

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, 1157, 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	9500 / 7900	MPa	ISO 527-1/-2
Stress at break, 5mm/min	170 / 140	MPa	ISO 527-1/-2
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 notched impact strength, 23°C	13 / -	kJ/m ²	ISO 179/1eA
Charpy notched impact strength, -40°C	12 / -	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 / -	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
Temp. 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
Coeff. of linear therm. expansion, parallel	20 / *	E-6/K	ISO 11359-1/-2



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Coeff. of linear therm. expansion, parallel, 55-160°C	14 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal, -40-23°C	83 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, 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	0.42	W/(m K)	ISO 22007-2
Thermal conductivity of melt	0.26	W/(m K)	Internal
Spec. heat capacity of melt	2100	J/(kg K)	Internal
Spec. heat capacity solid	950	J/(kg K)	Internal
RTI, electrical, 0.75mm	105	°C	UL 746B
RTI, electrical, 1.5mm	120	°C	UL 746B
RTI, electrical, 3mm	120	°C	UL 746B
RTI, strength, 1.5mm	120 / *	°C	UL 746B
RTI, strength, 3mm	120	°C	UL 746B
TGA curve	available		ISO 11359-1/-2

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
Burning Behav. at thickness h	HB / *	class	UL 94
Thickness tested	0.71 / *	mm	UL 94
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, 3mm	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, 3mm	725 / -	°C	IEC 60695-2-13
FMVSS Class	B		ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	23	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

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/m³	ISO 1183



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VDA Properties

Fogging, G-value (condensate)	dry/cond.	0.1 / *	mg	ISO 6452
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Injection

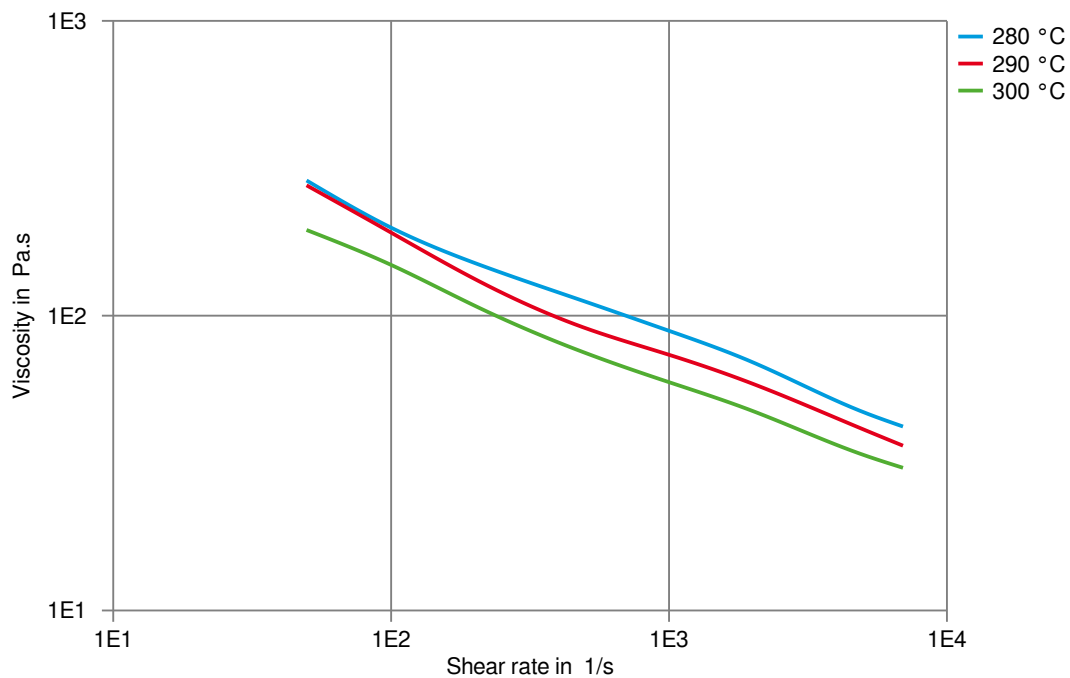
Drying Recommended	yes			
Drying Temperature	80 °C			
Drying Time, Dehumidified Dryer	2 - 4 h			
Processing Moisture Content	≤0.2 %			
Melt Temperature Optimum	290 °C			Internal
Min. melt temperature	280 °C			
Max. melt temperature	300 °C			
Screw tangential speed	≤0.2 m/s			
Mold Temperature Optimum	100 °C			
Min. mould temperature	70 °C			
Max. mould temperature	120 °C			
Hold pressure range	50 - 100 MPa			
Hold pressure time	3 s/mm			
Ejection temperature	210 °C			Internal



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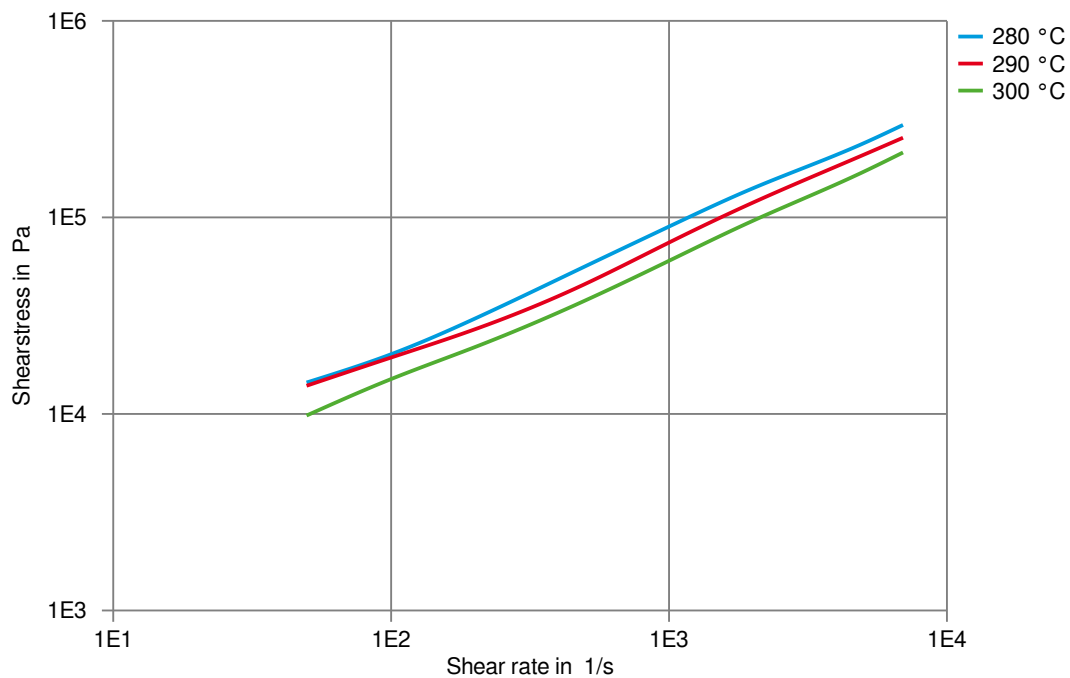
Viscosity-shear rate



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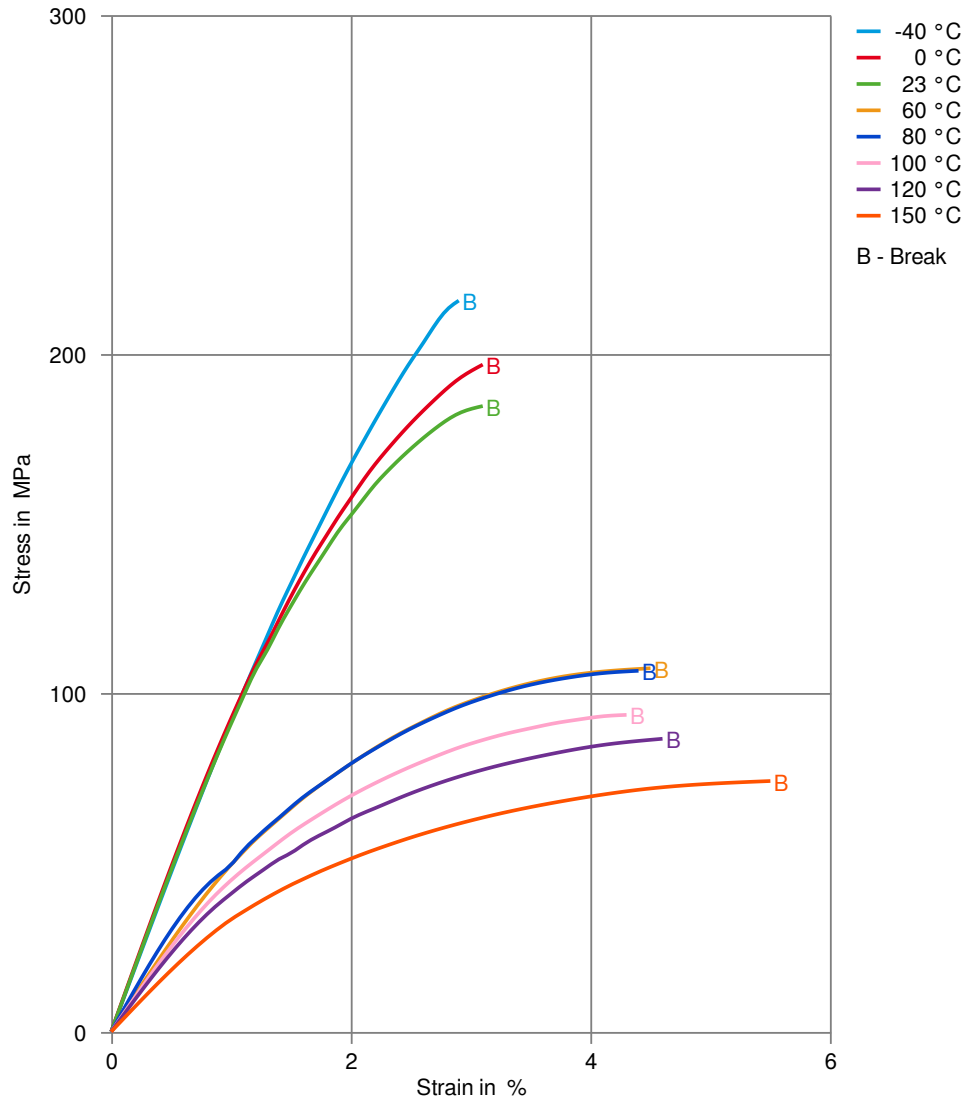
Shearstress-shear rate



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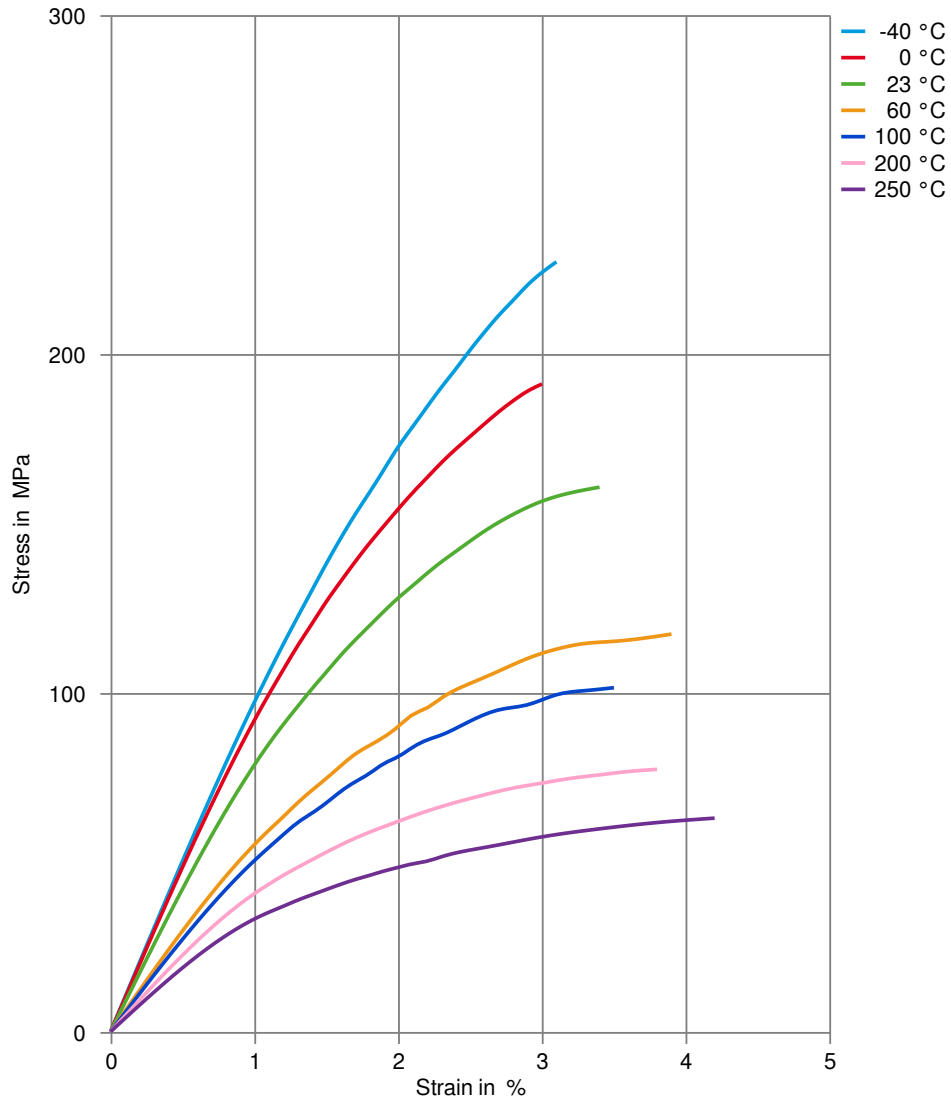
Stress-strain (dry)



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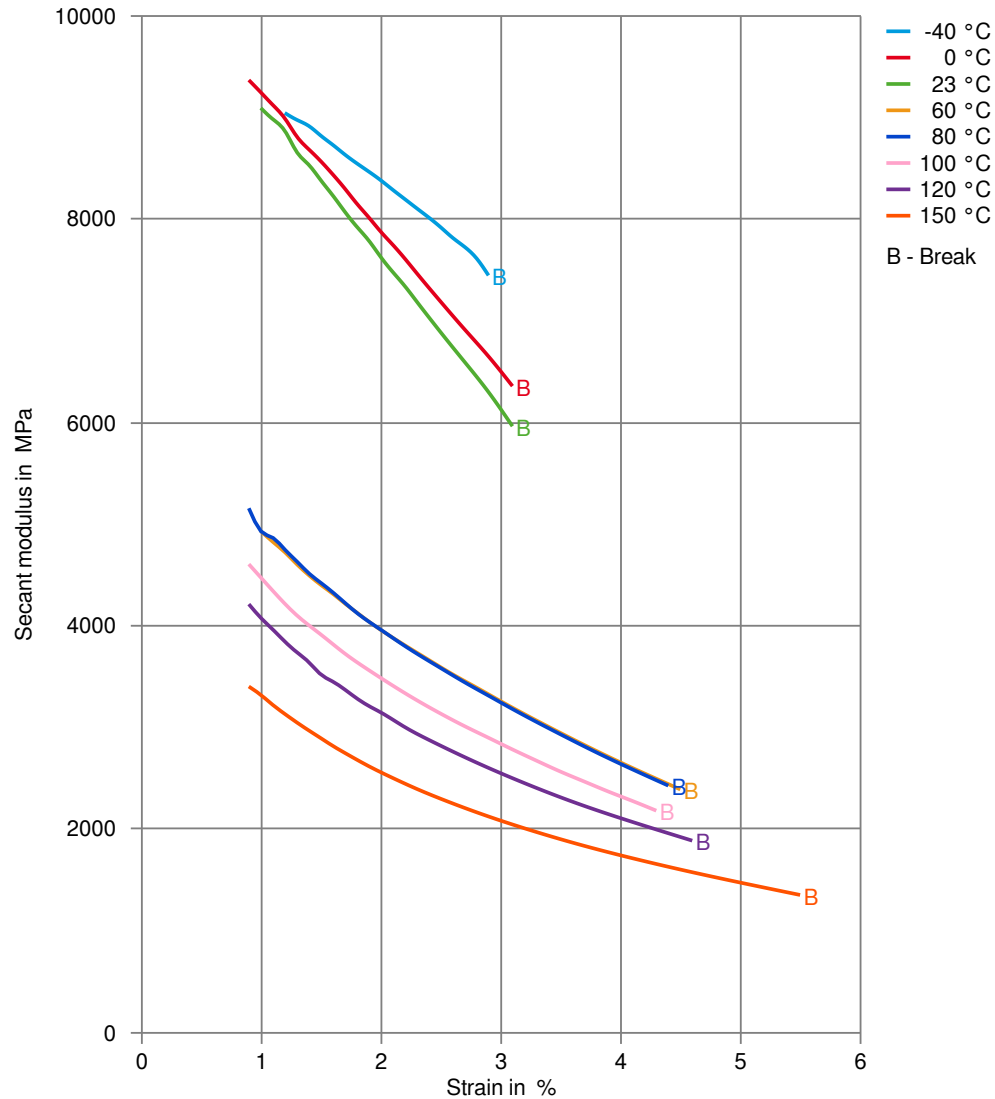
Stress-strain (cond.)



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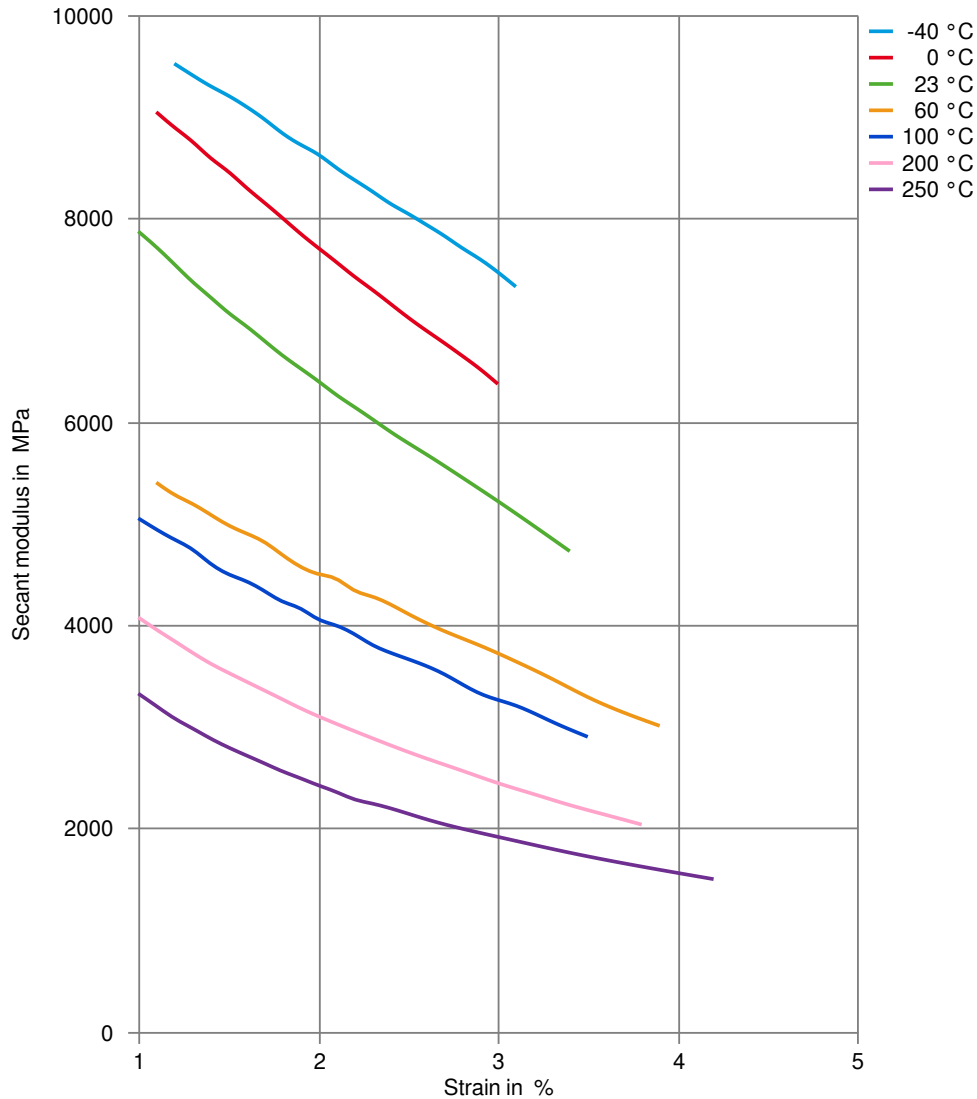
Secant modulus-strain (dry)



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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).

