Celanese
The chemistry inside innovation™

Zytel® ST7301 NC010

NYLON RESIN

ISO 1043: PA6-HI

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® ST7301 NC010 is a Super Tough, heat stabilised, lubricated polyamide 6 resin for injection moulding and extrusion. It offers outstanding impact resistance over a wide temperature and humidity range and high productivity.

Product information

Resin Identification	PA6-HI	ISO 1043
Part Marking Code	>PA6-HI<	ISO 11469
ISO designation	ISO 16396-PA6-I,,M1G1HNR,S14-020	

Rheological properties

	dry/cond.		
Viscosity number	160[1]/*	cm³/g	ISO 307, 1157, 1628
Moulding shrinkage, parallel	1.0 / -	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.0 / -	%	ISO 294-4, 2577
Postmoulding shrinkage, normal, 48h at 80 °C	0.1 / *	%	ISO 294-4
Postmoulding shrinkage, parallel, 48h at 80 °C	0.1 / *	%	ISO 294-4

[1]: Sulfuric acid 96%

Typical mechanical properties

	dry/cond.		
Tensile Modulus	1800 / 550	MPa	ISO 527-1/-2
Yield stress, 50mm/min	48 / 29	MPa	ISO 527-1/-2
Yield strain, 50mm/min	4 / 30	%	ISO 527-1/-2
Nominal strain at break	>50 / >50	%	ISO 527-1/-2
Flexural Modulus	1700 / 550	MPa	ISO 178
Flexural Stress at 3.5%	53 / 32	MPa	ISO 178
Tensile creep modulus, 1000h	* / 320	MPa	ISO 899-1
Charpy impact strength, 23 °C	N / N	kJ/m²	ISO 179/1eU

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Charpy impact strength, -30 °C	N / N	kJ/m²	ISO 179/1eU
Charpy notched impact strength, 23 °C	80 / 120	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -30 °C	17 / 18	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -40 °C	18 / 17	kJ/m²	ISO 179/1eA
Izod notched impact strength, 23 °C	60 / 95	kJ/m²	ISO 180/1A
Izod notched impact strength, -30 °C	14 / 15	kJ/m²	ISO 180/1A
Izod notched impact strength, -40 °C	15 / 13	kJ/m²	ISO 180/1A
Ball indentation hardness, H 358/30	95 / -[DS]	MPa	ISO 2039-1
Poisson's ratio	0.41 / 0.47		

[DS]: Derived from similar grade

Thermal properties

	dry/cond.		
Melting temperature, 10 °C/min	221 / *	°C	ISO 11357-1/-3
Glass transition temperature, 10 °C/min	60 / 15	°C	ISO 11357-1/-3
Temp. of deflection under load, 1.8 MPa	51 / *	°C	ISO 75-1/-2
Temp. of deflection under load, 0.45 MPa	95 / *	°C	ISO 75-1/-2
Thermal conductivity of melt	0.15	W/(m K)	Internal
Spec. heat capacity of melt	2600	J/(kg K)	Internal

Flammability

FMVSS Class	B		ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	<80	mm/min	ISO 3795 (FMVSS 302)

Other properties

	dry/cond.		
Humidity absorption, 2mm	2.7 / *	%	Sim. to ISO 62
Density	1060 / -	kg/m³	ISO 1183
Density of melt	960	kg/m³	Internal

Injection

Drying Recommended	yes		
Drying Temperature	80	°C	
Drying Time, Dehumidified Dryer	2 - 4	h	
Processing Moisture Content	≤0.2	%	
Melt Temperature Optimum	270	°C	Internal
Min. melt temperature	260	°C	
Max. melt temperature	280	°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	

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Hold pressure time	4	s/mm

Extrusion

Drying Temperature	80	°C
Drying Time, Dehumidified Dryer	3 - 4	h
Processing Moisture Content	≤0.06	%
Melt Temperature Optimum	240	°C
Melt Temperature Range	235 - 250	°C

Characteristics

Additives	Release agent

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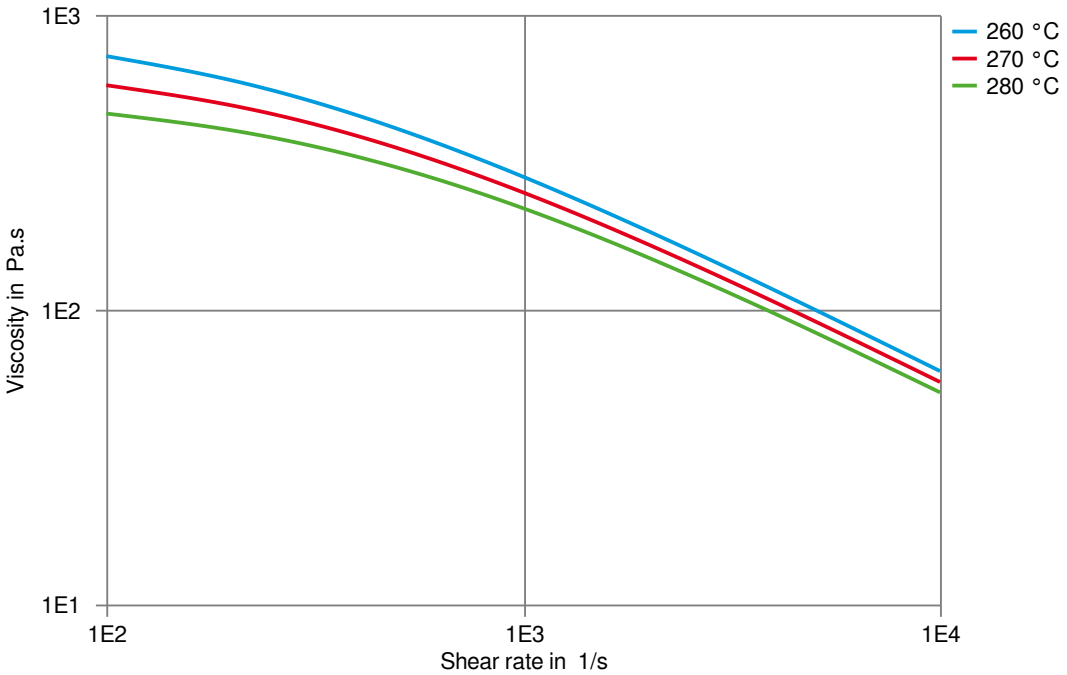
Viscosity-shear rate



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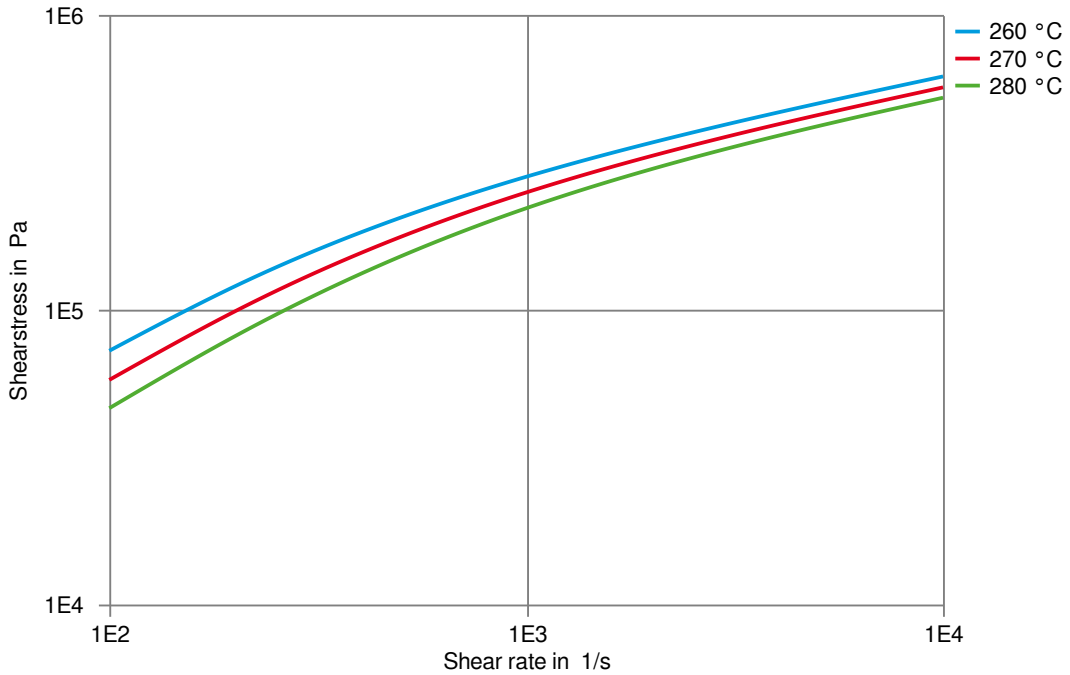
Shearstress-shear rate



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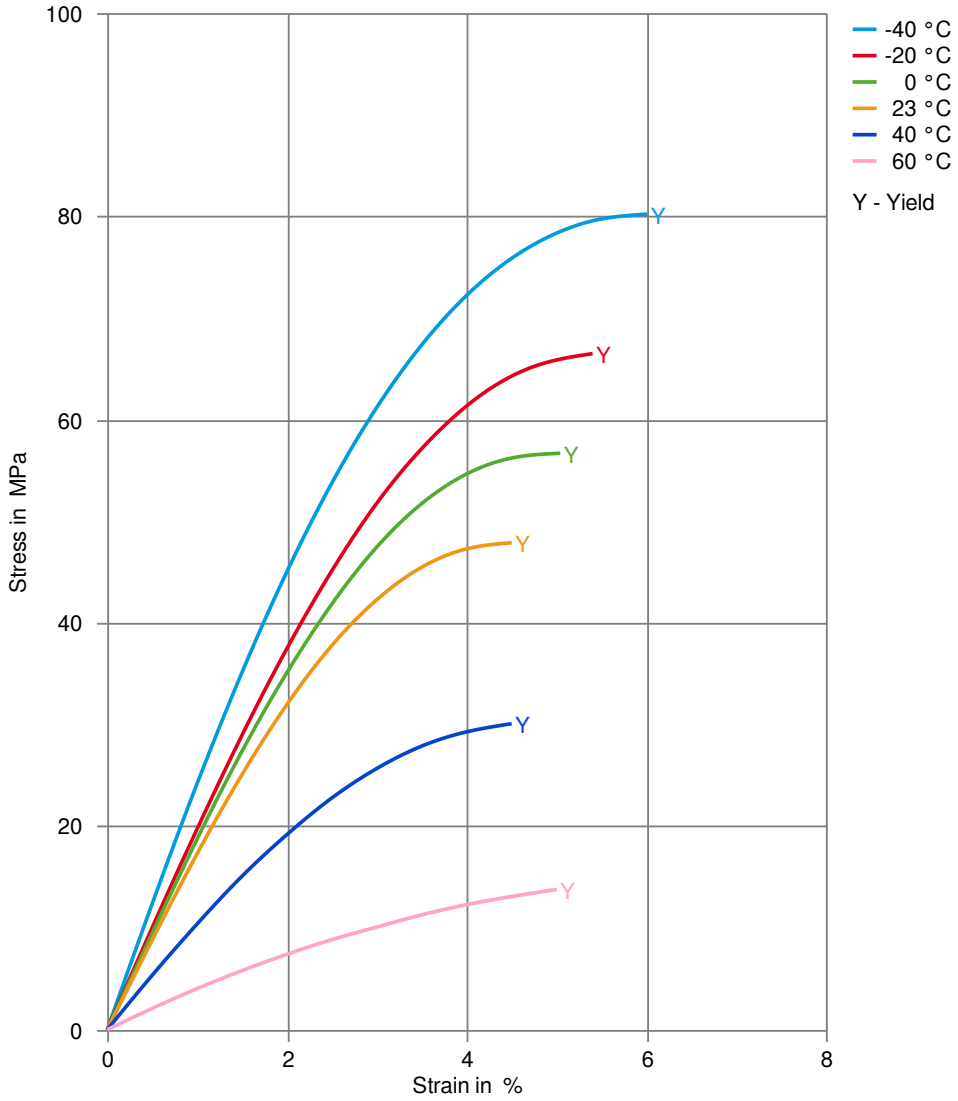
Stress-strain (dry)



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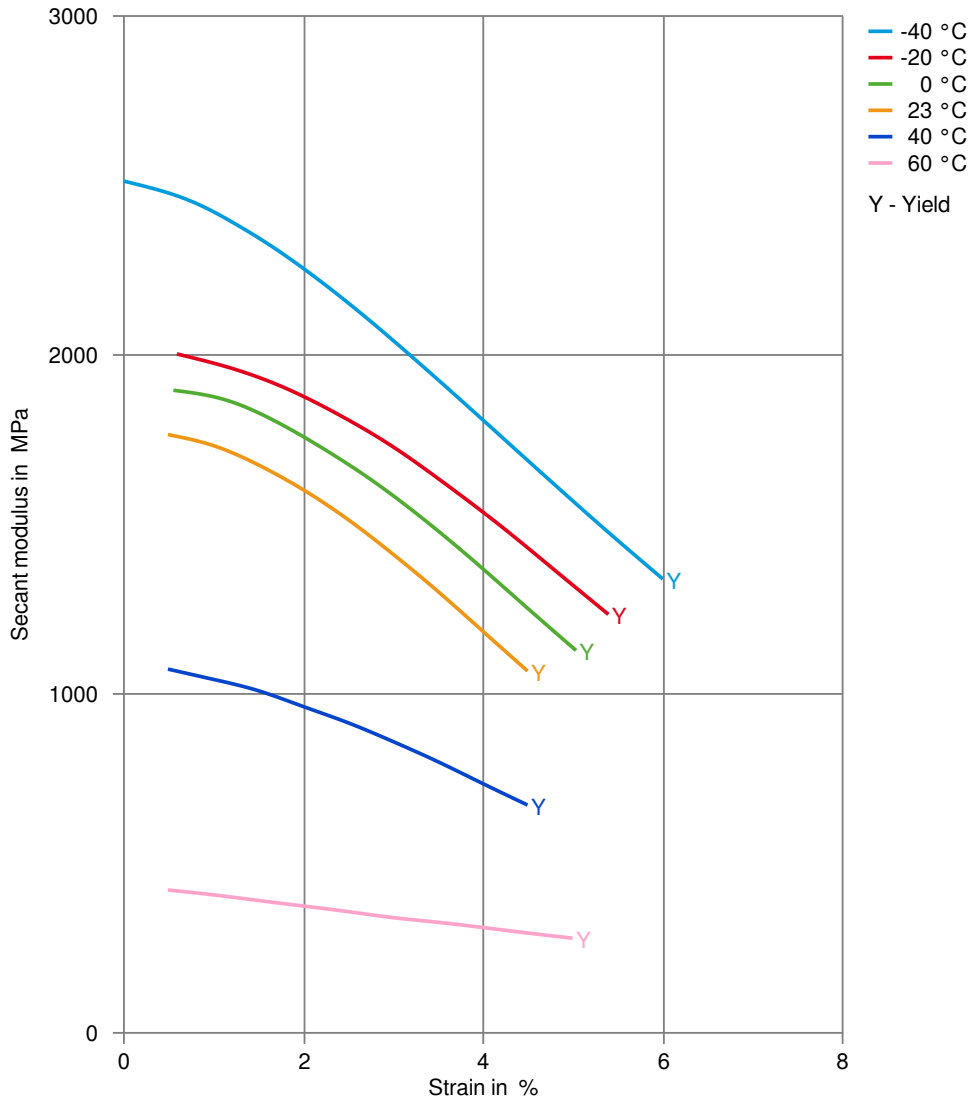
Secant modulus-strain (dry)



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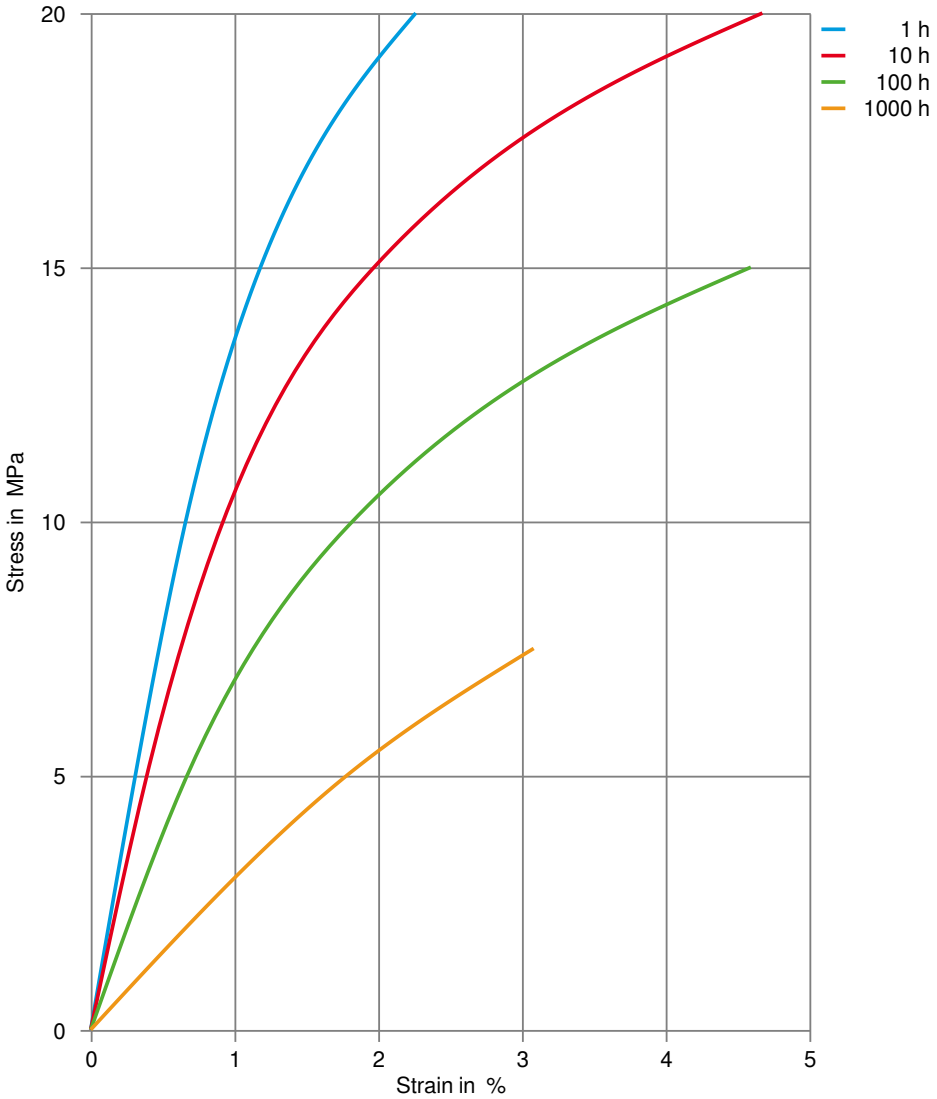
Stress-strain (isochronous) 23 °C (cond.)



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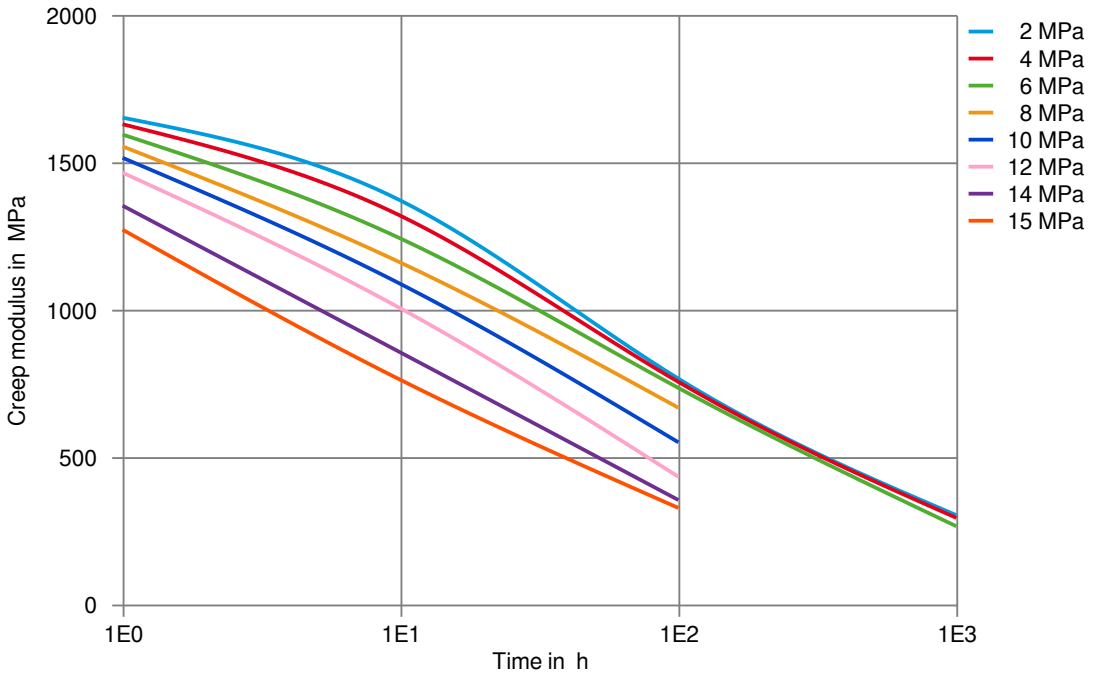
Creep modulus-time 23 °C (cond.)



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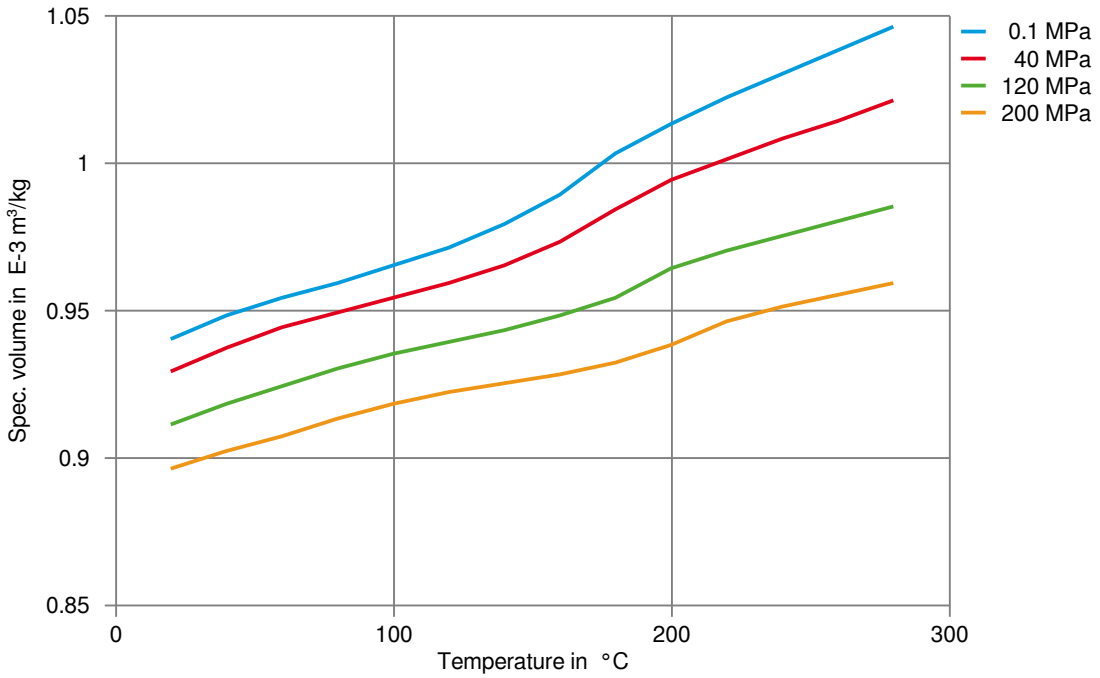
Specific volume-temperature (pvT)



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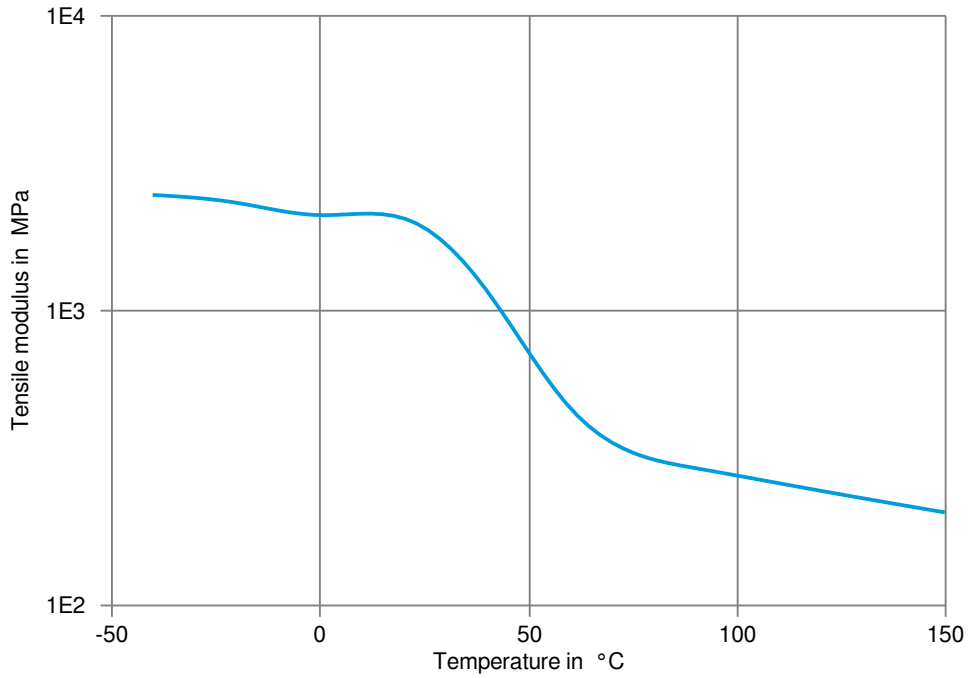
Tensile modulus-temperature (dry)
(measured on Zytel® ST7301 BK356)



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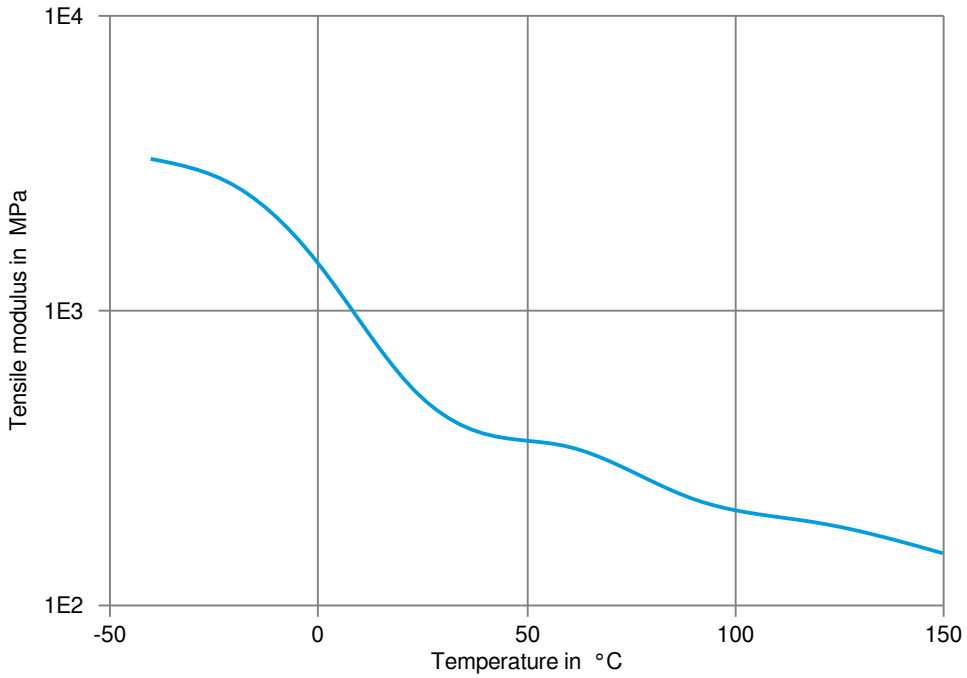
Tensile modulus-temperature (cond.)
(measured on Zytel® ST7301 BK356)



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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).