

# Crastin® SK609 NC010

## THERMOPLASTIC POLYESTER RESIN

Common features of Crastin® thermoplastic polyester resin include mechanical and physical properties such as stiffness and toughness, heat resistance, friction and wear resistance, excellent surface finishes and good colourability. Crastin® thermoplastic polyester resin has excellent electrical insulation characteristics and high arc-resistant grades are available. Many flame retardant grades have UL recognition (class V-0). Crastin® thermoplastic polyester resin typically has high chemical and heat ageing resistance.

The good melt stability of Crastin® thermoplastic polyester 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 (-24 kJ/g of base polymer) in appropriately equipped installations. For disposal, local regulations have to be observed.

Crastin® thermoplastic polyester resin typically is used in demanding applications in the electronics, electrical, automotive, mechanical engineering, chemical, domestic appliances and sporting goods industry.

Crastin® SK609 NC010 is a 50% glass fiber reinforced, lubricated polybutylene terephthalate resin for injection moulding.

### Product information

Resin Identification	PBT-GF50	ISO 1043
Part Marking Code	>PBT-GF50<	ISO 11469

### Rheological properties

Melt volume-flow rate	2 cm <sup>3</sup> /10min	ISO 1133
Temperature	250 °C	
Load	2.16 kg	
Melt mass-flow rate	3 g/10min	ISO 1133
Melt mass-flow rate, Temperature	250 °C	
Melt mass-flow rate, Load	2.16 kg	
Moulding shrinkage, parallel	0.3 %	ISO 294-4, 2577
Moulding shrinkage, normal	1.1 %	ISO 294-4, 2577
Postmoulding shrinkage, normal, 48h at 80 °C	0.2 %	ISO 294-4
Postmoulding shrinkage, parallel, 48h at 80 °C	0.1 %	ISO 294-4

### Typical mechanical properties

Tensile modulus	16000 MPa	ISO 527-1/-2
Tensile stress at break, 5mm/min	160 MPa	ISO 527-1/-2
Tensile strain at break, 5mm/min	1.7 %	ISO 527-1/-2
Flexural modulus	15000 MPa	ISO 178
Flexural strength	230 MPa	ISO 178
Tensile creep modulus, 1h	15000 MPa	ISO 899-1
Tensile creep modulus, 1000h	11600 MPa	ISO 899-1
Charpy impact strength, 23 °C	55 kJ/m <sup>2</sup>	ISO 179/1eU
Charpy impact strength, -30 °C	65 kJ/m <sup>2</sup>	ISO 179/1eU
Charpy notched impact strength, 23 °C	11 kJ/m <sup>2</sup>	ISO 179/1eA
Charpy notched impact strength, -30 °C	12 kJ/m <sup>2</sup>	ISO 179/1eA
Izod notched impact strength, 23 °C	10 kJ/m <sup>2</sup>	ISO 180/1A
Izod notched impact strength, -30 °C	10.0 kJ/m <sup>2</sup>	ISO 180/1A
Izod impact strength, 23 °C	43 kJ/m <sup>2</sup>	ISO 180/1U
Izod impact strength, -30 °C	43 kJ/m <sup>2</sup>	ISO 180/1U

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Poisson's ratio 0.33

### Thermal properties

Melting temperature, 10°C/min	224 °C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	55 °C	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	210 °C	ISO 75-1/-2
Temperature of deflection under load, 0.45 MPa	222 °C	ISO 75-1/-2
Vicat softening temperature, 50°C/h 50N	215 °C	ISO 306
Coefficient of linear thermal expansion (CLTE), parallel	20 E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal	80 E-6/K	ISO 11359-1/-2
Thermal conductivity of melt	0.36 W/(m K)	ISO 22007-2
Specific heat capacity of melt	1470 J/(kg K)	ISO 22007-4
RTI, electrical, 0.75mm	130 °C	UL 746B
RTI, electrical, 1.5mm	130 °C	UL 746B
RTI, electrical, 3.0mm	130 °C	UL 746B
RTI, electrical, 6mm	130 °C	UL 746B
RTI, impact, 0.75mm	125 °C	UL 746B
RTI, impact, 1.5mm	125 °C	UL 746B
RTI, impact, 3.0mm	125 °C	UL 746B
RTI, impact, 6mm	125 °C	UL 746B
RTI, strength, 0.75mm	130 °C	UL 746B
RTI, strength, 1.5mm	130 °C	UL 746B
RTI, strength, 3.0mm	130 °C	UL 746B
RTI, strength, 6mm	130 °C	UL 746B

### Flammability

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	0.75 mm	IEC 60695-11-10
UL recognition	yes	UL 94
Oxygen index	20 %	ISO 4589-1/-2
Glow Wire Flammability Index, 3.0mm	750 °C	IEC 60695-2-12
FMVSS Class	B	ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	27 mm/min	ISO 3795 (FMVSS 302)

### Electrical properties

Relative permittivity, 100Hz	4.1	IEC 62631-2-1
Relative permittivity, 1MHz	3.9	IEC 62631-2-1
Dissipation factor, 100Hz	38 E-4	IEC 62631-2-1
Dissipation factor, 1MHz	130 E-4	IEC 62631-2-1
Volume resistivity	>1E13 Ohm.m	IEC 62631-3-1
Electric strength	33 kV/mm	IEC 60243-1
Comparative tracking index	500	IEC 60112
Electric Strength, Short Time, 2mm	14 kV/mm	IEC 60243-1

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### Physical/Other properties

Humidity absorption, 2mm	0.1 %	Sim. to ISO 62
Water absorption, 2mm	0.2 %	Sim. to ISO 62
Density	1720 kg/m <sup>3</sup>	ISO 1183
Density of melt	1600 kg/m <sup>3</sup>	

### VDA Properties

Fogging, G-value (condensate)	0 mg	ISO 6452
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### Injection

Drying Recommended	yes
Drying Temperature	120 °C
Drying Time, Dehumidified Dryer	2 - 4 h
Processing Moisture Content	≤0.04 %
Melt Temperature Optimum	260 °C
Min. melt temperature	250 °C
Max. melt temperature	270 °C
Mold Temperature Optimum	80 °C
Min. mould temperature	60 °C
Max. mould temperature	130 °C
Hold pressure range	≥60 MPa
Hold pressure time	3 s/mm
Back pressure	As low as possible MPa
Ejection temperature	180 °C

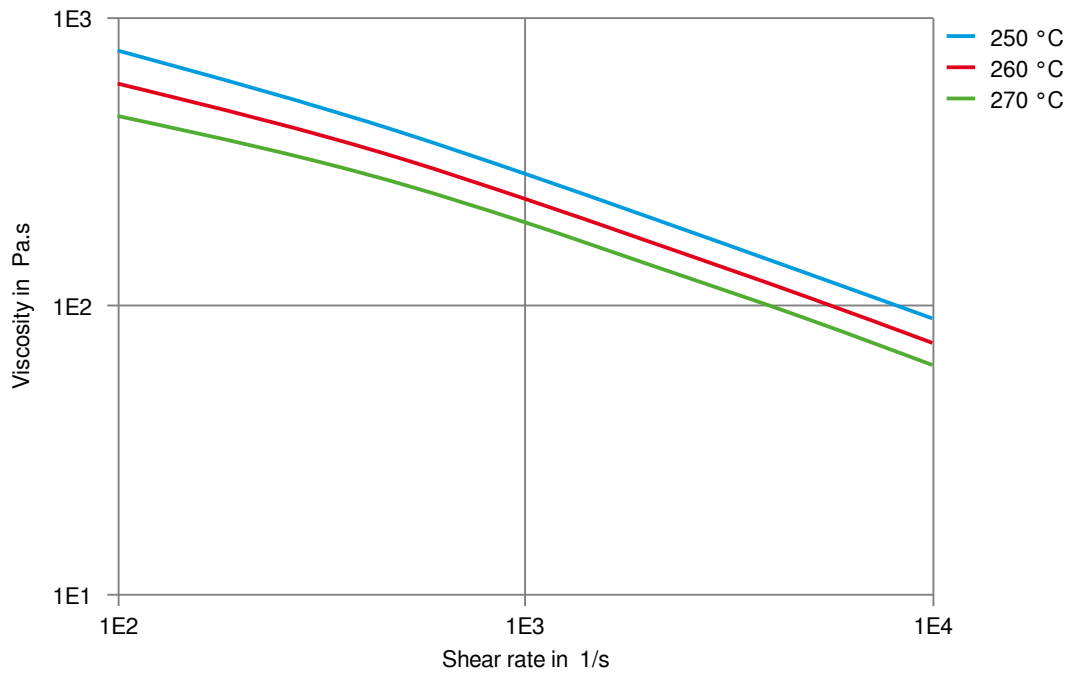
### Characteristics

Processing	Injection Moulding
Delivery form	Pellets
Additives	Release agent

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THERMOPLASTIC POLYESTER RESIN

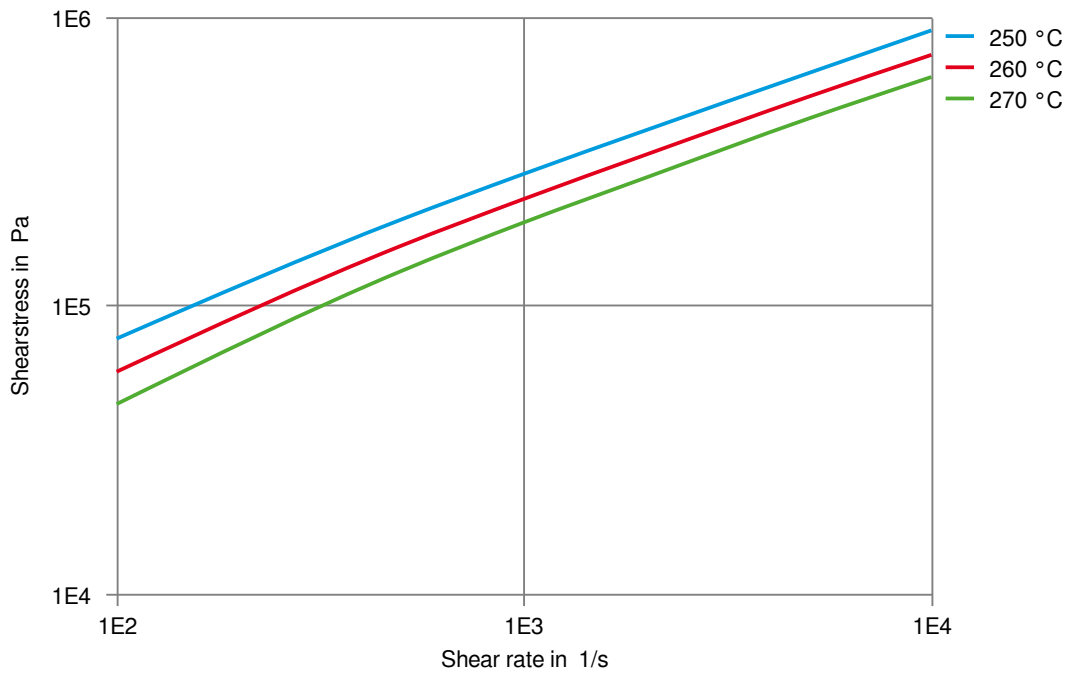
Viscosity-shear rate



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THERMOPLASTIC POLYESTER RESIN

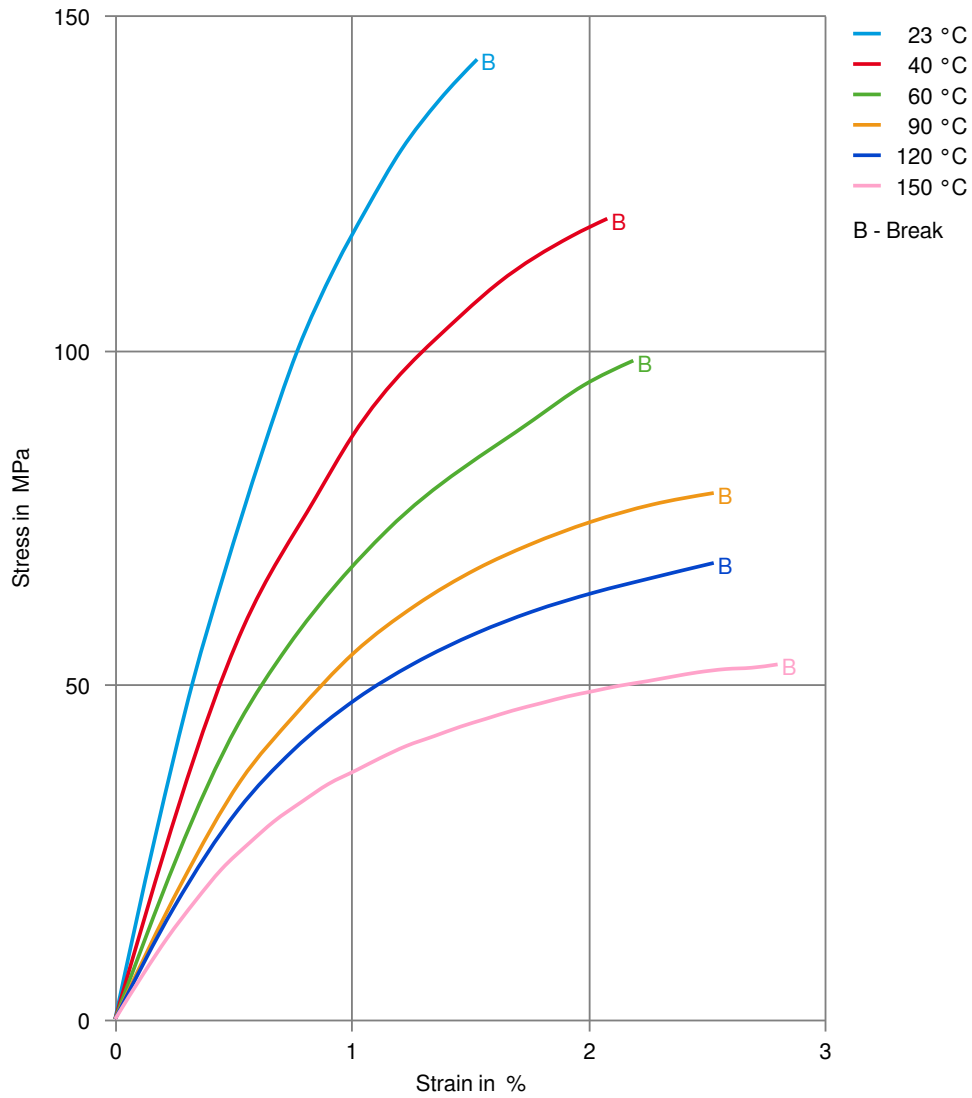
Shearstress-shear rate



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THERMOPLASTIC POLYESTER RESIN

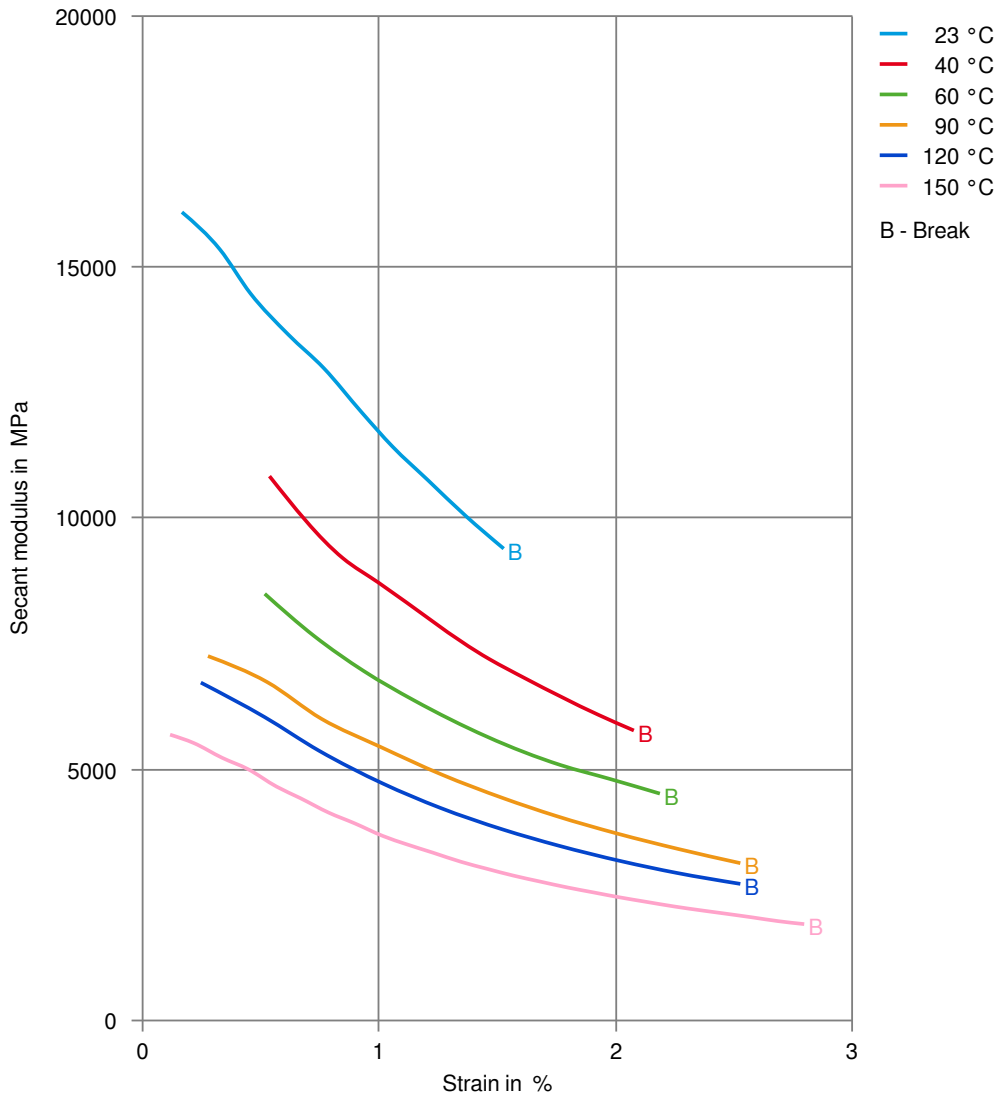
## Stress-strain



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THERMOPLASTIC POLYESTER RESIN

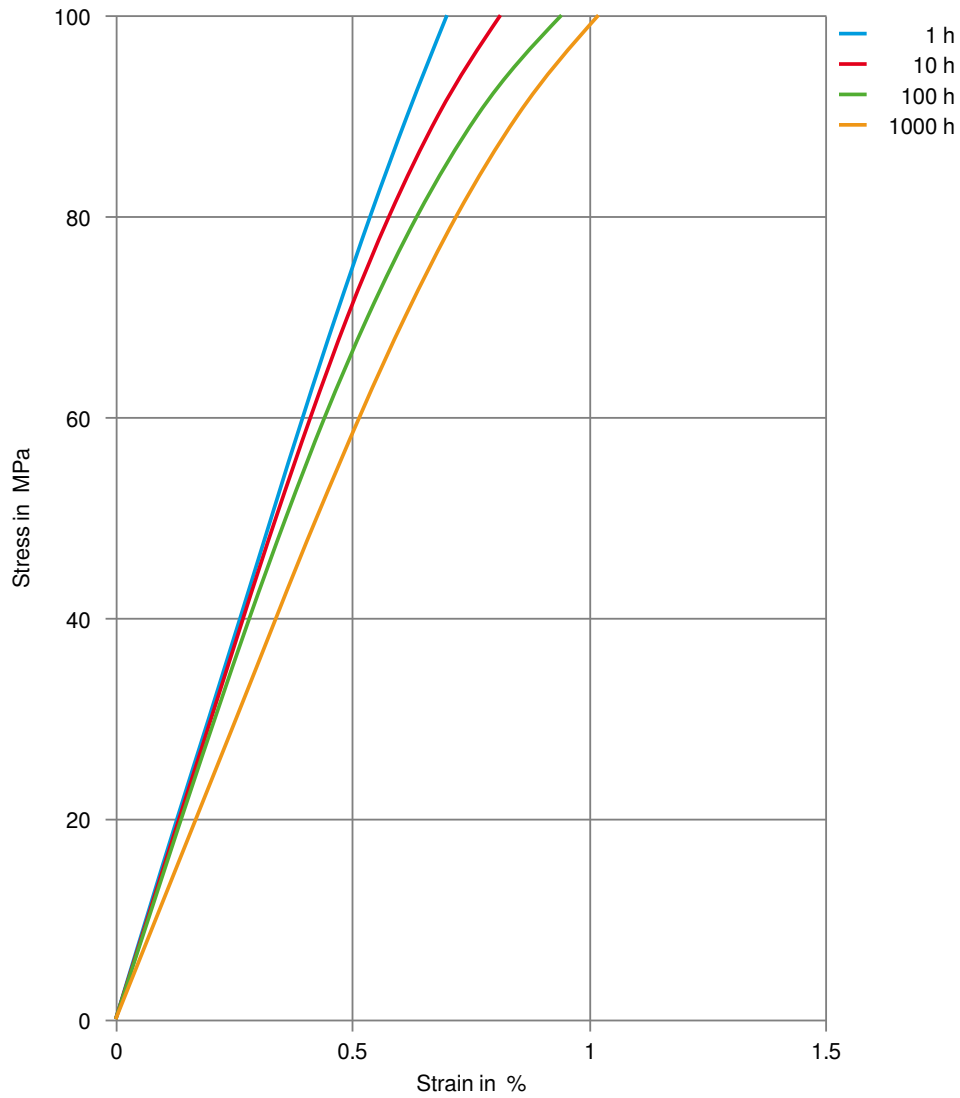
## Secant modulus-strain



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THERMOPLASTIC POLYESTER RESIN

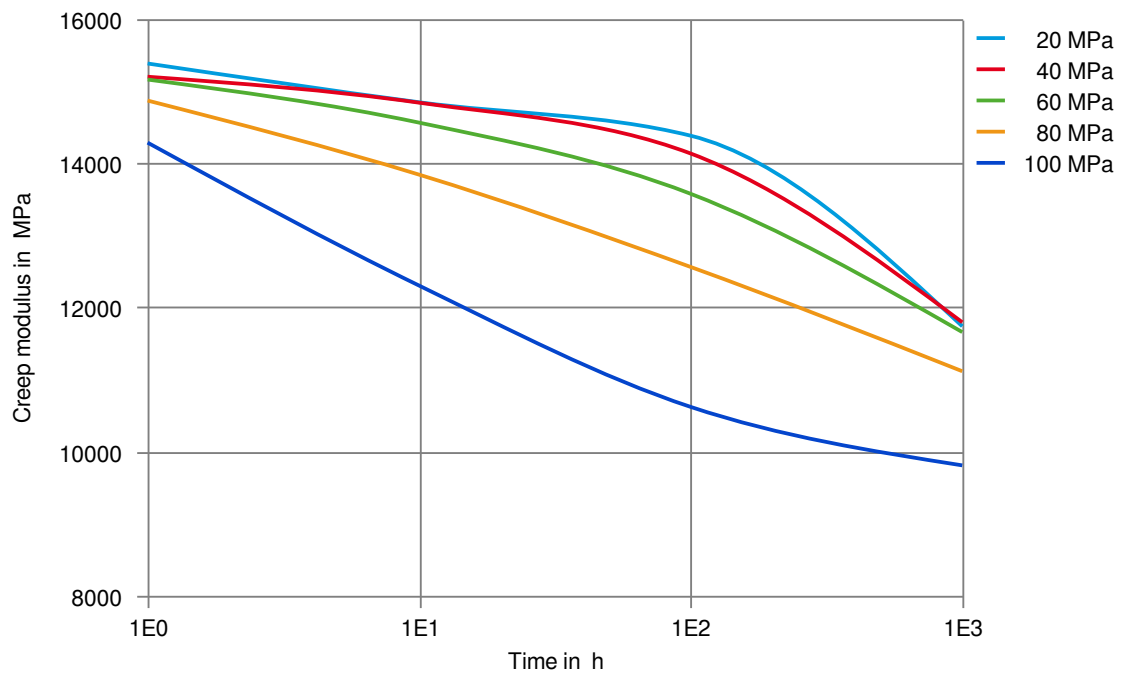
Stress-strain (isochronous) 23°C



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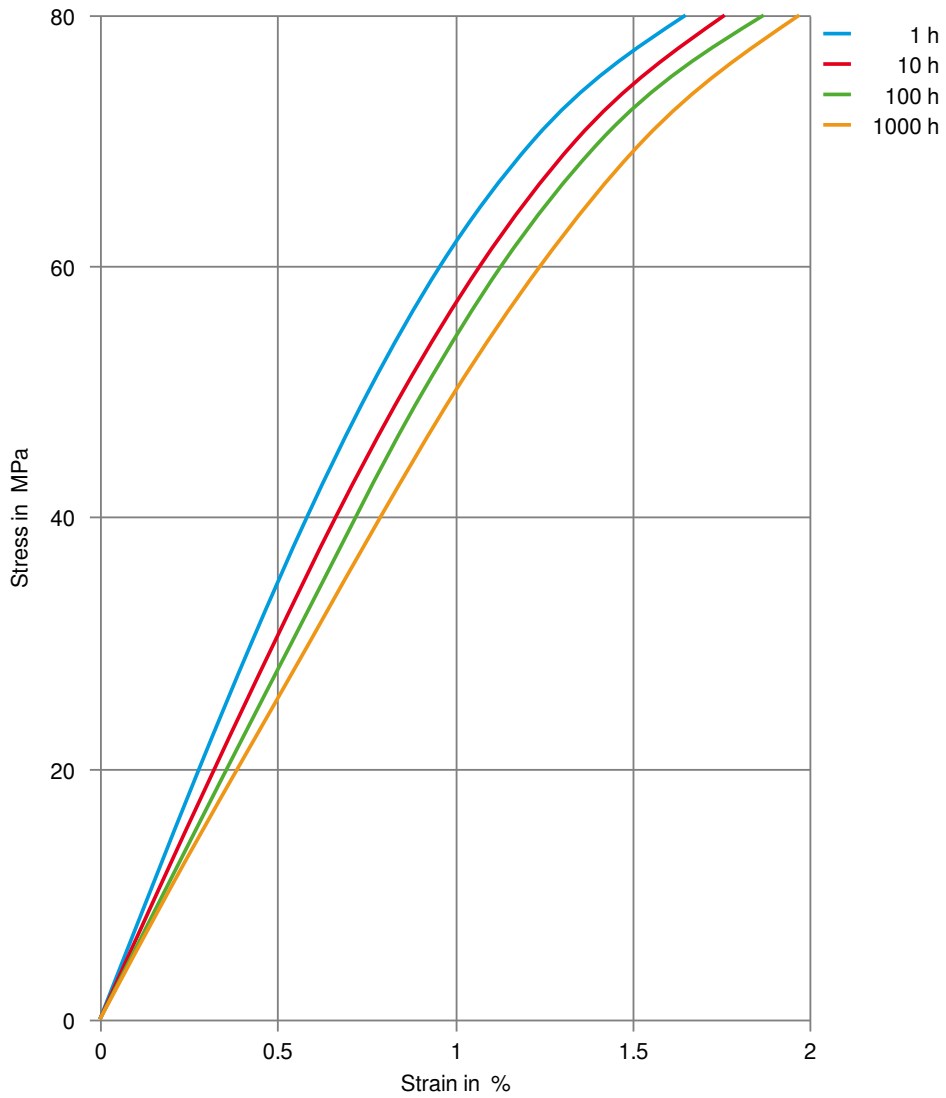
Creep modulus-time 23°C



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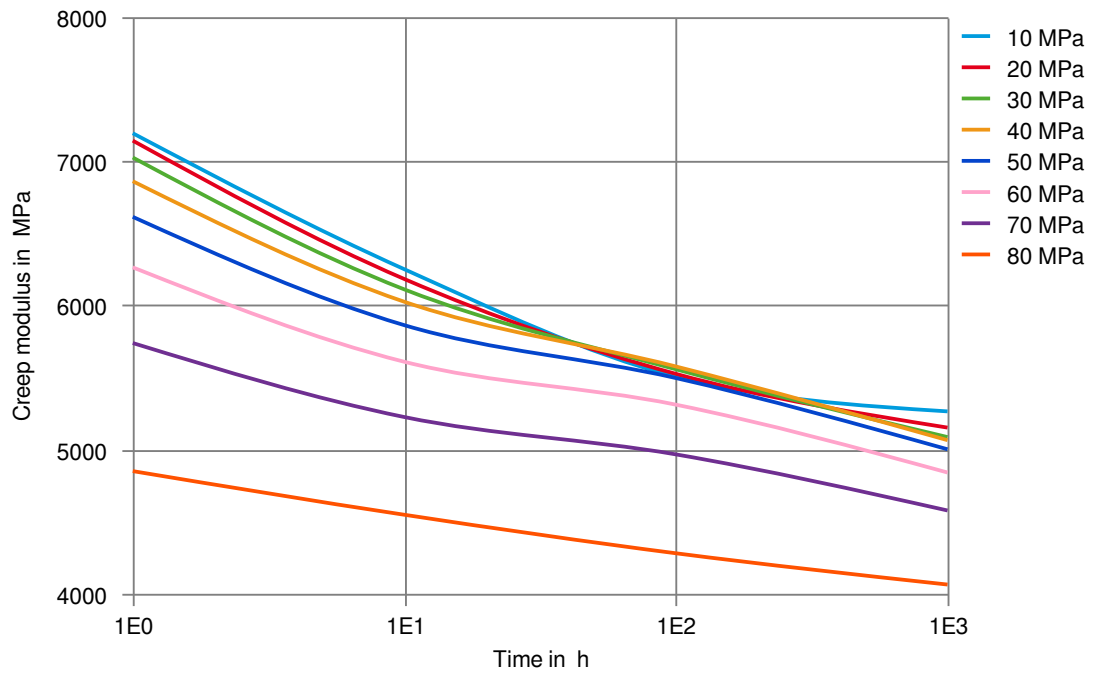
Stress-strain (isochronous) 60°C



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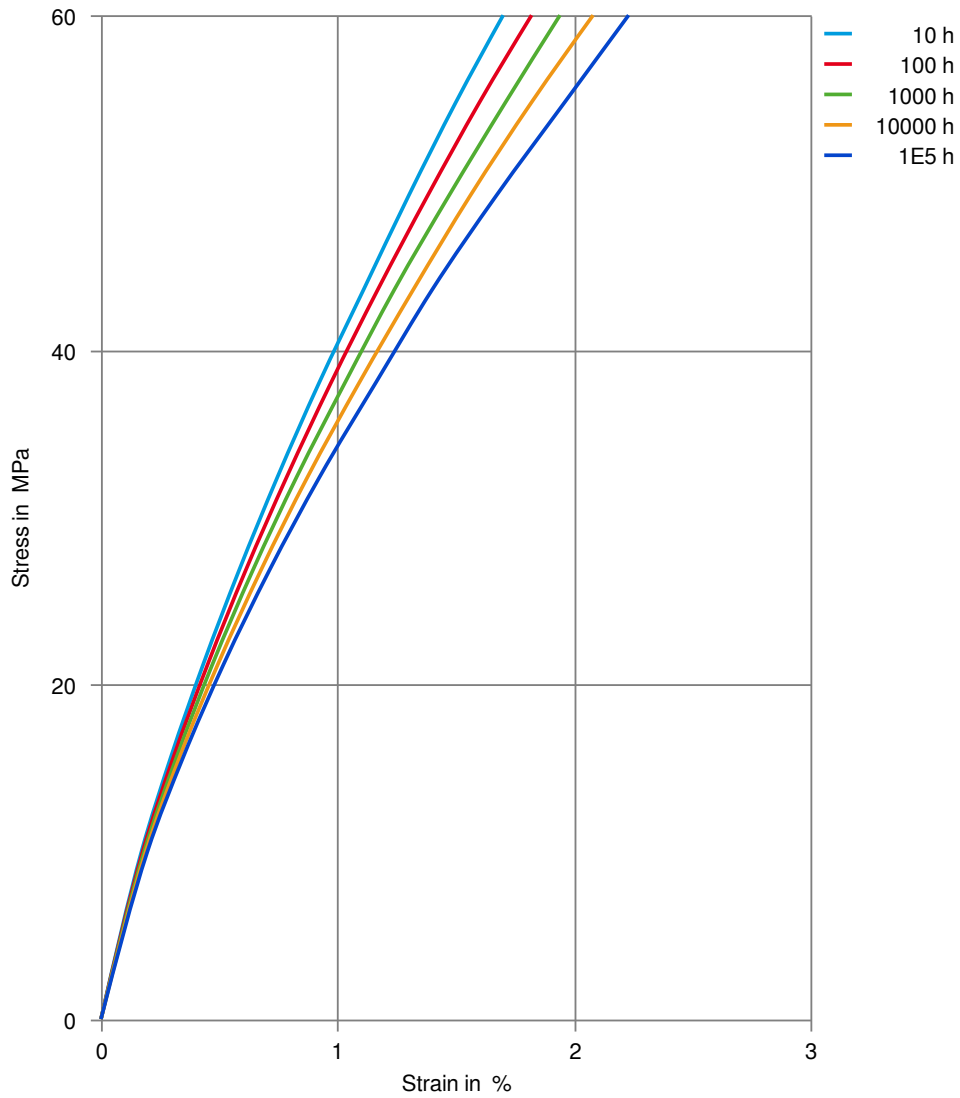
Creep modulus-time 60°C



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THERMOPLASTIC POLYESTER RESIN

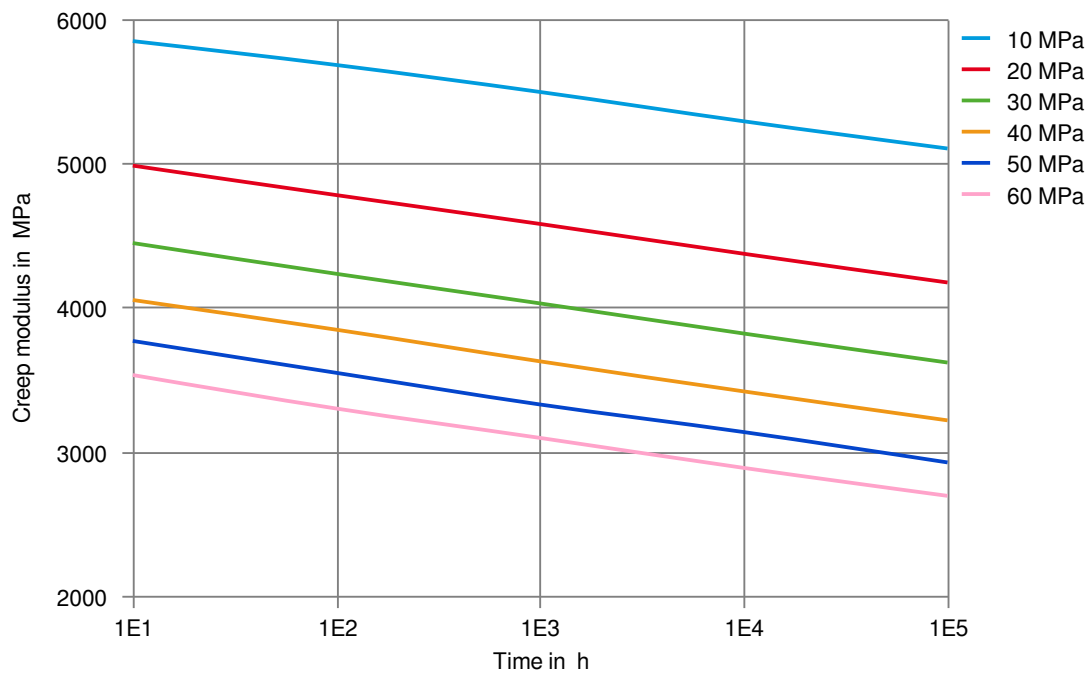
Stress-strain (isochronous) 90°C



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THERMOPLASTIC POLYESTER RESIN

Creep modulus-time 90°C



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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

#### Salt solutions

- ✓ Sodium Chloride solution (10% by mass), 23°C
- ✓ Sodium Hypochlorite solution (10% by mass), 23°C

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- ✓ 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).