

# Zytel® 80G43HS1L BK104

## 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® 80G43HS1L BK104 is a 43% glass fiber reinforced, heat stabilised, black polyamide 66 resin with superior impact resistance.

### Product information

Resin Identification	PA66-IGF43	ISO 1043
Part Marking Code	>PA66-IGF43<	ISO 11469
ISO designation	ISO 16396-PA66-I,GF43,M1CGHR,S14-120	

### Rheological properties

	dry/cond.		
Viscosity number	140 <sup>[1]/*</sup>	cm <sup>3</sup> /g	ISO 307, 1628
Moulding shrinkage, parallel	0.2/-	%	ISO 294-4, 2577
Moulding shrinkage, normal	0.6/-	%	ISO 294-4, 2577
Melt viscosity, @ 1000 sec-1, 280°C	230/*	Pa.s	ISO 11443

[1]: Sulfuric Acid

### Typical mechanical properties

	dry/cond.		
Tensile modulus	12300/8600	MPa	ISO 527-1/-2
Tensile stress at break, 5mm/min	176/127	MPa	ISO 527-1/-2
Tensile strain at break, 5mm/min	3.3/6.6	%	ISO 527-1/-2
Charpy impact strength, 23°C	90/-	kJ/m <sup>2</sup>	ISO 179/1eU
Charpy notched impact strength, 23°C	23/-	kJ/m <sup>2</sup>	ISO 179/1eA
Izod notched impact strength, 23°C	23/-	kJ/m <sup>2</sup>	ISO 180/1A
Poisson's ratio	0.33/0.34		

### Thermal properties

	dry/cond.		
Melting temperature, 10°C/min	260/*	°C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	75/20	°C	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	250/*	°C	ISO 75-1/-2
Temperature of deflection under load, 0.45 MPa	261/*	°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	15/*	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), parallel	15/*	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, parallel, 55-160°C	12/*	E-6/K	ISO 11359-1/-2

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Coeff. of linear therm. expansion, normal, -40-23°C	71 / *	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal	108 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal, 55-160°C	127 / *	E-6/K	ISO 11359-1/-2

### Flammability

	dry/cond.		
Burning Behav. at 1.5mm nom. thickn.	HB / *	class	IEC 60695-11-10
Thickness tested	1.5 / *	mm	IEC 60695-11-10
Burning Behav. at thickness h	HB / *	class	IEC 60695-11-10
Thickness tested	0.75 / *	mm	IEC 60695-11-10
Oxygen index	27 / *	%	ISO 4589-1/-2
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	>1E13 / 1E12	Ohm.m	IEC 62631-3-1
Comparative tracking index	600 / -		IEC 60112
Electric Strength, Short Time, 1mm	42 / 30	kV/mm	IEC 60243-1

### Physical/Other properties

	dry/cond.		
Humidity absorption, 2mm	1.5 / *	%	Sim. to ISO 62
Density	1430 / -	kg/m <sup>3</sup>	ISO 1183
Density of melt	1270	kg/m <sup>3</sup>	

### Injection

Drying Recommended	yes
Drying Temperature	80 °C
Drying Time, Dehumidified Dryer	2 - 4 h
Processing Moisture Content	≤0.2 %
Melt Temperature Optimum	295 °C
Min. melt temperature	285 °C
Max. melt temperature	305 °C
Screw tangential speed	≤0.2 m/s
Mold Temperature Optimum	80 °C
Min. mould temperature	50 °C
Max. mould temperature	100 °C
Hold pressure range	50 - 100 MPa
Hold pressure time	3 s/mm
Ejection temperature	195 °C

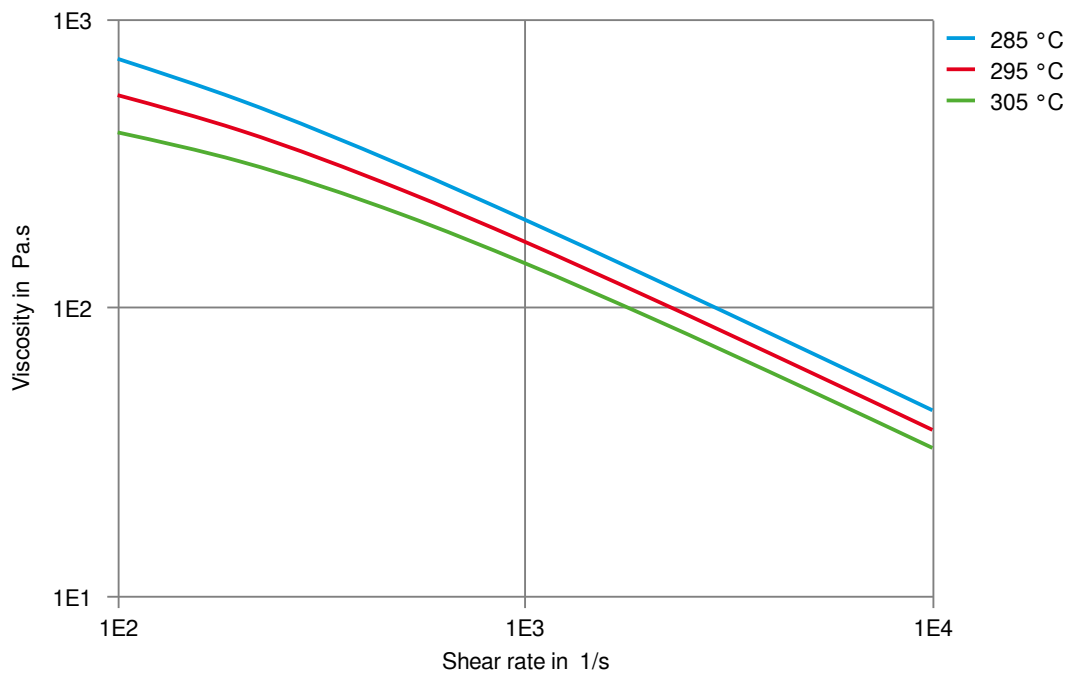
### Characteristics

Processing	Injection Moulding
Delivery form	Pellets
Additives	Release agent
Special characteristics	High impact or impact modified, Heat stabilised or stable to heat

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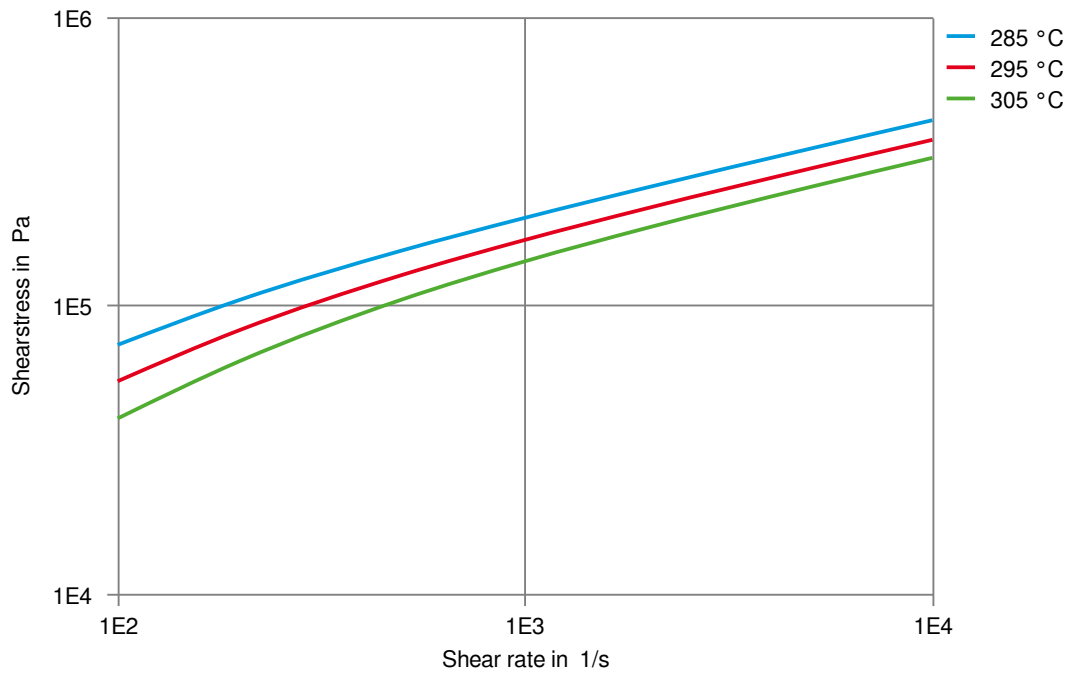
Viscosity-shear rate



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NYLON RESIN

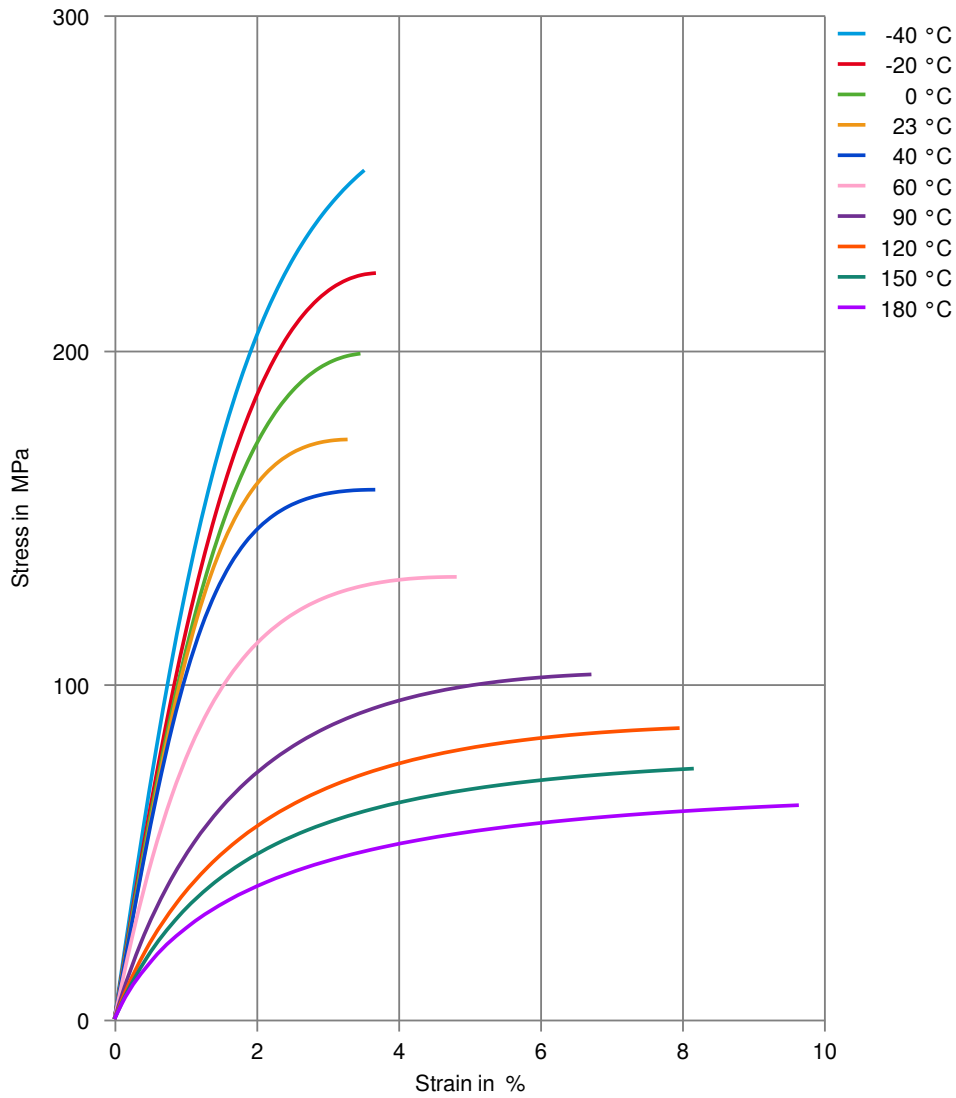
Shearstress-shear rate



# Zytel® 80G43HS1L BK104

NYLON RESIN

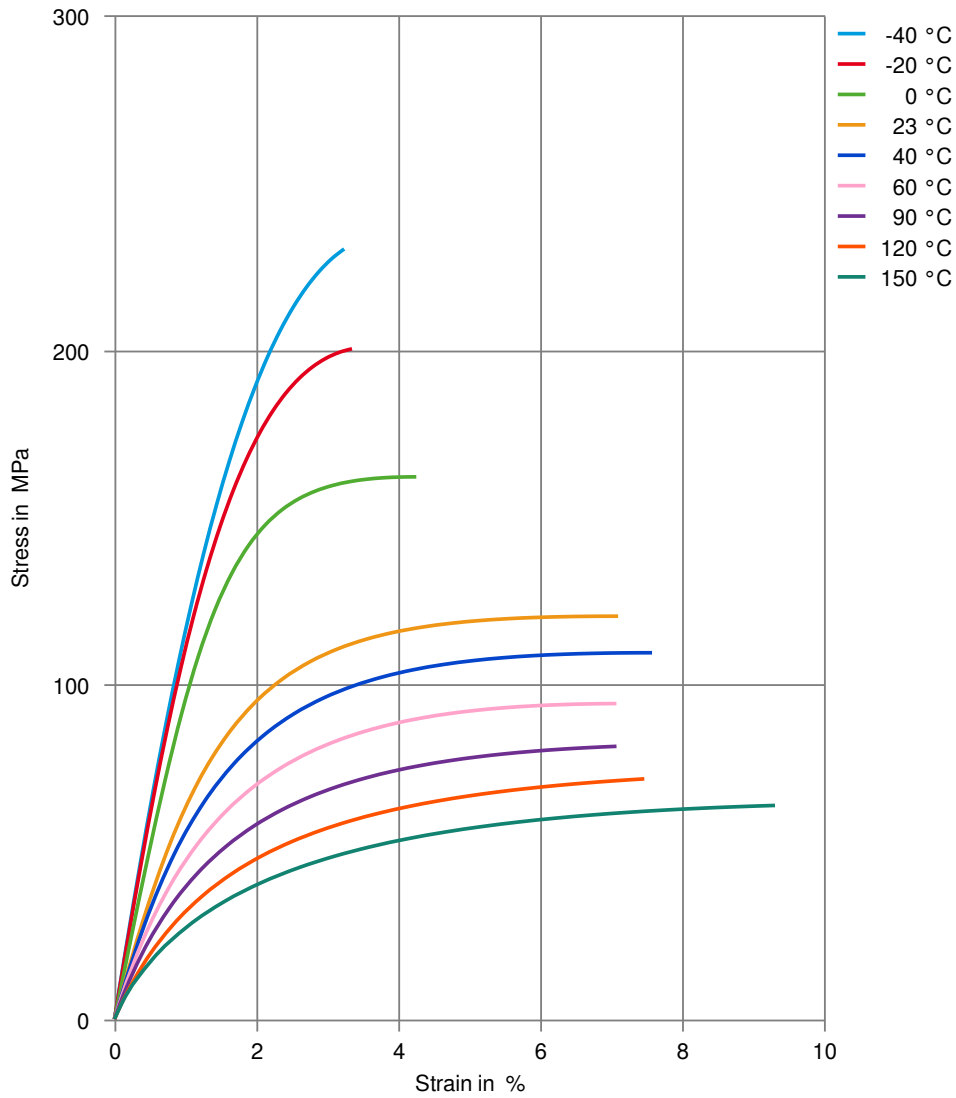
Stress-strain (dry)



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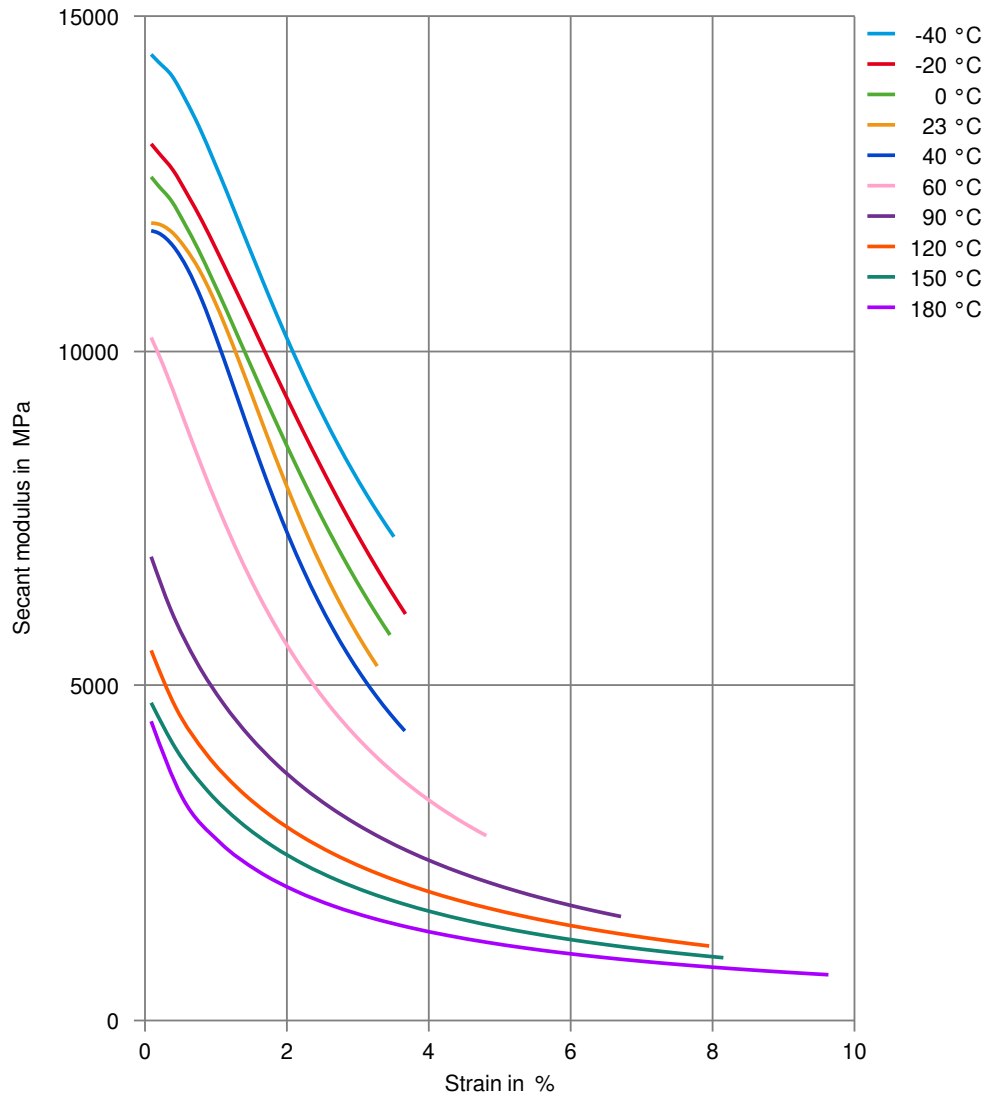
## Stress-strain (cond.)



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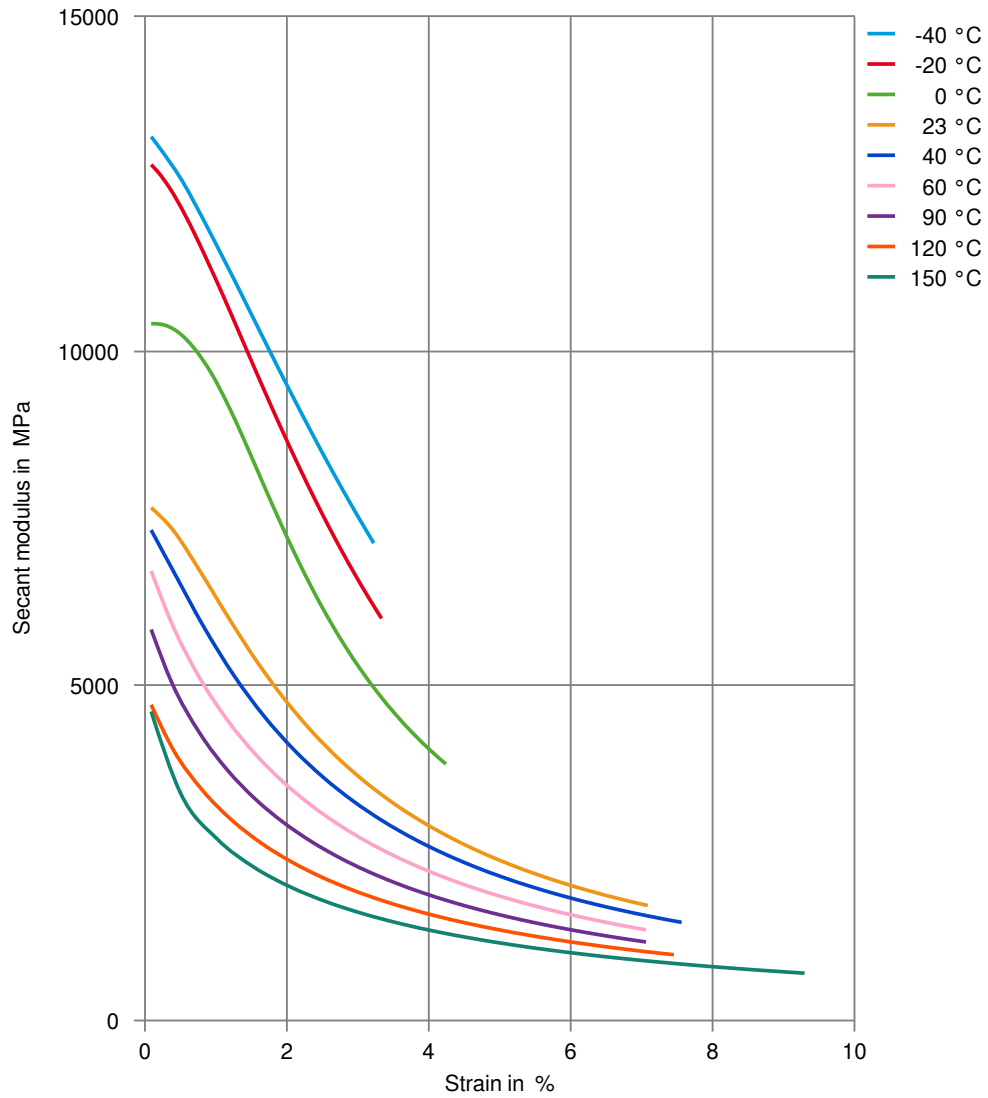
## Secant modulus-strain (dry)



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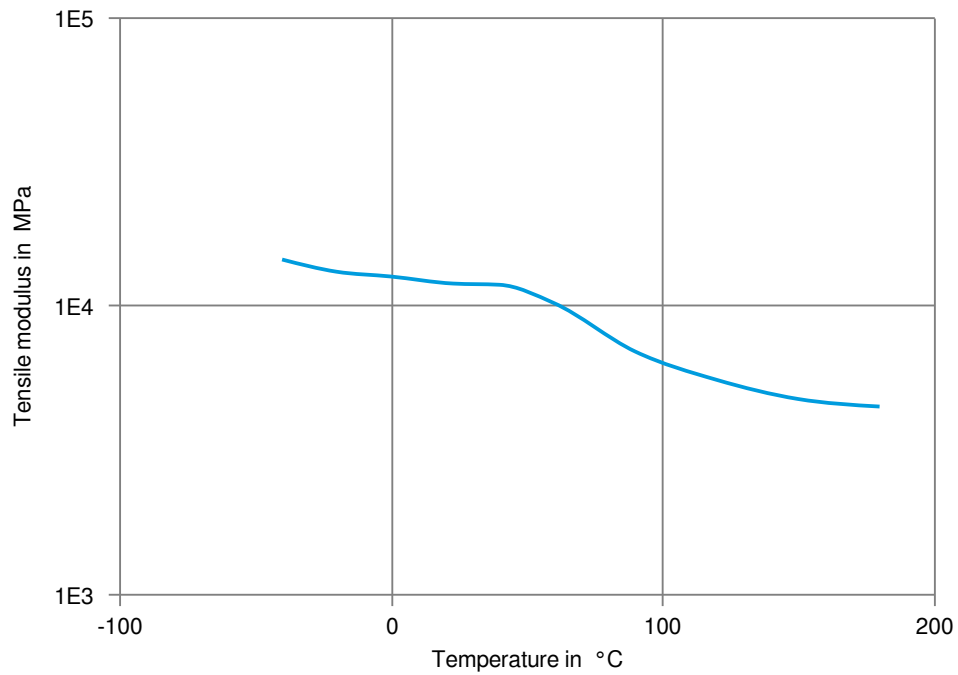
## Secant modulus-strain (cond.)



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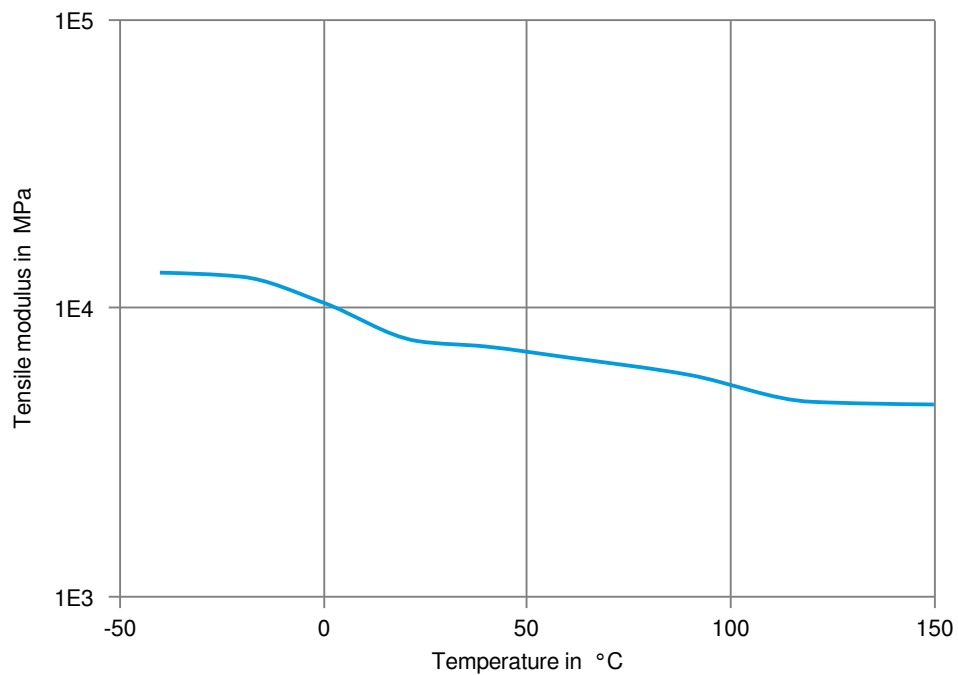
Tensile modulus-temperature (dry)



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Tensile modulus-temperature (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

#### 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

- ✓ Sodium Chloride solution (10% by mass), 23°C
- ✗ Sodium Hypochlorite solution (10% by mass), 23°C

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- ✓ 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).