

# DuPont™ Crastin® SK645FR 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® SK645FR is a flame retardant, 30% glass reinforced polybutylene terephthalate moulding resin. It is recognized as UL94V-0 at 0.75mm.**

General information	Value	Unit	Test Standard
Resin Identification	PBT-GF30FR(17)	-	-
Part Marking Code	>PBT-GF30FR(17)<	-	ISO 11469
Rheological properties	Value	Unit	Test Standard
Moulding shrinkage, parallel	0.3	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.2	%	ISO 294-4, 2577
Moulding shrinkage, parallel, annealed	0.5	%	ISO 294-4
Moulding shrinkage, normal, annealed	1.5	%	ISO 294-4
Mechanical properties	Value	Unit	Test Standard
Tensile Modulus	11200	MPa	ISO 527-1/-2
Stress at break	125	MPa	ISO 527-1/-2
Strain at break	2.4	%	ISO 527-1/-2
Flexural Strength	215	MPa	ISO 178
Tensile creep modulus			ISO 899-1
1h	11000	MPa	
1000h	8000	MPa	
Charpy impact strength			ISO 179/1eU
23 °C	53	kJ/m <sup>2</sup>	
-30 °C	57	kJ/m <sup>2</sup>	
Charpy notched impact strength			ISO 179/1eA
23 °C	9.1	kJ/m <sup>2</sup>	
-30 °C	9.4	kJ/m <sup>2</sup>	
Izod notched impact strength			ISO 180/1A
23 °C	9	kJ/m <sup>2</sup>	
-30 °C	8	kJ/m <sup>2</sup>	
Izod impact strength			ISO 180/1U
23 °C	40	kJ/m <sup>2</sup>	
-30 °C	40	kJ/m <sup>2</sup>	
Thermal properties	Value	Unit	Test Standard
Melting temperature, 10 °C/min	225	°C	ISO 11357-1/-3
Temp. of deflection under load			ISO 75-1/-2
1.8 MPa	210	°C	
0.45 MPa	220	°C	
Vicat softening temperature, 50 °C/h, 50N	212	°C	ISO 306
Coeff. of linear therm. expansion, parallel	30	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal	90	E-6/K	ISO 11359-1/-2
Thermal conductivity of melt	0.26	W/(m K)	-

To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

**North America**

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

**Asia Pacific**

Tel: +81 3 5521 8600

**Europe/Middle East/Africa**

Tel: +41 22 717 51 11



# DuPont™ Crastin® SK645FR NC010

## THERMOPLASTIC POLYESTER RESIN

Spec. heat capacity of melt	1600	J/(kg K)	-
RTI, electrical			UL 746B
0.8mm	140	°C	
1.5mm	140	°C	
3mm	140	°C	
6mm	140	°C	
RTI, impact			UL 746B
0.8mm	125	°C	
1.5mm	125	°C	
3mm	130	°C	
6mm	130	°C	
RTI, strength			UL 746B
0.8mm	140	°C	
1.5mm	140	°C	
3mm	140	°C	
6mm	140	°C	
<b>Flammability</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
Burning Behav. at 1.5mm nom. thickn.	V-0	class	IEC 60695-11-10
Thickness tested	1.5	mm	IEC 60695-11-10
UL recognition	UL	-	-
Burning Behav. at thickness h	V-0	class	IEC 60695-11-10
Thickness tested	0.8	mm	IEC 60695-11-10
Oxygen index	31	%	ISO 4589-1/-2
Glow Wire Flammability Index, 3mm	960	°C	IEC 60695-2-1/2
Flammability			IEC 60695-11-10
3.0mm	V-0	-	
6.0mm	V-0	-	
<b>Electrical properties</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
Relative permittivity			IEC 60250
100Hz	4.5	-	
1MHz	3.8	-	
Dissipation factor			IEC 60250
100Hz	30	E-4	
1MHz	160	E-4	
Volume resistivity	>1E13	Ohm*m	IEC 60093
Surface resistivity	1E15	Ohm	IEC 60093
Electric strength	28	kV/mm	IEC 60243-1
Comparative tracking index	250	-	IEC 60112
Electric Strength, 20s, 2mm	17	kV/mm	IEC 60243-1
<b>Other properties</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
Humidity absorption, 2mm	0.1	%	Sim. to ISO 62
Water absorption, 2mm	0.3	%	Sim. to ISO 62
Density	1710	kg/m <sup>3</sup>	ISO 1183
Density of melt	1490	kg/m <sup>3</sup>	-

### Characteristics

Processing	• Injection Moulding
Delivery form	• Pellets
Regional Availability	• North America • Europe • Asia Pacific • South and Central America • Near East/Africa • Global

### Processing Texts

#### Injection molding

##### PREPROCESSING

Drying recommended = Yes

To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

#### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

#### Asia Pacific

Tel: +81 3 5521 8600

#### Europe/Middle East/Africa

Tel: +41 22 717 51 11



# DuPont™ Crastin® SK645FR NC010

## THERMOPLASTIC POLYESTER RESIN

Drying temperature = 110-130 °C

Drying time, dehumidified dryer = 2-4 h

Processing moisture content = <0.04 %

### PROCESSING

Melt temperature optimum = 250 °C

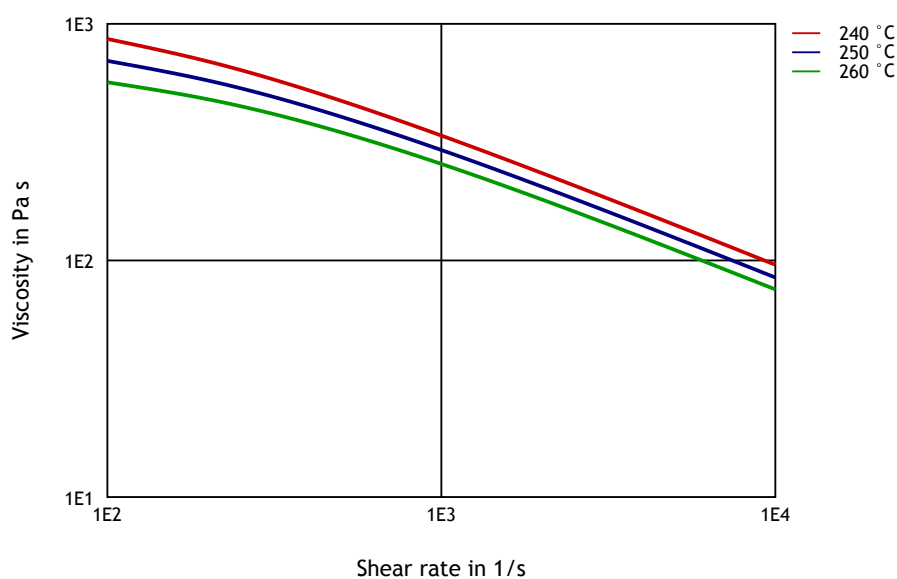
Melt temperature range = 240-260 °C

Mould temperature optimum = 80 °C

Mould temperature range = 30-130 °C

### Diagrams

#### Viscosity-shear rate



To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

#### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

#### Asia Pacific

Tel: +81 3 5521 8600

#### Europe/Middle East/Africa

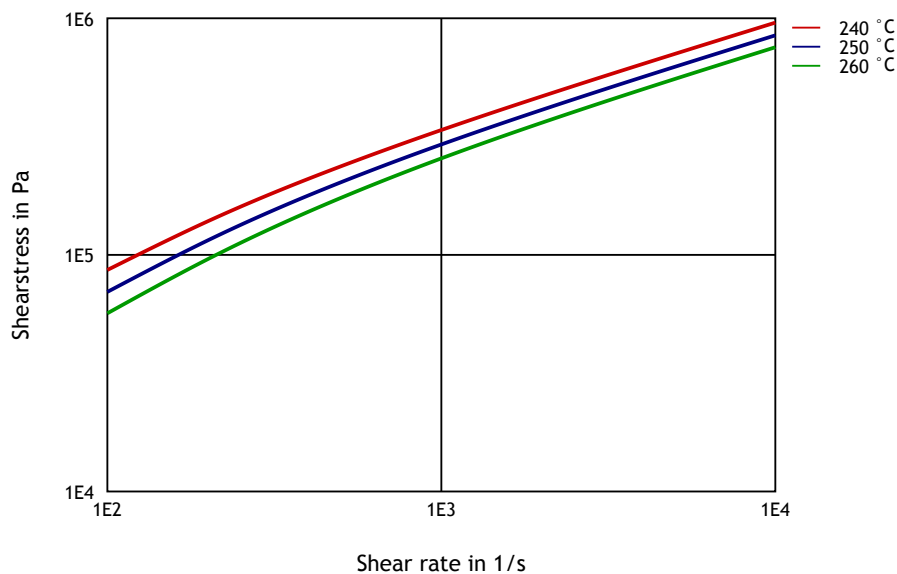
Tel: +41 22 717 51 11



# DuPont™ Crastin® SK645FR NC010

## THERMOPLASTIC POLYESTER RESIN

Shearstress-shear rate



To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

### Asia Pacific

Tel: +81 3 5521 8600

### Europe/Middle East/Africa

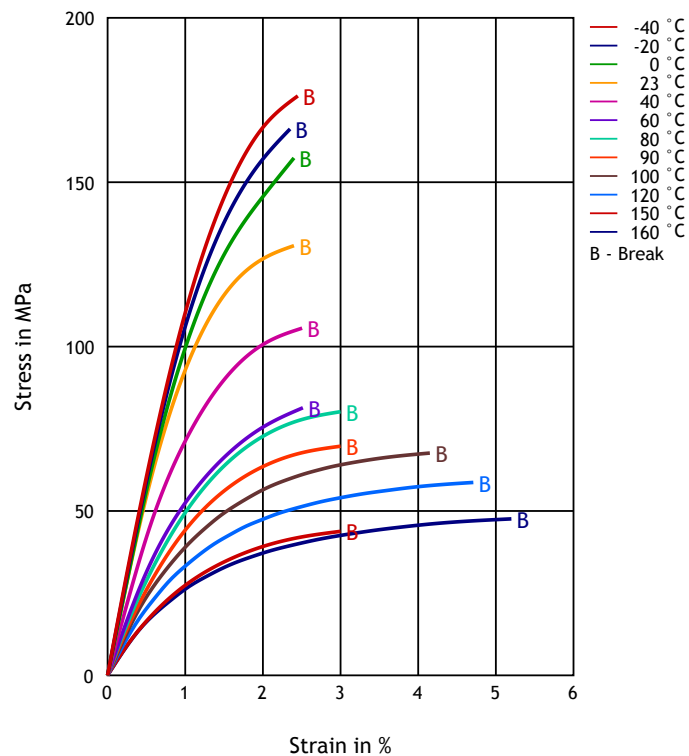
Tel: +41 22 717 51 11



# DuPont™ Crastin® SK645FR NC010

## THERMOPLASTIC POLYESTER RESIN

Stress-strain



To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

### Asia Pacific

Tel: +81 3 5521 8600

### Europe/Middle East/Africa

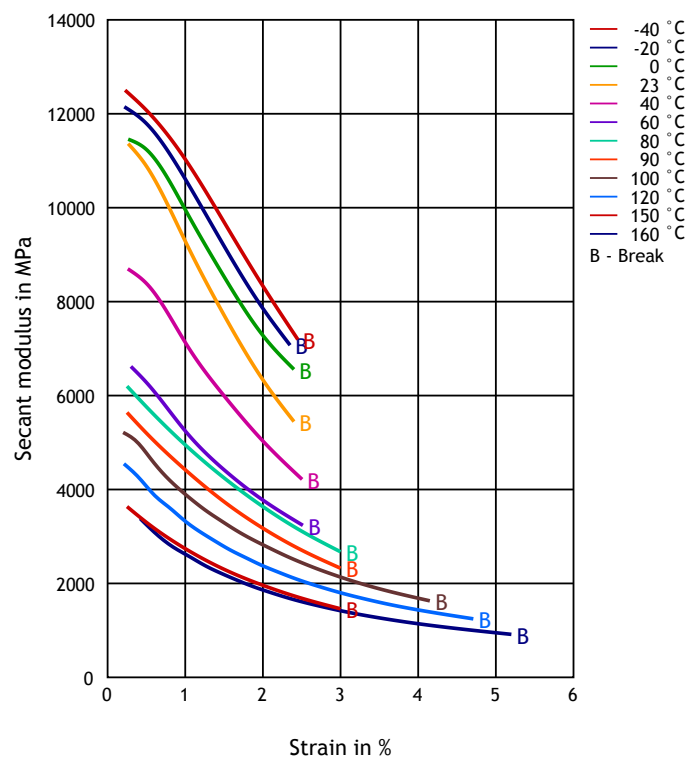
Tel: +41 22 717 51 11



# DuPont™ Crastin® SK645FR NC010

## THERMOPLASTIC POLYESTER RESIN

Secant modulus-strain



To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

### Asia Pacific

Tel: +81 3 5521 8600

### Europe/Middle East/Africa

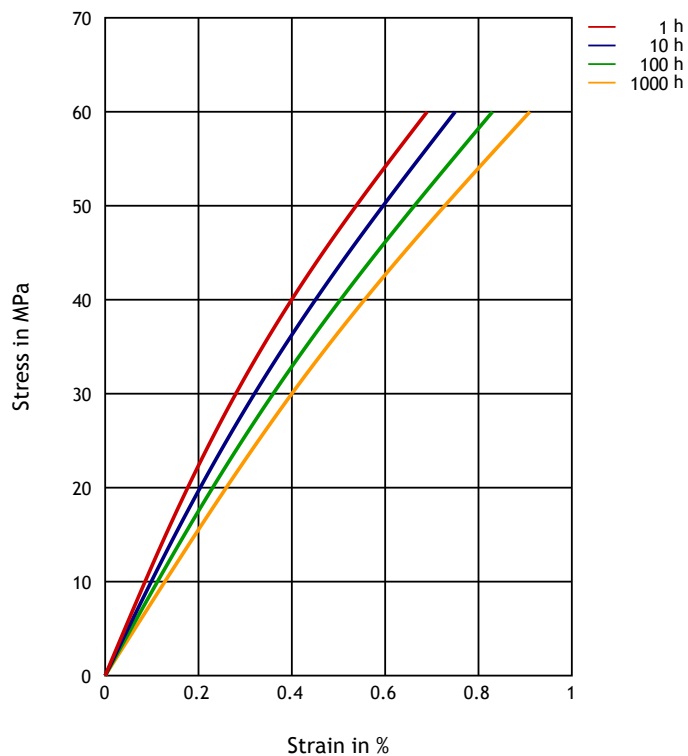
Tel: +41 22 717 51 11



# DuPont™ Crastin® SK645FR NC010

## THERMOPLASTIC POLYESTER RESIN

Stress-strain (isochronous) 23°C



To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

### Asia Pacific

Tel: +81 3 5521 8600

### Europe/Middle East/Africa

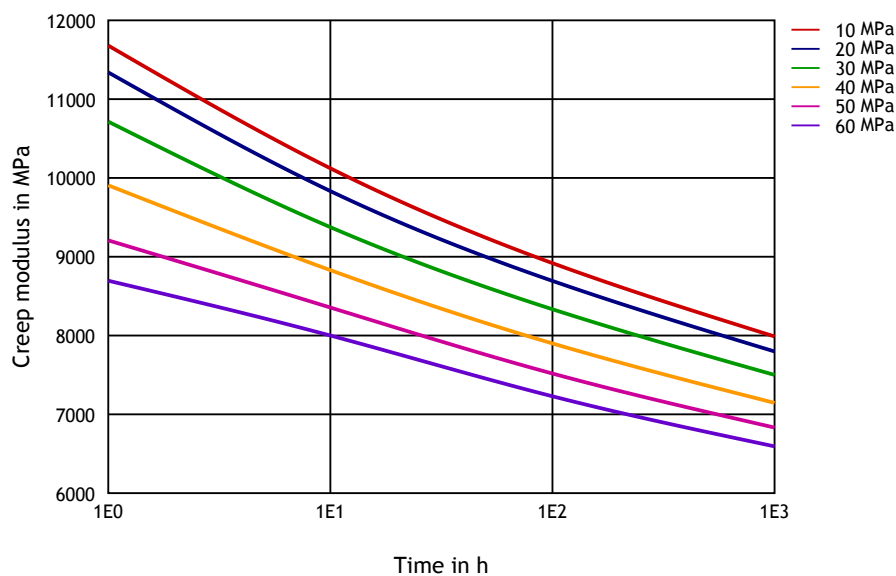
Tel: +41 22 717 51 11



# DuPont™ Crastin® SK645FR NC010

## THERMOPLASTIC POLYESTER RESIN

Creep modulus-time 23 °C



To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

### Asia Pacific

Tel: +81 3 5521 8600

### Europe/Middle East/Africa

Tel: +41 22 717 51 11

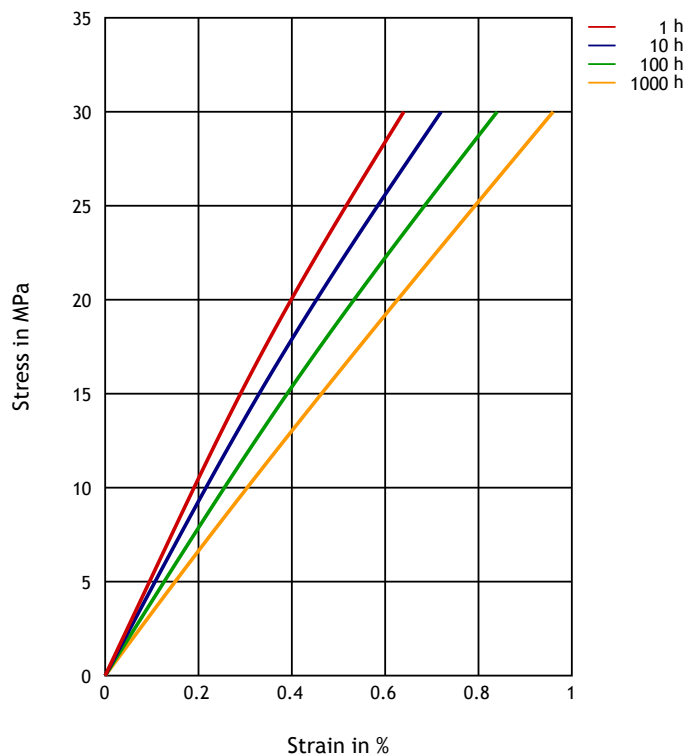




# DuPont™ Crastin® SK645FR NC010

## THERMOPLASTIC POLYESTER RESIN

Stress-strain (isochronous) 100 °C



To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

### Asia Pacific

Tel: +81 3 5521 8600

### Europe/Middle East/Africa

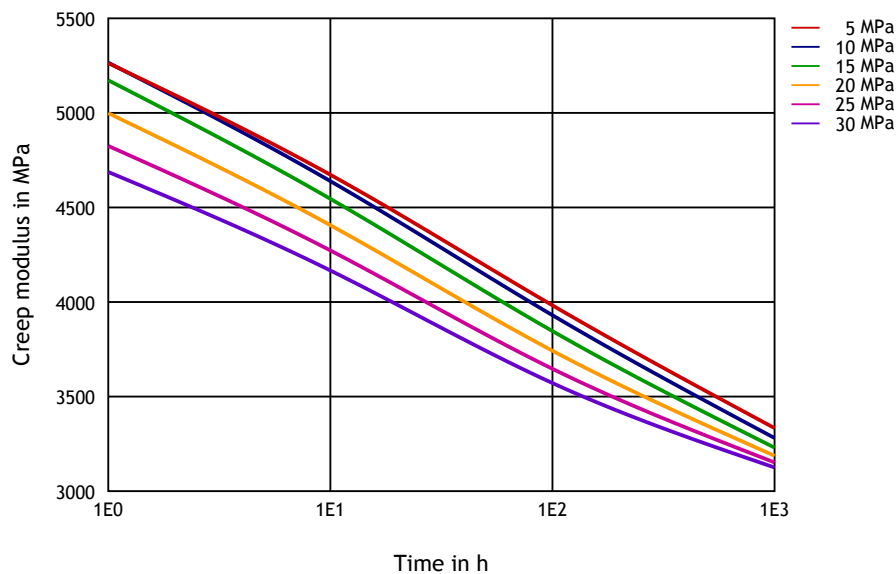
Tel: +41 22 717 51 11



# DuPont™ Crastin® SK645FR NC010

## THERMOPLASTIC POLYESTER RESIN

Creep modulus-time 100 °C



To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

### Asia Pacific

Tel: +81 3 5521 8600

### Europe/Middle East/Africa

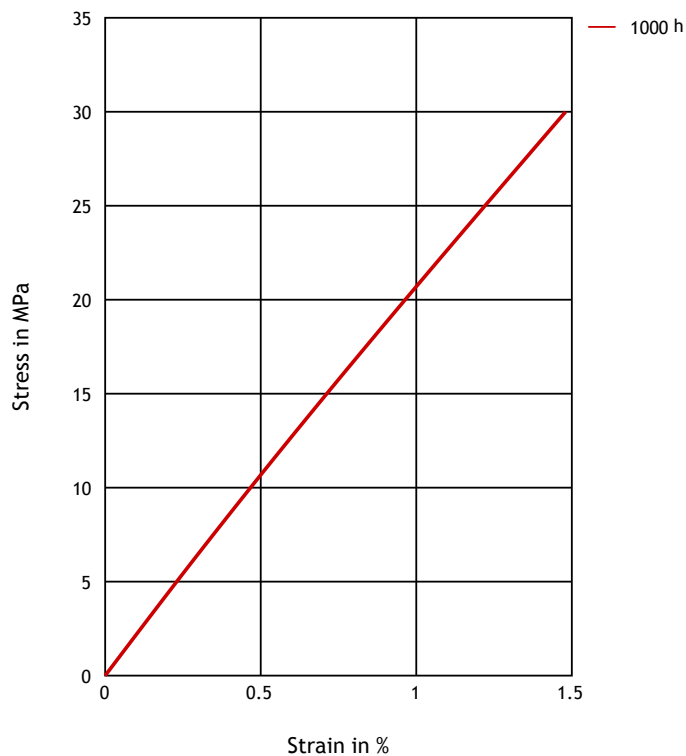
Tel: +41 22 717 51 11



# DuPont™ Crastin® SK645FR NC010

## THERMOPLASTIC POLYESTER RESIN

Stress-strain (isochronous) 120°C



To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

### Asia Pacific

Tel: +81 3 5521 8600

### Europe/Middle East/Africa

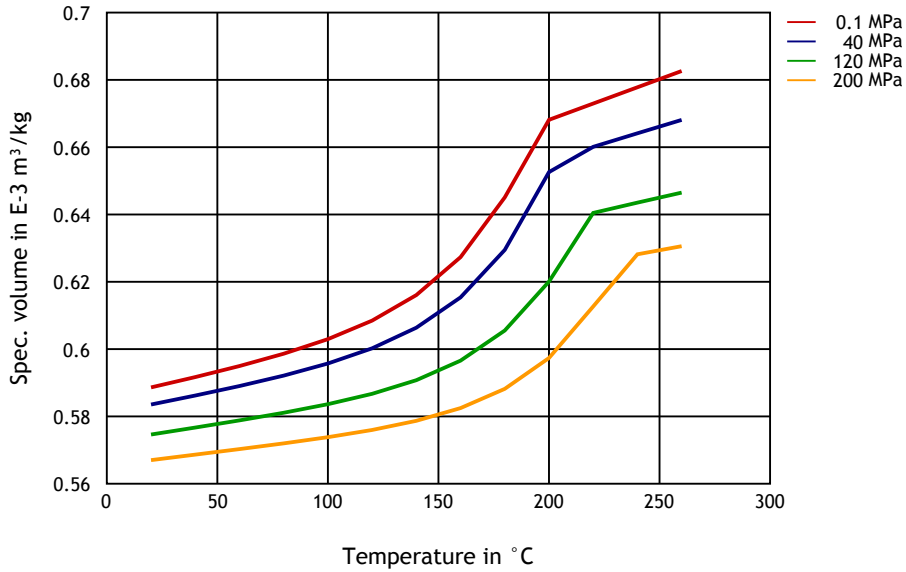
Tel: +41 22 717 51 11



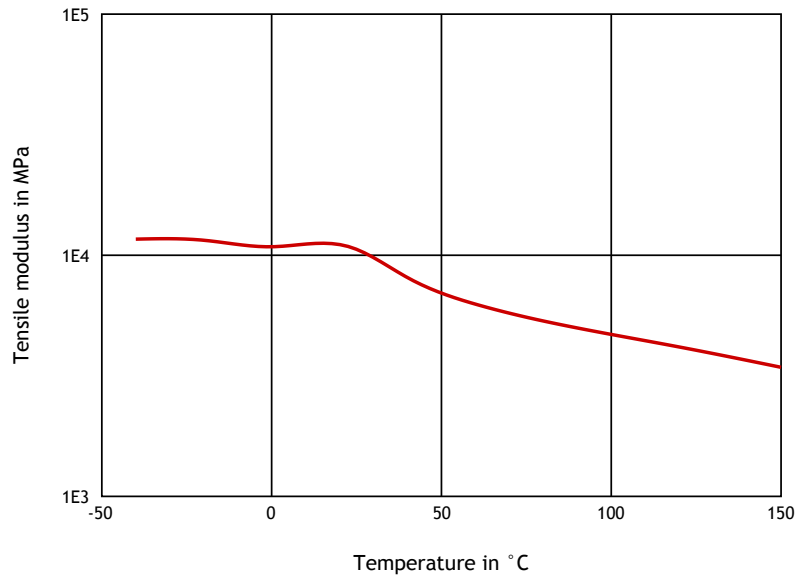
# DuPont™ Crastin® SK645FR NC010

## THERMOPLASTIC POLYESTER RESIN

### Specific volume-temperature (pvT)



### Tensile modulus-temperature



To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

#### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

#### Asia Pacific

Tel: +81 3 5521 8600

#### Europe/Middle East/Africa

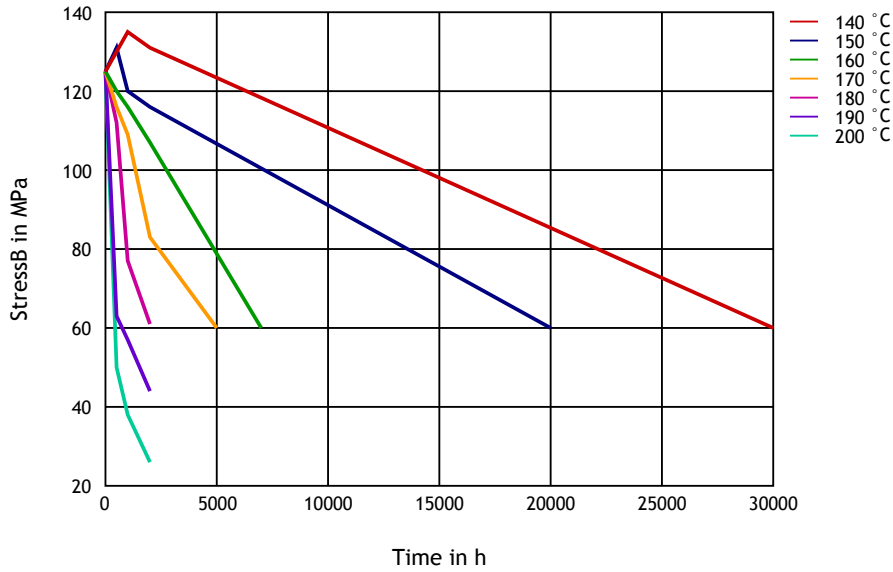
Tel: +41 22 717 51 11



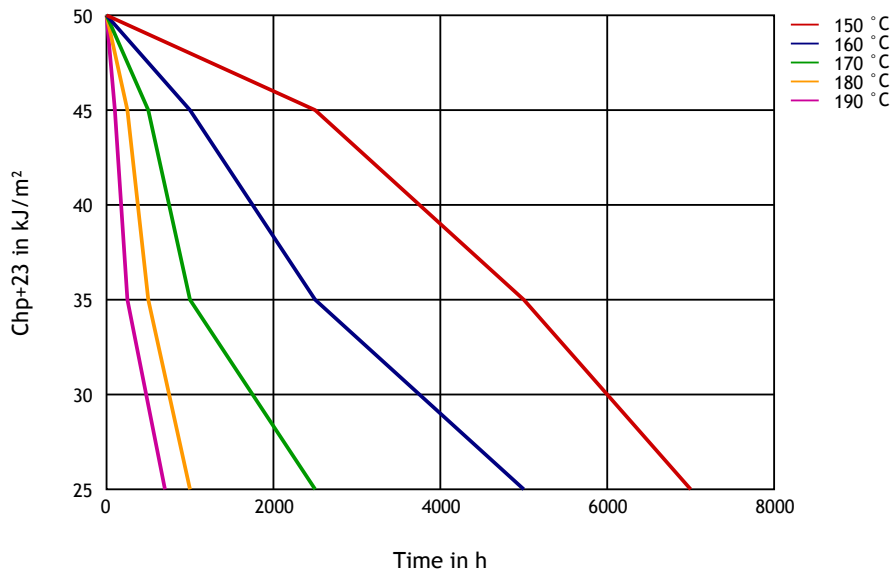
# DuPont™ Crastin® SK645FR NC010

## THERMOPLASTIC POLYESTER RESIN

LTHA-Stress at Break 3mm



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



To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

**North America**

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

**Asia Pacific**

Tel: +81 3 5521 8600

**Europe/Middle East/Africa**

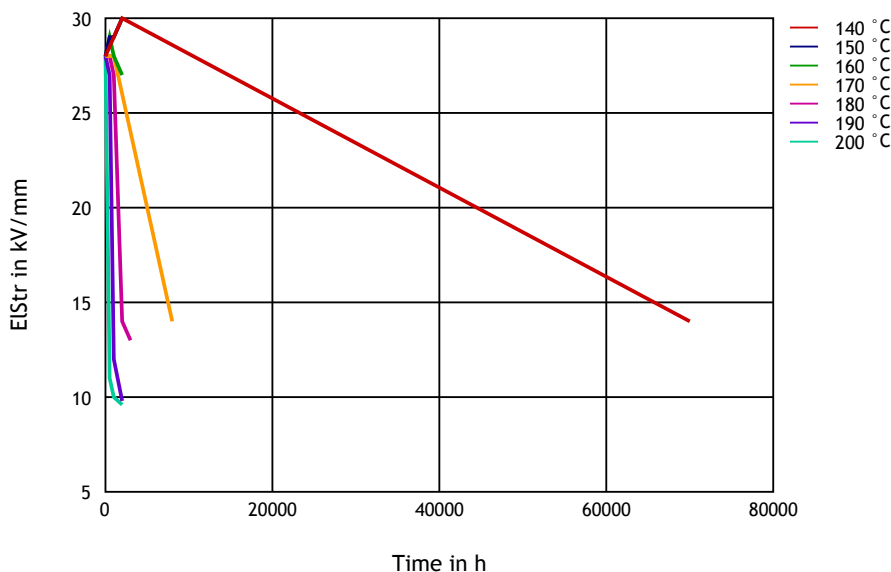
Tel: +41 22 717 51 11



# DuPont™ Crastin® SK645FR NC010

## THERMOPLASTIC POLYESTER RESIN

### LTHA-Electric Strength 1mm



### 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)

To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

#### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

#### Asia Pacific

Tel: +81 3 5521 8600

#### Europe/Middle East/Africa

Tel: +41 22 717 51 11



# DuPont™ Crastin® SK645FR NC010

## THERMOPLASTIC POLYESTER RESIN

✓ 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

- ✓ 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).

To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

#### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

#### Asia Pacific

Tel: +81 3 5521 8600

#### Europe/Middle East/Africa

Tel: +41 22 717 51 11



# DuPont™ Crastin® SK645FR NC010

## THERMOPLASTIC POLYESTER RESIN

**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).

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.

The information set forth herein is furnished free of charge and is based on technical data that DuPont believes to be reliable and falls within the normal range of properties. It is intended for use by persons having technical skill, at their own discretion and risk. This data should not be used to establish specification limits nor used alone as the basis of design. Handling precaution information is given with the understanding that those using it will satisfy themselves that their particular conditions of use present no health or safety hazards. Since conditions of product use and disposal are outside our control, we make no warranties, express or implied, and assume no liability in connection with any use of this information. As with any product, evaluation under end-use conditions prior to specification is essential. Nothing herein is to be taken as a license to operate or a recommendation to infringe on patents. Caution: Do not use in medical applications involving permanent implantation in the human body. For other medical applications, discuss with your DuPont customer representative and read Medical Caution H-50103-4.

Copyright © 2014 DuPont or its affiliates. All Rights Reserved. The DuPont Oval Logo, DuPont™, The miracles of science™ and all products denoted with ® or ™ are registered trademarks or trademarks of E.I. du Pont de Nemours and Company or its affiliates.

To find out more, visit [DuPont Performance Polymers](#) or contact nearest DuPont location.

#### North America

Tel: +1 302 999-4592

Toll-Free (USA): 800 441-0575

#### Asia Pacific

Tel: +81 3 5521 8600

#### Europe/Middle East/Africa

Tel: +41 22 717 51 11

