

# Zytel® PLS95G35DH1EF BK314LM

## ZYTEL® PLUS & XT 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® PLS95G35DH1EF BK314LM is a high flow, 35% glass fiber reinforced, SHIELD protected polyamide resin for injection moulding. It has been developed for electrical and electronics applications. It provides excellent surface appearance and exceptional resistance to hot air. It is well suited for laser marking

### Product information

|                      |                                       |           |
|----------------------|---------------------------------------|-----------|
| Resin Identification | PA66/6T-GF35                          | ISO 1043  |
| Part Marking Code    | >PA66/6T-GF35<                        | ISO 11469 |
| ISO designation      | ISO 16396-PA66/6T,GF35,M1GHNR,S12-110 |           |

### Rheological properties

|                                       | dry/cond.                             |                    |                 |
|---------------------------------------|---------------------------------------|--------------------|-----------------|
| Viscosity number                      | 115 <sup>[1]</sup> /* <sup>[PV]</sup> | cm <sup>3</sup> /g | ISO 307, 1628   |
| Moulding shrinkage, parallel          | 0.2 / -                               | %                  | ISO 294-4, 2577 |
| Moulding shrinkage, normal            | 0.9 / -                               | %                  | ISO 294-4, 2577 |
| Melt viscosity , @ 1000 sec-1, 280 °C | 140 <sup>[2]</sup> /*                 | Pa.s               | ISO 11443       |

[PV]: Preliminary Value

[1]: sulphuric acid 96%

[2]: Performed at 280 °C with a Shear Rate of 1000/sec and a Dwell Time of 300 secs using an Orifice with an L/D ratio of 20:1 and an Entrance Angle of 120°. Results are corrected to 0.13% Moisture.

### Typical mechanical properties

|                                       | dry/cond.               |                   |              |
|---------------------------------------|-------------------------|-------------------|--------------|
| Tensile modulus                       | 11000 / 8000            | MPa               | ISO 527-1/-2 |
| Tensile stress at break, 5mm/min      | 200 / 140               | MPa               | ISO 527-1/-2 |
| Tensile strain at break, 5mm/min      | 3 / 6                   | %                 | ISO 527-1/-2 |
| Charpy impact strength, 23 °C         | 70 / 90 <sup>[DS]</sup> | kJ/m <sup>2</sup> | ISO 179/1eU  |
| Charpy impact strength, -30 °C        | 70 / 70 <sup>[DS]</sup> | kJ/m <sup>2</sup> | ISO 179/1eU  |
| Charpy notched impact strength, 23 °C | 12 / 14 <sup>[DS]</sup> | kJ/m <sup>2</sup> | ISO 179/1eA  |
| Poisson's ratio                       | 0.34 / 0.34             |                   |              |

[DS]: Derived from similar grade

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### Thermal properties

|                                                               | dry/cond.            |          |                |
|---------------------------------------------------------------|----------------------|----------|----------------|
| Melting temperature, 10°C/min                                 | 268 / *              | °C       | ISO 11357-1/-3 |
| Glass transition temperature, 10°C/min                        | 80 / 40              | °C       | ISO 11357-1/-3 |
| Temperature of deflection under load, 1.8 MPa                 | 245 / *              | °C       | ISO 75-1/-2    |
| Coeff. of linear therm. expansion, parallel, -40-23°C         | 18 / *               | E-6/K    | ISO 11359-1/-2 |
| Coefficient of linear thermal expansion (CLTE), parallel      | 18 / *               | E-6/K    | ISO 11359-1/-2 |
| CLTE, Parallel, 23-55°C(73-130°F)                             | 18 / -               | E-6/K    | ASTM E 831     |
| Coeff. of linear therm. expansion, parallel, 55-160°C         | 13 / *               | E-6/K    | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, normal, -40-23°C           | 70 / *               | E-6/K    | ISO 11359-1/-2 |
| Coefficient of linear thermal expansion (CLTE), normal        | 88 / *               | E-6/K    | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, normal, 55-160°C           | 130 / *              | E-6/K    | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, Normal, 23-55°C (73-130°F) | 88 / -               | E-6/K    | ASTM E 831     |
| Thermal conductivity of melt                                  | 0.22                 | W/(m K)  | ISO 22007-2    |
| Specific heat capacity of melt                                | 2300 <sup>[DS]</sup> | J/(kg K) | ISO 22007-4    |
| TGA curve                                                     | available            |          | ISO 11359-1/-2 |

[DS]: Derived from similar grade

### Flammability

|                                      | dry/cond.               |        |                      |
|--------------------------------------|-------------------------|--------|----------------------|
| Burning Behav. at 1.5mm nom. thickn. | HB / * <sup>[DS]</sup>  | class  | IEC 60695-11-10      |
| Thickness tested                     | 1.5 / * <sup>[DS]</sup> | mm     | IEC 60695-11-10      |
| Oxygen index                         | 23 / *                  | %      | ISO 4589-1/-2        |
| FMVSS Class                          | B <sup>[OT]</sup>       |        | ISO 3795 (FMVSS 302) |
| Burning rate, Thickness 1 mm         | 25                      | mm/min | ISO 3795 (FMVSS 302) |

[DS]: Derived from similar grade  
[OT]: One time tested

### Electrical properties

|                            | dry/cond.              |       |             |
|----------------------------|------------------------|-------|-------------|
| Electric strength          | 33 / -                 | kV/mm | IEC 60243-1 |
| Comparative tracking index | 600 <sup>[3]</sup> / - |       | IEC 60112   |

[3]: CTI measured up to 700V

### Physical/Other properties

|                          | dry/cond.            |                   |                |
|--------------------------|----------------------|-------------------|----------------|
| Humidity absorption, 2mm | 1.8 / *              | %                 | Sim. to ISO 62 |
| Water absorption, 2mm    | 6 / *                | %                 | Sim. to ISO 62 |
| Density                  | 1430 / -             | kg/m <sup>3</sup> | ISO 1183       |
| Density of melt          | 1260 <sup>[DS]</sup> | kg/m <sup>3</sup> |                |

[DS]: Derived from similar grade

### 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  |

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|                          |              |
|--------------------------|--------------|
| Min. melt temperature    | 280 °C       |
| Max. melt temperature    | 290 °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       |
| Ejection temperature     | 210 °C       |

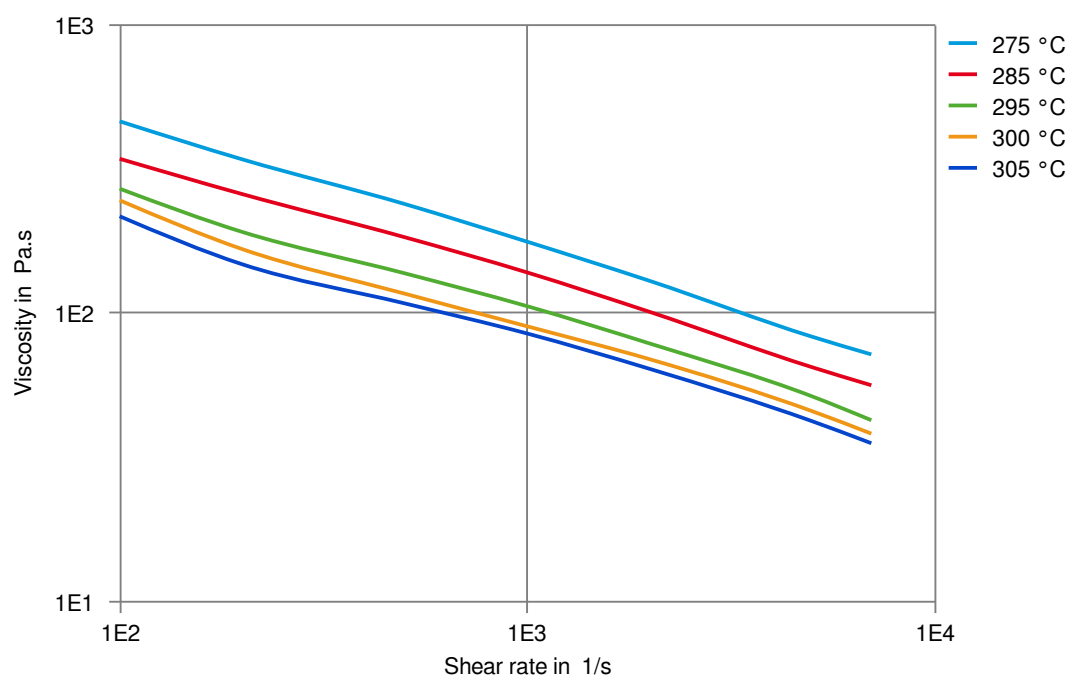
### Characteristics

|                         |                                                   |
|-------------------------|---------------------------------------------------|
| Processing              | Injection Moulding                                |
| Delivery form           | Pellets                                           |
| Additives               | Release agent, Low halide content                 |
| Special characteristics | Heat stabilised or stable to heat, Laser Markable |

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ZYTEL® PLUS & XT NYLON RESIN

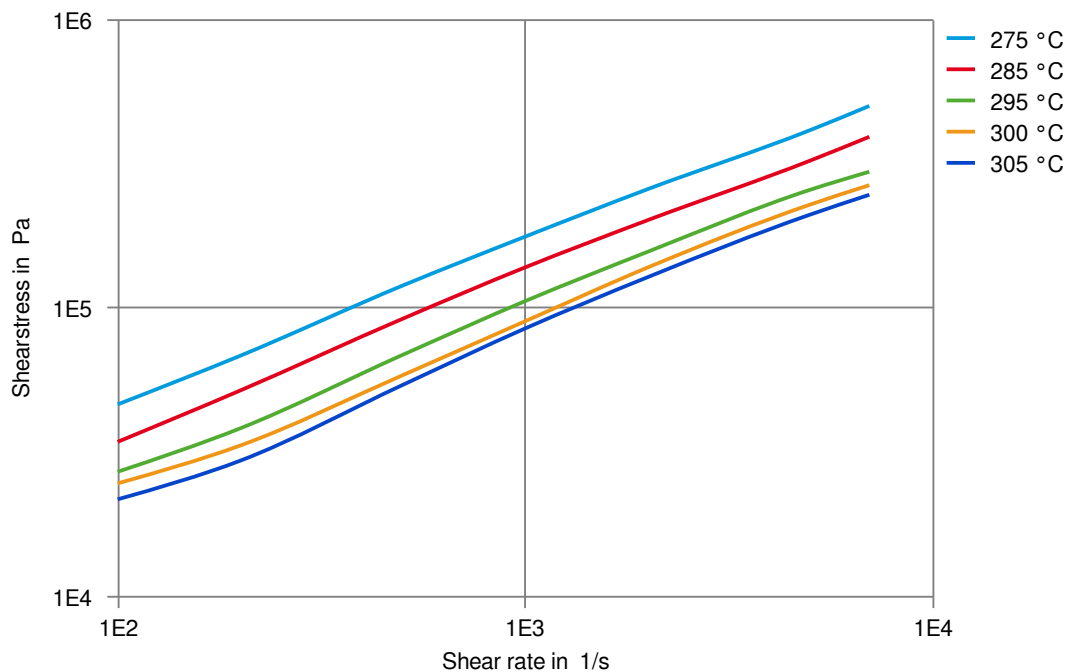
## Viscosity-shear rate



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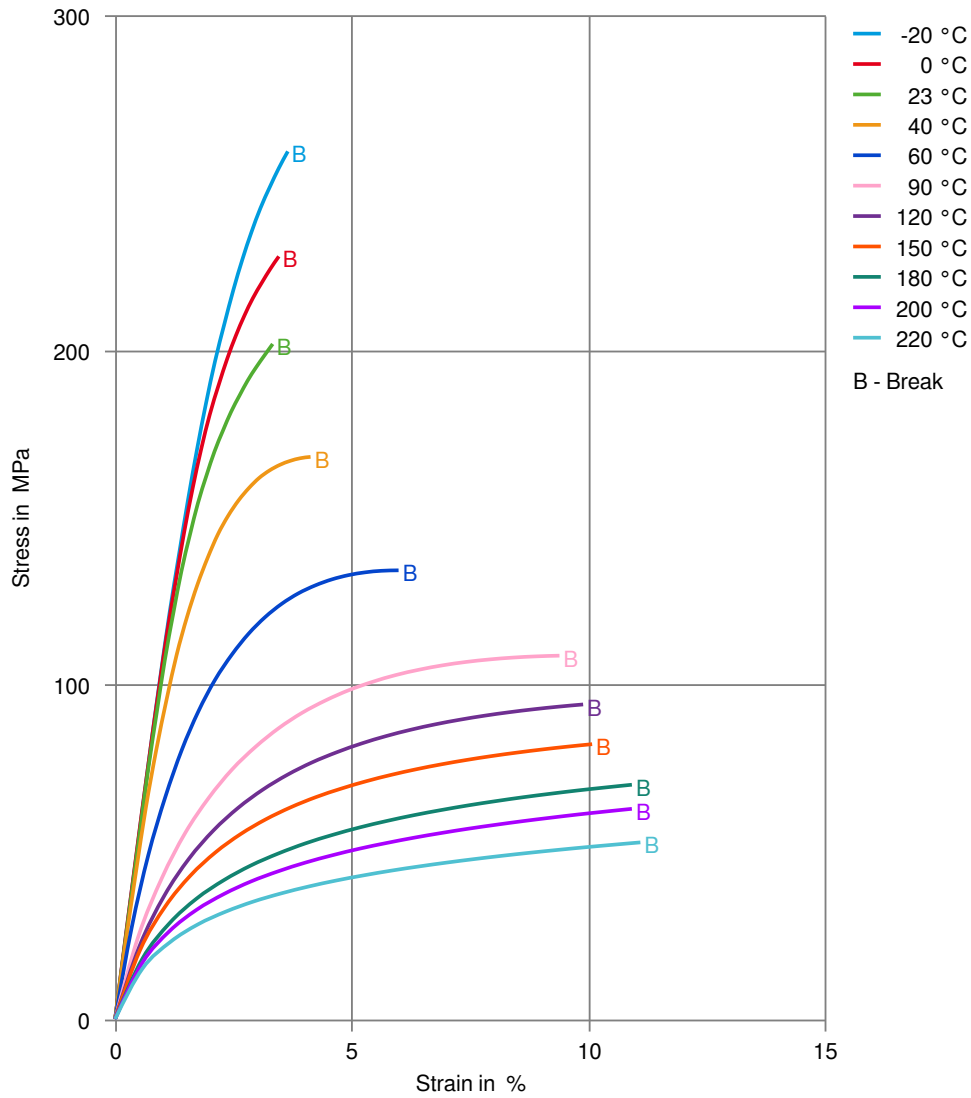
## Shearstress-shear rate



# Zytel® PLS95G35DH1EF BK314LM

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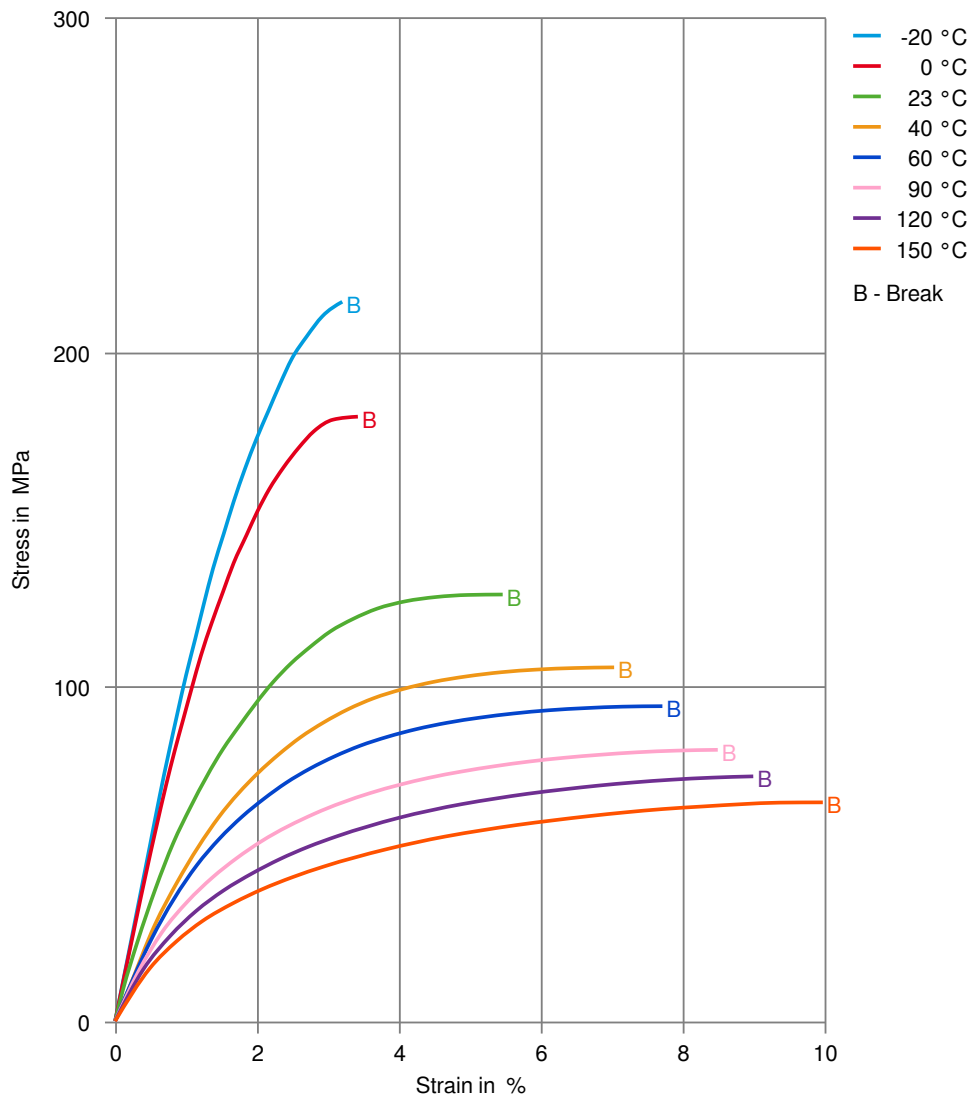
Stress-strain (dry)  
(measured on Zytel® PLS95G35DH1 BK549)



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ZYTEL® PLUS & XT NYLON RESIN

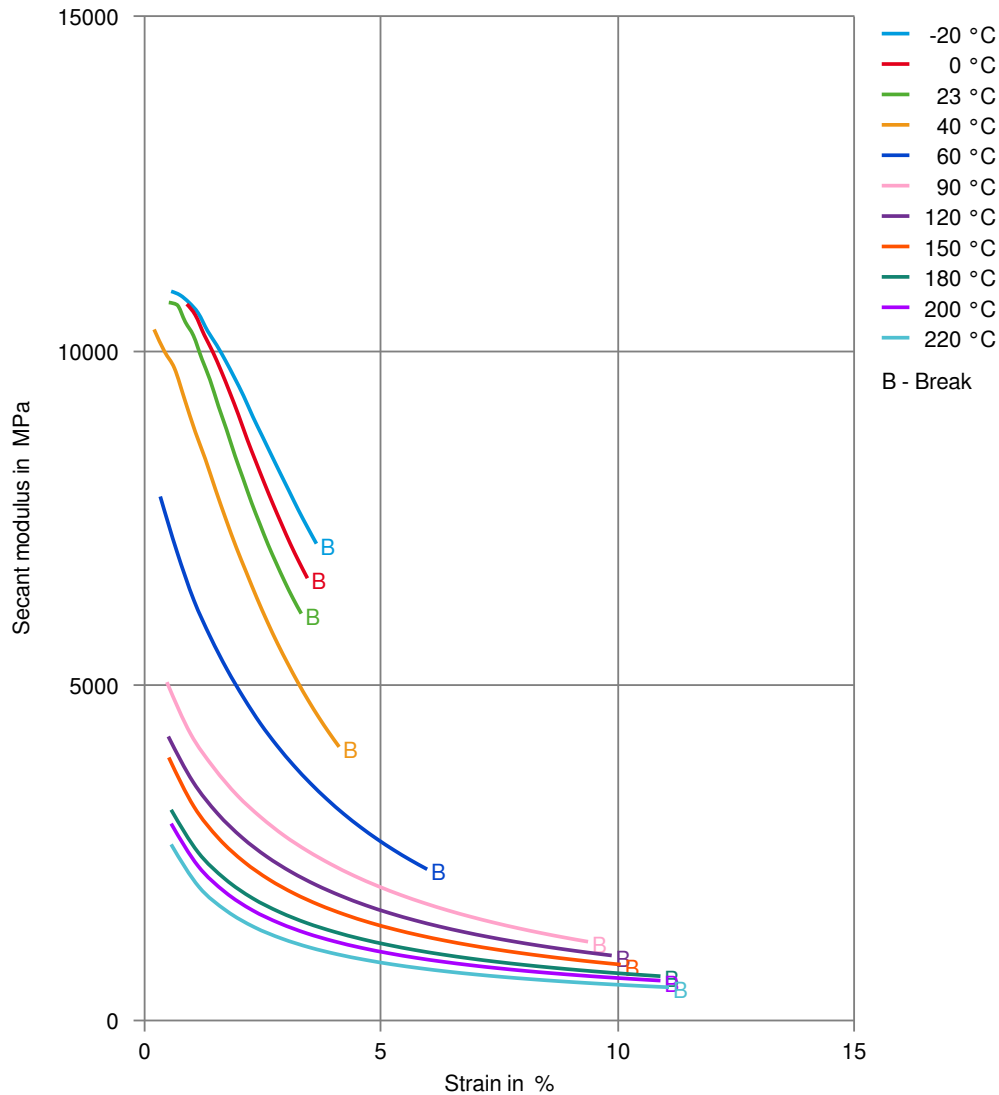
Stress-strain (cond.)  
(measured on Zytel® PLS95G35DH1 BK549)



# Zytel® PLS95G35DH1EF BK314LM

ZYTEL® PLUS & XT NYLON RESIN

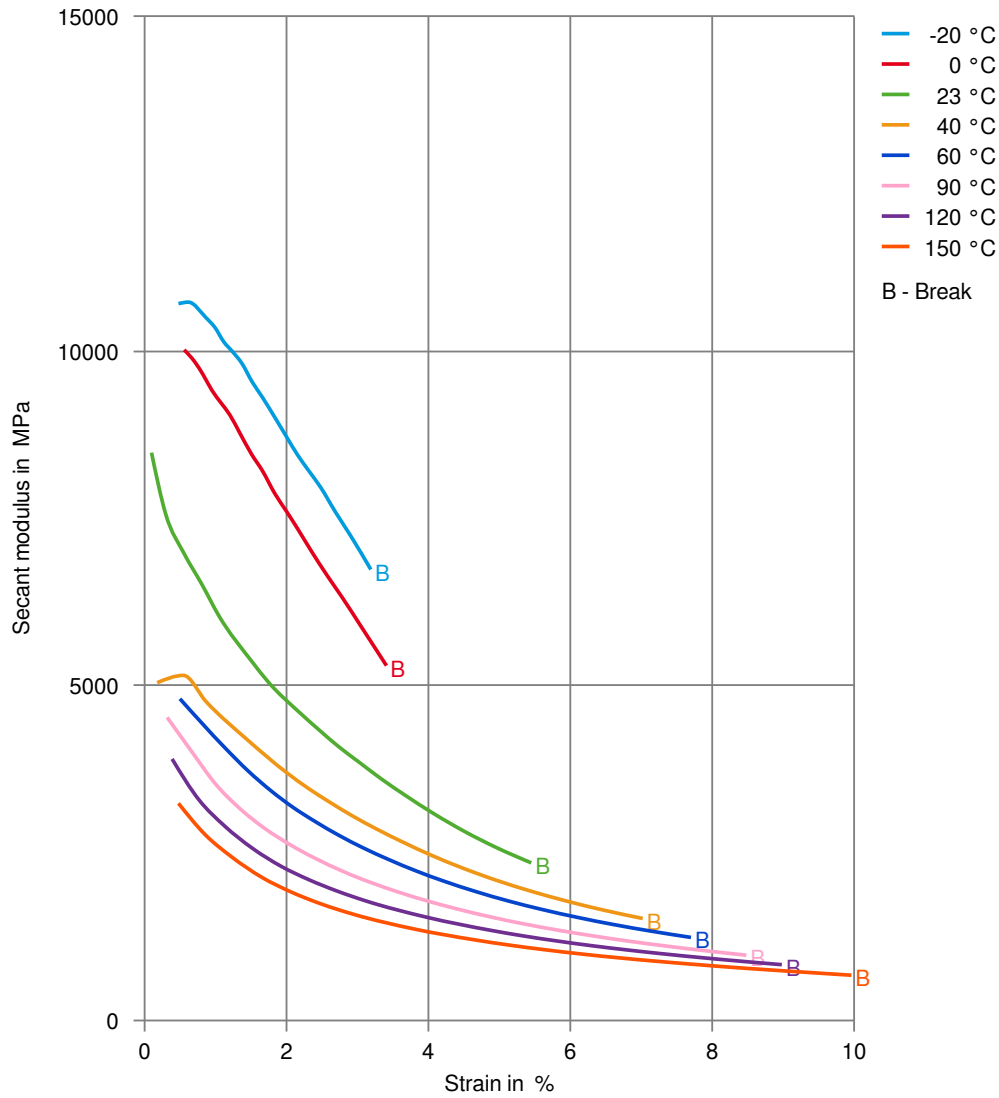
Secant modulus-strain (dry)  
(measured on Zytel® PLS95G35DH1 BK549)



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ZYTEL® PLUS & XT NYLON RESIN

Secant modulus-strain (cond.)  
(measured on Zytel® PLS95G35DH1 BK549)



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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

#### Mineral oils

- ✓ SAE 10W40 multigrade motor oil, 130°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
- ✓ 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

- ✗ Zinc Chloride solution (50% by mass), 23°C

#### Other

- ✓ Water, 23°C
- ✗ Water, 90°C
- ✗ Coolant Glysantin G48, 1:1 in water, 125°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).