

### 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® SK601 NC010 is a 10% glass fiber reinforced, lubricated polybutylene terephthalate resin for injection moulding.

#### **Product information**

Resin Identification	PBT-GF10	ISO 1043
Part Marking Code	>PBT-GF10<	ISO 11469

#### Rheological properties

15 cm <sup>3</sup> /10min	ISO 1133
18 g/10min	ISO 1133
250 °C	
2.16 kg	
250 °C	
2.16 kg	
110 cm <sup>3</sup> /g	ISO 307, 1628
0.7 %	ISO 294-4, 2577
1.2 %	ISO 294-4, 2577
0.4 %	ISO 294-4
0.15 %	ISO 294-4
	250 °C 2.16 kg 250 °C 2.16 kg 110 cm <sup>3</sup> /g 0.7 % 1.2 % 0.4 %

### Typical mechanical properties

21			
Tensile modulus	4500	MPa	ISO 527-1/-2
Tensile stress at break, 5mm/min	90	MPa	ISO 527-1/-2
Tensile strain at break, 5mm/min	4.7	%	ISO 527-1/-2
Flexural strength	140	MPa	ISO 178
Tensile creep modulus, 1h	4000	MPa	ISO 899-1
Tensile creep modulus, 1000h	2500	MPa	ISO 899-1
Charpy impact strength, 23°C	40	kJ/m²	ISO 179/1eU
Charpy impact strength, -30°C	40	kJ/m²	ISO 179/1eU
Charpy notched impact strength, 23°C	6	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -30°C	6	kJ/m²	ISO 179/1eA
Izod notched impact strength, 23°C	4.5	kJ/m²	ISO 180/1A
Izod notched impact strength, -30°C	5.0	kJ/m²	ISO 180/1A
Izod impact strength, 23°C	27	kJ/m²	ISO 180/1U
Izod impact strength, -30°C	26	kJ/m²	ISO 180/1U
Poisson's ratio	0.36		

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**ASTM 1894** 

# Crastin® SK601 NC010

### THERMOPLASTIC POLYESTER RESIN

Coefficient of sliding friction, 1h against steel

Tribo	Modica	al pro	perties
TIDE	nogice	טוס וג	

3 , 3			
Thermal properties			
Melting temperature, 10 °C/min	225	°C	ISO 11357-1/-3
Glass transition temperature, 10°C/min		°C	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	175	°C	ISO 75-1/-2
Temperature of deflection under load, 0.45 MPa	215	°C	ISO 75-1/-2
Vicat softening temperature, 50°C/h 50N	205	°C	ISO 306
Coefficient of linear thermal expansion	60	E-6/K	ISO 11359-1/-2
(CLTE), parallel			
Coefficient of linear thermal expansion (CLTE),	120	E-6/K	ISO 11359-1/-2
normal			
Thermal conductivity of melt	0.24	W/(m K)	ISO 22007-2
Specific heat capacity of melt	1890	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	_	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	°C	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	°C	UL 746B
TGA curve	available		ISO 11359-1/-2

0.37

## Flammability

Burning Behav. at 1.5mm nom. thickn.	НВ	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 Ignition Temperature, 0.75mm	750	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 1.0mm	750	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 2.0mm	750	°C	IEC 60695-2-13
FMVSS Class	В		ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	36	mm/min	ISO 3795 (FMVSS 302)

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### THERMOPLASTIC POLYESTER RESIN

### **Electrical properties**

Relative permittivity, 100Hz	3.9		IEC 62631-2-1
Relative permittivity, 1MHz	3.5		IEC 62631-2-1
Dissipation factor, 100Hz	20	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
Electric strength	30	kV/mm	IEC 60243-1
Comparative tracking index	300		IEC 60112
Electric Strength, Short Time, 2mm	17	kV/mm	IEC 60243-1

### Physical/Other properties

Humidity absorption, 2mm	0.2 %	Sim. to ISO 62
Water absorption, 2mm	0.4 %	Sim. to ISO 62
Density	1370 kg/m³	ISO 1183
Density of melt	1190 kg/m³	

### **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	°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	3	s/mm
Back pressure	As low as	MPa
	possible	
Ejection temperature	170	°C

#### Characteristics

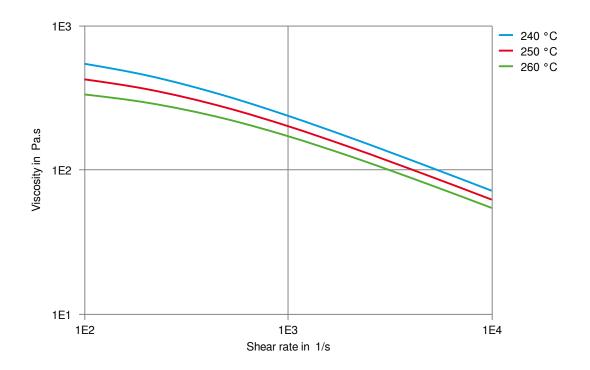
Additives Release agent

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### THERMOPLASTIC POLYESTER RESIN

Viscosity-shear rate

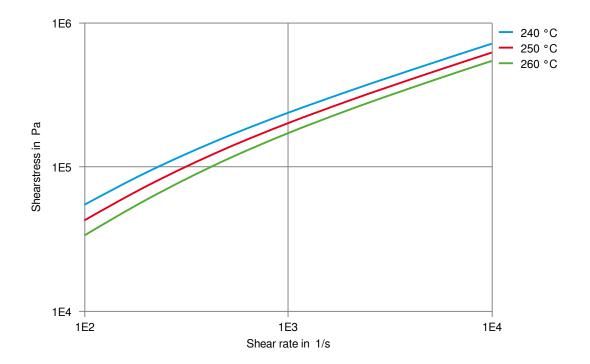


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### THERMOPLASTIC POLYESTER RESIN

Shearstress-shear rate

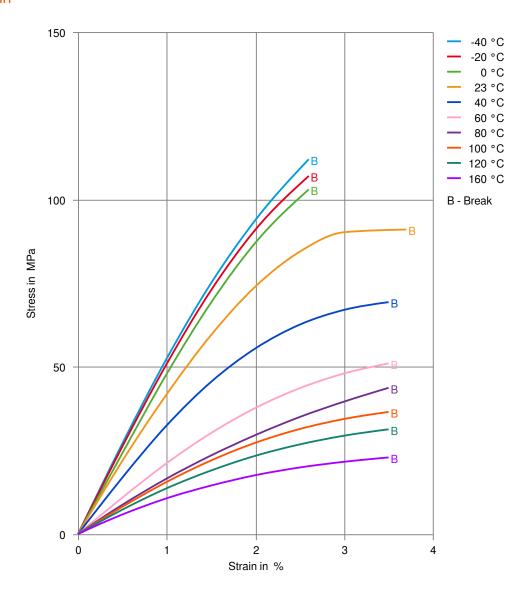


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## THERMOPLASTIC POLYESTER RESIN

### Stress-strain

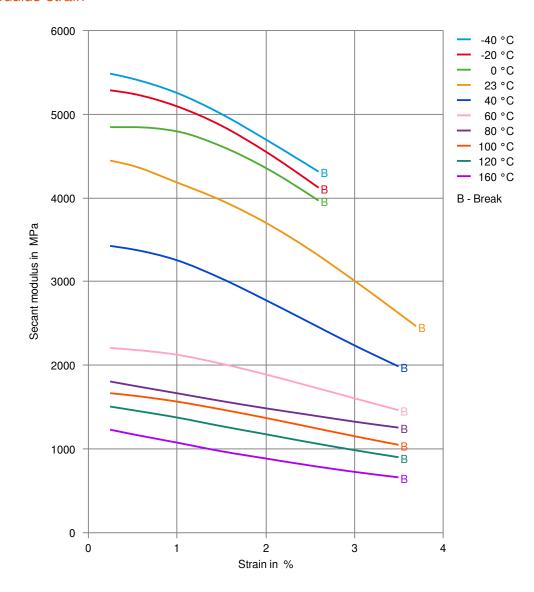


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### THERMOPLASTIC POLYESTER RESIN

### Secant modulus-strain

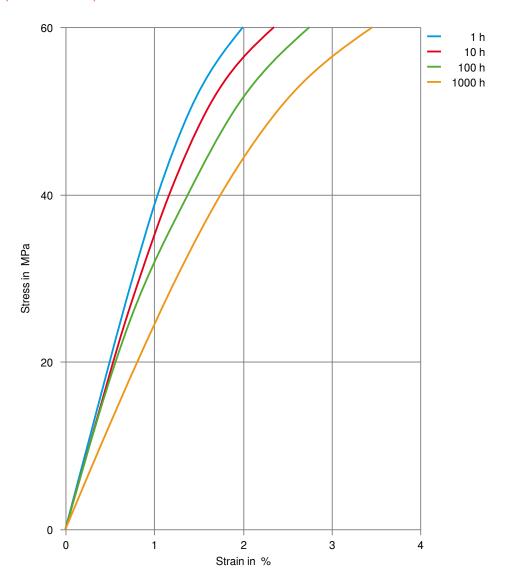


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## THERMOPLASTIC POLYESTER RESIN

Stress-strain (isochronous) 23°C

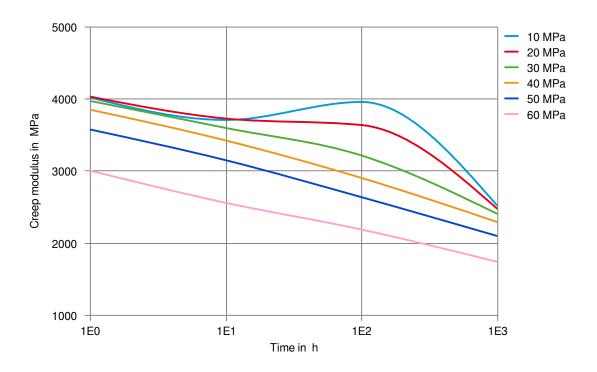


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## THERMOPLASTIC POLYESTER RESIN

Creep modulus-time 23°C

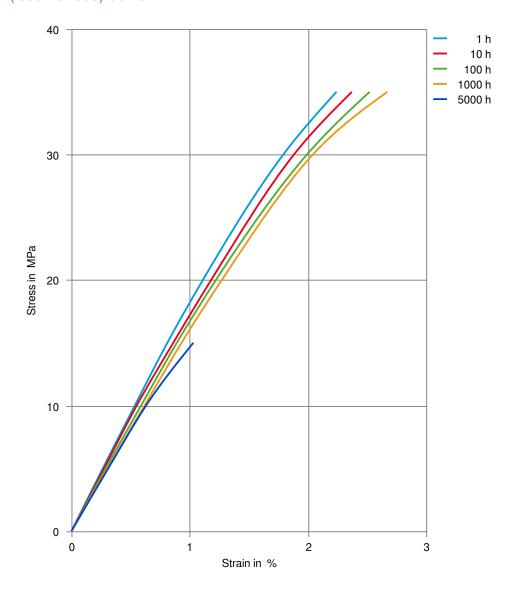


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## THERMOPLASTIC POLYESTER RESIN

Stress-strain (isochronous) 60°C

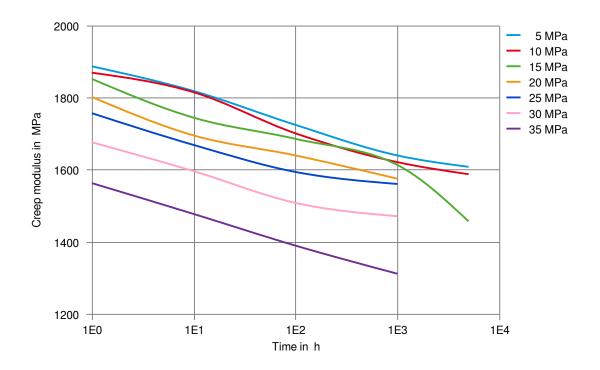


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## THERMOPLASTIC POLYESTER RESIN

Creep modulus-time 60°C

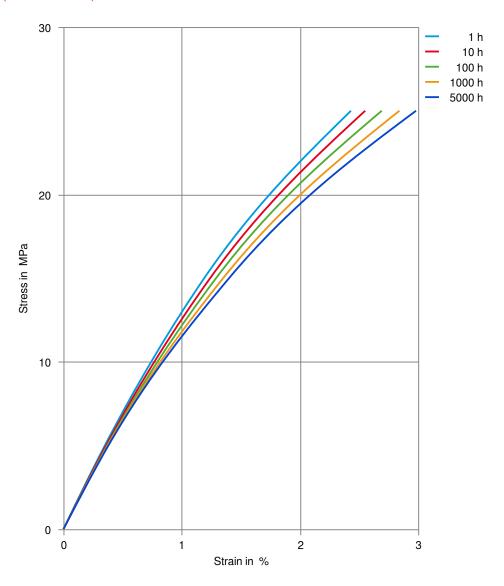


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## THERMOPLASTIC POLYESTER RESIN

Stress-strain (isochronous) 110°C

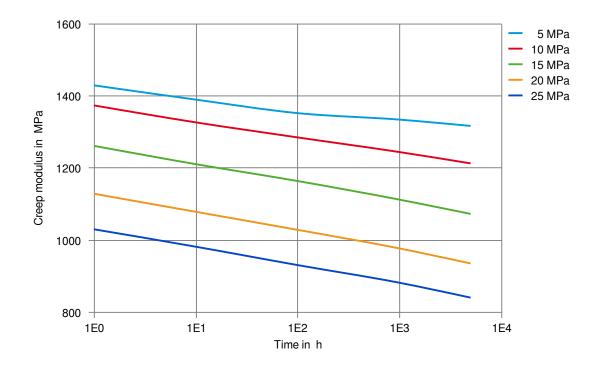


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## THERMOPLASTIC POLYESTER RESIN

Creep modulus-time 110°C

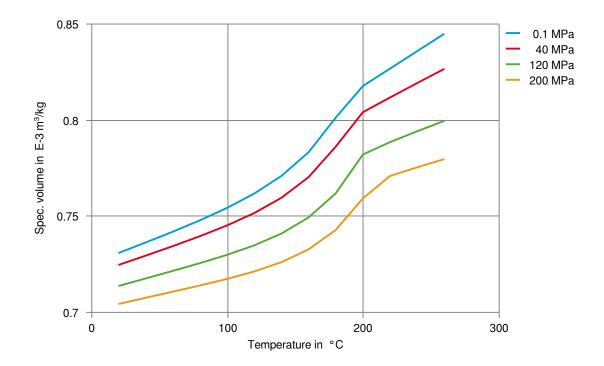


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## THERMOPLASTIC POLYESTER RESIN

Specific volume-temperature (pvT)



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### THERMOPLASTIC POLYESTER RESIN

#### 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
- X 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
- X Chromic Acid solution (40% by mass), 23°C

#### **Bases**

- X 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

- X ISO 1817 Liquid 1 E5, 60°C
- X ISO 1817 Liquid 2 M15E4, 60°C
- X 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
- ➤ 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
- X 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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Revised: 2022-05-24 Source: Celanese Materials Database

NOTICE TO USERS: Values shown are based on testing of laboratory test specimens and represent data that fall within the standard range of properties for natural material. These values alone do not represent a sufficient basis for any part design and are not intended for use in establishing maximum, minimum, or ranges of values for specification purposes. Colourants or other additives may cause significant variations in data values. Properties of moulded parts can be influenced by a wide variety of factors including, but not limited to, material selection, additives, part design, processing conditions and environmental exposure. Other than those products expressly identified as medical grade (including by MT® product designation or otherwise), Celanese's products are not intended for use in medical or dental implants. Regardless of any such product designation, any determination of the suitability of a particular material and part design for any use contemplated by the users and the manner of such use is the sole responsibility of the users, who must assure themselves that the material as subsequently processed meets the needs of their particular product or use. To the best of our knowledge, the information contained in this publication is accurate; however, we do not assume any liability whatsoever for the accuracy and completeness of such information. The information contained in this publication should not be construed as a promise or guarantee of specific properties of our products. It is the sole responsibility of the users to investigate whether any existing patents are infringed by the use of the materials mentioned in this publication. Moreover, there is a need to reduce human exposure to many materials to the lowest practical limits in view of possible adverse effects. To the extent that any hazards may have been mentioned in this publication, we neither suggest nor guarantee that such hazards are the only ones that exist. We recommend that persons intending to rely on any recommendation or to use any e

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