Celanese
The chemistry inside innovation™

# Crastin® S600F20 NC010

## THERMOPLASTIC POLYESTER RESIN

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, we recommend, 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 moulding.

## Product information

| | | |
|---|---|---|
| Resin Identification | PBT | ISO 1043 |
| Part Marking Code | >PBT< | ISO 11469 |
| ISO designation | ISO 7792-PBT,MGNR,11-030 | |

## Rheological properties

| | | | |
|---|---|---|---|
| Melt volume-flow rate | 14 | cm³/10min | ISO 1133 |
| Melt mass-flow rate | 19 | g/10min | ISO 1133 |
| Temperature | 250 | °C | ISO 1133 |
| Load | 2.16 | kg | ISO 1133 |
| Melt mass-flow rate, Temperature | 250 | °C | ISO 1133 |
| Melt mass-flow rate, Load | 2.16 | kg | ISO 1133 |
| Viscosity number | 130 | cm³/g | ISO 307, 1157, 1628 |
| Intrinsic viscosity | 1.08 | | ISO 307, 1157, 1628 |
| Moulding shrinkage, parallel | 1.7 | % | ISO 294-4, 2577 |
| Moulding shrinkage, normal | 1.6 | % | ISO 294-4, 2577 |
| Postmoulding shrinkage, normal, 48h at 80°C | 0.5 | % | ISO 294-4 |
| Postmoulding shrinkage, parallel, 48h at 80°C | 0.3 | % | ISO 294-4 |

## Typical mechanical properties

| | | | |
|---|---|---|---|
| Tensile Modulus | 2500 | MPa | ISO 527-1/-2 |
| Yield stress | 55 | MPa | ISO 527-1/-2 |
| Yield strain | 4 | % | ISO 527-1/-2 |
| Nominal strain at break | 40 | % | ISO 527-1/-2 |
| Flexural Modulus | 2200 | MPa | ISO 178 |

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| | | | |
|---|---|---|---|
| Flexural Strength | 85 | MPa | ISO 178 |
| Tensile creep modulus, 1h | 2600 | MPa | ISO 899-1 |
| Tensile creep modulus, 1000h | 1800 | MPa | ISO 899-1 |
| Charpy impact strength, 23°C | N | kJ/m² | ISO 179/1eU |
| Charpy impact strength, -30°C | N | kJ/m² | ISO 179/1eU |
| Charpy notched impact strength, 23°C | 5 | kJ/m² | ISO 179/1eA |
| Charpy notched impact strength, -30°C | 4 | kJ/m² | ISO 179/1eA |
| Izod notched impact strength, 23°C | 4.5 | kJ/m² | ISO 180/1A |
| Izod impact strength, 23°C | N | kJ/m² | ISO 180/1U |
| Ball indentation hardness, H 358/30 | 139 | MPa | ISO 2039-1 |
| Ball indentation hardness, H 961/30 | 139 | MPa | ISO 2039-1 |
| Poisson's ratio | 0.38 | | |

## Tribological properties

| | | | |
|---|---|---|---|
| Coefficient of static friction, against itself | 0.4 | | ASTM 1894 |
| Coefficient of static friction, against steel | 0.4 | | ASTM 1894 |

## Thermal properties

| | | | |
|---|---|---|---|
| Melting temperature, 10°C/min | 225 | °C | ISO 11357-1/-3 |
| Glass transition temperature, 10°C/min | 55 | °C | ISO 11357-1/-3 |
| Freezing temperature, 10°C/min | 192 | °C | ISO 11357-1/-2 |
| Temp. of deflection under load, 1.8 MPa | 50 | °C | ISO 75-1/-2 |
| Temp. of deflection under load, 1.8 MPa, annealed | 60 | °C | ISO 75-1/-2 |
| Temp. of deflection under load, 0.45 MPa | 115 | °C | ISO 75-1/-2 |
| Temp. of deflection under load, 0.45 MPa, annealed | 180 | °C | ISO 75-1/-2 |
| Vicat softening temperature, 50°C/h, 50N | 175 | °C | ISO 306 |
| Coeff. of linear therm. expansion, parallel, -40-23°C | 80 | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, parallel | 110 | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, parallel, 55-160°C | 190 | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, normal, -40-23°C | 90 | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, normal | 120 | E-6/K | ISO 11359-1/-2 |
| Coeff. of linear therm. expansion, normal, 55-160°C | 200 | E-6/K | ISO 11359-1/-2 |
| Thermal conductivity | 0.29 | W/(m K) | ISO 22007-2 |
| Thermal conductivity of melt | 0.21 | W/(m K) | ISO 22007-2 |
| Spec. heat capacity of melt | 2110 | J/(kg K) | |
| RTI, electrical, 0.75mm | 130 | °C | UL 746B |
| RTI, electrical, 1.5mm | 130 | °C | UL 746B |
| RTI, electrical, 3mm | 130 | °C | UL 746B |
| RTI, electrical, 6mm | 130 | °C | UL 746B |
| RTI, impact, 0.75mm | 115 | °C | UL 746B |
| RTI, impact, 1.5mm | 115 | °C | UL 746B |
| RTI, impact, 3mm | 115 | °C | UL 746B |
| RTI, impact, 6mm | 115 | °C | UL 746B |
| RTI, strength, 0.75mm | 120 | °C | UL 746B |

# Crastin® S600F20 NC010

## THERMOPLASTIC POLYESTER RESIN

| | | | |
|---|---|---|---|
| RTI, strength, 1.5mm | 120 | °C | UL 746B |
| RTI, strength, 3mm | 120 | °C | UL 746B |
| RTI, strength, 6mm | 120 | °C | UL 746B |
| TGA curve | available | | ISO 11359-1/-2 |

## Flammability

| | | | |
|---|---|---|---|
| Burning Behav. at 1.5mm 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, 3mm | 750 | °C | IEC 60695-2-12 |
| Glow Wire Ignition Temperature, 0.75mm | 750 | °C | IEC 60695-2-13 |
| Glow Wire Ignition Temperature, 1mm | 750 | °C | IEC 60695-2-13 |
| Glow Wire Ignition Temperature, 1.5mm | 750 | °C | IEC 60695-2-13 |
| Glow Wire Ignition Temperature, 2mm | 750 | °C | IEC 60695-2-13 |
| Glow Wire Ignition Temperature, 3mm | 725 | °C | IEC 60695-2-13 |
| FMVSS Class | SE | | ISO 3795 (FMVSS 302) |

## Electrical properties

| | | | |
|---|---|---|---|
| Relative permittivity, 100Hz | 3.6 | | IEC 62631-2-1 |
| Relative permittivity, 1MHz | 3.2 | | IEC 62631-2-1 |
| Dissipation factor, 100Hz | 7.9 | 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 | 26 | kV/mm | IEC 60243-1 |
| Comparative tracking index | 575 | | IEC 60112 |

## Other properties

| | | | |
|---|---|---|---|
| Humidity absorption, 2mm | 0.2 | % | Sim. to ISO 62 |
| Water absorption, 2mm | 0.4 | % | Sim. to ISO 62 |
| Density | 1310 | kg/m³ | ISO 1183 |
| Density of melt | 1110 | kg/m³ | |

## VDA Properties

| | | | |
|---|---|---|---|
| Thermal desorption analysis of organic emissions | 1[AMax] | µg/g | VDA 278 |
| Odour | 3[DS] | class | VDA 270 |
| Fogging, G-value (condensate) | | mg | ISO 6452 |

[AMax]: Assessed (Max)

[DS]: Derived from similar grade

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## Injection

| | | |
|---|---|---|
| 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. mould temperature | 30 | °C |
| Max. mould temperature | 130 | °C |
| Hold pressure range | ≥60 | MPa |
| Hold pressure time | 4 | s/mm |
| Back pressure | As low as possible | MPa |
| Ejection temperature | 170 | °C |

## Characteristics

| | |
|---|---|
| Additives | Release agent |

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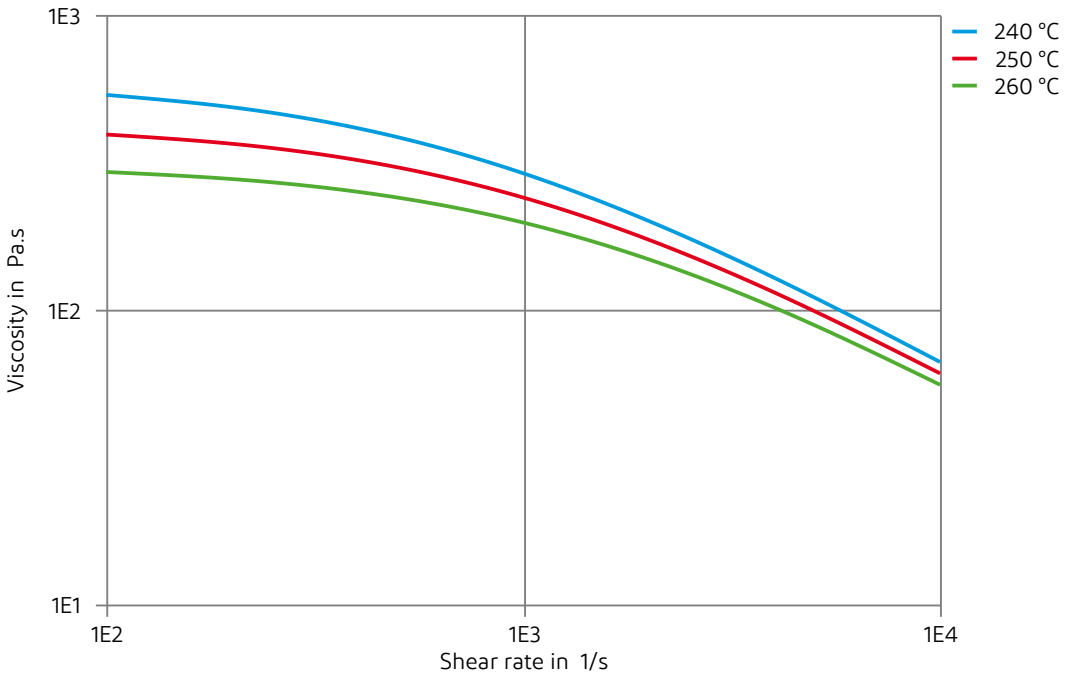
## Viscosity-shear rate



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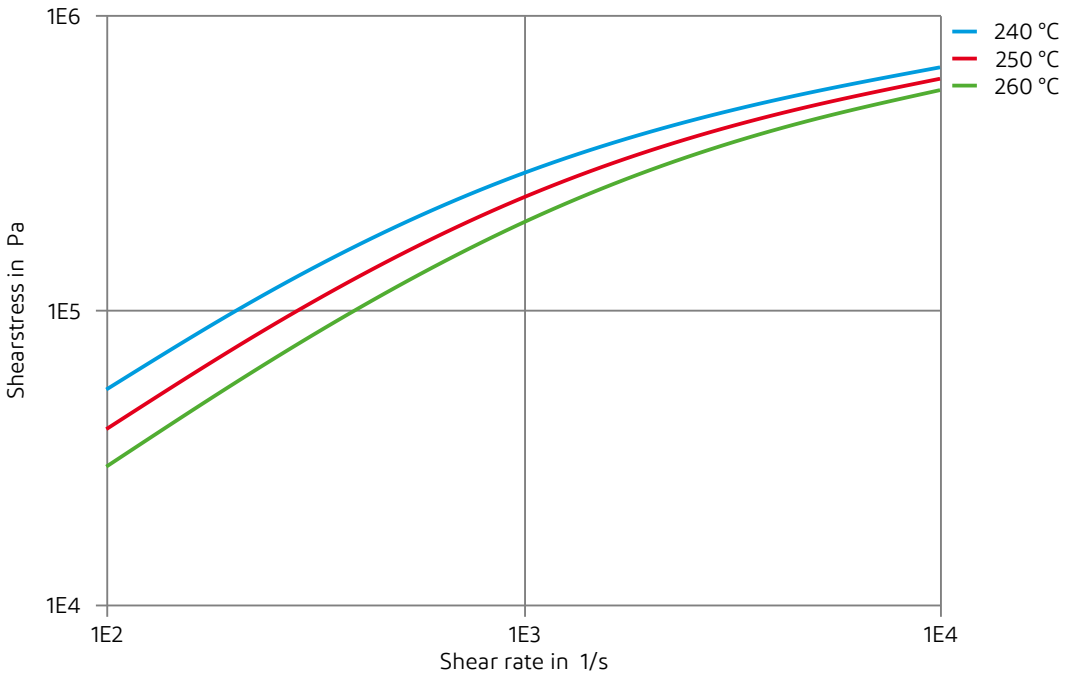
THERMOPLASTIC POLYESTER RESIN

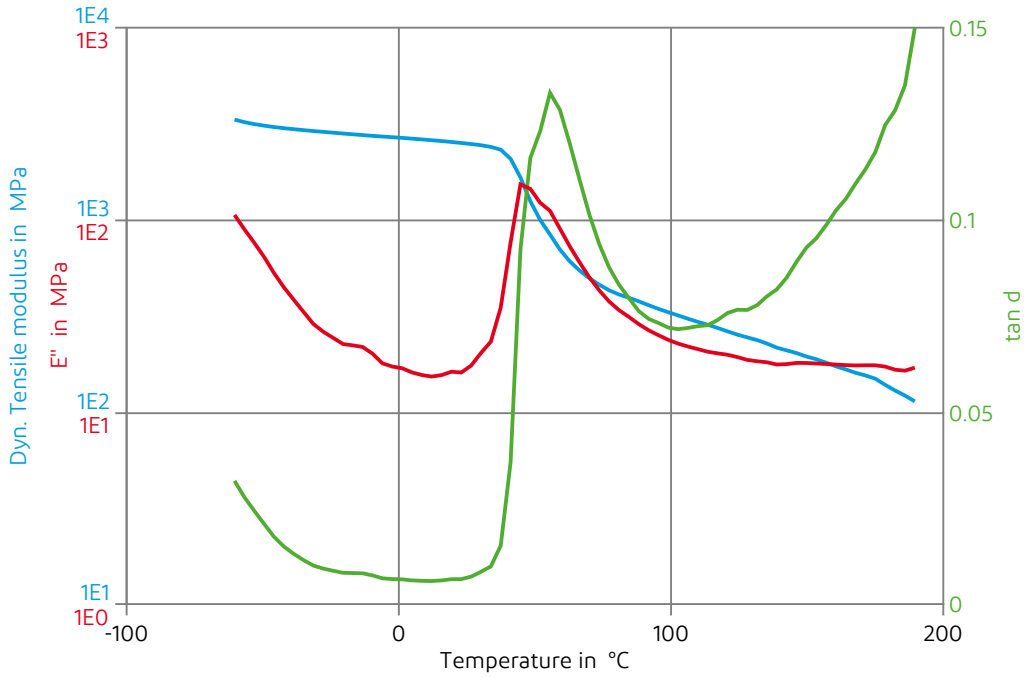
## Shearstress-shear rate



# Crastin® S600F20 NC010

THERMOPLASTIC POLYESTER RESIN

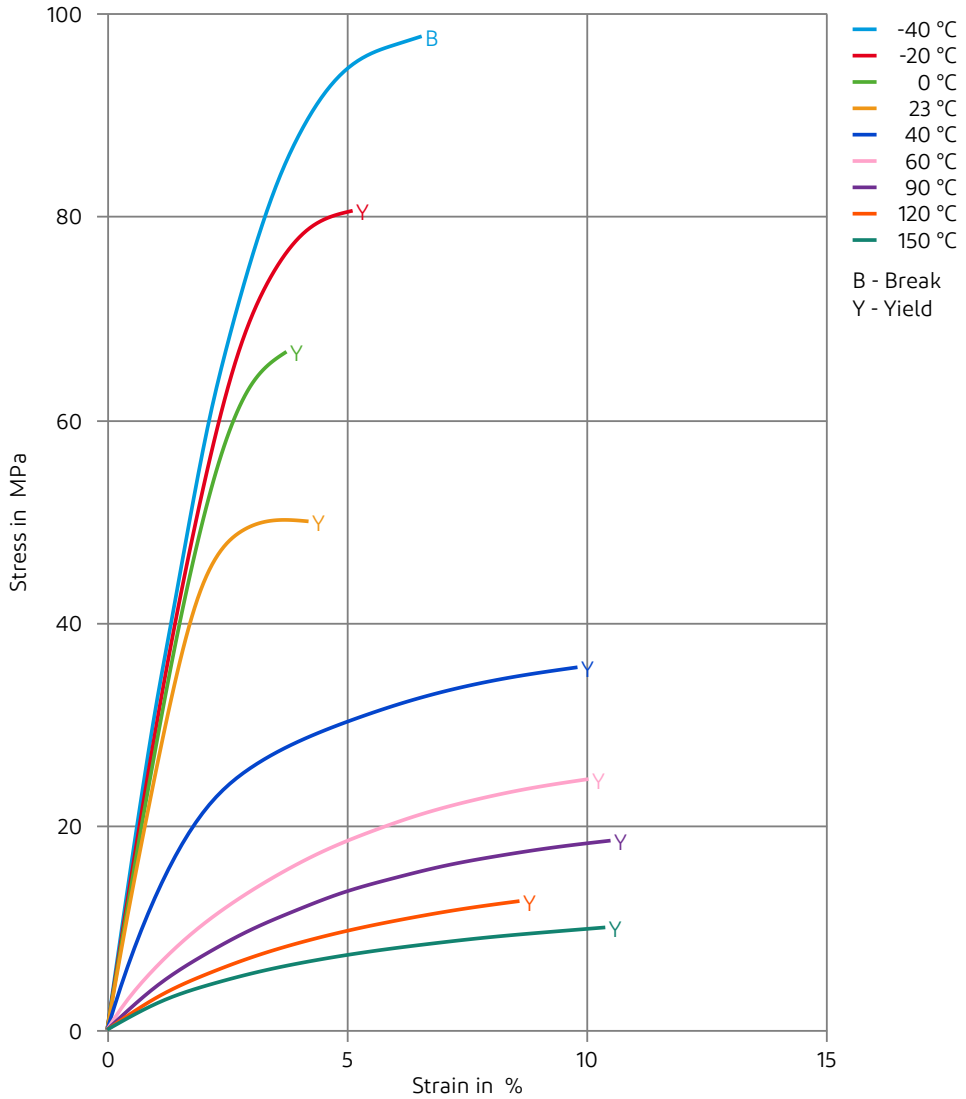
## Dynamic Tensile modulus-temperature



# Crastin® S600F20 NC010

THERMOPLASTIC POLYESTER RESIN

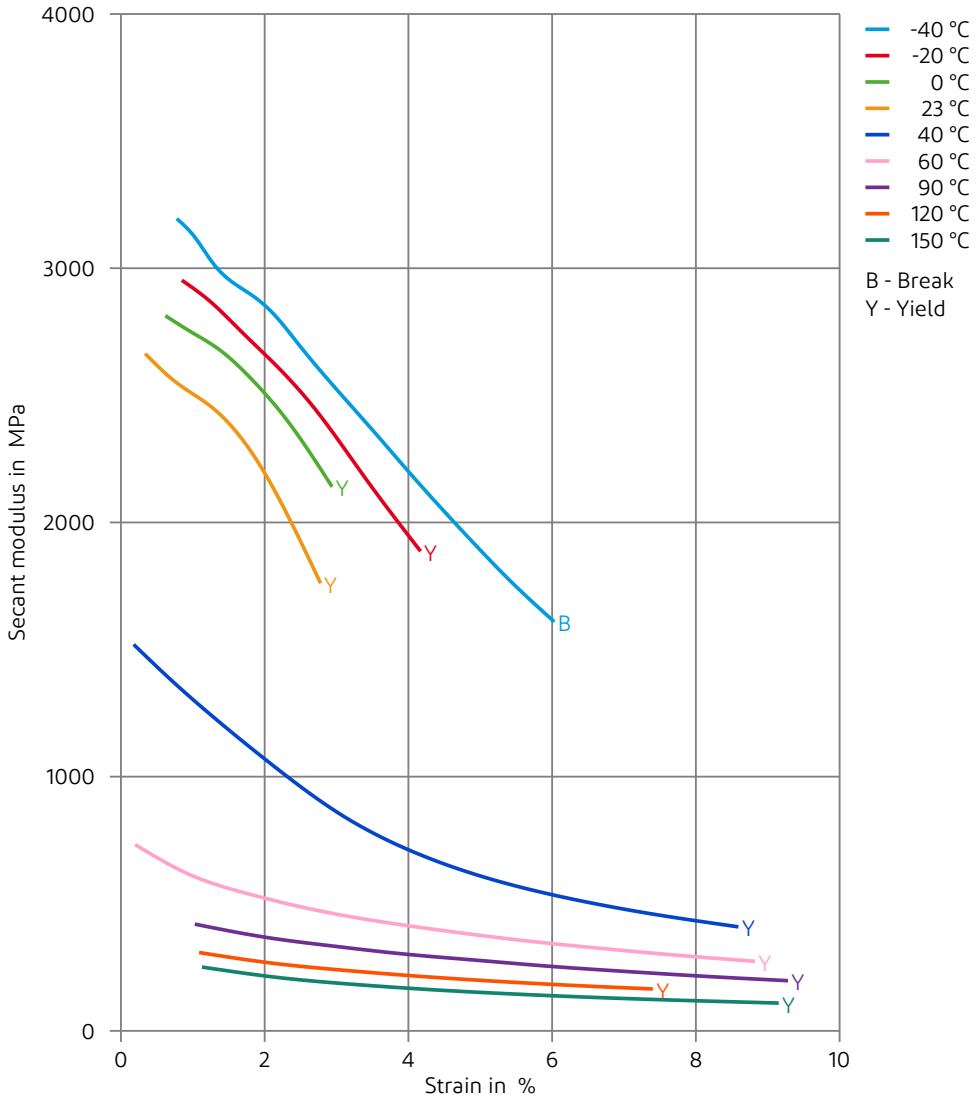
## Stress-strain



# Crastin® S600F20 NC010

THERMOPLASTIC POLYESTER RESIN

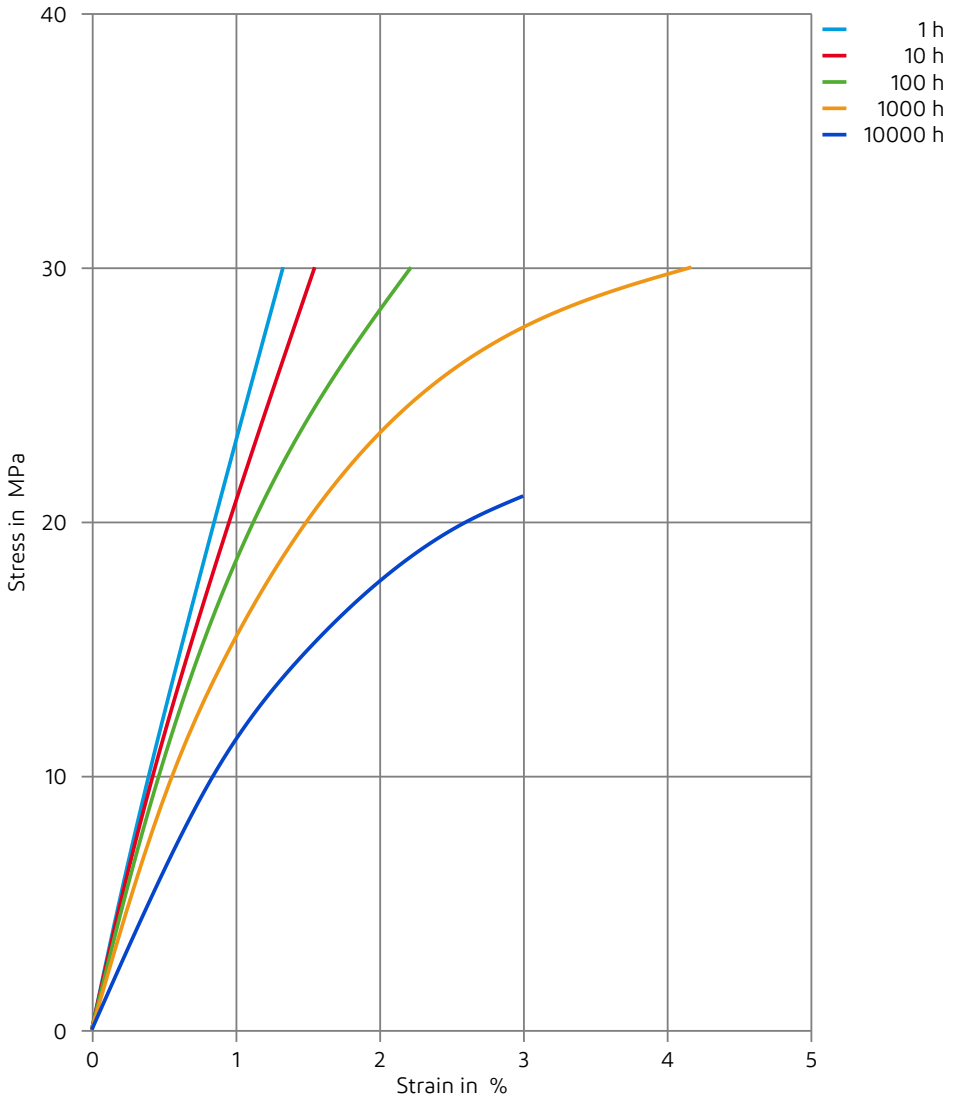
## Secant modulus-strain



# Crastin® S600F20 NC010

THERMOPLASTIC POLYESTER RESIN

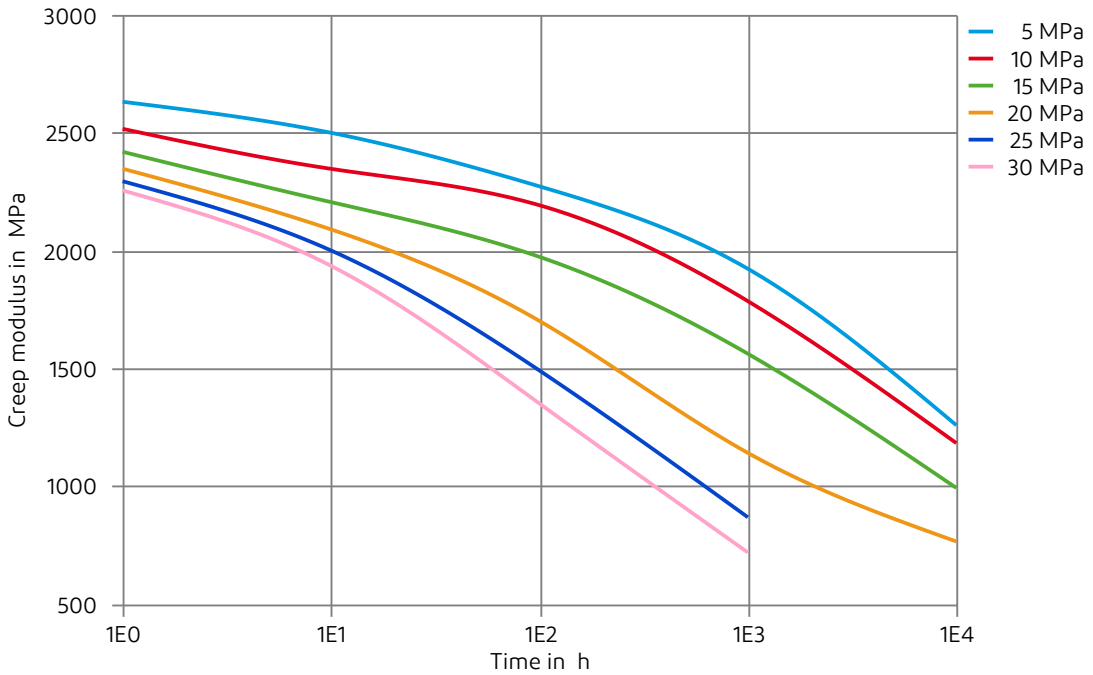
## Stress-strain (isochronous) 23°C



# Crastin® S600F20 NC010

THERMOPLASTIC POLYESTER RESIN

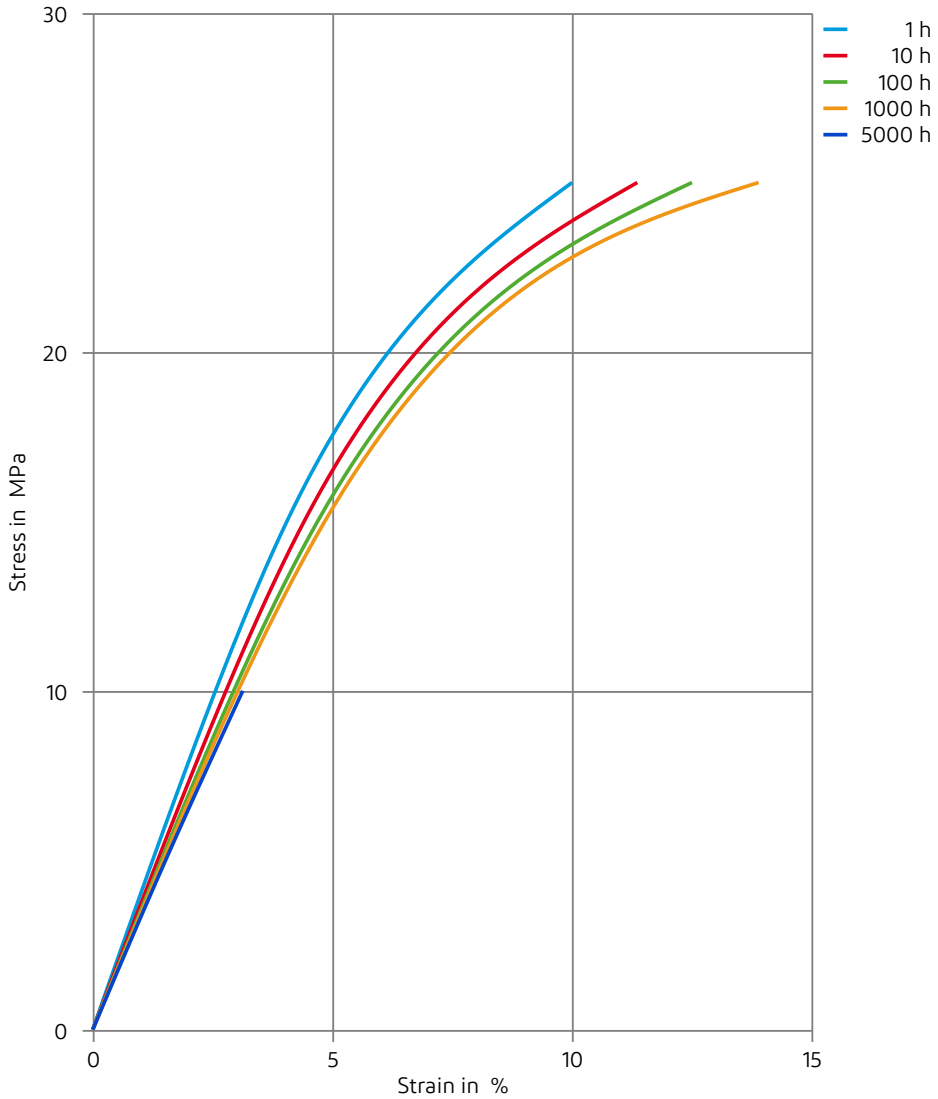
## Creep modulus-time 23°C



# Crastin® S600F20 NC010

THERMOPLASTIC POLYESTER RESIN

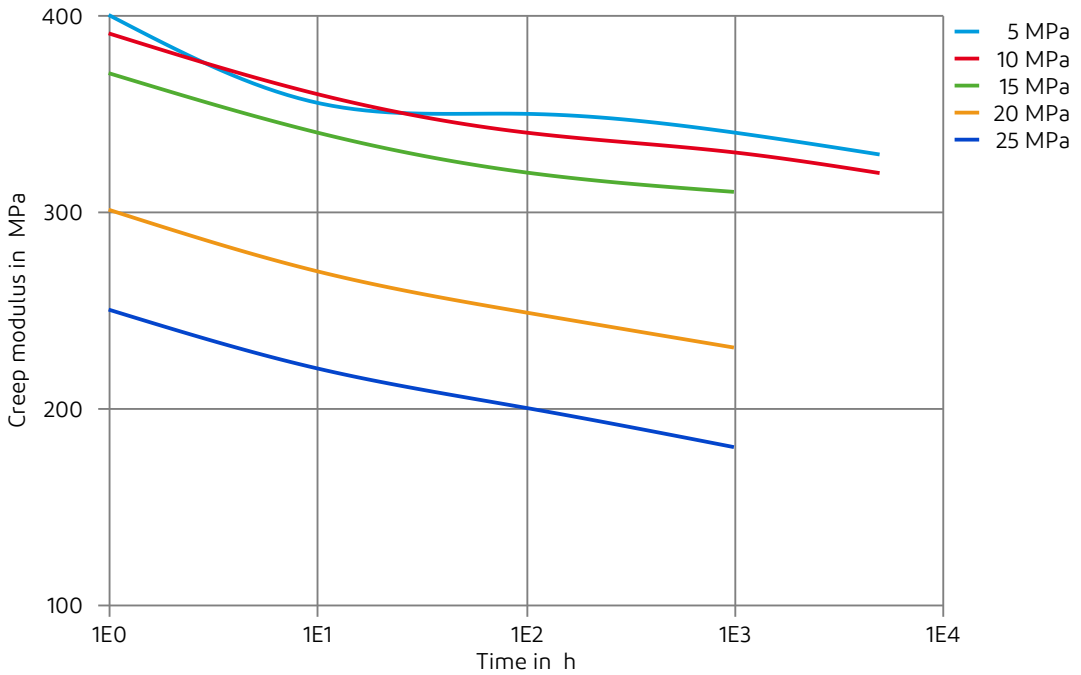
## Stress-strain (isochronous) 60°C



# Crastin® S600F20 NC010

THERMOPLASTIC POLYESTER RESIN

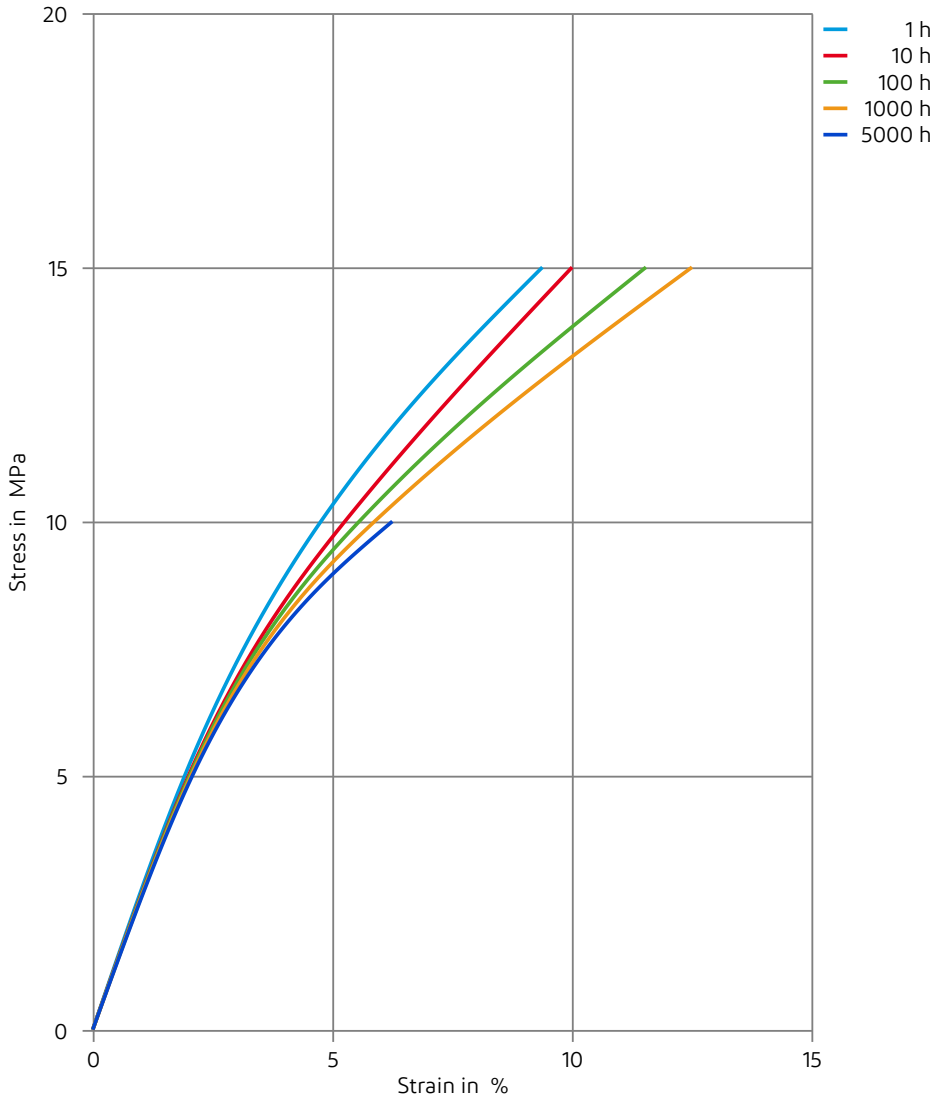
## Creep modulus-time 60°C



# Crastin® S600F20 NC010

THERMOPLASTIC POLYESTER RESIN

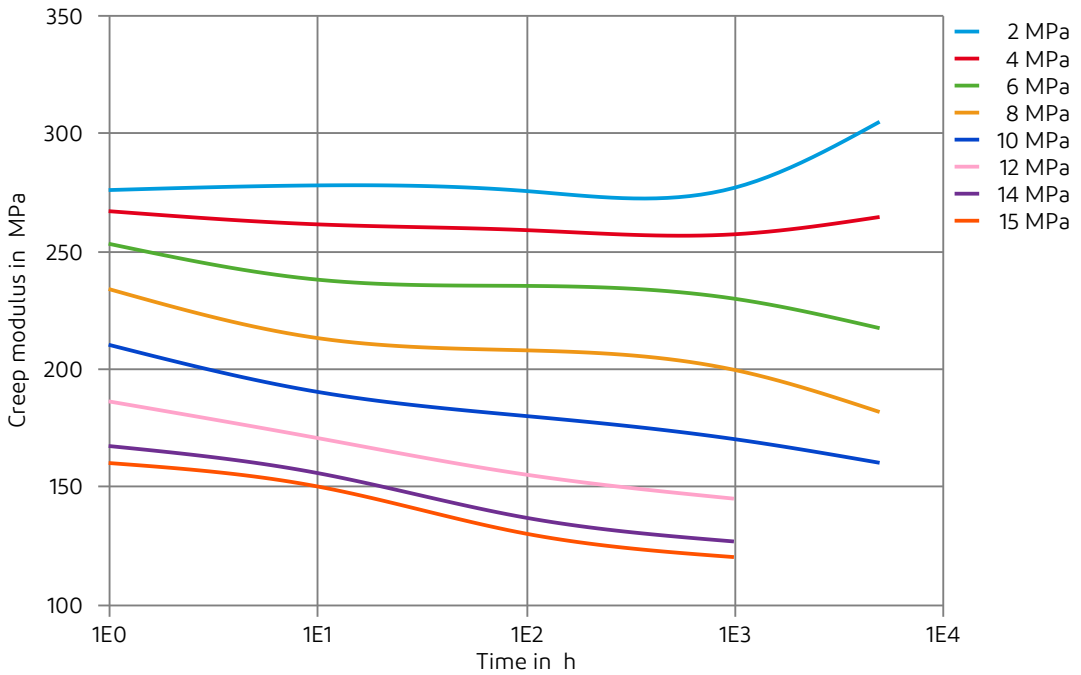
## Stress-strain (isochronous) 110°C



# Crastin® S600F20 NC010

THERMOPLASTIC POLYESTER RESIN

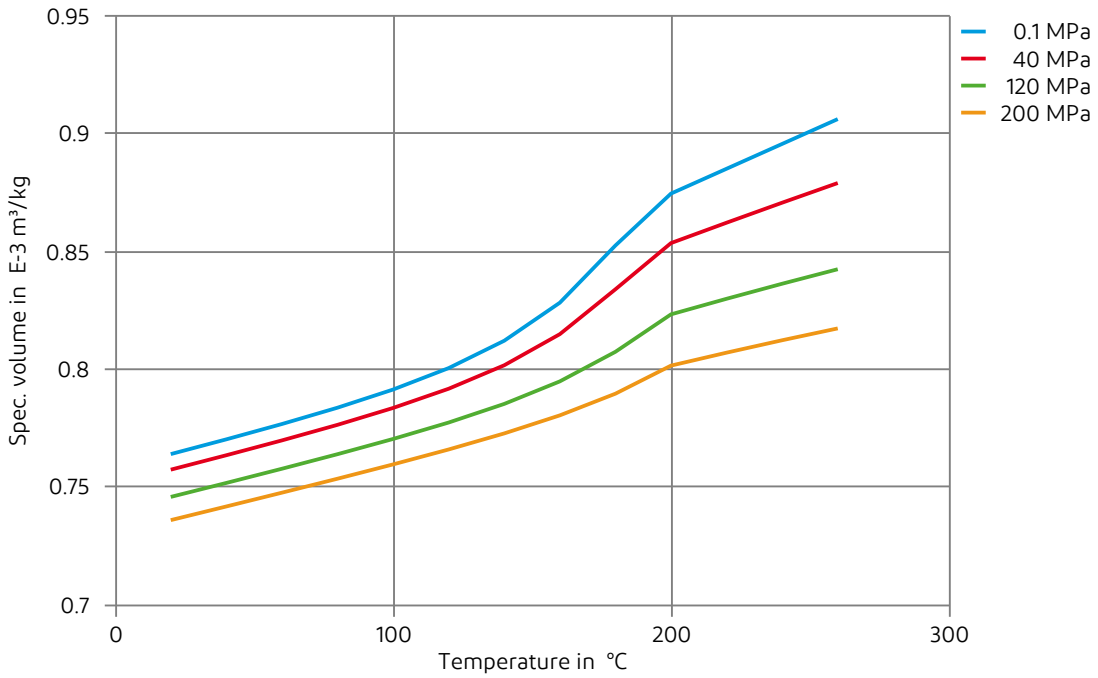
## Creep modulus-time 110°C



# Crastin® S600F20 NC010

THERMOPLASTIC POLYESTER RESIN

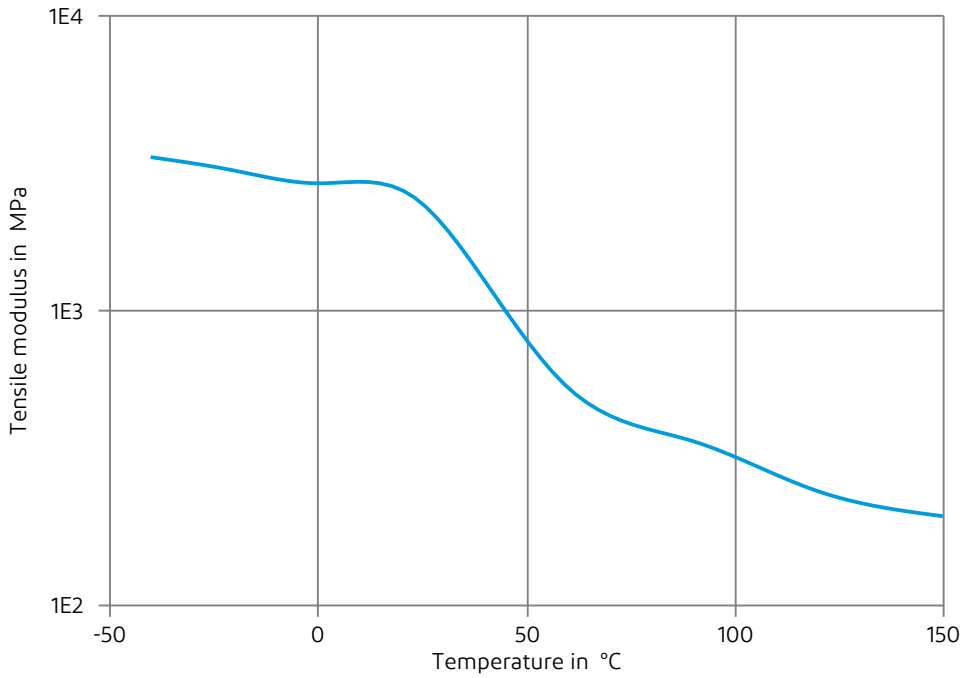
## Specific volume-temperature (pvT)



# Crastin® S600F20 NC010

THERMOPLASTIC POLYESTER RESIN

## Tensile modulus-temperature



# Crastin® S600F20 NC010

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
- ✔ 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

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### 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).