

# DuPont™ Crastin® S600F20 NC010

## THERMOPLASTIC POLYESTER RESIN

### Product Information

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, DuPont recommends, 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® S600F20 NC010 is an unreinforced, lubricated, medium viscosity polybutylene terephthalate resin for injection molding.**

General information	Value	Unit	Test Standard
Resin Identification	PBT	-	ISO 1043
Part Marking Code	PBT	-	ISO 11469
Rheological properties	Value	Unit	Test Standard
Melt mass-flow rate	19.1	g/10min	ISO 1133
Melt mass-flow rate, Temperature	250	°C	ISO 1133
Melt mass-flow rate, Load	2.16	kg	ISO 1133
Viscosity number	130	cm <sup>3</sup> /g	ISO 307, 1157, 1628
Molding shrinkage, parallel	1.7	%	ISO 294-4, 2577
Molding shrinkage, normal	1.6	%	ISO 294-4, 2577
Mechanical properties	Value	Unit	Test Standard
Tensile Modulus	2500	MPa	ISO 527-1/-2
Yield stress	58	MPa	ISO 527-1/-2
Yield strain	5	%	ISO 527-1/-2
Nominal strain at break	40	%	ISO 527-1/-2
Strain at Break, 23°C, 50mm/min	>50	%	ISO 527-1/-2
Flexural Modulus	2200	MPa	ISO 178
Flexural Strength	85	MPa	ISO 178
Tensile creep modulus			ISO 899-1
1h	2600	MPa	
1000h	1800	MPa	
Charpy impact strength			ISO 179/1eU
73°F	N	kJ/m <sup>2</sup>	
-22°F	N	kJ/m <sup>2</sup>	
Charpy notched impact strength			ISO 179/1eA
73°F	5	kJ/m <sup>2</sup>	
-22°F	4	kJ/m <sup>2</sup>	
Izod notched impact strength, 73°F	4.5	kJ/m <sup>2</sup>	ISO 180/1A
Izod impact strength, 73°F	N	kJ/m <sup>2</sup>	ISO 180/1U
Thermal properties	Value	Unit	Test Standard
Melting temperature, 18°F/min	225	°C	ISO 11357-1/-3
Glass transition temperature, 18°F/min	55	°C	ISO 11357-1/-2
Freezing temperature, 18°F/min	192	°C	ISO 11357-1/-2
Temp. of deflection under load			ISO 75-1/-2
260 psi	50	°C	
65 psi	115	°C	
65 psi, annealed	180	°C	
260 psi, annealed	60	°C	
Vicat softening temperature, 90°F/h, 11 lbf	175	°C	ISO 306

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Coeff. of linear therm. expansion, parallel	110	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion			ISO 11359-1/-2
normal	120	E-6/K	
Normal, -40-23°C	90	E-6/K	
Normal, 55-160°C	200	E-6/K	
Parallel, -40-23°C	80	E-6/K	
Parallel, 55-160°C	190	E-6/K	
Thermal conductivity of melt	0.21	W/(m K)	-
Spec. heat capacity of melt	2110	J/(kg K)	-
RTI, electrical			UL 746B
30mil	130	°C	
60mil	130	°C	
120mil	130	°C	
240mil	130	°C	
RTI, impact			UL 746B
30mil	115	°C	
60mil	115	°C	
120mil	115	°C	
240mil	115	°C	
RTI, strength			UL 746B
30mil	120	°C	
60mil	120	°C	
120mil	120	°C	
240mil	120	°C	
<b>Flammability</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
Burning Behav. at 60mil 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	22	%	ISO 4589-1/-2
Glow Wire Flammability Index, 120mil	750	°C	IEC 60695-2-1/2
Glow Wire Ignition Temperature			IEC 60695-2-1/3
30mil	750	°C	
40mil	750	°C	
60mil	750	°C	
80mil	750	°C	
120mil	725	°C	
FMVSS Class	SE	-	ISO 3795 (FMVSS 302)
<b>Electrical properties</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
Relative permittivity			IEC 60250
100Hz	3.6	-	
1MHz	3.2	-	
Dissipation factor			IEC 60250
100Hz	7.9	E-4	
1MHz	200	E-4	
Volume resistivity	>1E13	Ohm*m	IEC 60093
Surface resistivity	1E12	Ohm	IEC 60093
Electric strength	26	kV/mm	IEC 60243-1
Comparative tracking index	400	-	IEC 60112
<b>Other properties</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
Humidity absorption, 80mil	0.2	%	Sim. to ISO 62
Water absorption, 80mil	0.4	%	Sim. to ISO 62
Density	1310	kg/m <sup>3</sup>	ISO 1183
Density of melt	1110	kg/m <sup>3</sup>	-

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## THERMOPLASTIC POLYESTER RESIN

VDA Properties	Value	Unit	Test Standard	
Thermal desorption analysis of organic emissions	1	µg/g	VDA 278	AMax
Odor test	3	class	VDA 270	DS
Fogging, G-value (condensate)	0	mg	ISO 6452	

AMax: Assessed (Max) DS: Derived from similar grade

Injection	Value	Unit	Test Standard	
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. mold temperature	30	°C	-	
Max. mold temperature	130	°C	-	
Hold pressure range	≥60	MPa	-	
Hold pressure time	4	s/mm	-	
Back pressure	As low as possible		-	
Ejection temperature	170	°C	-	

Characteristics			
Processing	<ul style="list-style-type: none"> <li>• Injection Molding</li> </ul>		
Delivery form	<ul style="list-style-type: none"> <li>• Pellets</li> </ul>		
Additives	<ul style="list-style-type: none"> <li>• Release agent</li> </ul>		
Regional Availability	<ul style="list-style-type: none"> <li>• North America</li> <li>• Europe</li> </ul>	<ul style="list-style-type: none"> <li>• Asia Pacific</li> <li>• South and Central America</li> </ul>	<ul style="list-style-type: none"> <li>• Near East/Africa</li> <li>• Global</li> </ul>

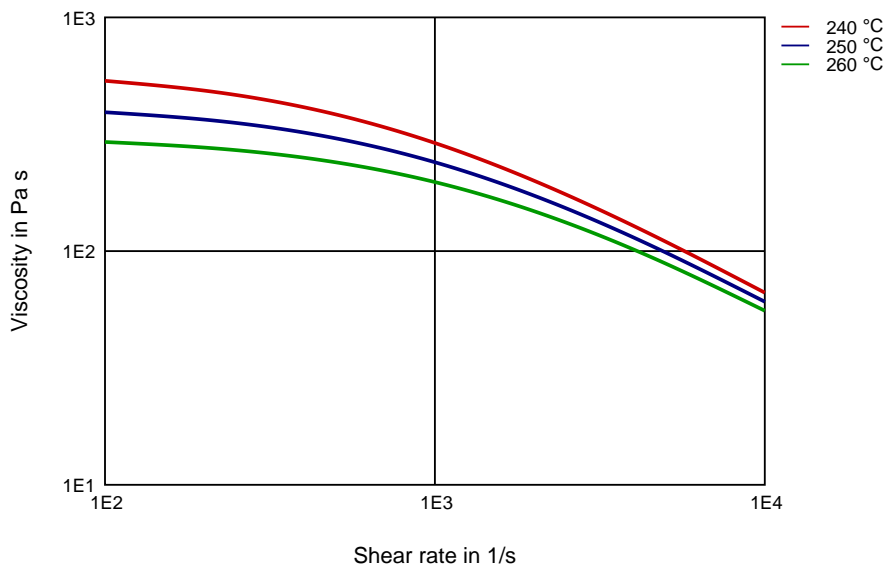


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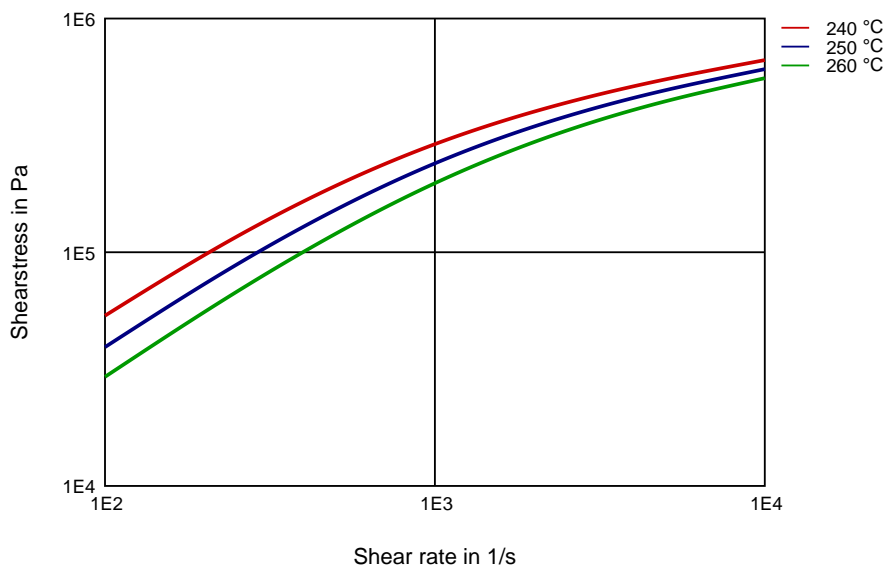
## THERMOPLASTIC POLYESTER RESIN

### Diagrams

#### Viscosity-shear rate



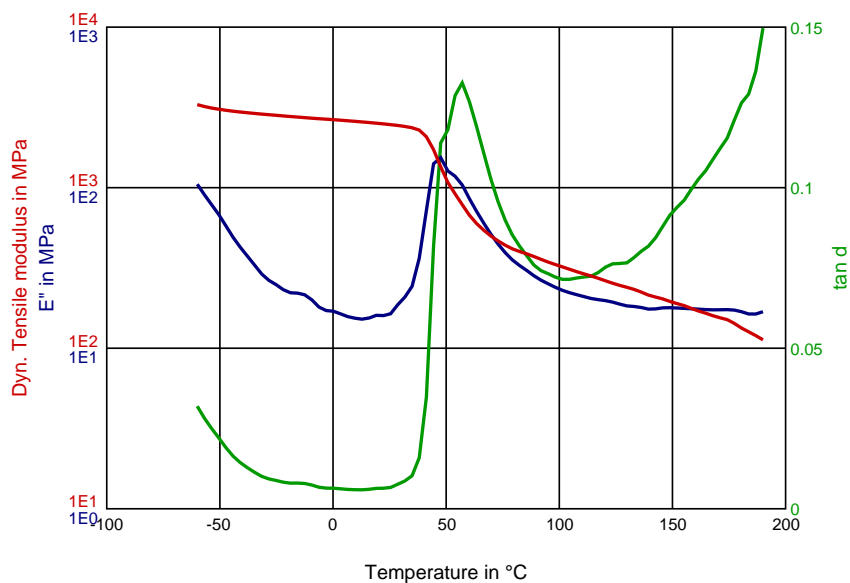
#### Shearstress-shear rate



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## THERMOPLASTIC POLYESTER RESIN

Dynamic Tensile modulus-temperature



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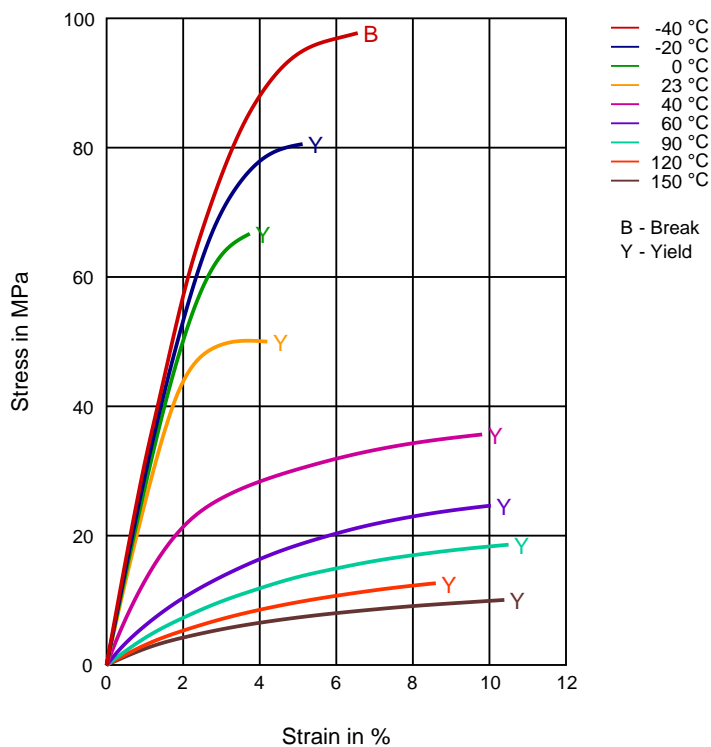


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## THERMOPLASTIC POLYESTER RESIN

Stress-strain



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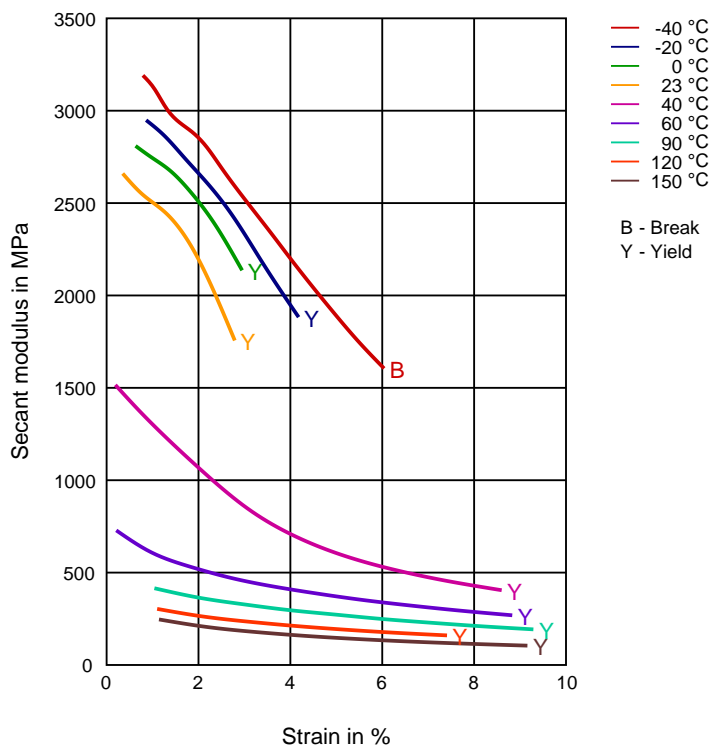
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## THERMOPLASTIC POLYESTER RESIN

Secant modulus-strain



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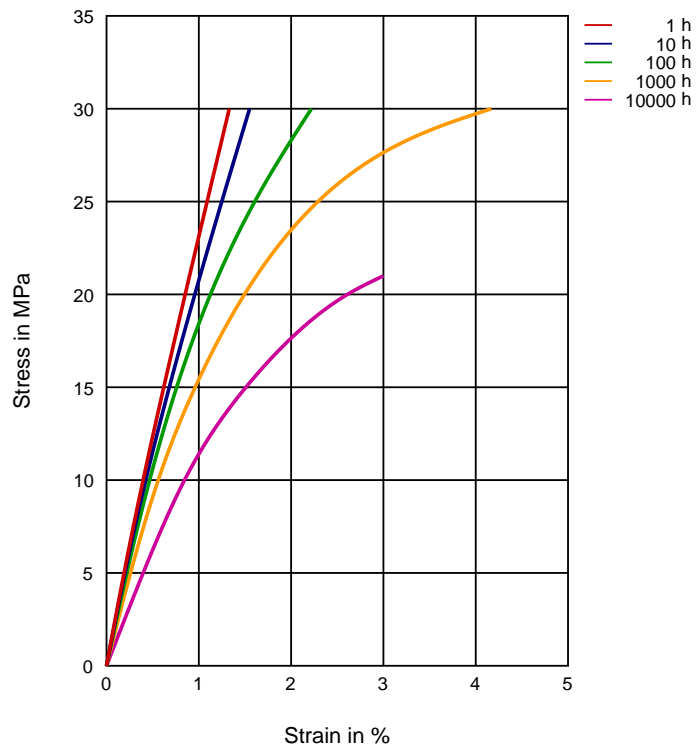
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## THERMOPLASTIC POLYESTER RESIN

Stress-strain (isochronous) 23 °C



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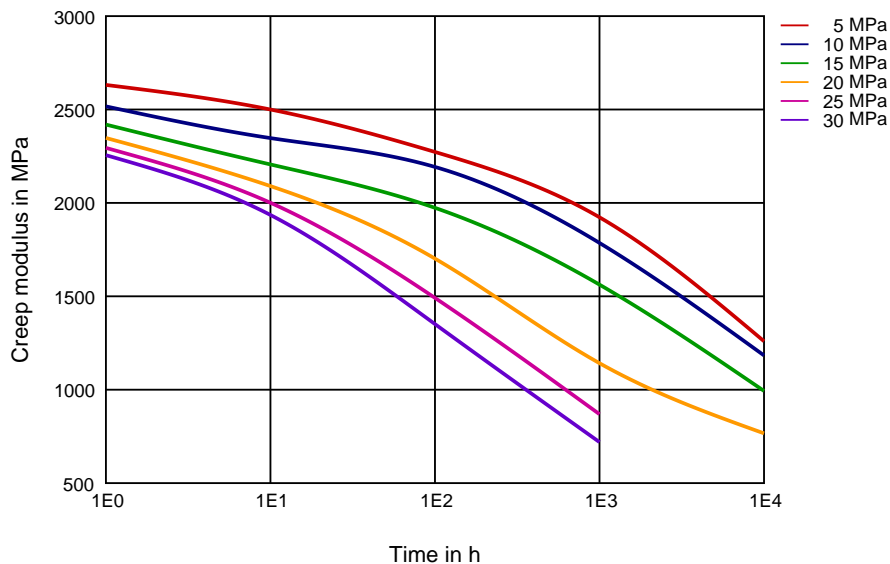




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## THERMOPLASTIC POLYESTER RESIN

Creep modulus-time 23 °C



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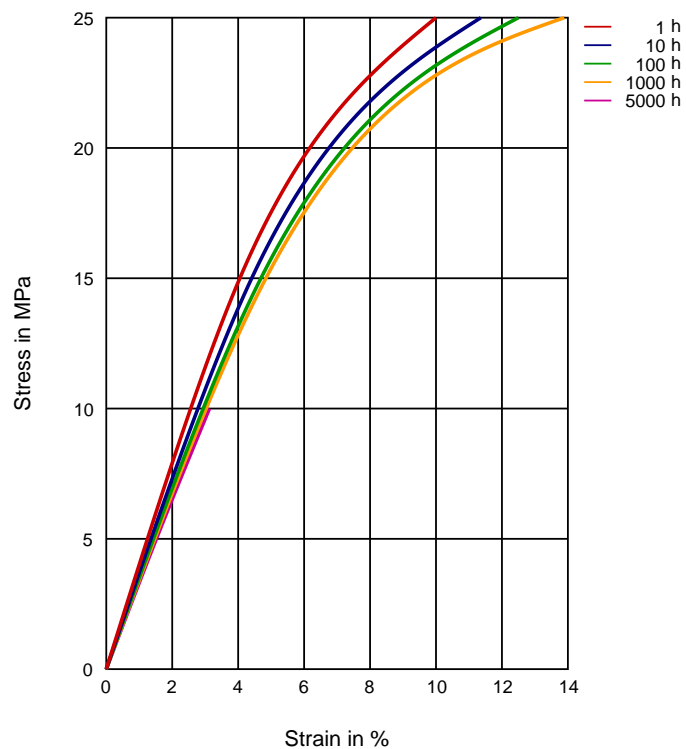
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## THERMOPLASTIC POLYESTER RESIN

Stress-strain (isochronous) 60°C



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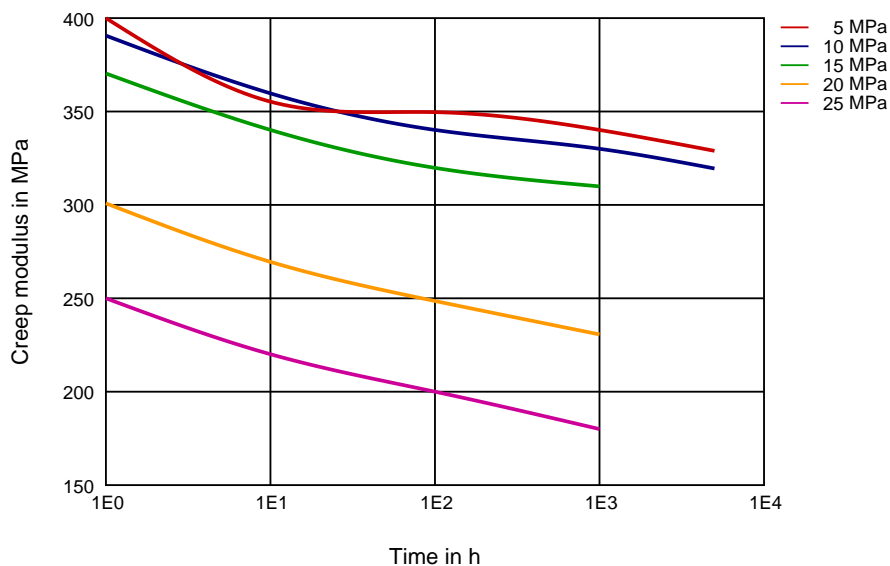
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## THERMOPLASTIC POLYESTER RESIN

Creep modulus-time 60 °C



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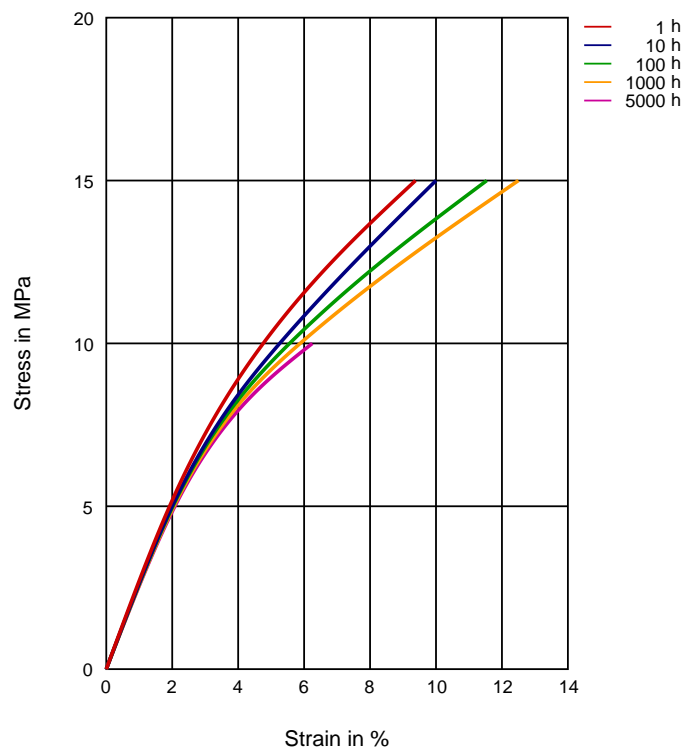


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## THERMOPLASTIC POLYESTER RESIN

Stress-strain (isochronous) 110°C



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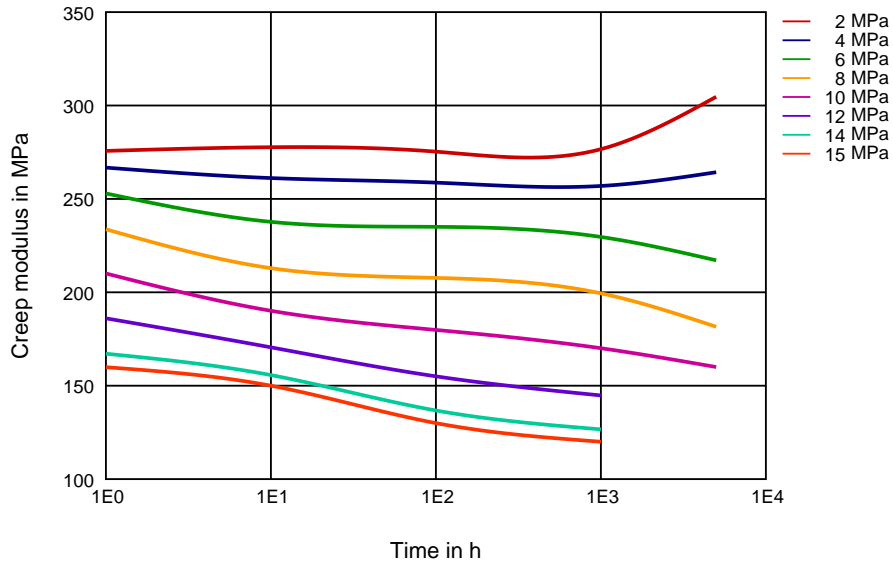
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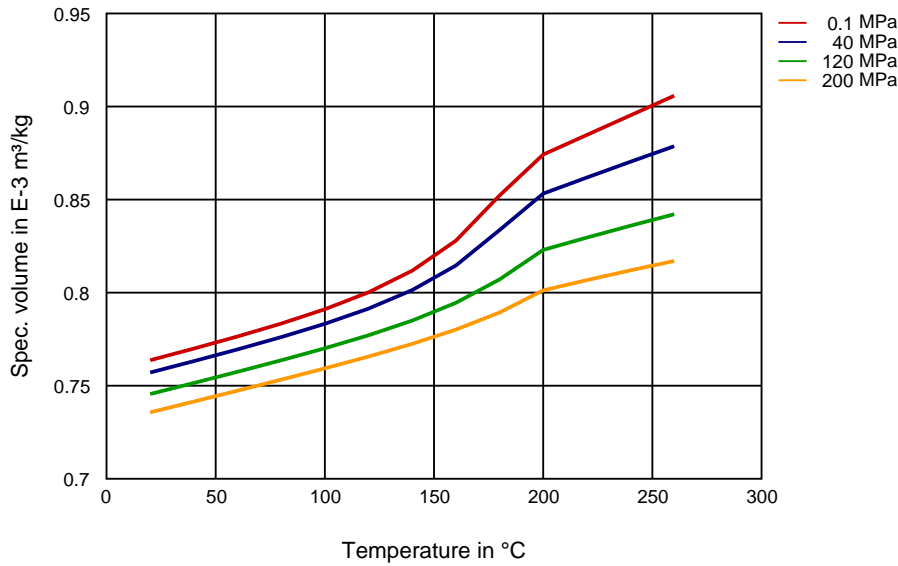
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## THERMOPLASTIC POLYESTER RESIN

Creep modulus-time 110°C



Specific volume-temperature (pvT)



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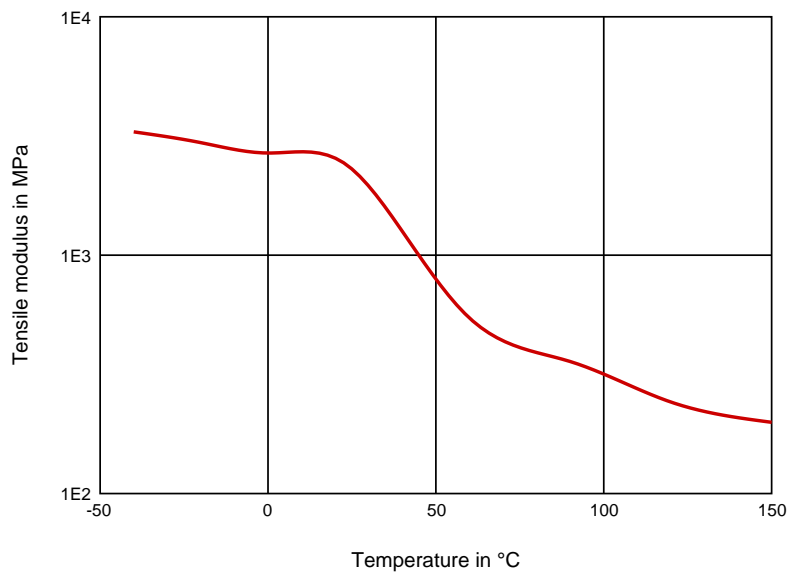
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## THERMOPLASTIC POLYESTER RESIN

Tensile modulus-temperature



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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)
- ✗ 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)

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- ✓ 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)
- ✓ 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).

Contact DuPont for Material Safety Data Sheet, general guides and/or additional information about ventilation, handling, purging, drying, etc. ISO Mechanical properties measured at 160 mil (Hytrel® measured at 80 mil), IEC Electrical properties measured at 80 mil, all ASTM properties measured at 120 mil, and test temperatures are 73°F unless otherwise stated.

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