



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® HR5315HF is a 15% glass reinforced PBT with high flow (HF), moderately toughened, hydrolysis resistant (HR) resin. Excellent balance of properties between terminal pullout and impact resistance. Developed for USCAR Class 3 and 4 environments.

Product information

Resin Identification	PBT-IGF15	ISO 1043
Part Marking Code	>PBT-IGF15<	ISO 11469

Rheological properties

Melt volume-flow rate 12	cm ³ /10min ISO 1133
Temperature 250	°C
Load 2.16	kg
Melt mass-flow rate 27	g/10min ISO 1133
Melt mass-flow rate, Temperature 250	°C
Melt mass-flow rate, Load 2.16	kg
Viscosity number 95	cm³/g ISO 307, 1628
Moulding shrinkage, parallel 0.5	% ISO 294-4, 2577
Moulding shrinkage, normal 1.1	% ISO 294-4, 2577
Flow length 430	mm
Flow length - pressure 80	MPa
Flow length - width/thickness 2	mm

Typical mechanical properties

Tensile modulus	5200	MPa	ISO 527-1/-2
Tensile stress at break, 5mm/min	95	MPa	ISO 527-1/-2
Tensile strain at break, 5mm/min	3.3	%	ISO 527-1/-2
Flexural modulus	4700	MPa	ISO 178
Flexural strength	150	MPa	ISO 178
Tensile creep modulus, 1h	5000	MPa	ISO 899-1
Tensile creep modulus, 1000h	4200	MPa	ISO 899-1
Charpy impact strength, 23°C	60	kJ/m²	ISO 179/1eU
Charpy impact strength, -30°C	30	kJ/m²	ISO 179/1eU
Charpy notched impact strength, 23°C	10	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -30°C	7	kJ/m²	ISO 179/1eA
Izod notched impact strength, 23°C	10	kJ/m²	ISO 180/1A

Printed: 2025-05-30 Page: 1 of 13





THERMOPLASTIC POLYESTER RESIN

Izod notched impact strength, -30°C Izod notched impact strength, -40°C Izod impact strength, 23°C Izod impact strength, -30°C Izod impact strength, -40°C Hardness, Rockwell, R-scale Poisson's ratio	6.0 45 40	kJ/m² kJ/m² kJ/m² kJ/m² kJ/m²	ISO 180/1A ISO 180/1A ISO 180/1U ISO 180/1U ISO 180/1U ISO 2039-2
Thermal properties			
Melting temperature, 10 ° C/min Glass transition temperature, 10 ° C/min Temperature of deflection under load, 1.8 MPa Temperature of deflection under load, 0.45 MPa Coefficient of linear thermal expansion (CLTE), parallel Coefficient of linear thermal expansion (CLTE), normal	200 220 41 110	°C °C °C E-6/K	ISO 11357-1/-3 ISO 11357-1/-3 ISO 75-1/-2 ISO 75-1/-2 ISO 11359-1/-2
Thermal conductivity of melt Specific heat capacity of melt		W/(m K) J/(kg K)	ISO 22007-2 ISO 22007-4
Flammability Burning Behav. at 1.5mm nom. thickn. Thickness tested Oxygen index Glow Wire Flammability Index, 3.0mm Glow Wire Ignition Temperature, 3.0mm FMVSS Class Burning rate, Thickness 1 mm	1.5 20 700 775 B	°C	IEC 60695-11-10 IEC 60695-11-10 ISO 4589-1/-2 IEC 60695-2-12 IEC 60695-2-13 ISO 3795 (FMVSS 302) ISO 3795 (FMVSS 302)
Electrical properties Relative permittivity, 100Hz Relative permittivity, 1MHz Dissipation factor, 100Hz Dissipation factor, 1MHz Volume resistivity Surface resistivity Electric strength Comparative tracking index	1E13	E-4 Ohm.m	IEC 62631-2-1 IEC 62631-2-1 IEC 62631-2-1 IEC 62631-2-1 IEC 62631-3-1 IEC 62631-3-2 IEC 60243-1 IEC 60112
Physical/Other properties Humidity absorption, 2mm Water absorption, 2mm Density Density of melt			Sim. to ISO 62 Sim. to ISO 62 ISO 1183

Printed: 2025-05-30 Page: 2 of 13





THERMOPLASTIC POLYESTER RESIN

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	60	°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	172	°C

Characteristics

Processing Injection Moulding

Delivery form Pellets

Additives Release agent

Special characteristics Hydrolysis resistant

Additional information

However we do not recommend temperature settings above 270°C

and residence times at 265°C should be below 10 minutes.

In case of longer residence times using hot-runners, for example after a shut-

down,

the complete system must be purged with glass reinforced Crastin® (type

SK602/605) before starting up again.

For successful processing of Crastin® HR with hot-runners, care should be taken to maintain a uniform temperature, avoid hot-spots and long residence times.

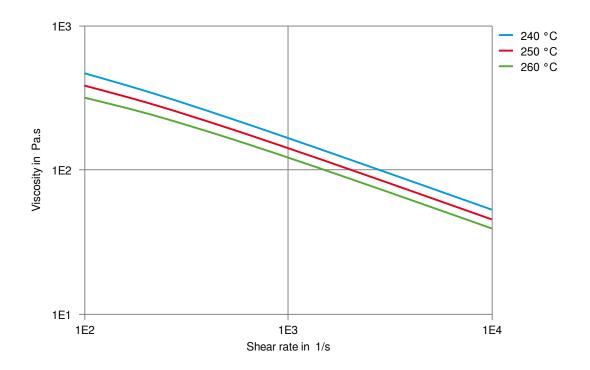
Printed: 2025-05-30 Page: 3 of 13





THERMOPLASTIC POLYESTER RESIN

Viscosity-shear rate



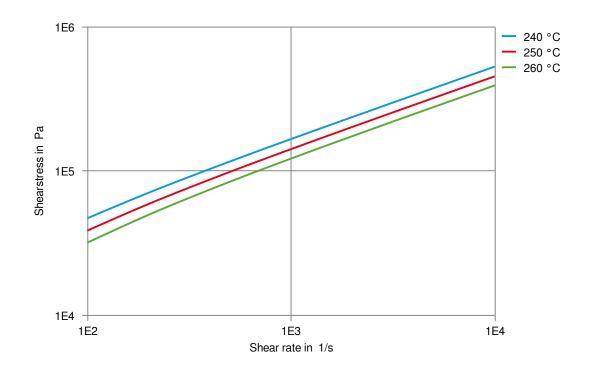
Printed: 2025-05-30 Page: 4 of 13





THERMOPLASTIC POLYESTER RESIN

Shearstress-shear rate



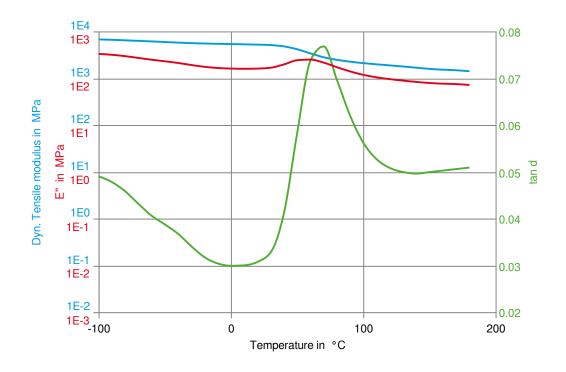
Printed: 2025-05-30 Page: 5 of 13





THERMOPLASTIC POLYESTER RESIN

Dynamic Tensile modulus-temperature



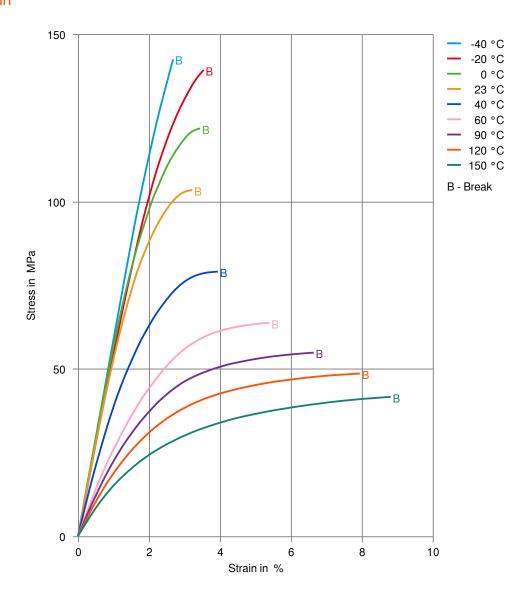
Printed: 2025-05-30 Page: 6 of 13





THERMOPLASTIC POLYESTER RESIN

Stress-strain



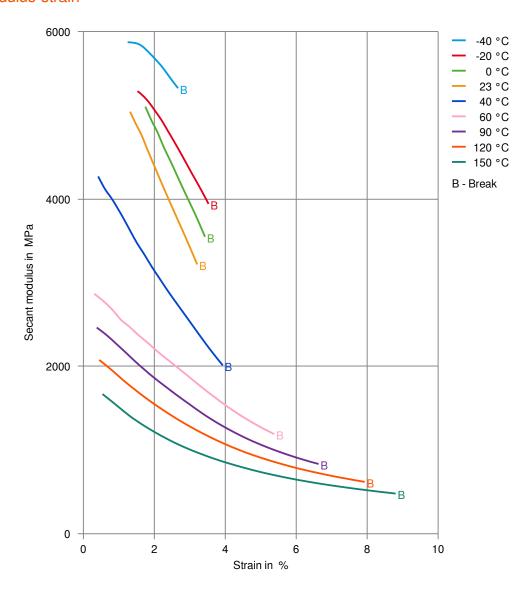
Printed: 2025-05-30 Page: 7 of 13





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Secant modulus-strain



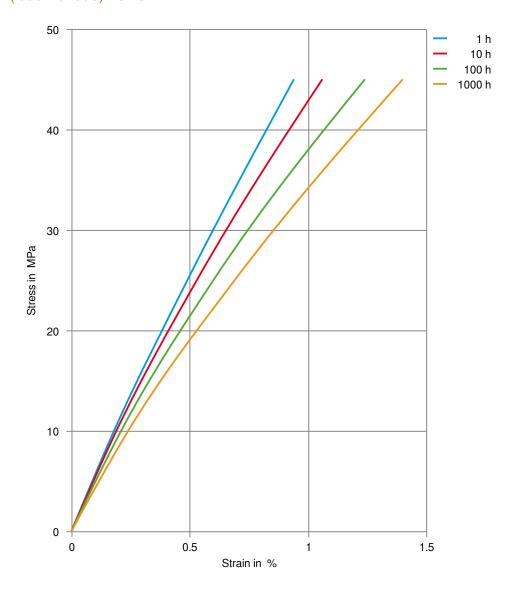
Printed: 2025-05-30 Page: 8 of 13





THERMOPLASTIC POLYESTER RESIN

Stress-strain (isochronous) 23°C



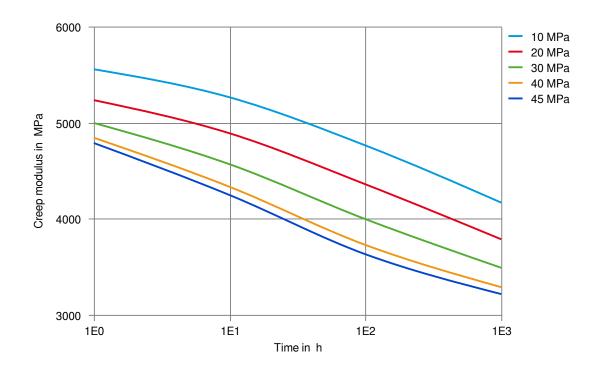
Printed: 2025-05-30 Page: 9 of 13





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Creep modulus-time 23°C



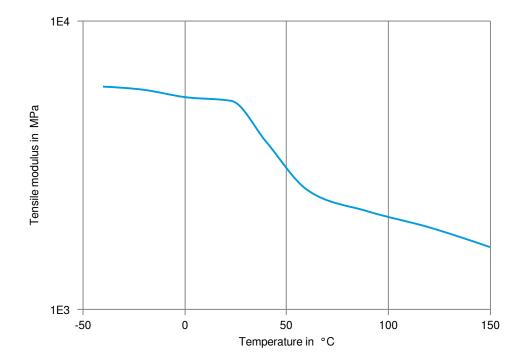
Printed: 2025-05-30 Page: 10 of 13





THERMOPLASTIC POLYESTER RESIN

Tensile modulus-temperature



Printed: 2025-05-30 Page: 11 of 13

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Crastin® HR5315HF NC010

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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
- 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

Printed: 2025-05-30 Page: 12 of 13





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
- ➤ 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).

Printed: 2025-05-30 Page: 13 of 13

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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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