

# DuPont™ Crastin® T841FR1 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® T841FR1 is a 10% glass fibre reinforced, flame retardant, polybutylene terephthalate for injection moulding. It has improved impact resistance and good surface finish of molded parts.**

General information	Value	Unit	Test Standard
Resin Identification	PBTC-GF10FR(17)	-	ISO 1043
Part Marking Code	PBTC-GF10FR(17)	-	ISO 11469
Rheological properties	Value	Unit	Test Standard
Moulding shrinkage, parallel	0.7	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.2	%	ISO 294-4, 2577
Melt viscosity, @ 1000 sec-1, 250°C	240	Pa s	ISO 11443
Mechanical properties	Value	Unit	Test Standard
Tensile Modulus	3900	MPa	ISO 527-1/-2
Stress at break	70	MPa	ISO 527-1/-2
Strain at break	4.7	%	ISO 527-1/-2
Poisson's ratio	0.36	-	ISO 527-1/-2
Tensile creep modulus			ISO 899-1
1h	3000	MPa	
1000h	2000	MPa	
Charpy impact strength			ISO 179/1eU
23°C	46	kJ/m <sup>2</sup>	
-30°C	40	kJ/m <sup>2</sup>	
Charpy notched impact strength			ISO 179/1eA
23°C	8.5	kJ/m <sup>2</sup>	
-30°C	5	kJ/m <sup>2</sup>	
Thermal properties	Value	Unit	Test Standard
Melting temperature, 10°C/min	205	°C	ISO 11357-1/-3
Temp. of deflection under load			ISO 75-1/-2
1.8 MPa	170	°C	
8 MPa	66	°C	
Vicat softening temperature, 50°C/h, 50N	180	°C	ISO 306
Thermal conductivity of melt	0.23	W/(m K)	-
Spec. heat capacity of melt	1970	J/(kg K)	-
RTI, electrical			UL 746B
0.75mm	130	°C	
1.5mm	130	°C	
3mm	130	°C	
6mm	130	°C	

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RTI, impact			UL 746B
0.75mm	115	°C	
1.5mm	130	°C	
3mm	130	°C	
6mm	130	°C	
RTI, strength			UL 746B
0.75mm	115	°C	
1.5mm	130	°C	
3mm	130	°C	
6mm	130	°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	yes	-	UL 94
Burning Behav. at thickness h	V-0	class	IEC 60695-11-10
Thickness tested	0.75	mm	IEC 60695-11-10
UL recognition	yes	-	UL 94
Oxygen index	30	%	ISO 4589-1/-2
Glow Wire Flammability Index, 3mm	960	°C	IEC 60695-2-12
FMVSS Class	DNI	-	ISO 3795 (FMVSS 302)
<b>Electrical properties</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
Relative permittivity			IEC 62631-2-1
100Hz	4	-	
1MHz	3.8	-	
Dissipation factor			IEC 62631-2-1
100Hz	100	E-4	
1MHz	180	E-4	
Volume resistivity	>1E13	Ohm*m	IEC 62631-3-1
Surface resistivity	1E14	Ohm	IEC 62631-3-2
Electric strength	27	kV/mm	IEC 60243-1
Comparative tracking index	250	-	IEC 60112
Electric Strength, 20s, 2mm	16	kV/mm	IEC 60243-1
<b>Other properties</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
Humidity absorption, 2mm	0.15	%	Sim. to ISO 62
Water absorption, 2mm	0.35	%	Sim. to ISO 62
Density	1540	kg/m <sup>3</sup>	ISO 1183
Density of melt	1310	kg/m <sup>3</sup>	-
<b>Injection</b>	<b>Value</b>	<b>Unit</b>	<b>Test Standard</b>
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	110	°C	-
Min. mould temperature	100	°C	-
Max. mould temperature	120	°C	-
Hold pressure range	≥60	MPa	-
Hold pressure time	3	s/mm	-
Back pressure	As low as possible		-
Ejection temperature	150	°C	-
<b>Characteristics</b>			
Processing	• Injection Moulding	• Profile Extrusion	• Sheet Extrusion
Delivery form	• Pellets		

Revised: 2017-02-02

Page: 2 of 13

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## THERMOPLASTIC POLYESTER RESIN

Additives

• Release agent

Regional Availability

• North America  
• Europe

• Asia Pacific  
• South and Central America

• Near East/Africa  
• Global

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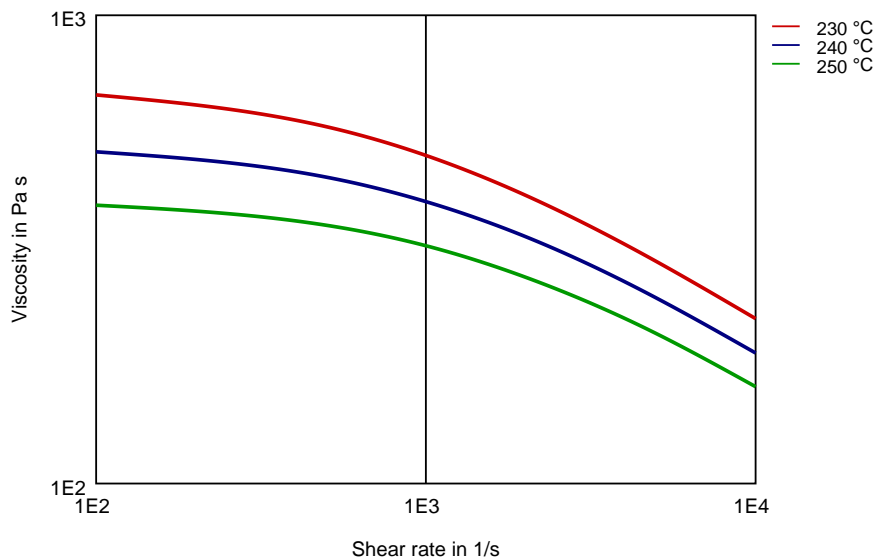


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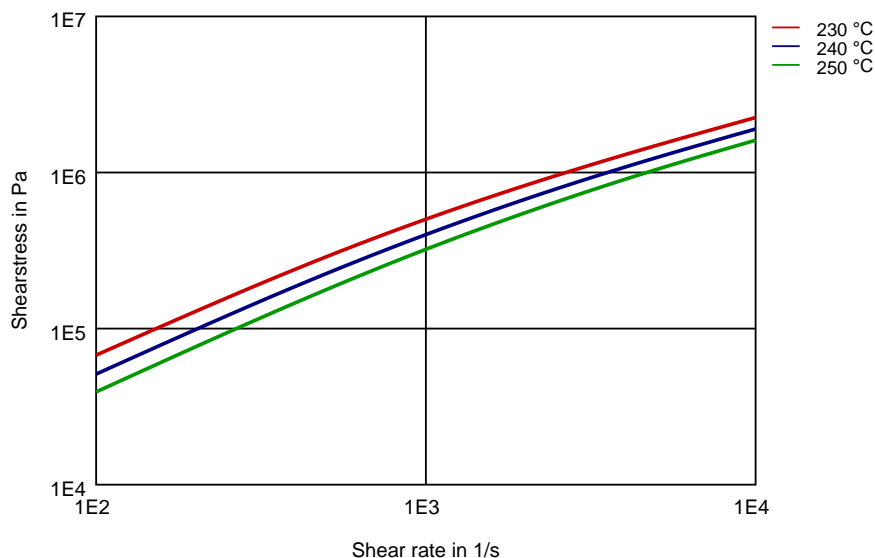
## THERMOPLASTIC POLYESTER RESIN

### Diagrams

#### Viscosity-shear rate



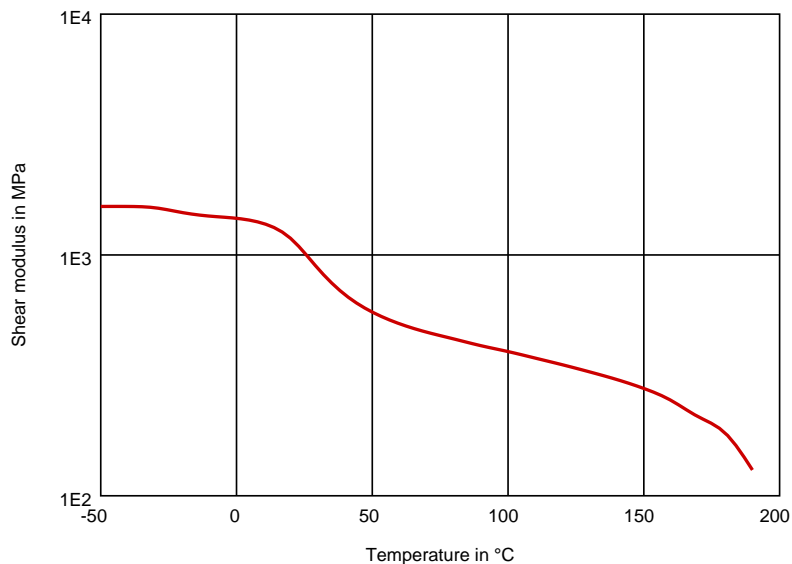
#### Shearstress-shear rate



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## THERMOPLASTIC POLYESTER RESIN

Dynamic Shear modulus-temperature



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Page: 5 of 13

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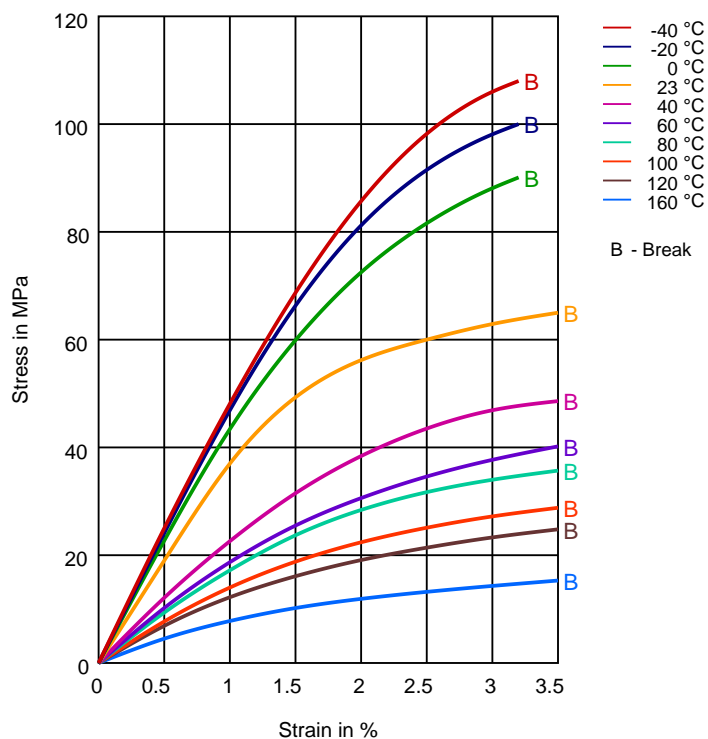
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## THERMOPLASTIC POLYESTER RESIN

Stress-strain



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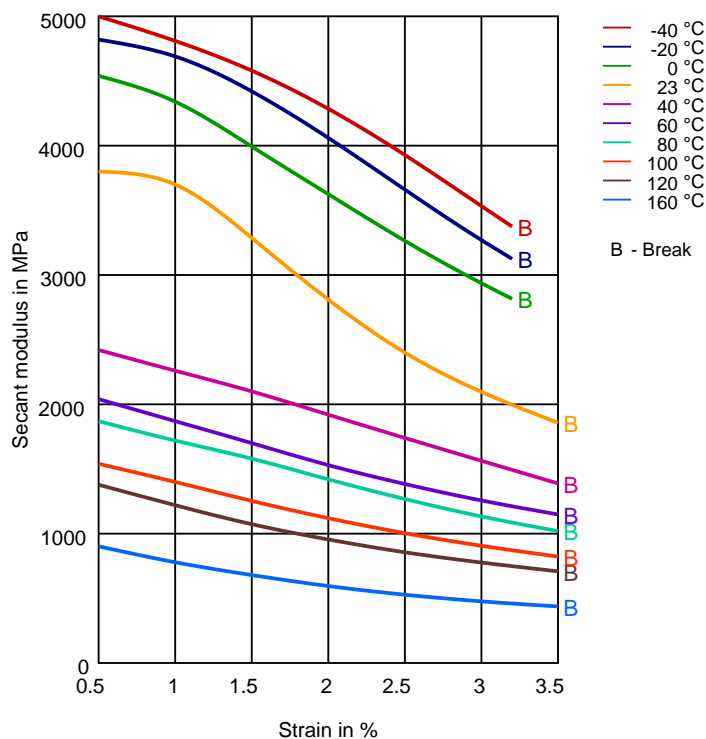
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## THERMOPLASTIC POLYESTER RESIN

Secant modulus-strain



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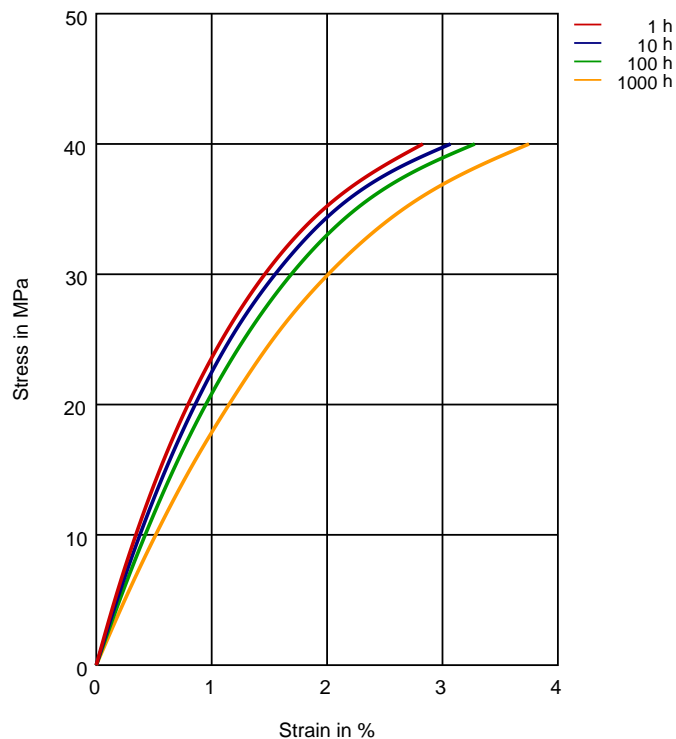
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## THERMOPLASTIC POLYESTER RESIN

Stress-strain (isochronous) 23°C



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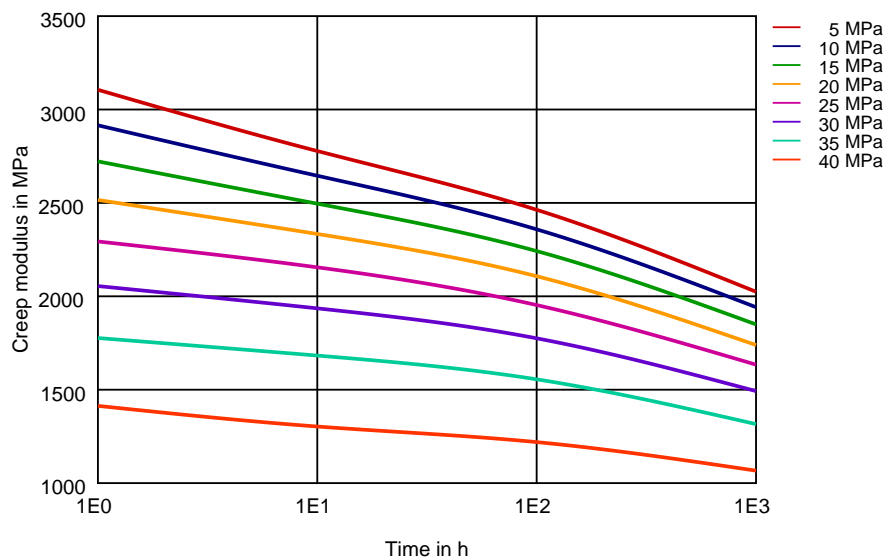




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## THERMOPLASTIC POLYESTER RESIN

Creep modulus-time 23 °C



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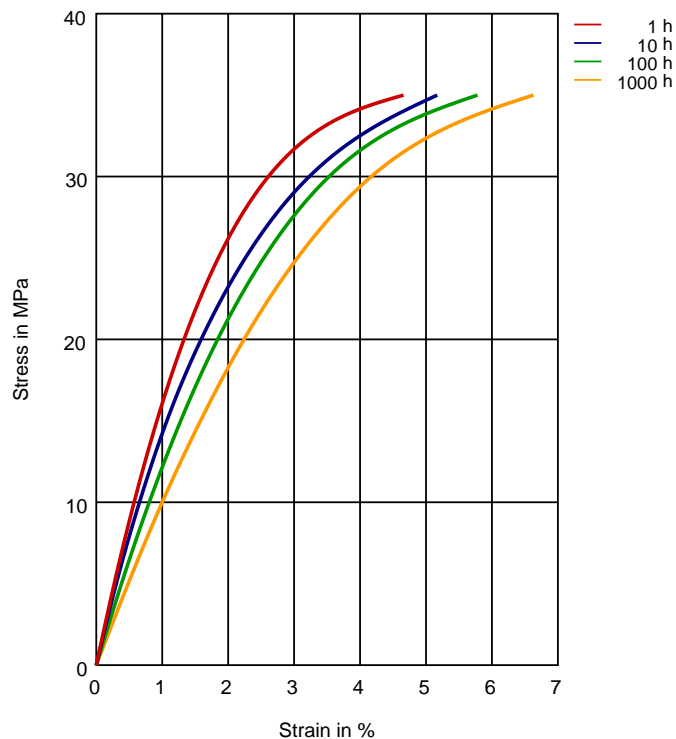
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## THERMOPLASTIC POLYESTER RESIN

Stress-strain (isochronous) 60°C



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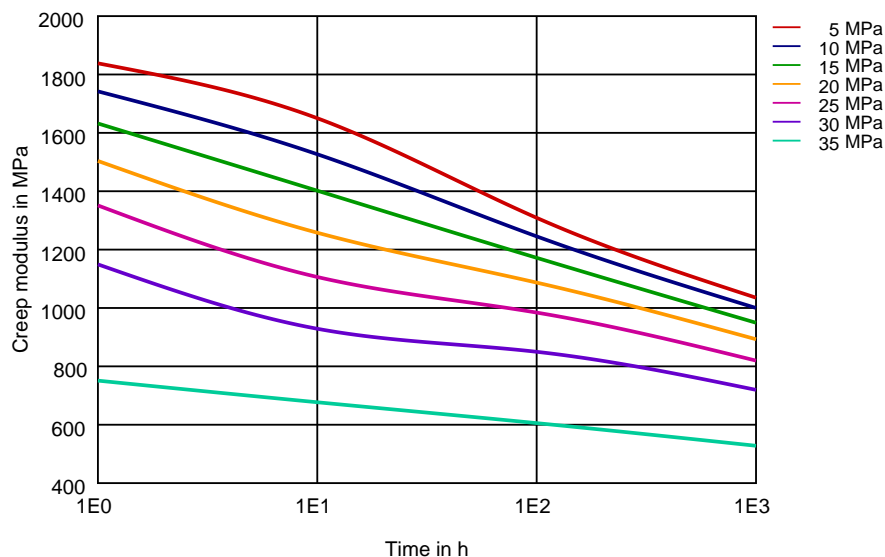
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## THERMOPLASTIC POLYESTER RESIN

Creep modulus-time 60 °C



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## 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)

Revised: 2017-02-02

Page: 12 of 13

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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 4mm (Hytrel® measured at 2 mm), IEC Electrical properties measured at 2mm, all ASTM properties measured at 3.2mm, and test temperatures are 23°C unless otherwise stated.

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