

# Crastin® SK642FR 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® SK642FR is a 15% glass fibre reinforced, flame retardant polybutylene terephthalate for injection moulding. It has a UL94 V-0 rating @ 1.5mm.

### Product information

Resin Identification	PBT- GF15FR(17)	ISO 1043
Part Marking Code	>PBT-GF15FR(17)<	ISO 11469

### Rheological properties

Melt mass-flow rate	16 g/10min	ISO 1133
Melt mass-flow rate, Temperature	250 °C	
Melt mass-flow rate, Load	2.16 kg	
Viscosity number	110 cm <sup>3</sup> /g	ISO 307, 1157, 1628
Moulding shrinkage, parallel	0.7 %	ISO 294-4, 2577
Moulding shrinkage, normal	1.2 %	ISO 294-4, 2577
Moulding shrinkage, parallel, annealed	0.8 %	ISO 294-4
Moulding shrinkage, normal, annealed	1.5 %	ISO 294-4

### Typical mechanical properties

Tensile Modulus	7200 MPa	ISO 527-1/-2
Stress at break, 5mm/min	100 MPa	ISO 527-1/-2
Strain at break, 5mm/min	3.4 %	ISO 527-1/-2
Flexural Strength	155 MPa	ISO 178
Tensile creep modulus, 1h	6000 MPa	ISO 899-1
Tensile creep modulus, 1000h	4800 MPa	ISO 899-1
Charpy impact strength, 23°C	53 kJ/m <sup>2</sup>	ISO 179/1eU
Charpy impact strength, -30°C	44 kJ/m <sup>2</sup>	ISO 179/1eU
Charpy notched impact strength, 23°C	7.5 kJ/m <sup>2</sup>	ISO 179/1eA
Charpy notched impact strength, -30°C	7.1 kJ/m <sup>2</sup>	ISO 179/1eA
Izod notched impact strength, 23°C	7 kJ/m <sup>2</sup>	ISO 180/1A
Izod notched impact strength, -30°C	6 kJ/m <sup>2</sup>	ISO 180/1A
Izod impact strength, 23°C	33 kJ/m <sup>2</sup>	ISO 180/1U

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Izod impact strength, -30 °C	32 kJ/m <sup>2</sup>	ISO 180/1U
Poisson's ratio	0.35	

### Thermal properties

Melting temperature, 10 °C/min	224 °C	ISO 11357-1/-3
Glass transition temperature, 10 °C/min	55 °C	ISO 11357-1/-3
Temp. of deflection under load, 1.8 MPa	203 °C	ISO 75-1/-2
Temp. of deflection under load, 0.45 MPa	218 °C	ISO 75-1/-2
Vicat softening temperature, 50 °C/h, 50N	207 °C	ISO 306
Coeff. of linear therm. expansion, parallel	50 E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal	110 E-6/K	ISO 11359-1/-2
Thermal conductivity of melt	0.27 W/(m K)	Internal
Spec. heat capacity of melt	1740 J/(kg K)	Internal
RTI, electrical, 0.75mm	140 °C	UL 746B
RTI, electrical, 1.5mm	140 °C	UL 746B
RTI, electrical, 3mm	140 °C	UL 746B
RTI, electrical, 6mm	140 °C	UL 746B
RTI, impact, 0.75mm	130 °C	UL 746B
RTI, impact, 1.5mm	130 °C	UL 746B
RTI, impact, 3mm	130 °C	UL 746B
RTI, impact, 6mm	130 °C	UL 746B
RTI, strength, 0.75mm	140 °C	UL 746B
RTI, strength, 1.5mm	140 °C	UL 746B
RTI, strength, 3mm	140 °C	UL 746B
RTI, strength, 6mm	140 °C	UL 746B

### Flammability

Burning Behav. at 1.5mm nom. thickn.	V-0 class	UL 94
Thickness tested	1.5 mm	UL 94
UL recognition	yes	UL 94
Burning Behav. at thickness h	V-0 class	UL 94
Thickness tested	3 mm	UL 94
UL recognition	yes	UL 94
Oxygen index	31 %	ISO 4589-1/-2
Glow Wire Flammability Index, 3mm	960 °C	IEC 60695-2-12
Glow Wire Ignition Temperature, 3mm	875 °C	IEC 60695-2-13
FMVSS Class	DNI	ISO 3795 (FMVSS 302)

### Electrical properties

Relative permittivity, 100Hz	3.8	IEC 62631-2-1
Relative permittivity, 1MHz	3.5	IEC 62631-2-1
Dissipation factor, 100Hz	13.2 E-4	IEC 62631-2-1
Dissipation factor, 1MHz	170 E-4	IEC 62631-2-1
Volume resistivity	>1E13 Ohm.m	IEC 62631-3-1

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Surface resistivity	1E15 Ohm	IEC 62631-3-2
Electric strength	28 kV/mm	IEC 60243-1
Comparative tracking index	225	IEC 60112
Electric Strength, Short Time, 2mm	17 kV/mm	IEC 60243-1

### Other properties

Humidity absorption, 2mm	0.14 %	Sim. to ISO 62
Water absorption, 2mm	0.33 %	Sim. to ISO 62
Density	1580 kg/m <sup>3</sup>	ISO 1183
Density of melt	1370 kg/m <sup>3</sup>	Internal

### 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	Internal
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	3 s/mm	
Back pressure	As low as possible	
Ejection temperature	170 °C	Internal

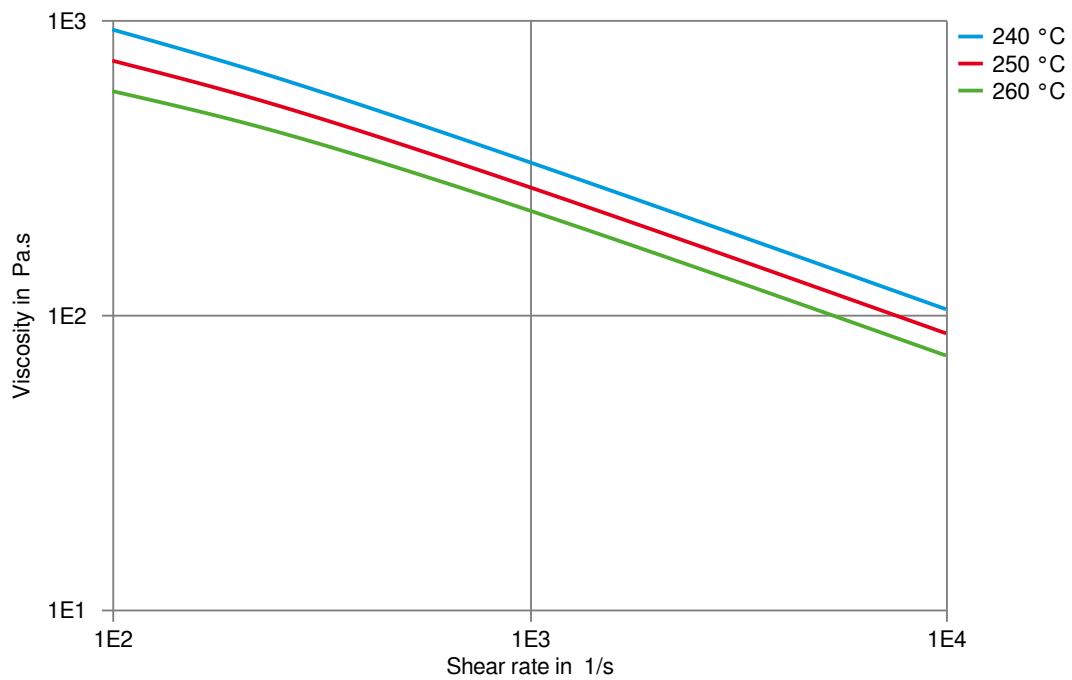
### Characteristics

Additives	Flame retardant
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THERMOPLASTIC POLYESTER RESIN

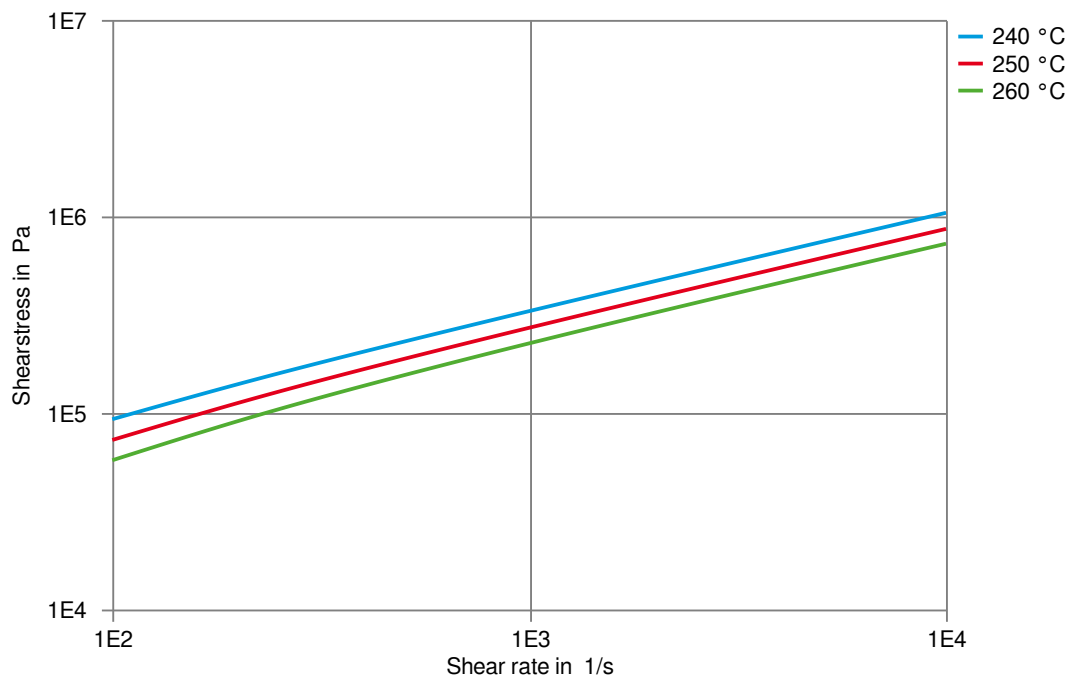
Viscosity-shear rate



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THERMOPLASTIC POLYESTER RESIN

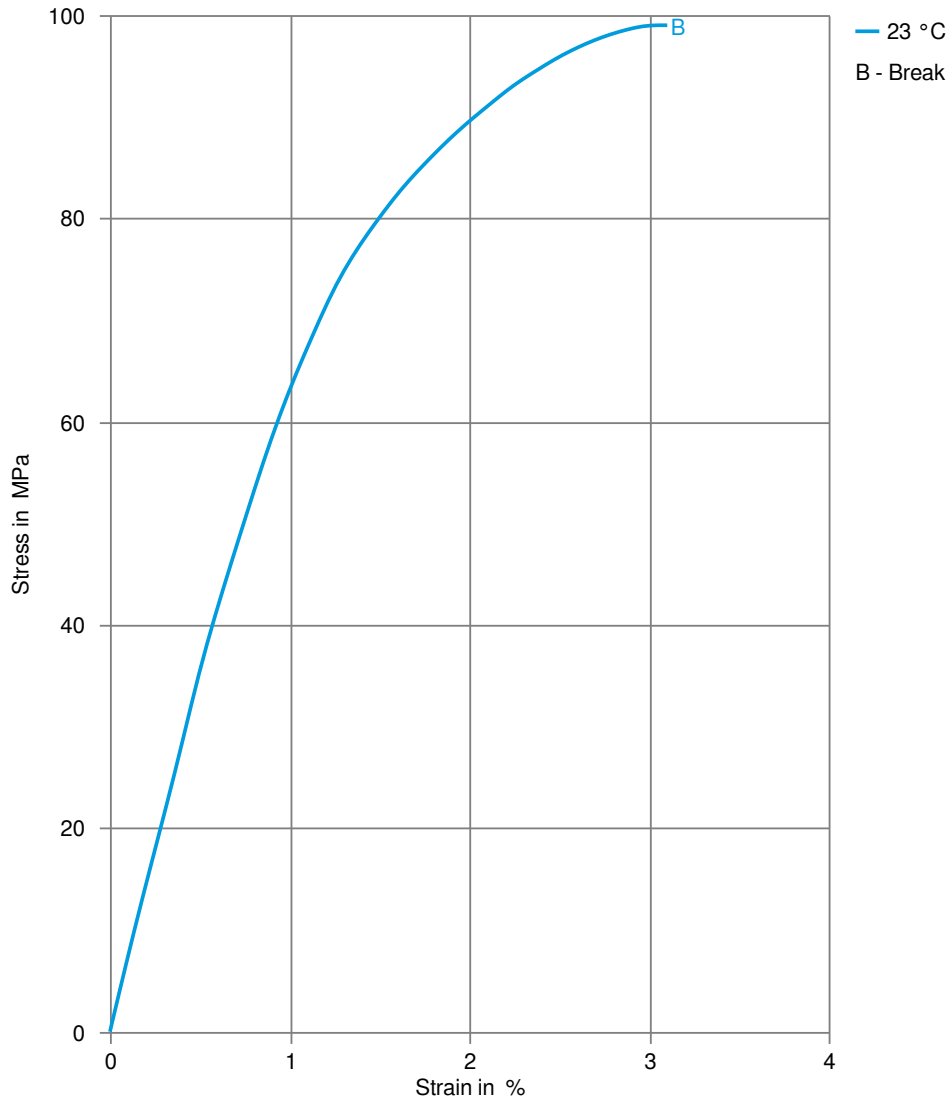
Shearstress-shear rate



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THERMOPLASTIC POLYESTER RESIN

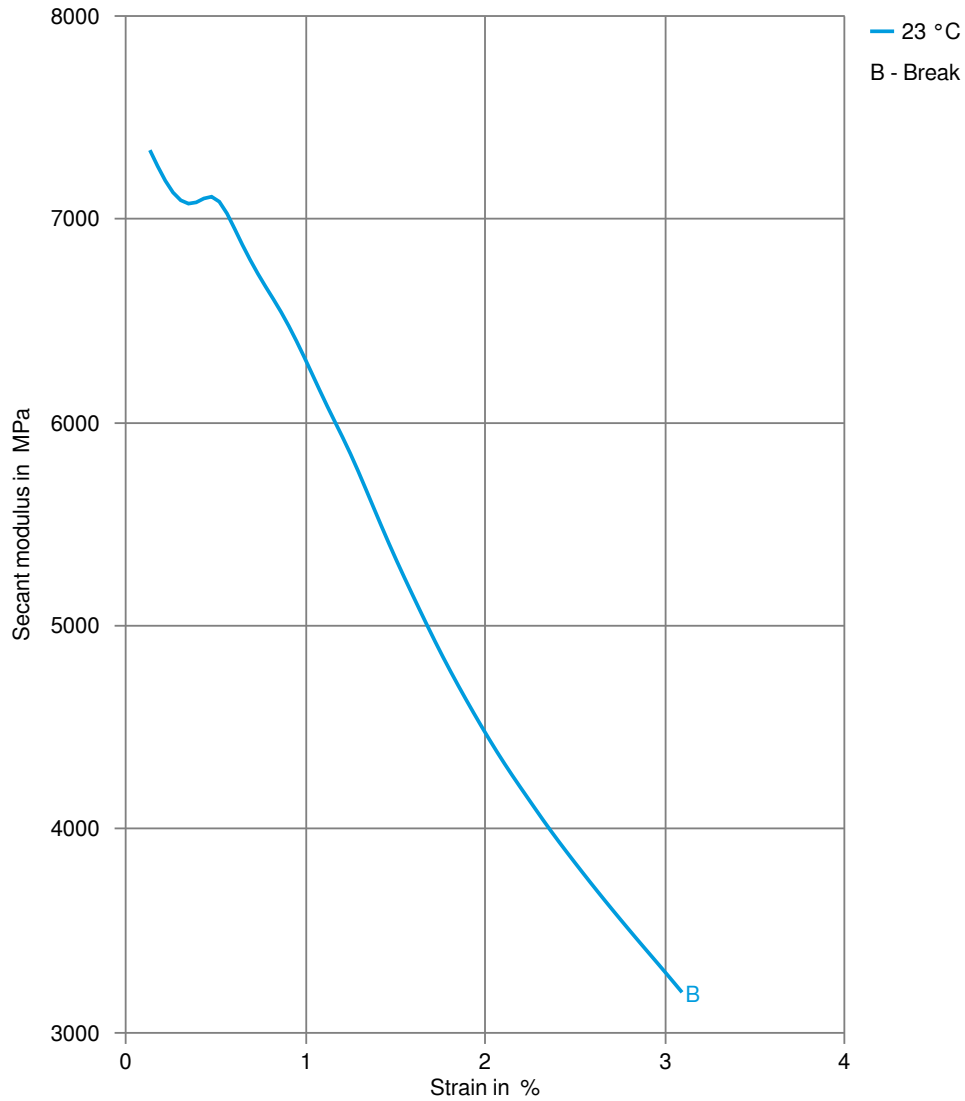
## Stress-strain



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THERMOPLASTIC POLYESTER RESIN

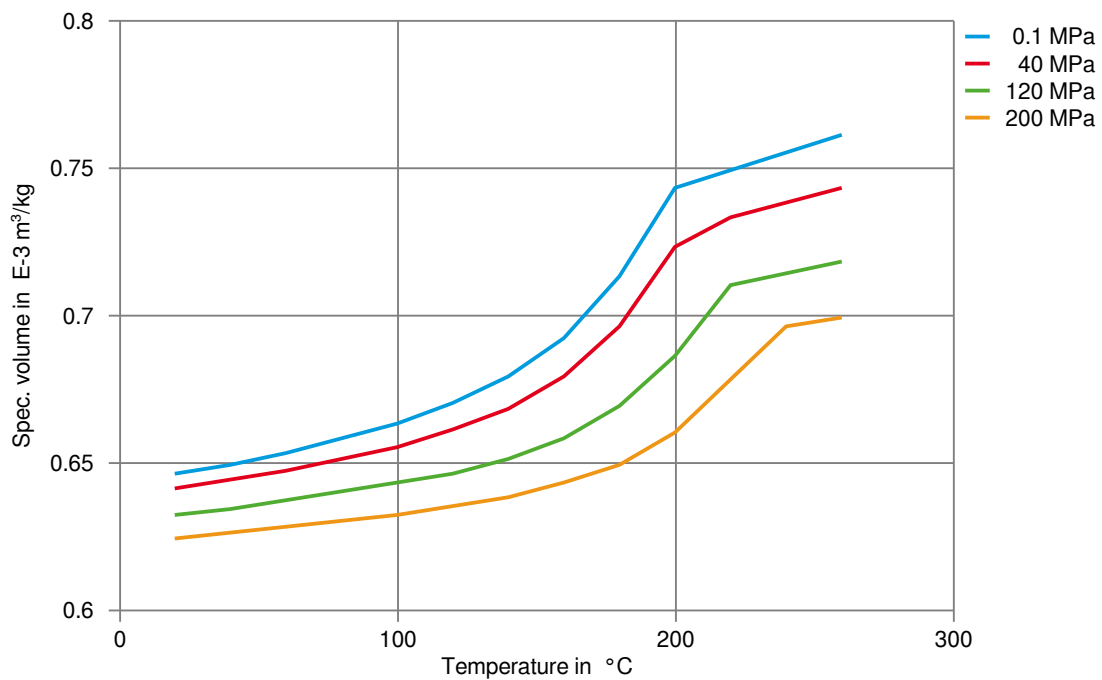
## Secant modulus-strain



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Specific volume-temperature (pvT)



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### 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).
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