



# Crastin® S600F20 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, DuPont recommends, 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® S600F20 NC010 is an unreinforced, lubricated, medium viscosity polybutylene terephthalate resin for injection moulding.

### Product information

Resin Identification	PBT	ISO 1043
Part Marking Code	>PBT<	ISO 11469
ISO designation	ISO 7792-PBT,MG NR,11-030	

### Rheological properties

Melt volume-flow rate	14 cm <sup>3</sup> /10min	ISO 1133
Melt mass-flow rate	19 g/10min	ISO 1133
Temperature	250 °C	ISO 1133
Load	2.16 kg	ISO 1133
Melt mass-flow rate, Temperature	250 °C	ISO 1133
Melt mass-flow rate, Load	2.16 kg	ISO 1133
Viscosity number	130 cm <sup>3</sup> /g	ISO 307, 1157, 1628
Intrinsic viscosity	1.08 -	ISO 307, 1157, 1628
Moulding shrinkage, parallel	1.7 %	ISO 294-4, 2577
Moulding shrinkage, normal	1.6 %	ISO 294-4, 2577
Postmoulding shrinkage, normal, 48h at 80°C	0.5 %	ISO 294-4
Postmoulding shrinkage, parallel, 48h at 80°C	0.3 %	ISO 294-4

### Typical mechanical properties

Tensile Modulus	2500 MPa	ISO 527-1/-2
Yield stress	55 MPa	ISO 527-1/-2
Yield strain	4 %	ISO 527-1/-2
Nominal strain at break	40 %	ISO 527-1/-2
Flexural Modulus	2200 MPa	ISO 178



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Flexural Strength	85 MPa	ISO 178
Tensile creep modulus, 1h	2600 MPa	ISO 899-1
Tensile creep modulus, 1000h	1800 MPa	ISO 899-1
Charpy impact strength, 23°C	N kJ/m <sup>2</sup>	ISO 179/1eU
Charpy impact strength, -30°C	N kJ/m <sup>2</sup>	ISO 179/1eU
Charpy notched impact strength, 23°C	5 kJ/m <sup>2</sup>	ISO 179/1eA
Charpy notched impact strength, -30°C	4 kJ/m <sup>2</sup>	ISO 179/1eA
Izod notched impact strength, 23°C	4.5 kJ/m <sup>2</sup>	ISO 180/1A
Izod impact strength, 23°C	N kJ/m <sup>2</sup>	ISO 180/1U
Ball indentation hardness, H 358/30	139 MPa	ISO 2039-1
Ball indentation hardness, H 961/30	139 MPa	ISO 2039-1
Poisson's ratio	0.38 -	

### Tribological properties

Coefficient of static friction, against itself	0.4	ASTM 1894
Coefficient of static friction, against steel	0.4	ASTM 1894

### Thermal properties

Melting temperature, 10°C/min	225 °C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	55 °C	ISO 11357-1/-2
Freezing temperature, 10°C/min	192 °C	ISO 11357-1/-2
Temp. of deflection under load, 1.8 MPa	50 °C	ISO 75-1/-2
Temp. of deflection under load, 1.8 MPa, annealed	60 °C	ISO 75-1/-2
Temp. of deflection under load, 0.45 MPa	115 °C	ISO 75-1/-2
Temp. of deflection under load, 0.45 MPa, annealed	180 °C	ISO 75-1/-2
Vicat softening temperature, 50°C/h, 50N	175 °C	ISO 306
CLTE, Parallel, -40-23°C	80 E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, parallel	110 E-6/K	ISO 11359-1/-2
CLTE, Parallel, 55-160°C	190 E-6/K	ISO 11359-1/-2
CLTE, Normal, -40-23°C	90 E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal	120 E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, Normal, 55-160°C	200 E-6/K	ISO 11359-1/-2
Thermal conductivity solid	0.29 W/(m K)	
Thermal conductivity of melt	0.21 W/(m K)	
Spec. heat capacity of melt	2110 J/(kg K)	
RTI, electrical, 0.75mm	130 °C	UL 746B
RTI, electrical, 1.5mm	130 °C	UL 746B
RTI, electrical, 3mm	130 °C	UL 746B
RTI, electrical, 6mm	130 °C	UL 746B
RTI, impact, 0.75mm	115 °C	UL 746B
RTI, impact, 1.5mm	115 °C	UL 746B
RTI, impact, 3mm	115 °C	UL 746B
RTI, impact, 6mm	115 °C	UL 746B
RTI, strength, 0.75mm	120 °C	UL 746B



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RTI, strength, 1.5mm	120 °C	UL 746B
RTI, strength, 3mm	120 °C	UL 746B
RTI, strength, 6mm	120 °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	22 %	ISO 4589-1/-2
Glow Wire Flammability Index, 3mm	750 °C	IEC 60695-2-12
Glow Wire Ignition Temperature, 0.75mm	750 °C	IEC 60695-2-13
Glow Wire Ignition Temperature, 1mm	750 °C	IEC 60695-2-13
Glow Wire Ignition Temperature, 1.5mm	750 °C	IEC 60695-2-13
Glow Wire Ignition Temperature, 2mm	750 °C	IEC 60695-2-13
Glow Wire Ignition Temperature, 3mm	725 °C	IEC 60695-2-13
FMVSS Class	SE -	ISO 3795 (FMVSS 302)

### Electrical properties

Relative permittivity, 100Hz	3.6 -	IEC 62631-2-1
Relative permittivity, 1MHz	3.2 -	IEC 62631-2-1
Dissipation factor, 100Hz	7.9 E-4	IEC 62631-2-1
Dissipation factor, 1MHz	200 E-4	IEC 62631-2-1
Volume resistivity	>1E13 Ohm.m	IEC 62631-3-1
Surface resistivity	1E12 Ohm	IEC 62631-3-2
Electric strength	26 kV/mm	IEC 60243-1
Comparative tracking index	575 -	IEC 60112

### Other properties

Humidity absorption, 2mm	0.2 %	Sim. to ISO 62
Water absorption, 2mm	0.4 %	Sim. to ISO 62
Density	1310 kg/m <sup>3</sup>	ISO 1183
Density of melt	1110 kg/m <sup>3</sup>	

### VDA Properties

Thermal desorption analysis of organic emissions	1 <sup>[AMax]</sup> µg/g	VDA 278
Odour	3 <sup>[DS]</sup> class	VDA 270
Fogging, G-value (condensate)	mg	ISO 6452

[AMax]: Assessed (Max)

[DS]: Derived from similar grade



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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	250 °C
Min. melt temperature	240 °C
Max. melt temperature	260 °C
Mold Temperature Optimum	80 °C
Min. mould temperature	30 °C
Max. mould temperature	130 °C
Hold pressure range	≥60 MPa
Hold pressure time	4 s/mm
Back pressure	As low as possible MPa
Ejection temperature	170 °C

## Characteristics

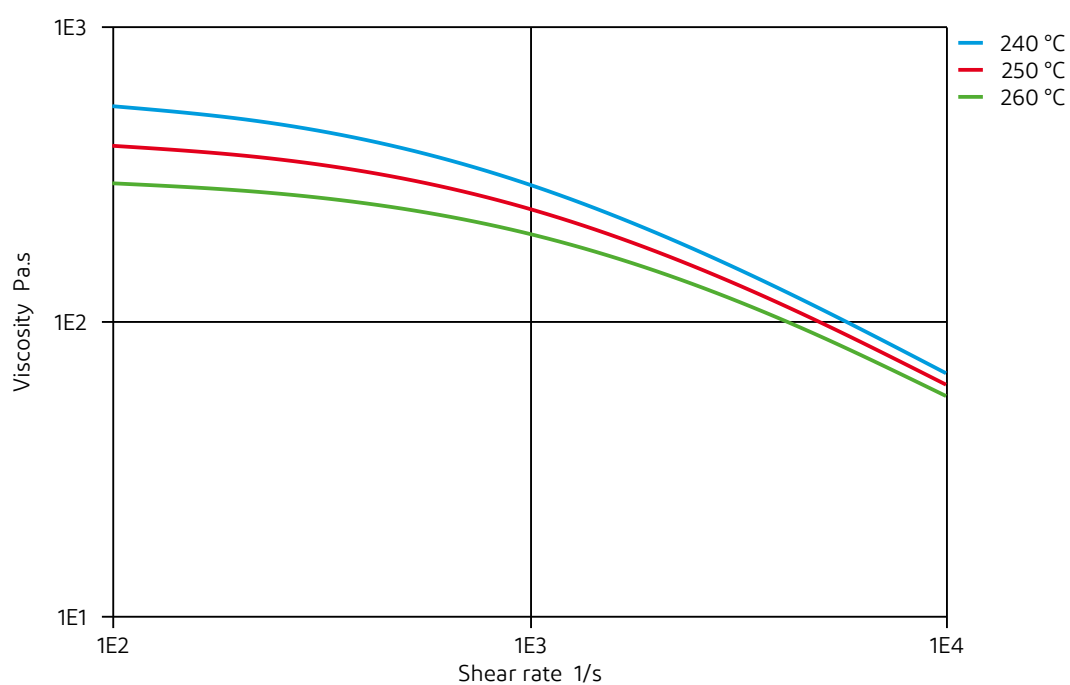
Additives	Release agent
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# Crastin<sup>®</sup> S600F20 NC010

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Viscosity-shear rate

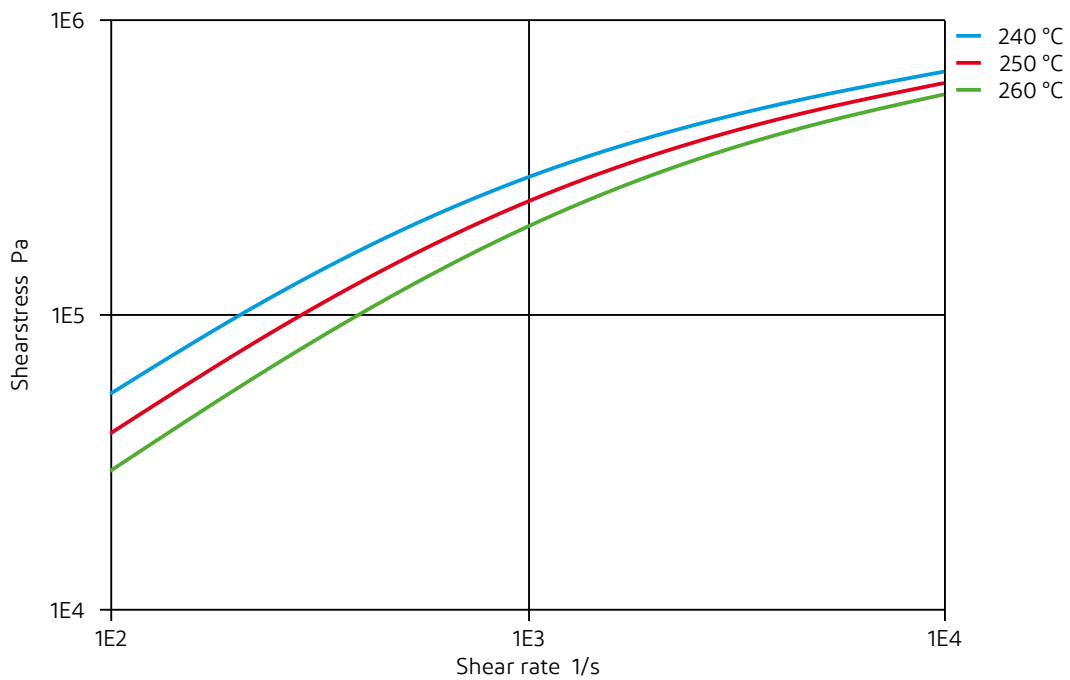




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THERMOPLASTIC POLYESTER RESIN

Shearstress-shear rate

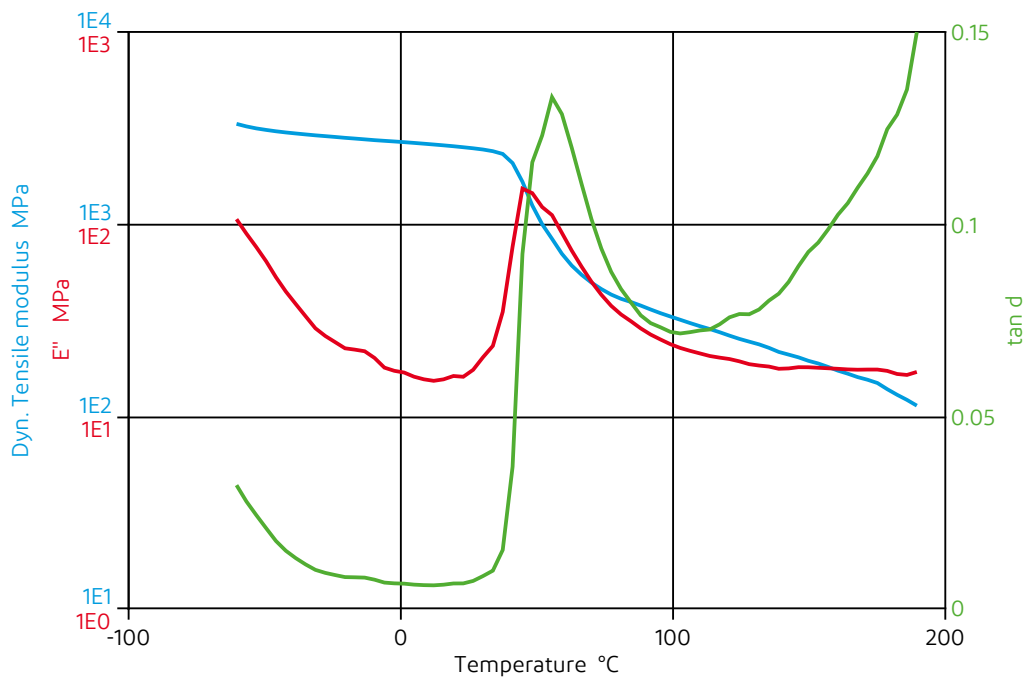




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THERMOPLASTIC POLYESTER RESIN

Dynamic Tensile modulus-temperature

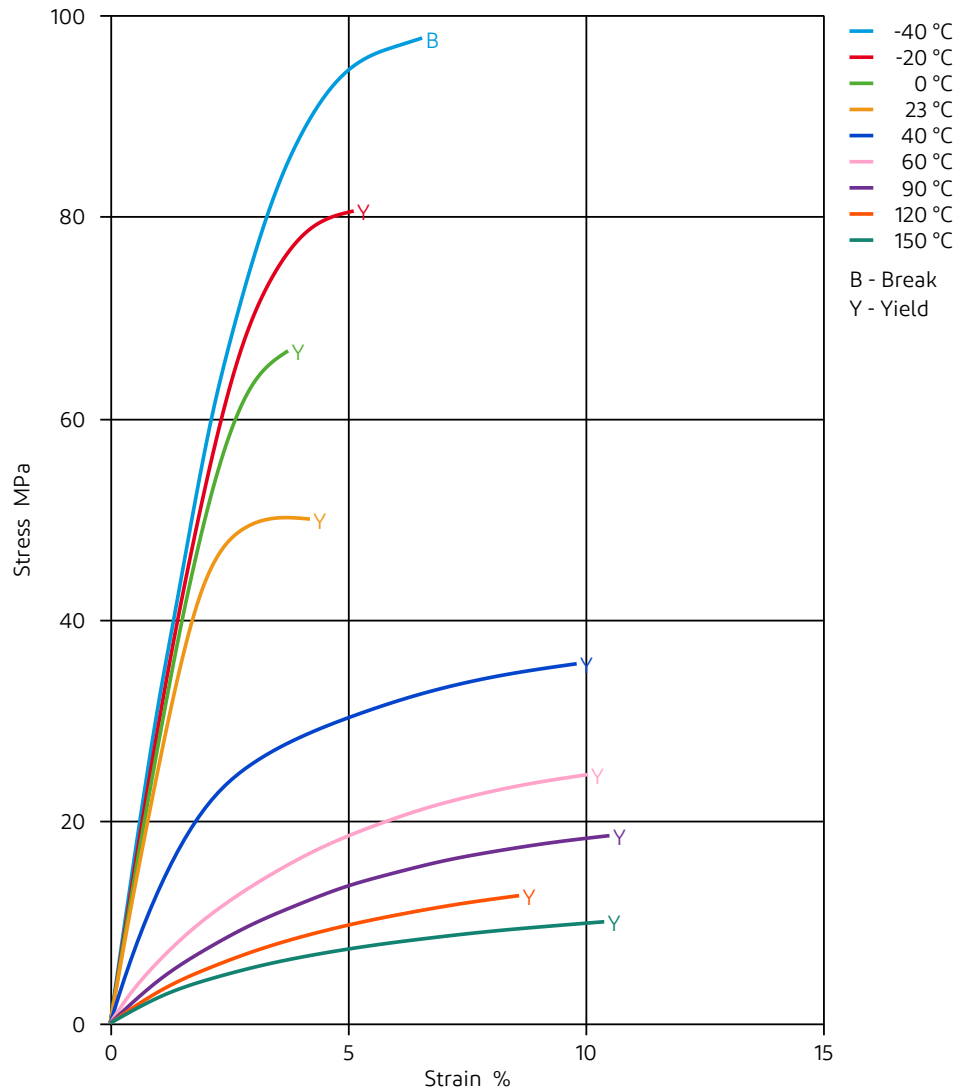




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THERMOPLASTIC POLYESTER RESIN

## Stress-strain



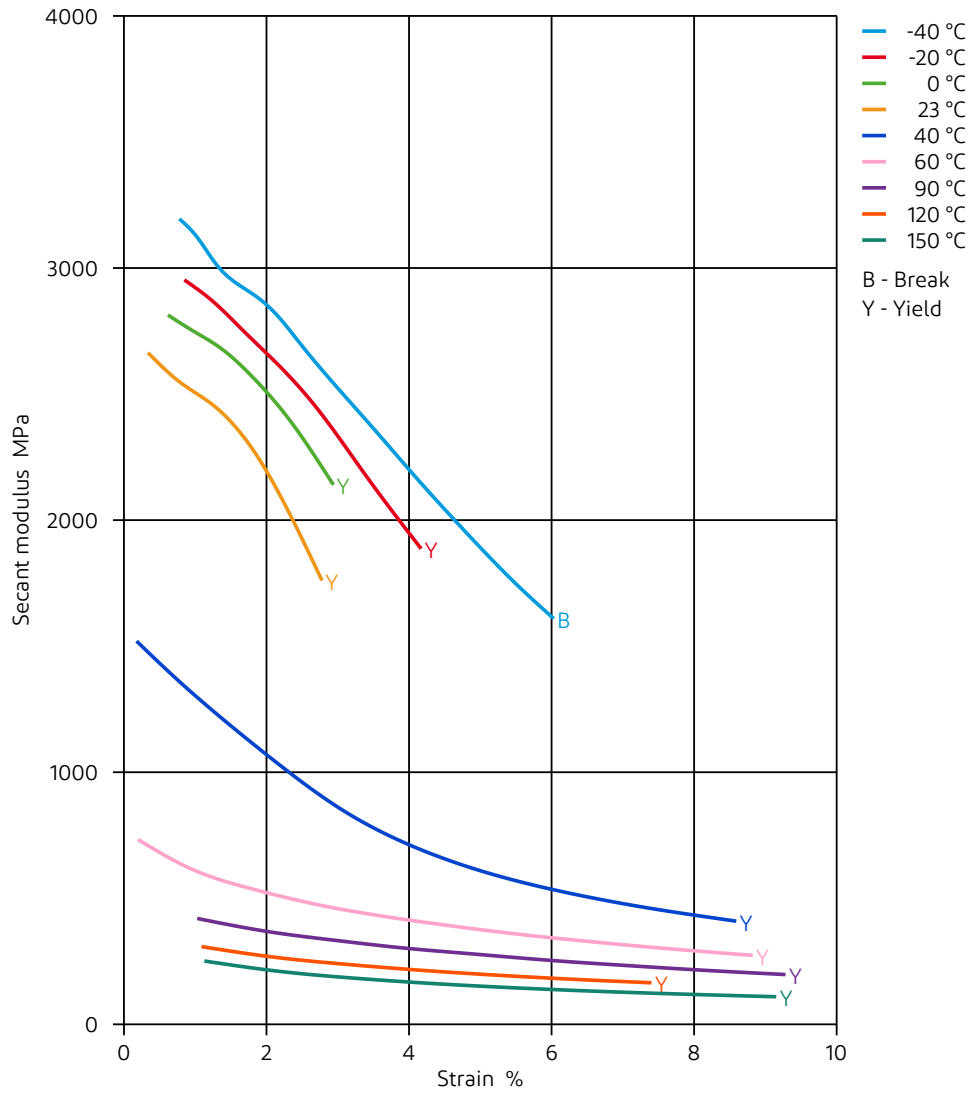




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THERMOPLASTIC POLYESTER RESIN

## Secant modulus-strain

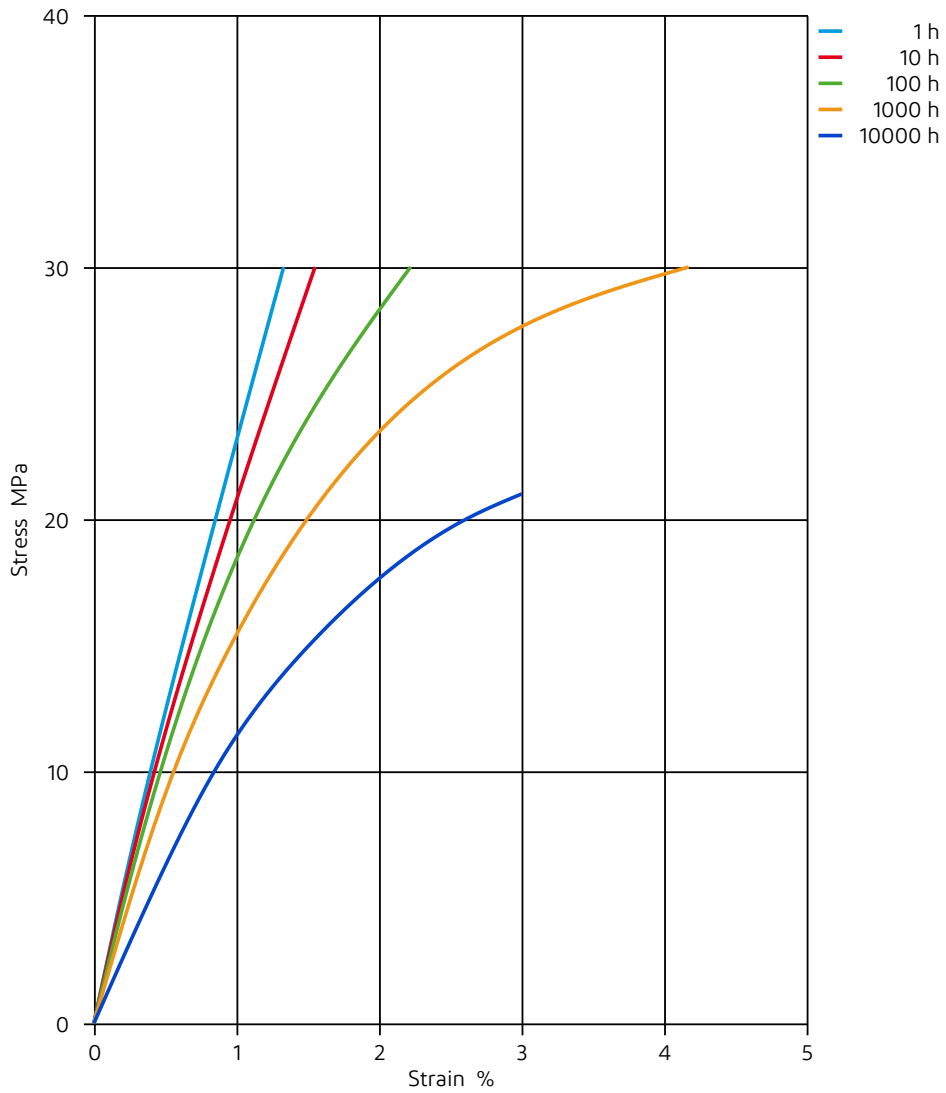




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THERMOPLASTIC POLYESTER RESIN

Stress-strain (isochronous) 23°C

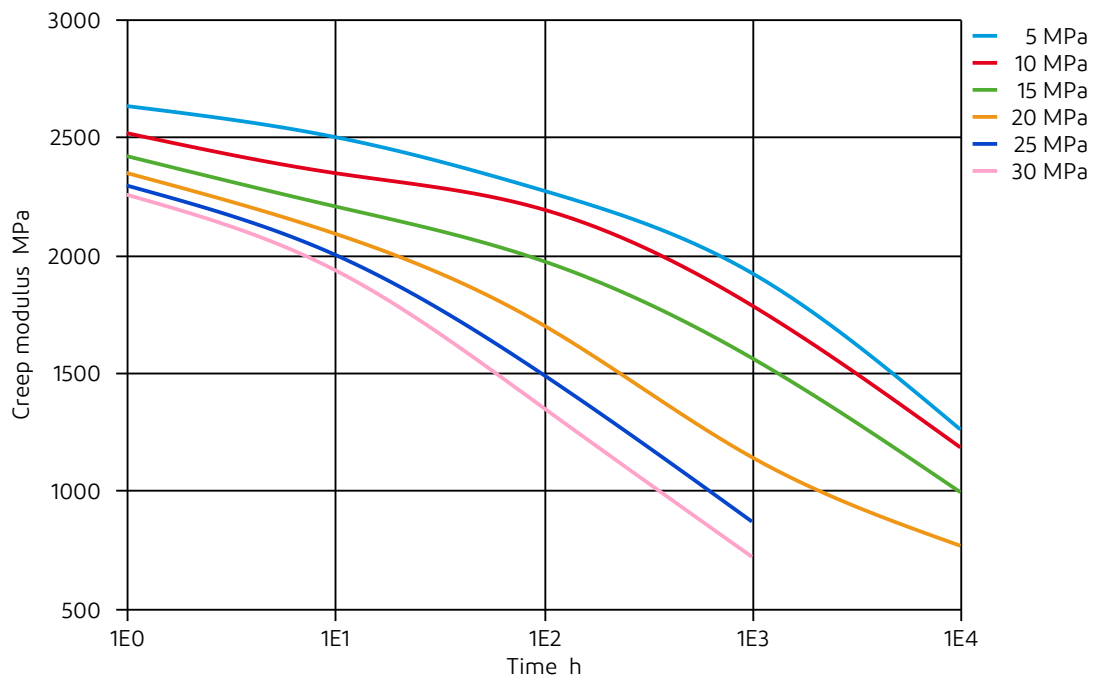




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THERMOPLASTIC POLYESTER RESIN

Creep modulus-time 23°C

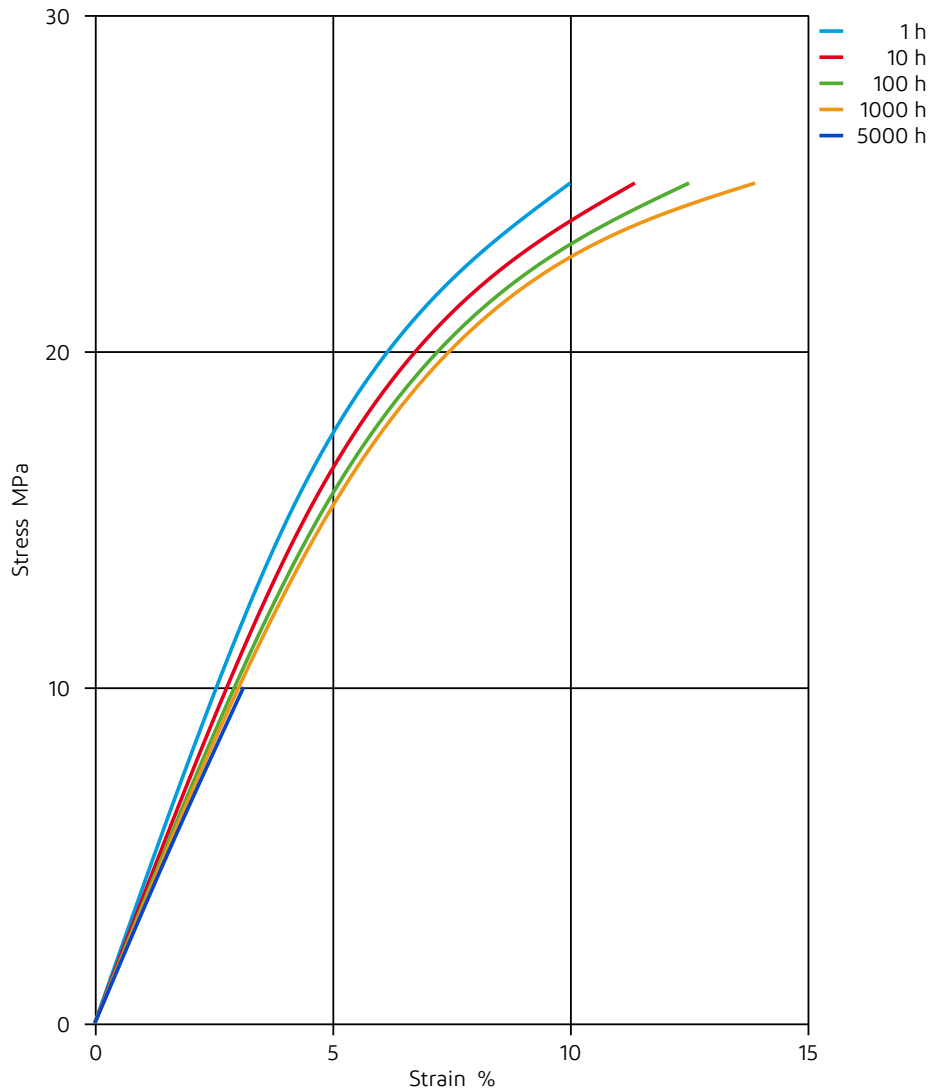




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THERMOPLASTIC POLYESTER RESIN

Stress-strain (isochronous) 60°C

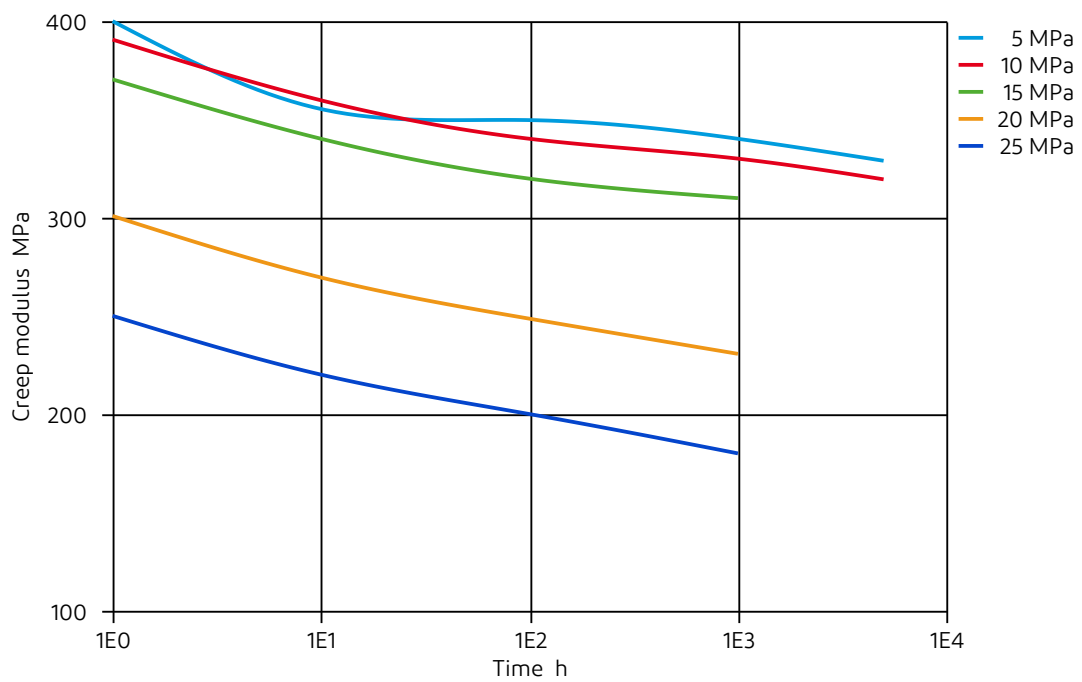




# Crastin<sup>®</sup> S600F20 NC010

THERMOPLASTIC POLYESTER RESIN

Creep modulus-time 60°C

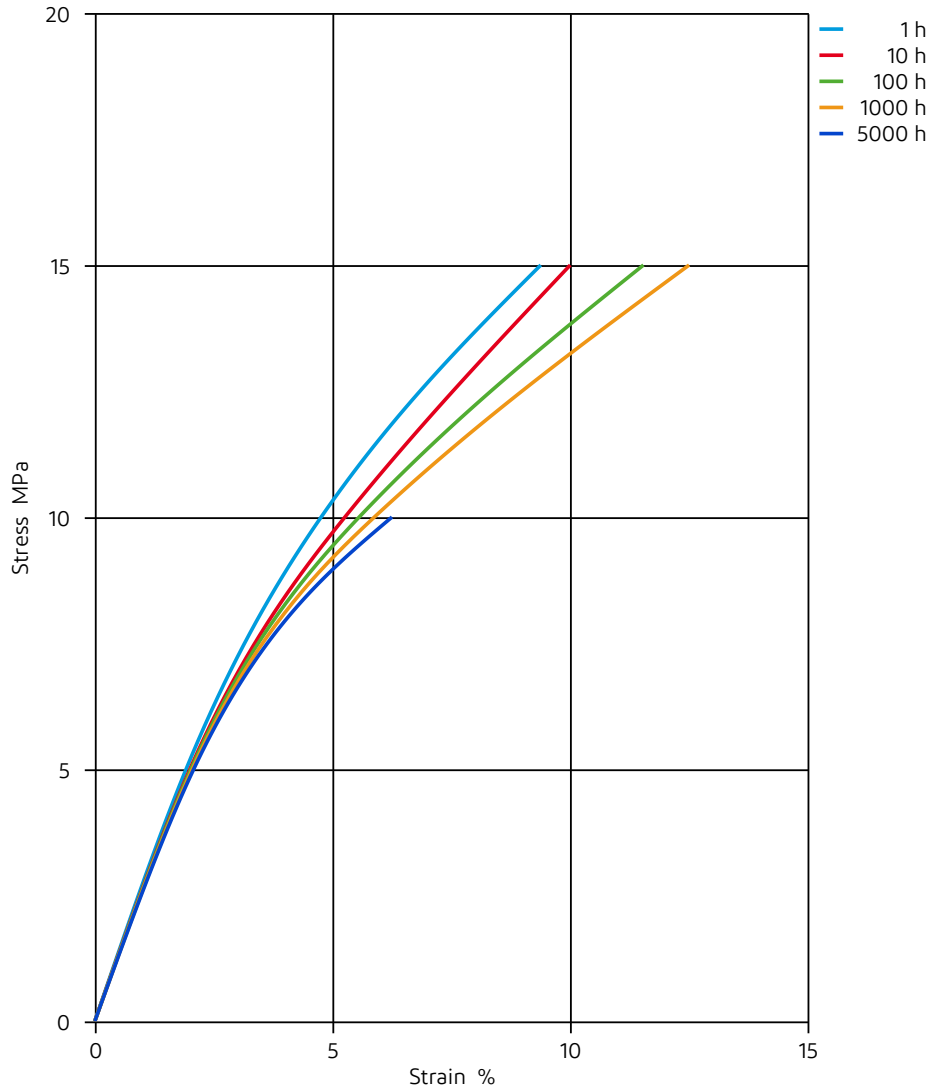




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THERMOPLASTIC POLYESTER RESIN

Stress-strain (isochronous) 110°C

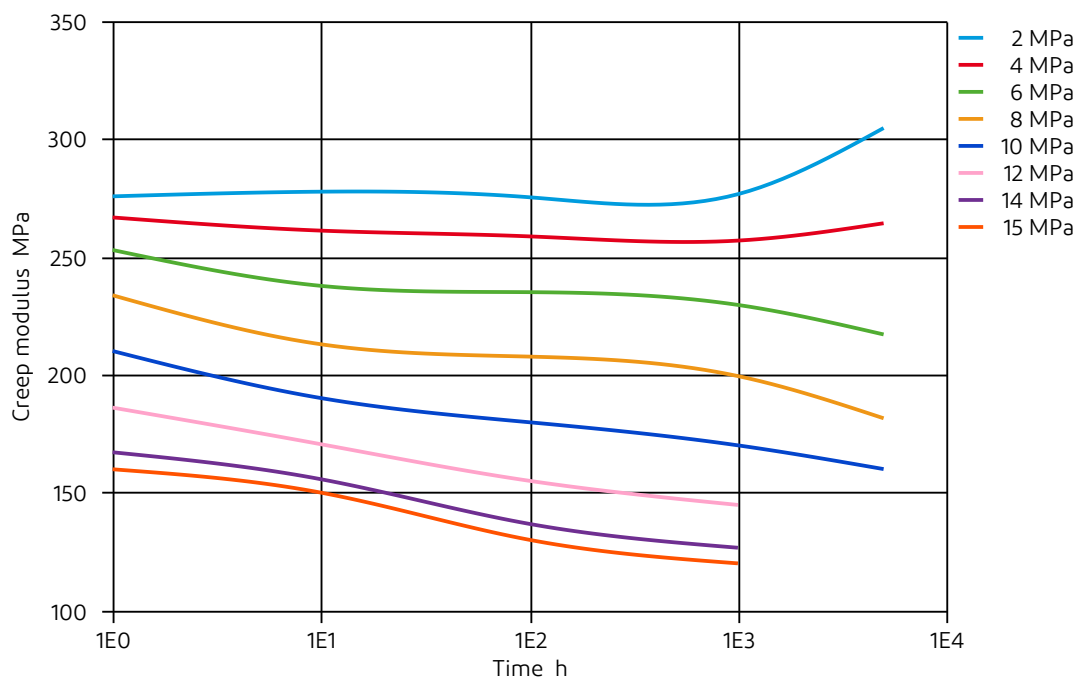




# Crastin<sup>®</sup> S600F20 NC010

THERMOPLASTIC POLYESTER RESIN

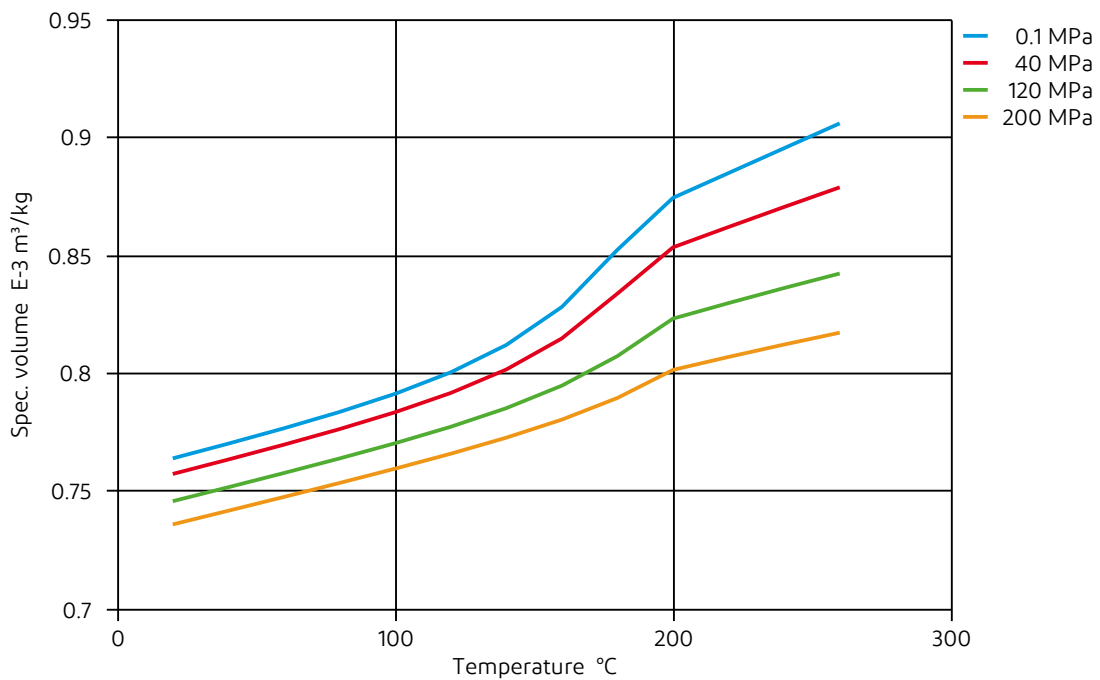
Creep modulus-time 110°C



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THERMOPLASTIC POLYESTER RESIN

Specific volume-temperature (pvT)



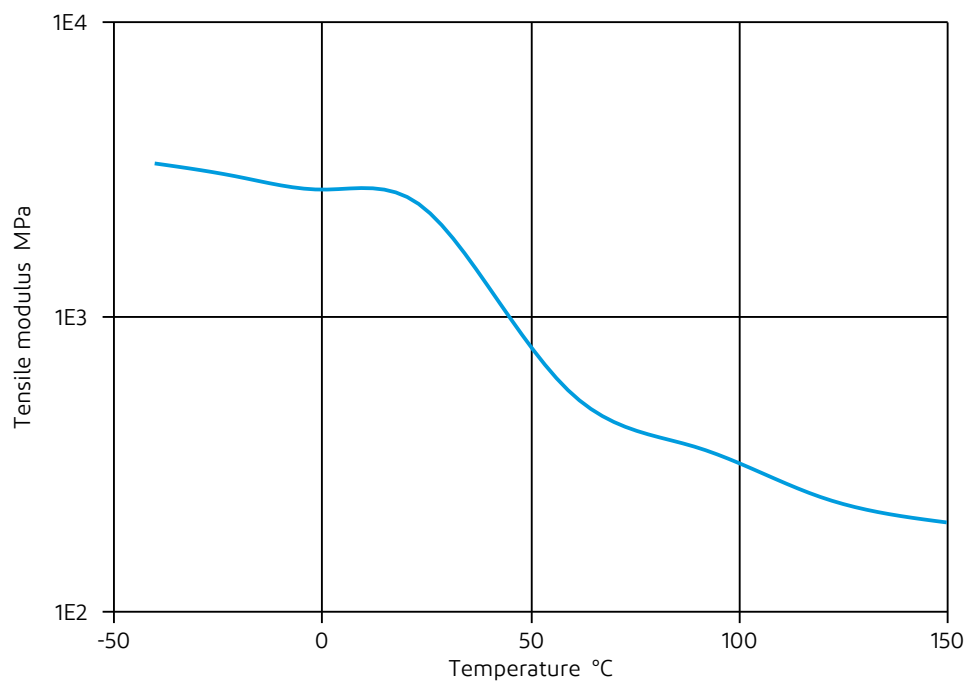




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THERMOPLASTIC POLYESTER RESIN

Tensile modulus-temperature

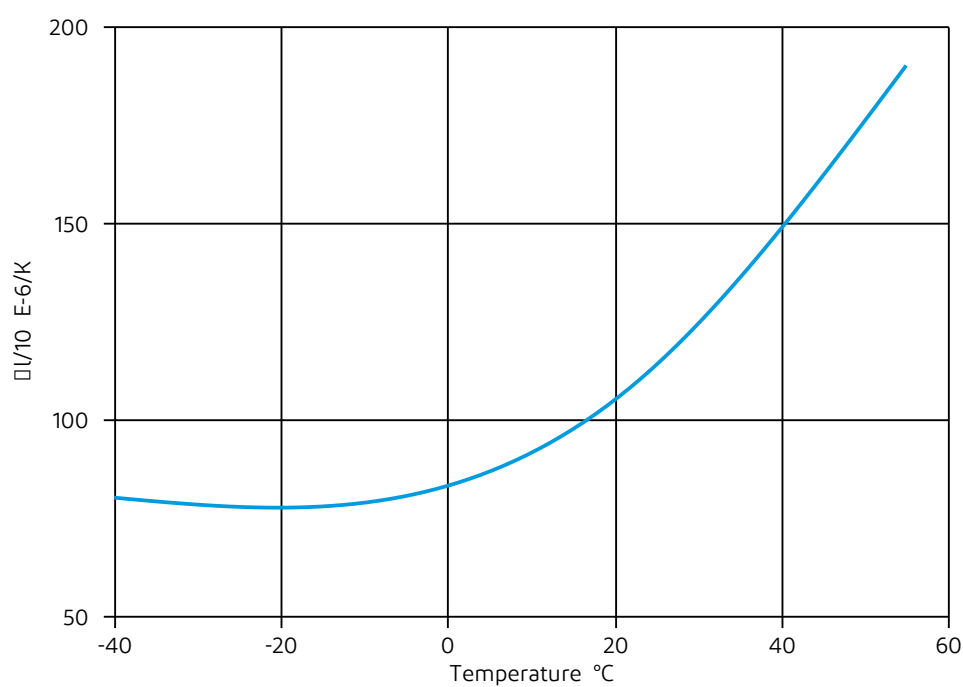




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Coeff. of linear thermal expansion



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## THERMOPLASTIC POLYESTER RESIN

### 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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