

# Zytel® 70G35HSLX BK357

## 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® 70G35HSLX BK357 is a 35% glass fiber reinforced, heat stabilised, black polyamide 66 for injection moulding.

### Product information

Resin Identification	PA66-GF35	ISO 1043
Part Marking Code	>PA66-GF35<	ISO 11469
ISO designation	ISO 16396-PA66,GF35,M1CGHR,S14-110	

### Rheological properties

	dry/cond.		
Viscosity number	140 <sup>[1]</sup> /*	cm <sup>3</sup> /g	ISO 307, 1628
Moulding shrinkage, parallel	0.3/-	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.1/-	%	ISO 294-4, 2577

[1]: formic acid 90%

### Typical mechanical properties

	dry/cond.		
Tensile modulus	11000/8000	MPa	ISO 527-1/-2
Tensile stress at break, 5mm/min	210/140	MPa	ISO 527-1/-2
Tensile strain at break, 5mm/min	3/5	%	ISO 527-1/-2
Flexural modulus	9500/7500	MPa	ISO 178
Flexural strength	300/230 <sup>[DS]</sup>	MPa	ISO 178
Tensile creep modulus, 1h	*/8500	MPa	ISO 899-1
Tensile creep modulus, 1000h	*/6000	MPa	ISO 899-1
Charpy impact strength, 23°C	80/90	kJ/m <sup>2</sup>	ISO 179/1eU
Charpy impact strength, -30°C	80/70	kJ/m <sup>2</sup>	ISO 179/1eU
Charpy notched impact strength, 23°C	13/16	kJ/m <sup>2</sup>	ISO 179/1eA
Charpy notched impact strength, -30°C	10/10	kJ/m <sup>2</sup>	ISO 179/1eA
Puncture energy, 23°C	6/-	J	ISO 6603-2
Izod notched impact strength, 23°C	12/15	kJ/m <sup>2</sup>	ISO 180/1A
Izod notched impact strength, -40°C	10.0/-	kJ/m <sup>2</sup>	ISO 180/1A
Izod impact strength, 23°C	60/-	kJ/m <sup>2</sup>	ISO 180/1U
Izod impact strength, -30°C	60/-	kJ/m <sup>2</sup>	ISO 180/1U
Hardness, Rockwell, M-scale	110/-		ISO 2039-2
Hardness, Rockwell, R-scale	125/117		ISO 2039-2
Ball indentation hardness, H 961/30	285/-	MPa	ISO 2039-1
Poisson's ratio	0.34/0.34		

[DS]: Derived from similar grade

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### Thermal properties

	dry/cond.		
Melting temperature, 10°C/min	263/*	°C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	70/20	°C	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	252/*	°C	ISO 75-1/-2
Temperature of deflection under load, 0.45 MPa	260/*	°C	ISO 75-1/-2
Coefficient of linear thermal expansion (CLTE), parallel	17/*	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal	85/*	E-6/K	ISO 11359-1/-2
Thermal conductivity of melt	0.24	W/(m K)	ISO 22007-2
Specific heat capacity of melt	2130	J/(kg K)	ISO 22007-4
TGA curve	available		ISO 11359-1/-2

### 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
Burning Behav. at thickness h	HB/*	class	IEC 60695-11-10
Thickness tested	0.7/*	mm	IEC 60695-11-10
Oxygen index	21/*	%	ISO 4589-1/-2
Glow Wire Flammability Index, 2.0mm	650/-	°C	IEC 60695-2-12
Glow Wire Flammability Index, 3.0mm	750/-	°C	IEC 60695-2-12
FMVSS Class	B		ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	30	mm/min	ISO 3795 (FMVSS 302)

### Electrical properties

	dry/cond.		
Relative permittivity, 1MHz	4.1/4.7		IEC 62631-2-1
Dissipation factor, 1MHz	140/620	E-4	IEC 62631-2-1
Volume resistivity	1E13/1E9	Ohm.m	IEC 62631-3-1
Surface resistivity	*/1E13	Ohm	IEC 62631-3-2

### Physical/Other properties

	dry/cond.		
Humidity absorption, 2mm	1.7/*	%	Sim. to ISO 62
Water absorption, 2mm	5.5/*	%	Sim. to ISO 62
Water absorption, Immersion 24h	1.1/*	%	Sim. to ISO 62
Density	1410/-	kg/m <sup>3</sup>	ISO 1183
Density of melt	1240	kg/m <sup>3</sup>	

### VDA Properties

	dry/cond.		
Odour	3	class	VDA 270
Fogging, G-value (condensate)	0.5/*	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

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Min. melt temperature	285 °C
Max. melt temperature	305 °C
Screw tangential speed	≤0.2 m/s
Mold Temperature Optimum	100 °C
Min. mould temperature	70 °C
Max. mould temperature	120 °C
Hold pressure range	50 - 100 MPa
Hold pressure time	3 s/mm
Ejection temperature	217 °C

### Characteristics

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

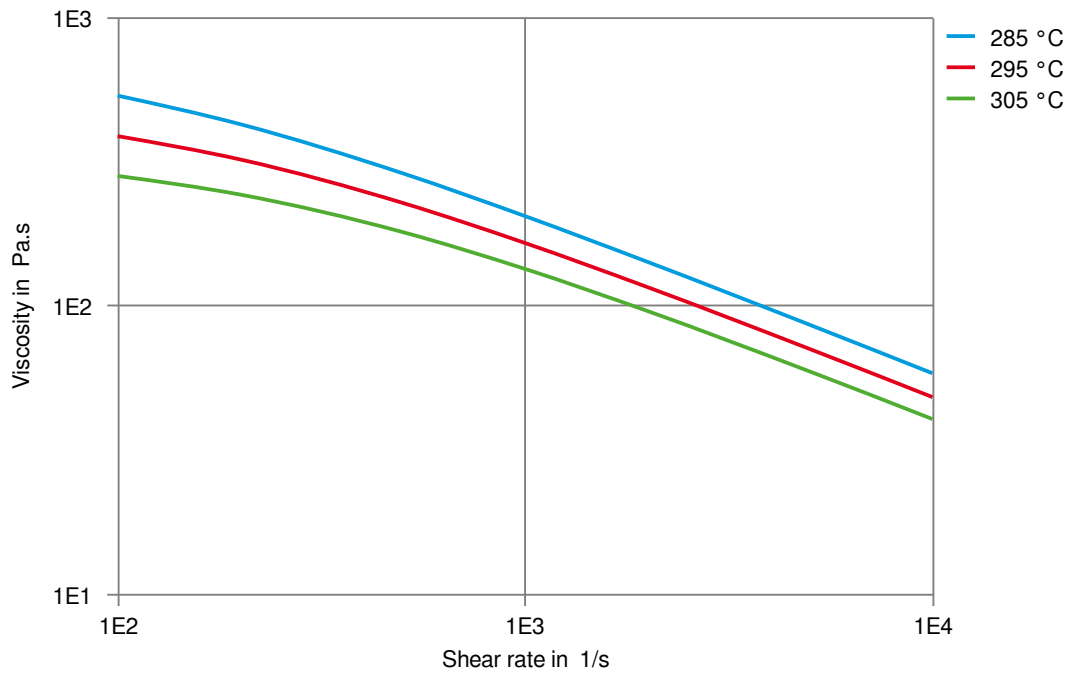
### Automotive

OEM	STANDARD	ADDITIONAL INFORMATION
BMW	GS93016-PA66-GF35	
BMW	GS93016-PA66-GF35	(Heat Aging Resistant)
General Motors	GMW17961P-PA-GF35-T1	Black
Mercedes-Benz	DBL5403.00 PA66 GF35	
Mercedes-Benz	DBL5403.32 PA66 GF35	
Mercedes-Benz	DBL5405.05 PA66 GF35	
Mercedes-Benz	DBL5408.50 PA66 GF35	
Mercedes-Benz	DBL5409.25 PA66 GF35	
Renault-Nissan	AS23-a, No Spec, Special Part Approval, See Your CE Account Manager.	
Renault-Nissan	AS23-b, No Spec, Special Part Approval, See Your CE Account Manager.	
Stellantis	MS.50150 / PA66.GF35.10000T.11C.HS.GR	01994_10_00032
Stellantis - Chrysler	MS.50017 / CPN-4777	Black
VW Group	TL 520 62 PA66-GF30	
VW Group	TL 539 PA66-GF30	
VW Group	VW 50127 PA66-8	
VW Group	VW 50133 PA66-7-A	
Valeo	PDTNVC15006 RevE	PA66-GF35 Class 6

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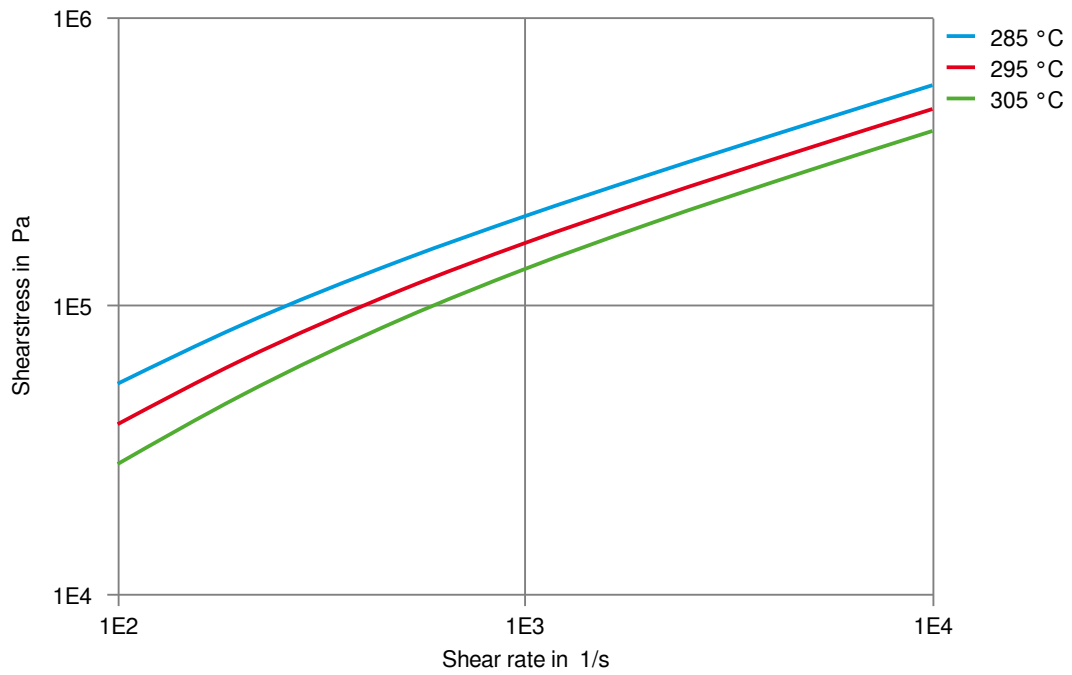
Viscosity-shear rate



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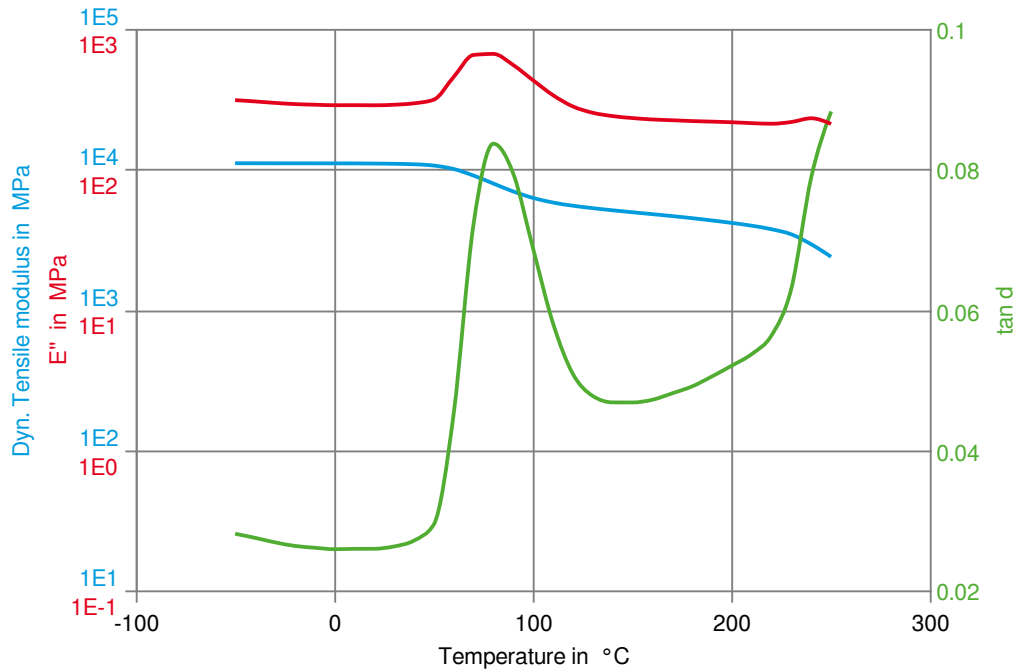
Shearstress-shear rate



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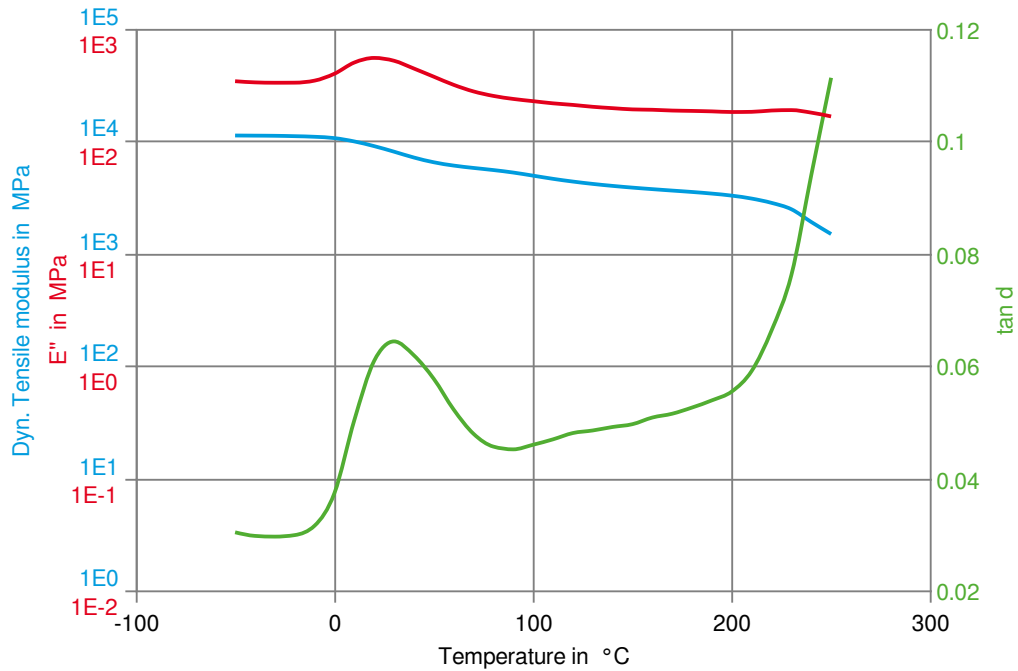
Dynamic Tensile modulus-temperature (dry)



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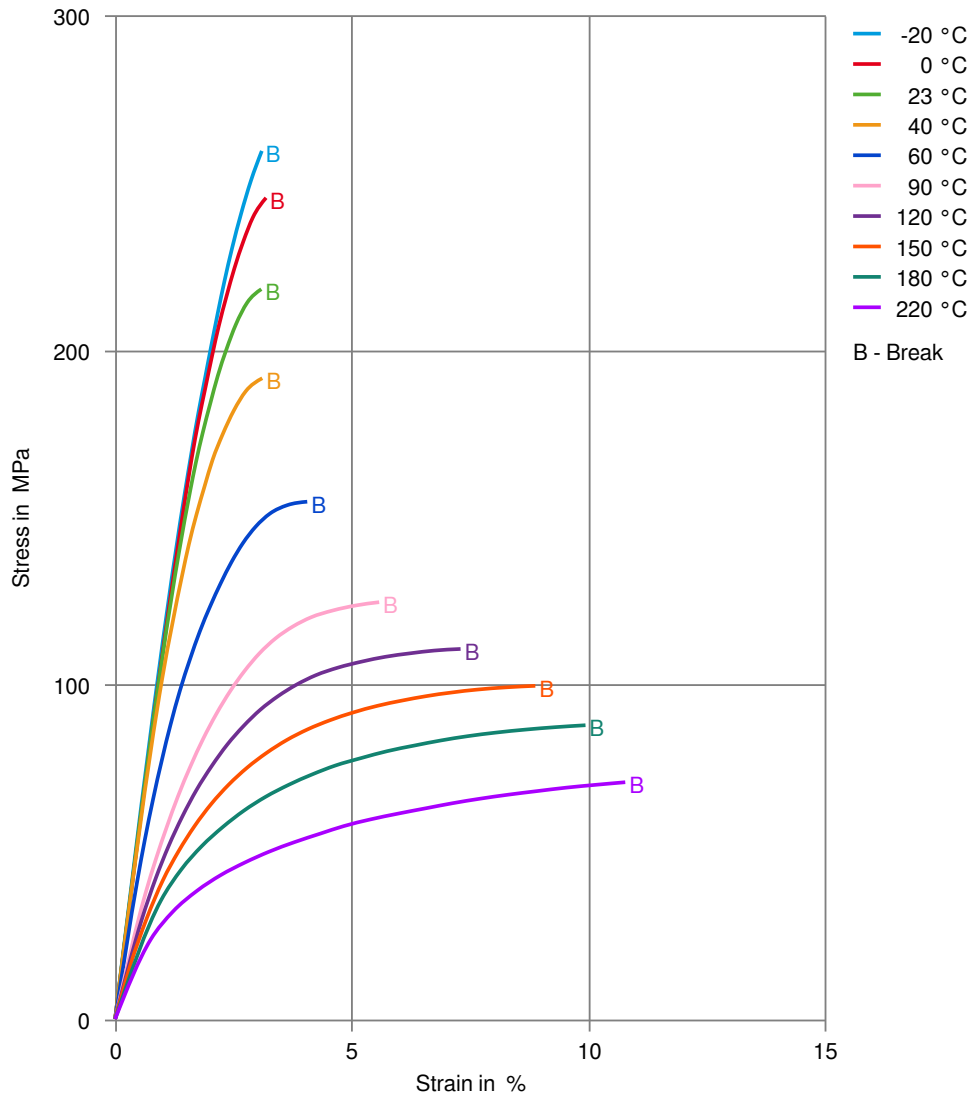
Dynamic Tensile modulus-temperature (cond.)



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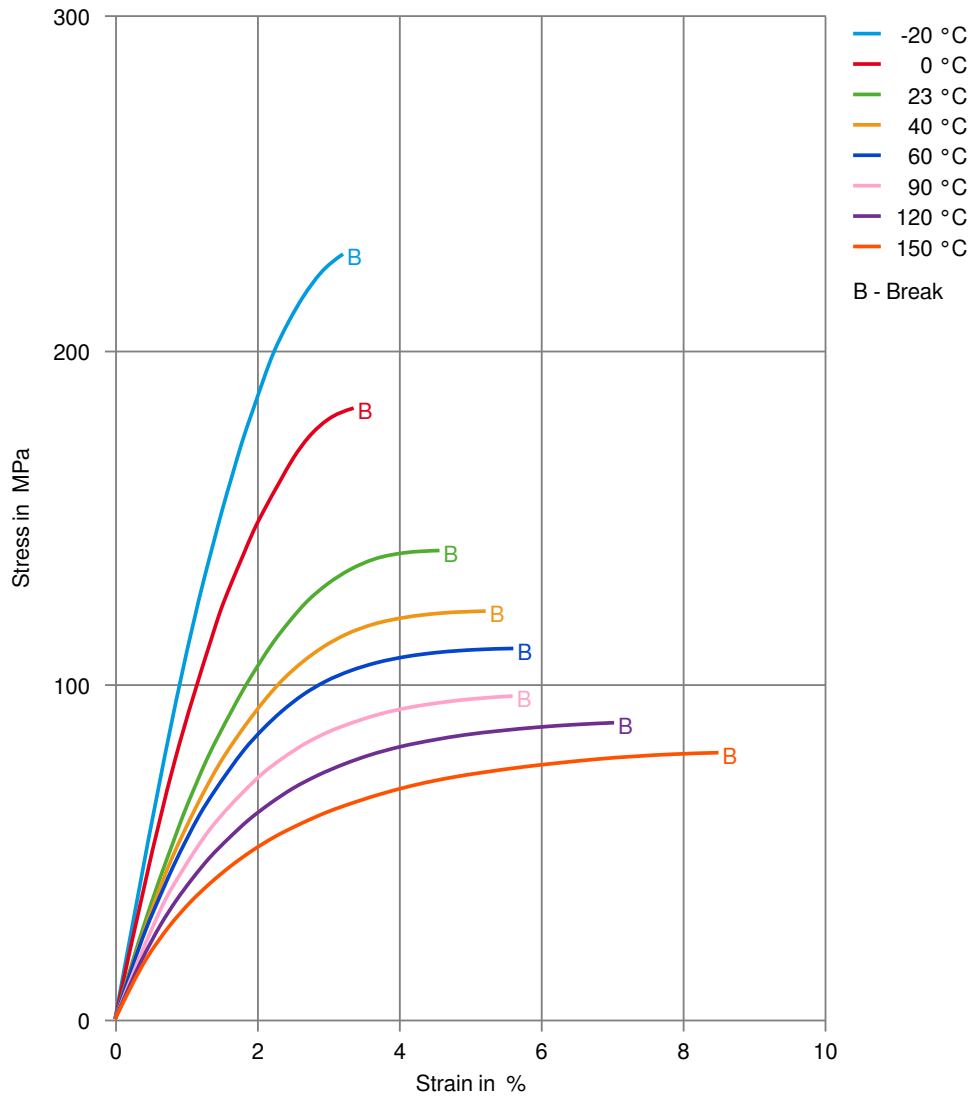
Stress-strain (dry)



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NYLON RESIN

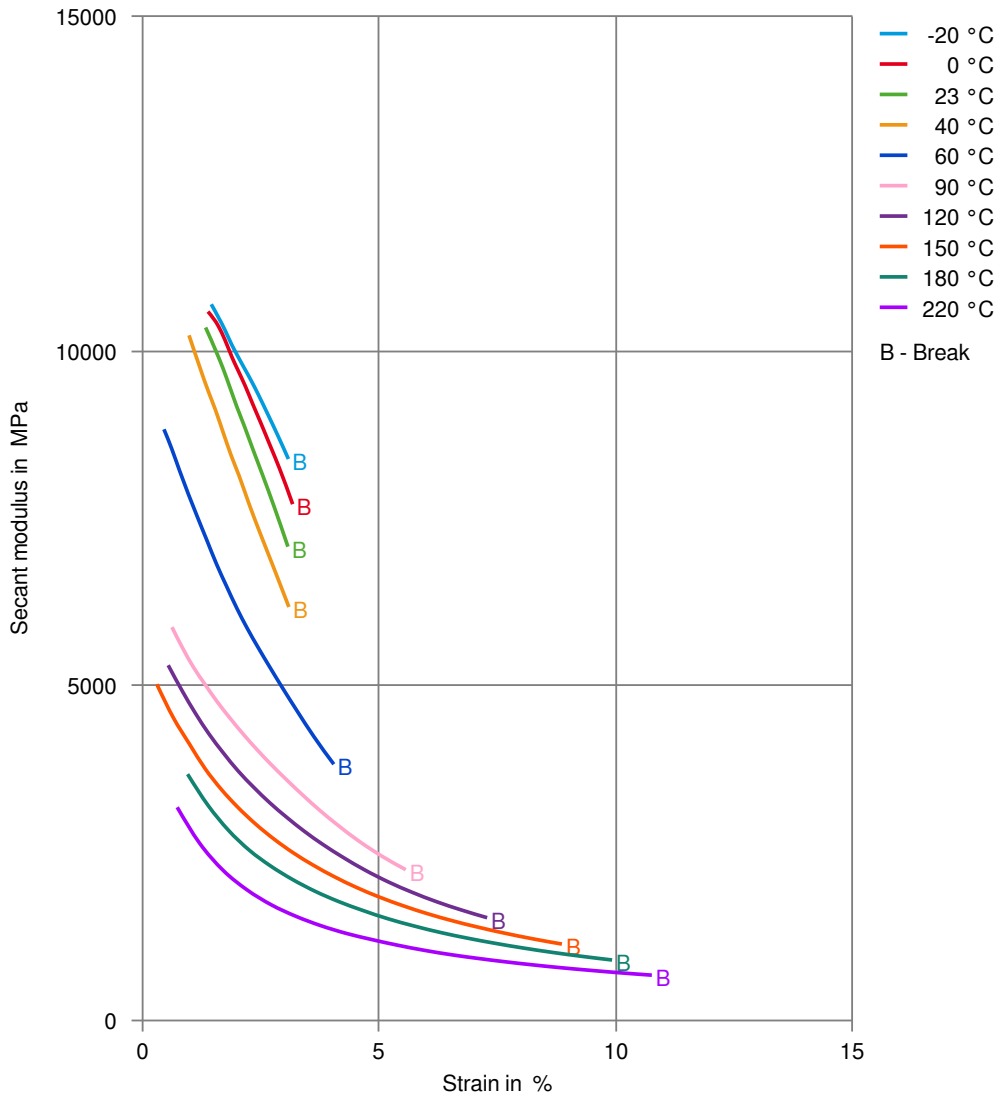
Stress-strain (cond.)



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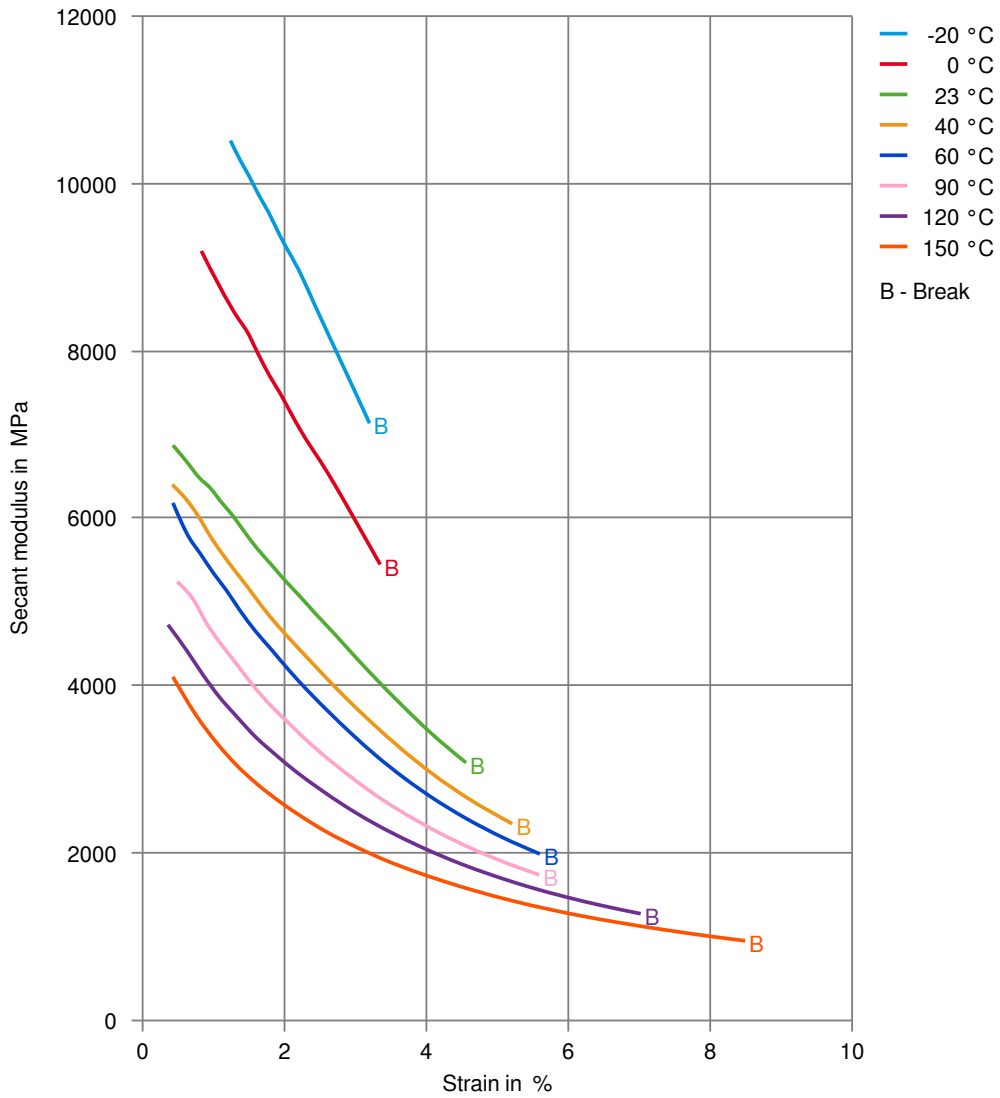
Secant modulus-strain (dry)



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NYLON RESIN

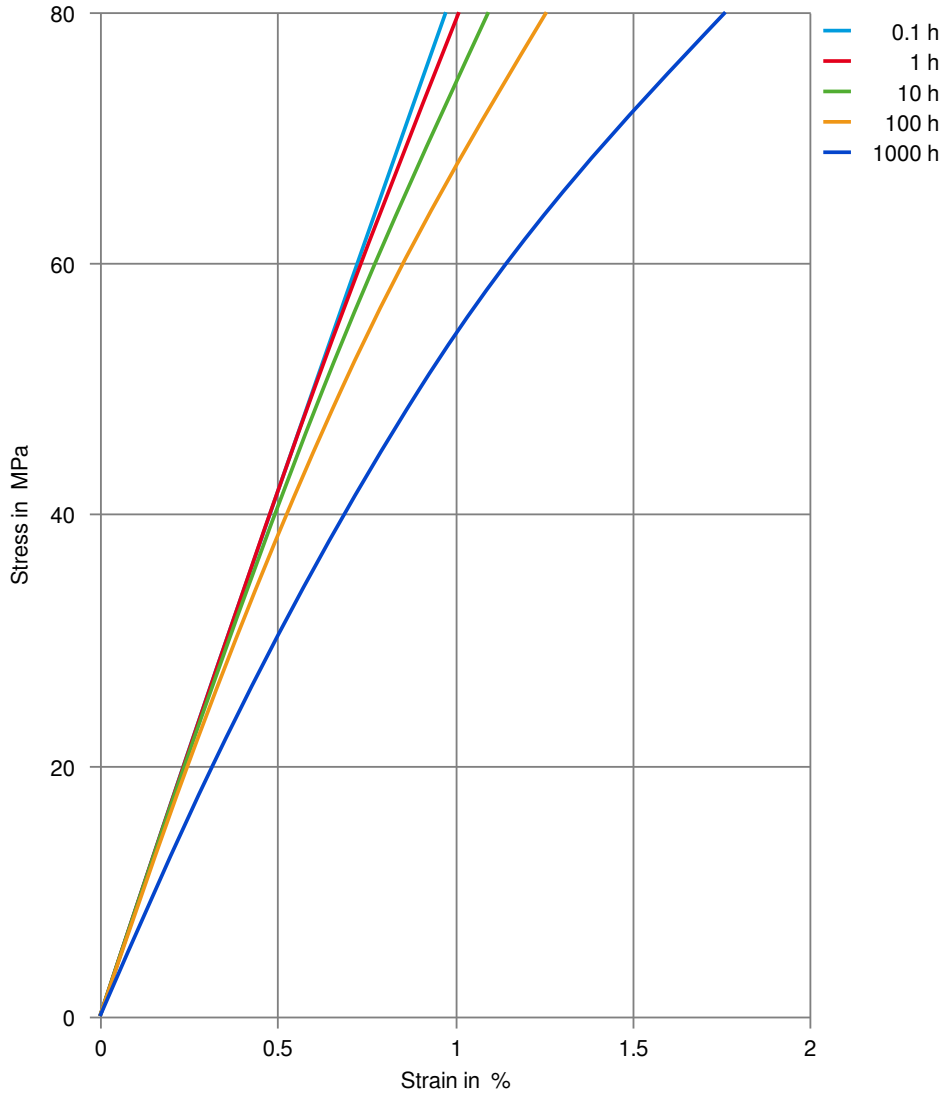
## Secant modulus-strain (cond.)



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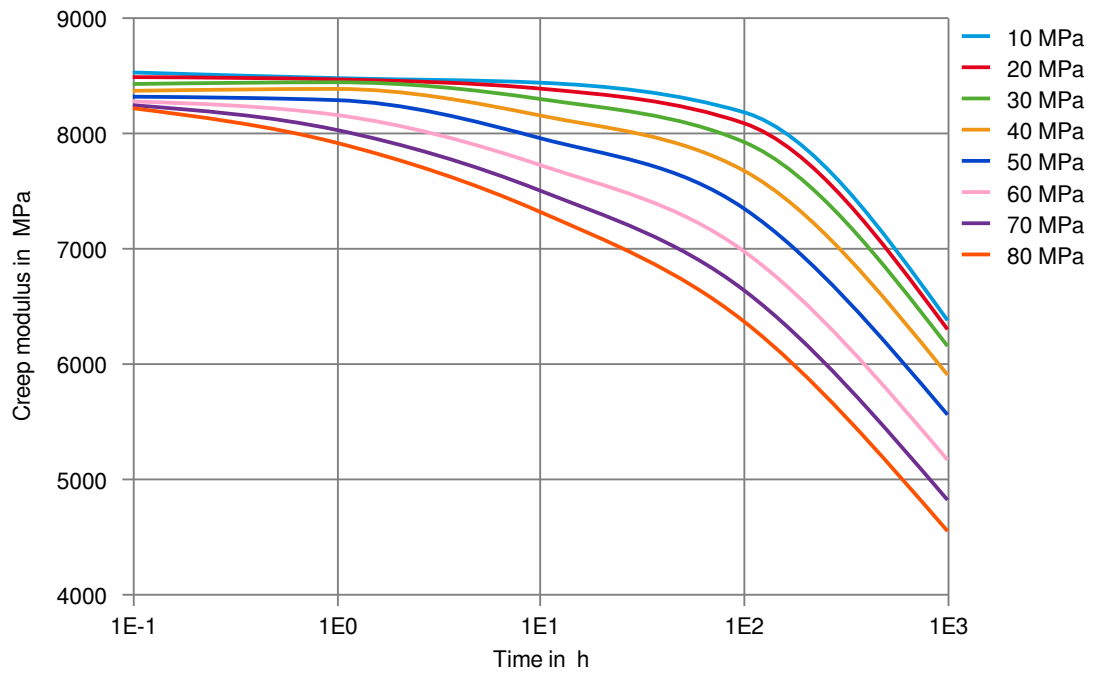
Stress-strain (isochronous) 23°C (cond.)



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NYLON RESIN

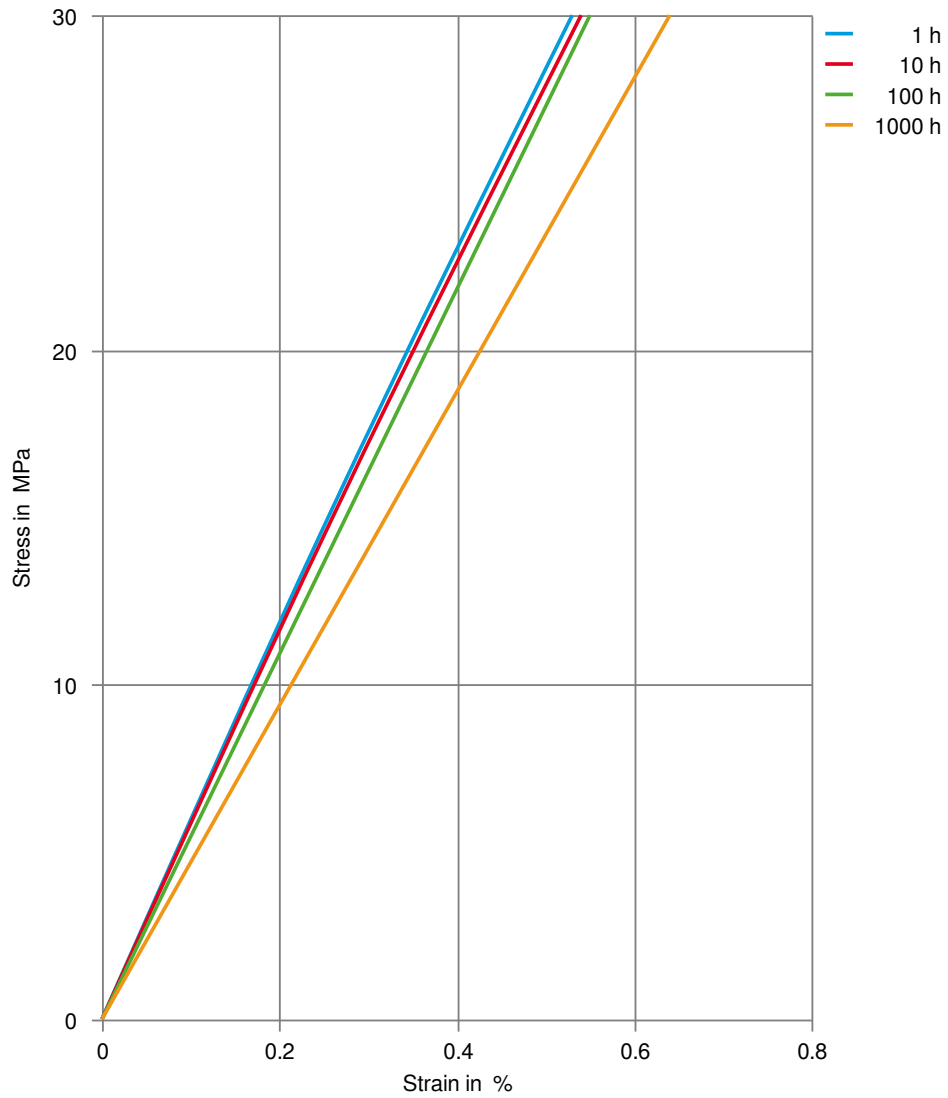
Creep modulus-time 23°C (cond.)



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NYLON RESIN

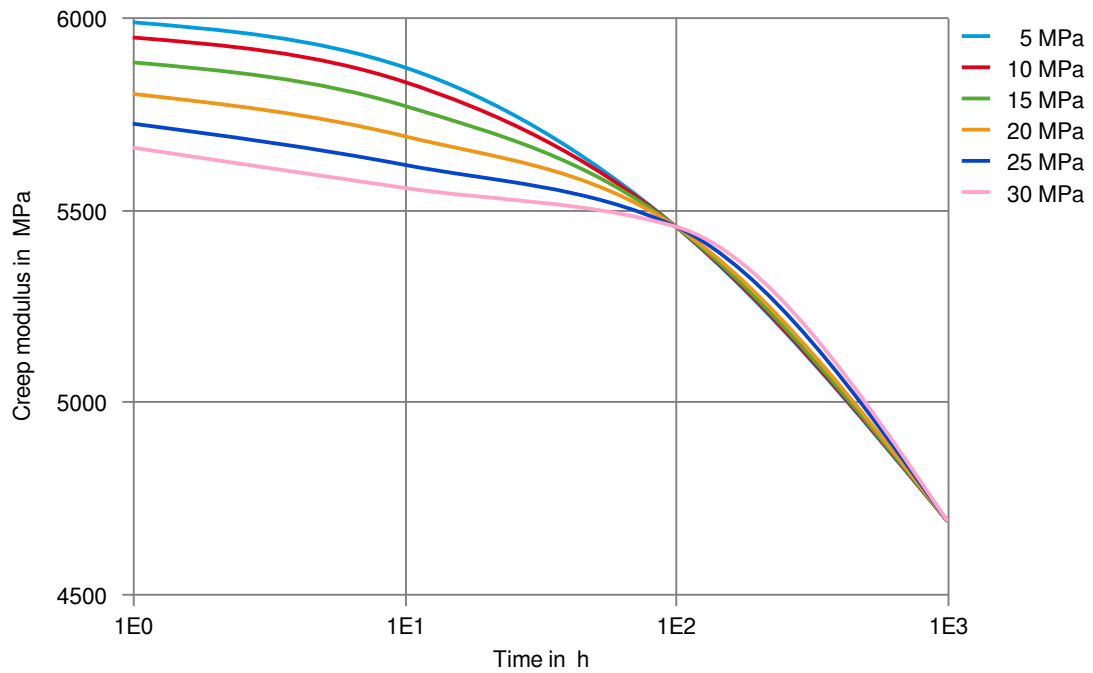
Stress-strain (isochronous) 100°C (dry)



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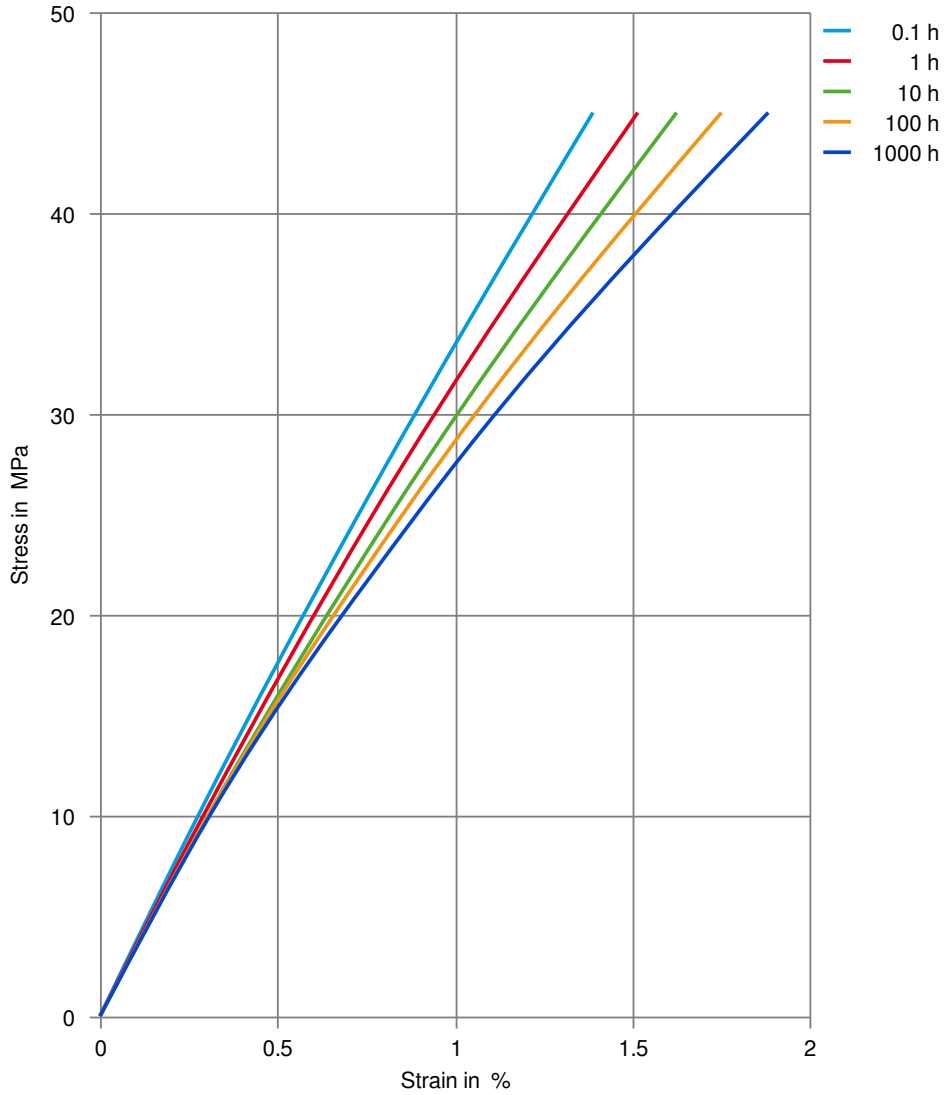
Creep modulus-time 100°C (dry)



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NYLON RESIN

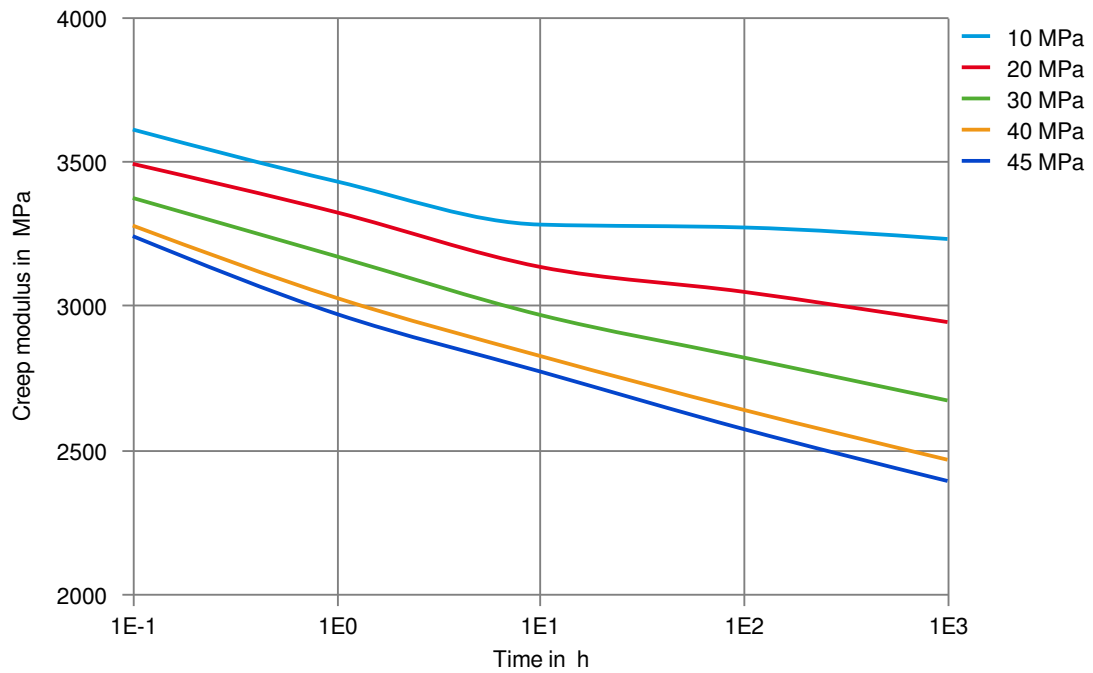
Stress-strain (isochronous) 130°C (dry)



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NYLON RESIN

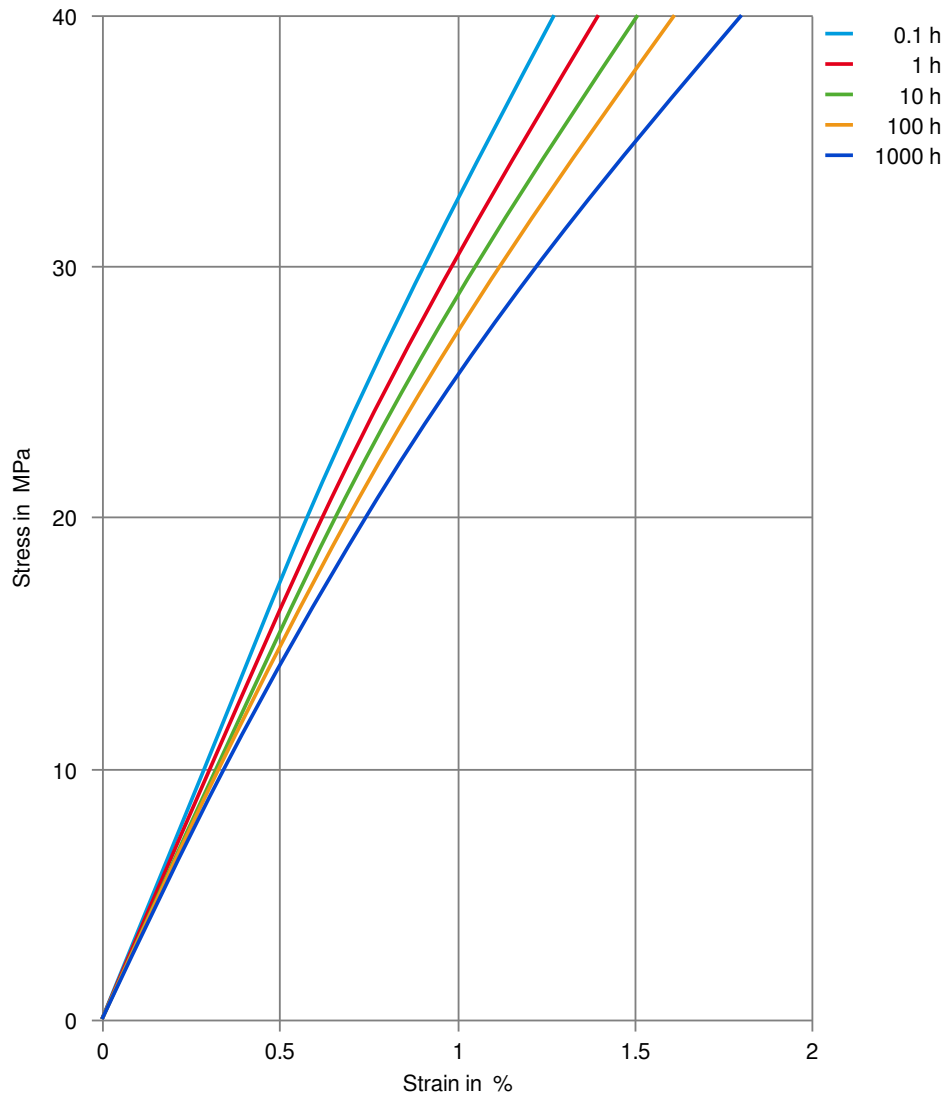
Creep modulus-time 130°C (dry)



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NYLON RESIN

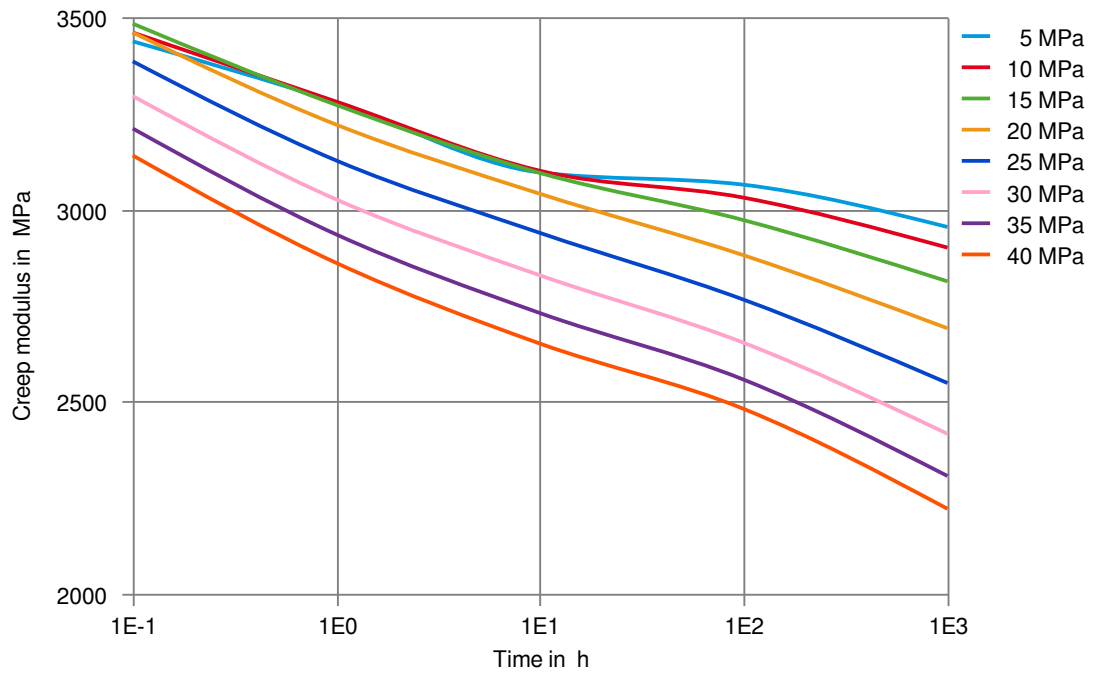
Stress-strain (isochronous) 150°C (dry)



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NYLON RESIN

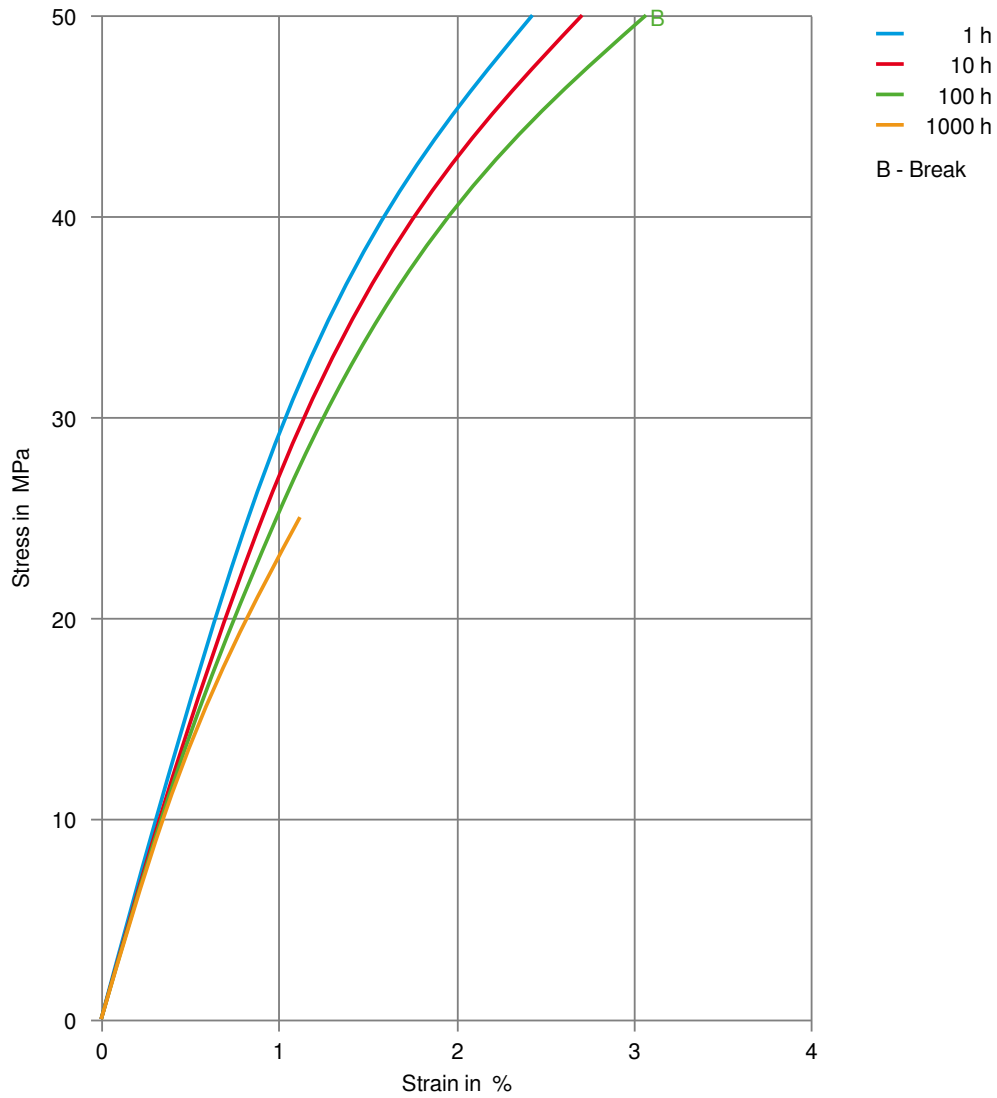
Creep modulus-time 150°C (dry)



# Zytel® 70G35HSLX BK357

NYLON RESIN

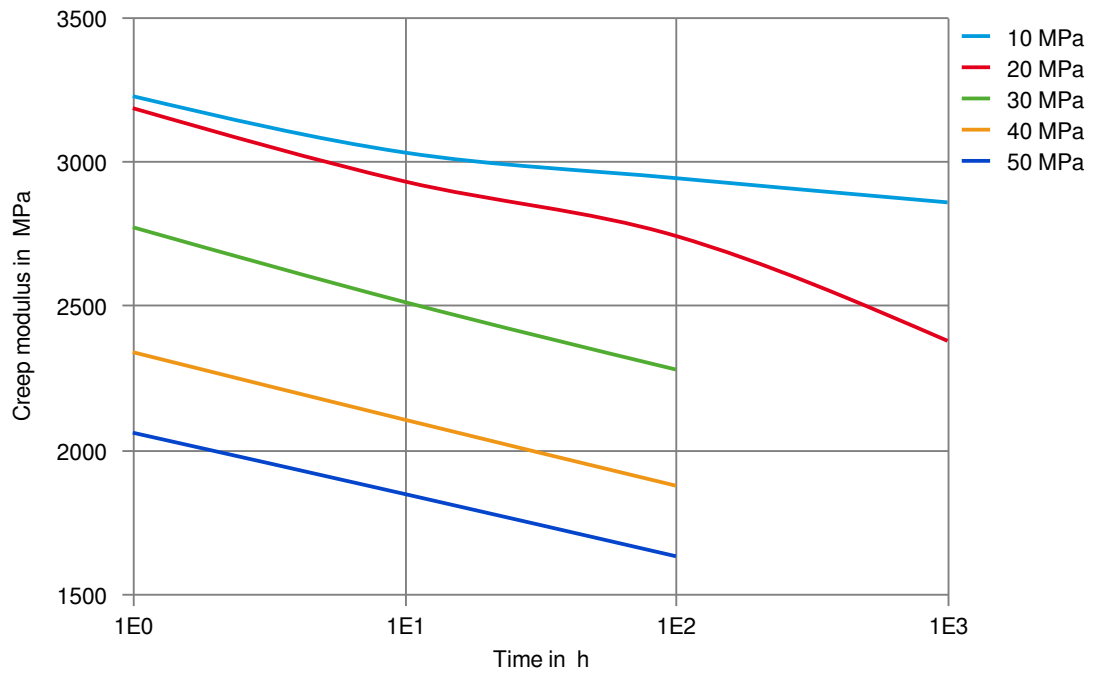
Stress-strain (isochronous) 180°C (dry)



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NYLON RESIN

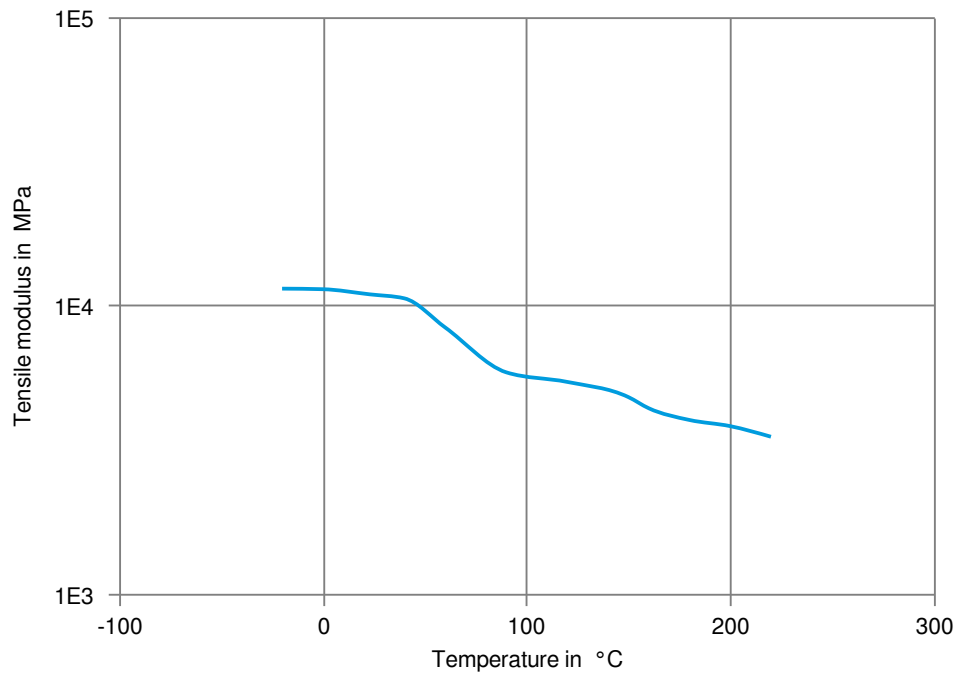
Creep modulus-time 180°C (dry)



# Zytel® 70G35HSLX BK357

NYLON RESIN

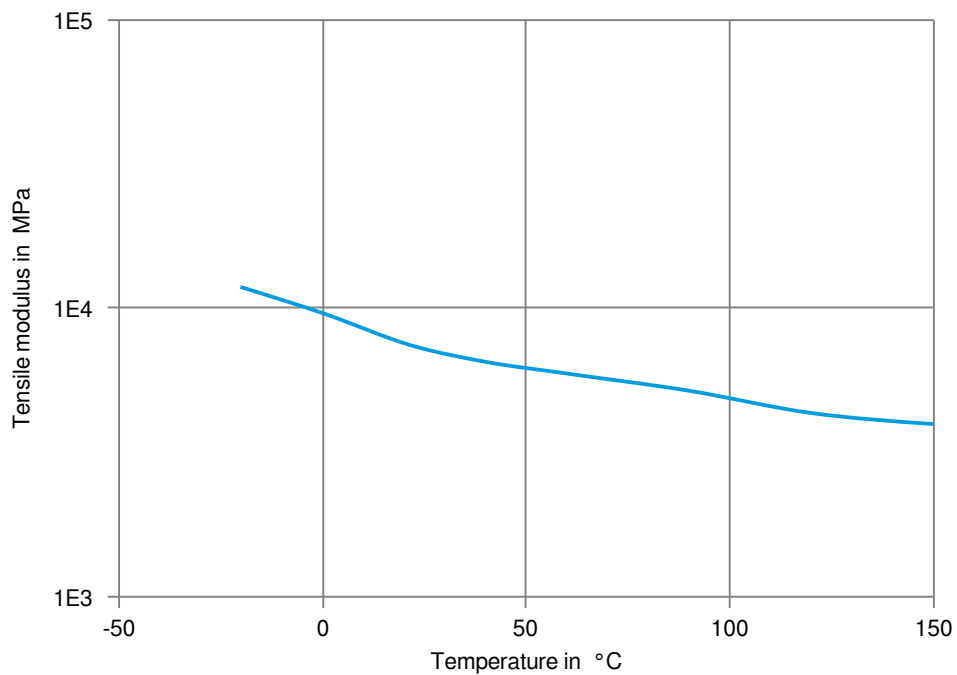
Tensile modulus-temperature (dry)



# Zytel® 70G35HSLX BK357

NYLON RESIN

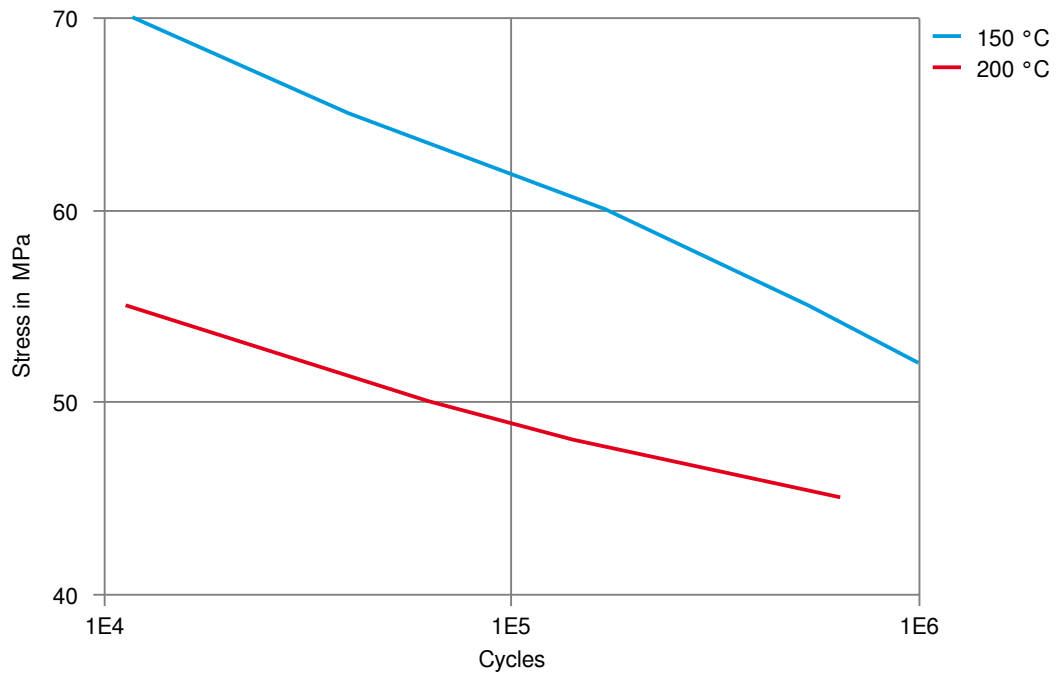
Tensile modulus-temperature (cond.)



# Zytel® 70G35HSLX BK357

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Tensile Fatigue, 10Hz, R=0.1 @ 2mm (dry)



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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
- ✓ 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

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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
- ✓ 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).