

### 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® S620F20 NC010 is an unreinforced, nucleated, lubricated, medium viscosity polybutylene terephthalate resin for fast injection moulding.

#### **Product information**

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

### Rheological properties

Melt mass-flow rate	19	g/10min	ISO 1133
Melt mass-flow rate, Temperature	250	°C	
Melt mass-flow rate, Load	2.16	kg	
Viscosity number	130	cm <sup>3</sup> /g	ISO 307, 1628
Intrinsic viscosity	1.1		ISO 307, 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	0.5	%	ISO 294-4

### Typical mechanical properties

Tensile modulus	2600	MPa	ISO 527-1/-2
Tensile stress at yield, 50mm/min	59	MPa	ISO 527-1/-2
Tensile strain at yield, 50mm/min	8	%	ISO 527-1/-2
Nominal strain at break	30	%	ISO 527-1/-2
Tensile strain at break, 50mm/min	>50	%	ISO 527-1/-2
Flexural modulus	3100	MPa	ISO 178
Flexural strength	88	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	4.5	kJ/m <sup>2</sup>	ISO 179/1eA
Charpy notched impact strength, -30°C	3.5	kJ/m <sup>2</sup>	ISO 179/1eA
Izod notched impact strength, 23°C	4	kJ/m <sup>2</sup>	ISO 180/1A
Izod notched impact strength, -30°C	5.0	kJ/m <sup>2</sup>	ISO 180/1A
Izod impact strength, 23°C	142	kJ/m <sup>2</sup>	ISO 180/1U

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Izod impact strength, -30°C Poisson's ratio	70 0.38	kJ/m²	ISO 180/1U
Thermal properties			
Melting temperature, 10°C/min Glass transition temperature, 10°C/min Freezing temperature, 10°C/min Temperature of deflection under load, 1.8 MPa Temperature of deflection under load, 1.8 MPa, annealed	192 60	°C	ISO 11357-1/-3 ISO 11357-1/-3 ISO 11357-1/-2 ISO 75-1/-2 ISO 75-1/-2
Temperature of deflection under load, 0.45 MPa Temperature of deflection under load, 0.45 MPa, annealed	145 180	°C	ISO 75-1/-2 ISO 75-1/-2
Vicat softening temperature, 50°C/h 50N Coefficient of linear thermal expansion (CLTE), parallel	175 130	°C E-6/K	ISO 306 ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal	130	E-6/K	ISO 11359-1/-2
Thermal conductivity of melt Specific heat capacity of melt RTI, electrical, 0.75mm RTI, electrical, 1.5mm RTI, electrical, 3.0mm RTI, electrical, 6mm RTI, impact, 0.75mm RTI, impact, 1.5mm RTI, impact, 3.0mm RTI, impact, 6mm RTI, strength, 0.75mm RTI, strength, 1.5mm RTI, strength, 3.0mm RTI, strength, 3.0mm RTI, strength, 6mm			ISO 22007-2 ISO 22007-4 UL 746B
Flammability			
Burning Behav. at 1.5mm nom. thickn. Thickness tested UL recognition Burning Behav. at thickness h Thickness tested UL recognition Oxygen index Glow Wire Flammability Index, 3.0mm Glow Wire Ignition Temperature, 0.75mm Glow Wire Ignition Temperature, 1.0mm Glow Wire Ignition Temperature, 2.0mm FMVSS Class	1.5 yes HB	°C °C °C	IEC 60695-11-10 IEC 60695-11-10 UL 94 IEC 60695-11-10 IEC 60695-11-10 UL 94 ISO 4589-1/-2 IEC 60695-2-12 IEC 60695-2-13 IEC 60695-2-13 IEC 60695-2-13

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## THERMOPLASTIC POLYESTER RESIN

### **Electrical properties**

Relative permittivity, 100Hz	3.8		IEC 62631-2-1
Relative permittivity, 1MHz	3.2		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	26	kV/mm	IEC 60243-1
Comparative tracking index	600		IEC 60112
Electric Strength, Short Time, 2mm	15	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	1310 kg/m <sup>3</sup>	ISO 1183
Density of melt	1110 kg/m <sup>3</sup>	

### **VDA** Properties

Fogging, (	G-value (condensat	e)	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	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	MPa
	possible	
Ejection temperature	167	°C

### Characteristics

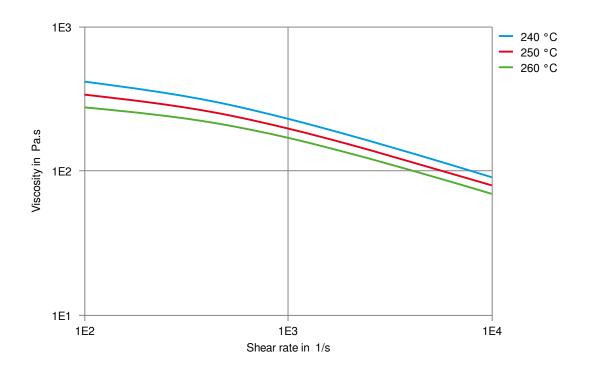
Additives Release agent

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Viscosity-shear rate

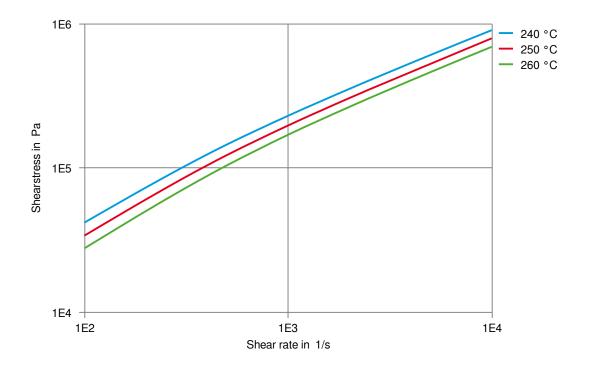


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Shearstress-shear rate

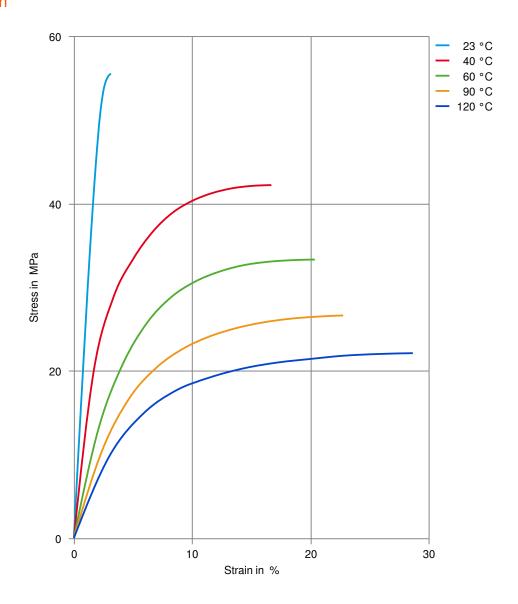


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### Stress-strain

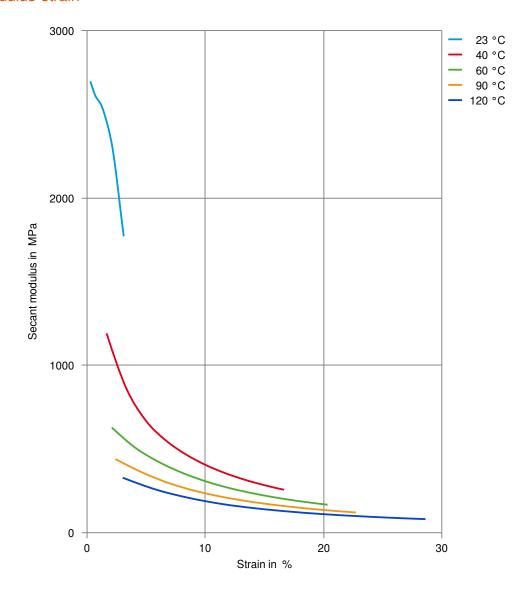


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## THERMOPLASTIC POLYESTER RESIN

### Secant modulus-strain



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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
- ★ 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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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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