

# Zytel® 73G60HSLA BK416

## 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® 73G60HSLA BK416 is a 60% Glass Reinforced, Heat Stabilized, High flow Polyamide 6

### Product information

Resin Identification	PA6-GF60	ISO 1043
Part Marking Code	>PA6-GF60<	ISO 11469
ISO designation	ISO 16396-PA6,GF60,M1CGHR,S09-220	

### Rheological properties

	dry/cond.		
Moulding shrinkage, parallel	0.3 / -	%	ISO 294-4, 2577
Moulding shrinkage, normal	0.6 / -	%	ISO 294-4, 2577

### Typical mechanical properties

	dry/cond.		
Tensile modulus	21000 / 15000	MPa	ISO 527-1/-2
Tensile stress at break, 5mm/min	250 / 170	MPa	ISO 527-1/-2
Tensile strain at break, 5mm/min	2.3 / 3.5	%	ISO 527-1/-2
Charpy impact strength, 23°C	80 / 90	kJ/m <sup>2</sup>	ISO 179/1eU
Charpy impact strength, -30°C	75 / 65	kJ/m <sup>2</sup>	ISO 179/1eU
Charpy impact strength, -40°C	70 / 60	kJ/m <sup>2</sup>	ISO 179/1eU
Charpy notched impact strength, 23°C	17 / 18	kJ/m <sup>2</sup>	ISO 179/1eA
Charpy notched impact strength, -30°C	14 / 12	kJ/m <sup>2</sup>	ISO 179/1eA
Charpy notched impact strength, -40°C	13 / 11	kJ/m <sup>2</sup>	ISO 179/1eA
Poisson's ratio	0.33 / 0.33		

### Thermal properties

	dry/cond.		
Melting temperature, 10°C/min	220 / *	°C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	60 / 15	°C	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	215 / *	°C	ISO 75-1/-2
Coefficient of linear thermal expansion (CLTE), parallel	13 / *	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal	70 / *	E-6/K	ISO 11359-1/-2

### Flammability

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

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### Physical/Other properties

	dry/cond.		
Humidity absorption, 2mm	1.2/*	%	Sim. to ISO 62
Water absorption, 2mm	3.6/*	%	Sim. to ISO 62
Density	1700/-	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	270 °C
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
Ejection temperature	164 °C

### Characteristics

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

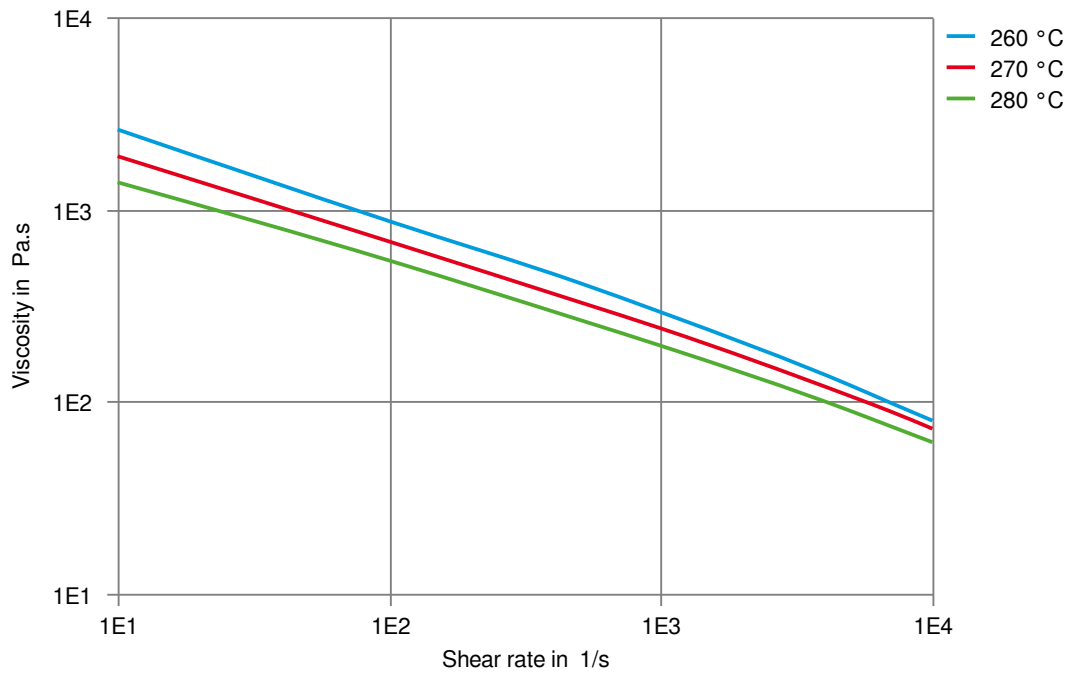
### Automotive

OEM	ADDITIONAL INFORMATION
Renault-Nissan	AS25, No Spec, Special Part Approval, See Your CE Account Manager.
Tesla	TM-1006 102160

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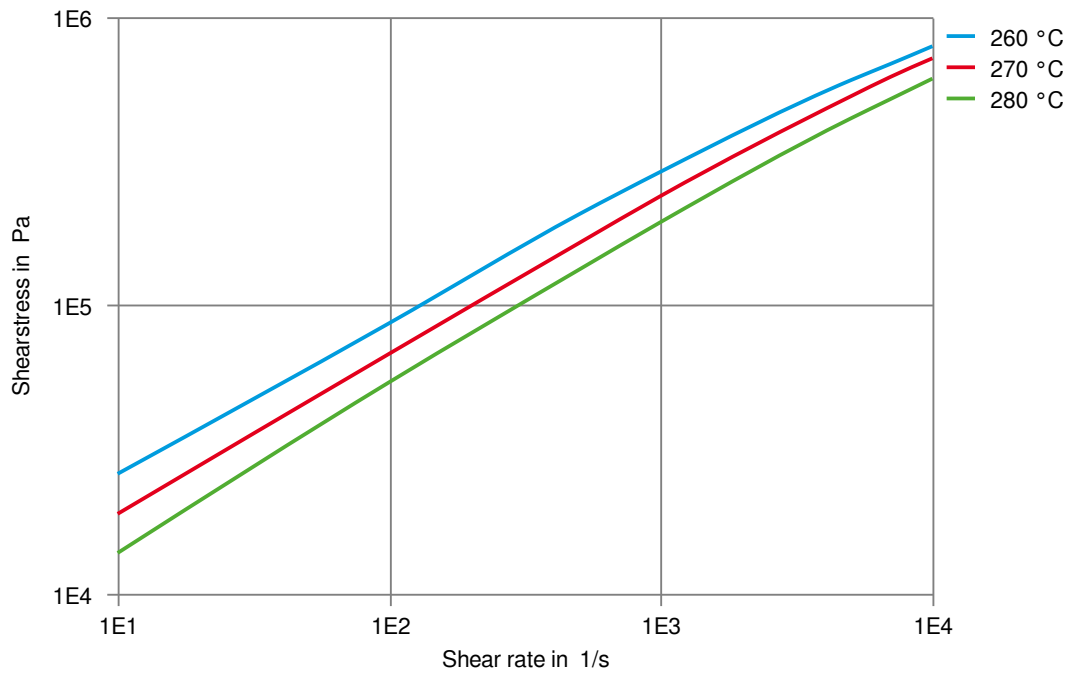
Viscosity-shear rate



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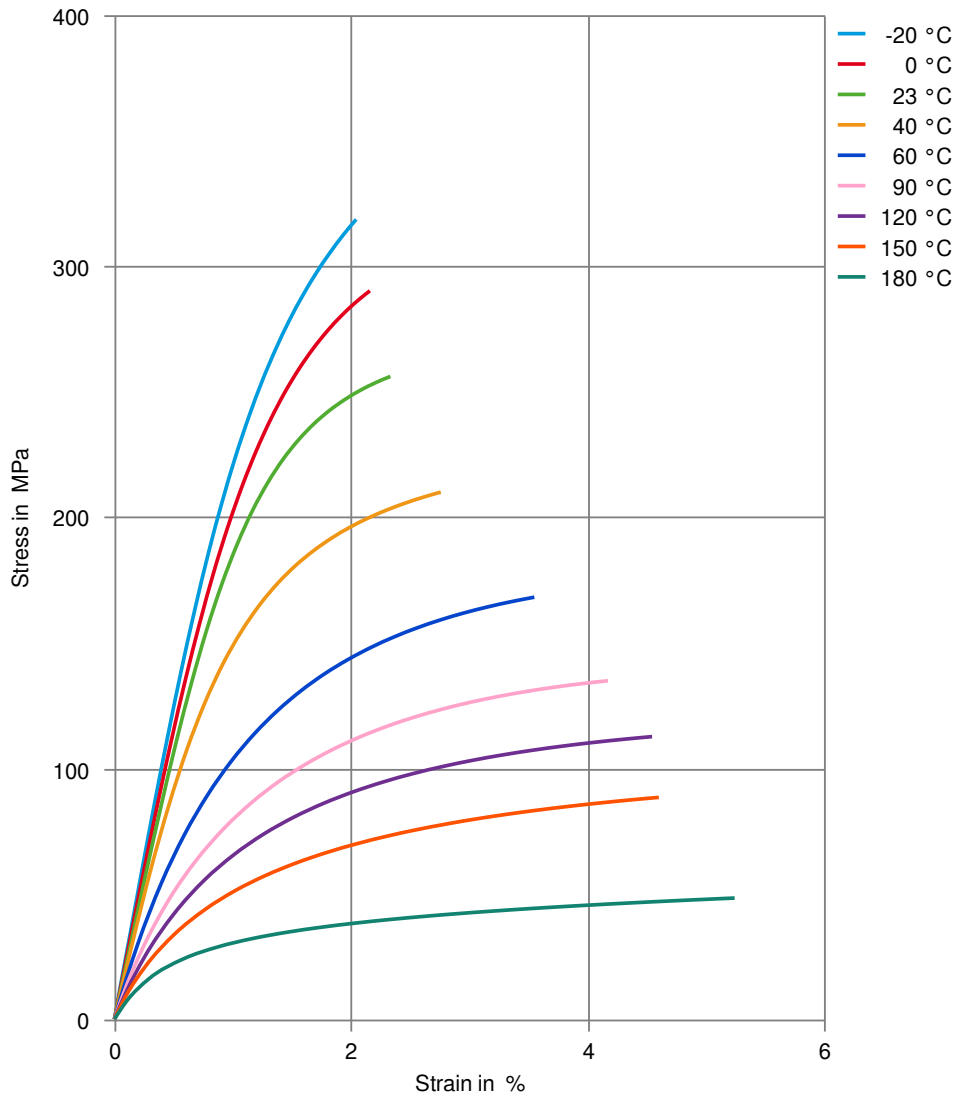
Shearstress-shear rate



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NYLON RESIN

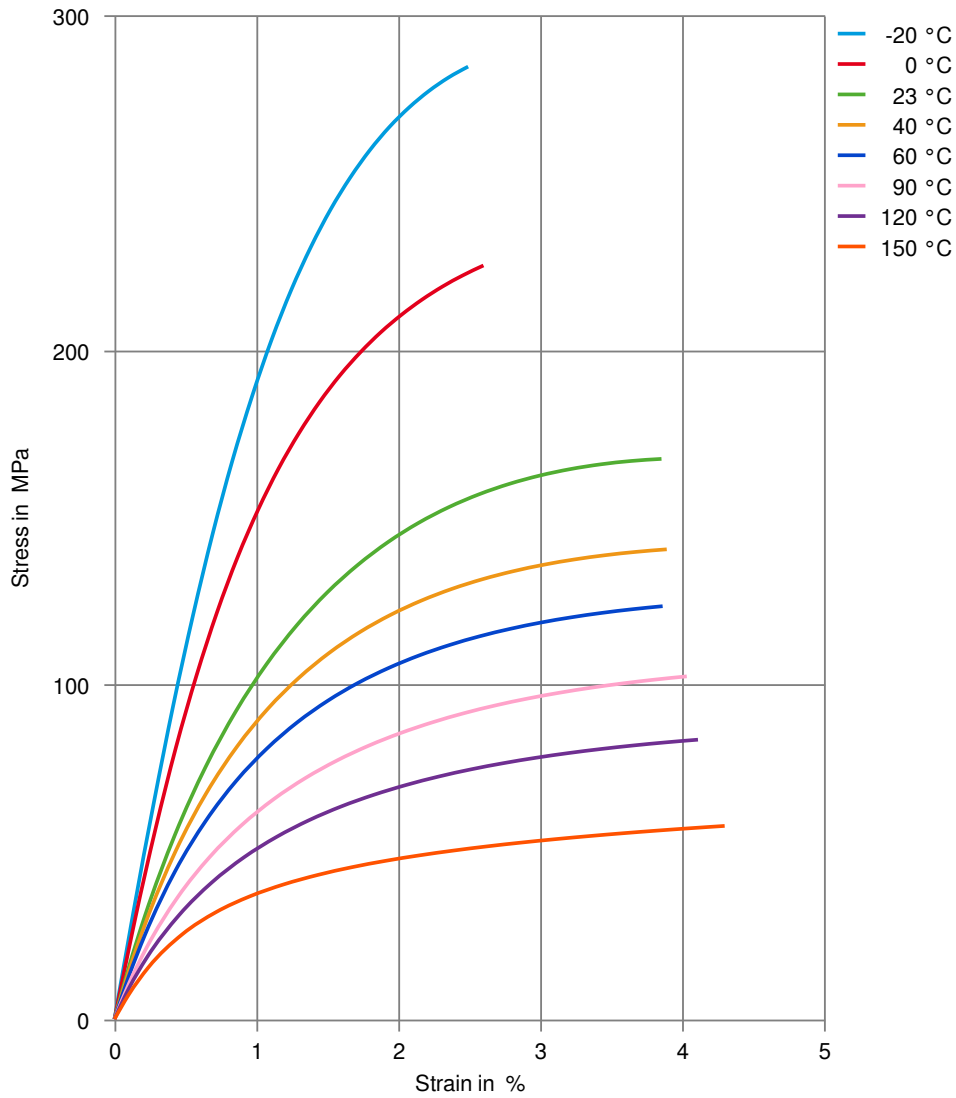
Stress-strain (dry)



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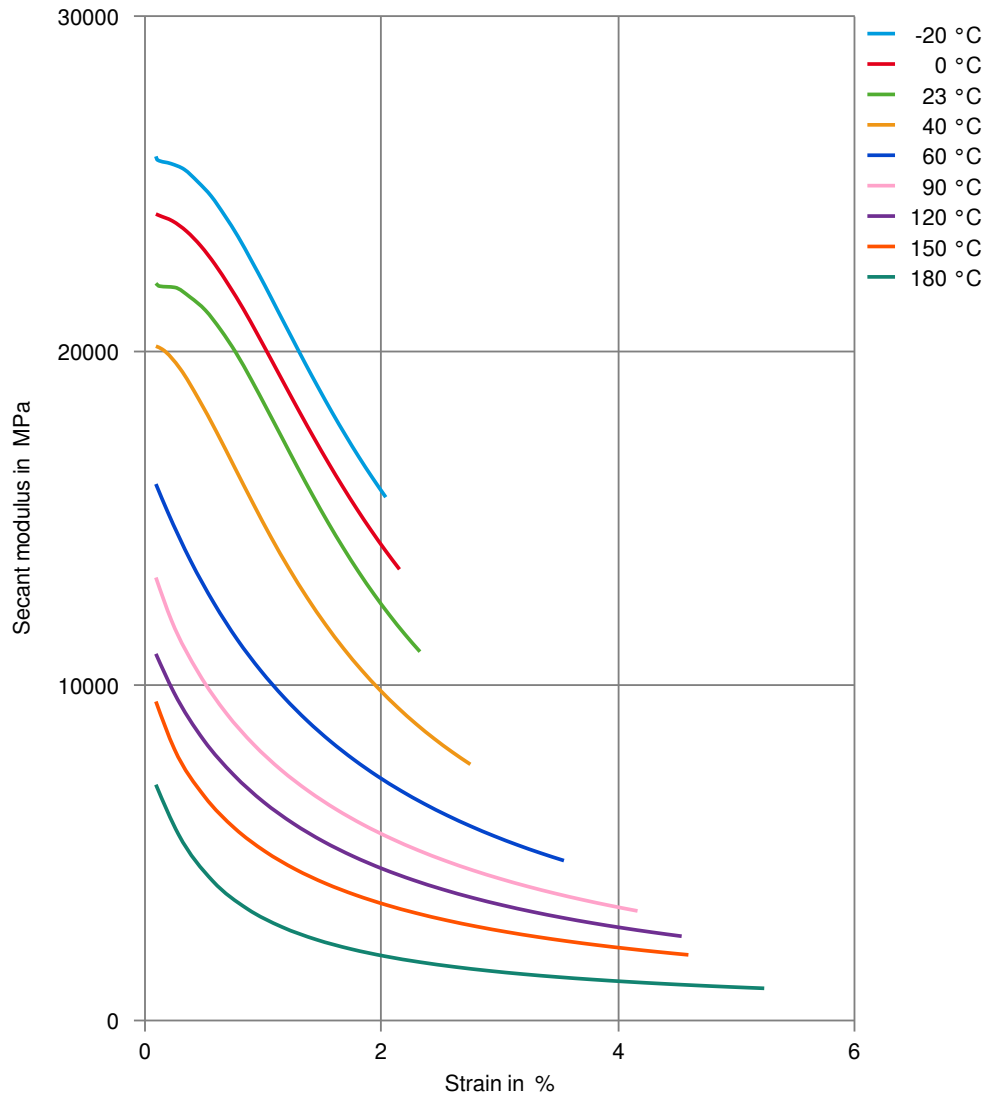
Stress-strain (cond.)



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NYLON RESIN

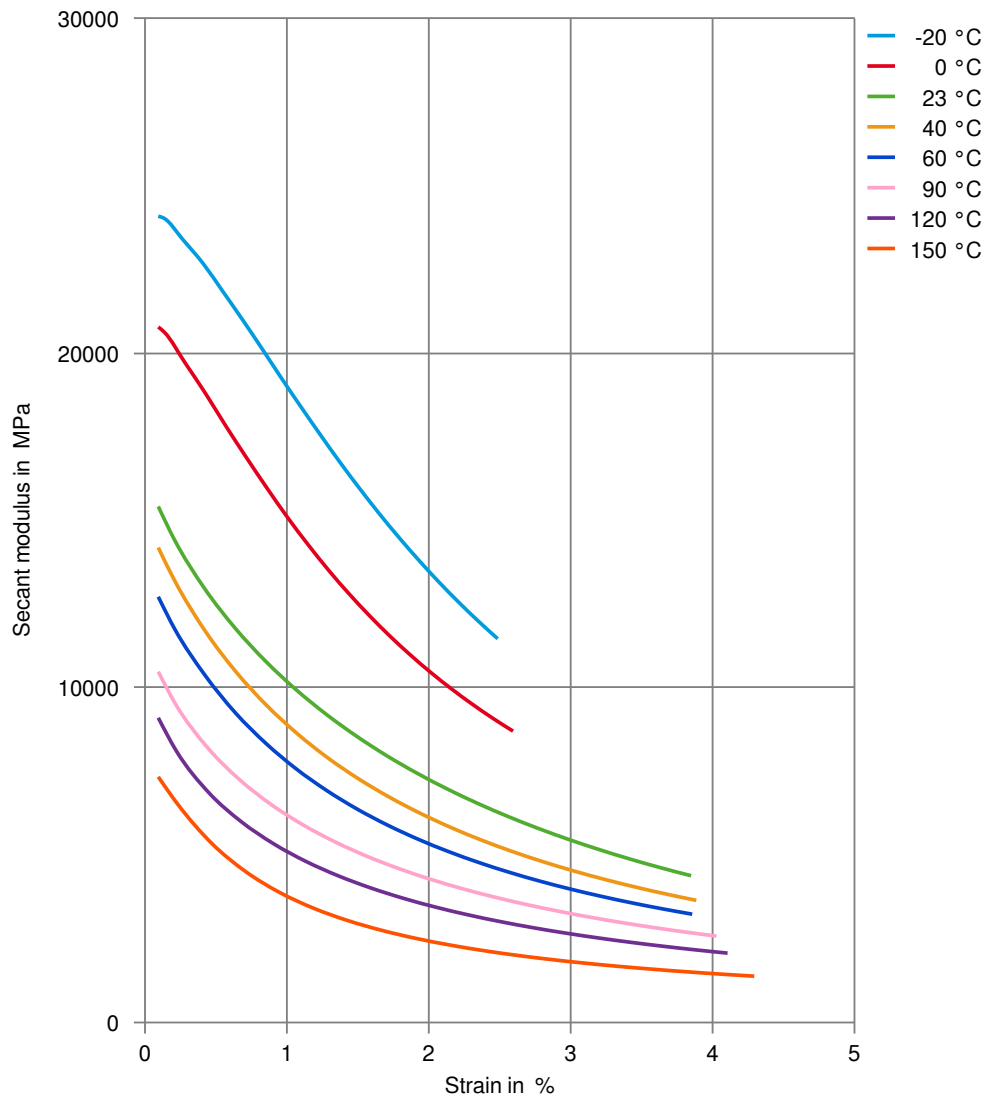
## Secant modulus-strain (dry)



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NYLON RESIN

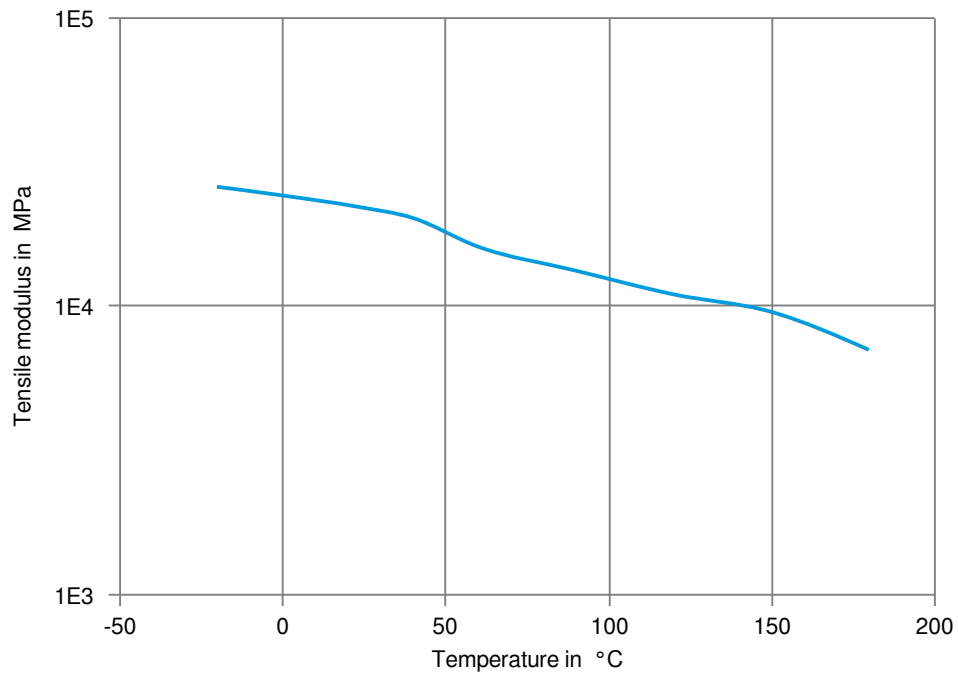
Secant modulus-strain (cond.)



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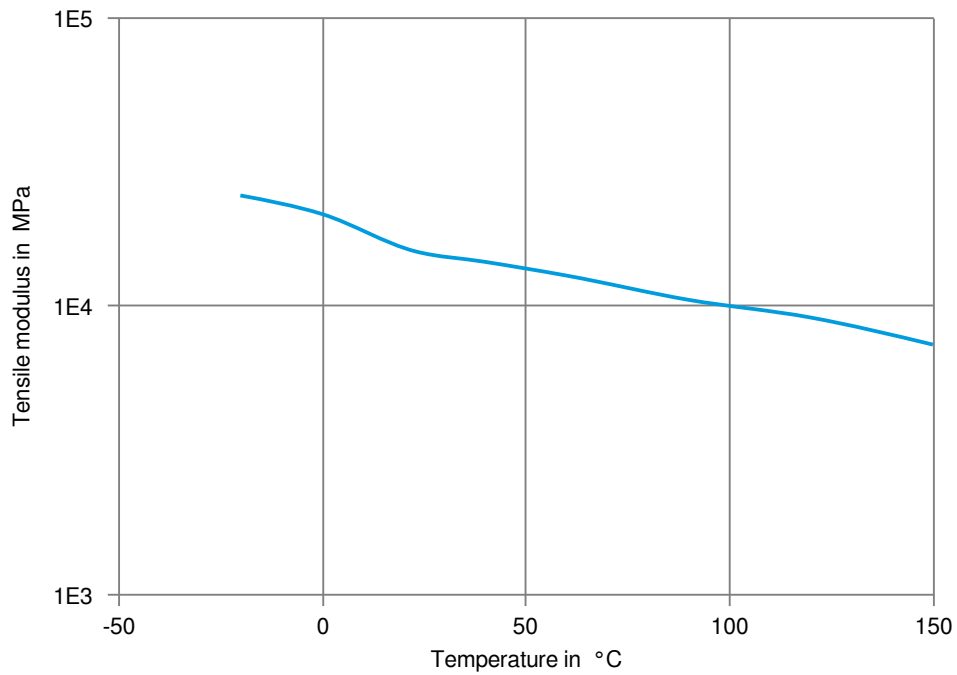
Tensile modulus-temperature (dry)



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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).