



# Zytel® 45HSB 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, DuPont recommends, 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® 45HSB NC010 is a high viscosity, heat stabilised polyamide 66 resin for injection moulding and extrusion.

### Product information

Resin Identification	PA66	ISO 1043
Part Marking Code	>PA66<	ISO 11469
ISO designation	ISO 16396-PA66,,M1G1HN,S32-030	

### Rheological properties

	dry/cond.		
Viscosity number	300/* <sup>[1]</sup>	cm <sup>3</sup> /g	ISO 307, 1157, 1628
Moulding shrinkage, parallel	1.4/-	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.3/-	%	ISO 294-4, 2577

[1]: Sulfuric acid 96%

### Typical mechanical properties

	dry/cond.		
Tensile Modulus	3100/1300	MPa	ISO 527-1/-2
Yield stress	83/55	MPa	ISO 527-1/-2
Yield strain	4/25	%	ISO 527-1/-2
Nominal strain at break	>50/>50	%	ISO 527-1/-2
Flexural Modulus	2800/1150	MPa	ISO 178
Flexural Stress at 3.5%	102/30	MPa	ISO 178
Charpy impact strength, 23°C	N/N	kJ/m <sup>2</sup>	ISO 179/1eU
Charpy impact strength, -30°C	N/N	kJ/m <sup>2</sup>	ISO 179/1eU
Charpy notched impact strength, 23°C	6/20	kJ/m <sup>2</sup>	ISO 179/1eA
Charpy notched impact strength, -30°C	4/6	kJ/m <sup>2</sup>	ISO 179/1eA
Izod notched impact strength, 23°C	6/-	kJ/m <sup>2</sup>	ISO 180/1A
Izod notched impact strength, -30°C	5/-	kJ/m <sup>2</sup>	ISO 180/1A
Poisson's ratio	0.37/0.44	-	



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### Thermal properties

	dry/cond.		
Melting temperature, 10°C/min	262/*	°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	160/*	°C	ISO 75-1/-2
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
RTI, electrical, 0.75mm	140	°C	UL 746B
RTI, electrical, 1.5mm	140	°C	UL 746B
RTI, electrical, 3mm	140	°C	UL 746B
RTI, impact, 0.75mm	95	°C	UL 746B
RTI, impact, 1.5mm	110	°C	UL 746B
RTI, impact, 3mm	110	°C	UL 746B
RTI, strength, 0.75mm	115	°C	UL 746B
RTI, strength, 1.5mm	125/*	°C	UL 746B
RTI, strength, 3mm	125	°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	0.71/*	mm	IEC 60695-11-10
UL recognition	yes/*	-	UL 94
FMVSS Class	B	-	ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	<80	mm/min	ISO 3795 (FMVSS 302)

### Electrical properties

	dry/cond.		
Comparative tracking index	600/-		IEC 60112

### Other properties

	dry/cond.		
Density	1140/-	kg/m <sup>3</sup>	ISO 1183

### 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
Min. melt temperature	280 °C
Max. melt temperature	300 °C
Max. screw tangential speed	0.3 m/s
Mold Temperature Optimum	70 °C
Min. mould temperature	50 °C



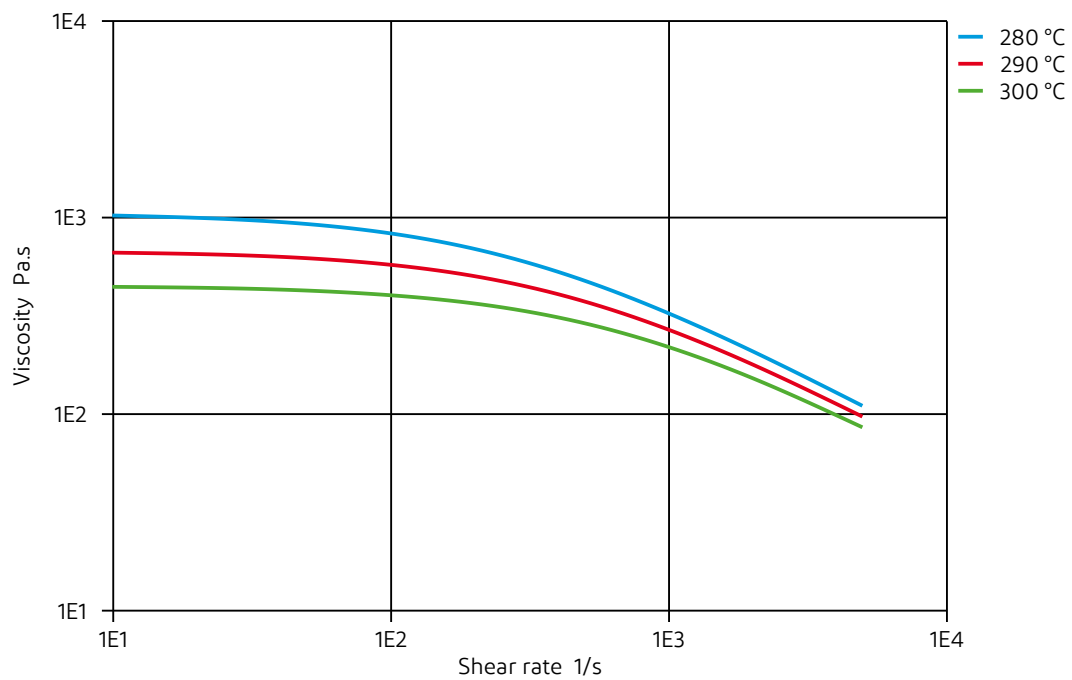
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Max. mould temperature  
Hold pressure range  
Hold pressure time  
Ejection temperature

90 °C  
50 - 100 MPa  
4 s/mm  
190 °C

Viscosity-shear rate  
(measured on Zytel® 42A NC010)

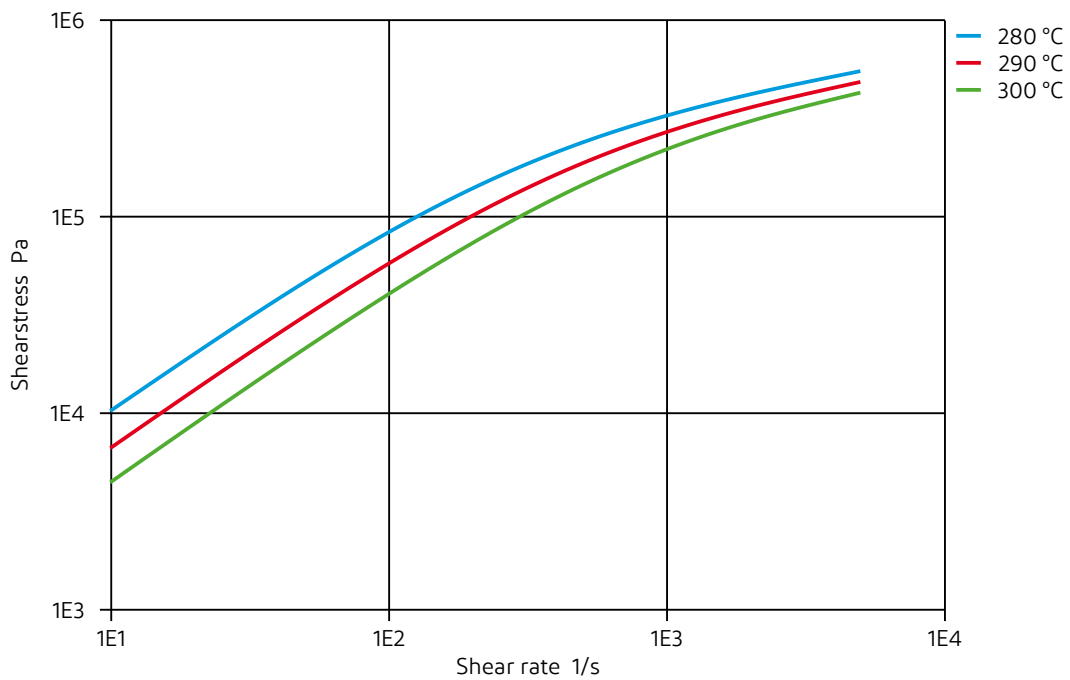




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Shearstress-shear rate  
(measured on Zytel<sup>®</sup> 42A NC010)

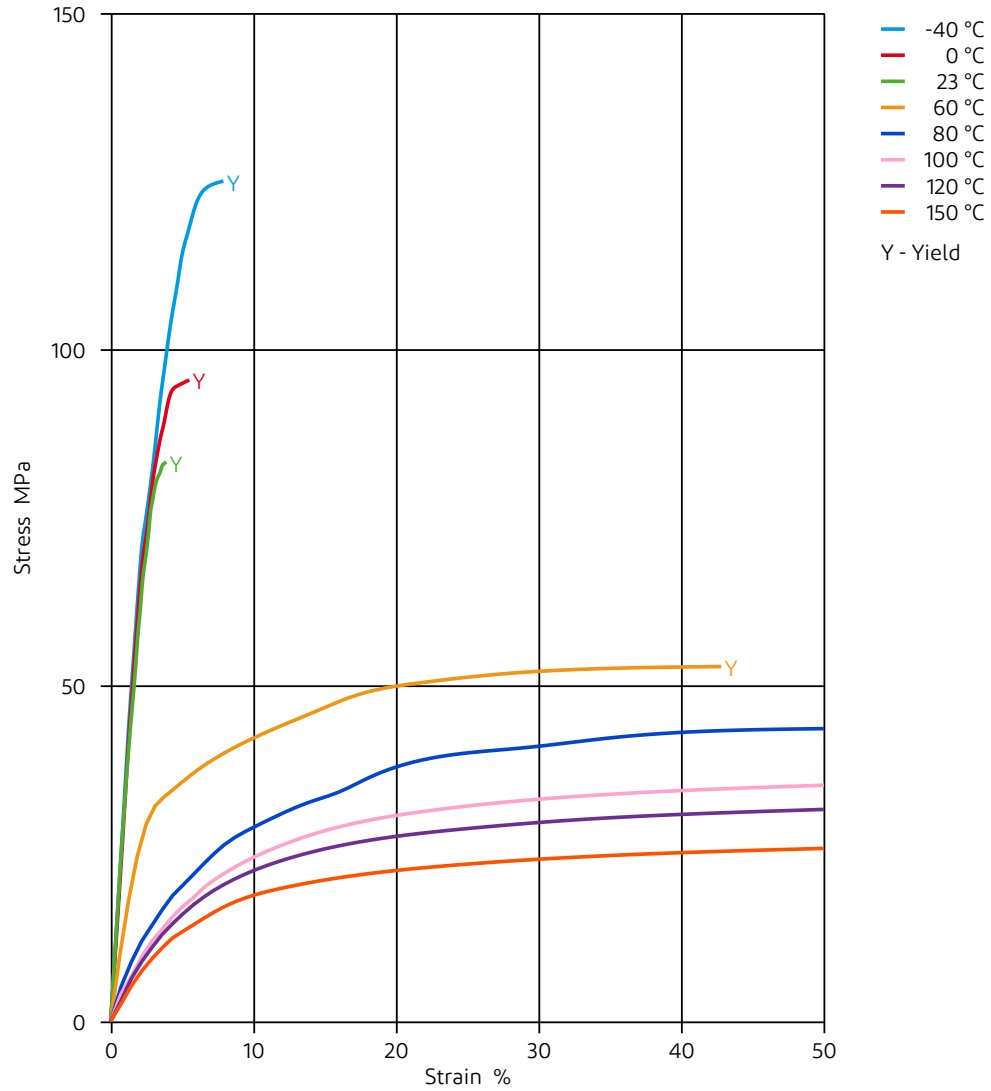




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Stress-strain (dry)  
(measured on Zytel® 42A NC010)

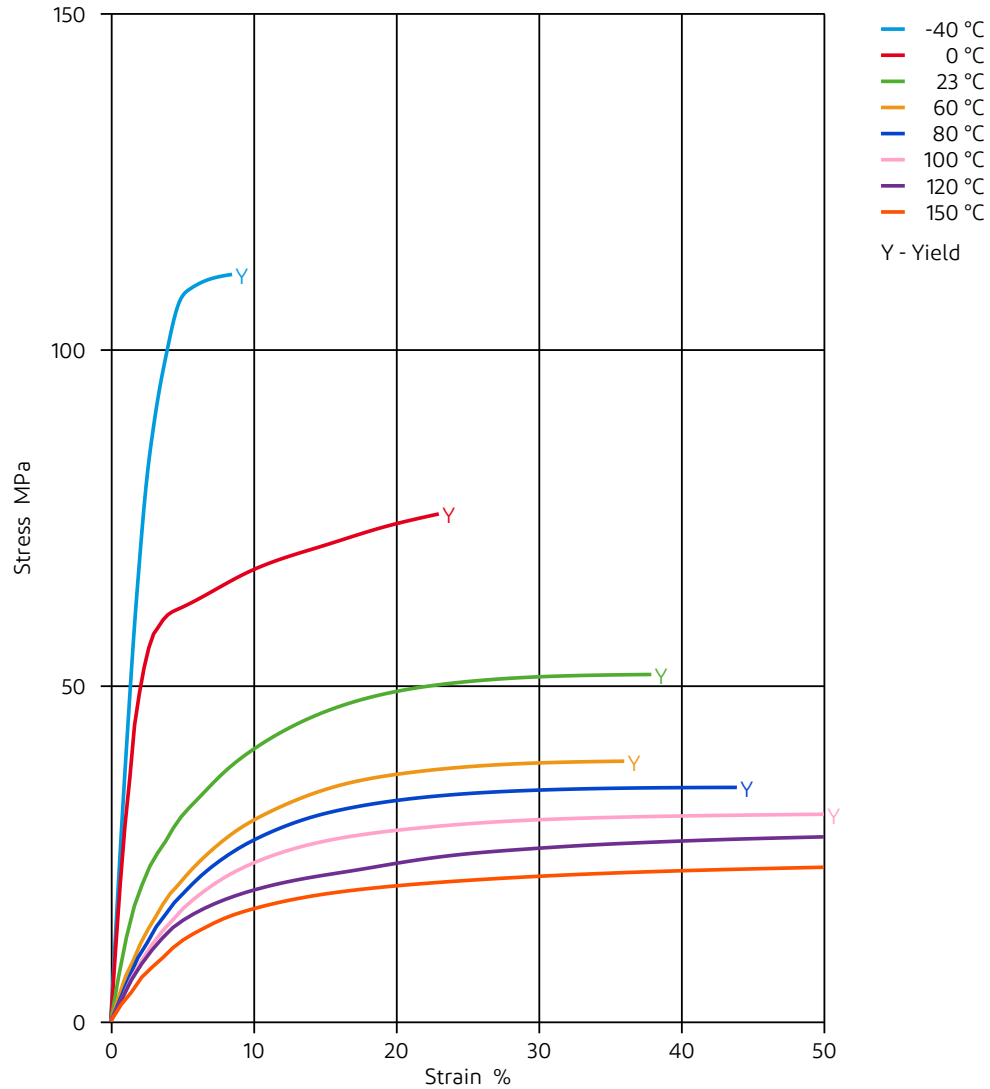




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Stress-strain (cond.)  
(measured on Zytel® 42A NC010)

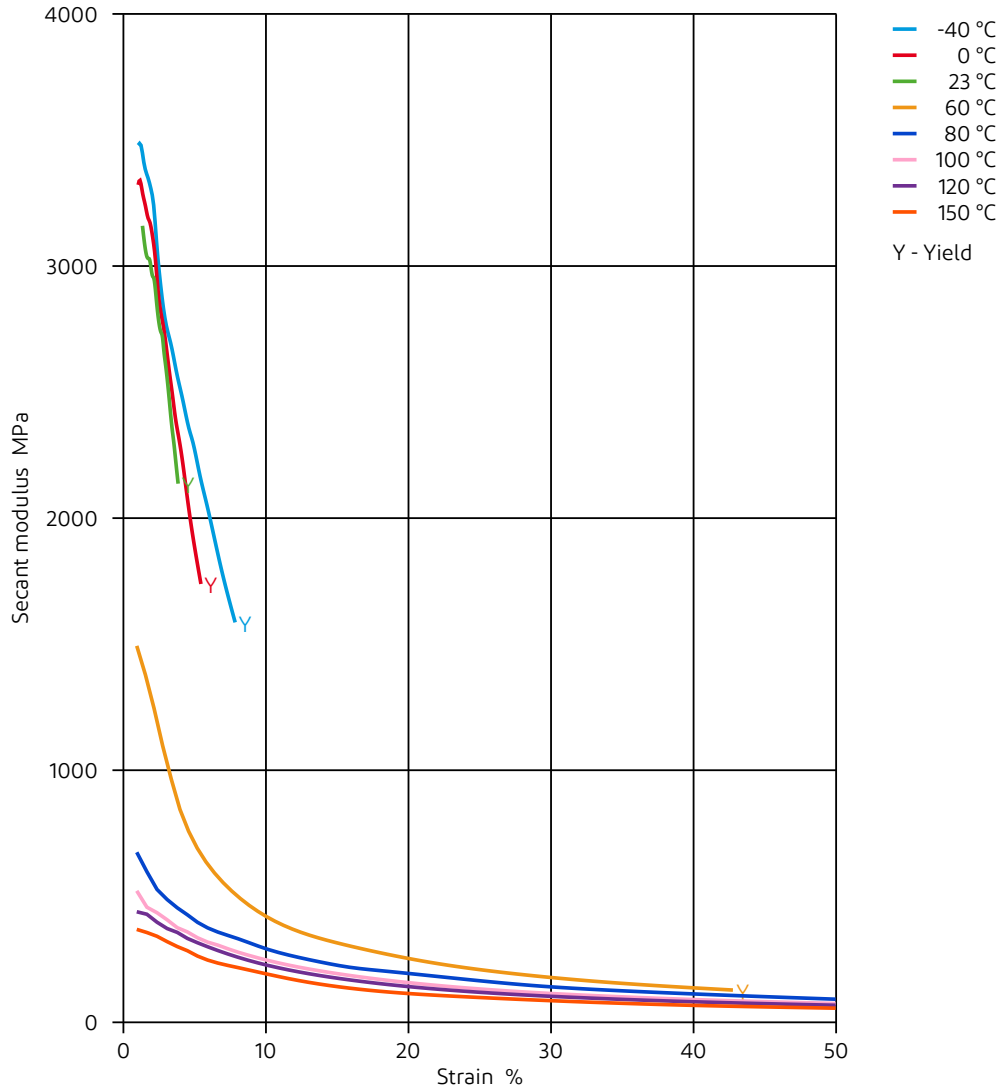




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Secant modulus-strain (dry)  
(measured on Zytel® 42A NC010)

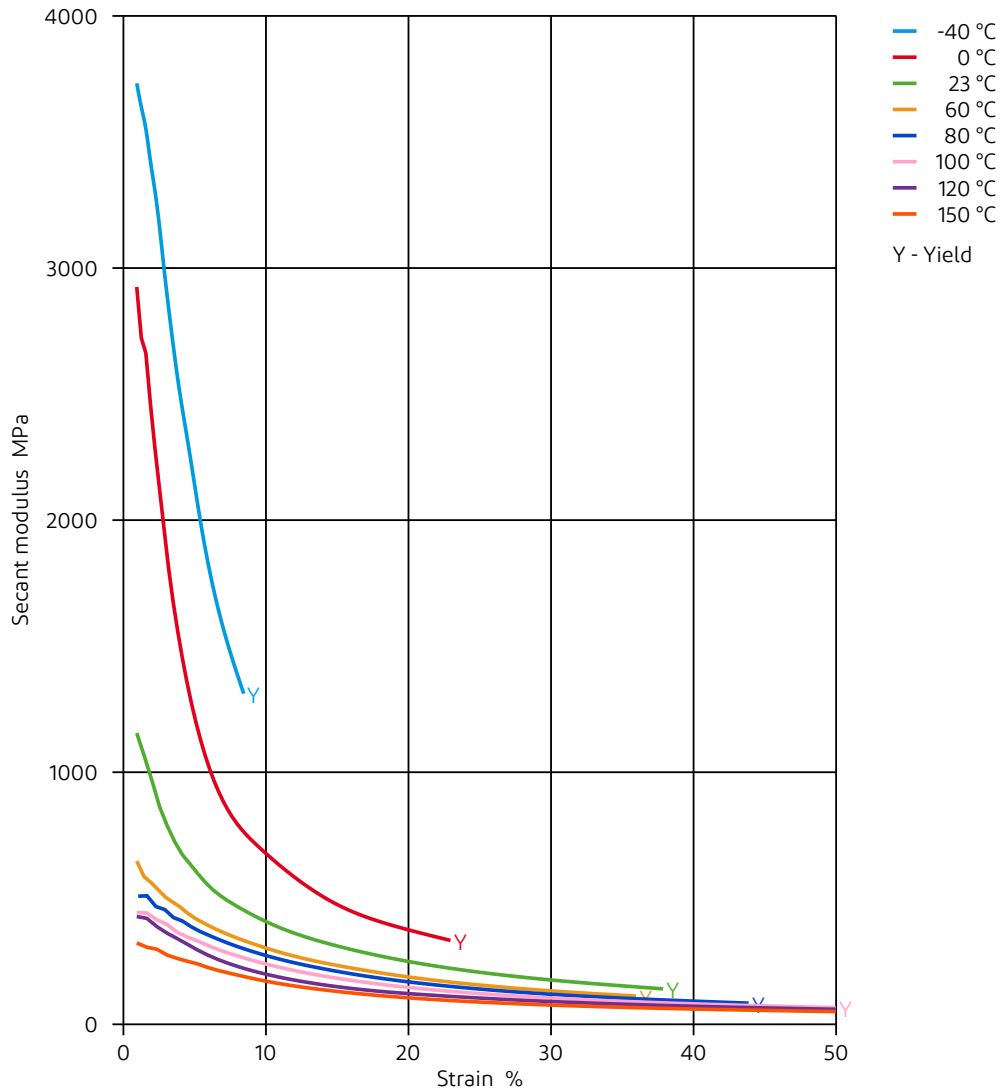




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NYLON RESIN

Secant modulus-strain (cond.)  
(measured on Zytel® 42A NC010)



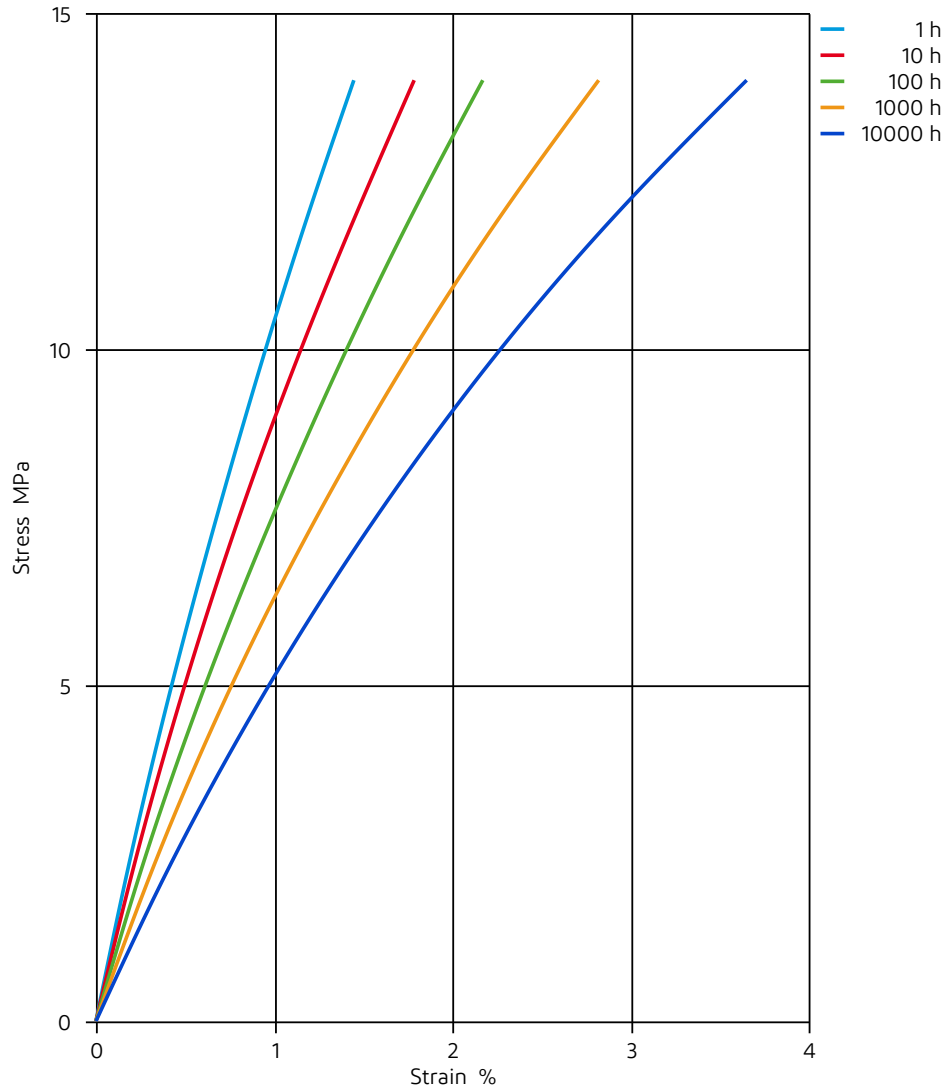




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Stress-strain (isochronous) 23°C (cond.)  
(measured on Zytel® 42A NC010)

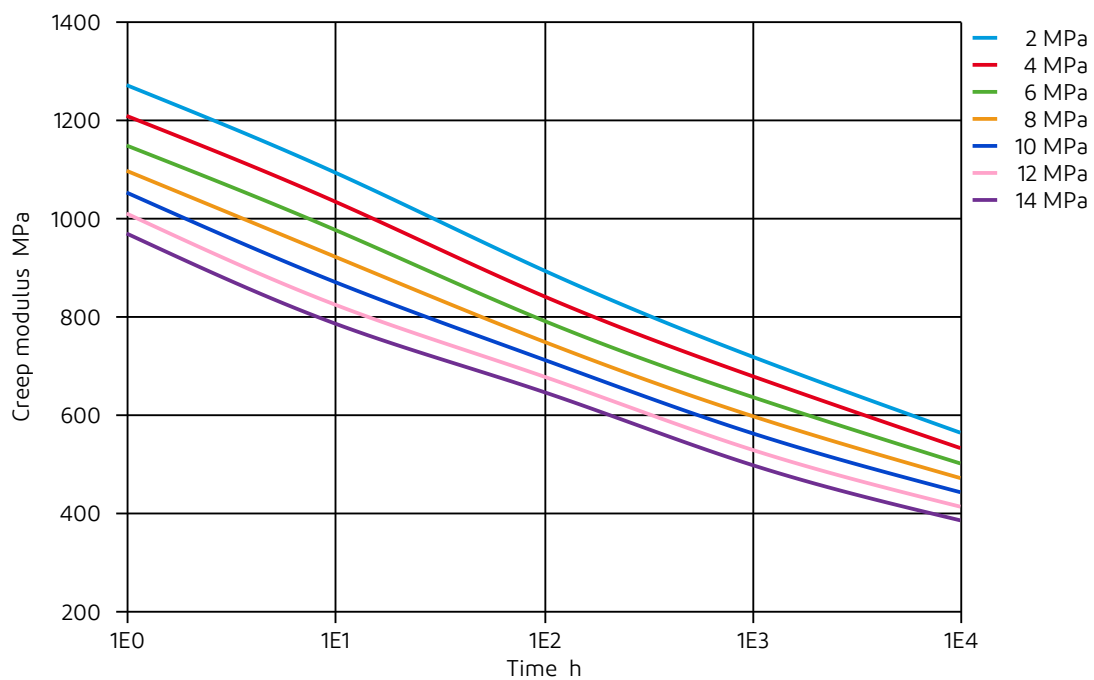




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Creep modulus-time 23°C (cond.)  
(measured on Zytel® 42A NC010)

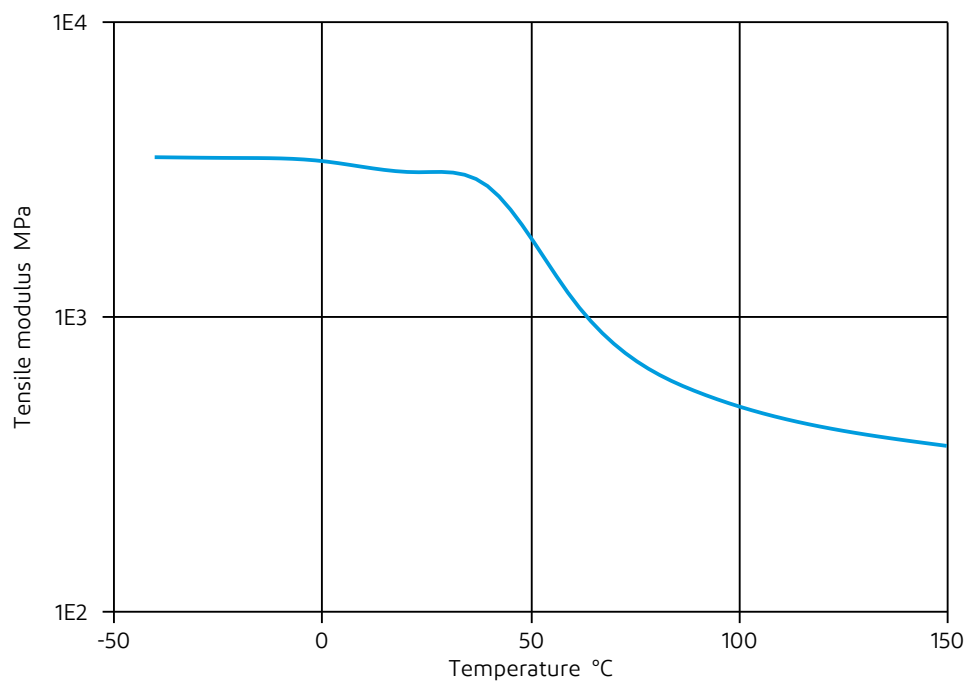




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Tensile modulus-temperature (dry)

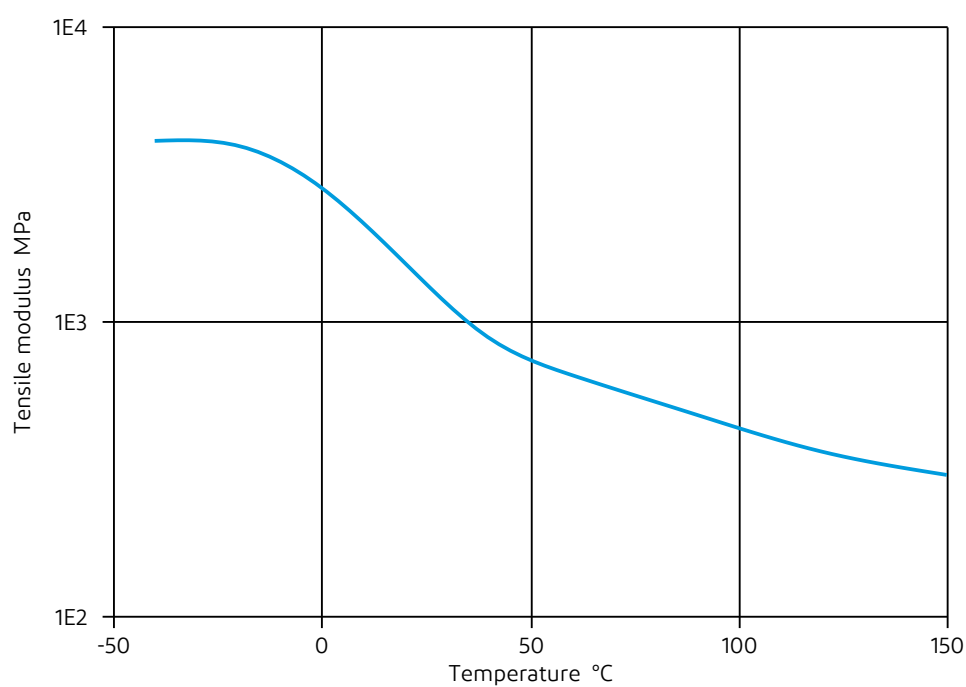




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Tensile modulus-temperature (cond.)



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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

### 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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