Celanese
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Zytel® FE5382 BK276

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® FE5382 BK276 is a 33% glass fiber reinforced, heat stabilized, black polyamide 612 resin developed for electrical bobbins and encapsulation applications.

Product information

Resin Identification	PA612-GF33	ISO 1043
Part Marking Code	>PA612-GF33<	ISO 11469
ISO designation	ISO 16396-PA612,GF33,MCG1HR,S10-100	

Rheological properties

	dry/cond.		
Viscosity number	105[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)	0.3 / *	%	
Mold Shrinkage, Transverse, 3.2mm (0.125in)	1 / *	%	

[1]: sulfuric acid 96%

Typical mechanical properties

	dry/cond.		
Tensile modulus	10000 / 8000	MPa	ISO 527-1/-2
Tensile stress at break, 5mm/min	180 / 150	MPa	ISO 527-1/-2
Tensile strain at break, 5mm/min	3 / 4	%	ISO 527-1/-2
Flexural modulus	9000 / 7500	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	12 / 12	kJ/m^2	ISO 179/1eA
Charpy notched impact strength, -40°C	10 / 9	kJ/m^2	ISO 179/1eA
Izod notched impact strength, 23°C	11 / -	kJ/m^2	ISO 180/1A
Izod notched impact strength, -40°C	10.0 / -	kJ/m^2	ISO 180/1A
Izod impact strength, 23°C	80 / -	kJ/m^2	ISO 180/1U
Poisson's ratio	0.34 / 0.34		
Shore D hardness, 15s	84 / -		ISO 48-4 / ISO 868

Thermal properties

	dry/cond.		
Melting temperature, 10°C/min	218 / *	°C	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	200 / *	°C	ISO 75-1/-2
Temperature of deflection under load, 0.45 MPa	216 / *	°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
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

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Coeff. of linear therm. expansion, normal, 55-160°C	160 / *	E-6/K	ISO 11359-1/-2
Thermal conductivity of melt	0.26	W/(m K)	ISO 22007-2
Specific heat capacity of melt	2130	J/(kg K)	ISO 22007-4
RTI, electrical, 0.75mm	65	°C	UL 746B
RTI, electrical, 1.5mm	65	°C	UL 746B
RTI, electrical, 3.0mm	65	°C	UL 746B
RTI, impact, 0.75mm	65	°C	UL 746B
RTI, impact, 1.5mm	65	°C	UL 746B
RTI, impact, 3.0mm	65	°C	UL 746B
RTI, strength, 0.75mm	65	°C	UL 746B
RTI, strength, 1.5mm	65 / *	°C	UL 746B
RTI, strength, 3.0mm	65	°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	0.75 / *	mm	IEC 60695-11-10
UL recognition	yes / *		UL 94
Glow Wire Flammability Index, 1.0mm	725 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 2.0mm	750 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 3.0mm	750 / -	°C	IEC 60695-2-12
Glow Wire Ignition Temperature, 1.0mm	725 / -	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 2.0mm	750 / -	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 3.0mm	750 / -	°C	IEC 60695-2-13
FMVSS Class	B		ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	50	mm/min	ISO 3795 (FMVSS 302)

Electrical properties

	dry/cond.		
Volume resistivity	1E13 / 1E12	Ohm.m	IEC 62631-3-1
Surface resistivity	* / >1E15	Ohm	IEC 62631-3-2
Electric strength	34 / -	kV/mm	IEC 60243-1
Comparative tracking index	600 / 600		IEC 60112

Physical/Other properties

	dry/cond.		
Humidity absorption, 2mm	0.8 / *	%	Sim. to ISO 62
Water absorption, 2mm	1.8 / *	%	Sim. to ISO 62
Density	1320 / -	kg/m³	ISO 1183
Density of melt	1120	kg/m³	

VDA Properties

	dry/cond.		
Weather stability delta l	9		DIN 53236
Weather stability delta a	-0.2		DIN 53236
Weather stability delta b	-0.5		DIN 53236
Weather stability delta E	9		DIN 53236
Weather stability grey scale	2		ISO 105-A02
Fogging, G-value (condensate)	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	≤0.15	%
Melt Temperature Optimum	290	°C
Min. melt temperature	280	°C
Max. melt temperature	300	°C
Mold Temperature Optimum	100	°C
Min. mould temperature	70	°C
Max. mould temperature	120	°C
Ejection temperature	181	°C

Characteristics

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

Automotive

OEM	STANDARD
Bosch	N28 BN05-OX019
Stellantis	B62_0300_61/216E/213M/12/C1B

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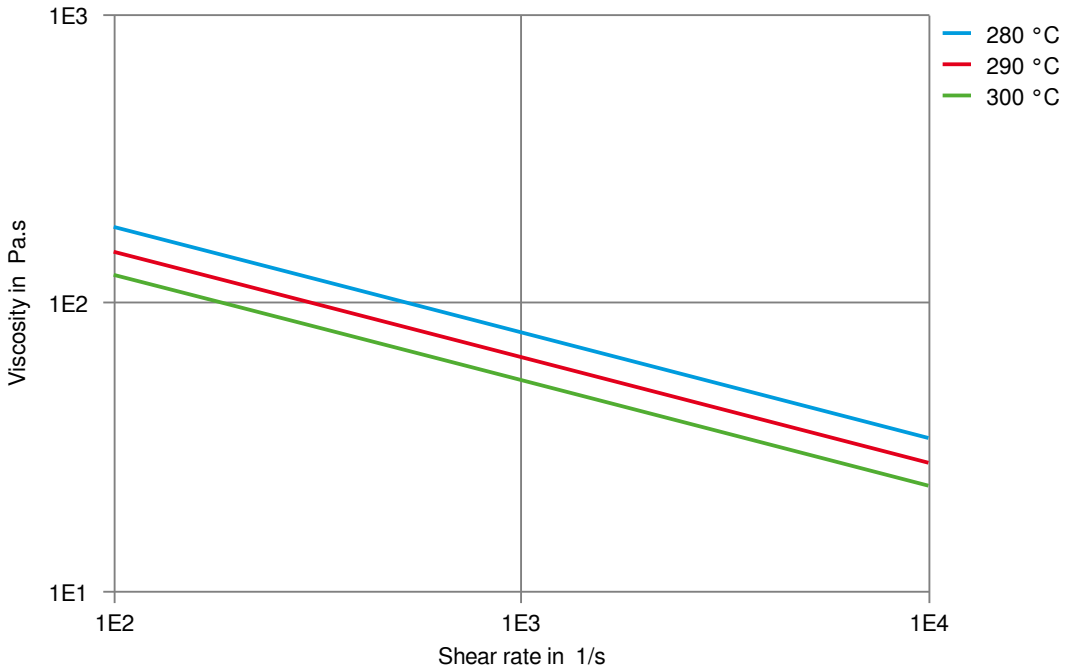
Viscosity-shear rate



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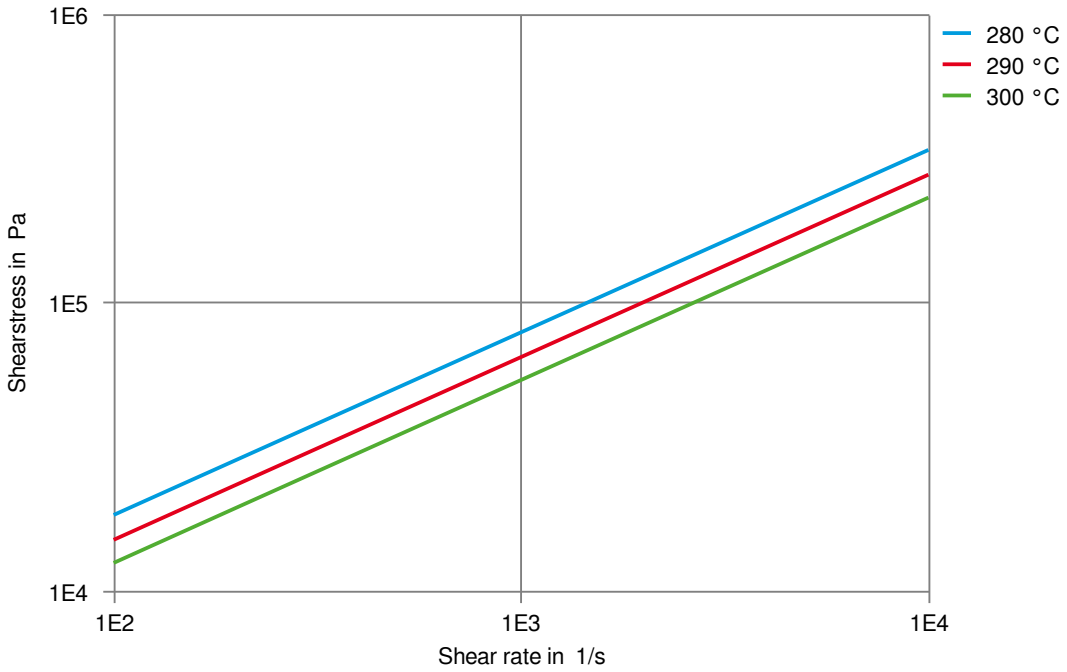
Shearstress-shear rate



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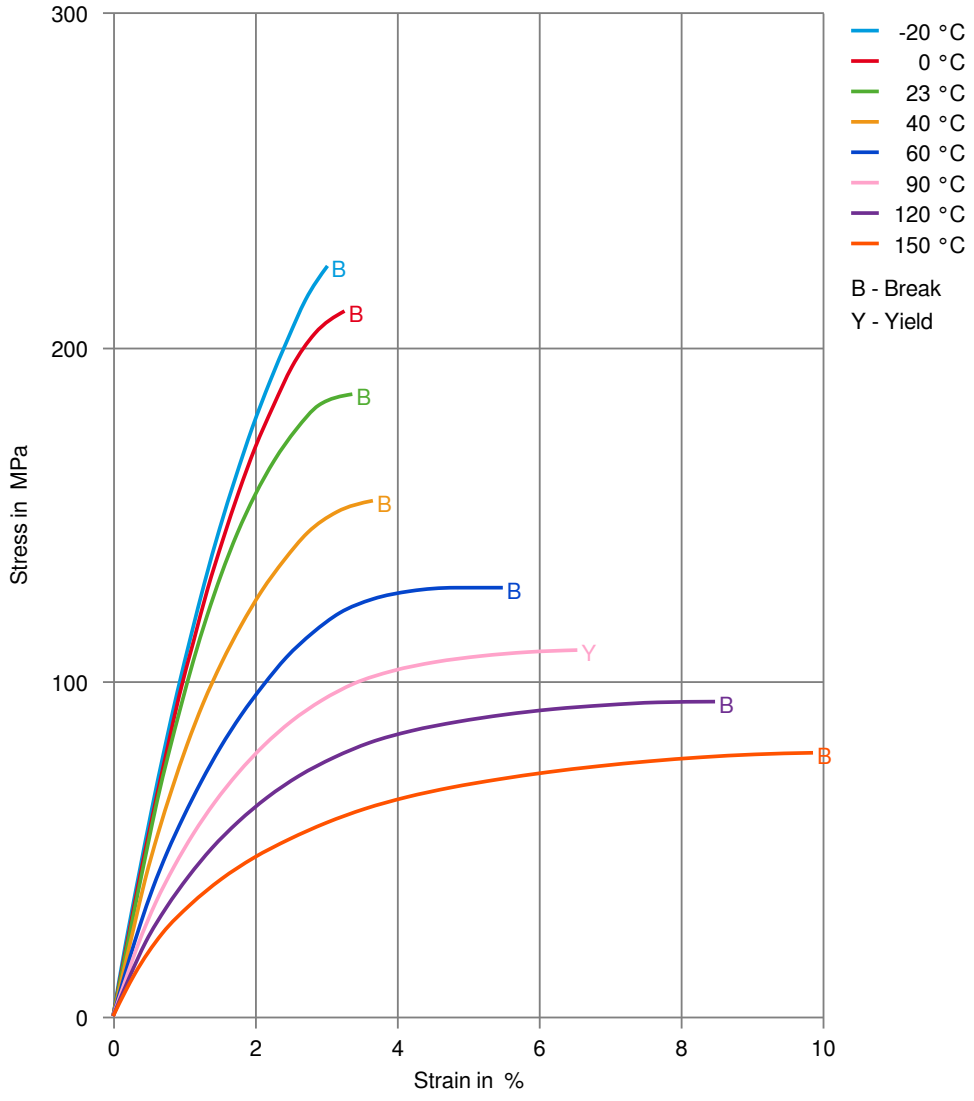
LONG CHAIN POLYAMIDE RESIN

Stress-strain (dry)



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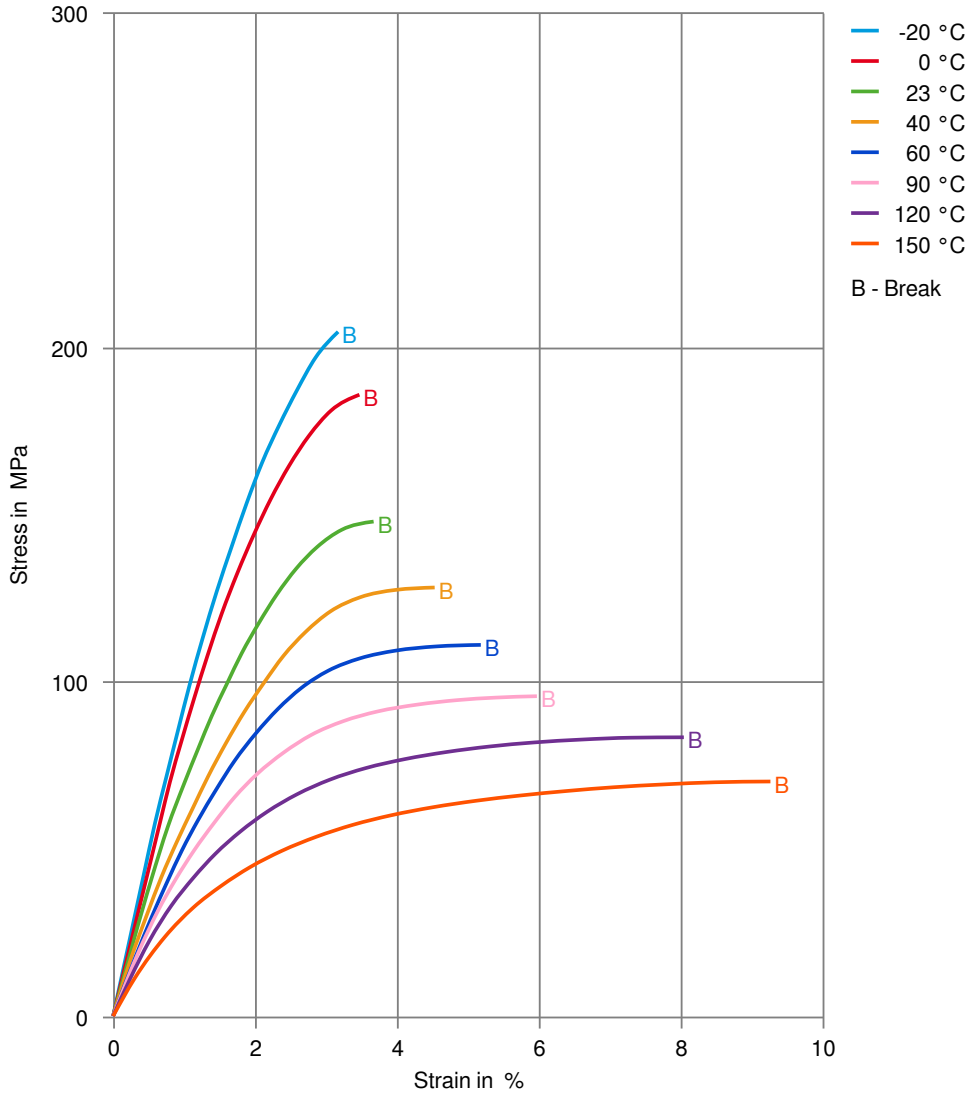
LONG CHAIN POLYAMIDE RESIN

Stress-strain (cond.)



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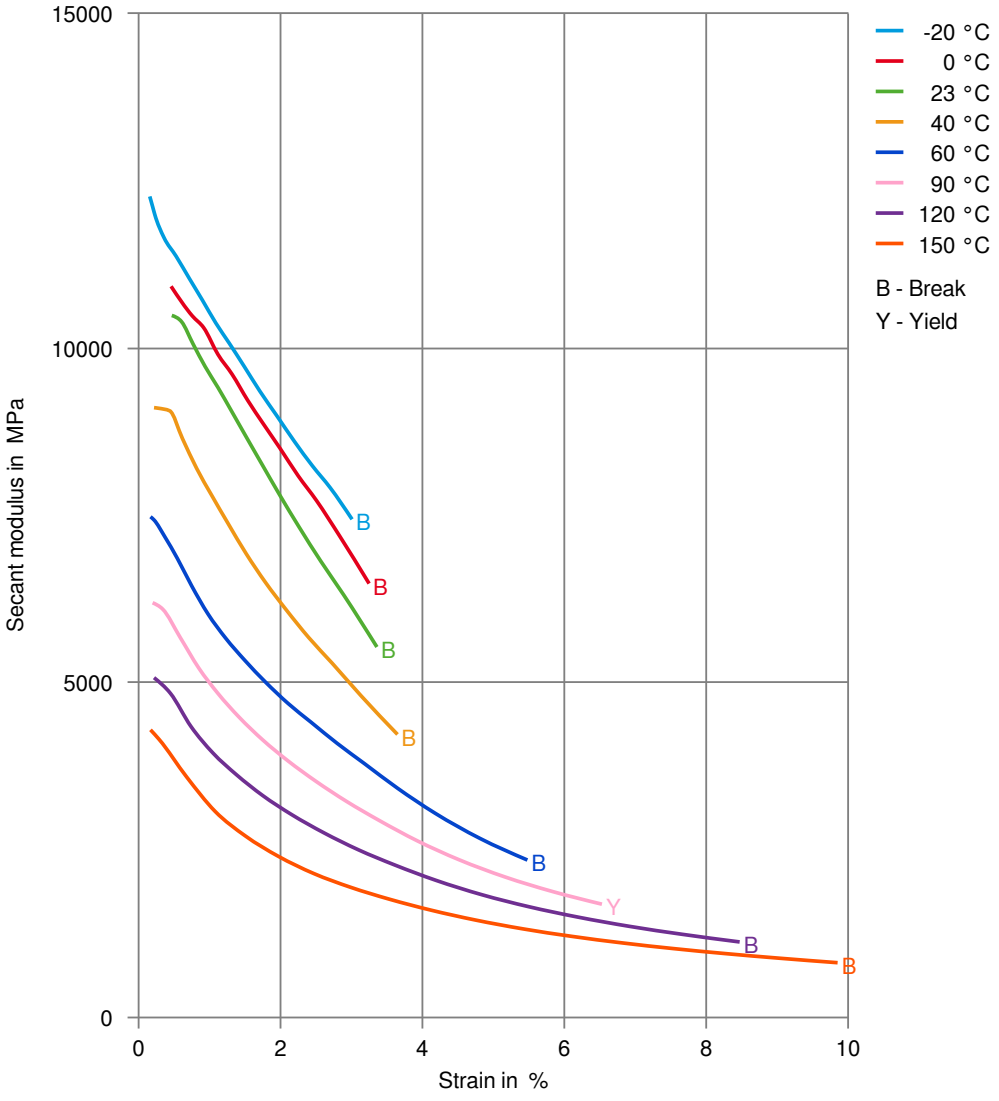
LONG CHAIN POLYAMIDE RESIN

Secant modulus-strain (dry)



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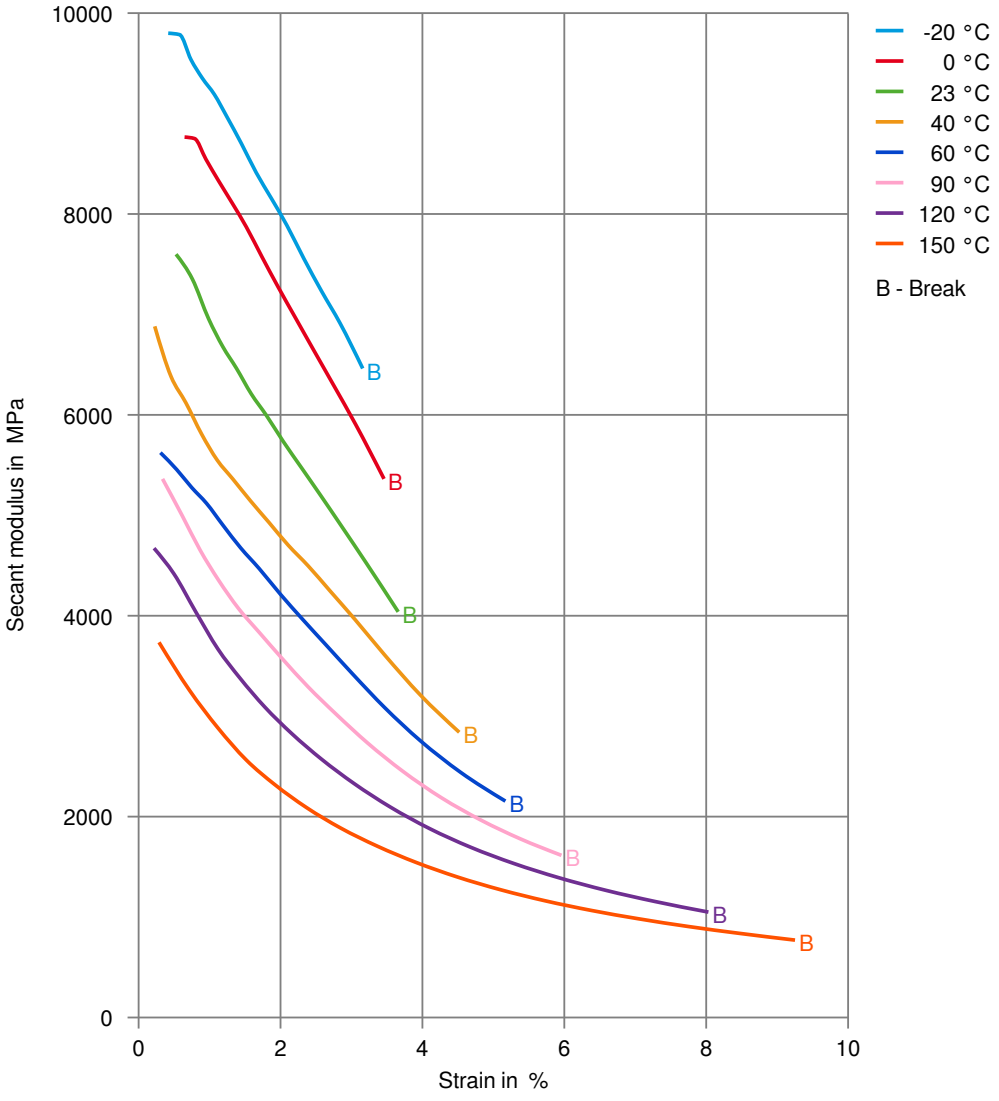
Secant modulus-strain (cond.)



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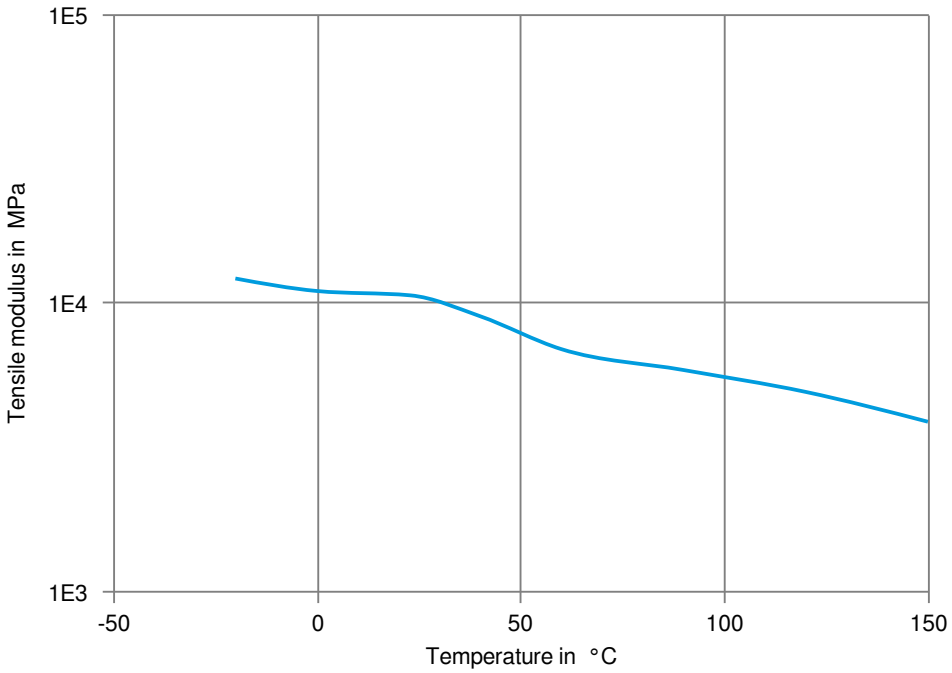
Tensile modulus-temperature (dry)



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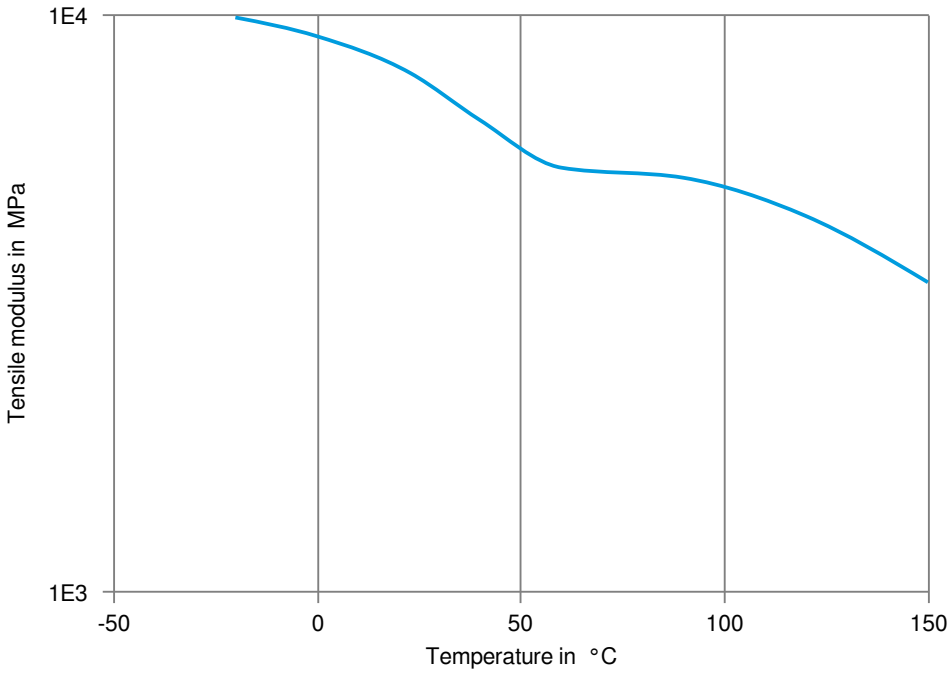
Tensile modulus-temperature (cond.)



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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
- ✔ Diesel EN 590, 100 °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
- ✔ Urea solution (32.5% 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).