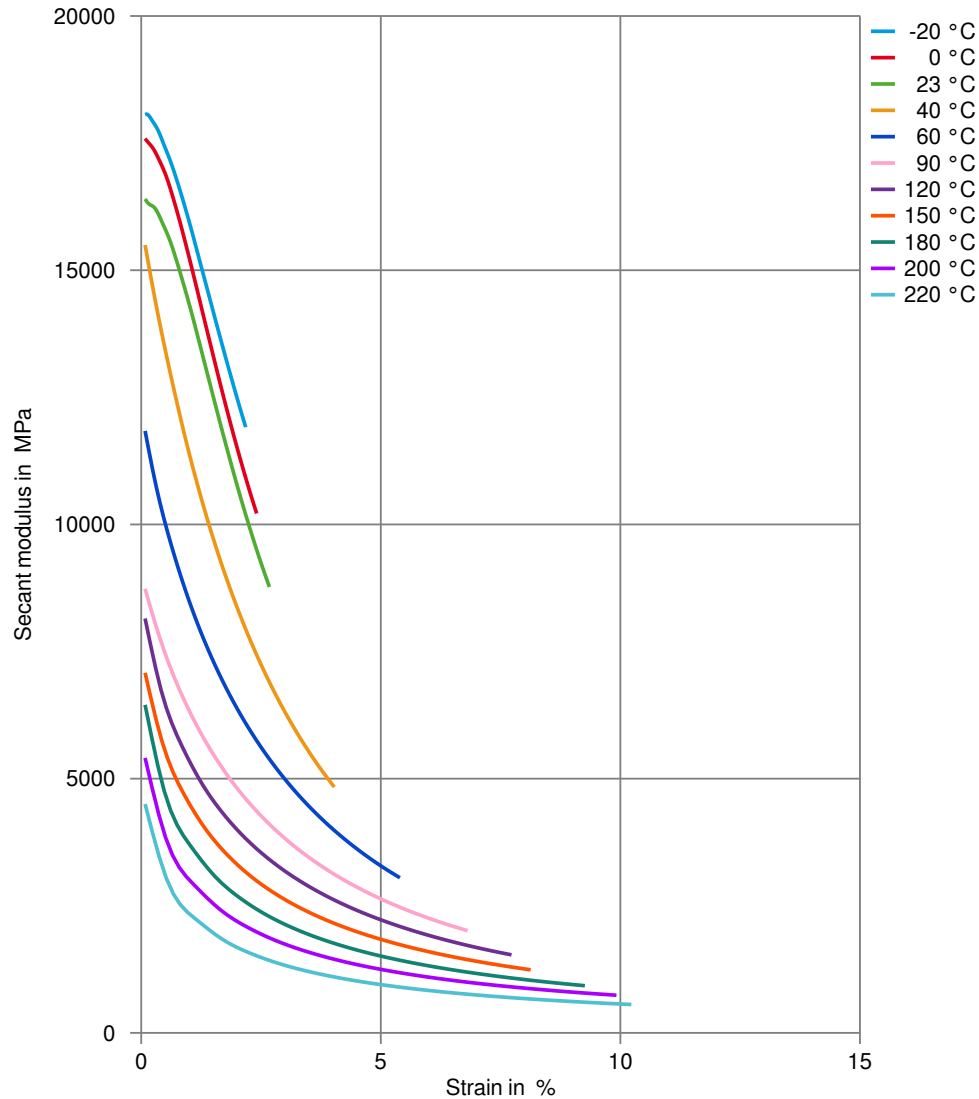
### Stress-strain (cond.)



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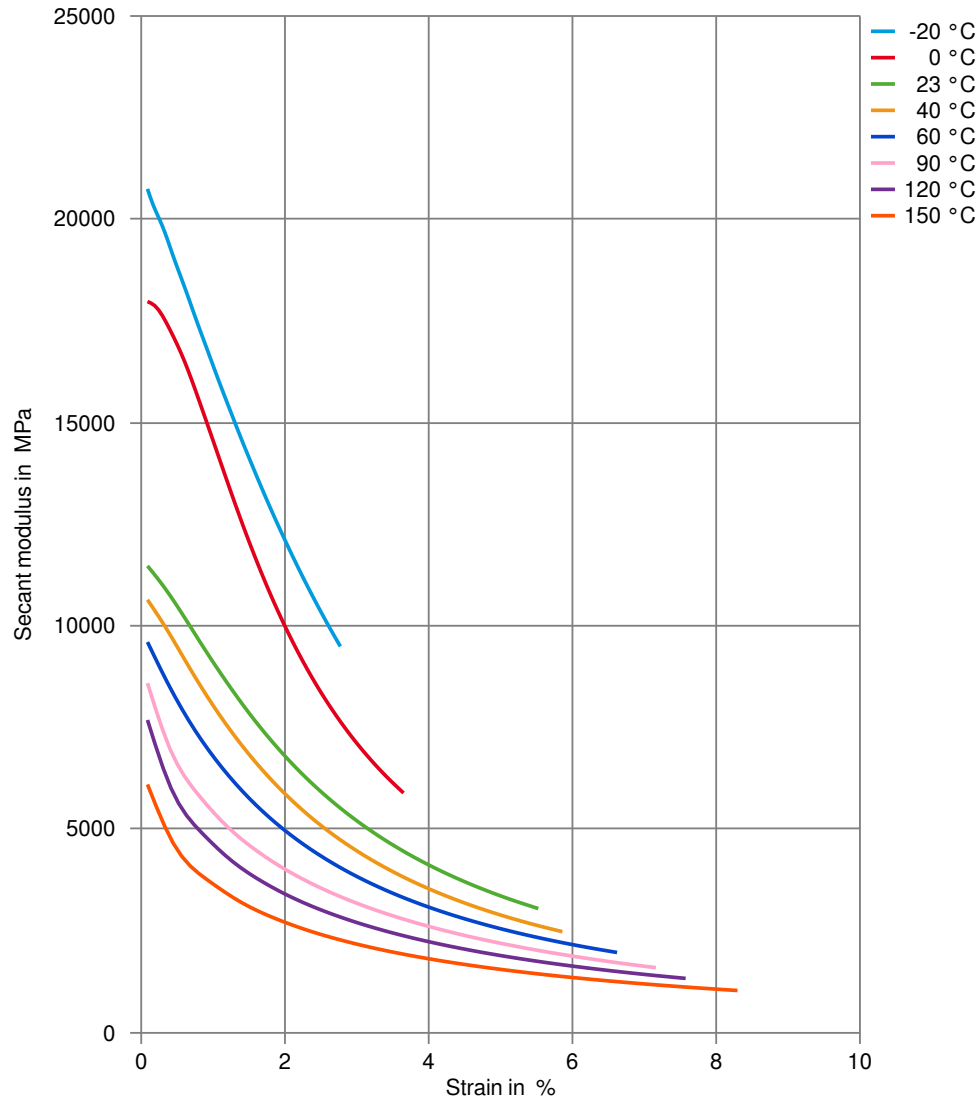
### Secant modulus-strain (dry)



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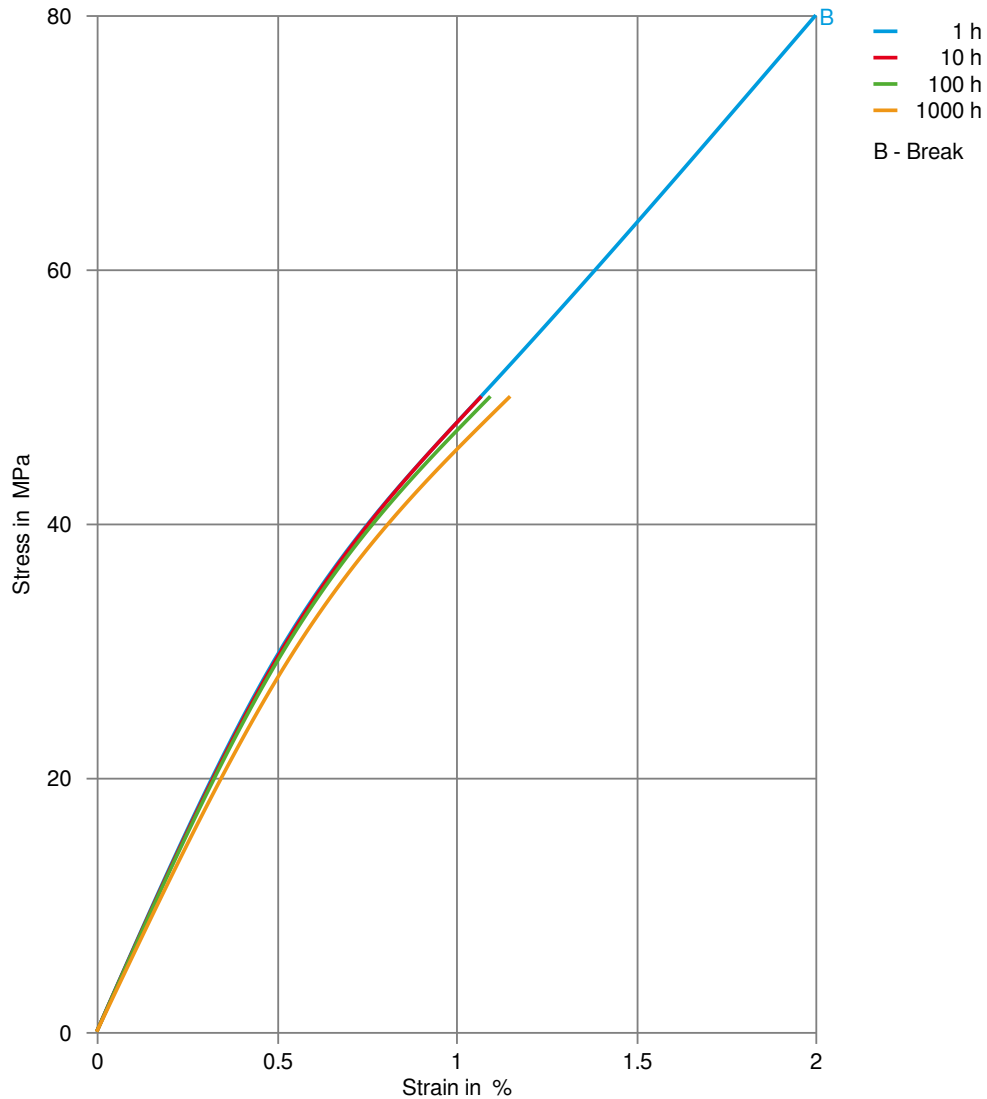
### Secant modulus-strain (cond.)



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## ZYTEL® PLUS & XT NYLON RESIN

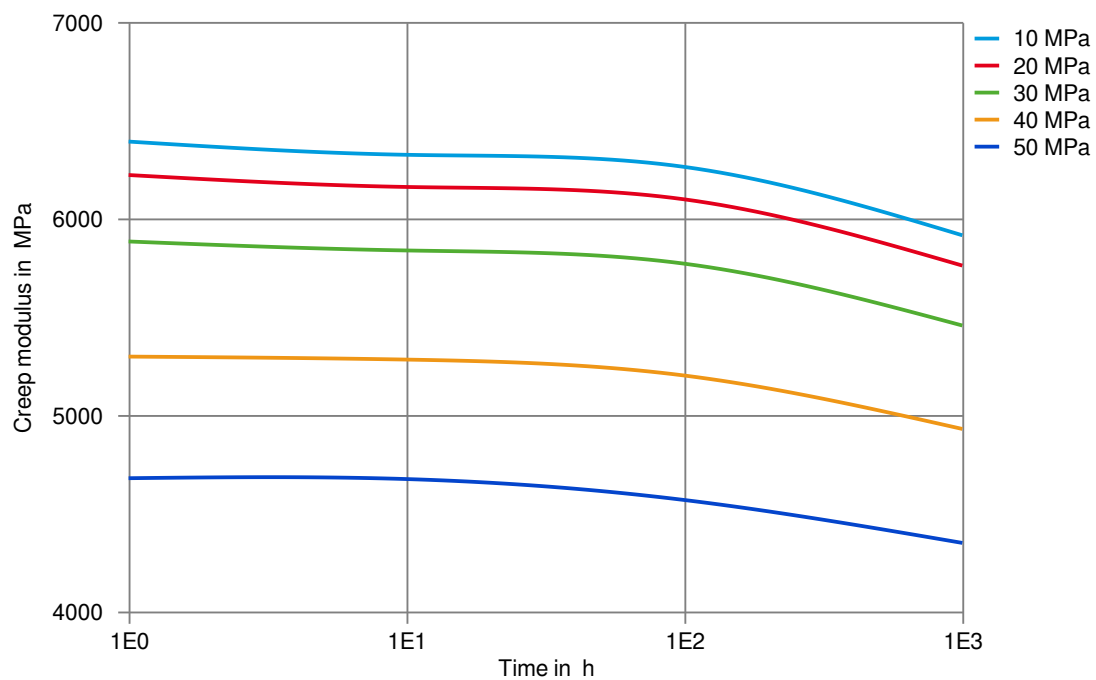
Stress-strain (isochronous) 110°C (dry)



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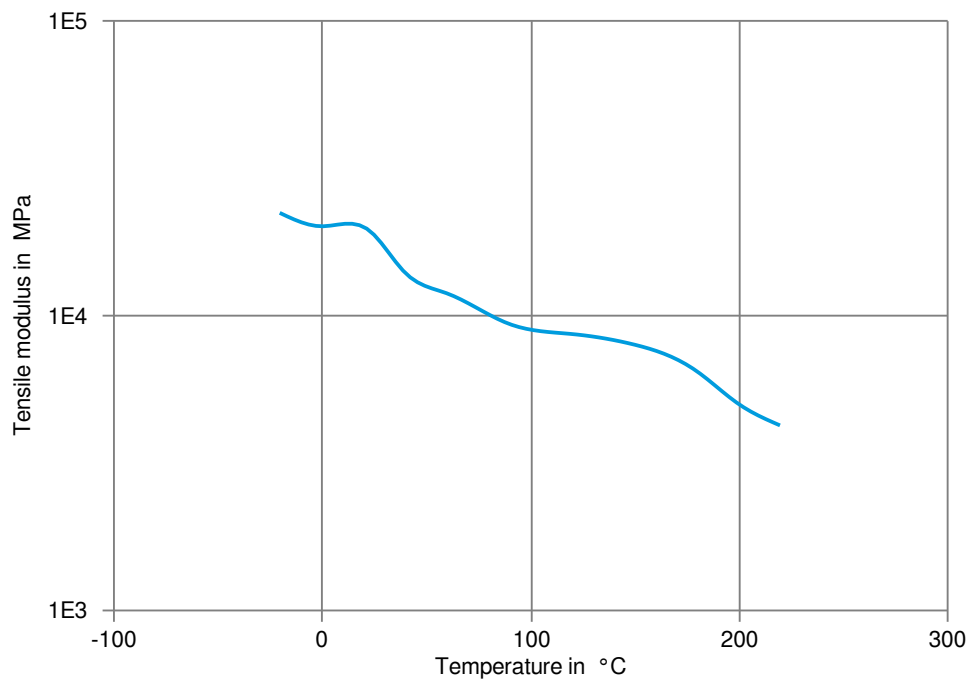
Creep modulus-time 110°C (dry)



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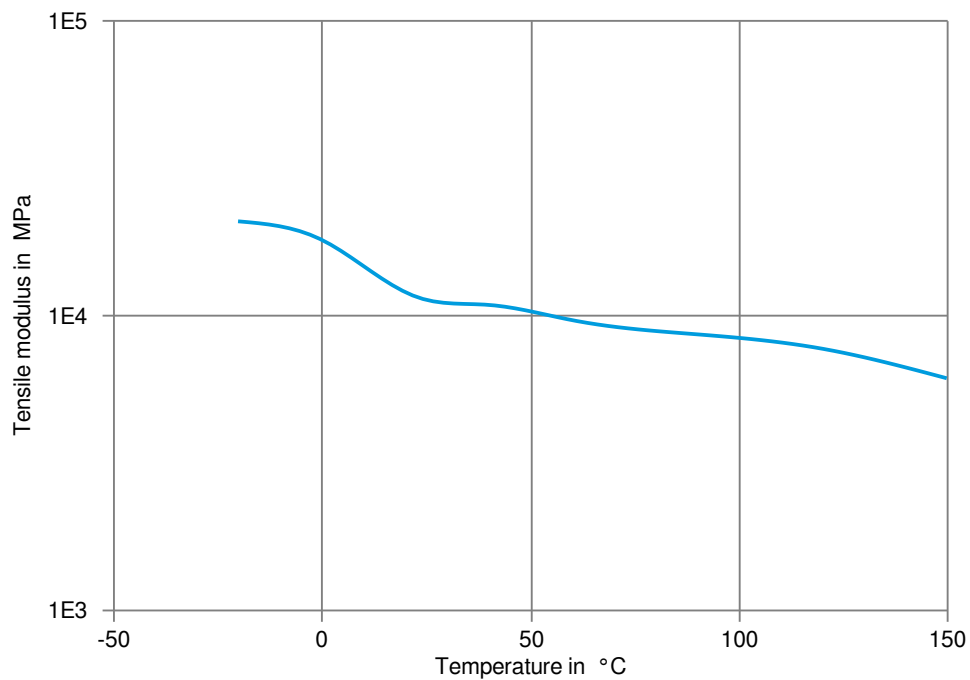
Tensile modulus-temperature (dry)



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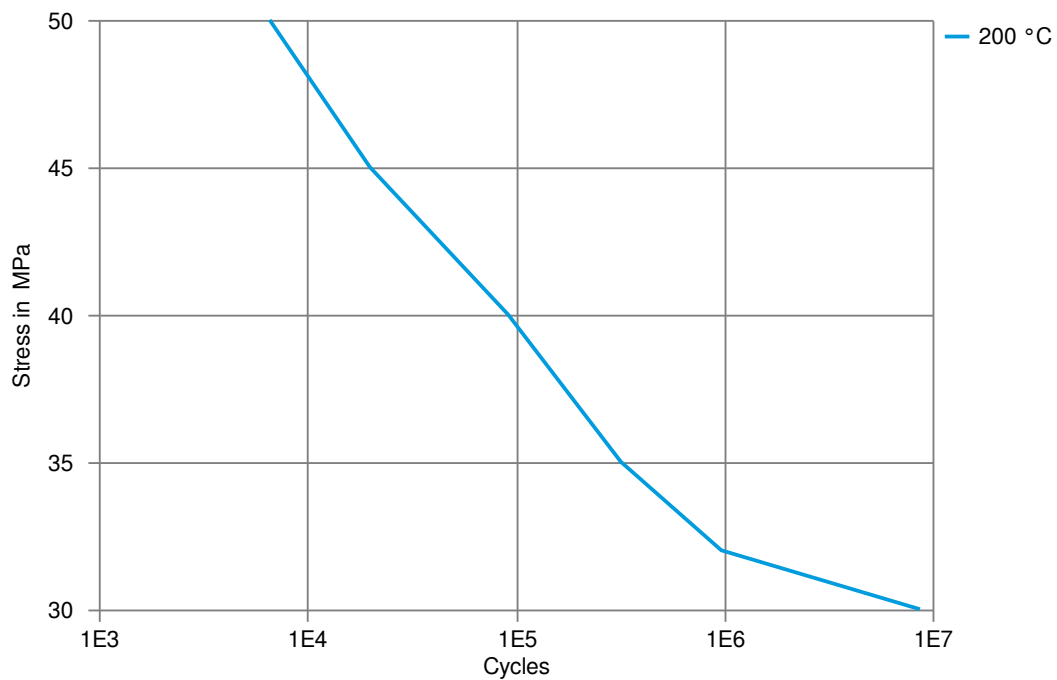
### Tensile modulus-temperature (cond.)



# Zytel® XT70G50HSL BK044A (PRELIMINARY)

## ZYTEL® PLUS & XT NYLON RESIN

Tensile Fatigue, 10Hz, R=0.1 @ 2mm (dry)



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### Chemical Media Resistance

#### Acids

- ✓ Acetic Acid (5% by mass), 23°C
- ✓ Citric Acid solution (10% by mass), 23°C
- ✓ Lactic Acid (10% by mass), 23°C
- ✗ Hydrochloric Acid (36% by mass), 23°C
- ✗ Nitric Acid (40% by mass), 23°C
- ✗ Sulfuric Acid (38% by mass), 23°C
- ✗ Sulfuric Acid (5% by mass), 23°C
- ✗ Chromic Acid solution (40% by mass), 23°C

#### Bases

- ✗ Sodium Hydroxide solution (35% by mass), 23°C
- ✓ Sodium Hydroxide solution (1% by mass), 23°C
- ✓ Ammonium Hydroxide solution (10% by mass), 23°C

#### Alcohols

- ✓ Isopropyl alcohol, 23°C
- ✓ Methanol, 23°C
- ✓ Ethanol, 23°C

#### Hydrocarbons

- ✓ n-Hexane, 23°C
- ✓ Toluene, 23°C
- ✓ iso-Octane, 23°C

#### Ketones

- ✓ Acetone, 23°C

#### Ethers

- ✓ Diethyl ether, 23°C

#### Mineral oils

- ✓ SAE 10W40 multigrade motor oil, 23°C
- ✓ SAE 10W40 multigrade motor oil, 130°C
- ✓ SAE 80/90 hypoid-gear oil, 130°C
- ✓ Insulating Oil, 23°C
- ✓ Motor oil OS206 304 Ref.Eng.Oil, ISP, 135°C
- ✓ Automatic hypoid-gear oil Shell Donax TX, 135°C
- ✓ Hydraulic oil Pentosin CHF 202, 125°C

#### Standard Fuels

- ✓ ISO 1817 Liquid 1 - E5, 60°C
- ✓ ISO 1817 Liquid 2 - M15E4, 60°C
- ✓ ISO 1817 Liquid 3 - M3E7, 60°C
- ✓ ISO 1817 Liquid 4 - M15, 60°C
- ✓ Standard fuel without alcohol (pref. ISO 1817 Liquid C), 23°C
- ✓ Standard fuel with alcohol (pref. ISO 1817 Liquid 4), 23°C



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- ✓ 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

### Salt solutions

- ✓ Sodium Chloride solution (10% by mass), 23°C
- ✗ Sodium Hypochlorite solution (10% by mass), 23°C
- ✓ Sodium Carbonate solution (20% by mass), 23°C
- ✓ Sodium Carbonate solution (2% by mass), 23°C
- ✗ Zinc Chloride solution (50% by mass), 23°C

### Other

- ✓ Ethyl Acetate, 23°C
- ✗ Hydrogen peroxide, 23°C
- ✓ DOT No. 4 Brake fluid, 130°C
- ✓ DOT No. 4 Brake fluid, 120°C
- ✓ Ethylene Glycol (50% by mass) in water, 108°C
- ✓ 1% nonylphenoxy-polyethyleneoxy ethanol in water, 23°C
- ✓ 50% Oleic acid + 50% Olive Oil, 23°C
- ✓ Water, 23°C
- ✓ Water, 90°C
- ✗ Phenol solution (5% by mass), 23°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).

