

# Zytel® 70G25HSLR 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® 70G25HSLR is a 25% glass fibre reinforced, heat stabilised, hydrolysis resistant Polyamide 66 resin for injection moulding.

### Product information

Resin Identification	PA66-GF25	ISO 1043
Part Marking Code	>PA66-GF25<	ISO 11469
ISO designation	ISO 16396-PA66,GF25,M1GHNRW,S14-080	

### Rheological properties

	dry/cond.		
Viscosity number	150 / *	cm <sup>3</sup> /g	ISO 307, 1628
Moulding shrinkage, parallel	0.3 / -	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.1 / -	%	ISO 294-4, 2577
Flow length	350 / *	mm	
Flow length - width/thickness	2 / *	mm	

### Typical mechanical properties

	dry/cond.		
Tensile modulus	8500 / 6000	MPa	ISO 527-1/-2
Tensile stress at break, 5mm/min	180 / 120	MPa	ISO 527-1/-2
Tensile strain at break, 5mm/min	3 / 6	%	ISO 527-1/-2
Flexural modulus	8000 / 5500	MPa	ISO 178
Flexural strength	260 / 170	MPa	ISO 178
Charpy impact strength, 23°C	60 / 80	kJ/m <sup>2</sup>	ISO 179/1eU
Charpy impact strength, -30°C	60 / 45	kJ/m <sup>2</sup>	ISO 179/1eU
Charpy notched impact strength, 23°C	10 / 11	kJ/m <sup>2</sup>	ISO 179/1eA
Charpy notched impact strength, -30°C	7 / 7	kJ/m <sup>2</sup>	ISO 179/1eA
Izod notched impact strength, 23°C	11 / 12	kJ/m <sup>2</sup>	ISO 180/1A
Izod notched impact strength, -40°C	7.0 / 7.0	kJ/m <sup>2</sup>	ISO 180/1A
Izod impact strength, 23°C	50 / 80	kJ/m <sup>2</sup>	ISO 180/1U
Izod impact strength, -30°C	50 / 50	kJ/m <sup>2</sup>	ISO 180/1U
Ball indentation hardness, H 961/30	260 / -	MPa	ISO 2039-1
Poisson's ratio	0.34 / 0.35		

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### Thermal properties

	dry/cond.		
Melting temperature, 10°C/min	262 / *	°C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	80 / 25	°C	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	252 / *	°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	257 / *	°C	ISO 306
Coeff. of linear therm. expansion, parallel, -40-23°C	34 / *	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), parallel	33 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, parallel, 55-160°C	18 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal, -40-23°C	75 / *	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal	112 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal, 55-160°C	130 / *	E-6/K	ISO 11359-1/-2
Thermal conductivity of melt	0.21	W/(m K)	ISO 22007-2
Specific heat capacity of melt	2090	J/(kg K)	ISO 22007-4
RTI, electrical, 0.75mm	105	°C	UL 746B
RTI, electrical, 1.5mm	120	°C	UL 746B
RTI, electrical, 3.0mm	120	°C	UL 746B
RTI, impact, 1.5mm	95	°C	UL 746B
RTI, impact, 3.0mm	95	°C	UL 746B
RTI, strength, 1.5mm	105 / *	°C	UL 746B
RTI, strength, 3.0mm	110	°C	UL 746B

### 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
UL recognition	yes / *		UL 94
Burning Behav. at thickness h	HB / *	class	IEC 60695-11-10
Thickness tested	3 / *	mm	IEC 60695-11-10
UL recognition	yes / *		UL 94
Glow Wire Flammability Index, 1.0mm	650 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 2.0mm	650 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 3.0mm	750 / -	°C	IEC 60695-2-12
FMVSS Class	B		ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	26	mm/min	ISO 3795 (FMVSS 302)

### Electrical properties

	dry/cond.		
Relative permittivity, 100Hz	3.6 / -		IEC 62631-2-1
Dissipation factor, 100Hz	70 / -	E-4	IEC 62631-2-1
Volume resistivity	1E13 / -	Ohm.m	IEC 62631-3-1
Surface resistivity	* / 1E13	Ohm	IEC 62631-3-2
Comparative tracking index	400 / -		IEC 60112
Electric Strength, Short Time, 1mm	24 / -	kV/mm	IEC 60243-1

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### Physical/Other properties

	dry/cond.		
Humidity absorption, 2mm	2 / *	%	Sim. to ISO 62
Water absorption, 2mm	6.4 / *	%	Sim. to ISO 62
Water absorption, Immersion 24h	1.4 / *	%	Sim. to ISO 62
Density	1320 / -	kg/m <sup>3</sup>	ISO 1183
Density of melt	1150	kg/m <sup>3</sup>	

### VDA Properties

	dry/cond.		
Odour	3.5	class	VDA 270
Fogging, G-value (condensate)	0.5 / *	mg	ISO 6452

### 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	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
Special characteristics	Heat stabilised or stable to heat, Hydrolysis resistant

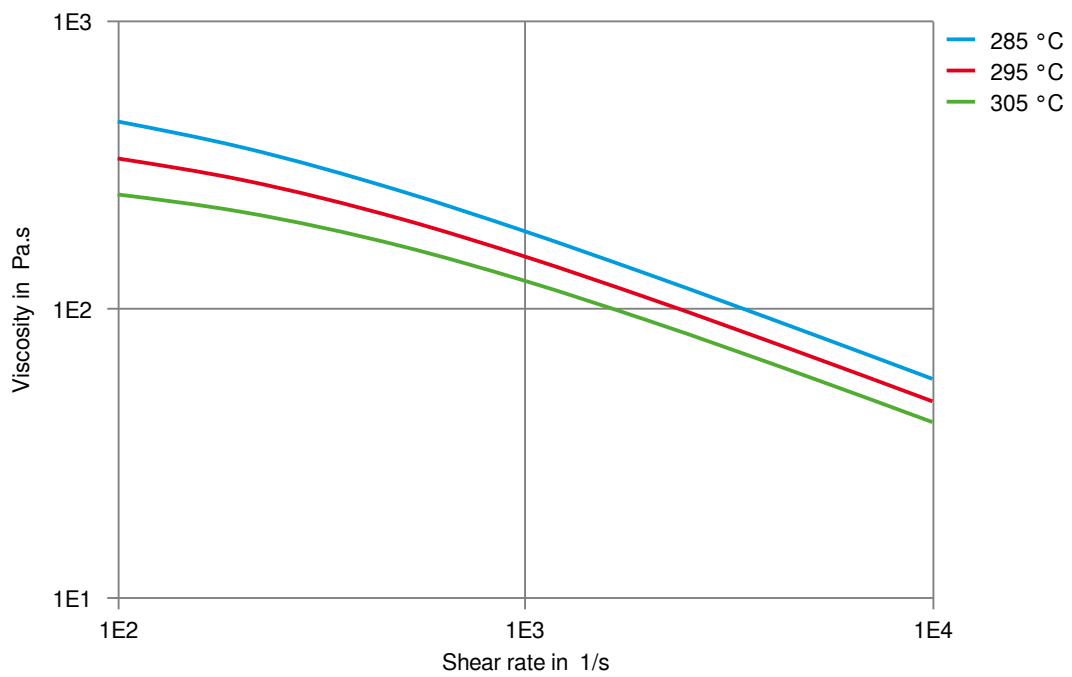
### Automotive

OEM	STANDARD	ADDITIONAL INFORMATION
Ford	WSS-M4D1016-A1	
General Motors	GMW16270P-PA66-GF25	Natural
General Motors	GMW3038P-PA66-GF25H	Natural
General Motors	GMW3038P-PA66-GF25J	Natural
Hyundai	MS941-03 Type A-5	
Mercedes-Benz	DBL5410.00 PA66 GF25	
VW Group	VW 50133 PA66-5-A	

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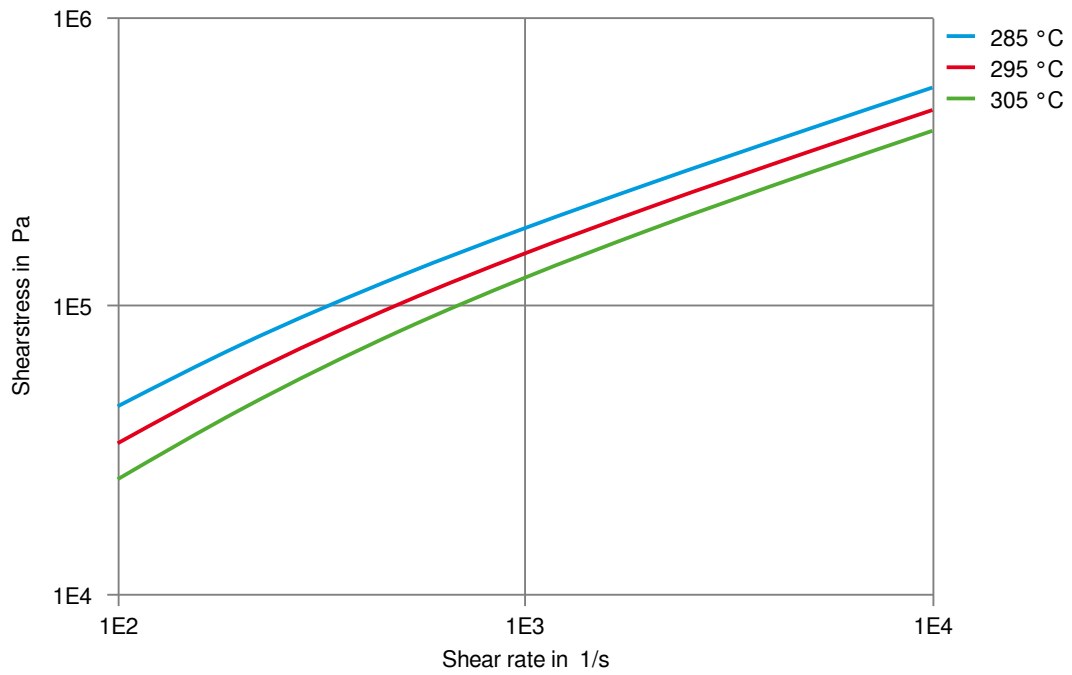
## Viscosity-shear rate



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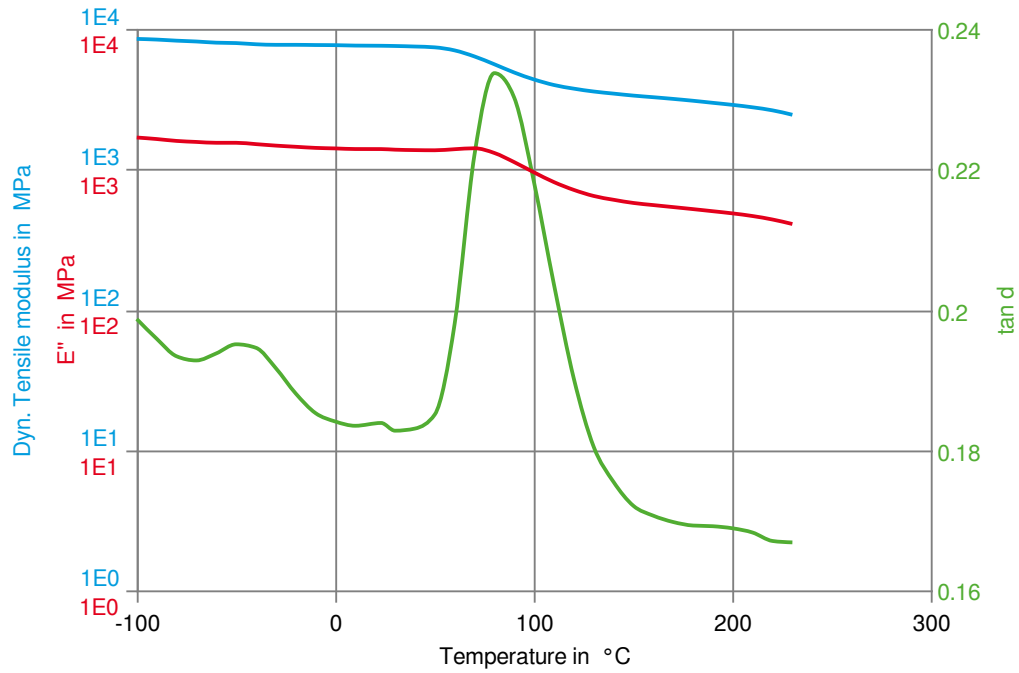
Shearstress-shear rate



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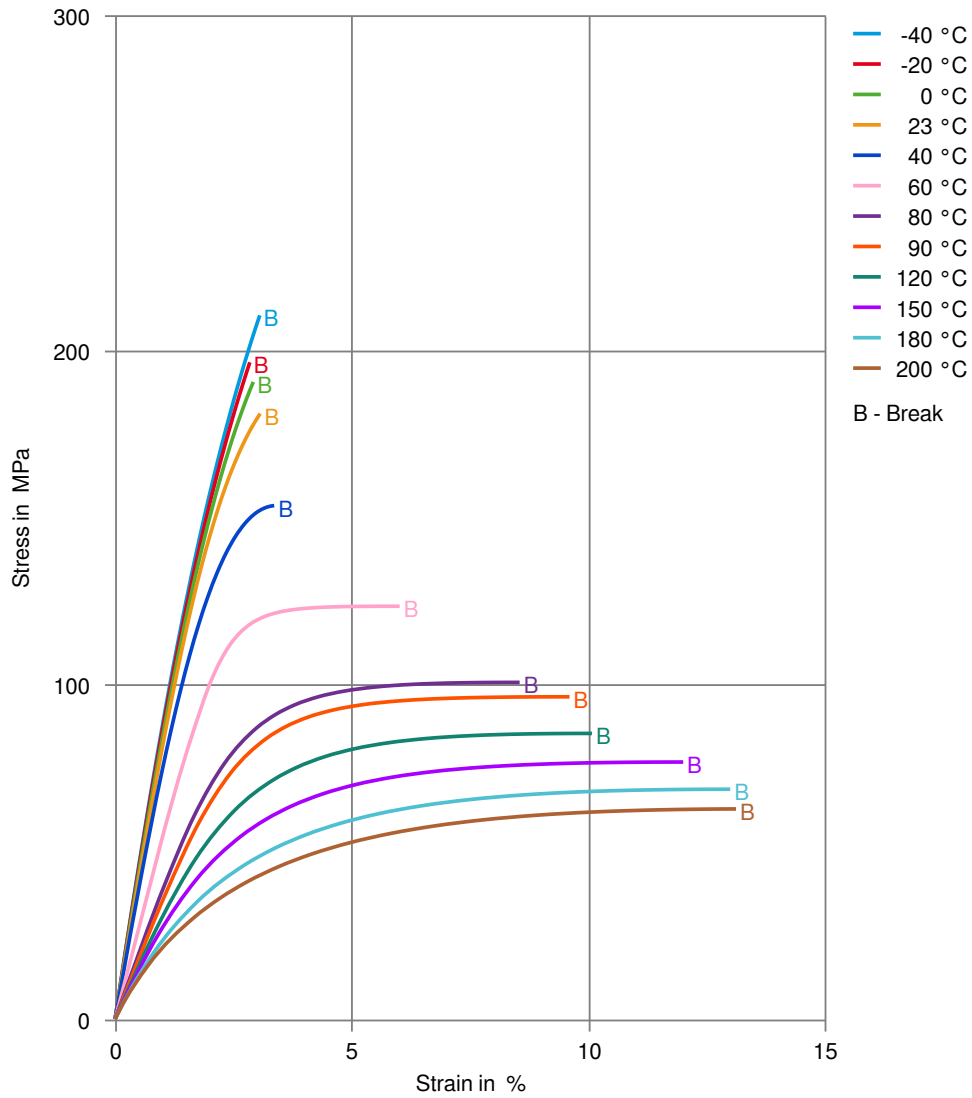
Dynamic Tensile modulus-temperature (dry)



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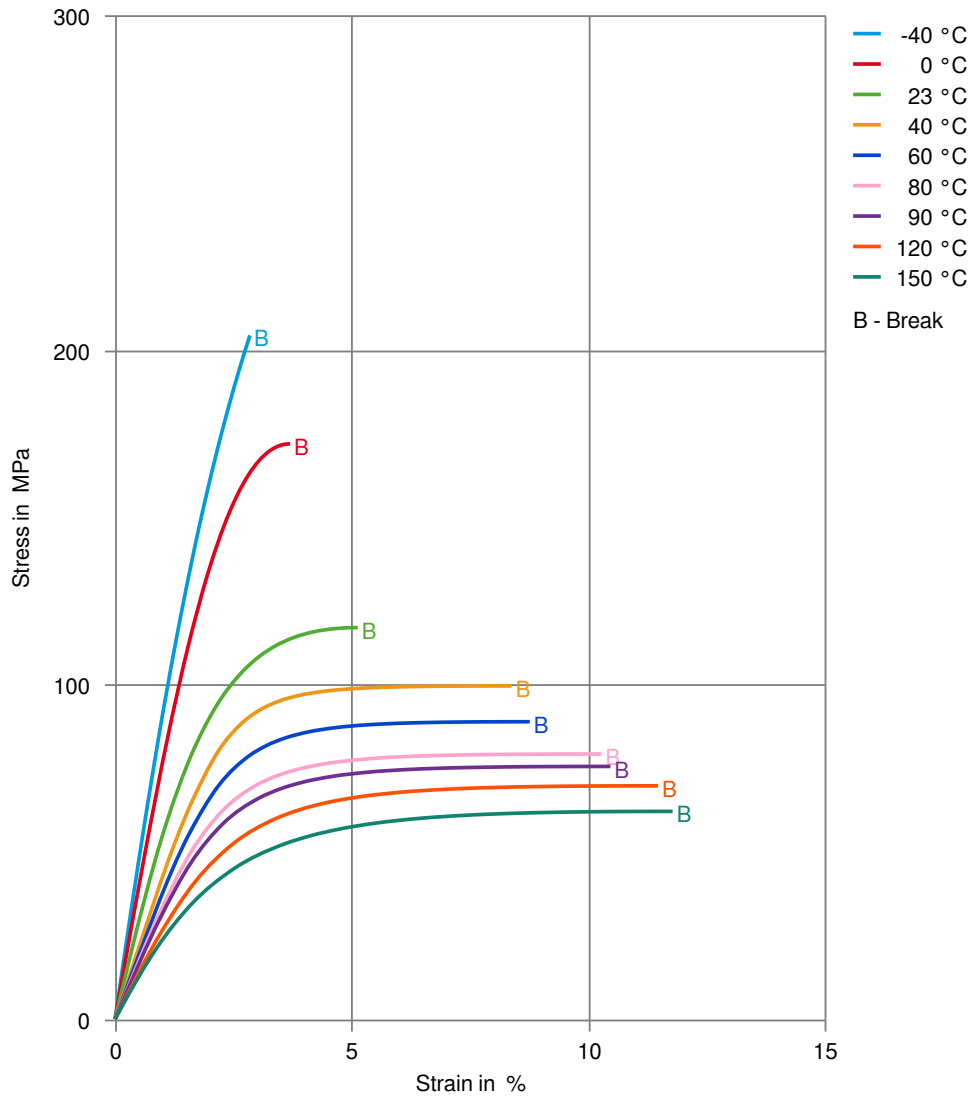
Stress-strain (dry)  
(measured on Zytel® 70G25HSLR BK099)



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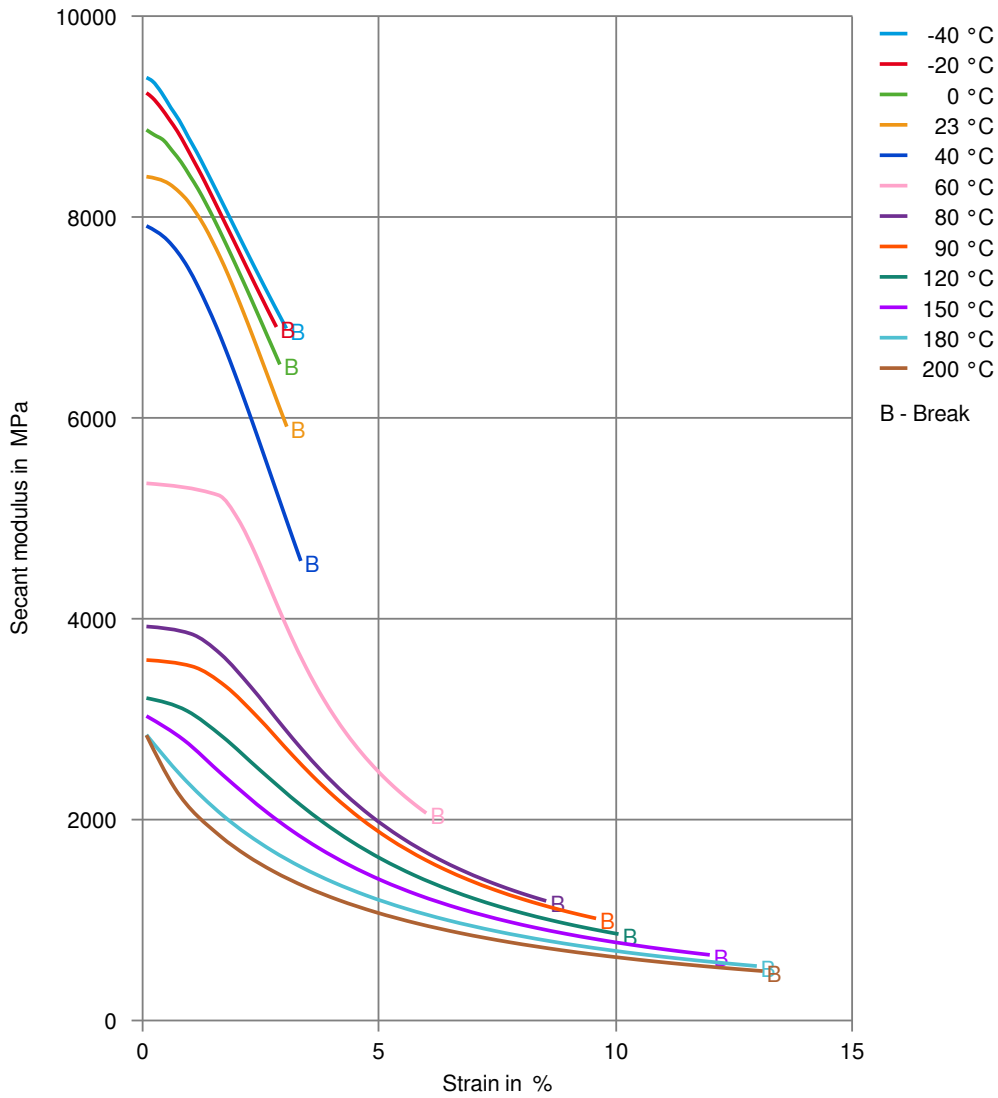
Stress-strain (cond.)  
(measured on Zytel® 70G25HSLR BK099)



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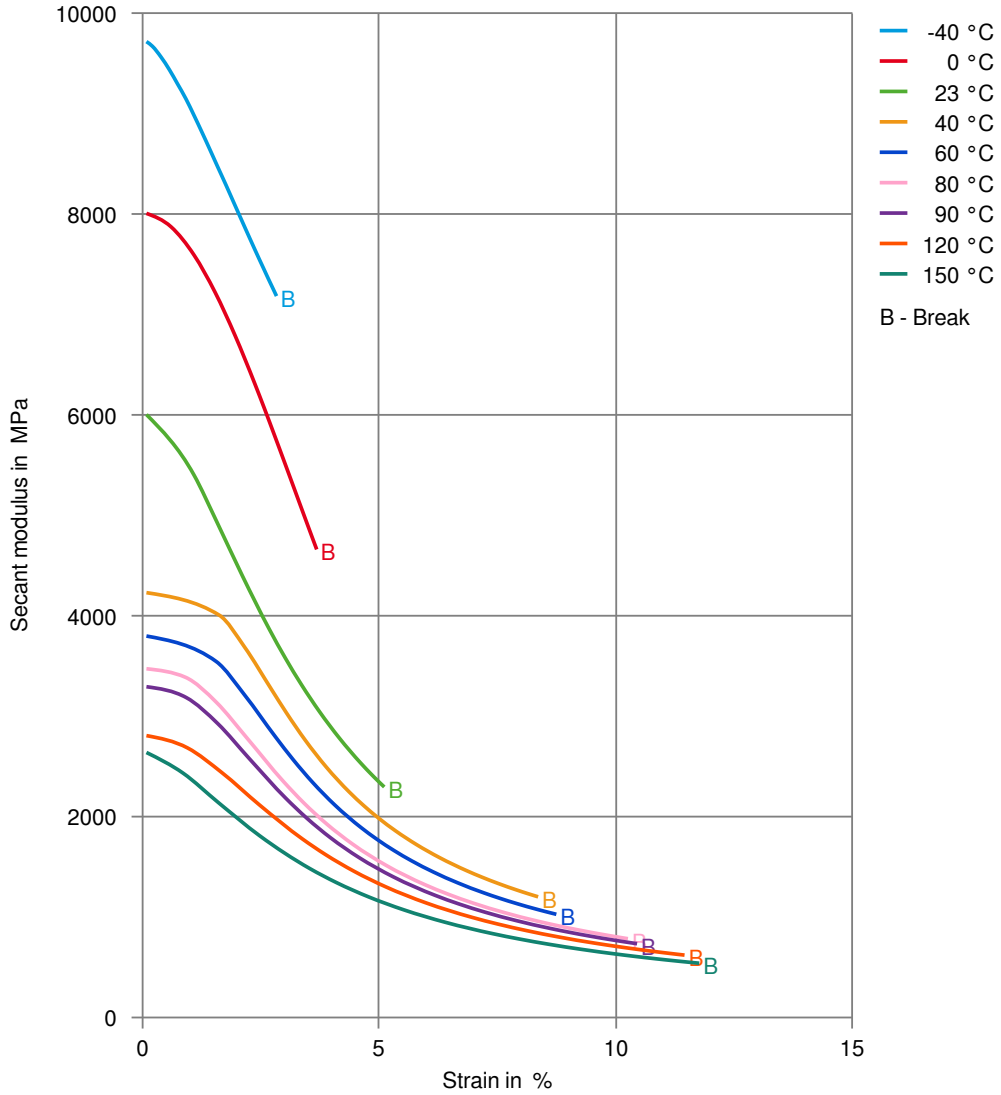
Secant modulus-strain (dry)  
(measured on Zytel® 70G25HSLR BK099)



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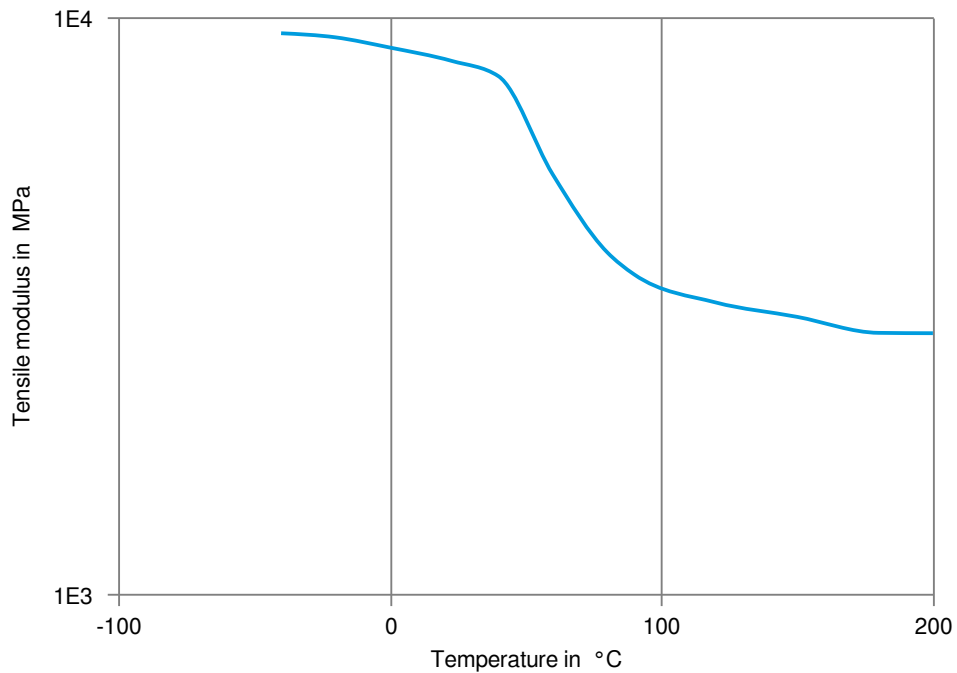
Secant modulus-strain (cond.)  
(measured on Zytel® 70G25HSLR BK099)



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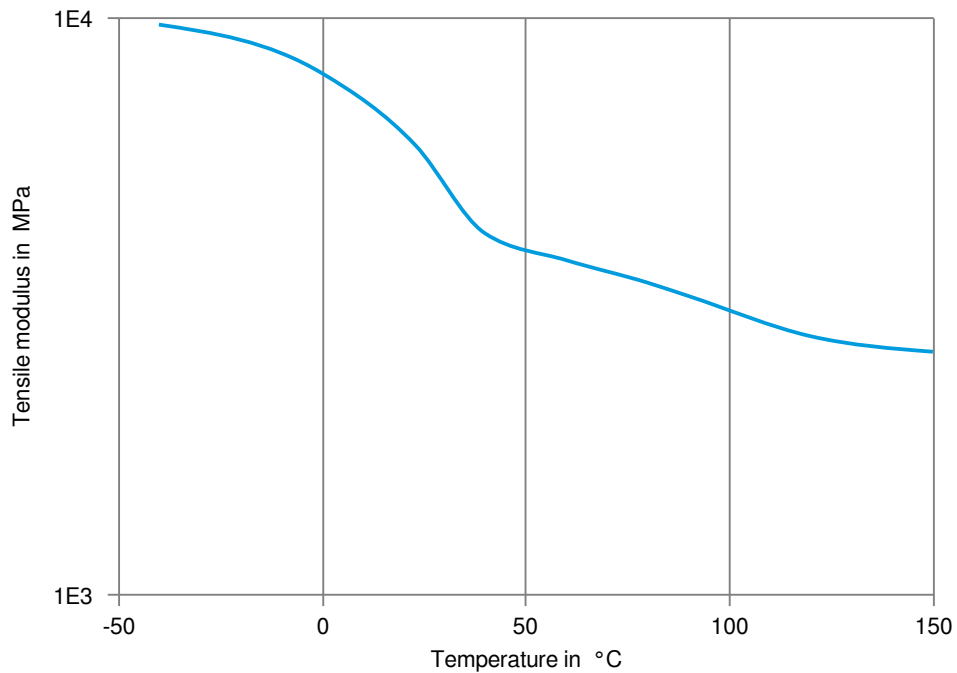
Tensile modulus-temperature (dry)  
(measured on Zytel® 70G25HSLR BK099)



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Tensile modulus-temperature (cond.)  
(measured on Zytel® 70G25HSLR BK099)



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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
- ✓ DOT No. 4 Brake fluid, 120 °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
- ✓ 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).