Zytel® 70G35EF 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® 70G35EF NC010 is a 35% glass reinforced polyamide 66 developed for electrical and electronics applications.

Product information

Resin Identification	PA66-GF35	ISO 1043
Part Marking Code	>PA66-GF35<	ISO 11469
ISO designation	ISO 16396-PA66,GF35,M1GNR,S14-110	

Rheological properties

	dry/cond.		
Viscosity number	143/*	cm³/g	ISO 307, 1157, 1628
Moulding shrinkage, parallel	0.4/-	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.0/-	%	ISO 294-4, 2577
Melt viscosity , @ 1000 sec-1, 280°C	170/*	Pa.s	ISO 11443

Typical mechanical properties

	dry/cond.		
Tensile Modulus	11000/8500	MPa	ISO 527-1/-2
Stress at break	200/140	MPa	ISO 527-1/-2
Strain at break	3.5/4.6	%	ISO 527-1/-2
Flexural Modulus	10000/7500	MPa	ISO 178
Flexural Strength	290/230	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	90/100	kJ/m²	ISO 179/1eU
Charpy impact strength, -30°C	80/80	kJ/m²	ISO 179/1eU
Charpy notched impact strength, 23°C	14/18	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -30°C	11/10	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -40°C	11/-	kJ/m²	ISO 179/1eA
Puncture energy, 23°C	6/-	J	ISO 6603-2
Izod notched impact strength, 23°C	15/-	kJ/m²	ISO 180/1A

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Izod notched impact strength, -40°C	13 / -	kJ/m²	ISO 180/1A
Poisson's ratio	0.34 / 0.34	-	

Thermal properties

	dry/cond.		
Melting temperature, 10°C/min	260 / *	°C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	70 / 20	°C	ISO 11357-1/-2
Temp. of deflection under load, 1.8 MPa	250 / *	°C	ISO 75-1/-2
Temp. of deflection under load, 8 MPa	110 / *	°C	ISO 75-1/-2
Vicat softening temperature, 50°C/h, 50N	255 / *	°C	ISO 306
Coeff. of linear therm. expansion, parallel	14 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal	85 / *	E-6/K	ISO 11359-1/-2
Thermal conductivity of melt	0.24	W/(m K)	
Spec. heat capacity of melt	2130	J/(kg K)	

Flammability

	dry/cond.		
Burning Behav. at 1.5mm nom. thickn.	HB / *[DS]	class	IEC 60695-11-10
Thickness tested	1.5 / *	mm	IEC 60695-11-10
Burning Behav. at thickness h	HB / *[DS]	class	IEC 60695-11-10
Thickness tested	0.75 / *	mm	IEC 60695-11-10
Oxygen index	24 / *	%	ISO 4589-1/-2
Glow Wire Flammability Index, 2mm	650 / -	°C	IEC 60695-2-12
FMVSS Class	B	-	ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	26	mm/min	ISO 3795 (FMVSS 302)

[DS]: Derived from similar grade

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
Electric strength	36 / 31	kV/mm	IEC 60243-1
Comparative tracking index	575 / -	-	IEC 60112

Other properties

	dry/cond.		
Humidity absorption, 2mm	1.7 / *	%	Sim. to ISO 62
Water absorption, 2mm	5.5 / *	%	Sim. to ISO 62
Density	1400 / -	kg/m³	ISO 1183
Density of melt	1240	kg/m³	

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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
Min. melt temperature	285	°C
Max. melt temperature	305	°C
Max. 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	210	°C

Characteristics

Additives	Release agent, Low halide content

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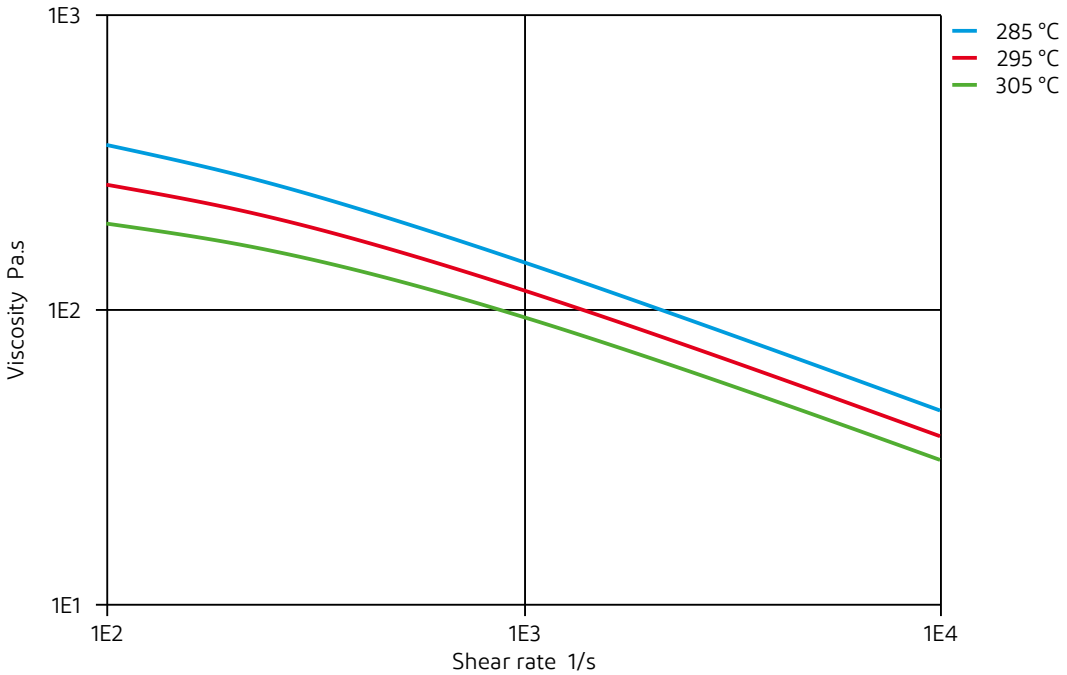
Viscosity-shear rate



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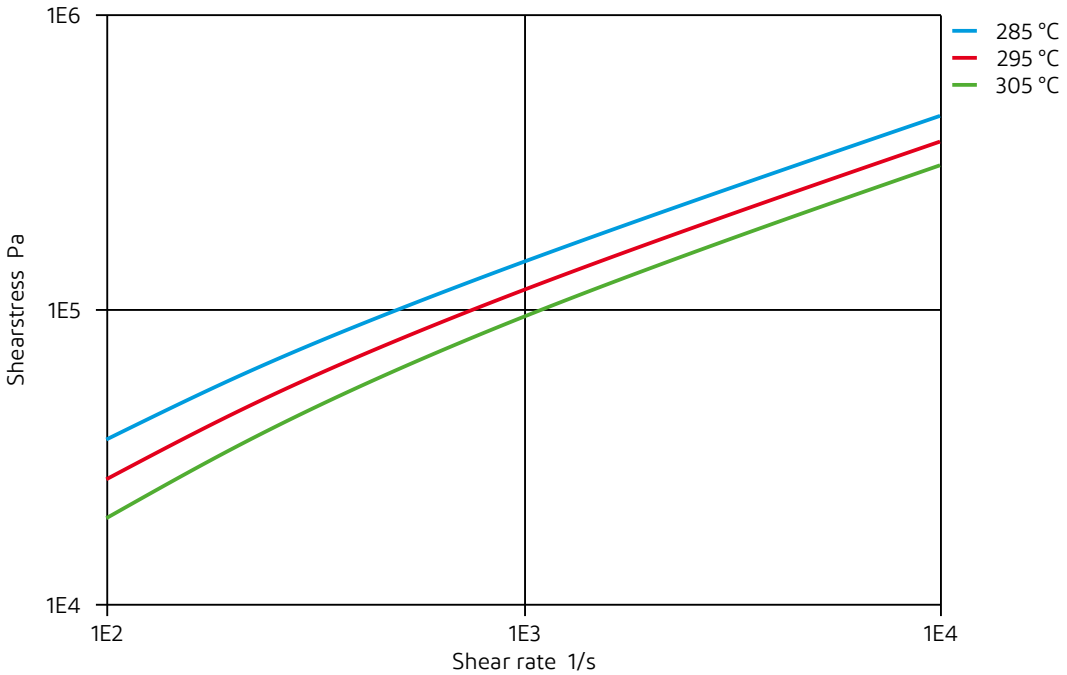
NYLON RESIN

Shearstress-shear rate



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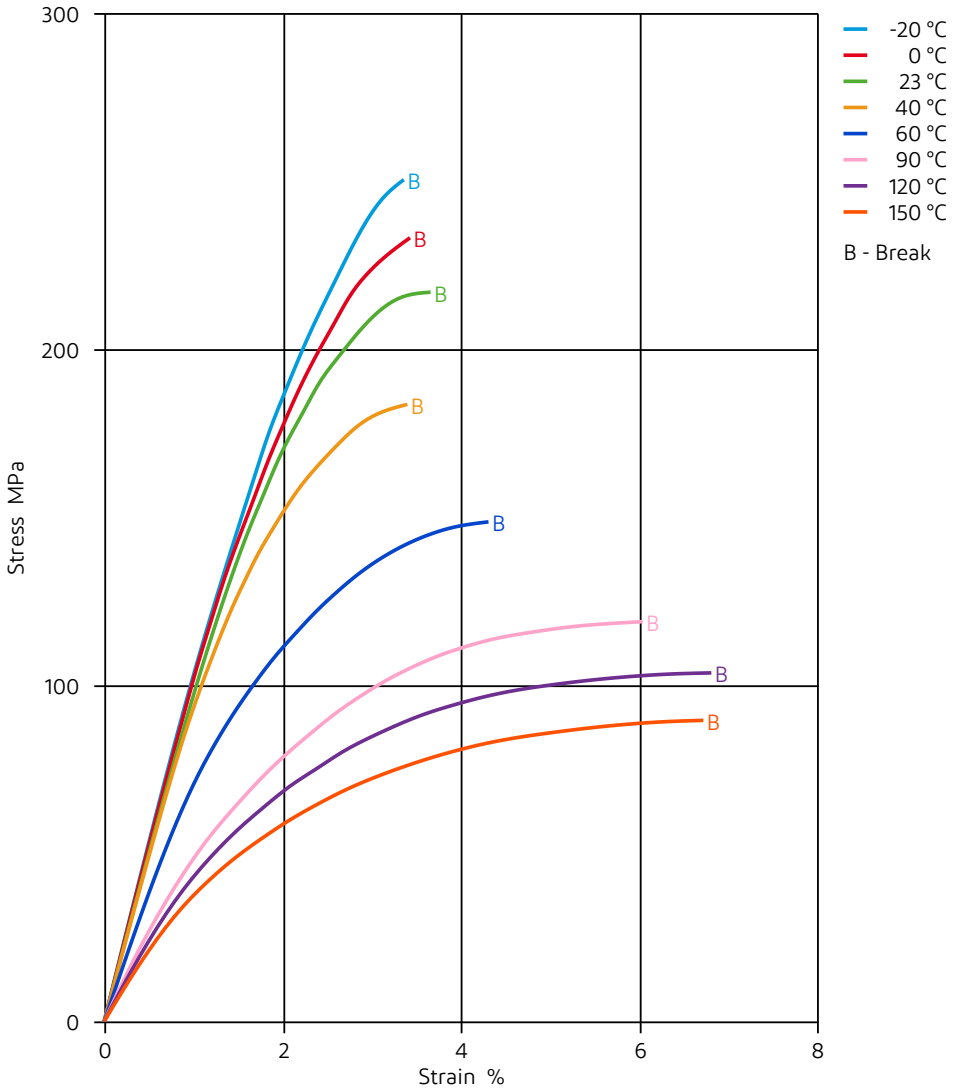
NYLON RESIN

Stress-strain (dry)



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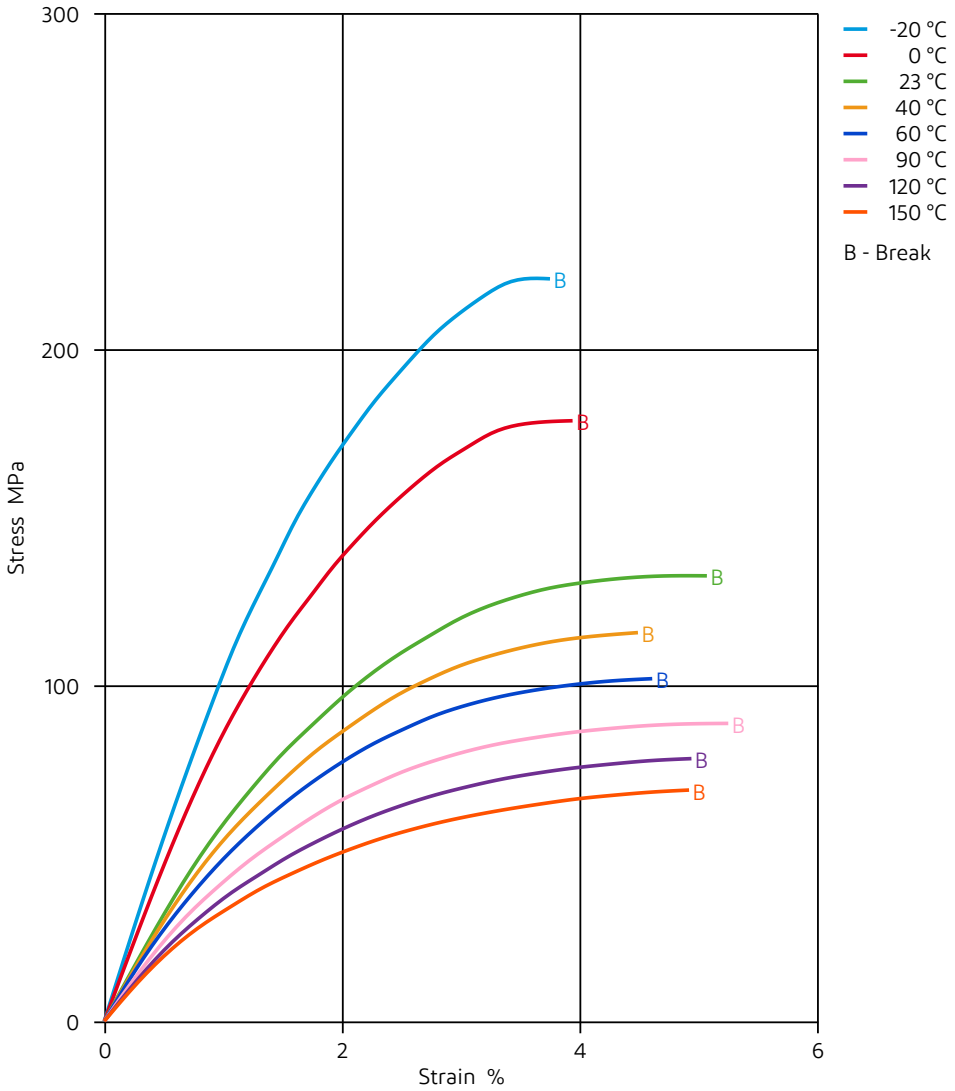
NYLON RESIN

Stress-strain (cond.)



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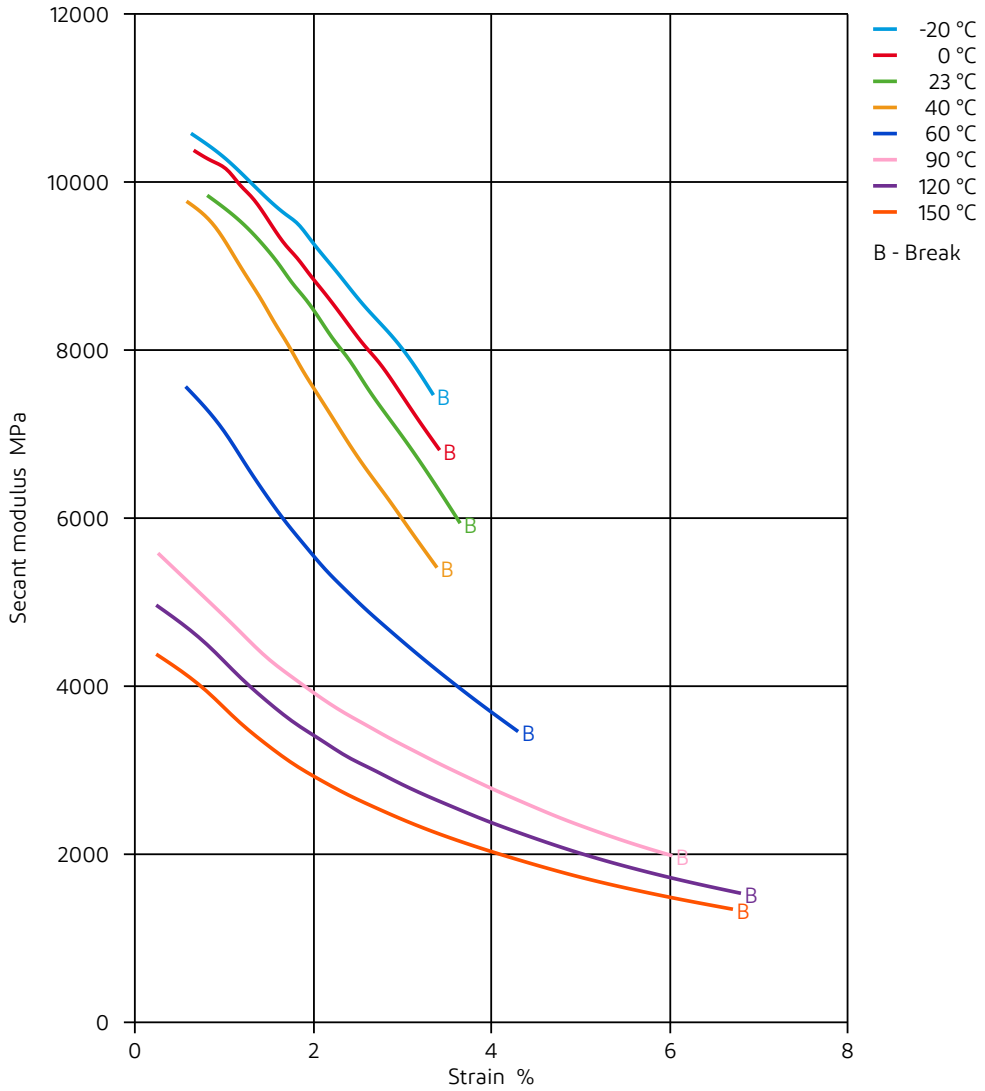
NYLON RESIN

Secant modulus-strain (dry)



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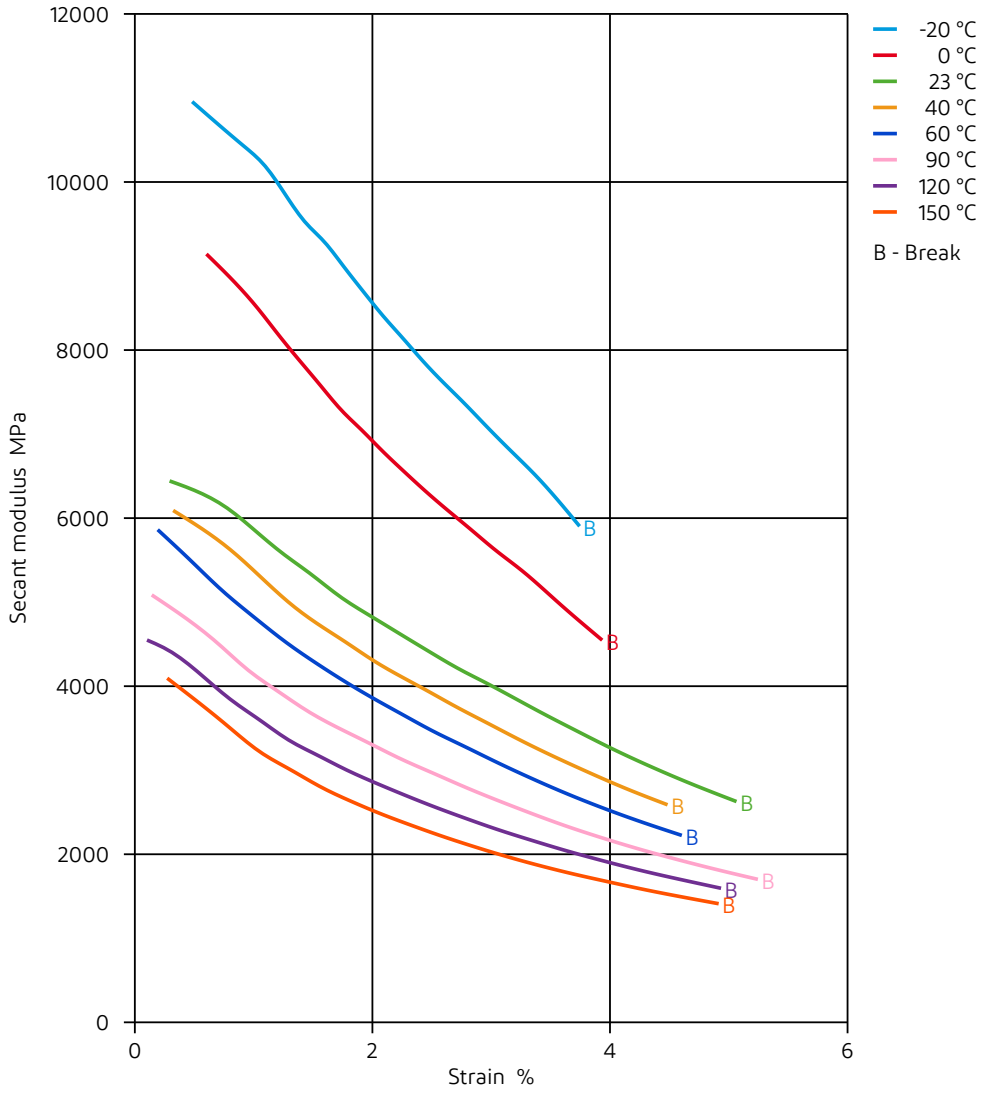
NYLON RESIN

Secant modulus-strain (cond.)



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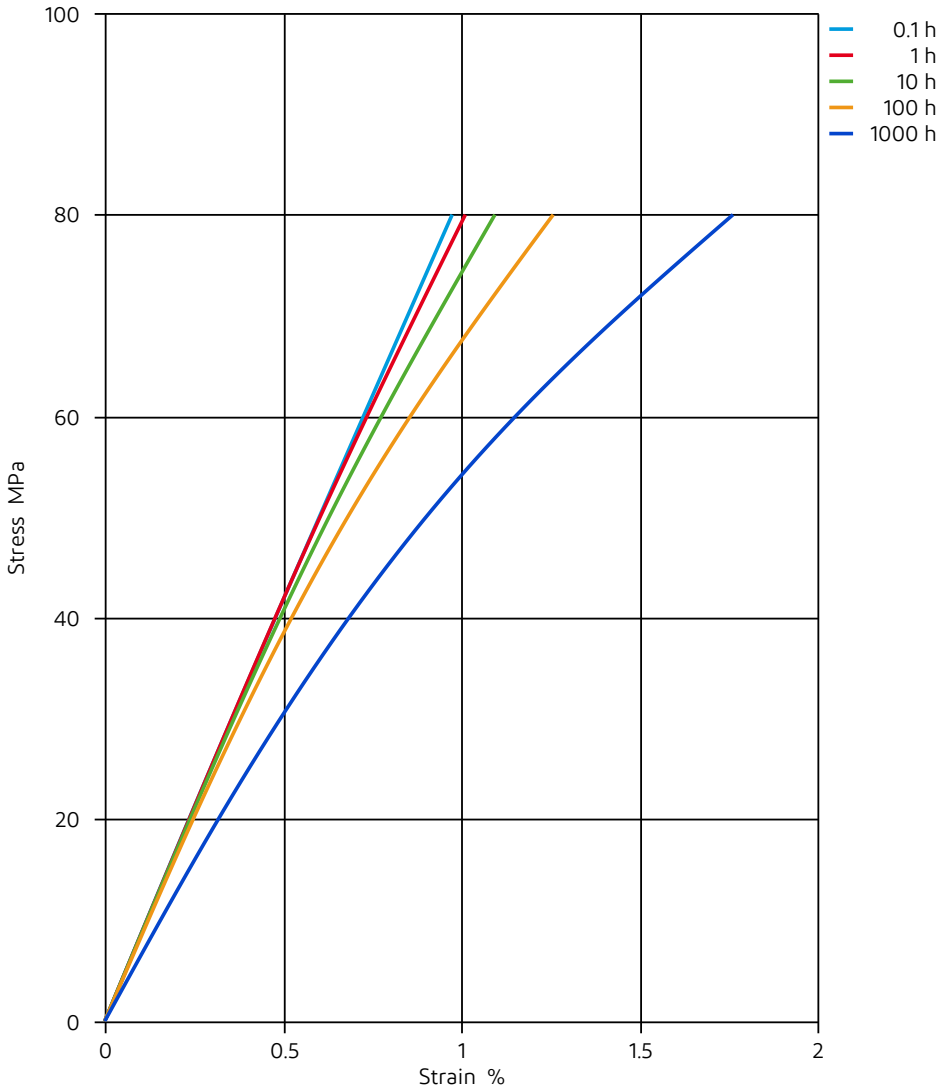
NYLON RESIN

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



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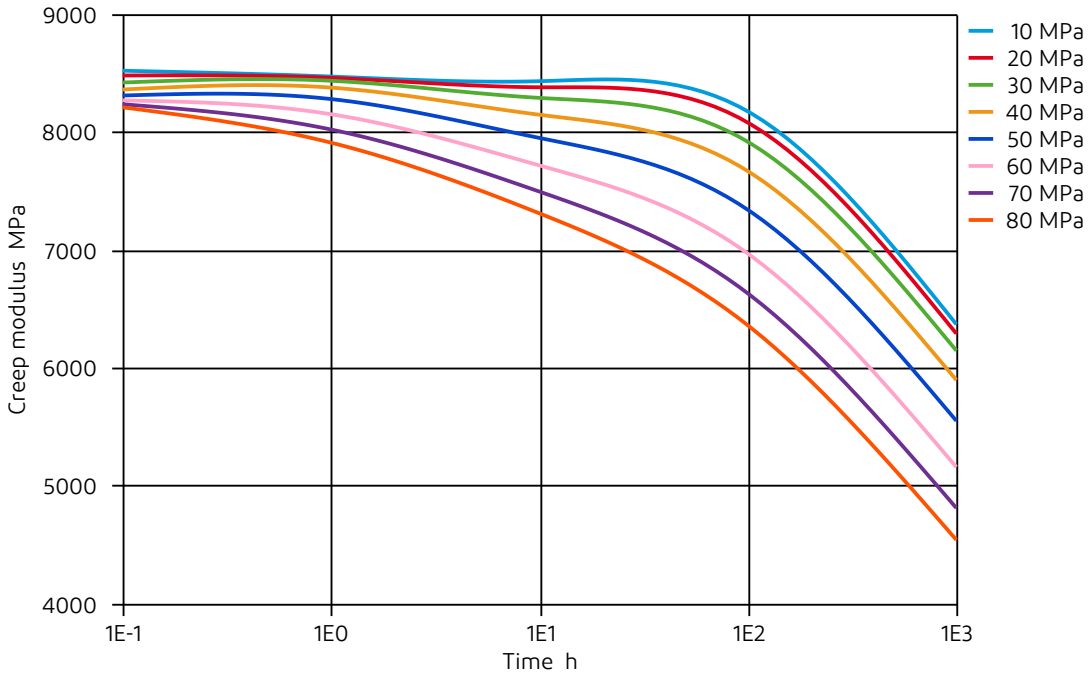
NYLON RESIN

Creep modulus-time 23°C (cond.)



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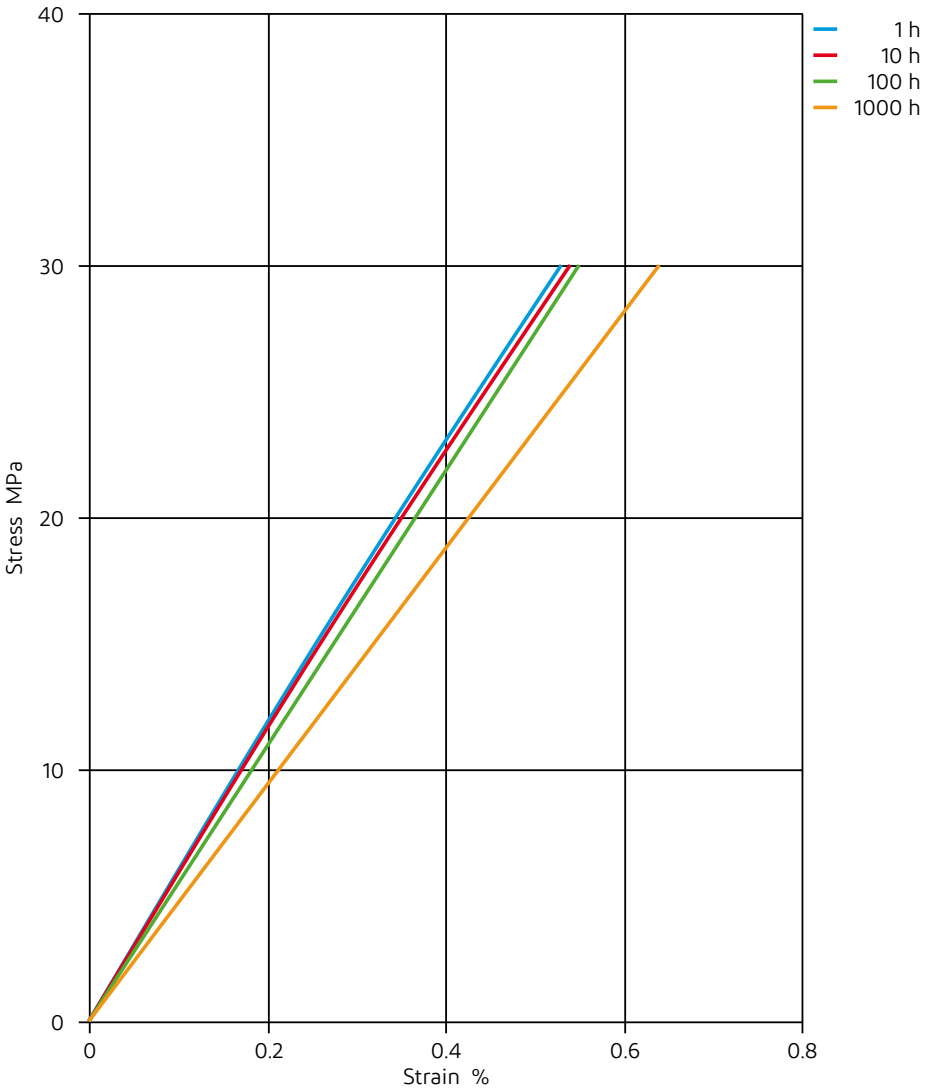
NYLON RESIN

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



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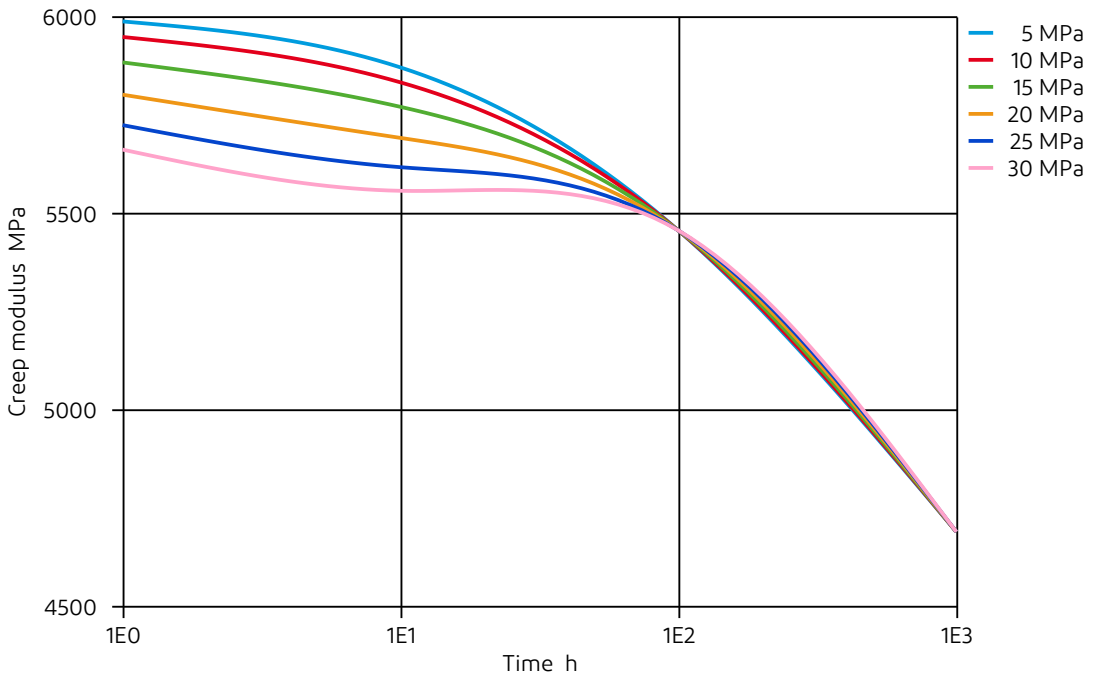
NYLON RESIN

Creep modulus-time 100°C (dry)



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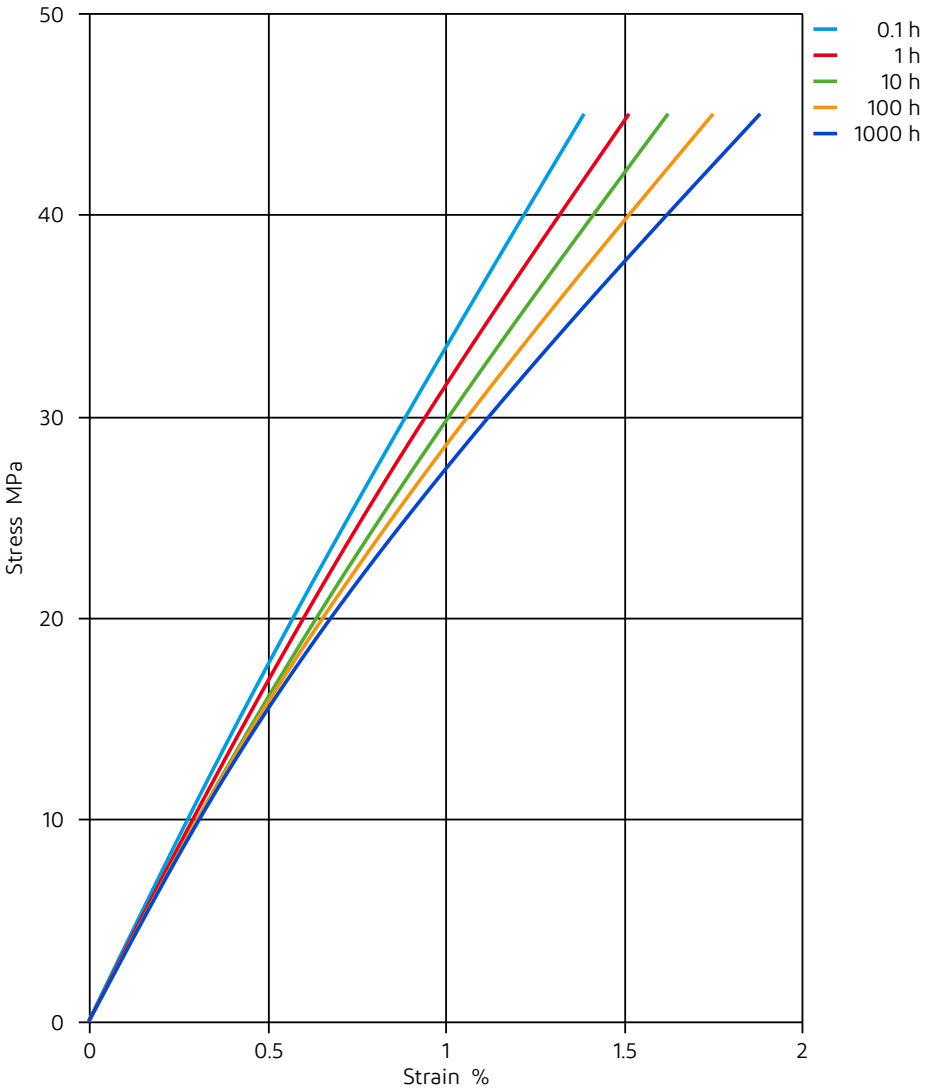
NYLON RESIN

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



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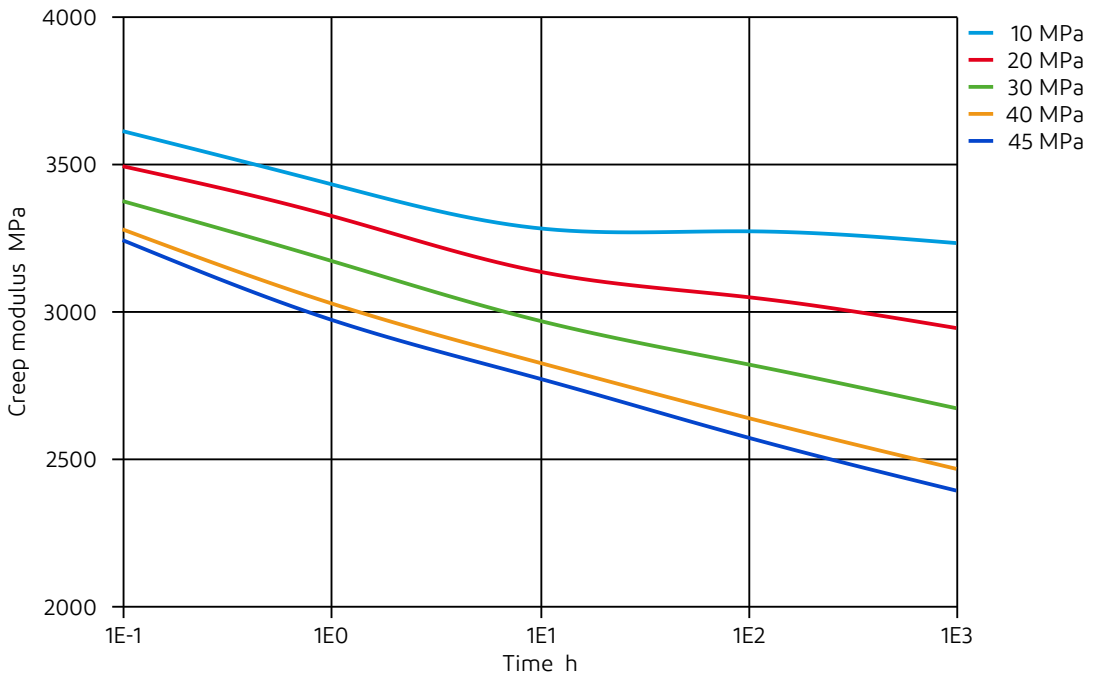
NYLON RESIN

Creep modulus-time 130°C (dry)



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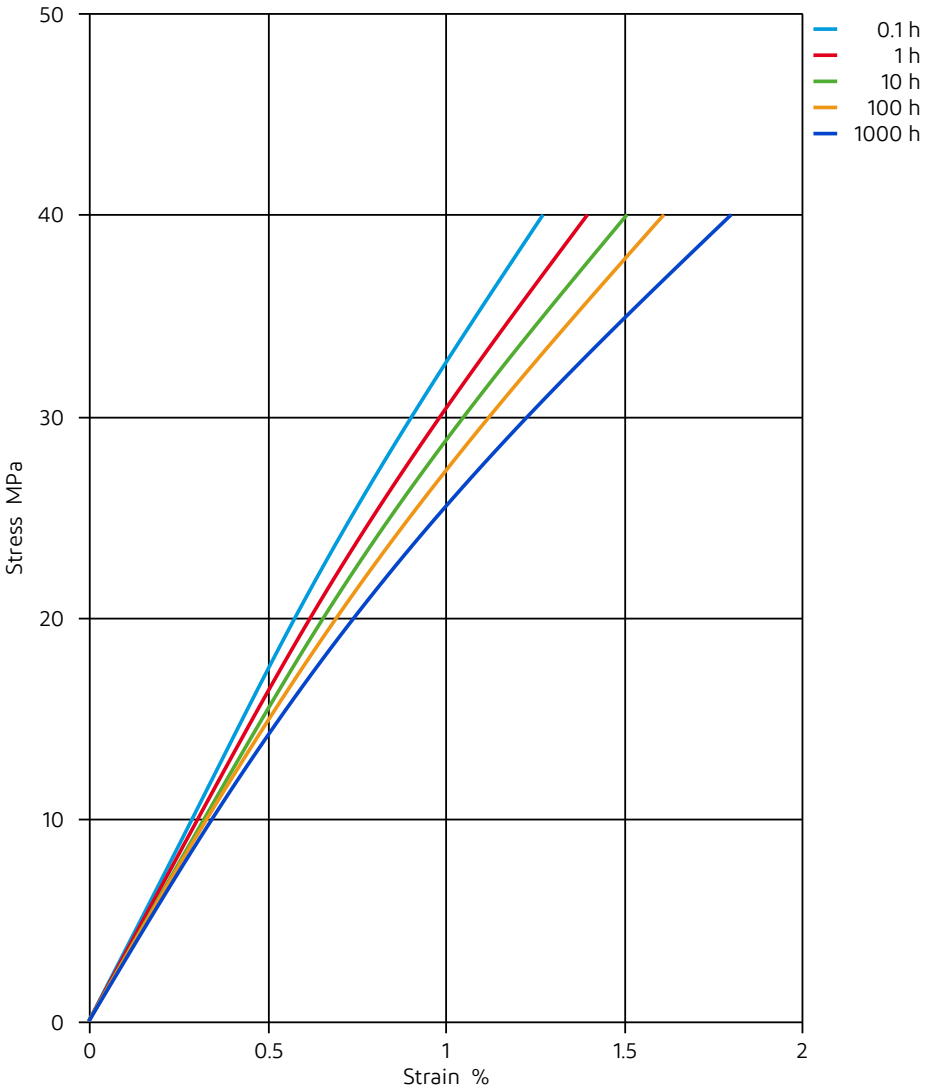
NYLON RESIN

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



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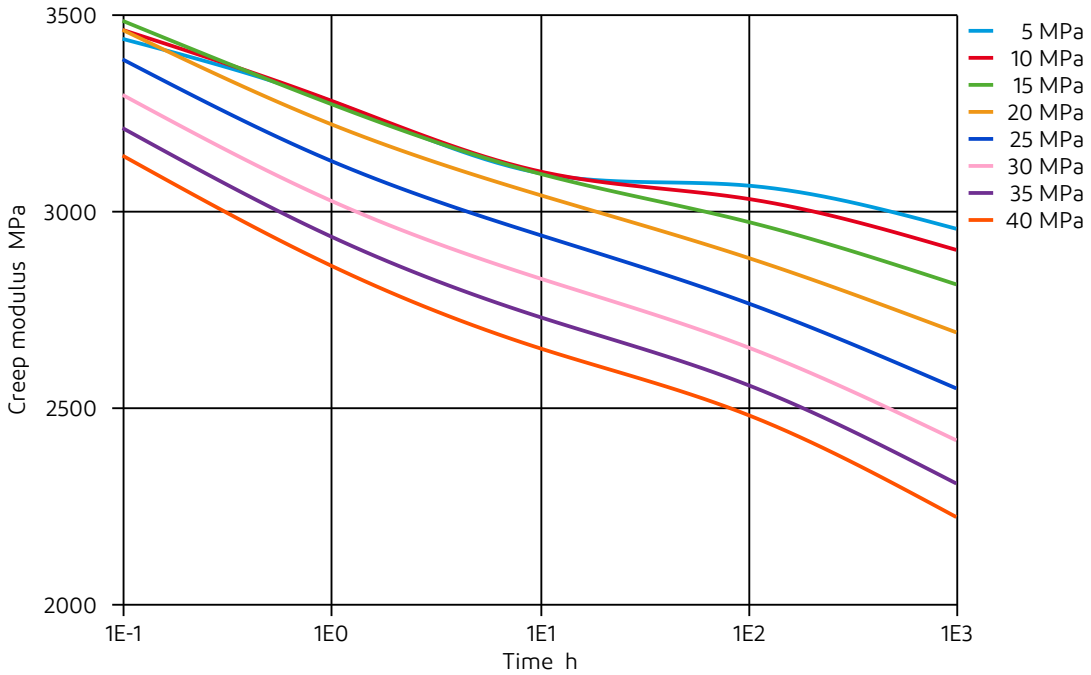
NYLON RESIN

Creep modulus-time 150°C (dry)



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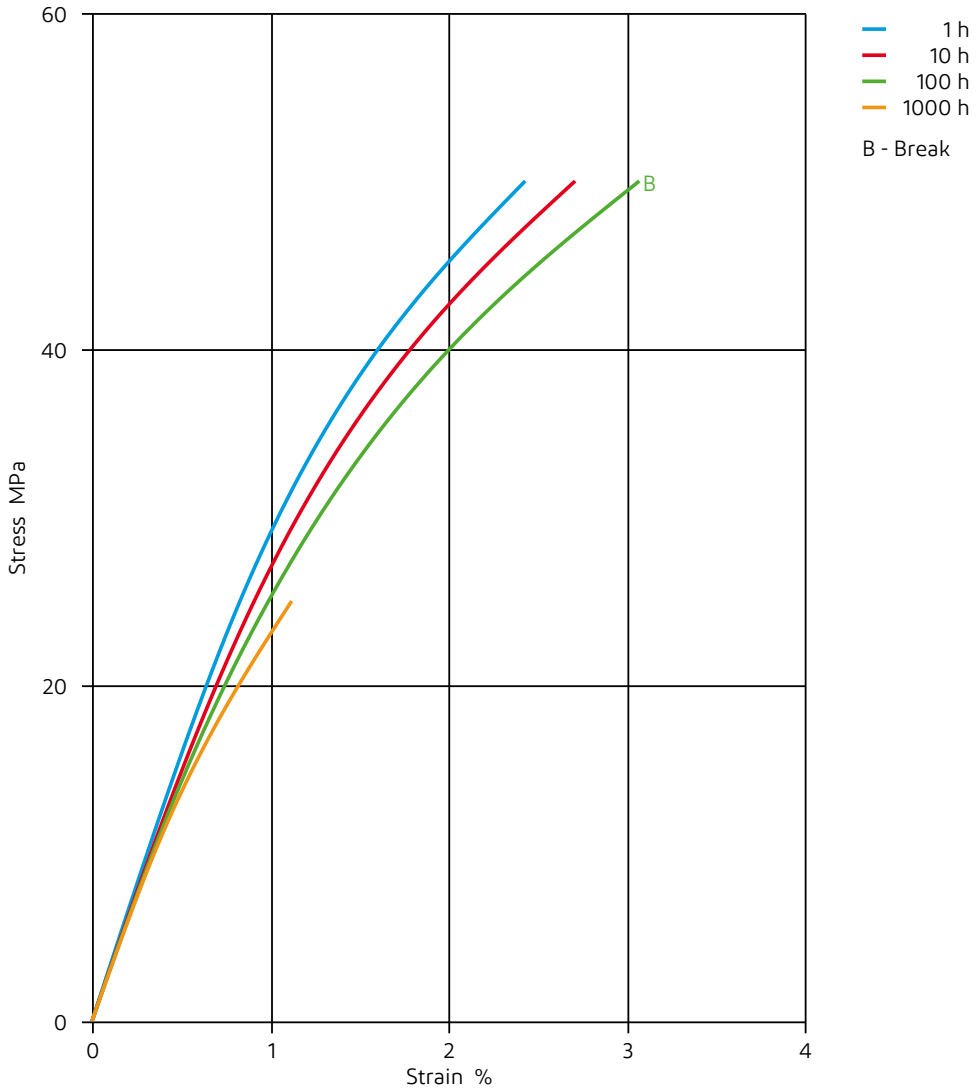
NYLON RESIN

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



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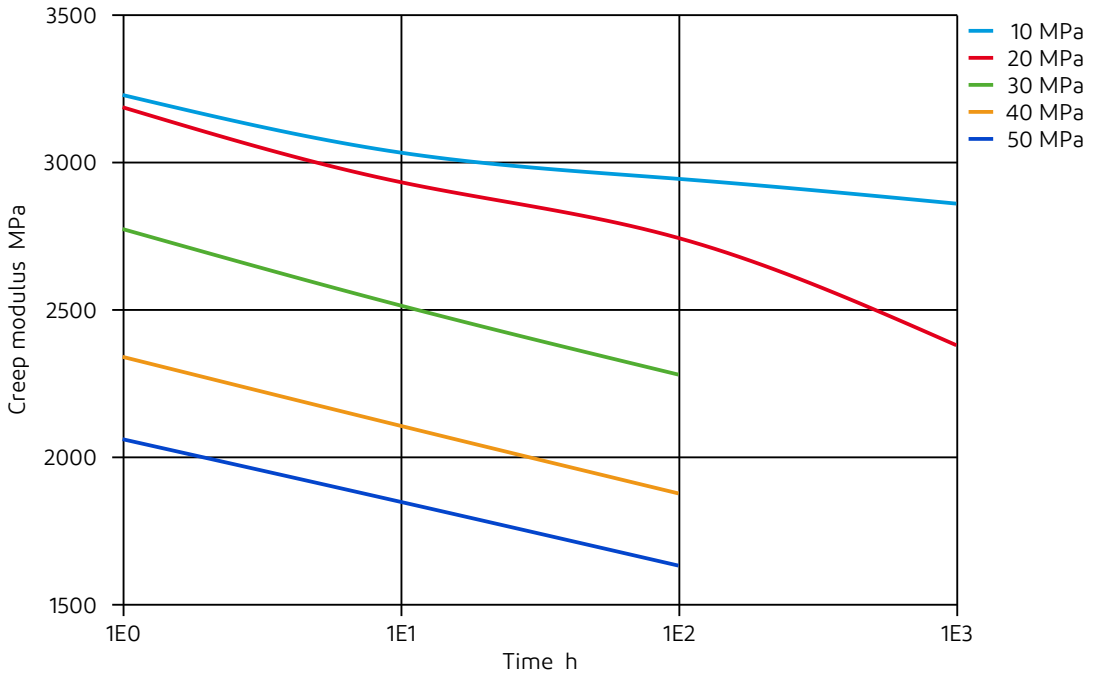
NYLON RESIN

Creep modulus-time 180°C (dry)



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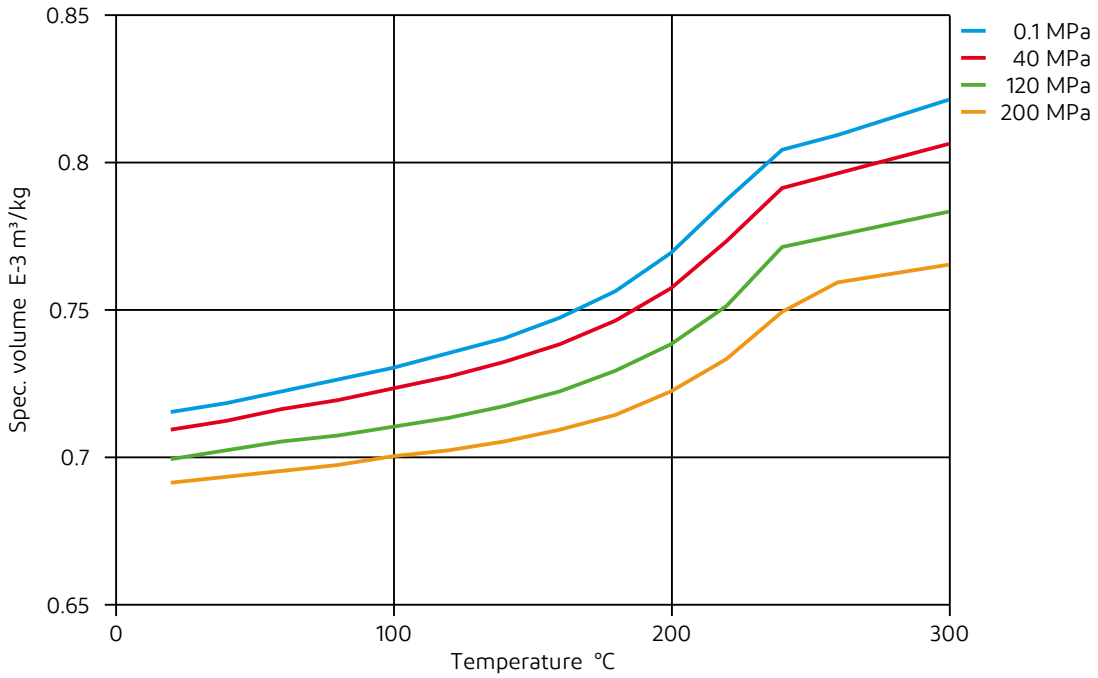
Specific volume-temperature (pvT)



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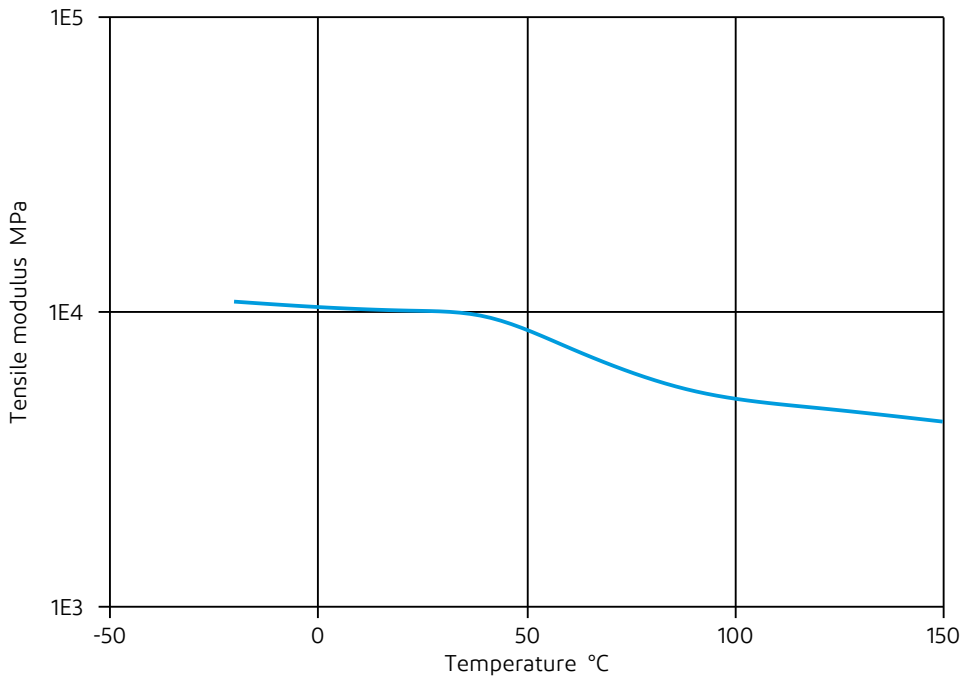
NYLON RESIN

Tensile modulus-temperature (dry)



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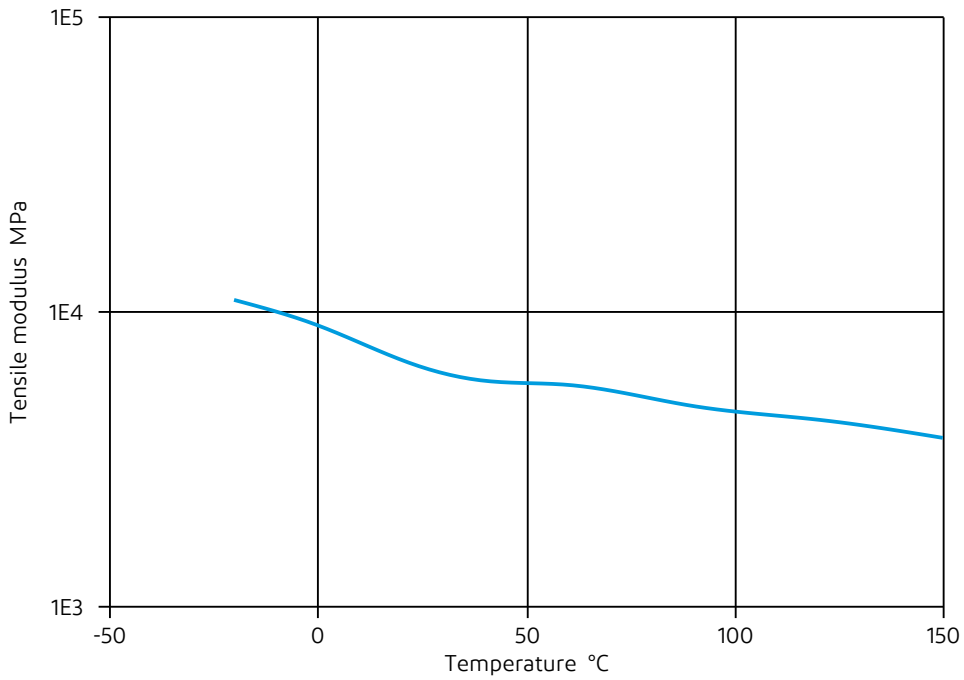
NYLON RESIN

Tensile modulus-temperature (cond.)



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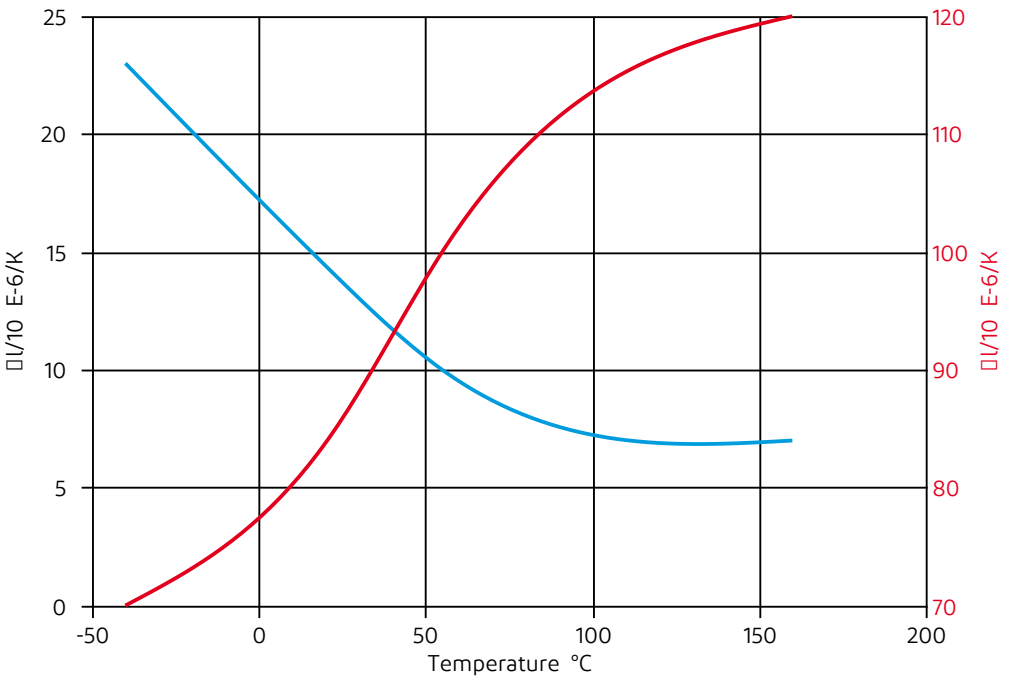
Coeff. of linear thermal expansion



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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

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- ✔ 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

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
- ✔ DOT No. 4 Brake fluid, 120°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
- ✔ 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).