

# DuPont™ Crastin® S600F10 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® S600F10 NC010 is an unreinforced, lubricated, medium high viscosity polybutylene terephthalate resin for injection molding.**

| General information                    | Value | Unit              | Test Standard   |
|--|-------|-------------------|-----------------|
| Resin Identification                   | PBT   | -                 | -               |
| Part Marking Code                      | >PBT< | -                 | ISO 11469       |
| Rheological properties                 | Value | Unit              | Test Standard   |
| Melt mass-flow rate                    | 10.1  | g/10min           | ISO 1133        |
| Melt mass-flow rate, Temperature       | 250   | °C                | -               |
| Melt mass-flow rate, Load              | 2.16  | kg                | -               |
| Moulding shrinkage, parallel           | 1.7   | %                 | ISO 294-4, 2577 |
| Moulding shrinkage, normal             | 1.6   | %                 | ISO 294-4, 2577 |
| Mechanical properties                  | Value | Unit              | Test Standard   |
| Tensile Modulus                        | 2600  | MPa               | ISO 527-1/-2    |
| Yield stress                           | 57    | MPa               | ISO 527-1/-2    |
| Yield strain                           | 6     | %                 | ISO 527-1/-2    |
| Nominal strain at break                | >50   | %                 | ISO 527-1/-2    |
| Strain at Break, 23°C, 50mm/min        | >50   | %                 | ISO 527-1/-2    |
| Flexural Modulus                       | 2300  | 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     |
| 23°C                                   | N     | kJ/m <sup>2</sup> |                 |
| -30°C                                  | N     | kJ/m <sup>2</sup> |                 |
| Charpy notched impact strength         |       |                   | ISO 179/1eA     |
| 23°C                                   | 5     | kJ/m <sup>2</sup> |                 |
| -30°C                                  | 4     | kJ/m <sup>2</sup> |                 |
| Izod notched impact strength           |       |                   | ISO 180/1A      |
| 23°C                                   | 5     | kJ/m <sup>2</sup> |                 |
| -30°C                                  | 5     | kJ/m <sup>2</sup> |                 |
| Izod impact strength                   |       |                   | ISO 180/1U      |
| 23°C                                   | N     | kJ/m <sup>2</sup> |                 |
| -30°C                                  | 130   | kJ/m <sup>2</sup> |                 |
| Thermal properties                     | Value | Unit              | Test Standard   |
| Melting temperature, 10°C/min          | 225   | °C                | ISO 11357-1/-3  |
| Glass transition temperature, 10°C/min | 55    | °C                | ISO 11357-1/-2  |
| Temp. of deflection under load         |       |                   | ISO 75-1/-2     |
| 1.8 MPa                                | 50    | °C                |                 |
| 0.45 MPa                               | 115   | °C                |                 |
| 0.45 MPa, annealed                     | 180   | °C                |                 |
| 1.8 MPa, annealed                      | 60    | °C                |                 |

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|---|------------------|-------------------|----------------------|
| Vicat softening temperature, 50°C/h, 50N    | 175              | °C                | ISO 306              |
| Coeff. of linear therm. expansion, parallel | 110              | E-6/K             | ISO 11359-1/-2       |
| Coeff. of linear therm. expansion, normal   | 120              | E-6/K             | ISO 11359-1/-2       |
| Thermal conductivity of melt                | 0.21             | W/(m K)           | -                    |
| Spec. heat capacity of melt                 | 2100             | J/(kg K)          | -                    |
| RTI, electrical, 0.8mm                      | 130              | °C                | UL 746B              |
| RTI, impact, 0.8mm                          | 115              | °C                | UL 746B              |
| RTI, strength, 0.8mm                        | 120              | °C                | UL 746B              |
| <b>Flammability</b>                         | <b>Value</b>     | <b>Unit</b>       | <b>Test Standard</b> |
| Burning Behav. at 1.5mm nom. thickn.        | HB               | class             | IEC 60695-11-10      |
| Thickness tested                            | 1.5              | mm                | IEC 60695-11-10      |
| UL recognition                              | UL               | -                 | -                    |
| Burning Behav. at thickness h               | HB               | class             | IEC 60695-11-10      |
| Thickness tested                            | 0.8              | mm                | IEC 60695-11-10      |
| UL recognition                              | UL               | -                 | -                    |
| Oxygen index                                | 22               | %                 | ISO 4589-1/-2        |
| Glow Wire Flammability Index, 3mm           | 750              | °C                | IEC 60695-2-1/2      |
| Glow Wire Ignition Temperature              |                  |                   | IEC 60695-2-1/3      |
| 0.75mm                                      | 750              | °C                |                      |
| 1mm   | 750              | °C                |                      |
| 2mm   | 750              | °C                |                      |
| <b>Electrical properties</b>                | <b>Value</b>     | <b>Unit</b>       | <b>Test Standard</b> |
| Relative permittivity                       |                  |                   | IEC 60250            |
| 100Hz                                       | 3.8              | -                 |                      |
| 1MHz  | 3.2              | -                 |                      |
| Dissipation factor                          |                  |                   | IEC 60250            |
| 100Hz                                       | 20               | E-4               |                      |
| 1MHz  | 200              | E-4               |                      |
| Volume resistivity                          | >1E13            | Ohm*m             | IEC 60093            |
| Surface resistivity                         | 1E15             | Ohm               | IEC 60093            |
| Electric strength                           | 26               | kV/mm             | IEC 60243-1          |
| Comparative tracking index                  | 600              | -                 | IEC 60112            |
| Electric Strength, Short Time               |                  |                   | IEC 60243-1          |
| 1mm   | 26               | kV/mm             |                      |
| 2mm   | 15               | kV/mm             |                      |
| <b>Other properties</b>                     | <b>Value</b>     | <b>Unit</b>       | <b>Test Standard</b> |
| Humidity absorption, 2mm                    | 0.2              | %                 | Sim. to ISO 62       |
| Water absorption, 2mm                       | 0.5              | %                 | Sim. to ISO 62       |
| Density                                     | 1300             | kg/m <sup>3</sup> | ISO 1183             |
| Density of melt                             | 1110             | kg/m <sup>3</sup> | -                    |
| <b>VDA Properties</b>                       | <b>Value</b>     | <b>Unit</b>       | <b>Test Standard</b> |
| Burning rate, Thickness 1 mm                | 0 <sup>(1)</sup> | mm/min            | ISO 3795 (FMVSS 302) |
| Emission of organic compounds               | 145              | µgC/g             | VDA 277              |
| Odour                                       | 3                | class             | VDA 270              |

1: SE/NBR

### Characteristics

|                       |   |   |
|-----------------------|---|---|
| Processing            | <ul style="list-style-type: none"> <li>• Injection Moulding</li> <li>• Profile Extrusion</li> </ul> | <ul style="list-style-type: none"> <li>• Other Extrusion</li> <li>• Coatable</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> <li>• Near East/Africa</li> <li>• Global</li> </ul> |

### Processing Texts

#### Injection molding

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## THERMOPLASTIC POLYESTER RESIN

### PREPROCESSING

Drying recommended = Yes  
Drying temperature = 110-130 °C  
Drying time, dehumidified dryer = 2-4 h  
Processing moisture content = <0.04 %

### PROCESSING

Melt temperature optimum = 250 °C  
Melt temperature range = 240-260 °C  
Mould temperature optimum = 80 °C  
Mould temperature range = 30-130 °C

### Profile extrusion

#### PREPROCESSING

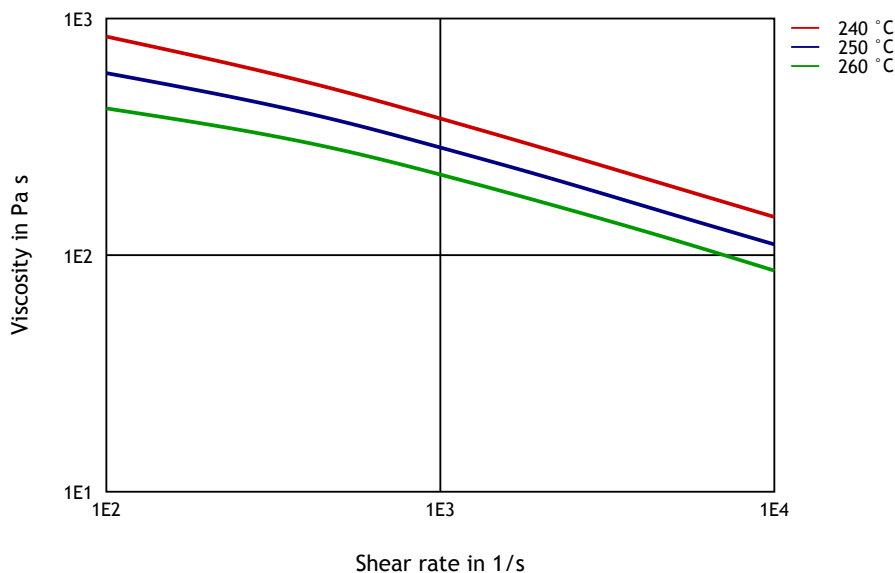
Drying recommended = Yes  
Drying temperature = 110-130 °C  
Drying time, dehumidified dryer = 2-4 h  
Processing moisture content = <0.04 %

#### PROCESSING

Melt temperature optimum = 250 °C  
Melt temperature range = 240-260 °C

### Diagrams

#### Viscosity-shear rate



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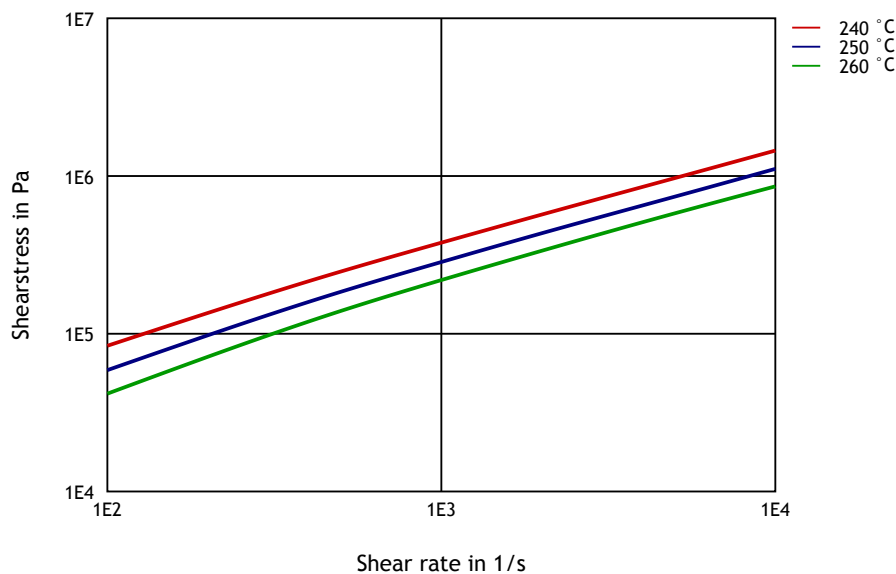
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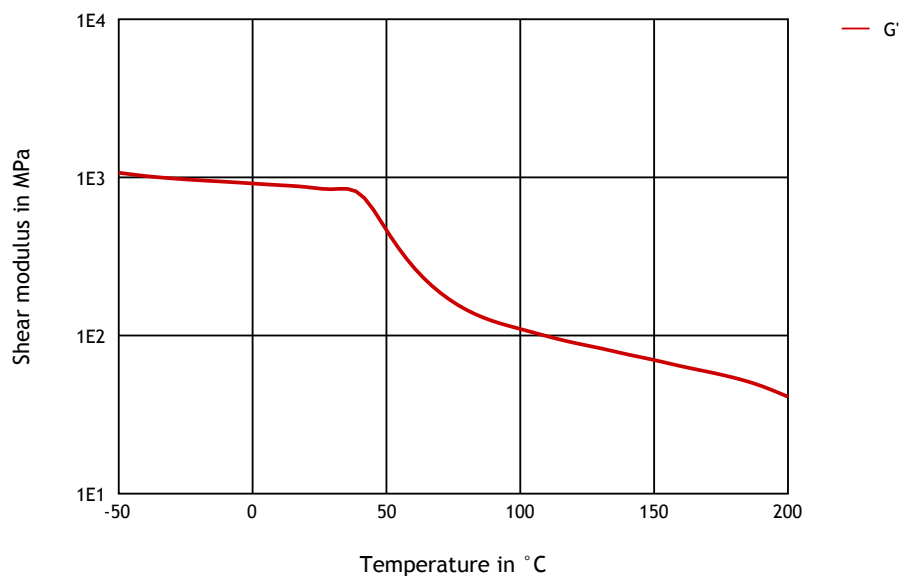
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## THERMOPLASTIC POLYESTER RESIN

### Shearstress-shear rate



### Dynamic Shear modulus-temperature



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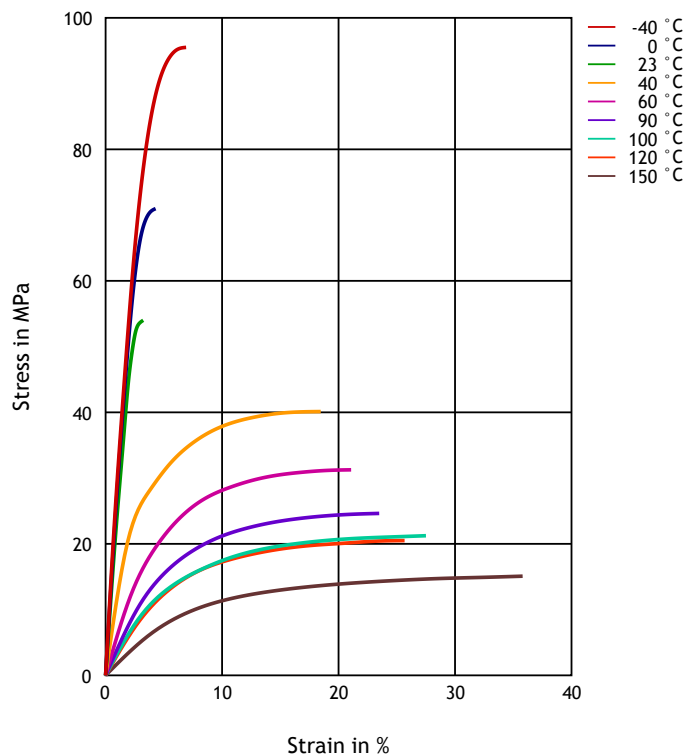
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## THERMOPLASTIC POLYESTER RESIN

Stress-strain



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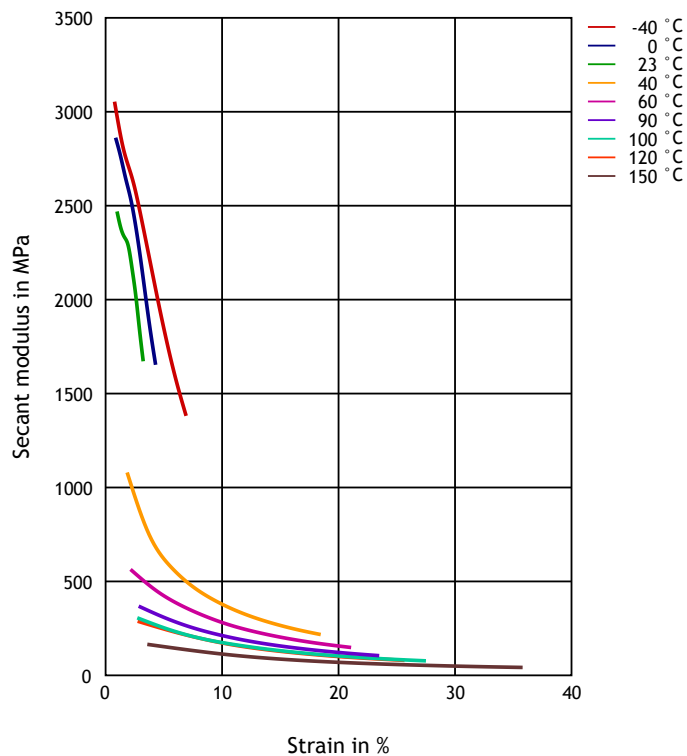
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# DuPont™ Crastin® S600F10 NC010

## THERMOPLASTIC POLYESTER RESIN

Secant modulus-strain



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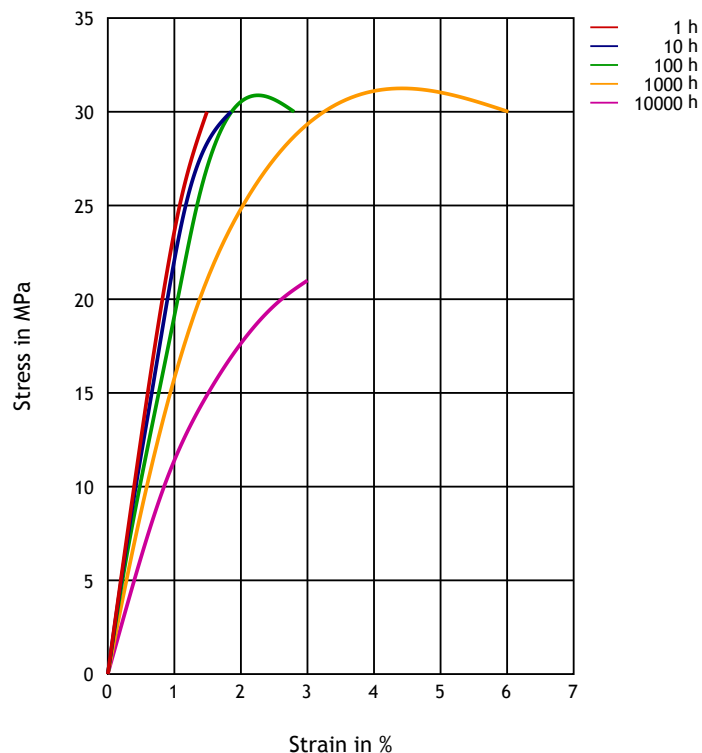
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# DuPont™ Crastin® S600F10 NC010

## THERMOPLASTIC POLYESTER RESIN

Stress-strain (isochronous) 23 °C



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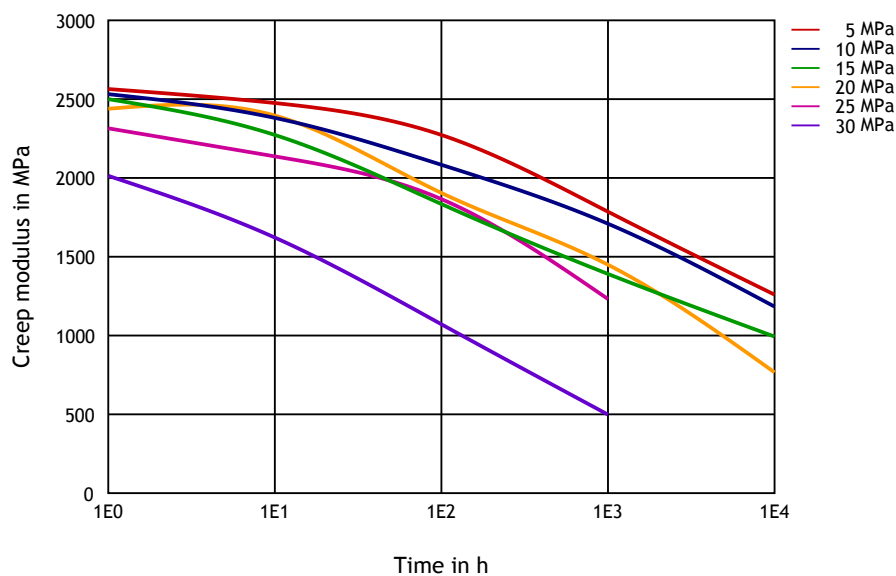
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# DuPont™ Crastin® S600F10 NC010

## THERMOPLASTIC POLYESTER RESIN

Creep modulus-time 23 °C



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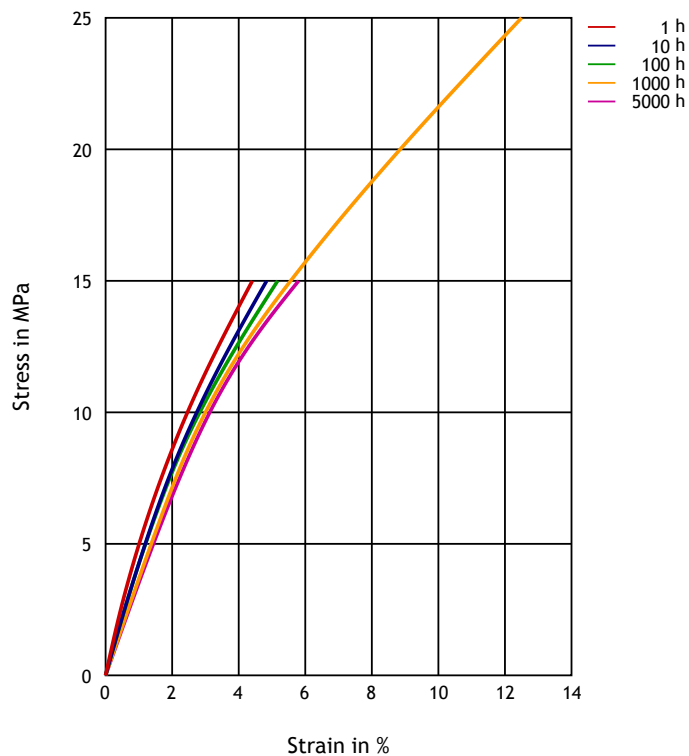




# DuPont™ Crastin® S600F10 NC010

## THERMOPLASTIC POLYESTER RESIN

Stress-strain (isochronous) 60°C



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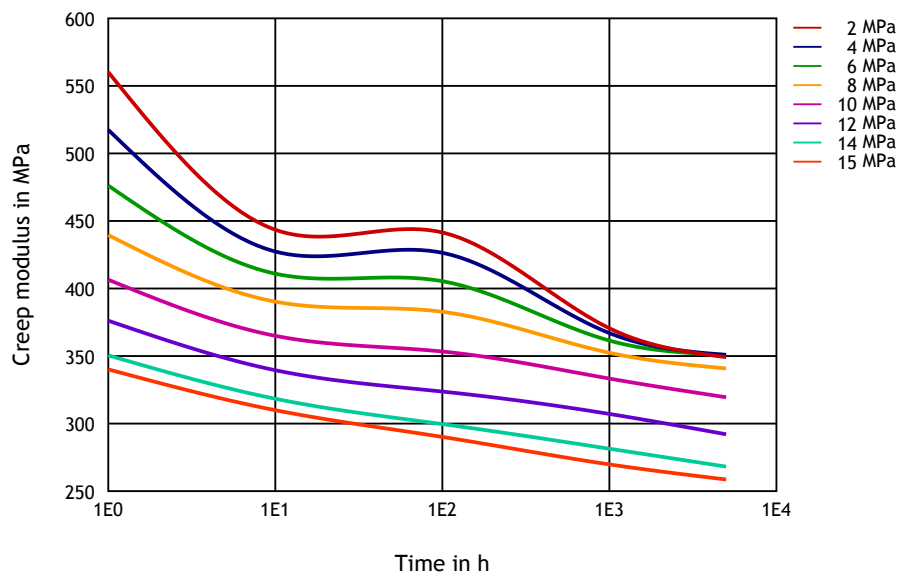
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# DuPont™ Crastin® S600F10 NC010

## THERMOPLASTIC POLYESTER RESIN

Creep modulus-time 60 °C



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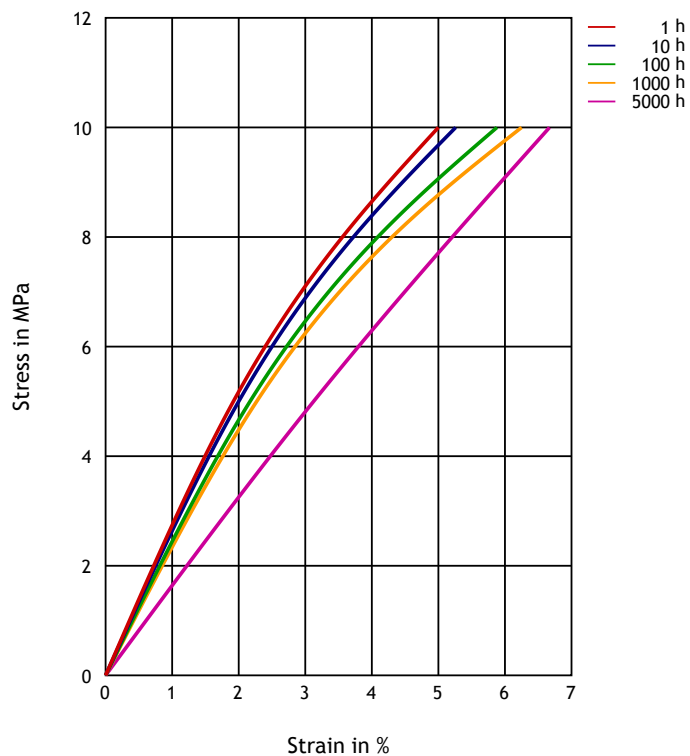
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# DuPont™ Crastin® S600F10 NC010

## THERMOPLASTIC POLYESTER RESIN

Stress-strain (isochronous) 110°C



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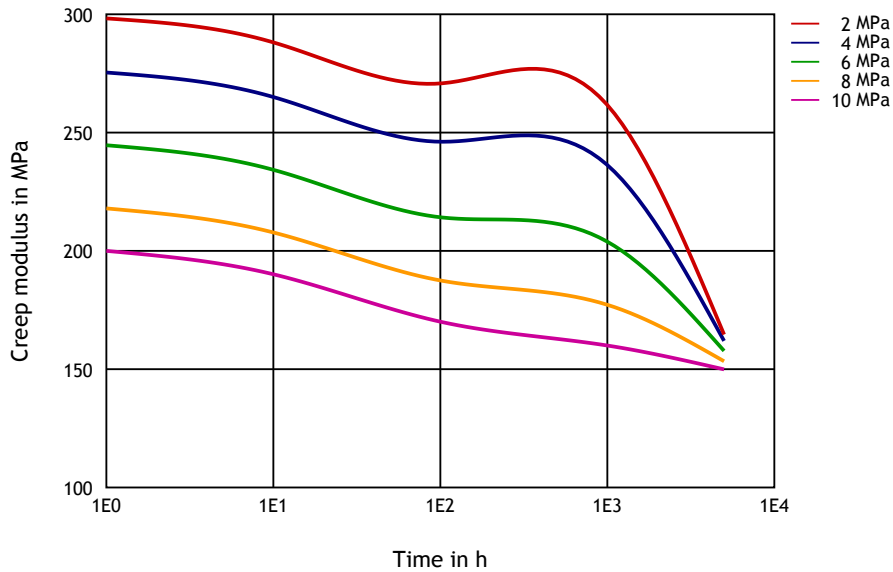
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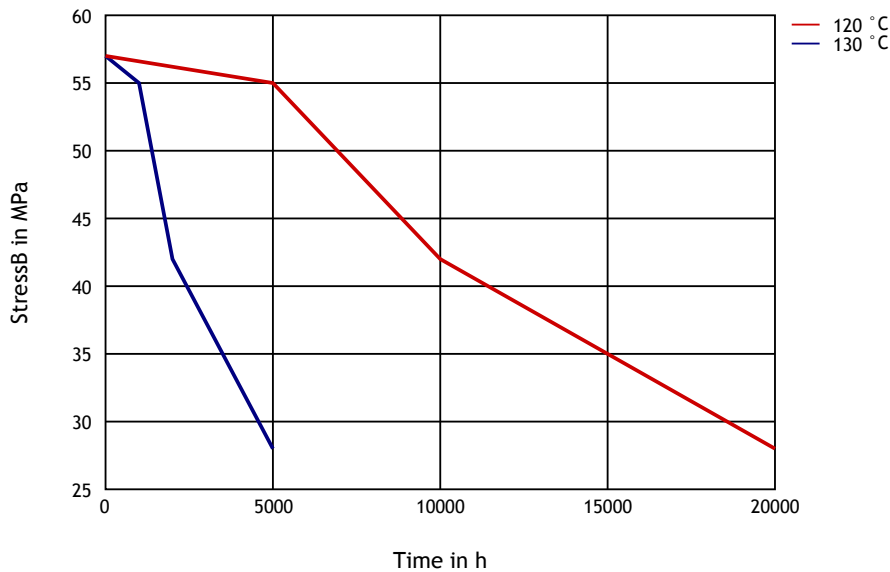
# DuPont™ Crastin® S600F10 NC010

## THERMOPLASTIC POLYESTER RESIN

### Creep modulus-time 110 °C



### LTHA-Stress at Break 4mm



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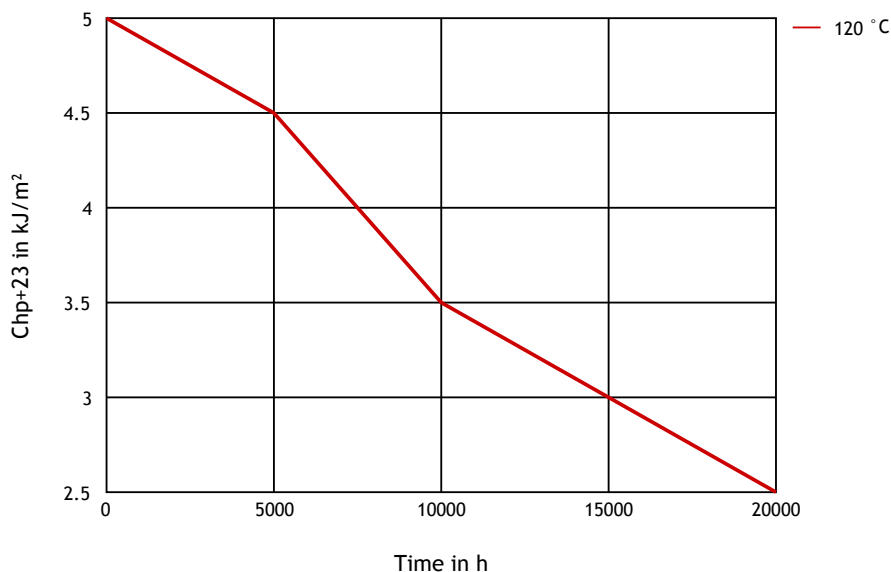
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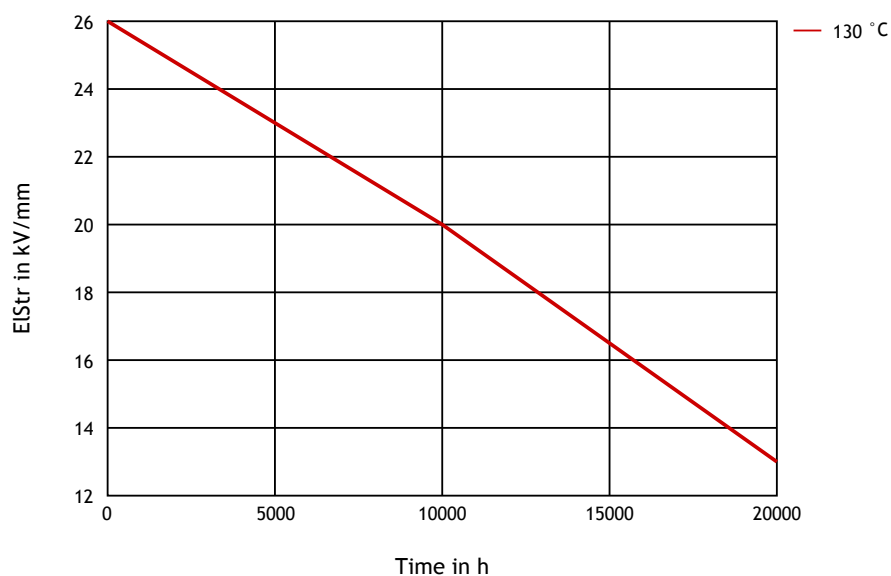
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## THERMOPLASTIC POLYESTER RESIN

### LTHA-Charpy Impact Strength (23 °C) 4mm



### LTHA-Electric Strength 1mm



### Chemical Media Resistance

#### Acids

- ✓ Acetic Acid (5% by mass) (23 °C)

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## THERMOPLASTIC POLYESTER RESIN

- ✓ 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 (60 °C)
- ✗ ISO 1817 Liquid 2 (60 °C)
- ✗ ISO 1817 Liquid 3 (60 °C)
- ✗ ISO 1817 Liquid 4 (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

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## THERMOPLASTIC POLYESTER RESIN

- ✓ 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 4.0mm (Hytrel® measured at 2 mm), IEC Electrical properties measured at 2.0mm, all ASTM properties measured at 3.2mm, and test temperatures are 23°C unless otherwise stated.

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