

### 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® SK602 NC010 is a 15% glass fiber reinforced, lubricated polybutylene terephthalate resin for injection moulding.

### **Product information**

Resin Identification	PBT-GF15		ISO 1043
Part Marking Code	>PBT-GF15<		ISO 11469
-			
Rheological properties			
Melt volume-flow rate	15	cm <sup>3</sup> /10min	ISO 1133
Melt mass-flow rate	18	g/10min	ISO 1133
Temperature	250	°C	
Load	2.16	kg	
Melt mass-flow rate, Temperature	250	°Č	
Melt mass-flow rate, Load	2.16	kg	
Viscosity number	105	cm <sup>3</sup> /g	ISO 307, 1628
Moulding shrinkage, parallel	0.4	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.1	%	ISO 294-4, 2577
Postmoulding shrinkage, normal, 48h at 80°C	0.3	%	ISO 294-4
Postmoulding shrinkage, parallel, 48h at 80°C	0.15	%	ISO 294-4
Typical mechanical properties			
Tensile modulus	5800	MPa	ISO 527-1/-2
Tensile stress at break, 5mm/min	110	MPa	ISO 527-1/-2
Tensile strain at break, 5mm/min	3.5	%	ISO 527-1/-2
Flexural modulus	5200		ISO 178
Flexural strength	160	MPa	ISO 178
Tensile creep modulus, 1h	5300	MPa	ISO 899-1
Tensile creep modulus, 1000h	4300	MPa	ISO 899-1
Charpy impact strength, 23°C	45	kJ/m²	ISO 179/1eU
Charpy impact strength, -30°C	45	kJ/m²	ISO 179/1eU
Charpy impact strength, -40°C	40	kJ/m²	ISO 179/1eU
Charpy notched impact strength, 23°C	7	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -30°C	7	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -40°C	7	kJ/m²	ISO 179/1eA
Izod notched impact strength, 23°C	6.5	kJ/m²	ISO 180/1A
Izod notched impact strength, -30 °C	6.0	kJ/m²	ISO 180/1A

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Izod notched impact strength, -40°C Izod impact strength, 23°C Izod impact strength, -30°C Izod impact strength, -40°C Poisson's ratio	50 50	kJ/m² kJ/m² kJ/m² kJ/m²	ISO 180/1A ISO 180/1U ISO 180/1U ISO 180/1U
Thermal properties			
Melting temperature, 10°C/min	225	°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	200	°C	ISO 75-1/-2
Temperature of deflection under load, 0.45 MPa	220	°C	ISO 75-1/-2
Vicat softening temperature, 50 ° C/h 50N	205	°C	ISO 306
Coefficient of linear thermal expansion	50	E-6/K	ISO 11359-1/-2
(CLTE), parallel			
Coefficient of linear thermal expansion (CLTE),	110	E-6/K	ISO 11359-1/-2
normal			
Thermal conductivity of melt		W/(m K)	ISO 22007-2
Specific heat capacity of melt		J/(kg K)	ISO 22007-4
RTI, electrical, 0.75mm	130		UL 746B
RTI, electrical, 1.5mm	130		UL 746B
RTI, electrical, 3.0mm	130		UL 746B
RTI, electrical, 6mm	130		UL 746B
RTI, impact, 0.75mm	115		UL 746B
RTI, impact, 1.5mm	115		UL 746B
RTI, impact, 3.0mm	115		UL 746B
RTI, impact, 6mm	115		UL 746B
RTI, strength, 0.75mm	120		UL 746B
RTI, strength, 1.5mm	120		UL 746B
RTI, strength, 3.0mm	120		UL 746B
RTI, strength, 6mm	120 available	ч <b>С</b>	UL 746B
TGA curve	available		ISO 11359-1/-2
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	19	%	ISO 4589-1/-2
Glow Wire Flammability Index, 3.0mm	750		IEC 60695-2-12
Glow Wire Ignition Temperature, 0.75mm	750		IEC 60695-2-13
Glow Wire Ignition Temperature, 1.0mm	750		IEC 60695-2-13
Glow Wire Ignition Temperature, 1.5mm	750		IEC 60695-2-13
Glow Wire Ignition Temperature, 2.0mm	750		IEC 60695-2-13
Glow Wire Ignition Temperature, 3.0mm	725	°C	IEC 60695-2-13
FMVSS Class	В		ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	30	mm/min	ISO 3795 (FMVSS 302)

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### Electrical properties

Relative permittivity, 100Hz	3.8		IEC 62631-2-1
Relative permittivity, 1MHz	3.5		IEC 62631-2-1
Dissipation factor, 100Hz		E-4	IEC 62631-2-1
Dissipation factor, 1MHz	200		IEC 62631-2-1
Volume resistivity		Ohm.m	IEC 62631-3-1
Surface resistivity	1E15		IEC 62631-3-2
Electric strength		kV/mm	IEC 60243-1
Comparative tracking index	350		IEC 60112
Electric Strength, Short Time, 2mm	17	kV/mm	IEC 60243-1
Physical/Other properties			
Humidity absorption, 2mm	0.17	%	Sim. to ISO 62
Water absorption, 2mm	0.42	%	Sim. to ISO 62
Density		kg/m³	ISO 1183
Density of melt		kg/m <sup>3</sup>	
		C C	
VDA Properties			
Odour	3	class	VDA 270
Fogging, G-value (condensate)	0.1	mg	ISO 6452
		-	
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		
Max. melt temperature	260		
Mold Temperature Optimum	80	°C	
Min. mould temperature		°C	
Max. mould temperature	130		
Hold pressure range	≥60	MPa	
Hold pressure time		s/mm	
Back pressure	As low as	MPa	
	possible		
Ejection temperature	185	°C	
Characteristics			

### Characteristics

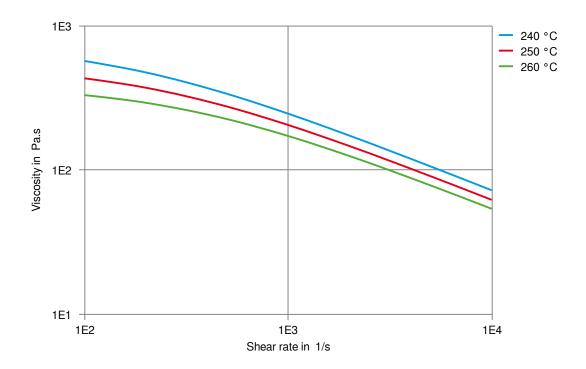
Additives

Release agent



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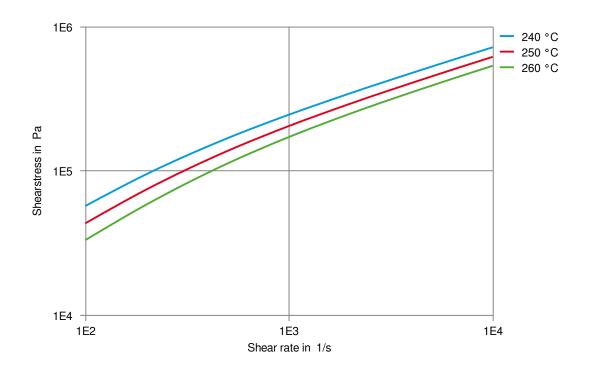
Viscosity-shear rate





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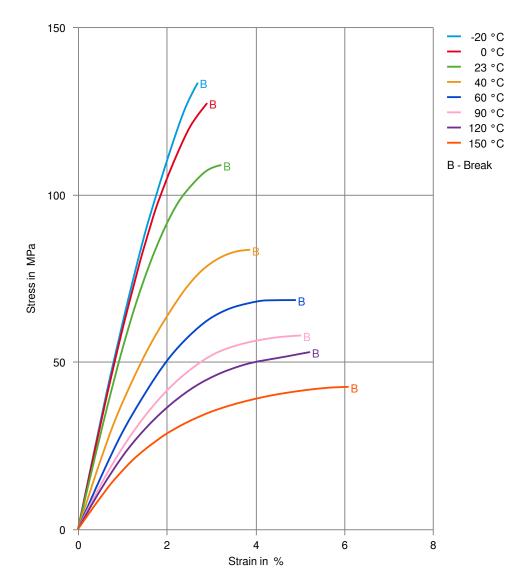
Shearstress-shear rate





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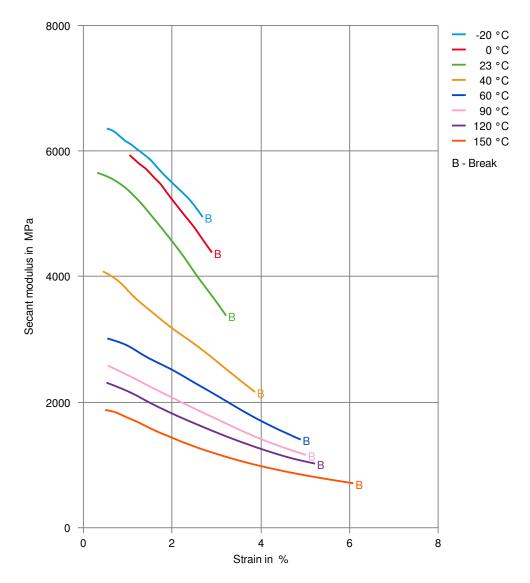
### Stress-strain





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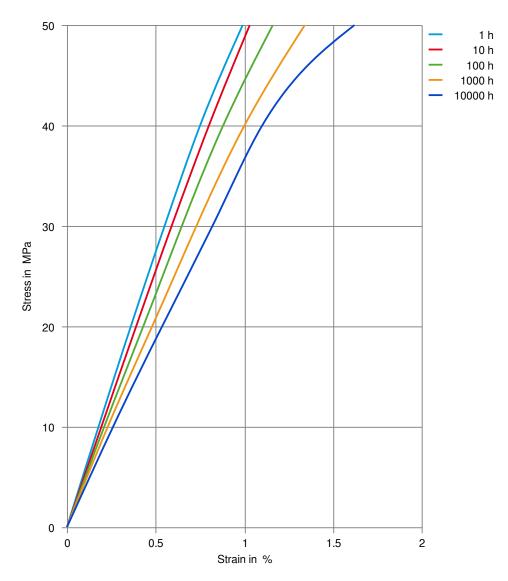
### Secant modulus-strain





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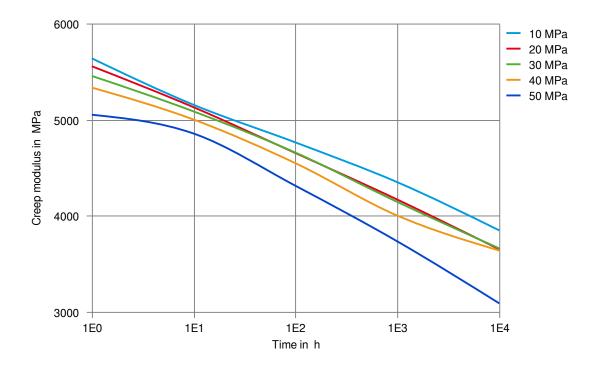
### Stress-strain (isochronous) 23°C





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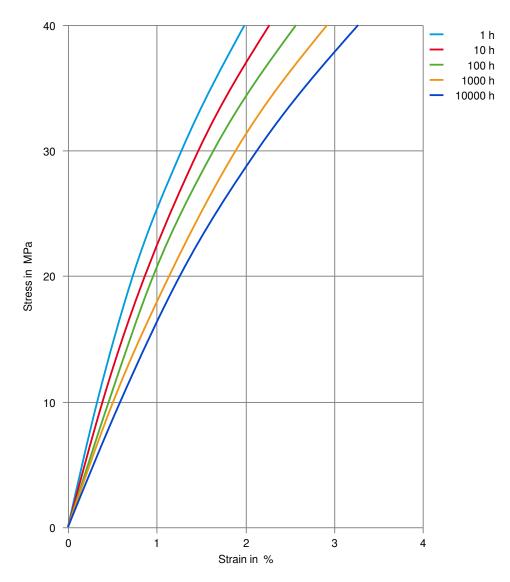
Creep modulus-time 23°C





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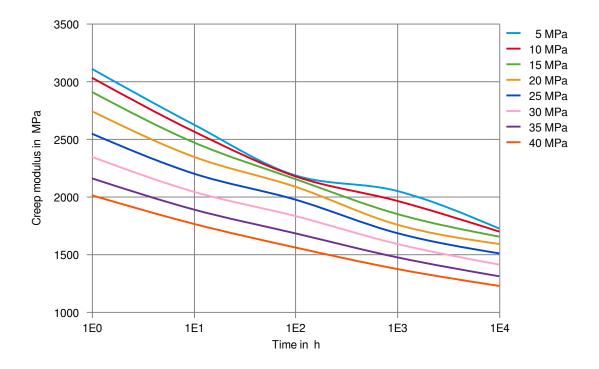
### Stress-strain (isochronous) 60°C





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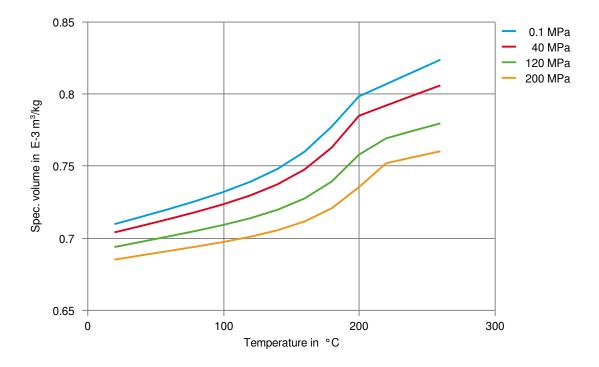
Creep modulus-time 60°C





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Specific volume-temperature (pvT)





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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
- X Nitric Acid (40% by mass), 23°C
- X Sulfuric Acid (38% by mass), 23 °C
- X 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
- X SAE 10W40 multigrade motor oil, 130°C
- X 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
- X 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
- X 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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### THERMOPLASTIC POLYESTER RESIN

- 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
- X Hydrogen peroxide, 23°C
- X 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).

X 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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