

Zytel® 42A 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® 42A is a high viscosity polyamide 66 for injection moulding and extrusion.

Product information

Resin Identification	PA66	ISO 1043
Part Marking Code	>PA66<	ISO 11469
ISO designation	ISO 16396-PA66,,M1G1NR,S32-030	

Rheological properties

	dry/cond.		
Melt mass-flow rate	2.5 / *	g/10min	ISO 1133
Melt mass-flow rate, Temperature	275 / *	°C	
Melt mass-flow rate, Load	2.16 / *	kg	
Viscosity number	300 ^[1] / *	cm ³ /g	ISO 307, 1157, 1628
Moulding shrinkage, parallel	1.4 / -	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.4 / -	%	ISO 294-4, 2577

[1]: Sulfuric acid 96%

Typical mechanical properties

	dry/cond.		
Tensile Modulus	3100 / 1300	MPa	ISO 527-1/-2
Yield stress, 50mm/min	83 / 55	MPa	ISO 527-1/-2
Yield strain, 50mm/min	4.4 / 27	%	ISO 527-1/-2
Nominal strain at break	>50 / >50	%	ISO 527-1/-2
Flexural Modulus	2800 / 1070	MPa	ISO 178
Charpy impact strength, 23°C	N / N	kJ/m ²	ISO 179/1eU
Charpy impact strength, -30°C	N / N	kJ/m ²	ISO 179/1eU
Charpy notched impact strength, 23°C	6 / 20	kJ/m ²	ISO 179/1eA
Charpy notched impact strength, -30°C	6 / 4	kJ/m ²	ISO 179/1eA
Izod notched impact strength, 23°C	6 / 23	kJ/m ²	ISO 180/1A
Izod notched impact strength, -30°C	7 / 6	kJ/m ²	ISO 180/1A
Izod impact strength, 23°C	N / N	kJ/m ²	ISO 180/1U
Izod impact strength, -30°C	N / N	kJ/m ²	ISO 180/1U
Poisson's ratio	0.37 / 0.44		
Abrasion resistance	3.5 / *	mm ³	ISO 4649



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Tribological properties

Coefficient of sliding friction, 1h against steel	dry/cond. -/0.65	ASTM 1894
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Thermal properties

Melting temperature, 10°C/min	262 / *	°C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	70 / 40	°C	ISO 11357-1/-3
Temp. of deflection under load, 1.8 MPa	70 / *	°C	ISO 75-1/-2
Temp. of deflection under load, 0.45 MPa	200 / *	°C	ISO 75-1/-2
Vicat softening temperature, 50°C/h, 50N	244 / *	°C	ISO 306
Coeff. of linear therm. expansion, parallel	100 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal	100 / *	E-6/K	ISO 11359-1/-2
Thermal conductivity of melt	0.16	W/(m K)	Internal
Eff. thermal diffusivity	7E-8	m²/s	Internal
Spec. heat capacity of melt	2790	J/(kg K)	Internal
RTI, electrical, 0.75mm	125	°C	UL 746B
RTI, electrical, 1.5mm	125	°C	UL 746B
RTI, electrical, 3mm	125	°C	UL 746B
RTI, electrical, 6mm	125	°C	UL 746B
RTI, impact, 0.75mm	65	°C	UL 746B
RTI, impact, 1.5mm	75	°C	UL 746B
RTI, impact, 3mm	75	°C	UL 746B
RTI, impact, 6mm	75	°C	UL 746B
RTI, strength, 0.75mm	65	°C	UL 746B
RTI, strength, 1.5mm	85 / *	°C	UL 746B
RTI, strength, 3mm	85	°C	UL 746B
RTI, strength, 6mm	85	°C	UL 746B

Flammability

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	V-2 / *	class	UL 94
Thickness tested	3 / *	mm	UL 94
UL recognition	yes / *		UL 94
Oxygen index	28 / *	%	ISO 4589-1/-2
Glow Wire Flammability Index, 0.4mm	960 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 0.75mm	960 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 1mm	960 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 1.5mm	960 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 2mm	960 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 3mm	960 / -	°C	IEC 60695-2-12
Glow Wire Ignition Temperature, 0.75mm	930 / -	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 0.4mm	930 / -	°C	IEC 60695-2-12
Glow Wire Ignition Temperature, 2mm	800 / -	°C	IEC 60695-2-13



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Glow Wire Ignition Temperature, 3mm	725/-	°C	IEC 60695-2-13
Glow Wire Temperature, No Flame, 1mm	750/-	°C	IEC 60335-1
Glow Wire Temperature, No Flame, 2mm	725/-	°C	IEC 60335-1
FMVSS Class	SE		ISO 3795 (FMVSS 302)

Electrical properties

	dry/cond.		
Relative permittivity, 100Hz	4.3/10.3		IEC 62631-2-1
Relative permittivity, 1MHz	3.6/4.2		IEC 62631-2-1
Dissipation factor, 100Hz	150/2000	E-4	IEC 62631-2-1
Dissipation factor, 1MHz	240/750	E-4	IEC 62631-2-1
Volume resistivity	1E13/1E11	Ohm.m	IEC 62631-3-1
Electric strength	30.5/-	kV/mm	IEC 60243-1

Other properties

	dry/cond.		
Humidity absorption, 2mm	2.6/*	%	Sim. to ISO 62
Water absorption, 2mm	8.5/*	%	Sim. to ISO 62
Density	1140/-	kg/m³	ISO 1183
Density of melt	1010	kg/m³	Internal

Injection

Drying Recommended	yes		
Drying Temperature	80	°C	
Drying Time, Dehumidified Dryer	2 - 4	h	
Processing Moisture Content	≤0.05	%	
Melt Temperature Optimum	290	°C	Internal
Min. melt temperature	280	°C	
Max. melt temperature	300	°C	
Screw tangential speed	≤0.3	m/s	
Mold Temperature Optimum	70	°C	
Min. mould temperature	50	°C	
Max. mould temperature	90	°C	
Hold pressure range	50 - 100	MPa	
Hold pressure time	4	s/mm	
Ejection temperature	190	°C	Internal

Extrusion

Drying Temperature	80	°C
Drying Time, Dehumidified Dryer	4 - 6	h
Processing Moisture Content	≤0.06	%
Melt Temperature Range	275 - 290	°C



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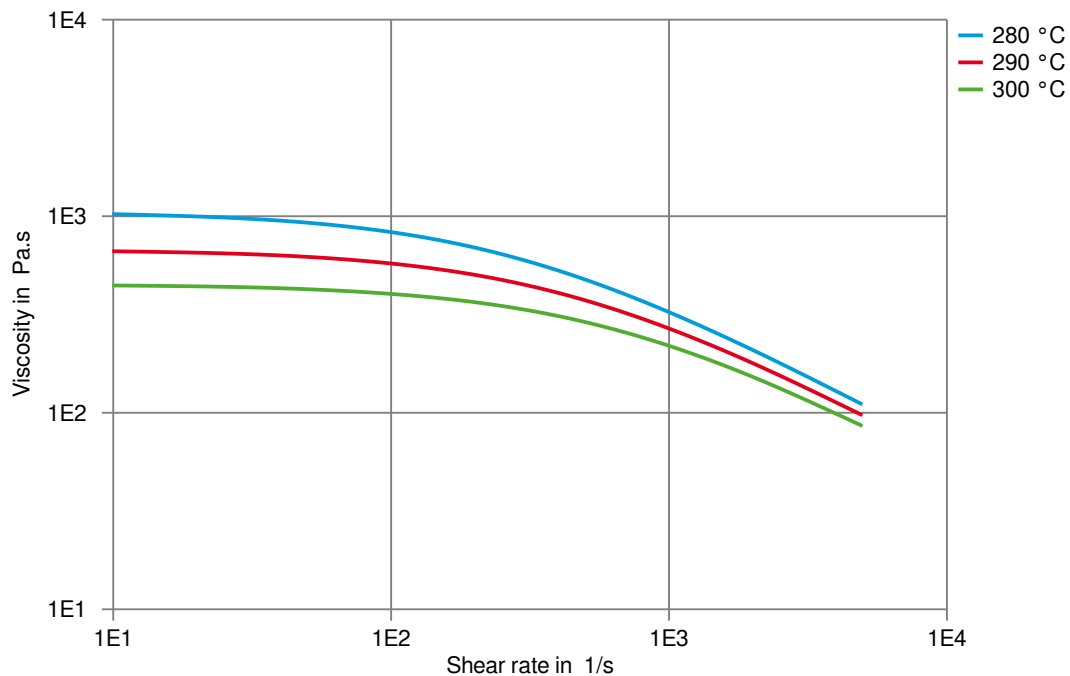
NYLON RESIN

Characteristics

Additives

Release agent

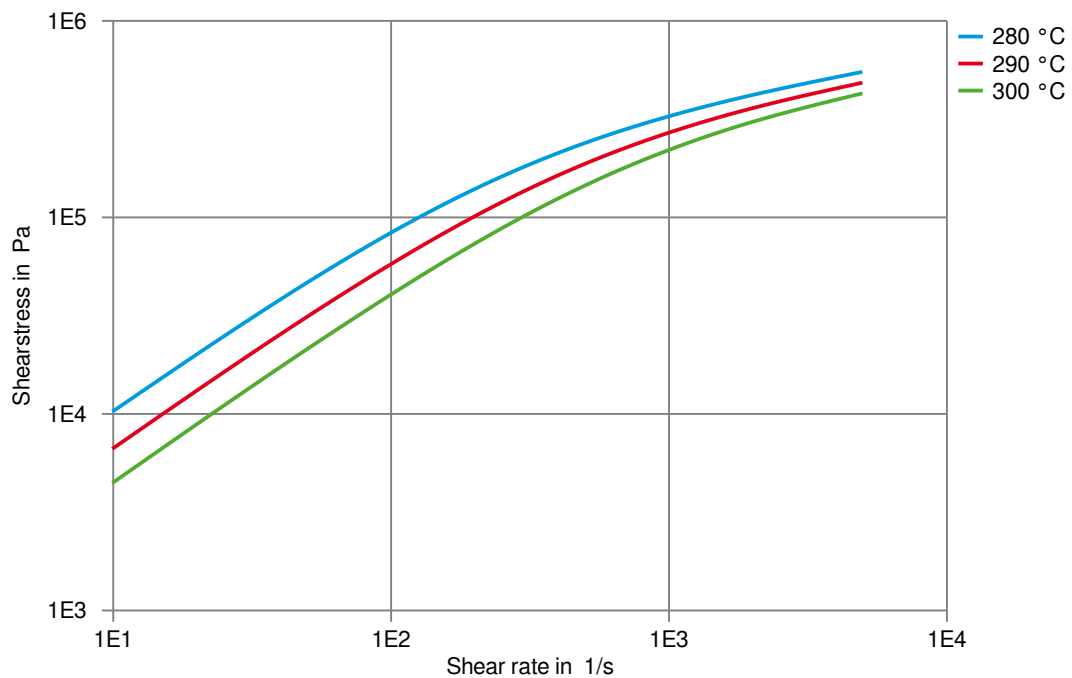
Viscosity-shear rate



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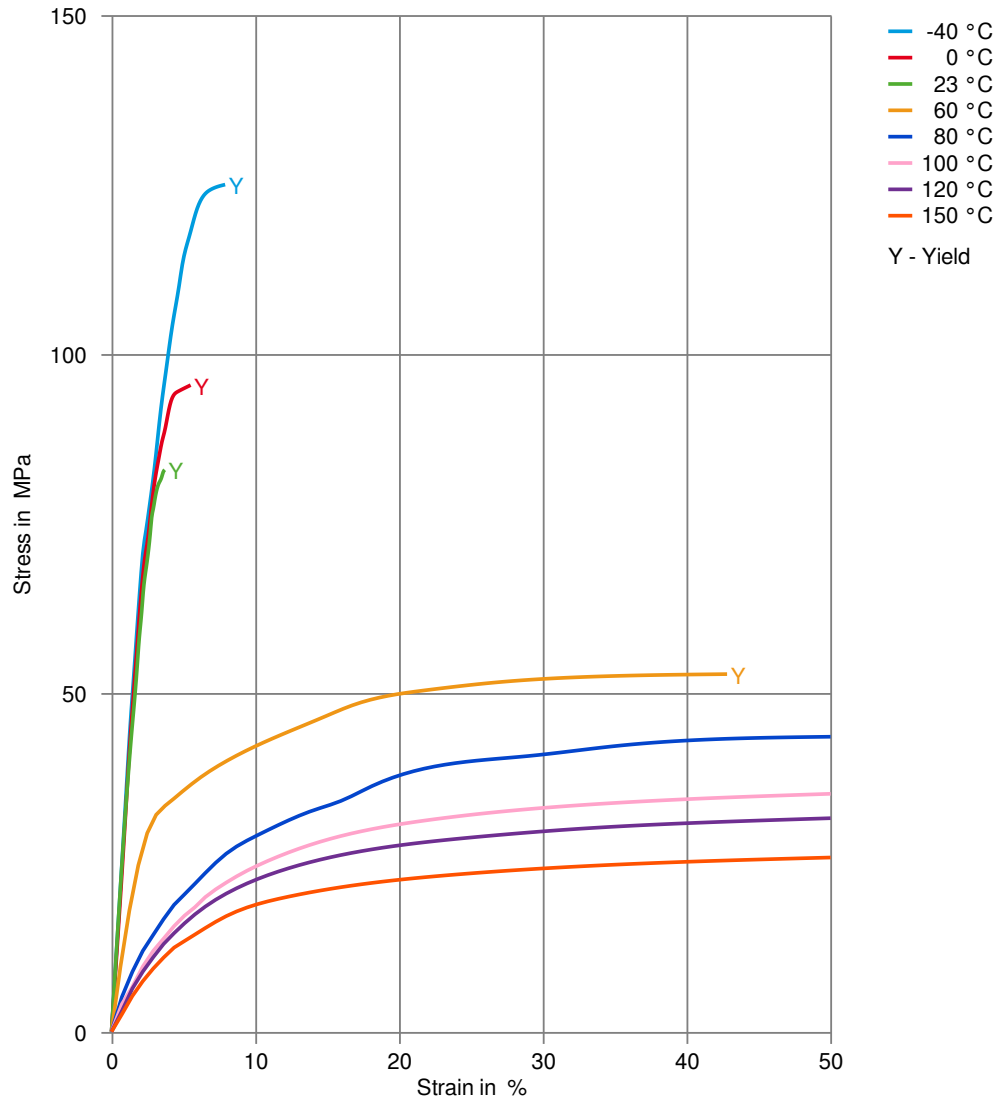
Shearstress-shear rate



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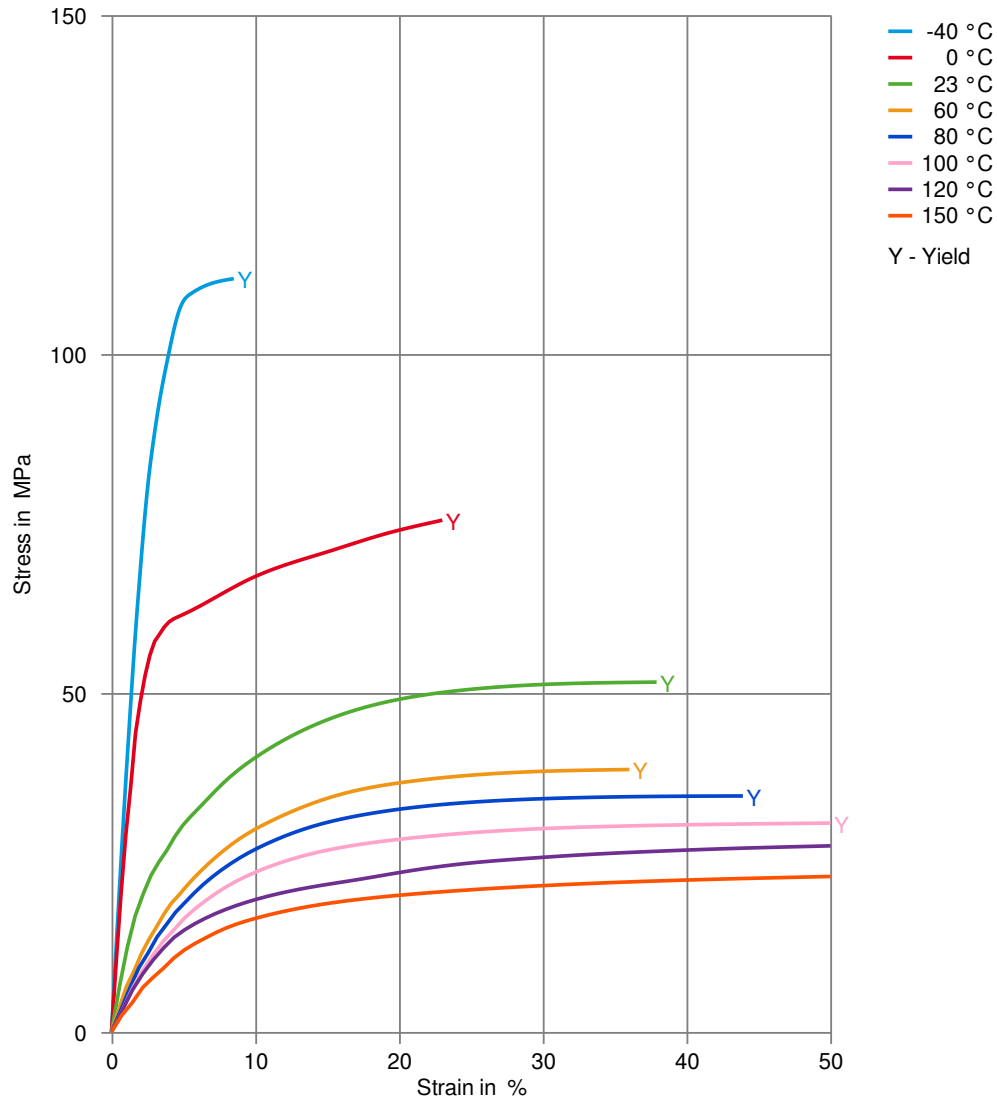
Stress-strain (dry)



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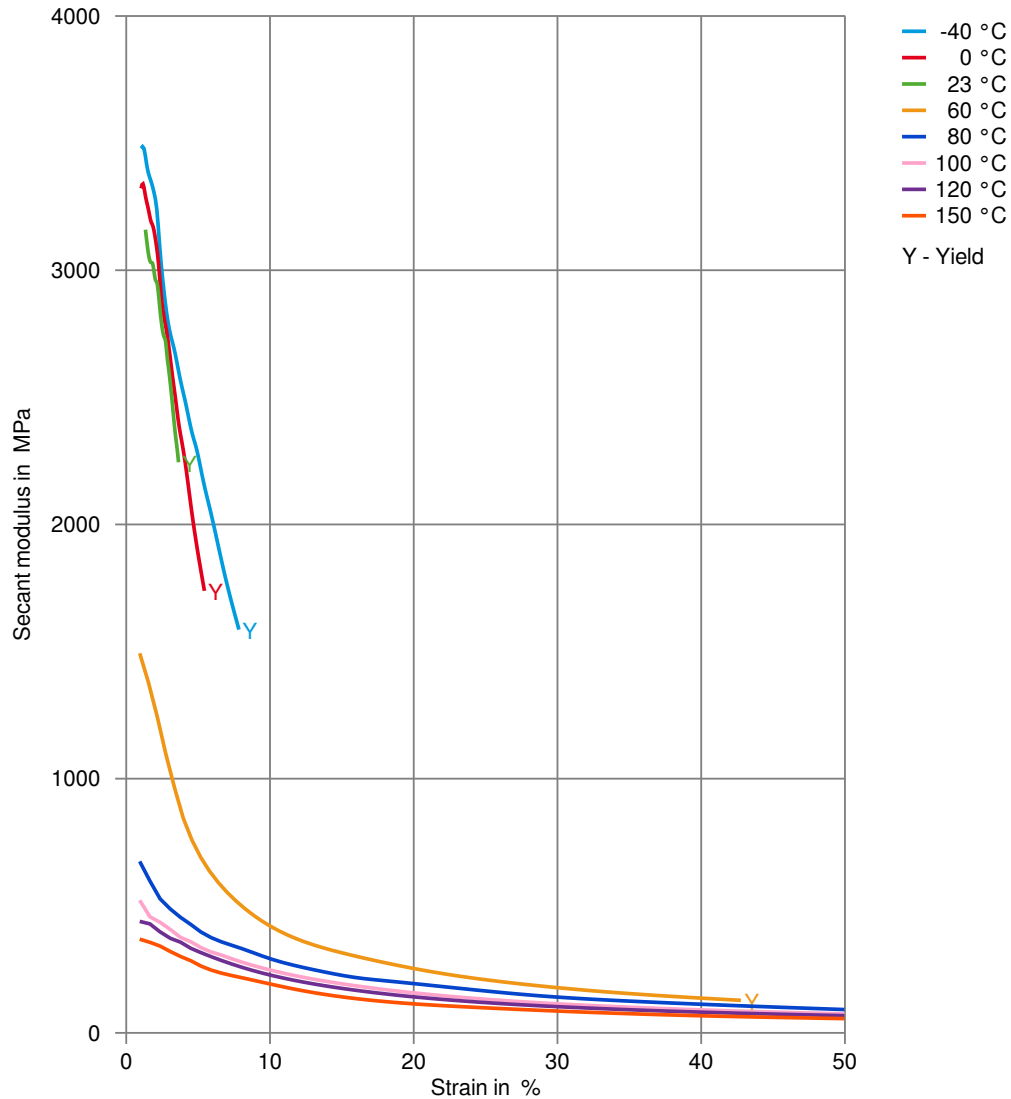
Stress-strain (cond.)



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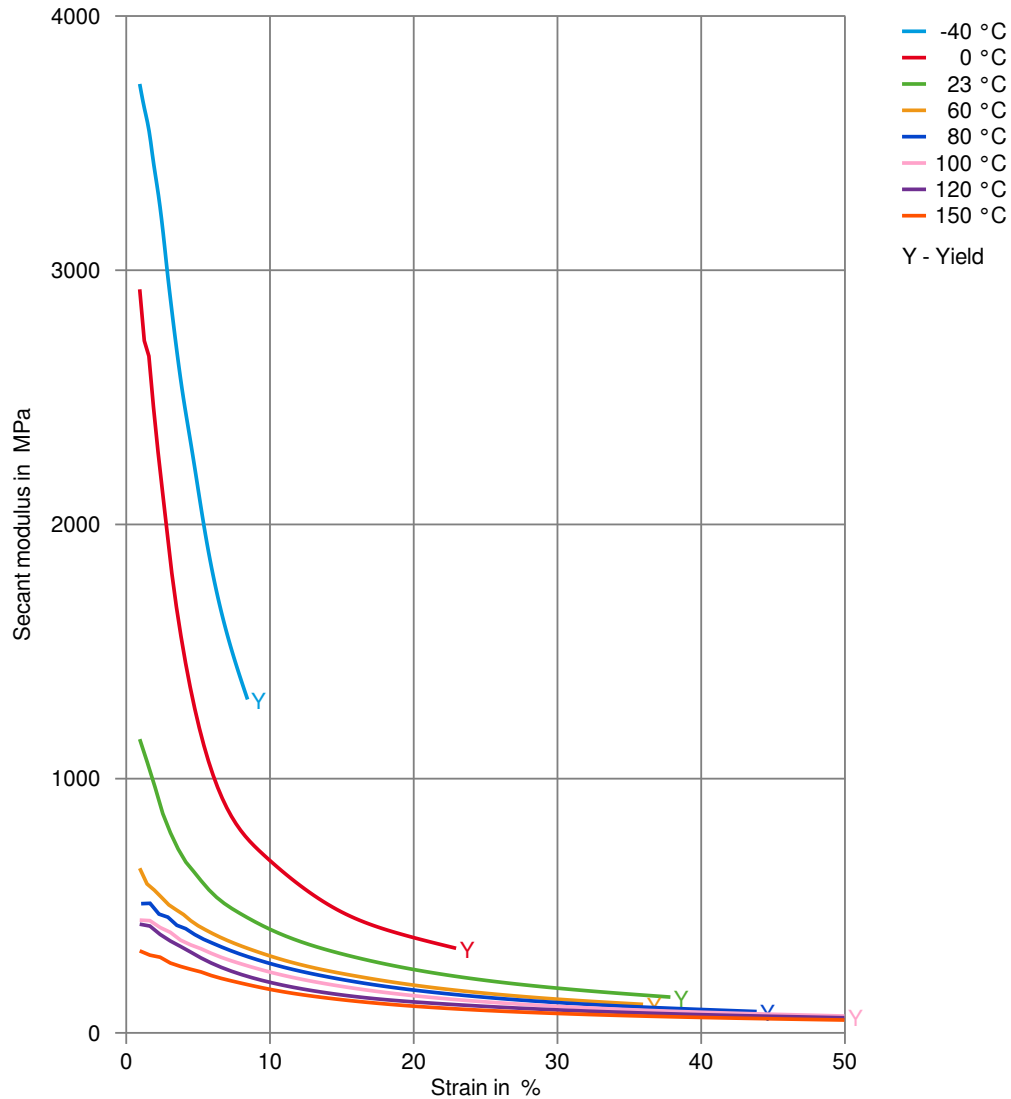
Secant modulus-strain (dry)



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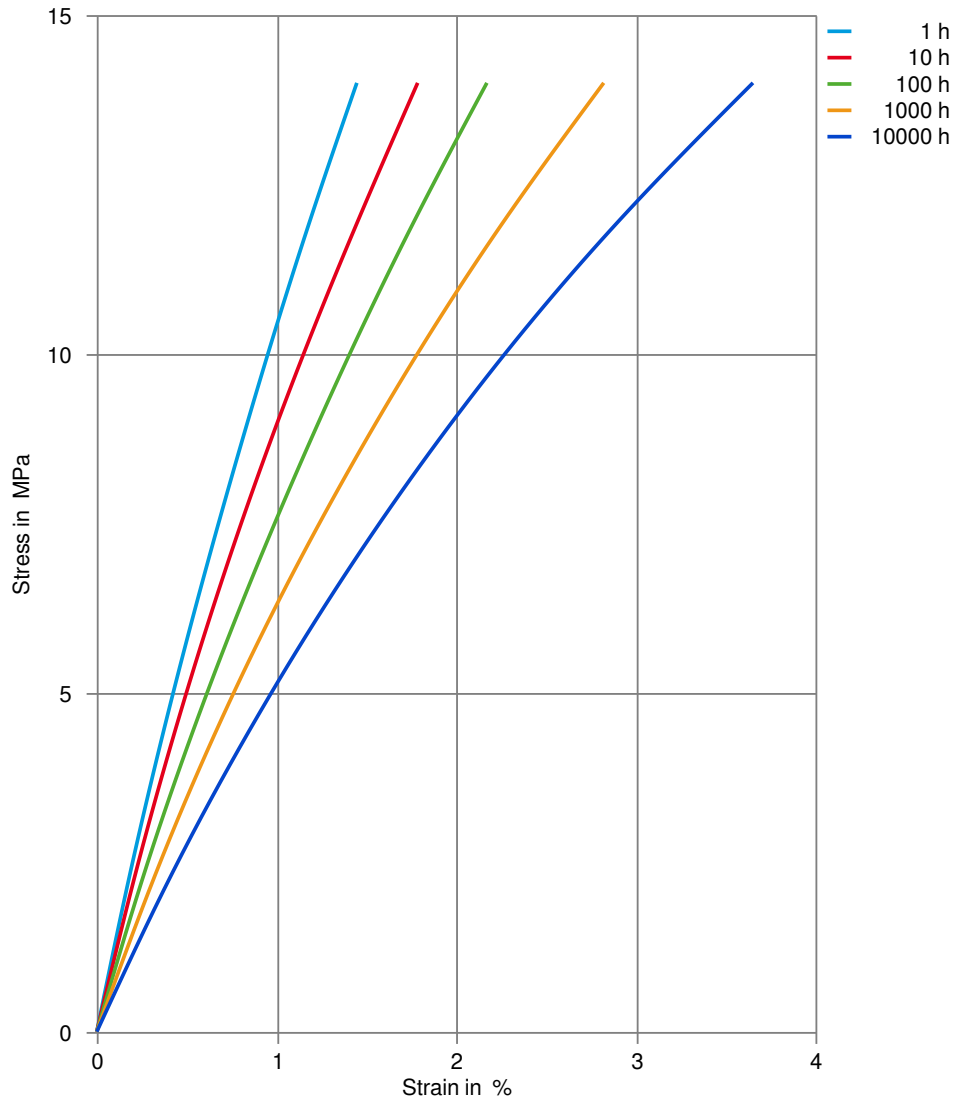
Secant modulus-strain (cond.)



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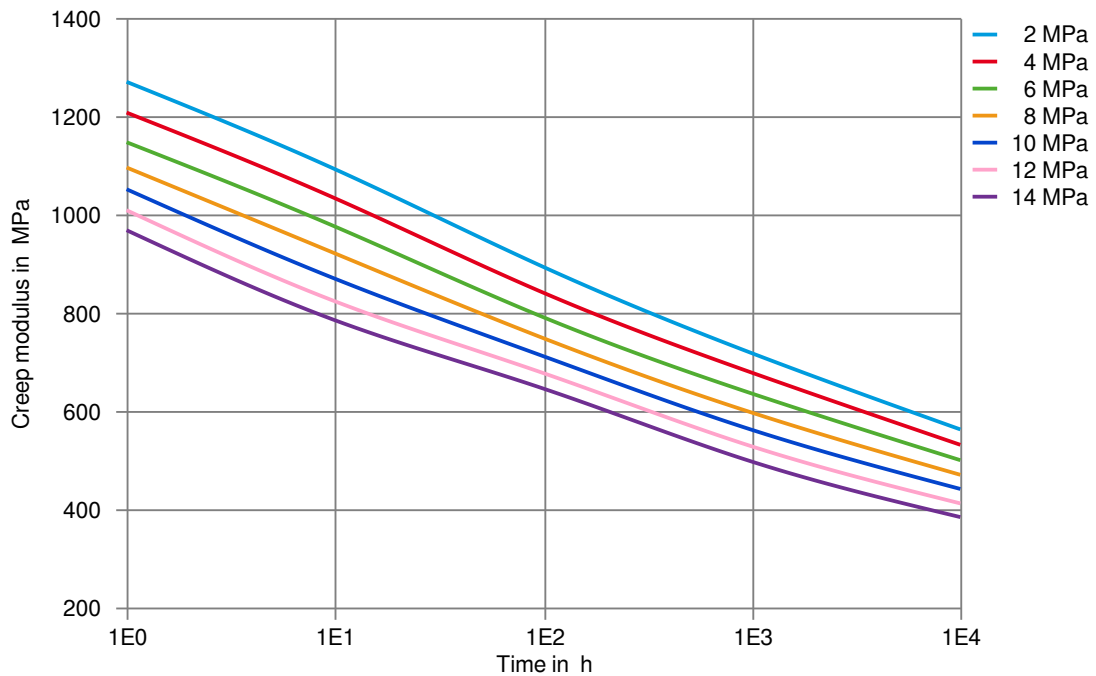
Stress-strain (isochronous) 23°C (cond.)



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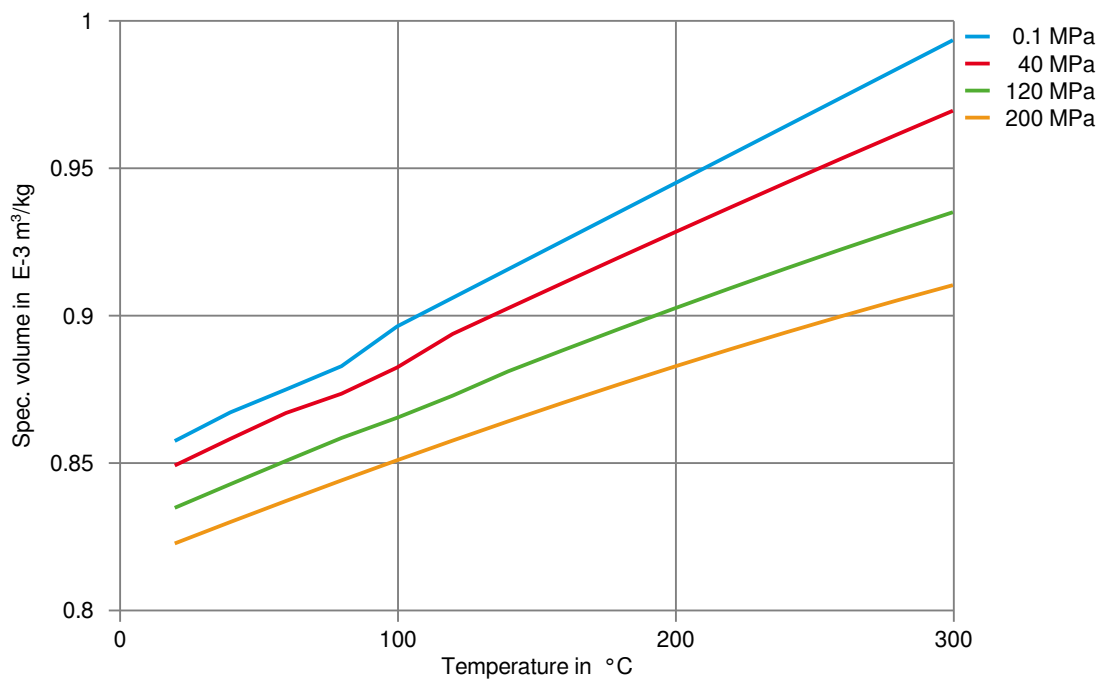
Creep modulus-time 23°C (cond.)



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Specific volume-temperature (pvT)



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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

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).

