

# Zytel® 73G35HSL BK262

## NYLON RESIN

Common features of Zytel® nylon resin include mechanical and physical properties such as high mechanical strength, excellent balance of stiffness and toughness, good high temperature performance, good electrical and flammability properties, good abrasion and chemical resistance. In addition, Zytel® nylon resins are available in different modified and reinforced grades to create a wide range of products with tailored properties for specific processes and end-uses. Zytel® nylon resin, including most flame retardant grades, offer the ability to be coloured.

The good melt stability of Zytel® nylon resin normally enables the recycling of properly handled production waste. If recycling is not possible, we recommend, as the preferred option, incineration with energy recovery (-31kJ/g of base polymer) in appropriately equipped installations. For disposal, local regulations have to be observed.

Zytel® nylon resin typically is used in demanding applications in the automotive, furniture, domestic appliances, sporting goods and construction industry.

Zytel® 73G35HSL BK262 is a 35% glass fiber reinforced, heat stabilised, black polyamide 6 resin for injection moulding.

### Product information

|                      |                                   |           |
|----------------------|-----------------------------------|-----------|
| Resin Identification | PA6-GF35                          | ISO 1043  |
| Part Marking Code    | >PA6-GF35<                        | ISO 11469 |
| ISO designation      | ISO 16396-PA6,GF35,M1CGHR,S14-110 |           |

### Rheological properties

|                              | dry/cond. |                    |                     |
|------------------------------|-----------|--------------------|---------------------|
| Viscosity number             | 143 / *   | cm <sup>3</sup> /g | ISO 307, 1157, 1628 |
| Moulding shrinkage, parallel | 0.1 / -   | %                  | ISO 294-4, 2577     |
| Moulding shrinkage, normal   | 0.6 / -   | %                  | ISO 294-4, 2577     |

### Typical mechanical properties

|                                       | dry/cond.              |                   |              |
|---------------------------------------|------------------------|-------------------|--------------|
| Tensile Modulus                       | 11000 / 6500           | MPa               | ISO 527-1/-2 |
| Stress at break, 5mm/min              | 190 / 120              | MPa               | ISO 527-1/-2 |
| Strain at break, 5mm/min              | 3.2 / 6                | %                 | ISO 527-1/-2 |
| Flexural Modulus                      | 9500 / 6000            | MPa               | ISO 178      |
| Flexural Strength                     | 280 / 150              | MPa               | ISO 178      |
| Tensile creep modulus, 1h             | */6000 <sup>[DS]</sup> | MPa               | ISO 899-1    |
| Tensile creep modulus, 1000h          | */5000 <sup>[DS]</sup> | MPa               | ISO 899-1    |
| Charpy impact strength, 23°C          | 85 / 90                | kJ/m <sup>2</sup> | ISO 179/1eU  |
| Charpy impact strength, -30°C         | 80 / 90                | kJ/m <sup>2</sup> | ISO 179/1eU  |
| Charpy notched impact strength, 23°C  | 14 / 22                | kJ/m <sup>2</sup> | ISO 179/1eA  |
| Charpy notched impact strength, -30°C | 10 / 10                | kJ/m <sup>2</sup> | ISO 179/1eA  |
| Charpy notched impact strength, -40°C | 11 / 12                | kJ/m <sup>2</sup> | ISO 179/1eA  |
| Puncture energy, 23°C                 | 3 / 6                  | J                 | ISO 6603-2   |
| Izod notched impact strength, 23°C    | 13 / 20                | kJ/m <sup>2</sup> | ISO 180/1A   |
| Poisson's ratio                       | 0.34 / 0.35            |                   |              |

[DS]: Derived from similar grade



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### Thermal properties

|                                                       |           |       |                |
|-------------------------------------------------------|-----------|-------|----------------|
|                                                       | dry/cond. |       |                |
| Melting temperature, 10°C/min                         | 221 / *   | °C    | ISO 11357-1/-3 |
| Glass transition temperature, 10°C/min                | 55 / 15   | °C    | ISO 11357-1/-3 |
| Temp. of deflection under load, 1.8 MPa               | 208 / *   | °C    | ISO 75-1/-2    |
| Temp. of deflection under load, 0.45 MPa              | 220 / *   | °C    | ISO 75-1/-2    |
| Vicat softening temperature, 50°C/h, 50N              | 215 / *   | °C    | ISO 306        |
| Coeff. of linear therm. expansion, parallel, -40-23°C | 21 / *    | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, parallel           | 18 / *    | 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   | 72 / *    | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, normal             | 102 / *   | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, normal, 55-160°C   | 147 / *   | E-6/K | ISO 11359-1/-2 |
| RTI, electrical, 1.5mm                                | 65        | °C    | UL 746B        |
| RTI, impact, 1.5mm                                    | 65        | °C    | UL 746B        |
| RTI, strength, 1.5mm                                  | 65 / *    | °C    | UL 746B        |

### Flammability

|                                      |           |        |                      |
|--------------------------------------|-----------|--------|----------------------|
|                                      | dry/cond. |        |                      |
| Burning Behav. at 1.5mm nom. thickn. | HB / *    | class  | UL 94                |
| Thickness tested                     | 1.5 / *   | mm     | UL 94                |
| UL recognition                       | yes / *   |        | UL 94                |
| FMVSS Class                          | B         |        | ISO 3795 (FMVSS 302) |
| Burning rate, Thickness 1 mm         | 24        | mm/min | ISO 3795 (FMVSS 302) |

### Other properties

|                                 |           |       |                |
|---------------------------------|-----------|-------|----------------|
|                                 | dry/cond. |       |                |
| Humidity absorption, 2mm        | 2.1 / *   | %     | Sim. to ISO 62 |
| Water absorption, 2mm           | 5.8 / *   | %     | Sim. to ISO 62 |
| Water absorption, Immersion 24h | 1 / *     | %     | Sim. to ISO 62 |
| Density                         | 1410 / -  | kg/m³ | ISO 1183       |
| [1]: wall thickness 3mm         |           |       |                |

### Injection

|                                 |          |      |          |
|---------------------------------|----------|------|----------|
| Drying Recommended              | yes      |      |          |
| Drying Time, Dehumidified Dryer | 2 - 4    | h    |          |
| Processing Moisture Content     | ≤0.2     | %    |          |
| Melt Temperature Optimum        | 270      | °C   | Internal |
| Min. melt temperature           | 260      | °C   |          |
| Max. melt temperature           | 280      | °C   |          |
| Screw tangential speed          | ≤0.2     | m/s  |          |
| Mold Temperature Optimum        | 100      | °C   |          |
| Min. mould temperature          | 70       | °C   |          |
| Max. mould temperature          | 120      | °C   |          |
| Hold pressure range             | 50 - 100 | MPa  |          |
| Hold pressure time              | 3        | s/mm |          |



# Zytel® 73G35HSL BK262

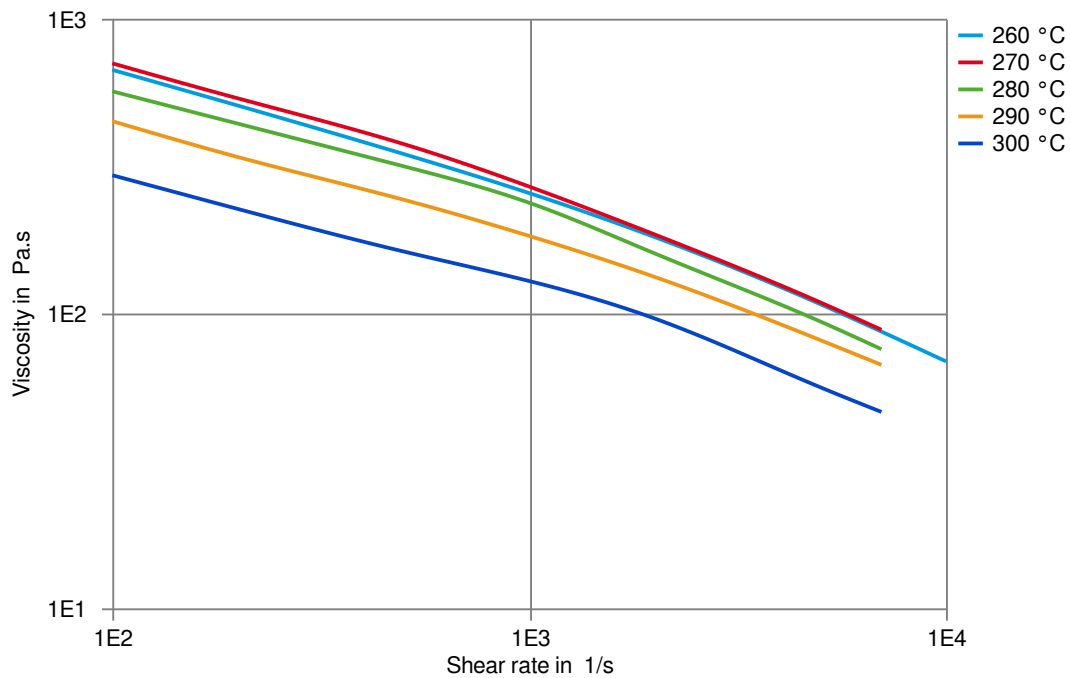
## NYLON RESIN

### Characteristics

Additives

Release agent

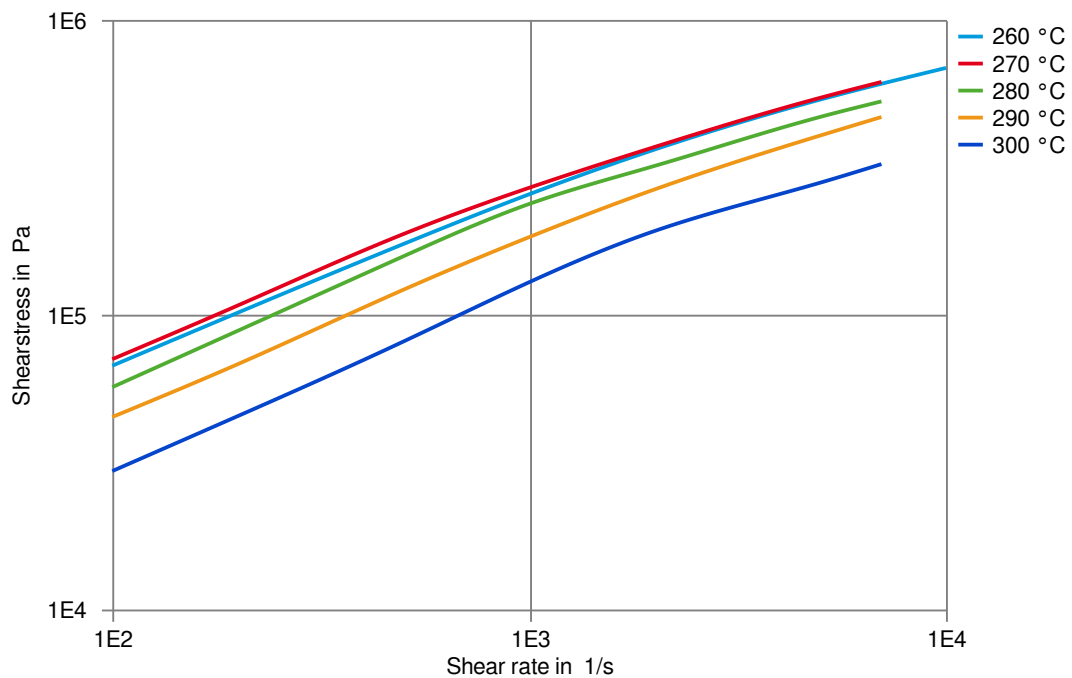
### Viscosity-shear rate



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NYLON RESIN

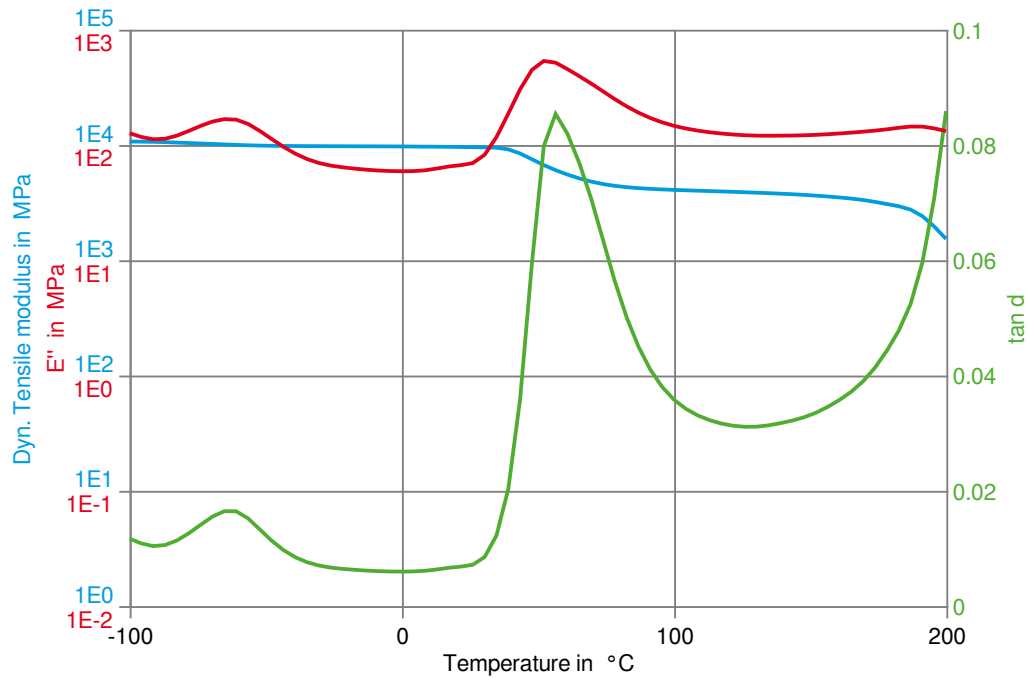
Shearstress-shear rate



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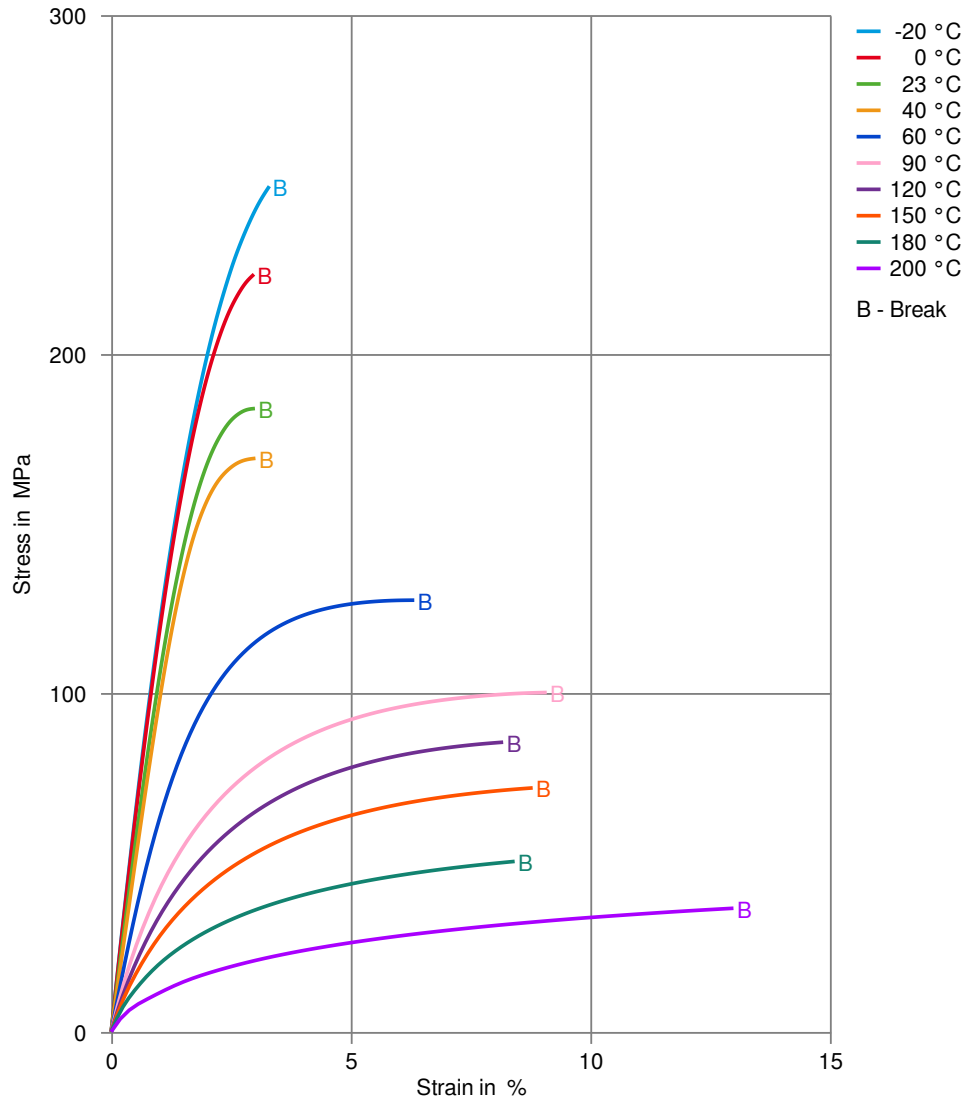
Dynamic Tensile modulus-temperature (dry)



# Zytel® 73G35HSL BK262

NYLON RESIN

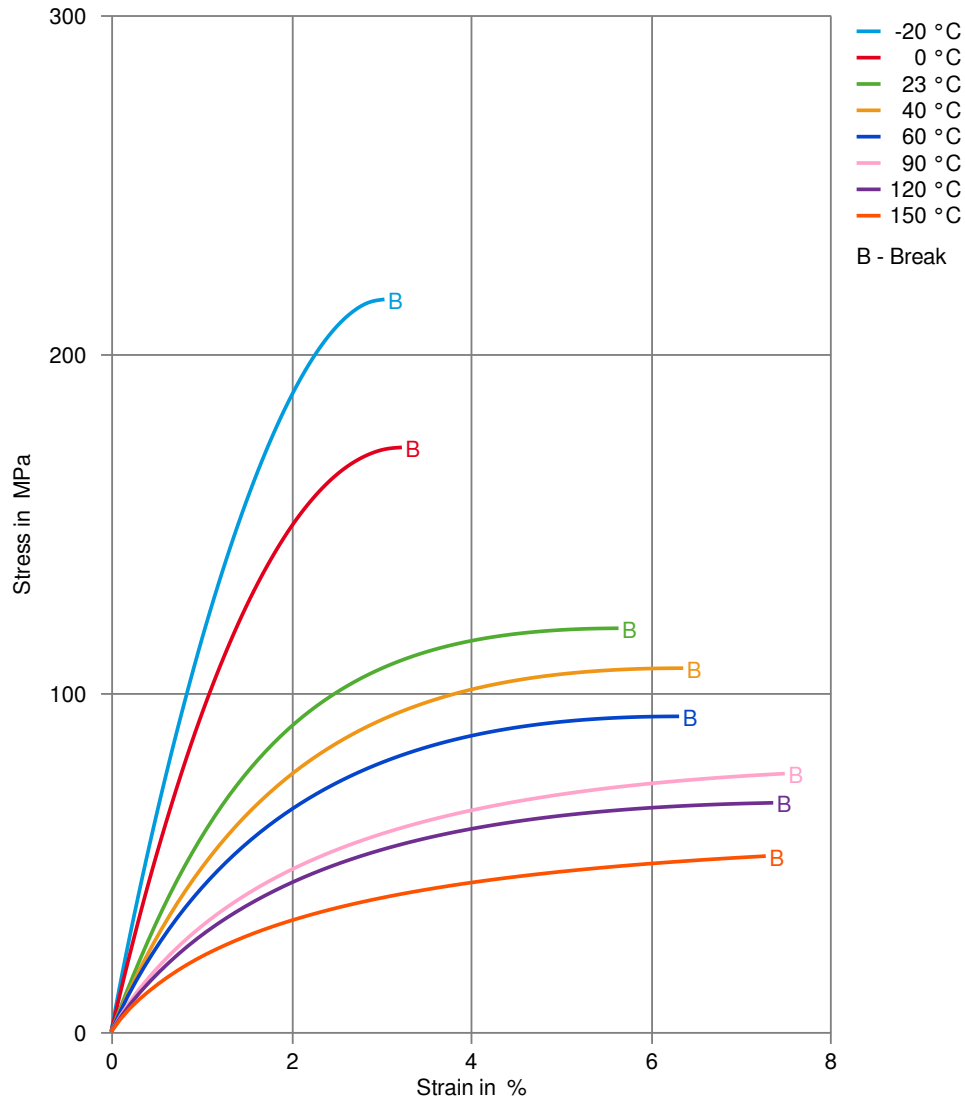
Stress-strain (dry)



# Zytel® 73G35HSL BK262

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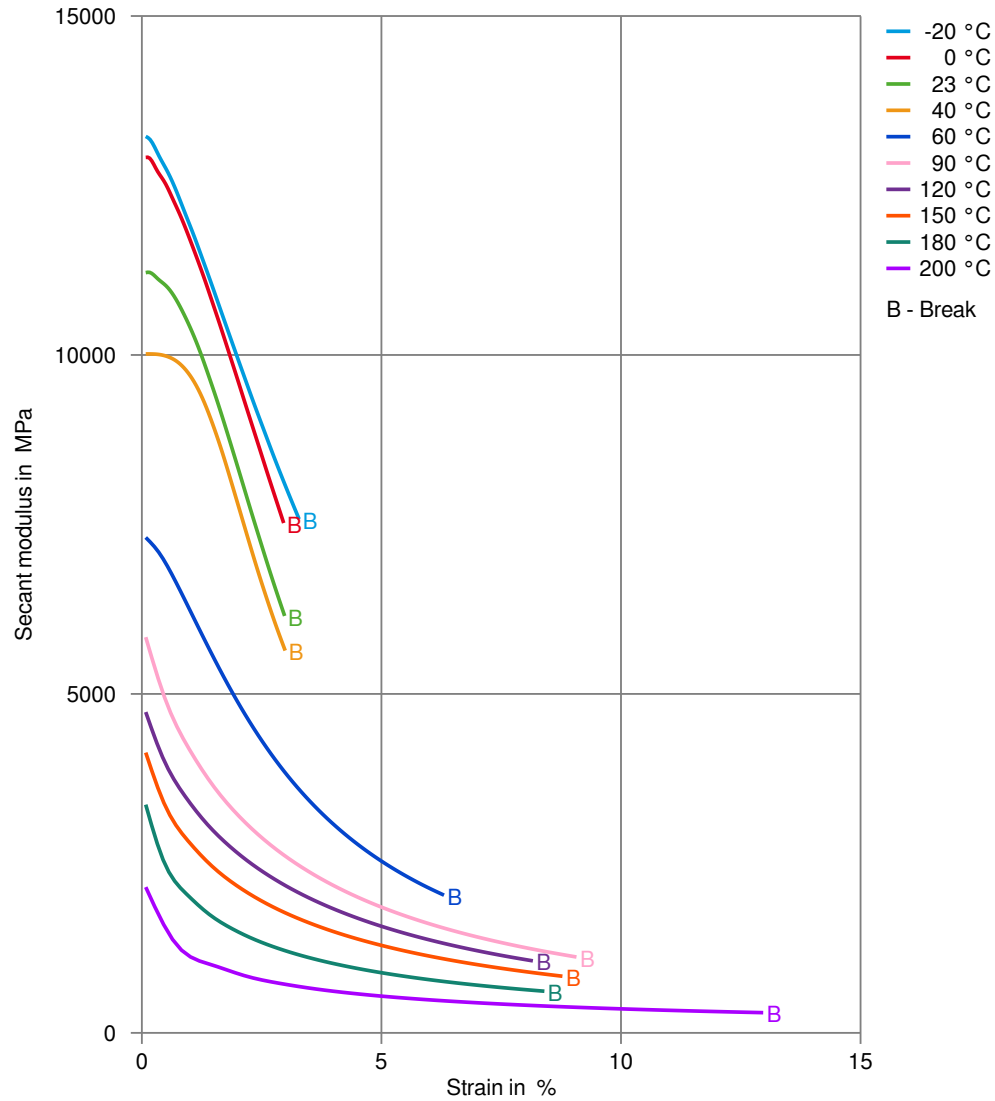
Stress-strain (cond.)



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Secant modulus-strain (dry)

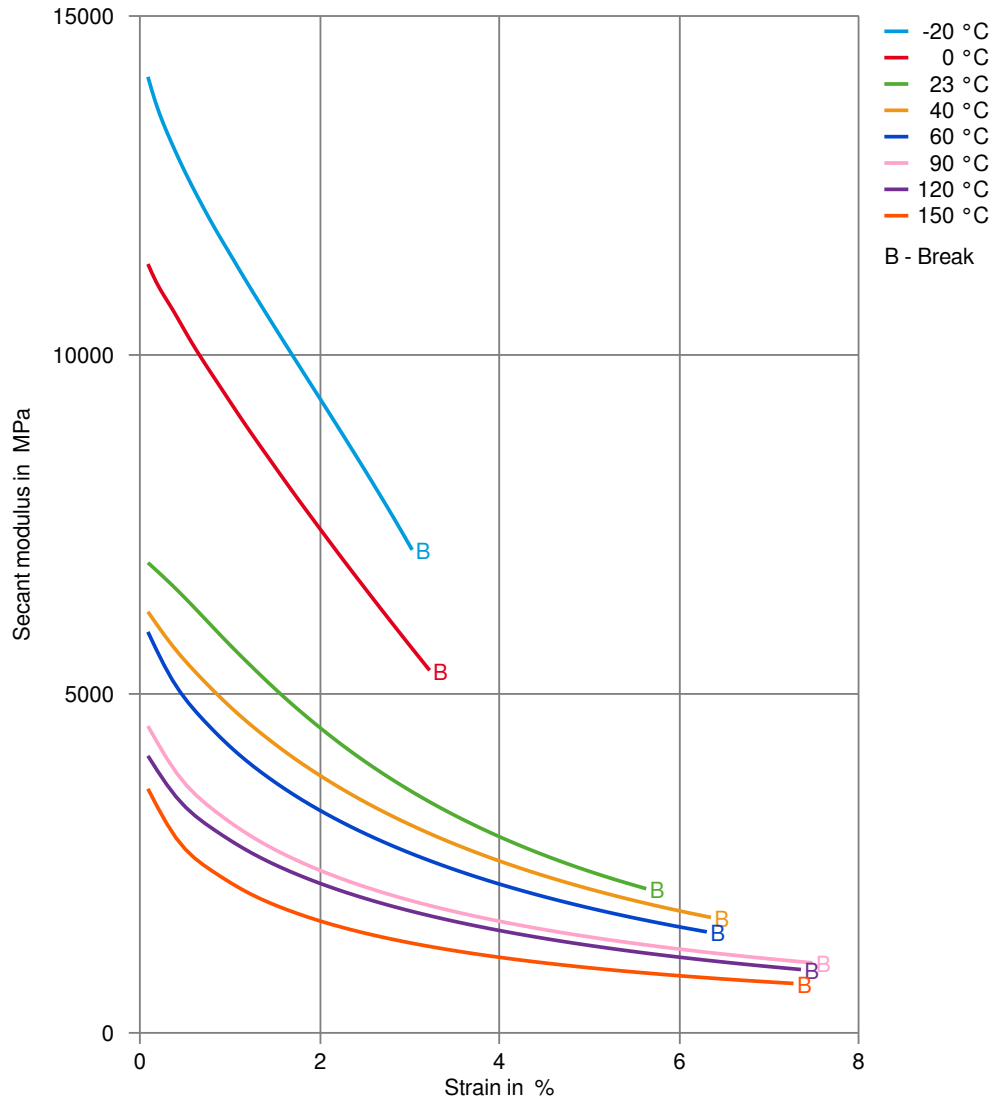




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## NYLON RESIN

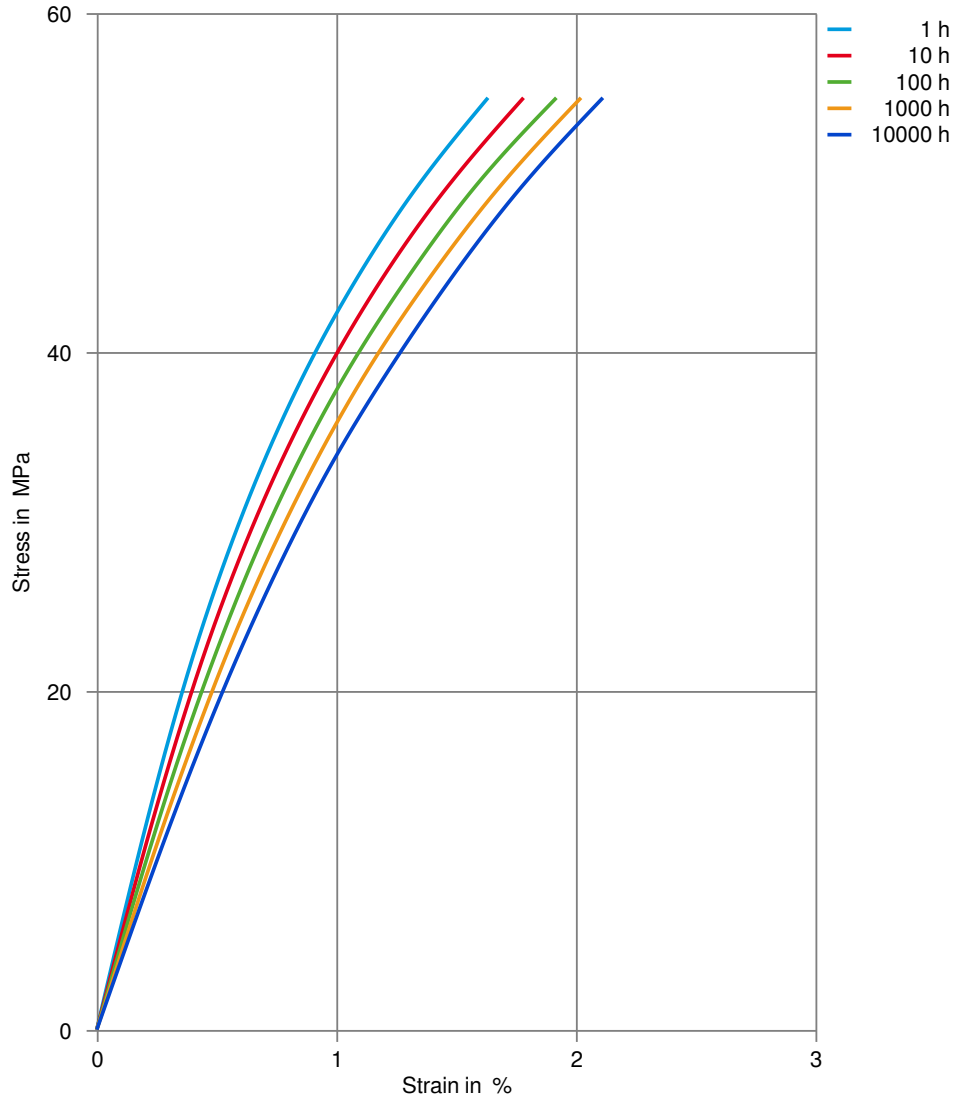
### Secant modulus-strain (cond.)



# Zytel® 73G35HSL BK262

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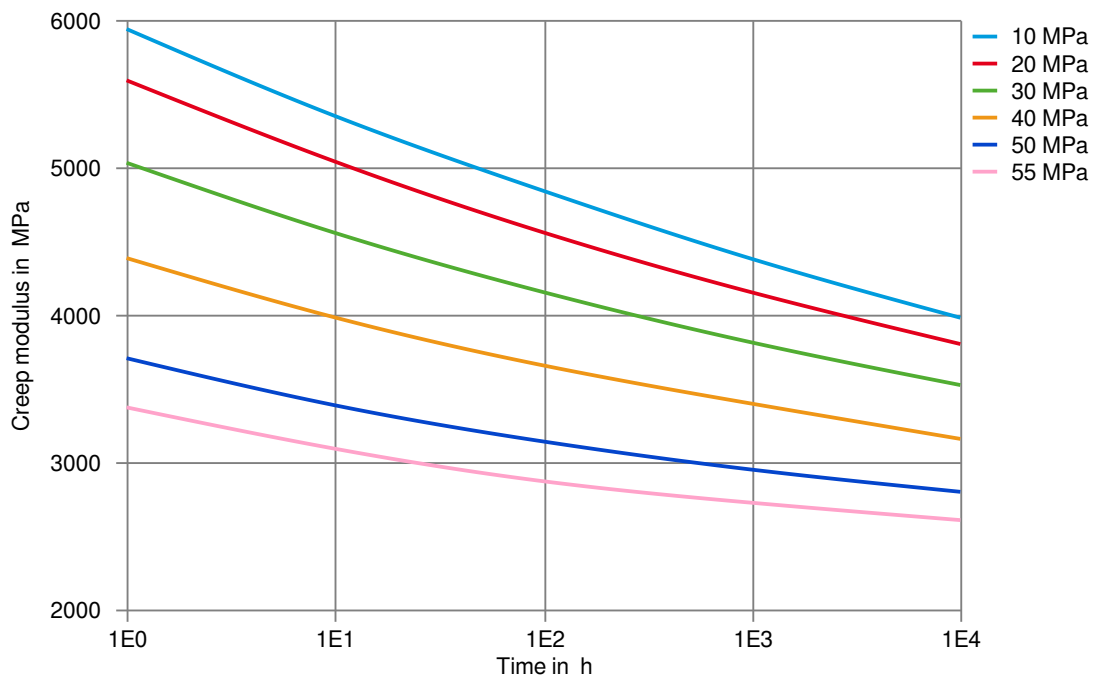
Stress-strain (isochronous) 23°C (cond.)



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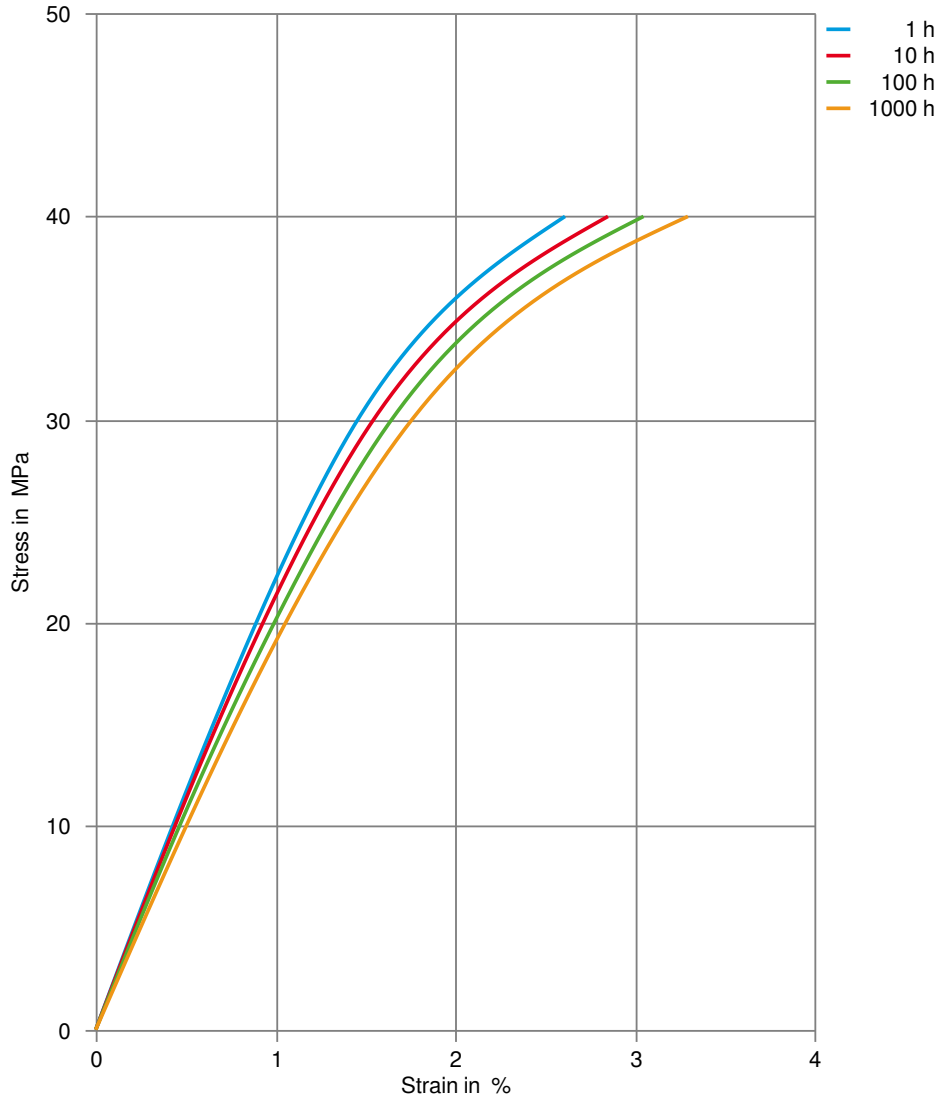
Creep modulus-time 23°C (cond.)



# Zytel® 73G35HSL BK262

NYLON RESIN

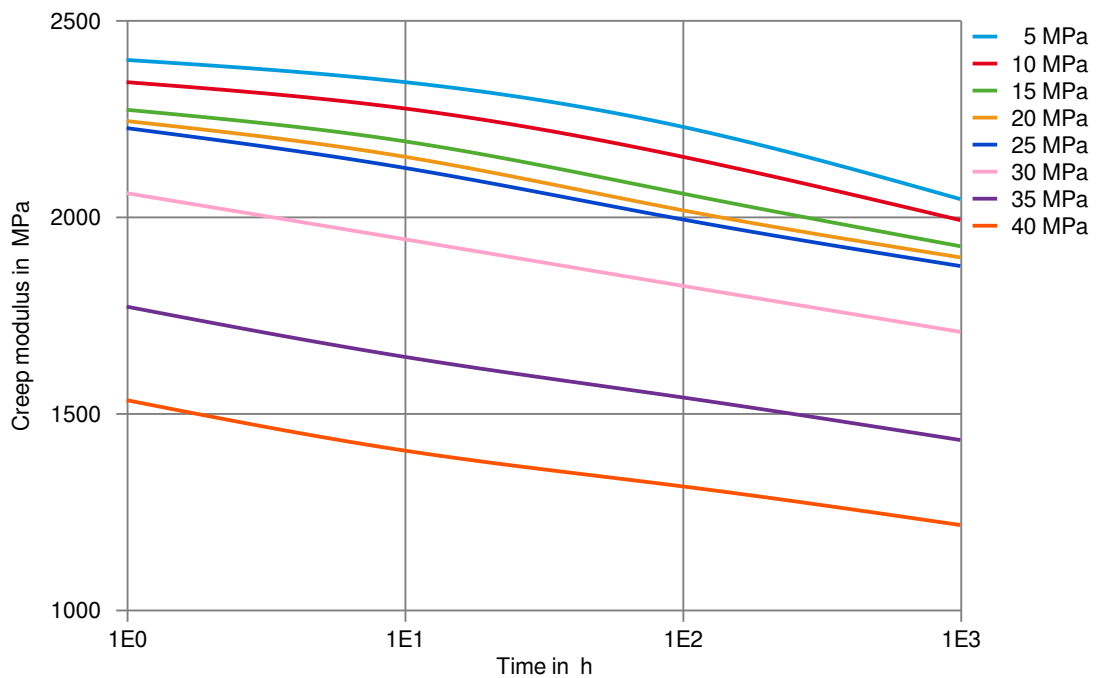
Stress-strain (isochronous) 150°C (dry)



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NYLON RESIN

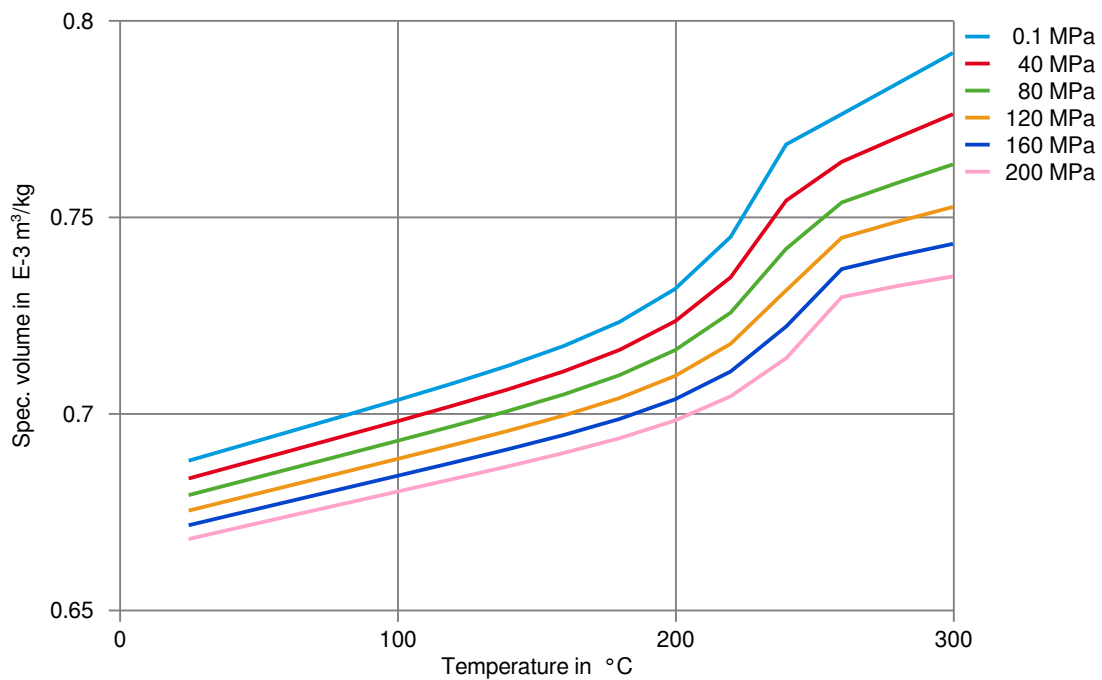
Creep modulus-time 150°C (dry)



# Zytel® 73G35HSL BK262

NYLON RESIN

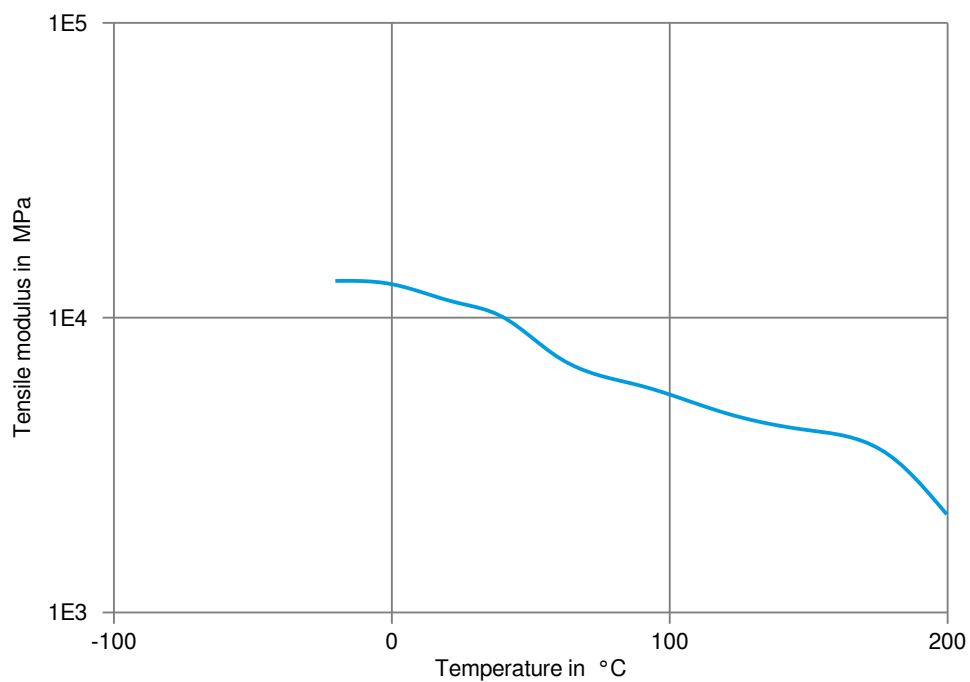
Specific volume-temperature (pvT)



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NYLON RESIN

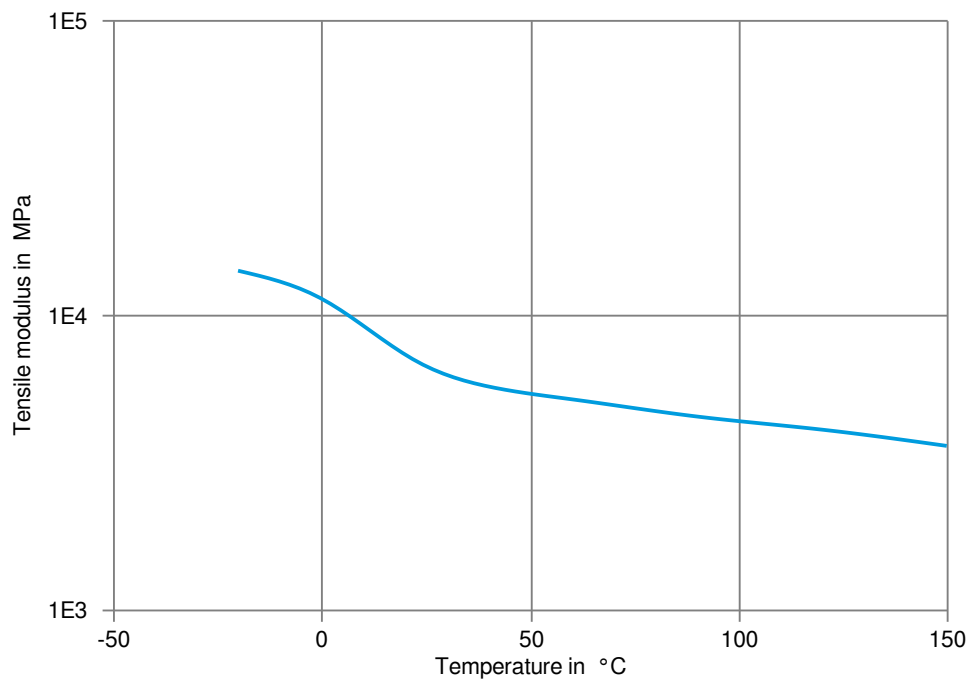
Tensile modulus-temperature (dry)



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NYLON RESIN

Tensile modulus-temperature (cond.)

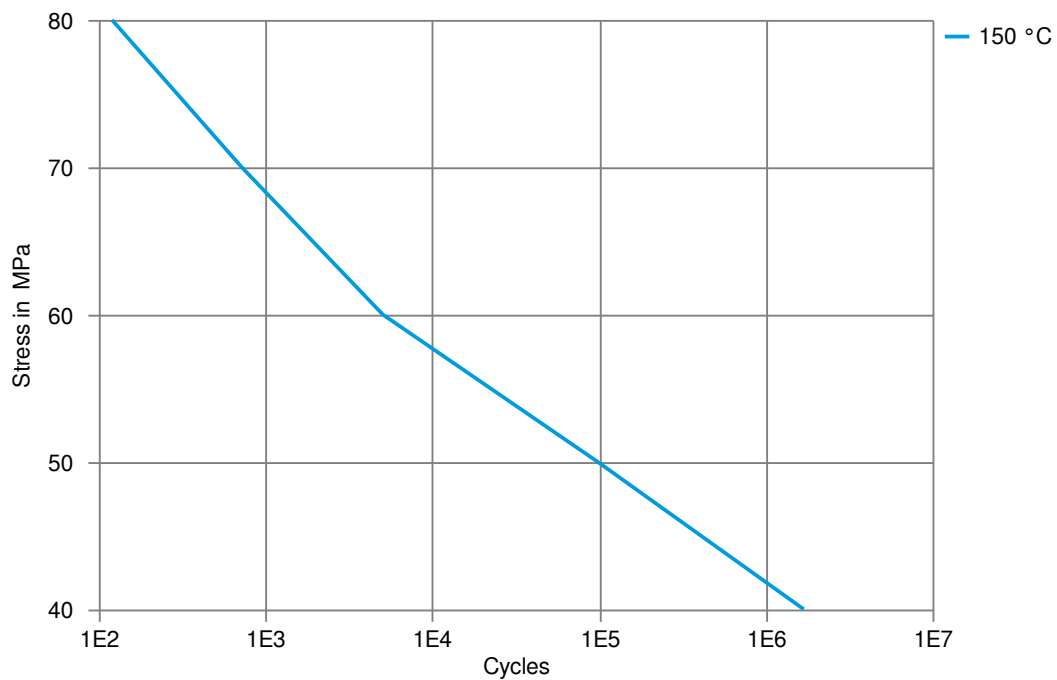




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Tensile Fatigue, 10Hz, R=0.1 @ 4mm (cond.)



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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

### 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
- ✗ 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).

