Crastin® FGS600F40 NC010

THERMOPLASTIC POLYESTER RESIN

Crastin® FGS600F40 NC010 is an unreinforced lubricated, low viscosity polybutylene terephthalate resin for injection molding. It has been developed for consideration into applications such as parts for the food industry.

FOOD CONTACT

This product is manufactured according to Good Manufacturing Practice (GMP) principles and generally accepted in food contact applications in Europe and the USA when meeting applicable use conditions. For details, individual compliance statements are available from our representative.

Product information

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

Rheological properties

Melt volume-flow rate	33	cm^3/10min	ISO 1133
Temperature	482	°F	
Load	4.76	lb	
Molding shrinkage, parallel	1.6	%	ISO 294-4, 2577
Molding shrinkage, normal	1.6	%	ISO 294-4, 2577

Typical mechanical properties

Tensile modulus	348000	psi	ISO 527-1/-2
Tensile stress at yield, 50mm/min	8000	psi	ISO 527-1/-2
Tensile strain at yield, 50mm/min	4	%	ISO 527-1/-2
Nominal strain at break	30	%	ISO 527-1/-2
Tensile strain at break, 50mm/min	>50	%	ISO 527-1/-2
Tensile creep modulus, 1h	377000	psi	ISO 899-1
Tensile creep modulus, 1000h	261000	psi	ISO 899-1
Charpy impact strength, 23°C	N	$ftlb/in^2$	ISO 179/1eU
Charpy impact strength, -30°C	N	$ftlb/in^2$	ISO 179/1eU
Charpy notched impact strength, 23°C	1.9	$ftlb/in^2$	ISO 179/1eA
Charpy notched impact strength, -30°C	1.9	$ftlb/in^2$	ISO 179/1eA

Thermal properties

Melting temperature, 10°C/min	433	°F	ISO 11357-1/-3
Glass transition temperature, 10°C/min	131	°F	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	122	°F	ISO 75-1/-2
Temperature of deflection under load, 1.8 MPa, annealed	140	°F	ISO 75-1/-2
Temperature of deflection under load, 0.45 MPa	239	°F	ISO 75-1/-2
Temperature of deflection under load, 0.45 MPa, annealed	356	°F	ISO 75-1/-2
Vicat softening temperature, 50°C/h 50N	347	°F	ISO 306
Coefficient of linear thermal expansion (CLTE), parallel	0.61	E-4/°F	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal	0.667	E-4/°F	ISO 11359-1/-2

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Thermal conductivity of melt	0.21	W/(m K)	ISO 22007-2
Specific heat capacity of melt	2110	J/(kg K)	ISO 22007-4
RTI, electrical, 0.75mm	266	°F	UL 746B
RTI, electrical, 1.5mm	266	°F	UL 746B
RTI, electrical, 3.0mm	266	°F	UL 746B
RTI, electrical, 6mm	266	°F	UL 746B
RTI, impact, 0.75mm	239	°F	UL 746B
RTI, impact, 1.5mm	239	°F	UL 746B
RTI, impact, 3.0mm	239	°F	UL 746B
RTI, impact, 6mm	239	°F	UL 746B
RTI, strength, 0.75mm	248	°F	UL 746B
RTI, strength, 1.5mm	248	°F	UL 746B
RTI, strength, 3.0mm	248	°F	UL 746B
RTI, strength, 6mm	248	°F	UL 746B

Flammability

Burning Behav. at 1.5mm nom. thickn.	HB	class	IEC 60695-11-10
Thickness tested	0.0591	in	IEC 60695-11-10
UL recognition	yes		UL 94
Burning Behav. at thickness h	HB	class	IEC 60695-11-10
Thickness tested	0.1181	in	IEC 60695-11-10
UL recognition	yes		UL 94
Oxygen index	22	%	ISO 4589-1/-2
FMVSS Class	B		ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	1.1	in/min	ISO 3795 (FMVSS 302)

Electrical properties

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
Surface resistivity	1E12	Ohm	IEC 62631-3-2
Electric strength	660	kV/in	IEC 60243-1
Comparative tracking index	600		IEC 60112

Physical/Other properties

Humidity absorption, 2mm	0.2	%	Sim. to ISO 62
Water absorption, 2mm	0.4	%	Sim. to ISO 62
Density	0.0473	lb/in^3	ISO 1183
Density of melt	69.3	lb/ft^3	

Emissions

Odor test	3	class	VDA 270
Fogging, F-value (refraction)	95	%	ISO 6452
Fogging, G-value (condensate)	0.2	mg	ISO 6452

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Injection

Drying Recommended	yes	
Drying Temperature	284	°F
Drying Time, Dehumidified Dryer	4 - 6	h
Processing Moisture Content	≤0.01	%
Melt Temperature Optimum	464	°F
Min. melt temperature	464	°F
Max. melt temperature	482	°F
Mold Temperature Optimum	176	°F
Min. mold temperature	140	°F
Max. mold temperature	248	°F
Hold pressure range	≥8700	psi
Hold pressure time	0.102	s/mil
Hold Pressure Time (h is the max. wall thickness of the part in mm)	$1.5h^2+2$	s
Back pressure	as low as possible	psi
Ejection temperature	338	°F

Characteristics

Processing	Injection Molding

Additional information

Injection molding

To minimize the volatile content in the final product, dry the resin to ≤0.01% water content. In injection molding, use the lowest possible melt temperature (recommended 240 °C) and shortest feasible residence time (recommended 2-3 minutes). Store the parts in a ventilated, clean area before use. If assistance is needed please contact your Celanese account representative.

These recommendations are based on internal Celanese testing. For drying and injection molding conditions outside the above parameters, customer must test for and verify suitably low volatiles emissions on molded articles to confirm the final product is suitably pure for its intended use.

Processing Notes

Pre-Drying

To avoid hydrolytic degradation during processing, CRASTIN resins have to be dried to a moisture level equal to or less than 0.01%. Drying should be done in a dehumidifying hopper dryer capable of dewpoints <-40°C (-40°F) at 140°C (284°F) for 4-6 hours.

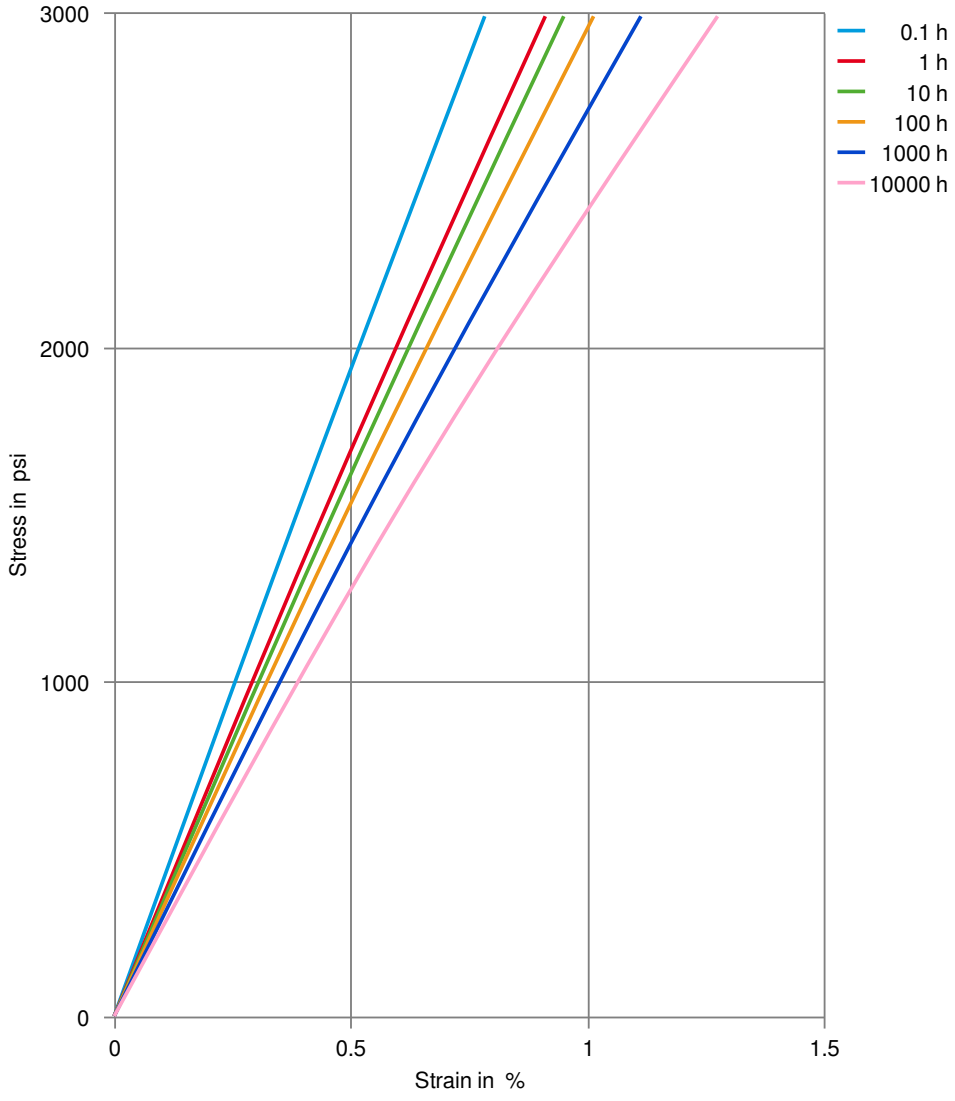
Storage

For subsequent storage of the material in the dryer until processed (<= 60 h) it is necessary to lower the temperature to 100° C.

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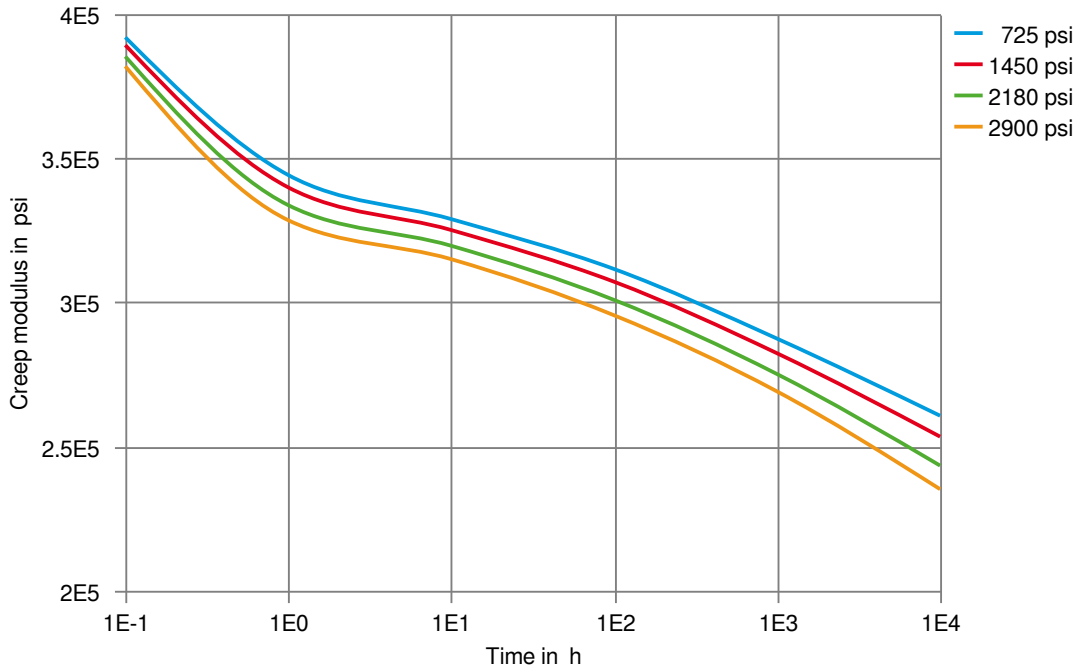
Stress-strain (isochronous) °F
(measured on Crastin® S600F40 NC010)



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Creep modulus-time °F
(measured on Crastin® S600F40 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
- ✘ 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

Salt solutions

- ✔ Sodium Chloride solution (10% by mass), 23°C
- ✔ Sodium Hypochlorite solution (10% by mass), 23°C

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- ✔ 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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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. Colorants or other additives may cause significant variations in data values. Properties of molded 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 equipment, processing technique or material mentioned in this publication should satisfy themselves that they can meet all applicable safety and health standards. We strongly recommend that users seek and adhere to the manufacturer's current instructions for handling each material they use, and entrust the handling of such material to adequately trained personnel only. Please call the telephone numbers listed for additional technical information. Call Customer Services for the appropriate Materials Safety Data Sheets (MSDS) before attempting to process our products.
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