

Zytel® 77G33L BK031

LONG CHAIN POLYAMIDE RESIN

Zytel® LCPA long chain polyamide resins provide an innovative and growing portfolio of flexible polymers with excellent thermal, chemical, and hydrolysis resistance. The diverse selection of Zytel® LCPA grades is targeted for a range of performance characteristics, balancing temperature resistance, flexibility and low permeation.

Zytel® 77G33L BK031 is a 33% glass fiber reinforced, black polyamide 612 resin for injection moulding.

Product information

Resin Identification	PA612-GF33	ISO 1043
Part Marking Code	>PA612-GF33<	ISO 11469
ISO designation	ISO 16396-PA612,GF33,M1CGR,S09-090	

Rheological properties

	dry/cond.		
Melt mass-flow rate	47 / *	g/10min	ISO 1133
Melt mass-flow rate, Temperature	250 / *	°C	
Melt mass-flow rate, Load	10 / *	kg	
Viscosity number	100 ^[1] / *	cm ³ /g	ISO 307, 1628
Moulding shrinkage, parallel	0.3 / -	%	ISO 294-4, 2577
Moulding shrinkage, normal	0.9 / -	%	ISO 294-4, 2577
Mold Shrinkage, Flow, 3.2mm (0.125in)	0.2 / *	%	
Mold Shrinkage, Transverse, 3.2mm (0.125in)	1 / *	%	

[1]: sulphuric acid 96%

Typical mechanical properties

	dry/cond.		
Tensile modulus	9700 / 7900	MPa	ISO 527-1/-2
Tensile stress at break, 5mm/min	170 / 140	MPa	ISO 527-1/-2
Tensile strain at break, 5mm/min	3 / 3.2	%	ISO 527-1/-2
Flexural modulus	8500 / -	MPa	ISO 178
Flexural strength	250 / -	MPa	ISO 178
Charpy impact strength, 23°C	80 / 90	kJ/m ²	ISO 179/1eU
Charpy impact strength, -30°C	60 / 65	kJ/m ²	ISO 179/1eU
Charpy notched impact strength, 23°C	13 / 12	kJ/m ²	ISO 179/1eA
Charpy notched impact strength, -30°C	12 / 10	kJ/m ²	ISO 179/1eA
Charpy notched impact strength, -40°C	12 / 10	kJ/m ²	ISO 179/1eA
Izod notched impact strength, 23°C	13 / -	kJ/m ²	ISO 180/1A
Izod notched impact strength, -40°C	11.0 / -	kJ/m ²	ISO 180/1A
Izod impact strength, 23°C	60 / -	kJ/m ²	ISO 180/1U
Poisson's ratio	0.34 / 0.34		

Thermal properties

	dry/cond.		
Melting temperature, 10°C/min	218 / *	°C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	65 / 55	°C	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	200 / *	°C	ISO 75-1/-2
Coeff. of linear therm. expansion, parallel, -40-23°C	26 / *	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), parallel	20 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, parallel, 55-160°C	14 / *	E-6/K	ISO 11359-1/-2

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Coeff. of linear therm. expansion, normal, -40-23°C	83 / *	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal	110 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal, 55-160°C	160 / *	E-6/K	ISO 11359-1/-2
Thermal conductivity, flow	0.42	W/(m K)	ISO 22007-2
Thermal conductivity of melt	0.26	W/(m K)	ISO 22007-2
Specific heat capacity of melt	2100	J/(kg K)	ISO 22007-4
Specific heat capacity solid	950	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, strength, 1.5mm	120 / *	°C	UL 746B
RTI, strength, 3.0mm	120	°C	UL 746B
TGA curve	available		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
UL recognition	yes / *		UL 94
Burning Behav. at thickness h	HB / *	class	IEC 60695-11-10
Thickness tested	0.71 / *	mm	IEC 60695-11-10
UL recognition	yes / *		UL 94
Glow Wire Flammability Index, 0.75mm	675 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 1.5mm	675 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 3.0mm	700 / -	°C	IEC 60695-2-12
Glow Wire Ignition Temperature, 0.75mm	700 / -	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 1.5mm	700 / -	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 3.0mm	725 / -	°C	IEC 60695-2-13
FMVSS Class	B		ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	5	mm/min	ISO 3795 (FMVSS 302)
Electrical properties			
		dry/cond.	
Volume resistivity	2E12 / -	Ohm.m	IEC 62631-3-1
Surface resistivity	* / >1E15	Ohm	IEC 62631-3-2
Electric strength	46 / -	kV/mm	IEC 60243-1
Comparative tracking index	600 / -		IEC 60112
Physical/Other properties			
		dry/cond.	
Humidity absorption, 2mm	0.7 / *	%	Sim. to ISO 62
Water absorption, Immersion 24h	0.1 / *	%	Sim. to ISO 62
Density	1320 / -	kg/m ³	ISO 1183
VDA Properties			
		dry/cond.	
Weather stability delta I	36		DIN 53236
Weather stability delta a	-0.2		DIN 53236
Weather stability delta b	10		DIN 53236
Weather stability delta E	37		DIN 53236
Weather stability grey scale	1		ISO 105-A02

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Fogging, G-value (condensate) 0.1 / * 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	290 °C
Min. melt temperature	280 °C
Max. melt temperature	300 °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

Characteristics

Processing Injection Moulding

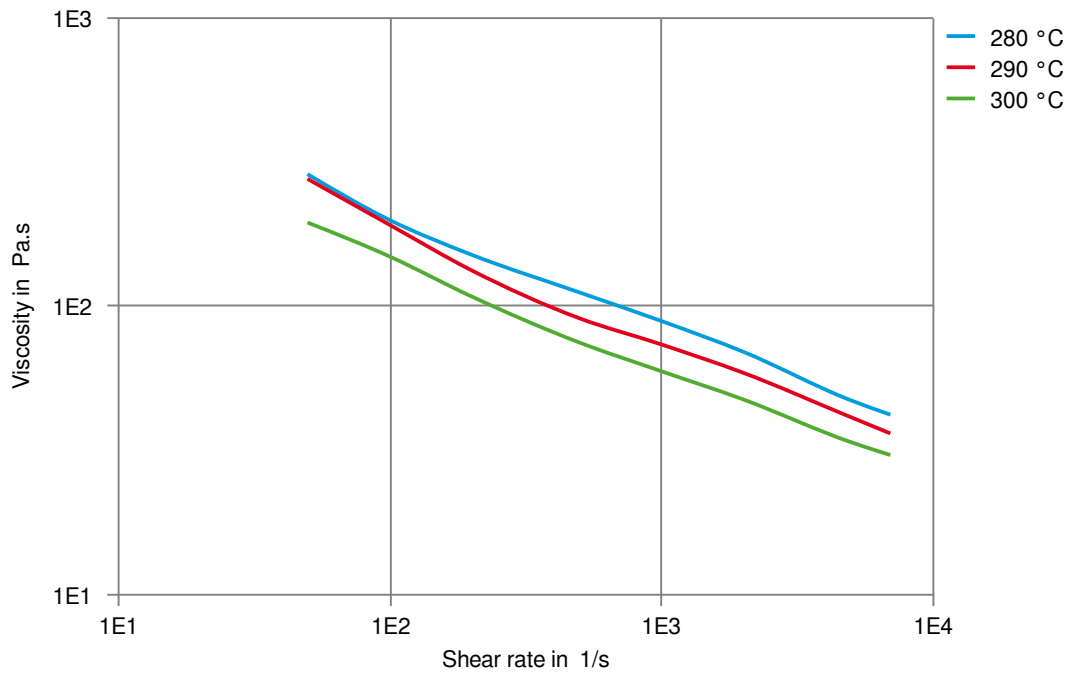
Automotive

OEM STANDARD
Bosch N28 BN05-OX020

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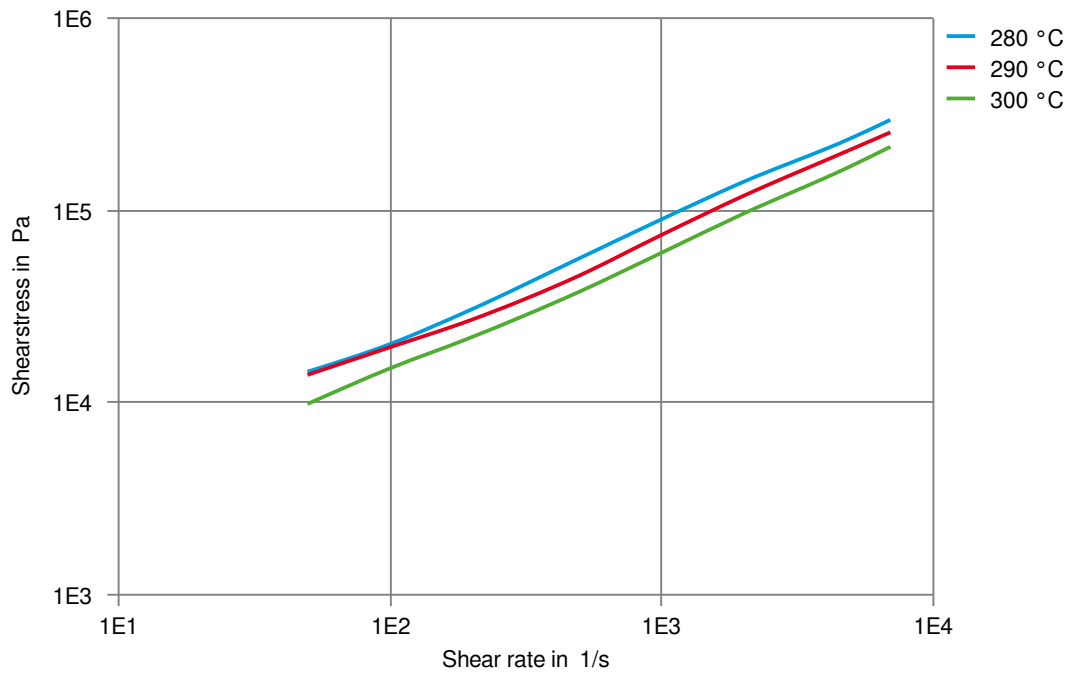
Viscosity-shear rate



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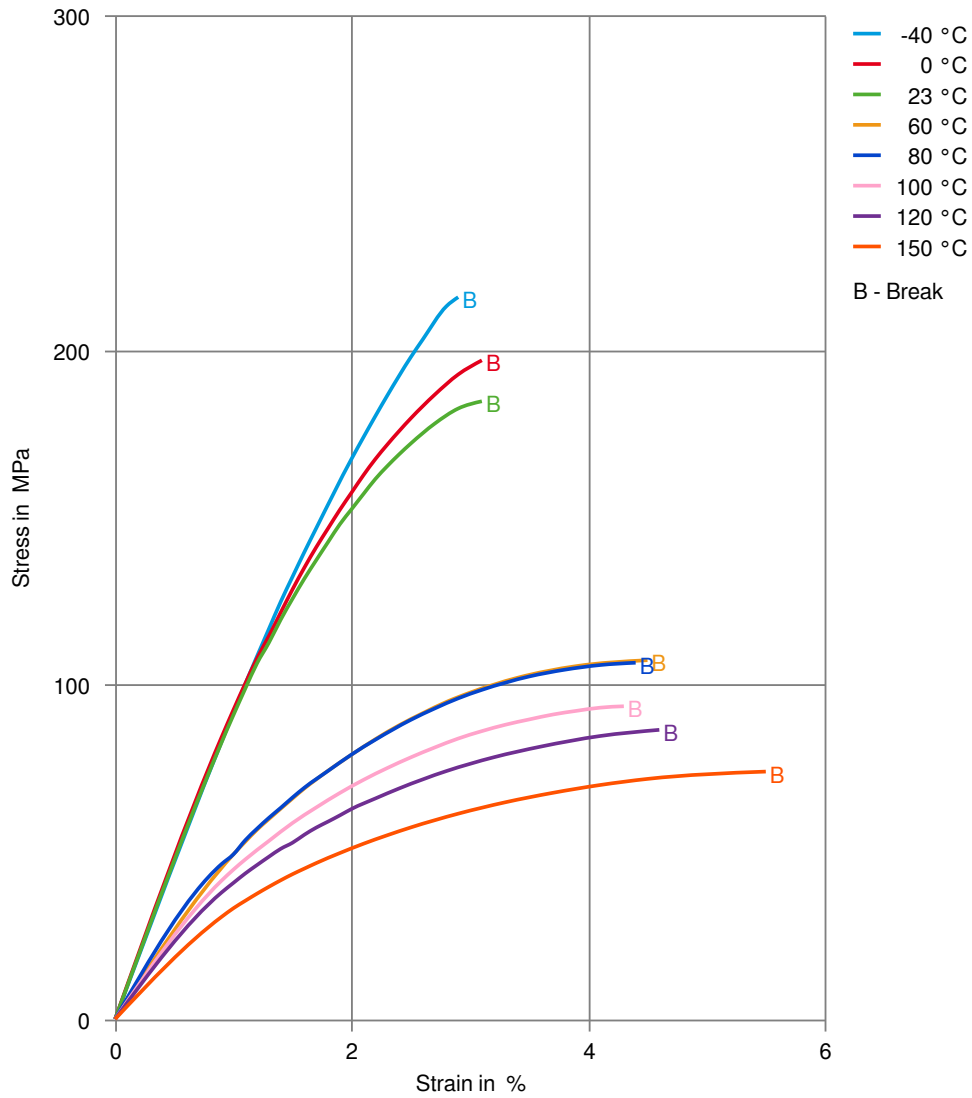
Shearstress-shear rate



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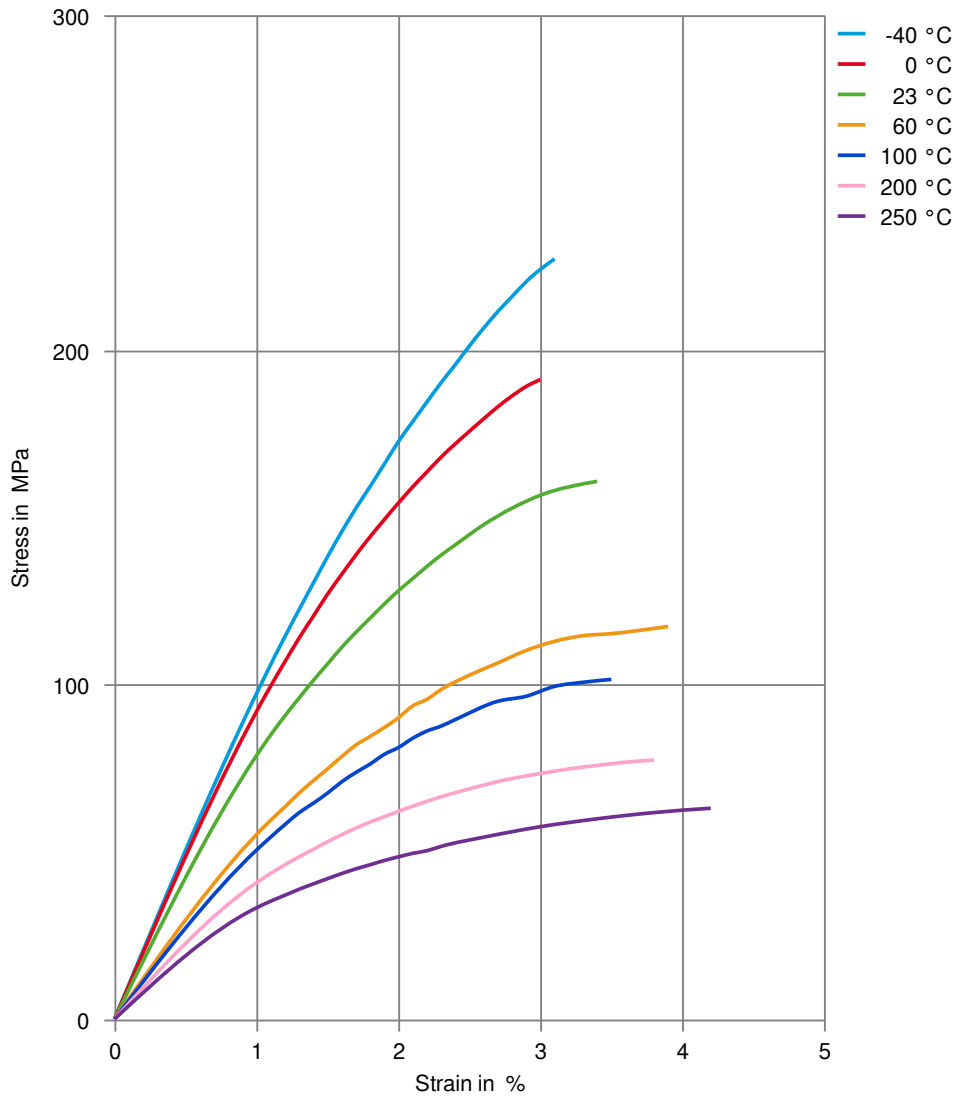
Stress-strain (dry)



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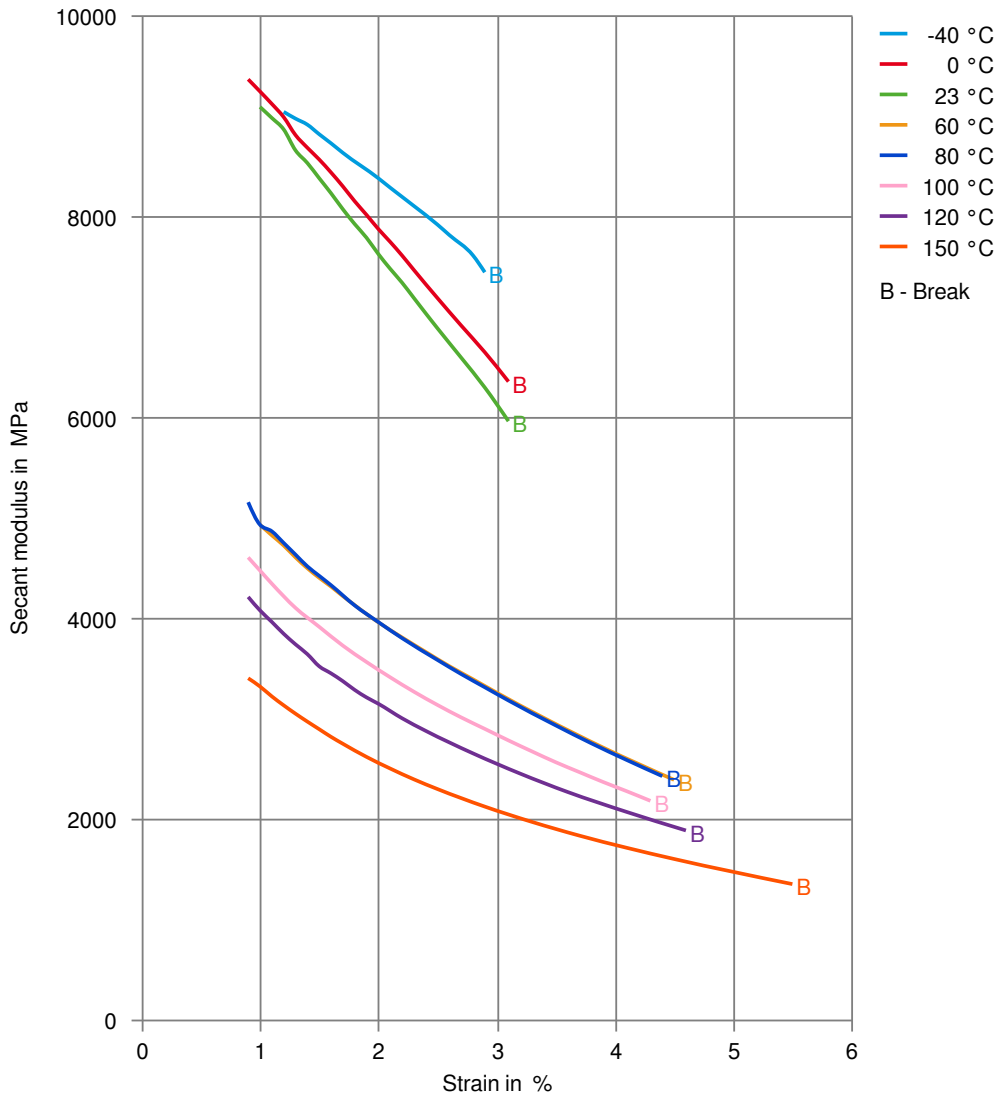
Stress-strain (cond.)



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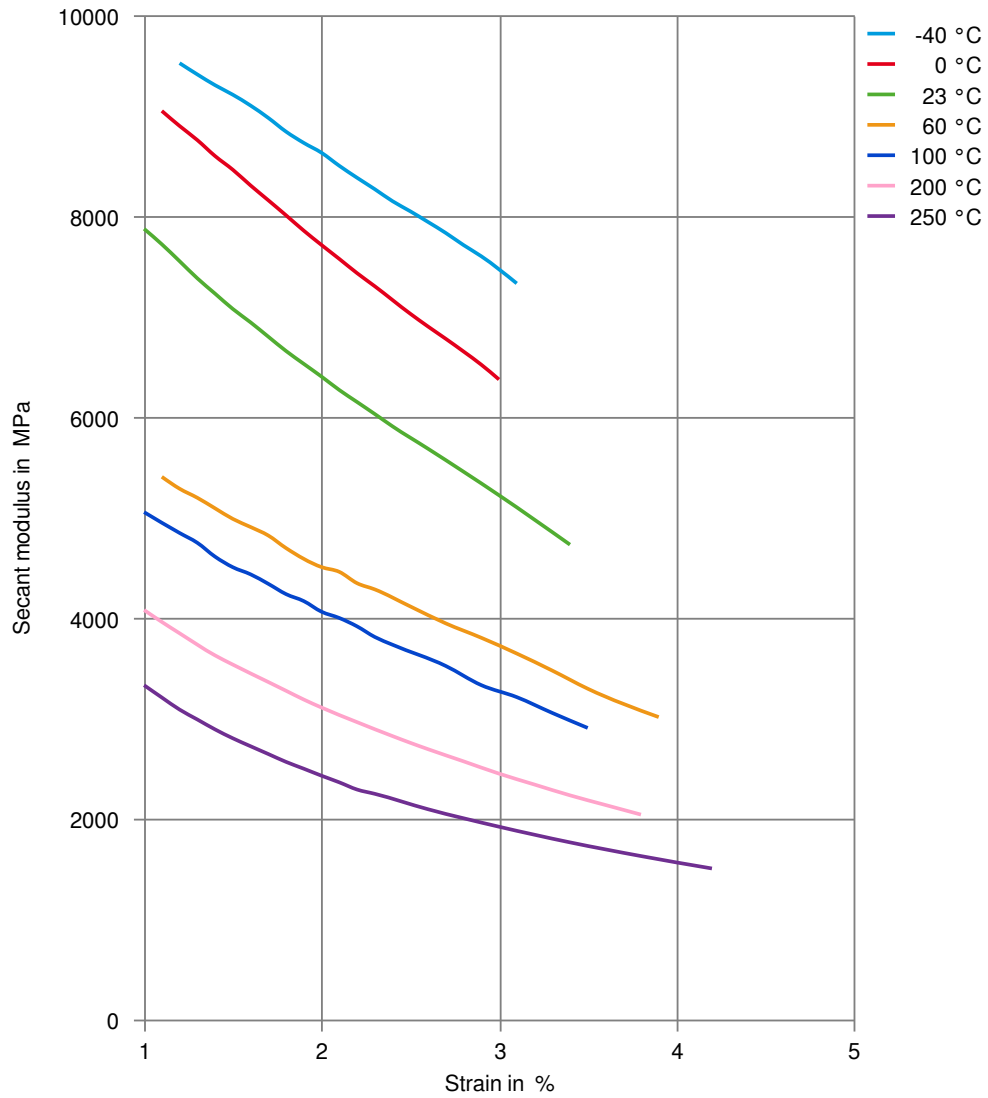
Secant modulus-strain (dry)



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Secant modulus-strain (cond.)



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Chemical Media Resistance

Other

- ✓ Ethylene Glycol (50% by mass) in water, 108 °C
- ✓ 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).