Celanese
The chemistry inside innovation™

Zytel® 80G33HS1L 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® 80G33HS1L NC010 is a 33% glass fiber reinforced heat stabilized polyamide 66 resin with outstanding impact resistance developed using our Super Tough technology.

Product information

Resin Identification	PA66-IGF33	ISO 1043
Part Marking Code	>PA66-IGF33<	ISO 11469
ISO designation	ISO 16396-PA66-I,GF33,M1GHNR,S14-090	

Rheological properties

	dry/cond.		
Viscosity number	144[1]/*	cm³/g	ISO 307, 1157, 1628
Moulding shrinkage, parallel	0.3 / -	%	ISO 294-4, 2577
Moulding shrinkage, normal	0.7 / -	%	ISO 294-4, 2577

[1]: sulfuric acid 96%

Typical mechanical properties

	dry/cond.		
Tensile Modulus	8900 / 6200	MPa	ISO 527-1/-2
Stress at break, 5mm/min	150 / 110	MPa	ISO 527-1/-2
Strain at break, 5mm/min	3.7 / 7	%	ISO 527-1/-2
Flexural Modulus	7500 / 6200	MPa	ISO 178
Flexural Strength	200 / -	MPa	ISO 178
Tensile creep modulus, 1h	* / 5300	MPa	ISO 899-1
Tensile creep modulus, 1000h	* / 4300	MPa	ISO 899-1
Charpy impact strength, 23°C	97 / 98	kJ/m²	ISO 179/1eU
Charpy impact strength, -30°C	110 / 100	kJ/m²	ISO 179/1eU
Charpy notched impact strength, 23°C	20 / 28	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -30°C	18 / 17	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -40°C	14 / 18	kJ/m²	ISO 179/1eA
Izod notched impact strength, 23°C	21 / 26	kJ/m²	ISO 180/1A
Izod notched impact strength, -30°C	17 / 16	kJ/m²	ISO 180/1A
Izod notched impact strength, -40°C	15 / 15	kJ/m²	ISO 180/1A
Izod impact strength, 23°C	80 / 80	kJ/m²	ISO 180/1U
Izod impact strength, -30°C	80 / 75	kJ/m²	ISO 180/1U

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Hardness, Rockwell, M-scale	70 / -		ISO 2039-2
Hardness, Rockwell, R-scale	110 / -		ISO 2039-2
Ball indentation hardness, H 961/30	220 / -	MPa	ISO 2039-1
Poisson's ratio	0.34 / 0.35		

Thermal properties

	dry/cond.		
Melting temperature, 10 °C/min	262 / *	°C	ISO 11357-1/-3
Glass transition temperature, 10 °C/min	75 / 20	°C	ISO 11357-1/-3
Temp. of deflection under load, 1.8 MPa	250 / *	°C	ISO 75-1/-2
Temp. of deflection under load, 0.45 MPa	260 / *	°C	ISO 75-1/-2
Vicat softening temperature, 50 °C/h, 50N	240 / *	°C	ISO 306
Coeff. of linear therm. expansion, parallel	15 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal	120 / *	E-6/K	ISO 11359-1/-2
Thermal conductivity of melt	0.22	W/(m K)	Internal
Eff. thermal diffusivity	9E-8	m^2/s	Internal
Spec. heat capacity of melt	2200	J/(kg K)	Internal
RTI, electrical, 0.75mm	130	°C	UL 746B
RTI, electrical, 1.5mm	130	°C	UL 746B
RTI, electrical, 3mm	130	°C	UL 746B
RTI, impact, 0.75mm	65	°C	UL 746B
RTI, impact, 1.5mm	105	°C	UL 746B
RTI, impact, 3mm	105	°C	UL 746B
RTI, strength, 0.75mm	85	°C	UL 746B
RTI, strength, 1.5mm	95 / *	°C	UL 746B
RTI, strength, 3mm	105	°C	UL 746B

Flammability

	dry/cond.		
Burning Behav. at 1.5mm nom. thickn.	HB / *	class	UL 94
Thickness tested	1.5 / *	mm	UL 94
UL recognition	yes[2] / *		UL 94
Burning Behav. at thickness h	HB / *	class	UL 94
Thickness tested	0.75 / *	mm	UL 94
UL recognition	yes / *		UL 94
Glow Wire Flammability Index, 1mm	650 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 2mm	700 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 3mm	900 / -	°C	IEC 60695-2-12
Glow Wire Ignition Temperature, 1mm	700 / -	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 2mm	700 / -	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 3mm	750 / -	°C	IEC 60695-2-13
FMVSS Class	SE / B		ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	23	mm/min	ISO 3795 (FMVSS 302)

[2]: UL yellow card with (f1)

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Electrical properties

	dry/cond.		
Relative permittivity, 1MHz	3.6 / 4.3		IEC 62631-2-1
Dissipation factor, 1MHz	130 / 600	E-4	IEC 62631-2-1
Volume resistivity	>1E13 / 1E9	Ohm.m	IEC 62631-3-1
Surface resistivity	* / 1E12	Ohm	IEC 62631-3-2
Comparative tracking index	- / 425		IEC 60112

Other properties

	dry/cond.		
Humidity absorption, 2mm	1.5 / *	%	Sim. to ISO 62
Water absorption, 2mm	4.5 / *	%	Sim. to ISO 62
Water absorption, Immersion 24h	0.85 / *	%	Sim. to ISO 62
Density	1330 / -	kg/m³	ISO 1183
Density of melt	1120	kg/m³	Internal

VDA Properties

	dry/cond.		
Emission of organic compounds	25	µgC/g	VDA 277
Odour	3	class	VDA 270
Fogging, G-value (condensate)	0.8 / *	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	Internal
Min. melt temperature	285	°C	
Max. melt temperature	305	°C	
Screw tangential speed	≤0.2	m/s	
Mold Temperature Optimum	80	°C	
Min. mould temperature	50	°C	
Max. mould temperature	100	°C	
Hold pressure range	50 - 100	MPa	
Hold pressure time	3	s/mm	
Ejection temperature	210	°C	Internal

Characteristics

Additives	Release agent

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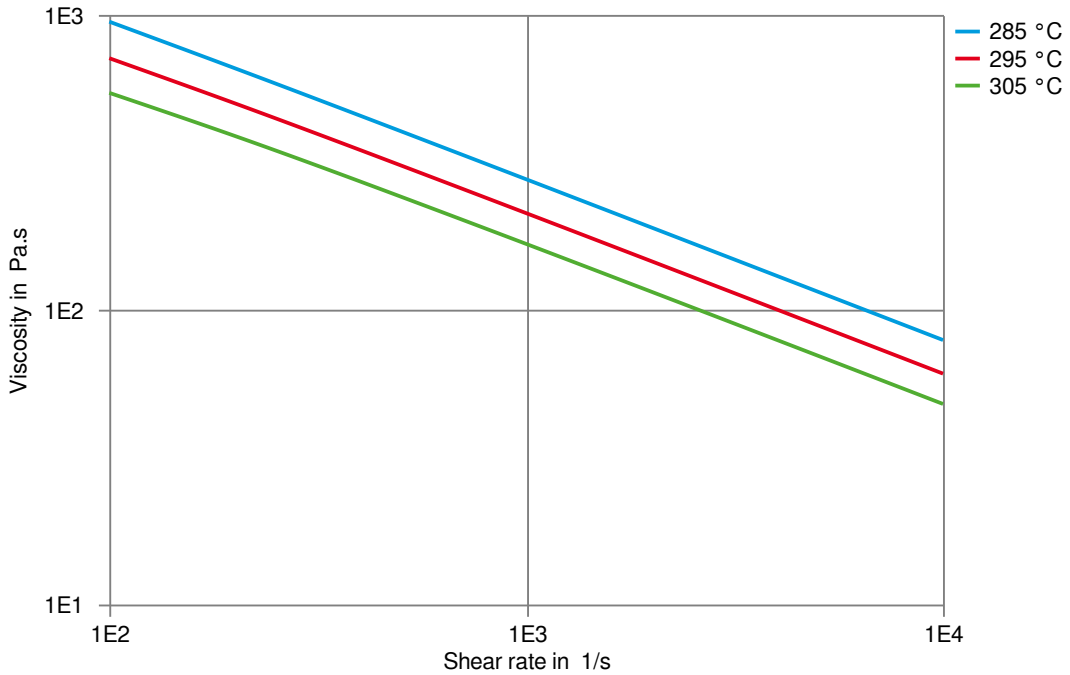
Viscosity-shear rate



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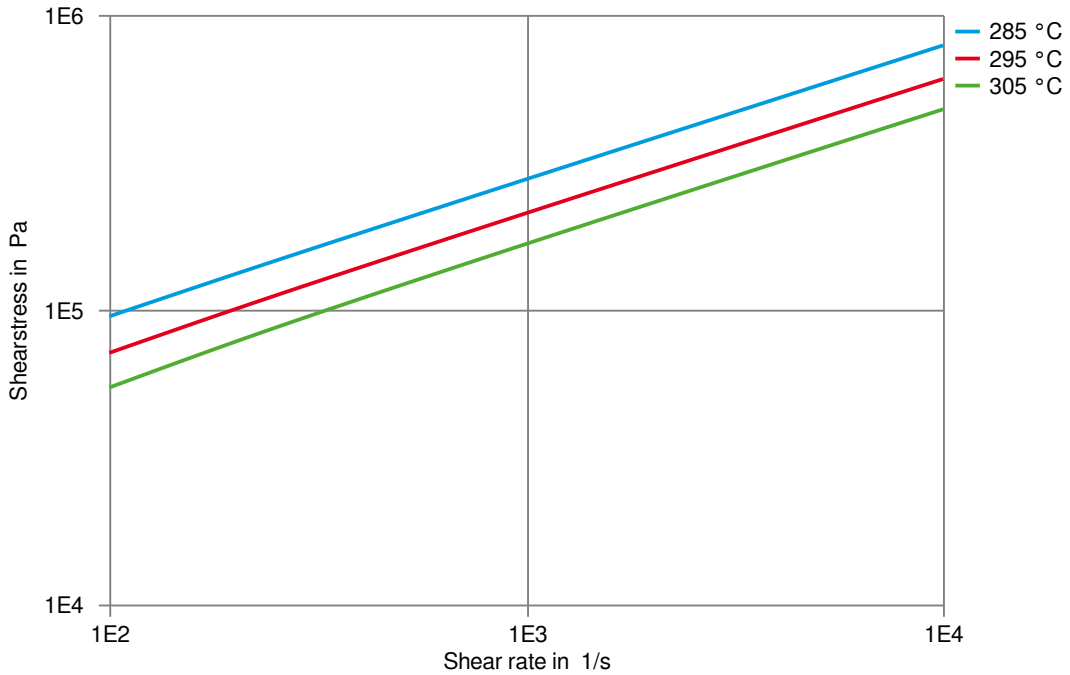
Shearstress-shear rate



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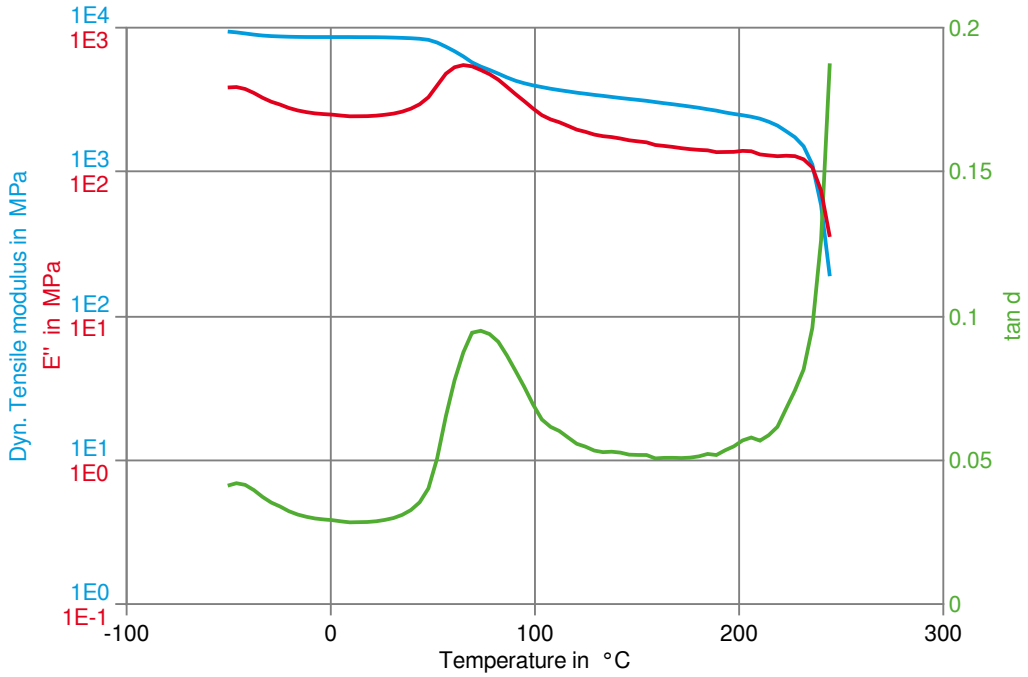
Dynamic Tensile modulus-temperature (dry)



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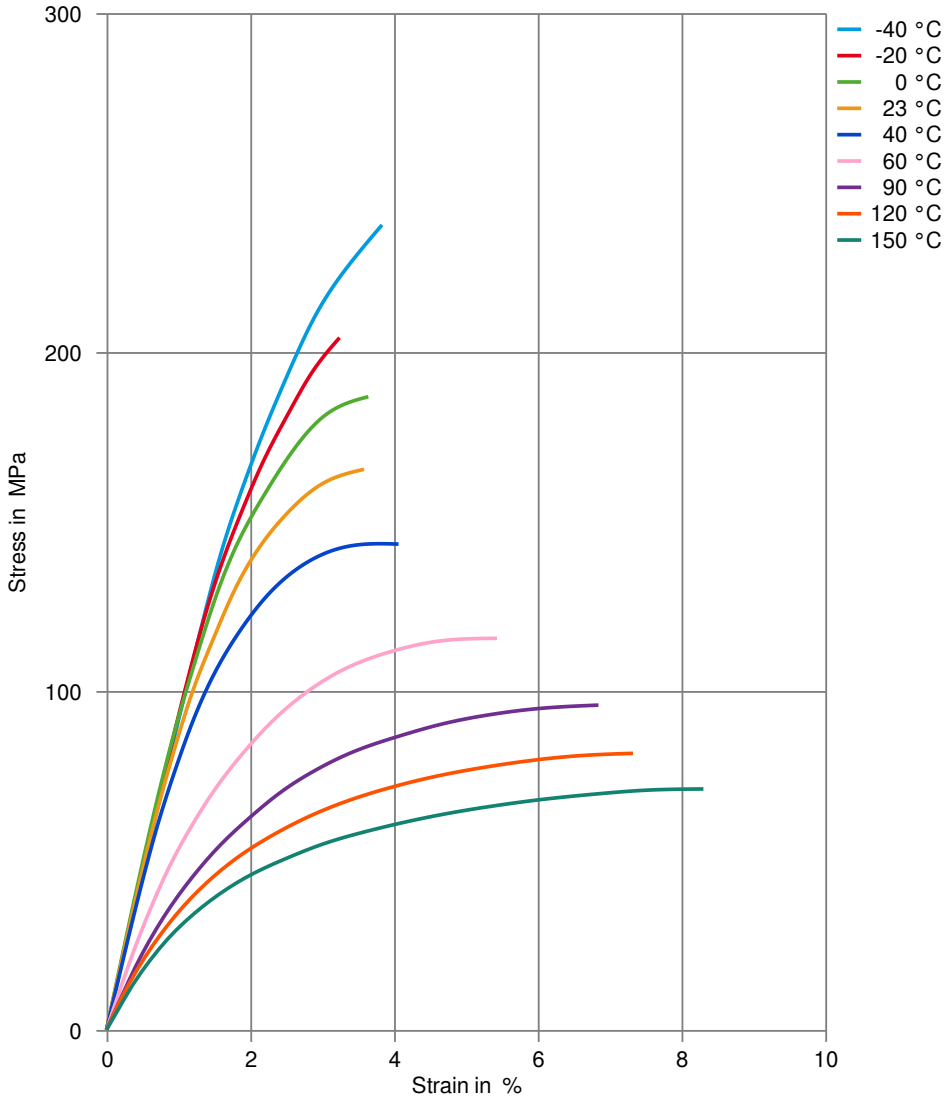
Stress-strain (dry)



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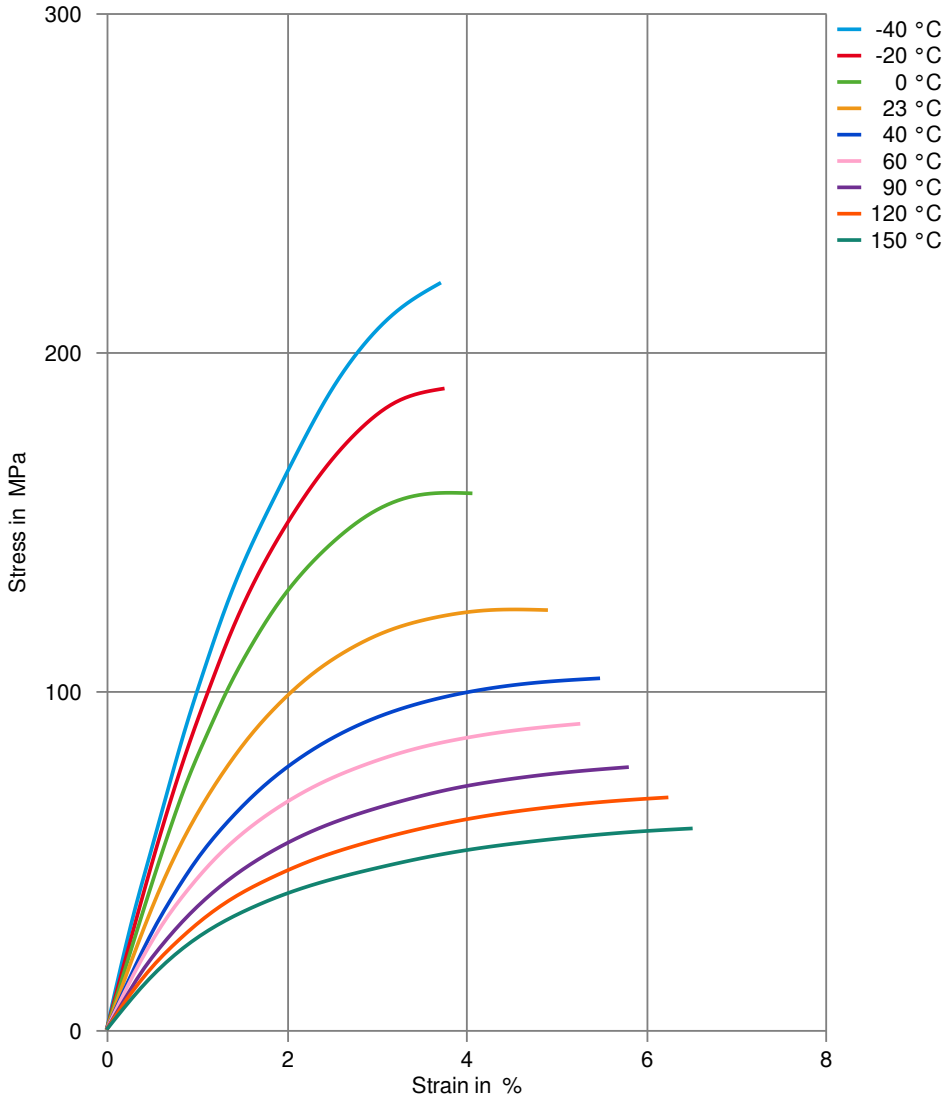
NYLON RESIN

Stress-strain (cond.)



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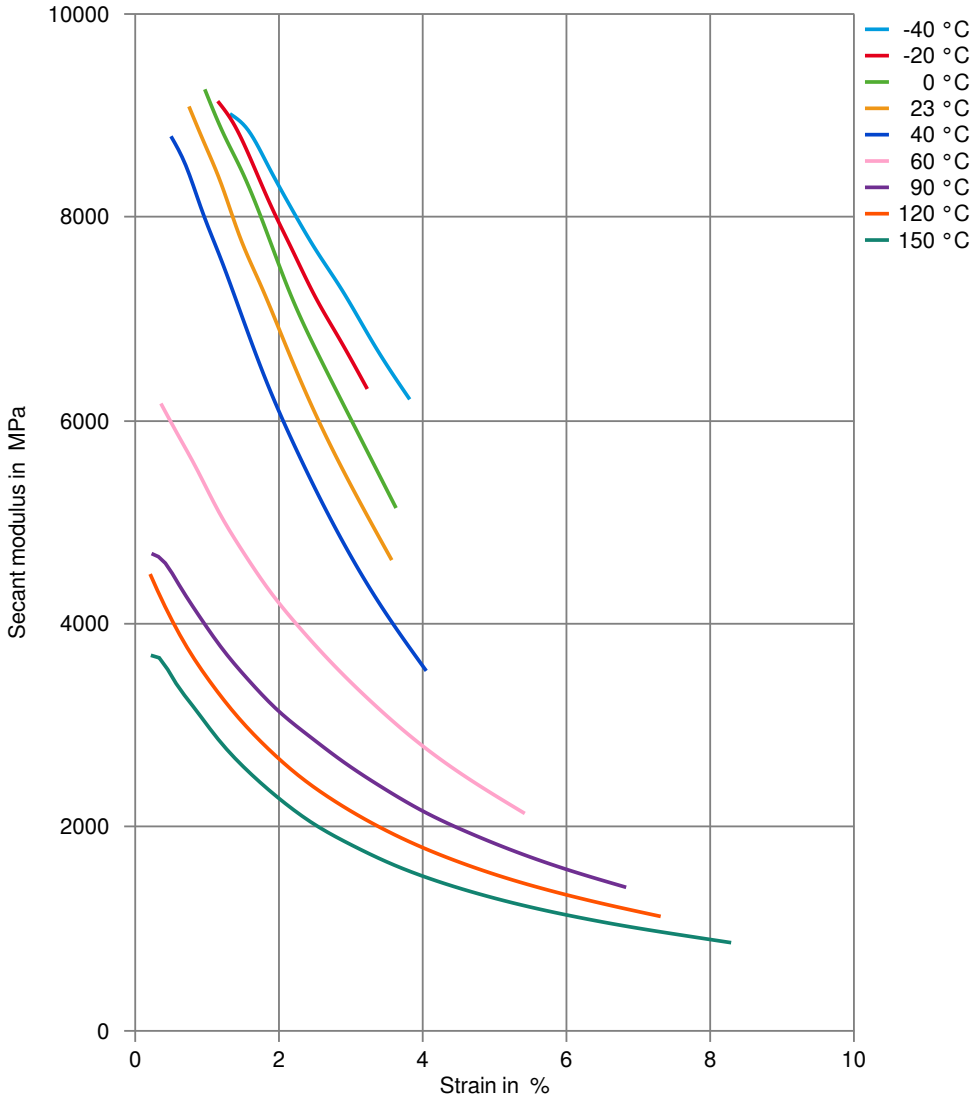
Secant modulus-strain (dry)



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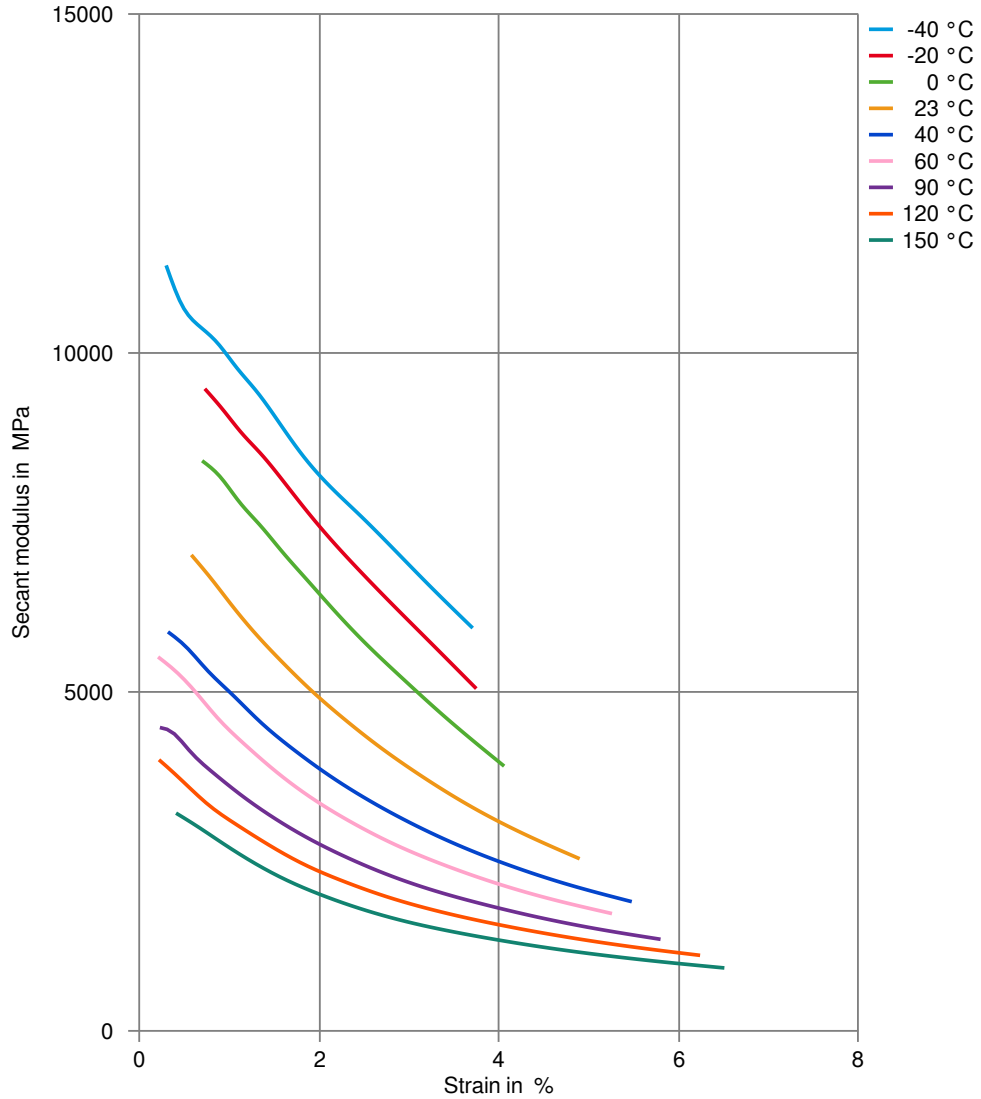
Secant modulus-strain (cond.)



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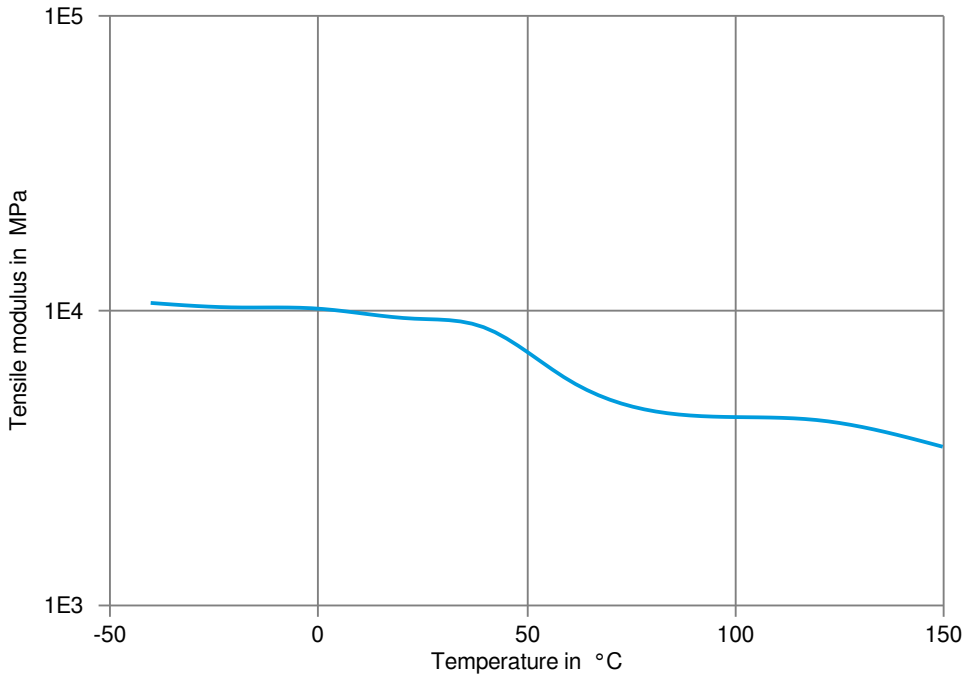
Tensile modulus-temperature (dry)



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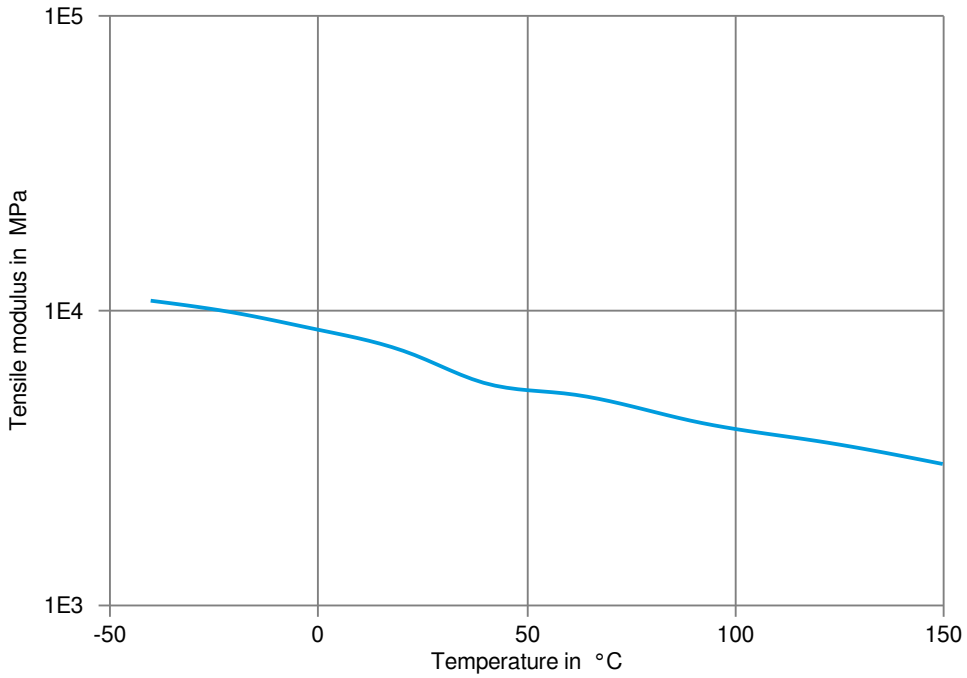
Tensile modulus-temperature (cond.)



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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

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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).

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