Zytel® HTN51G35HSL NC010

HIGH PERFORMANCE POLYAMIDE RESIN

Zytel® HTN high performance polyamide resins feature high retention of properties upon exposure to elevated temperature, to high moisture, and to harsh chemical environments. Polymer families and grades of Zytel® HTN are tailored to optimize performance as well as processability.

Typical applications with Zytel® HTN include demanding applications in the automotive, electrical and electronics, domestic appliances, and construction industries.

Zytel® HTN51G35HSL NC010 is a 35% glass reinforced, heat stabilised, lubricated, hydrolysis resistant high performance polyamide resin. It is also a PPA resin.

Product information

Resin Identification	PA6T/XT-GF35	ISO 1043
Part Marking Code	>PA6T/XT-GF35<	ISO 11469
Part Marking Code	>PPA-GF35<	SAE J1344
ISO designation	ISO 16396-PA6T/XT,GF35,M1GHNR,S10-120	

Rheological properties

	dry/cond.		
Moulding shrinkage, parallel	0.2 / -	%	ISO 294-4, 2577
Moulding shrinkage, normal	0.6 / -	%	ISO 294-4, 2577

Typical mechanical properties

	dry/cond.		
Tensile modulus	12000 / 12000	MPa	ISO 527-1/-2
Tensile stress at break, 5mm/min	210 / 210	MPa	ISO 527-1/-2
Tensile strain at break, 5mm/min	2.4 / 2.2	%	ISO 527-1/-2
Flexural modulus	10300 / 10300	MPa	ISO 178
Flexural strength	300 / 290	MPa	ISO 178
Tensile creep modulus, 1h	* / 11000	MPa	ISO 899-1
Tensile creep modulus, 1000h	* / 9500	MPa	ISO 899-1
Charpy impact strength, 23°C	60 / 55	kJ/m²	ISO 179/1eU
Charpy impact strength, -30°C	60 / 50	kJ/m²	ISO 179/1eU
Charpy notched impact strength, 23°C	11 / 11	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -30°C	10 / 10	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -40°C	11 / -	kJ/m²	ISO 179/1eA
Izod notched impact strength, 23°C	11 / 11	kJ/m²	ISO 180/1A
Izod notched impact strength, -30°C	10.0 / 10.0	kJ/m²	ISO 180/1A
Izod impact strength, -30°C	50 / 40	kJ/m²	ISO 180/1U
Hardness, Rockwell, M-scale	108 / -		ISO 2039-2
Hardness, Rockwell, R-scale	124 / -		ISO 2039-2
Poisson's ratio	0.33 / 0.33		

Tribological properties

	dry/cond.	
Coefficient of sliding friction, 1h against steel	- / 0.35	ASTM 1894

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Thermal properties

	dry/cond.		
Melting temperature, 10°C/min	300 / *	°C	ISO 11357-1/-3
Melting temperature, first heat	300 / *	°C	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	264 / *	°C	ISO 75-1/-2
Temperature of deflection under load, 0.45 MPa	284 / *	°C	ISO 75-1/-2
Vicat softening temperature, 50°C/h 50N	290 / *	°C	ISO 306
Coeff. of linear therm. expansion, parallel, -40-23°C	18 / *	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), parallel	18 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal, -40-23°C	55 / *	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal	55 / *	E-6/K	ISO 11359-1/-2
Thermal conductivity of melt	0.25	W/(m K)	ISO 22007-2
Specific heat capacity of melt	1840	J/(kg K)	ISO 22007-4
RTI, electrical, 0.75mm	150	°C	UL 746B
RTI, electrical, 1.5mm	150	°C	UL 746B
RTI, electrical, 3.0mm	150	°C	UL 746B
RTI, impact, 0.75mm	125	°C	UL 746B
RTI, impact, 1.5mm	125	°C	UL 746B
RTI, impact, 3.0mm	130	°C	UL 746B
RTI, strength, 0.75mm	130	°C	UL 746B
RTI, strength, 1.5mm	140 / *	°C	UL 746B
RTI, strength, 3.0mm	150	°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	0.85 / *	mm	IEC 60695-11-10
UL recognition	yes / *		UL 94
Oxygen index	24 / *	%	ISO 4589-1/-2
Glow Wire Flammability Index, 0.75mm	750 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 1.5mm	750 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 3.0mm	960 / -	°C	IEC 60695-2-12
Glow Wire Ignition Temperature, 1.5mm	775 / -	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 3.0mm	800 / -	°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.		
Relative permittivity, 100Hz	4 / -		IEC 62631-2-1
Relative permittivity, 1MHz	4 / -		IEC 62631-2-1
Dissipation factor, 1MHz	120 / -	E-4	IEC 62631-2-1
Volume resistivity	>1E13 / 1E13	Ohm.m	IEC 62631-3-1
Surface resistivity	* / 1E14	Ohm	IEC 62631-3-2
Electric strength	36 / 36	kV/mm	IEC 60243-1
Comparative tracking index	600 / 600		IEC 60112

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Dielectric Constant, 1 GHz	3.9 / -		ASTM D 2520 B
Dissipation Factor, 1 GHz	120 / -	E-4	ASTM D 2520 B

Physical/Other properties

	dry/cond.		
Humidity absorption, 2mm	1.4 / *	%	Sim. to ISO 62
Water absorption, 2mm	4 / *	%	Sim. to ISO 62
Water absorption, Immersion 24h	1 / *	%	Sim. to ISO 62
Density	1470 / -	kg/m³	ISO 1183
Density of melt	1230	kg/m³	

[1]: 2mm thickness

VDA Properties

Odour	4	class	VDA 270

Injection

Drying Recommended	yes	
Drying Temperature	100	°C
Drying Time, Dehumidified Dryer	6 - 8	h
Processing Moisture Content	≤0.1	%
Melt Temperature Optimum	325	°C
Min. melt temperature	320	°C
Max. melt temperature	330	°C
Mold Temperature Optimum	145	°C
Min. mould temperature	130[2]	°C
Max. mould temperature	160	°C
Ejection temperature	260	°C

[2]: Higher temperature needed for thinner sections.

Characteristics

Processing	Injection Moulding
Delivery form	Pellets
Additives	Release agent
Special characteristics	Heat stabilised or stable to heat, Hydrolysis resistant

Additional information

Injection molding

During molding, use proper protective equipment and adequate ventilation. Avoid exposure to fumes and limit the hold up time and temperature of the resin in the machine. Purge degraded resin carefully with HDPE.

When lower mold temperatures are used, the initial warpage and shrinkage may be lower, but the surface appearance and chemical resistance may be reduced, and the dimensional change may be greater when parts are subsequently heated.

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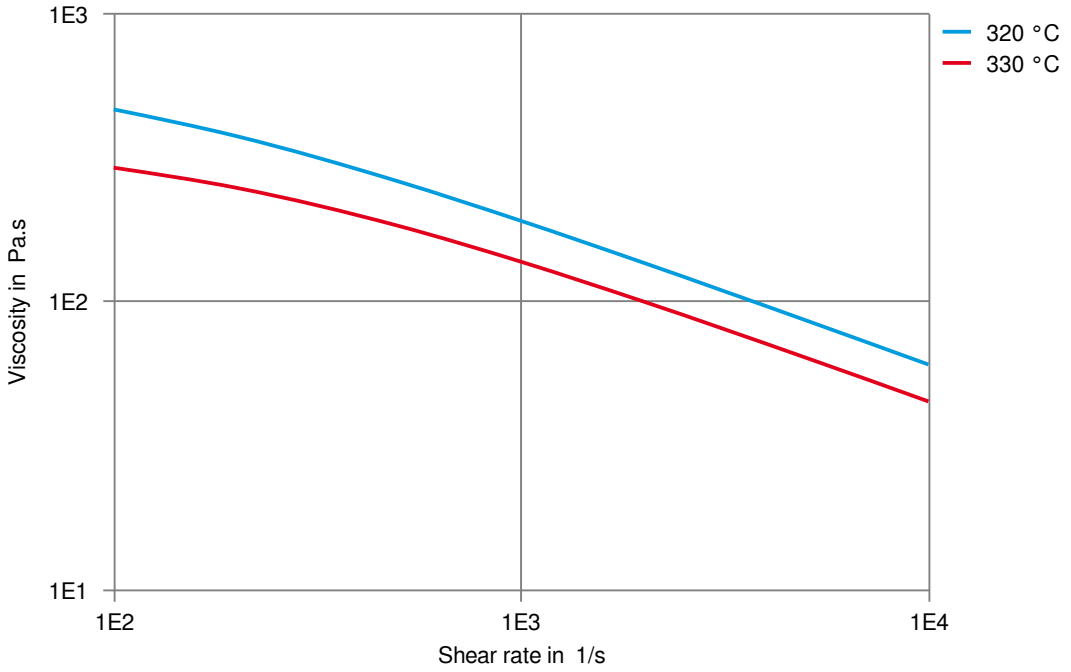
Automotive

OEM	STANDARD	ADDITIONAL INFORMATION
Ford	WSS-M98P14-A3	
General Motors	GMW16356P-PPA-GF35	Natural
Hyundai	MS941-03 Type N-4	
Stellantis	B62 0300 / 61/213M+/215E+/H113/H115(168h)13/C1B	Natural
Stellantis	MS.50156 / PPA.GF30-35.100001.7C.HS	CPN4190, 01994_10_00119
Stellantis - Chrysler	MS.50103 / CPN-4190	Natural

Viscosity-shear rate



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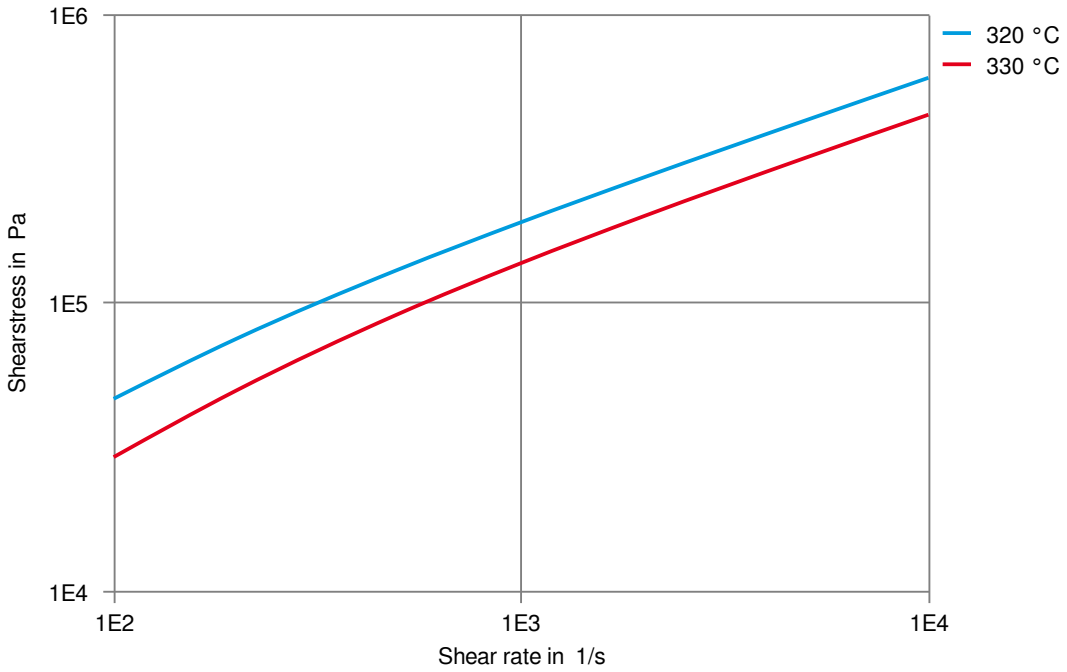
Shearstress-shear rate



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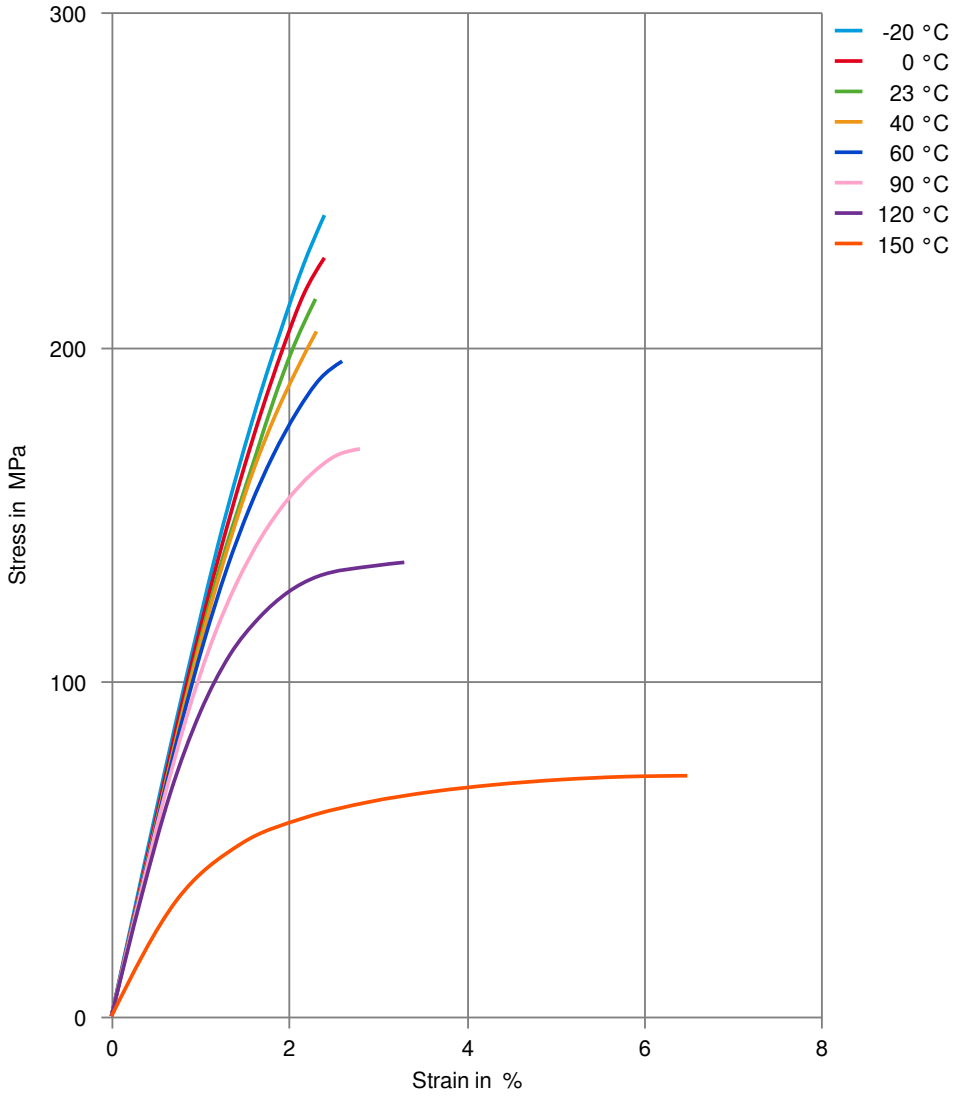
Stress-strain (dry)



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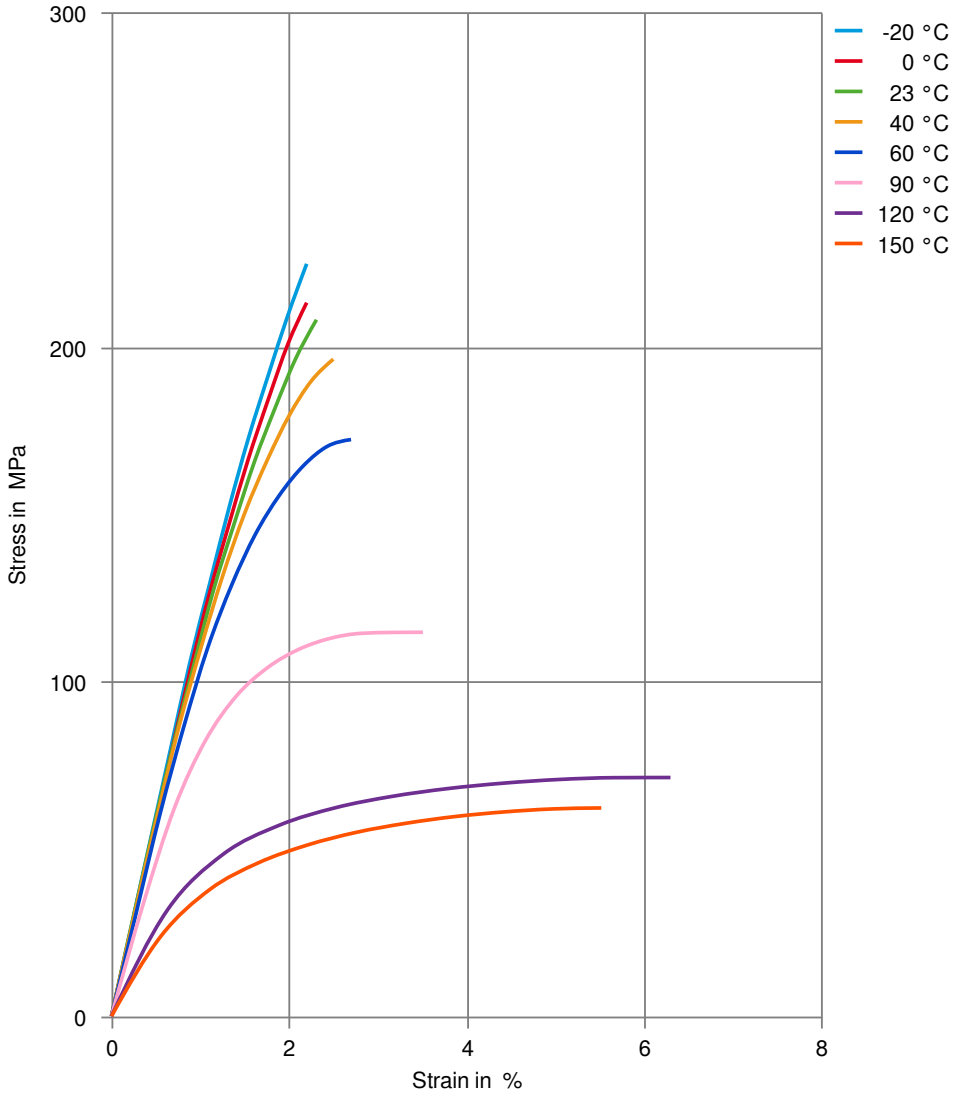
HIGH PERFORMANCE POLYAMIDE RESIN

Stress-strain (cond.)



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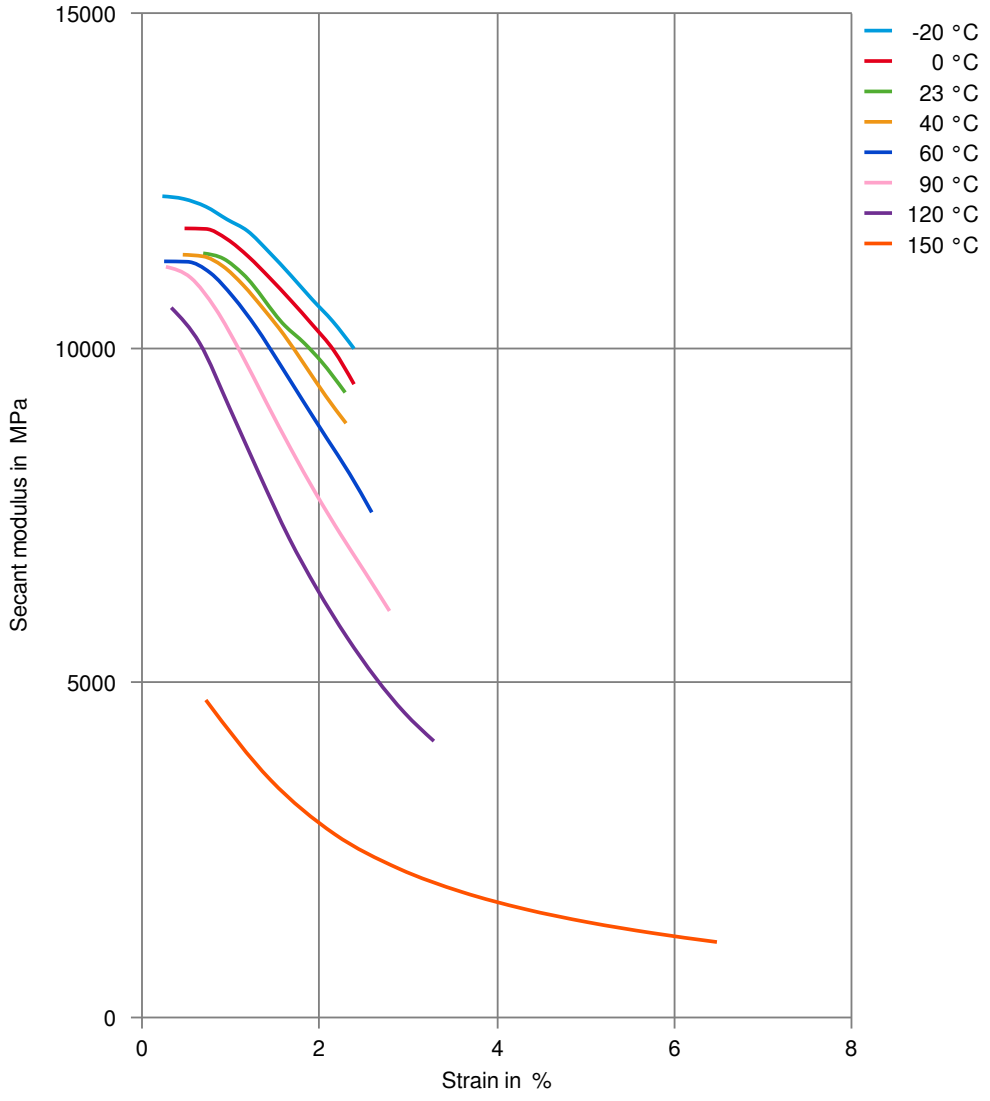
HIGH PERFORMANCE POLYAMIDE RESIN

Secant modulus-strain (dry)



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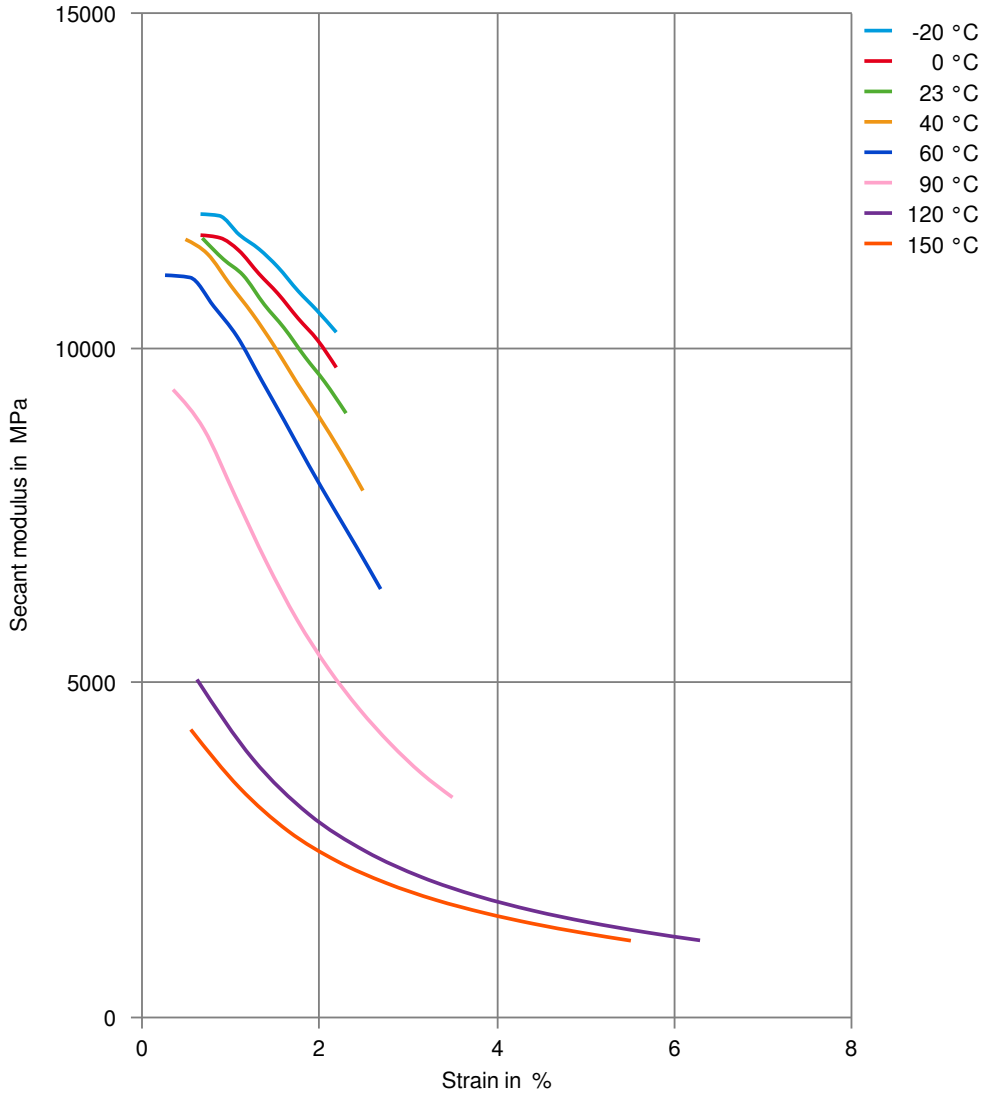
HIGH PERFORMANCE POLYAMIDE RESIN

Secant modulus-strain (cond.)



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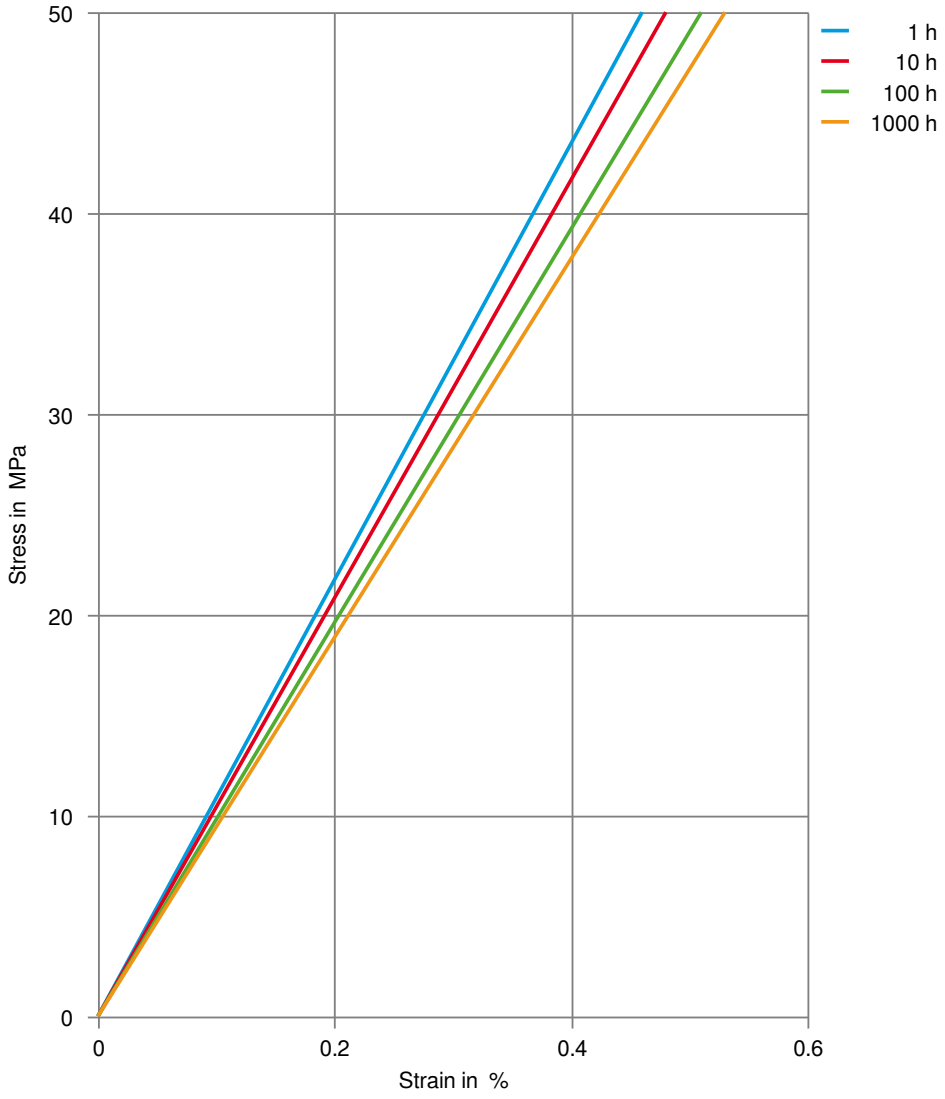
HIGH PERFORMANCE POLYAMIDE RESIN

Stress-strain (isochronous) 23 °C (cond.)



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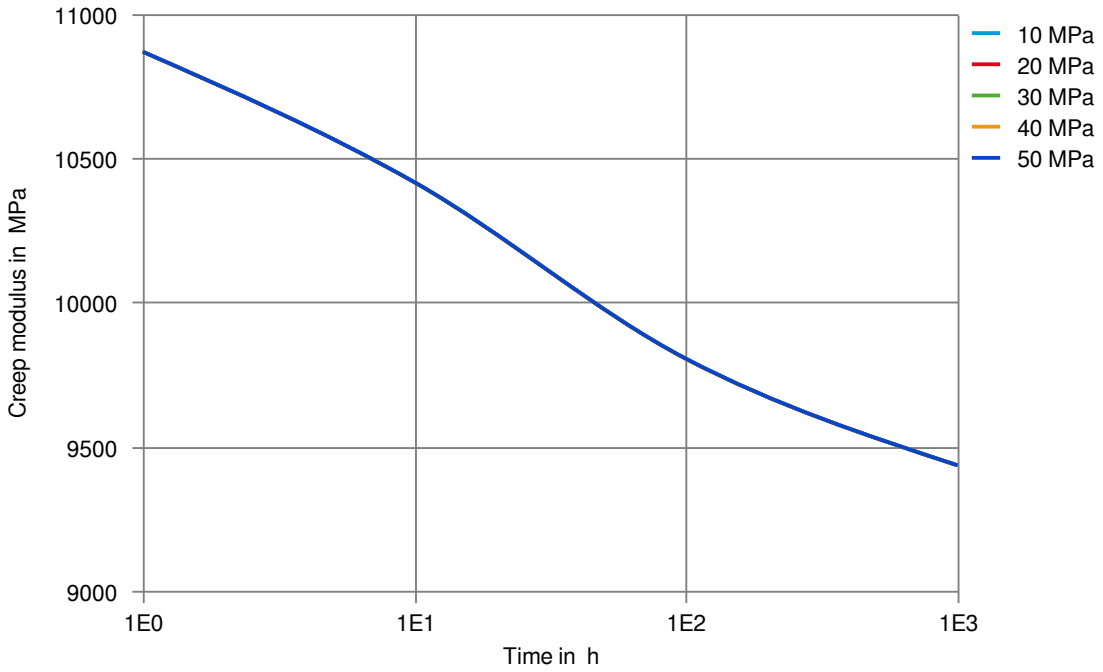
HIGH PERFORMANCE POLYAMIDE RESIN

Creep modulus-time 23 °C (cond.)



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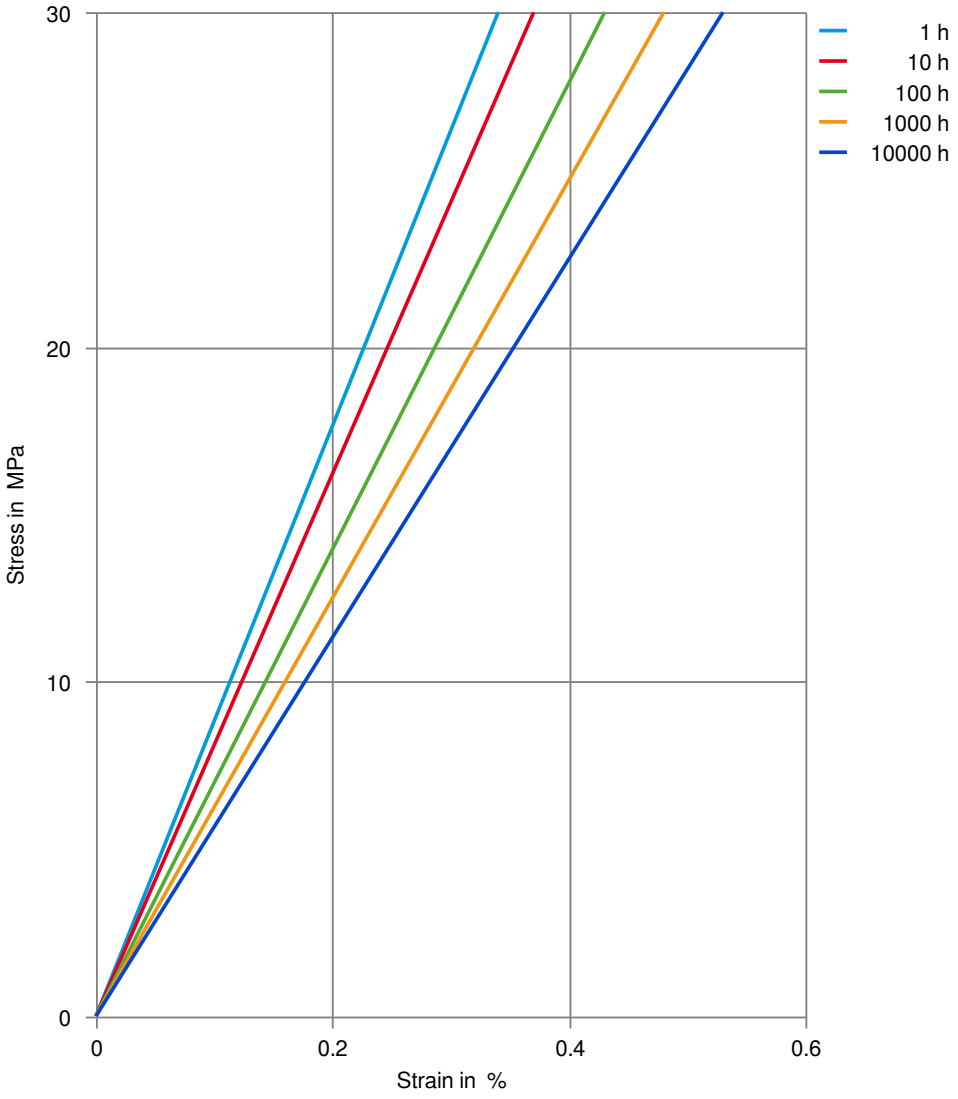
HIGH PERFORMANCE POLYAMIDE RESIN

Stress-strain (isochronous) 100 °C (dry)



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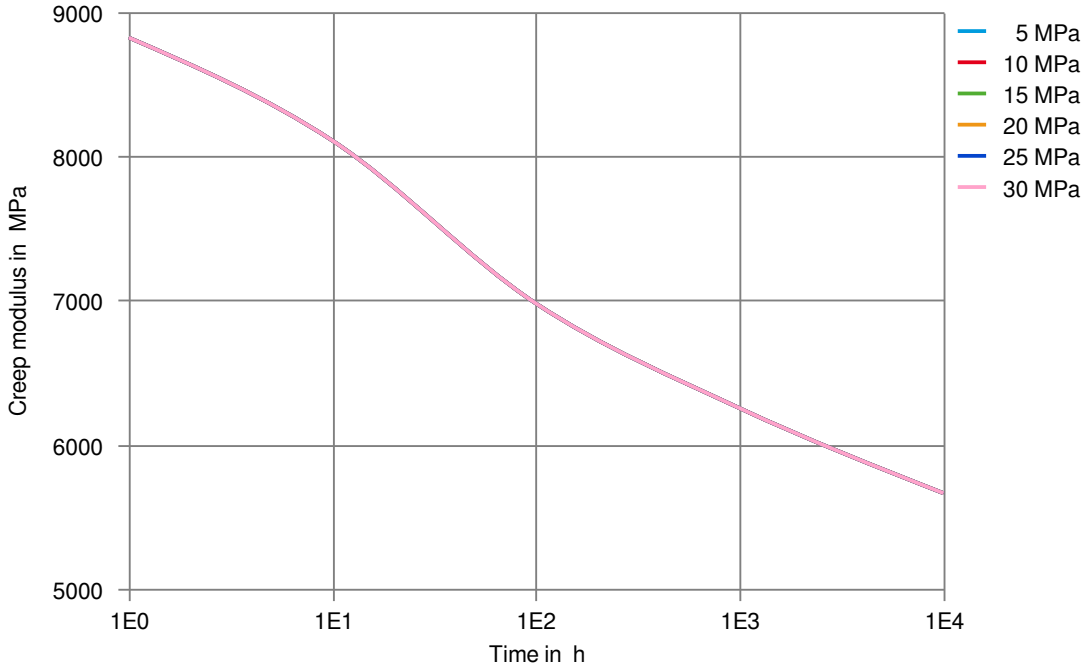
HIGH PERFORMANCE POLYAMIDE RESIN

Creep modulus-time 100 °C (dry)



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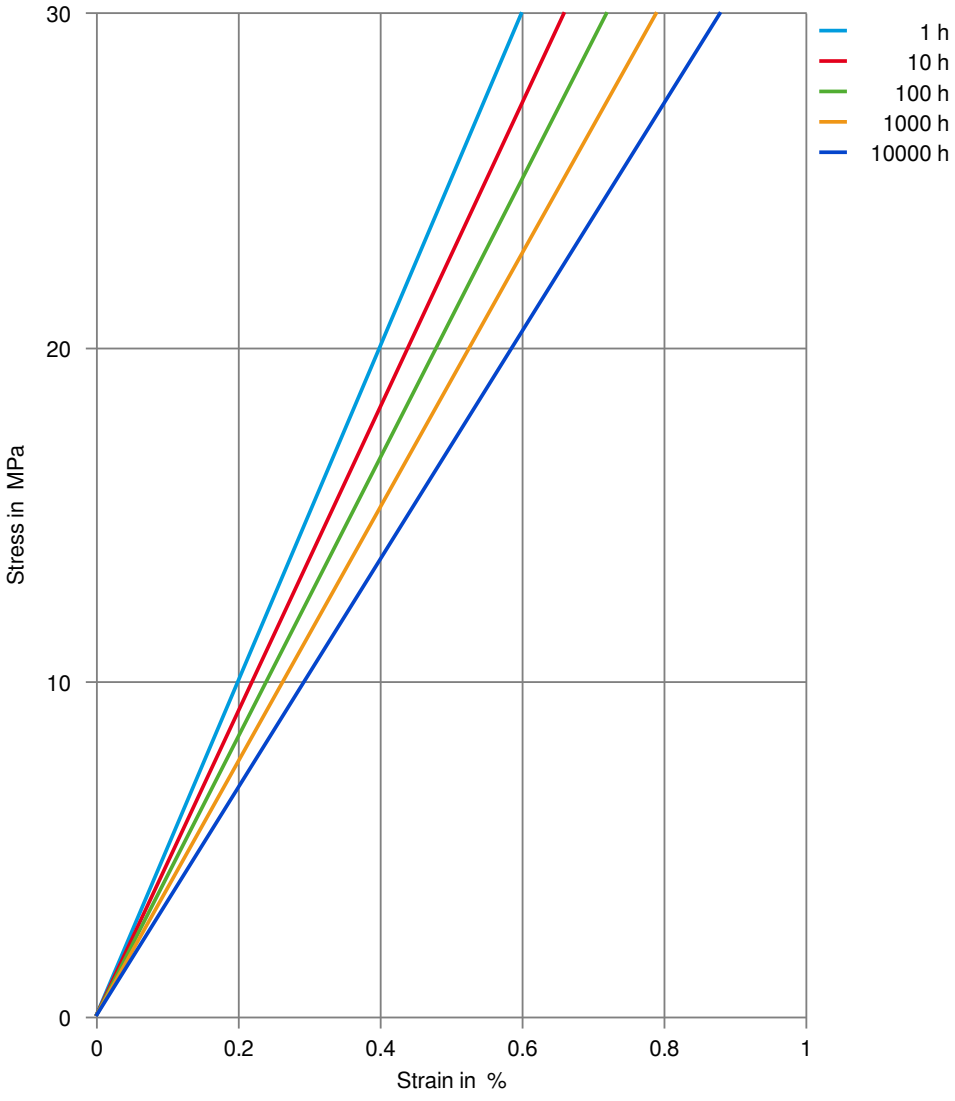
HIGH PERFORMANCE POLYAMIDE RESIN

Stress-strain (isochronous) 150 °C (dry)



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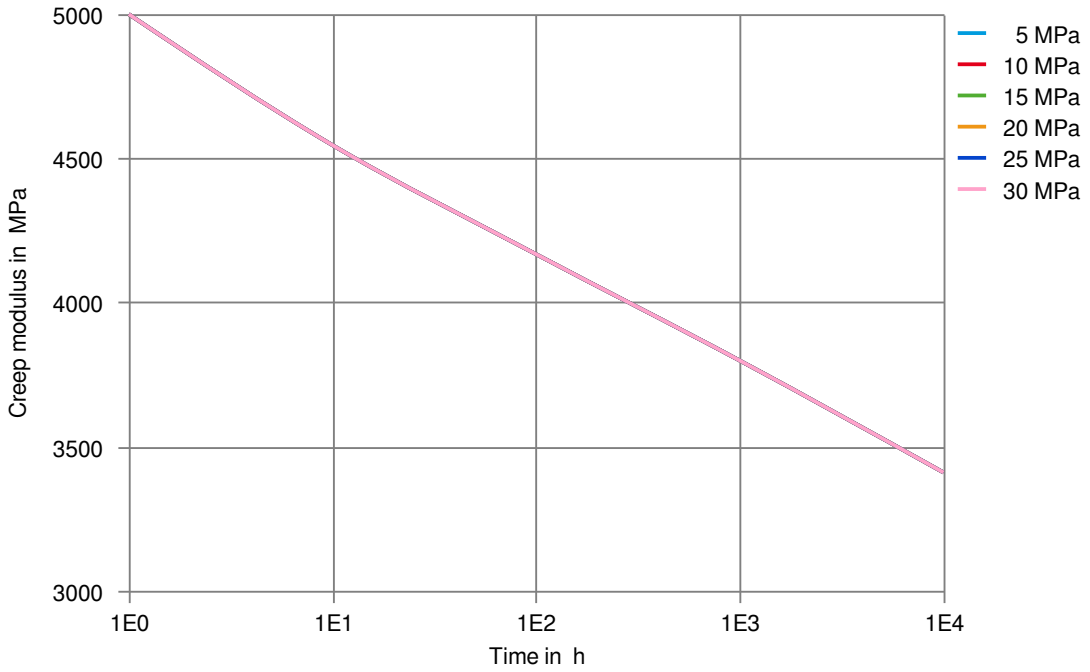
HIGH PERFORMANCE POLYAMIDE RESIN

Creep modulus-time 150 °C (dry)



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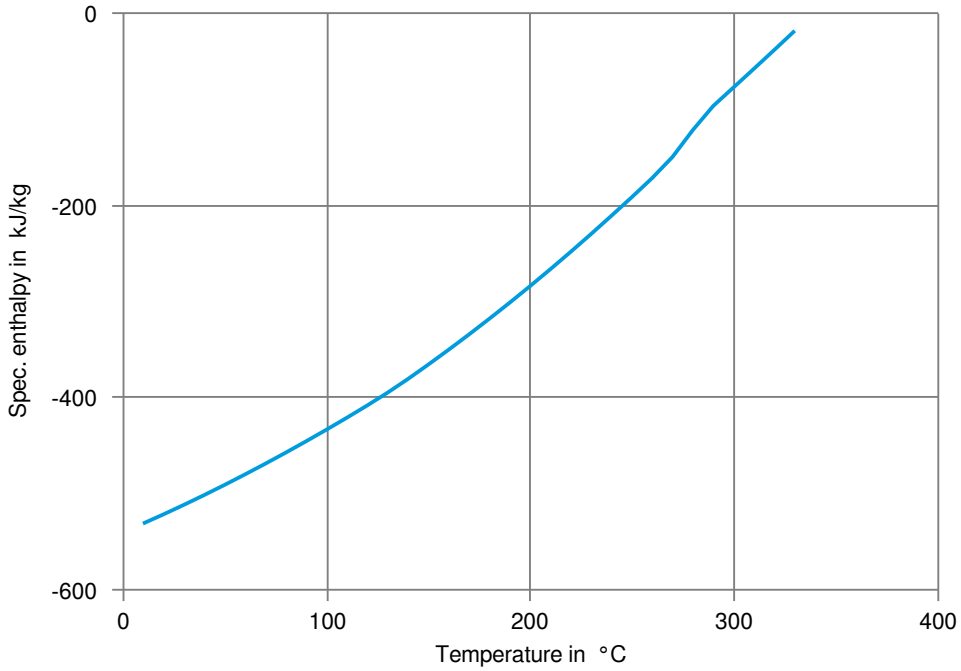
Spec. enthalpy/mass-temp. (DSC)



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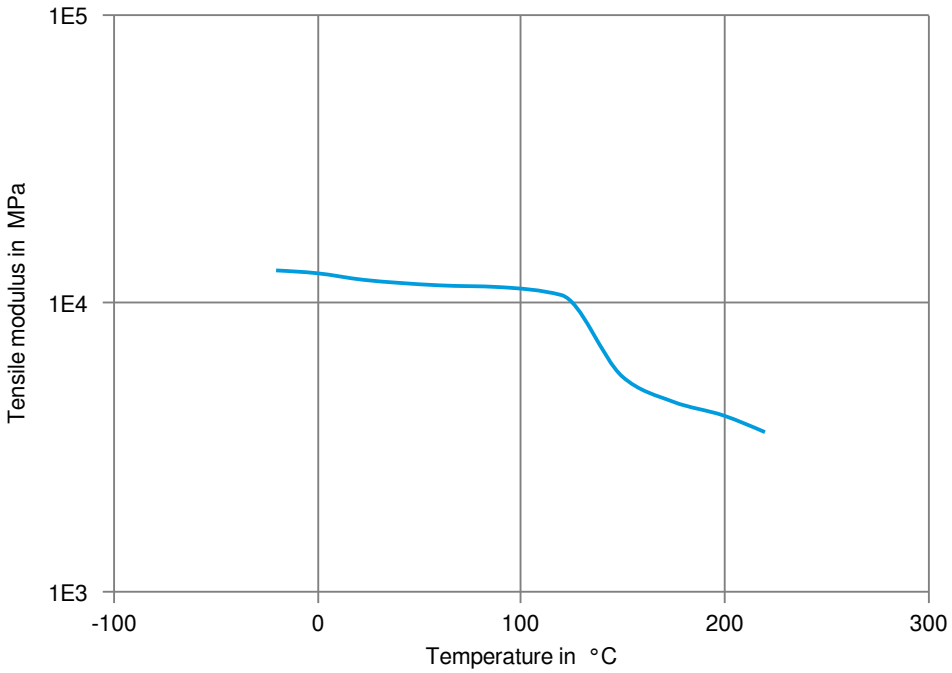
Tensile modulus-temperature (dry)



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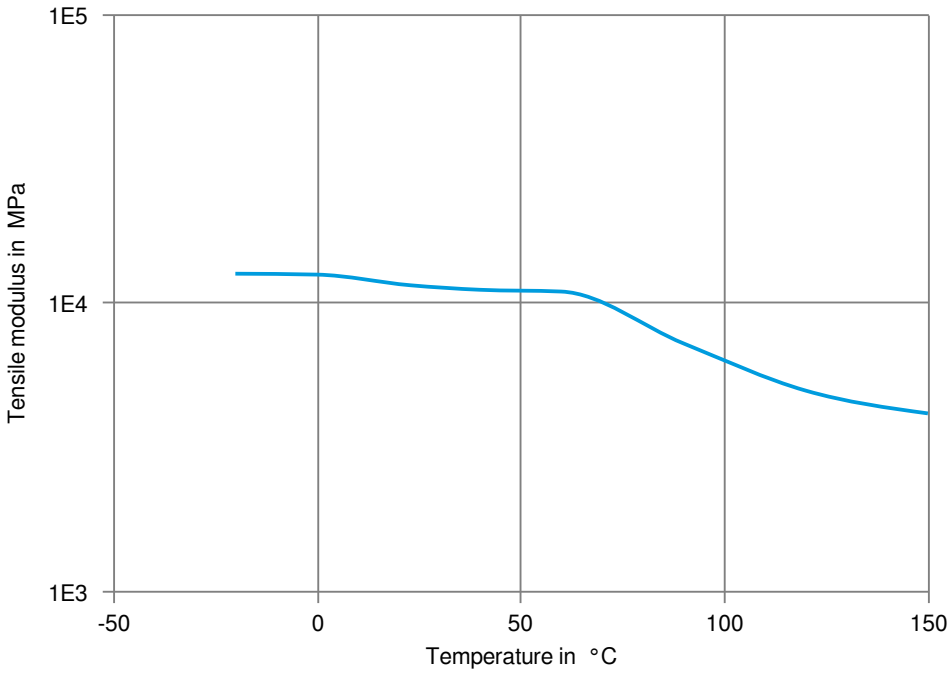
Tensile modulus-temperature (cond.)



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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

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
- ✔ Motor oil OS206 304 Ref.Eng.Oil, ISP, 135°C
- ✔ Automatic hypoid-gear oil Shell Donax TX, 135°C
- ✔ Hydraulic oil Pentosin CHF 202, 125°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

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).

Revised: 2024-11-29 Source: Celanese Materials Database