

# Zytel® 73G45L NC010

## 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® 73G45L NC010 is a 45% glass fiber reinforced polyamide 6 resin for injection moulding.

### Product information

Resin Identification	PA6-GF45	ISO 1043
Part Marking Code	>PA6-GF45<	ISO 11469
ISO designation	ISO 16396-PA6,GF45,M1GNR,S14-140	

### Rheological properties

	dry/cond.		
Viscosity number	148/*	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	14500/9700	MPa	ISO 527-1/-2
Stress at break, 5mm/min	230/160	MPa	ISO 527-1/-2
Strain at break, 5mm/min	3/5	%	ISO 527-1/-2
Flexural Modulus	13000/-	MPa	ISO 178
Flexural Strength	310/-	MPa	ISO 178
Compressive strength	-/170	MPa	ISO 604
Shear Strength	-/60	MPa	ASTM D 732
Tensile creep modulus, 1h	*/9400	MPa	ISO 899-1
Tensile creep modulus, 1000h	*/7300	MPa	ISO 899-1
Charpy impact strength, 23°C	115/111	kJ/m <sup>2</sup>	ISO 179/1eU
Charpy impact strength, -30°C	115/101	kJ/m <sup>2</sup>	ISO 179/1eU
Charpy notched impact strength, 23°C	20/25	kJ/m <sup>2</sup>	ISO 179/1eA
Charpy notched impact strength, -30°C	19/23	kJ/m <sup>2</sup>	ISO 179/1eA
Izod notched impact strength, 23°C	18/24	kJ/m <sup>2</sup>	ISO 180/1A
Izod notched impact strength, -30°C	15/-	kJ/m <sup>2</sup>	ISO 180/1A
Ball indentation hardness, H 961/30	250/-	MPa	ISO 2039-1

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Poisson's ratio 0.33/0.34

### 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	213/*	°C	ISO 75-1/-2
Temp. of deflection under load, 0.45 MPa	221/*	°C	ISO 75-1/-2
Vicat softening temperature, 50°C/h, 50N	215/*	°C	ISO 306
Coeff. of linear therm. expansion, parallel	16/*	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal	100/*	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	44	mm/min	ISO 3795 (FMVSS 302)

### Other properties

	dry/cond.		
Humidity absorption, 2mm	1.7/*	%	Sim. to ISO 62
Water absorption, 2mm	4.9/*	%	Sim. to ISO 62
Density	1510/-	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	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	

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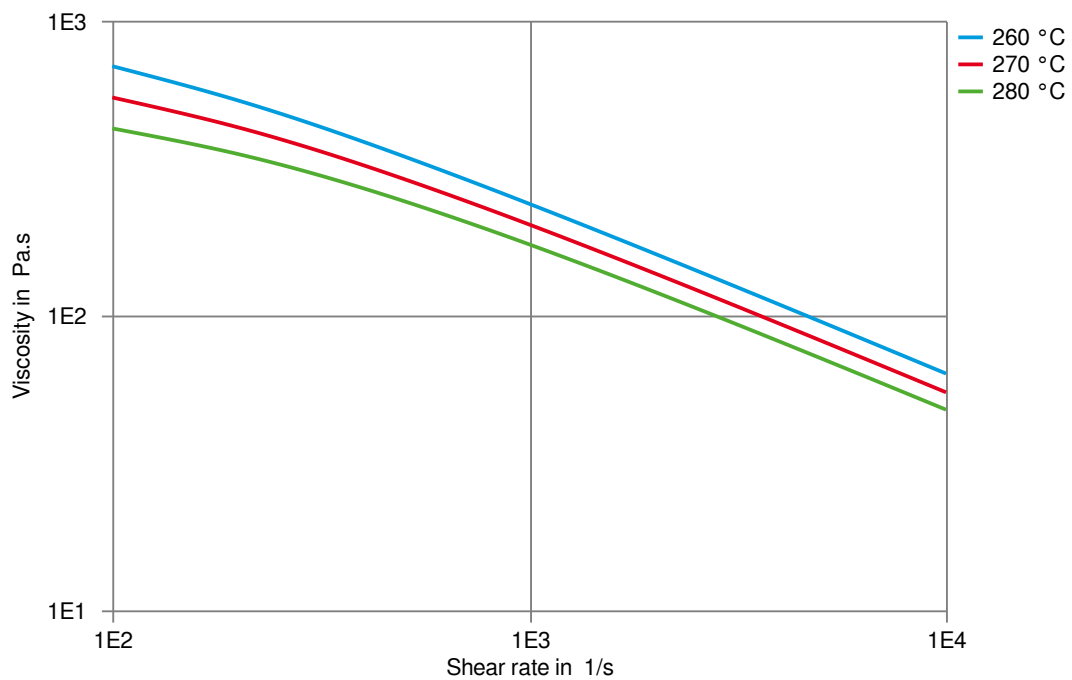
## NYLON RESIN

### Characteristics

Additives

Release agent

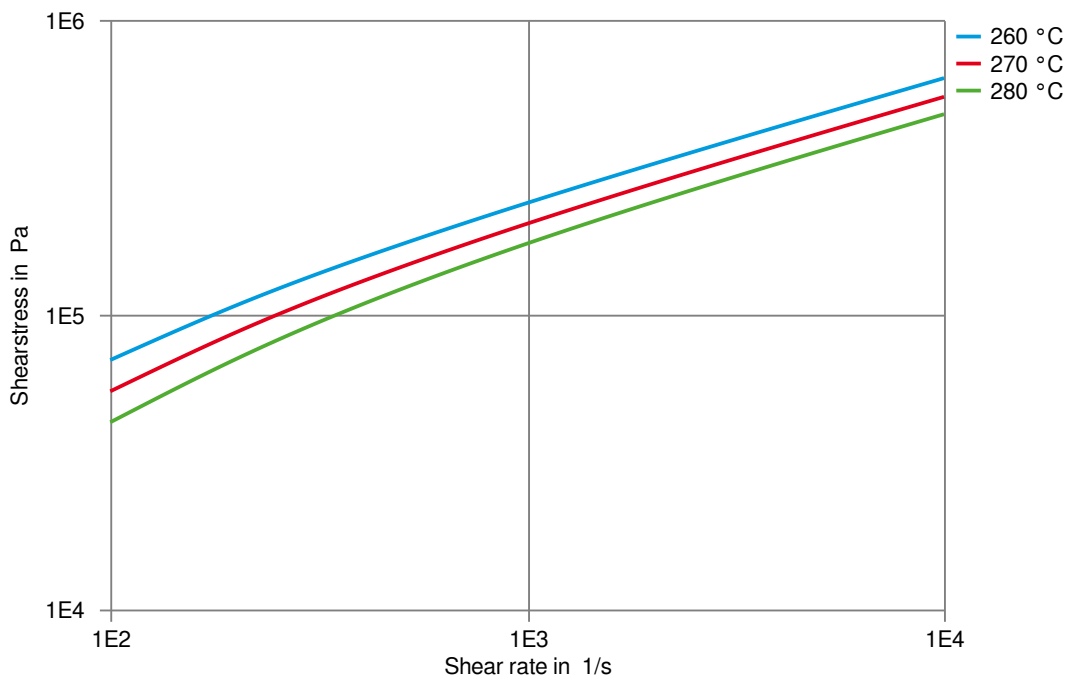
Viscosity-shear rate  
(measured on Zytel® 73G45 BK263)



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NYLON RESIN

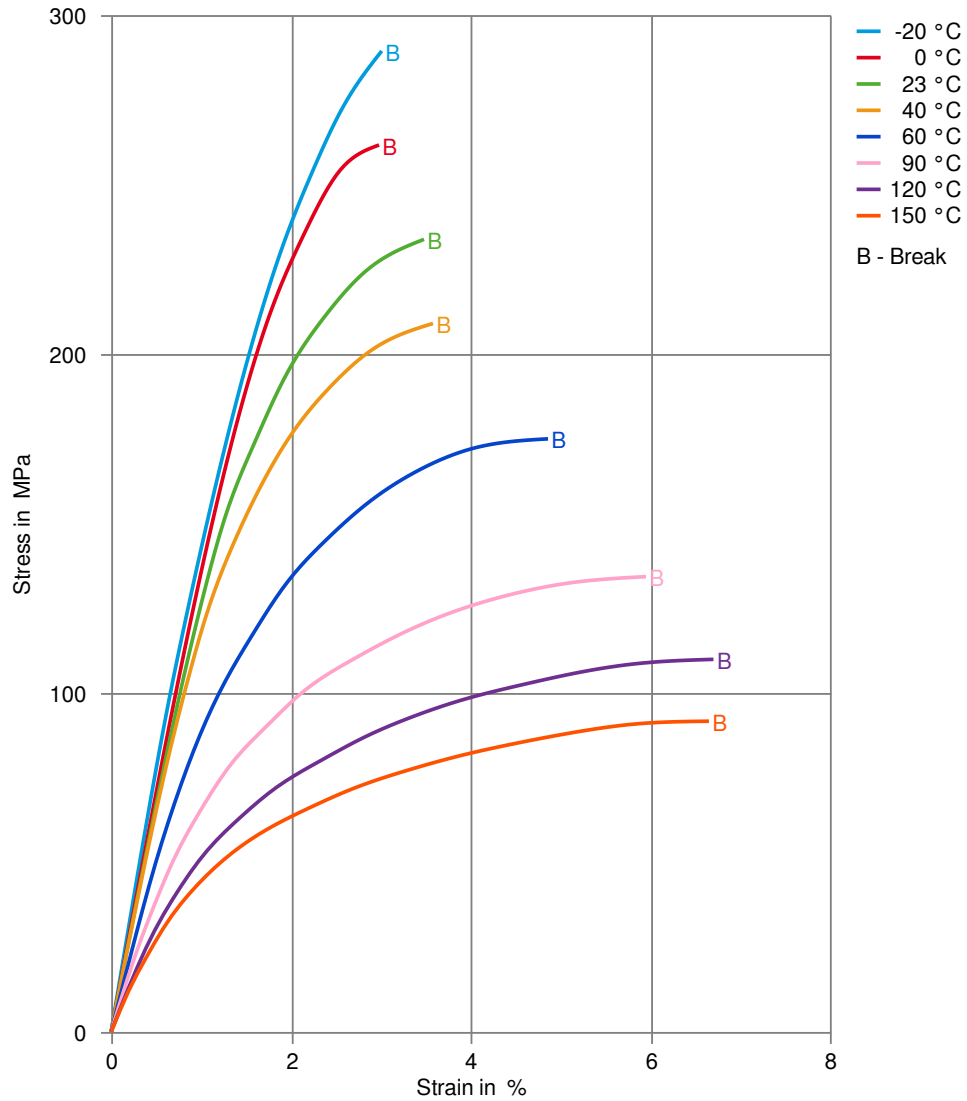
Shearstress-shear rate  
(measured on Zytel® 73G45 BK263)



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NYLON RESIN

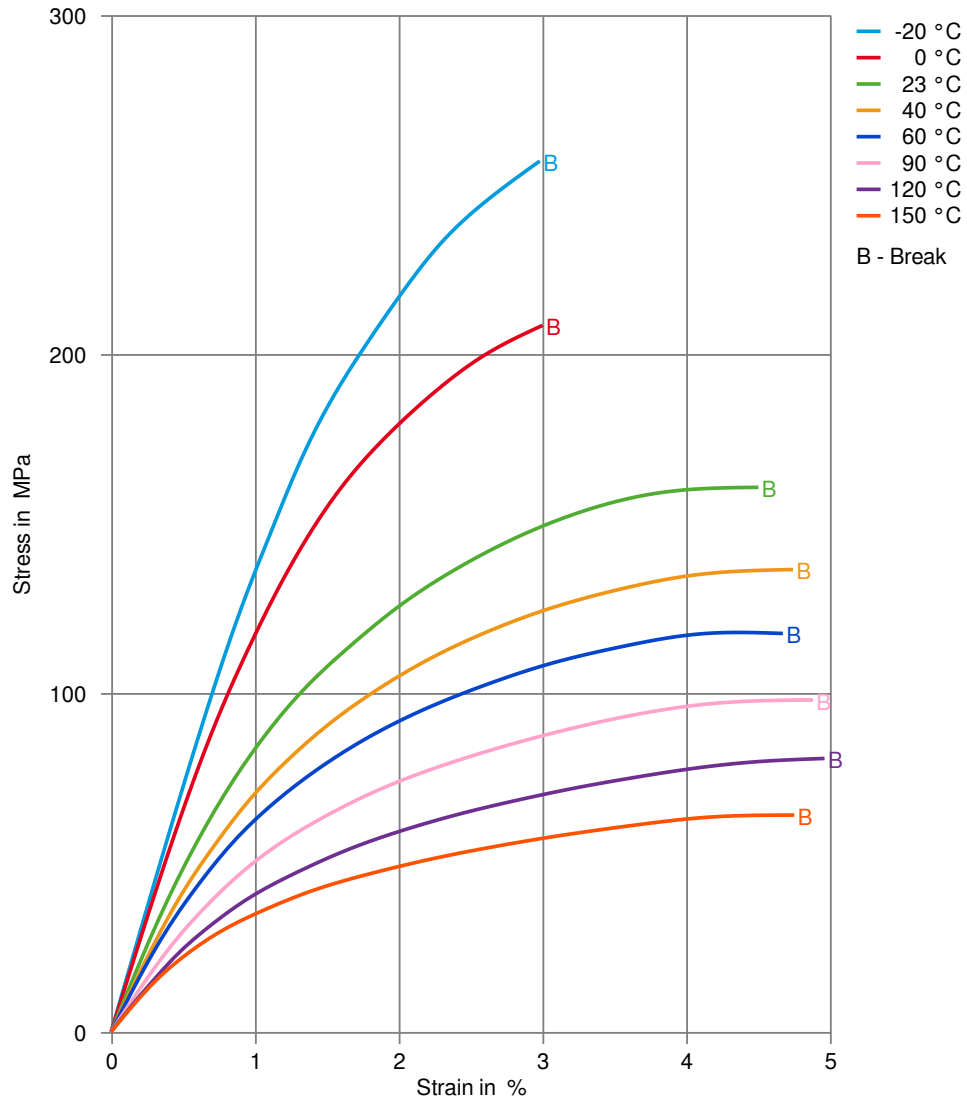
Stress-strain (dry)



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NYLON RESIN

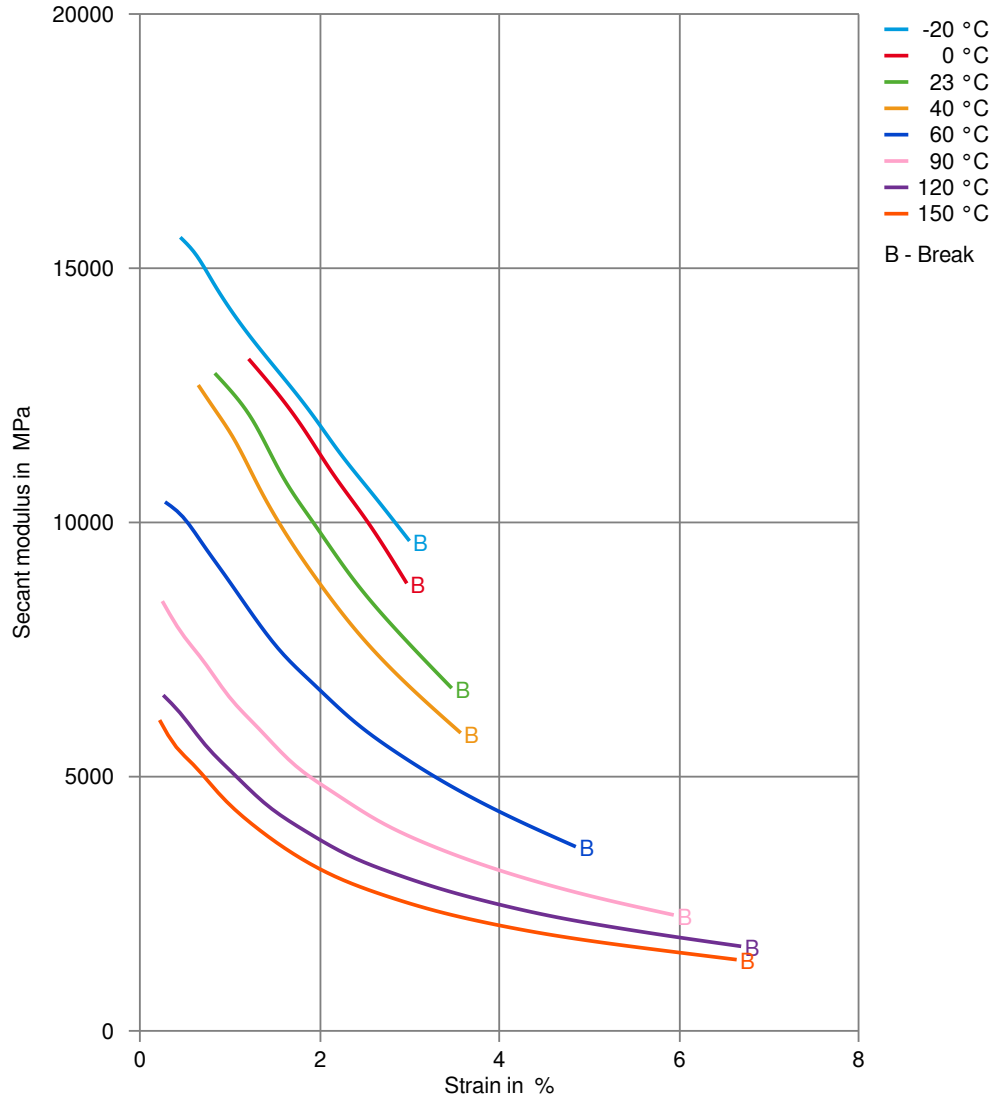
Stress-strain (cond.)



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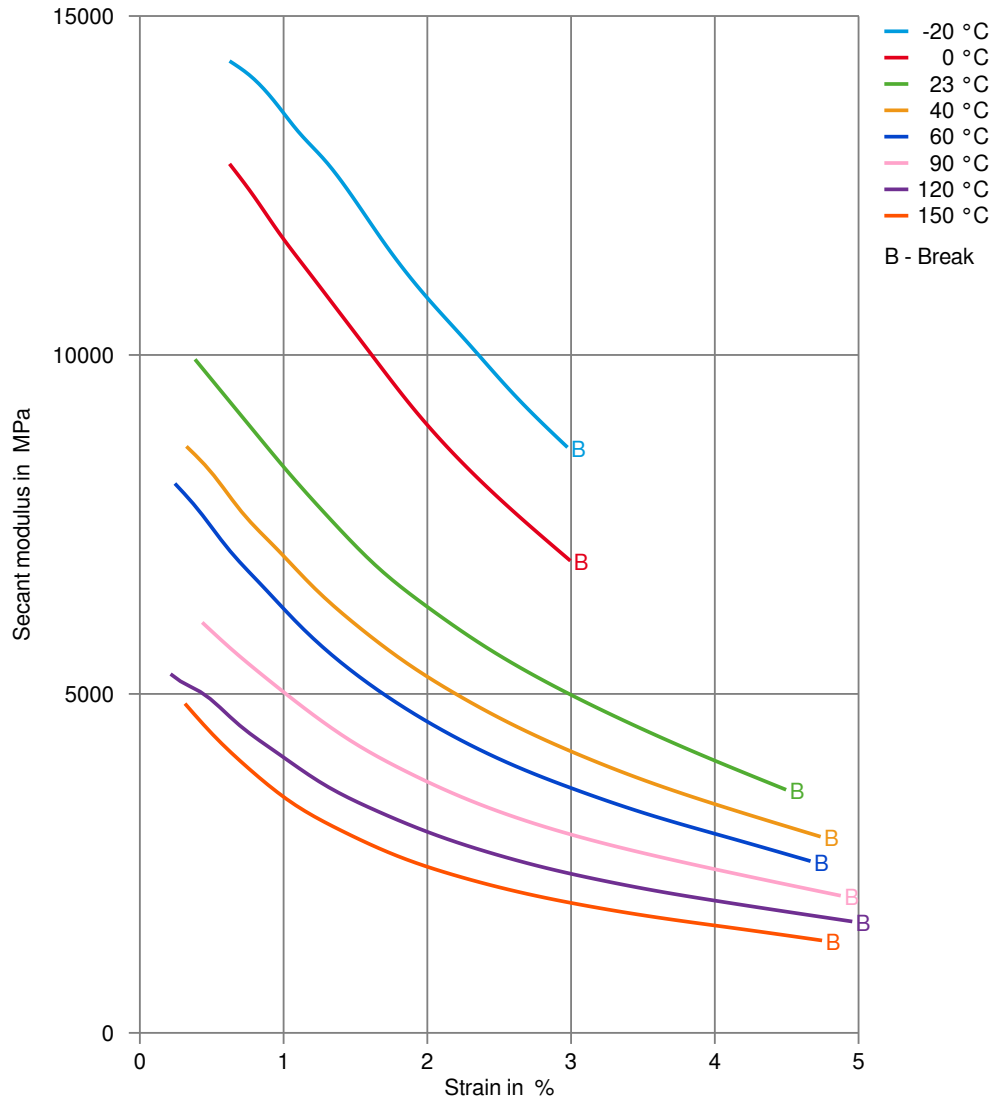
Secant modulus-strain (dry)



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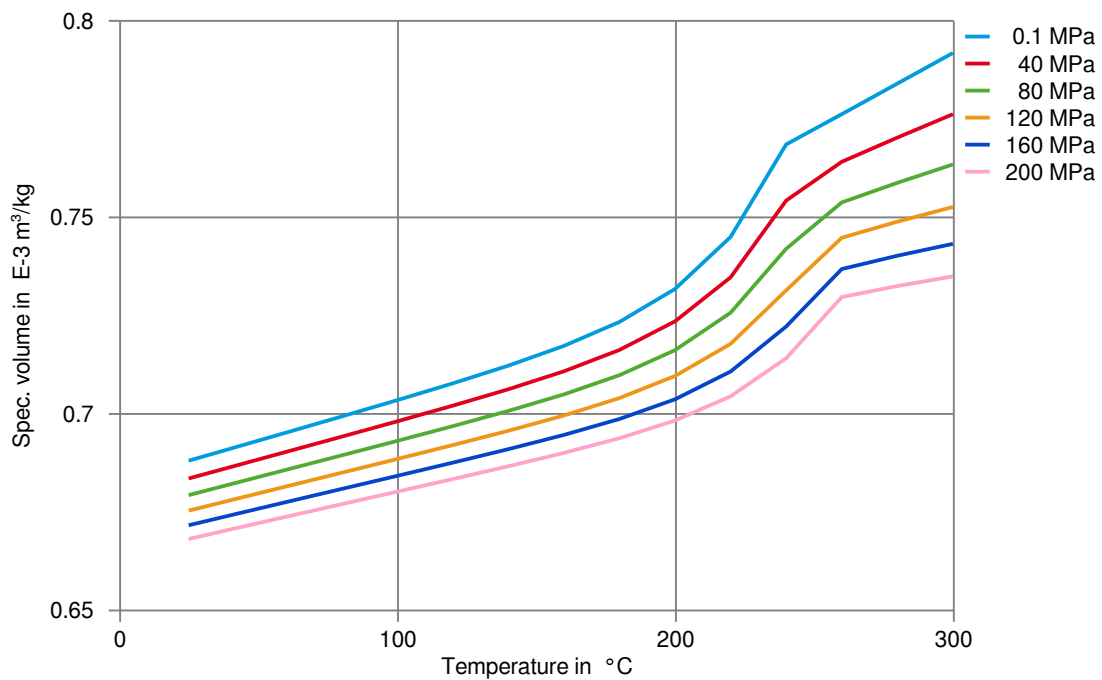
Secant modulus-strain (cond.)



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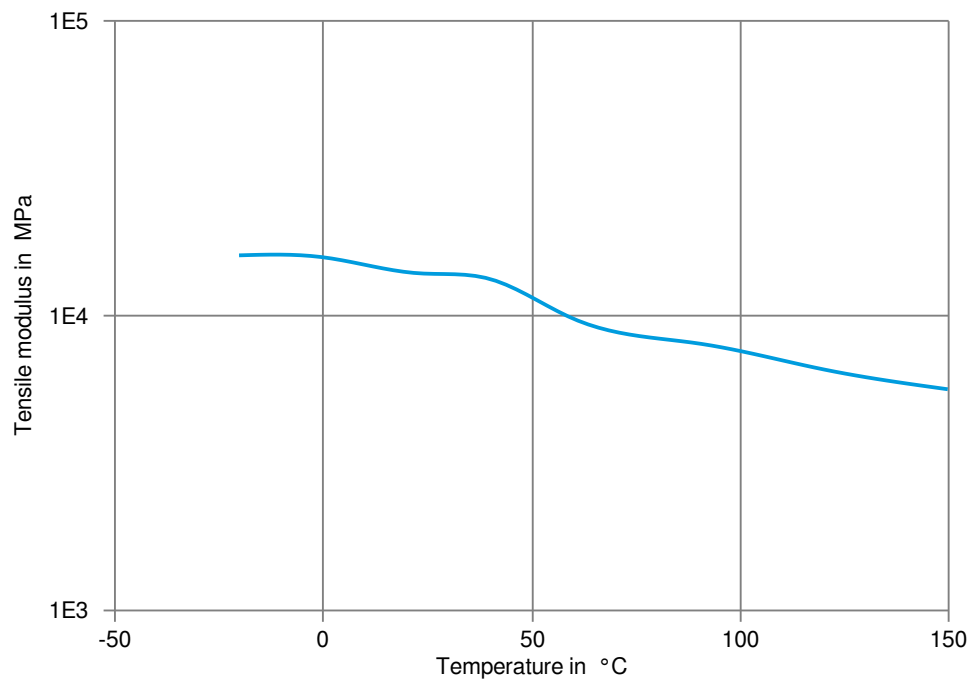
Specific volume-temperature (pvT)



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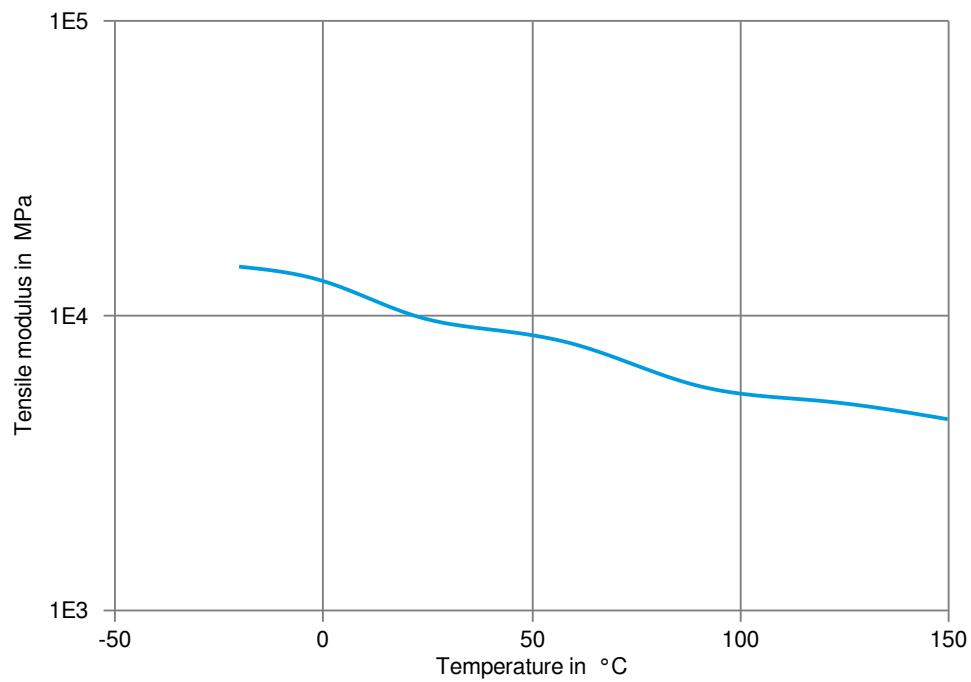
Tensile modulus-temperature (dry)



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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

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### 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).