Zytel® FR50 BK505

NYLON RESIN

Common features of Zytel® nylon resin include mechanical and physical properties such as high mechanical strength, excellent balance of stiffness and toughness, good high temperature performance, good electrical and flammability properties, good abrasion and chemical resistance. In addition, Zytel® nylon resins are available in different modified and reinforced grades to create a wide range of products with tailored properties for specific processes and end-uses. Zytel® nylon resin, including most flame retardant grades, offer the ability to be coloured.

The good melt stability of Zytel® nylon 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 (-31kJ/g of base polymer) in appropriately equipped installations. For disposal, local regulations have to be observed.

Zytel® nylon resin typically is used in demanding applications in the automotive, furniture, domestic appliances, sporting goods and construction industry.

Zytel® FR50 BK505 is a 25% glass fiber reinforced, flame retardant polyamide 66 resin for injection moulding.

Product information

Resin Identification	PA66-GF25FR(17)	ISO 1043
Part Marking Code	>PA66-GF25FR(17)<	ISO 11469
ISO designation	ISO 16396-PA66,GF25 FR(17),M1CF1GR,S14-110	

Rheological properties

	dry/cond.		
Viscosity number	150 / *[DS, 1]	cm³/g	ISO 307, 1157, 1628
Moulding shrinkage, parallel	0.3 / -	%	ISO 294-4, 2577
Moulding shrinkage, normal	0.7 / -	%	ISO 294-4, 2577

[DS]: Derived from similar grade

[1]: Sulfuric acid 96%

Typical mechanical properties

	dry/cond.		
Tensile Modulus	11000 / -	MPa	ISO 527-1/-2
Stress at break	160 / -	MPa	ISO 527-1/-2
Strain at break	2.1 / -	%	ISO 527-1/-2
Flexural Modulus	9500 / -	MPa	ISO 178
Charpy impact strength, 23°C	60 / -	kJ/m²	ISO 179/1eU
Charpy impact strength, -40°C	50 / -[DS]	kJ/m²	ISO 179/1eU
Charpy notched impact strength, 23°C	8.4 / -	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -40°C	7.9 / -	kJ/m²	ISO 179/1eA
Poisson's ratio	0.34 / -	-	

[DS]: Derived from similar grade

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Thermal properties

	dry/cond.		
Melting temperature, 10°C/min	260/*[2]	°C	ISO 11357-1/-3
Temp. of deflection under load, 1.8 MPa	242/*	°C	ISO 75-1/-2
CLTE, Parallel, -40-23°C	25/*	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, parallel	21/*	E-6/K	ISO 11359-1/-2
CLTE, Parallel, 55-160°C	12/*	E-6/K	ISO 11359-1/-2
CLTE, Normal, -40-23°C	69/*	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal	79/*	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, Normal, 55-160°C	110/*	E-6/K	ISO 11359-1/-2
Thermal conductivity of melt	0.25	W/(m K)	
Spec. heat capacity of melt	2000	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, impact, 0.75mm	105	°C	UL 746B
RTI, impact, 1.5mm	115	°C	UL 746B
RTI, impact, 3mm	115	°C	UL 746B
RTI, strength, 0.75mm	105	°C	UL 746B
RTI, strength, 1.5mm	115/*	°C	UL 746B
RTI, strength, 3mm	120	°C	UL 746B

[2]: 1st heating

Flammability

	dry/cond.		
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	0.4/*	mm	IEC 60695-11-10
UL recognition	yes/*	-	UL 94
Burning Behav. 5V at thickness h	5VA/*	class	IEC 60695-11-20
Thickness tested	1.5/*	mm	IEC 60695-11-20
UL recognition	yes/*	-	UL 94
Oxygen index	35/*	%	ISO 4589-1/-2
Glow Wire Flammability Index, 0.75mm	960/-	°C	IEC 60695-2-12
Glow Wire Flammability Index, 1.5mm	960/-	°C	IEC 60695-2-12
Glow Wire Flammability Index, 3mm	960/-	°C	IEC 60695-2-12
Glow Wire Ignition Temperature, 0.75mm	900/-	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 1.5mm	900/-	°C	IEC 60695-2-13
Glow Wire Ignition Temperature, 3mm	930/-	°C	IEC 60695-2-13
FMVSS Class	SE/B	-	ISO 3795 (FMVSS 302)

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Electrical properties

	dry/cond.		
Volume resistivity	>1E13/2.7E10	Ohm.m	IEC 62631-3-1
Electric strength	24/22[DS]	kV/mm	IEC 60243-1
Comparative tracking index	275/-[DS]	-	IEC 60112

[DS]: Derived from similar grade

Other properties

	dry/cond.		
Humidity absorption, 2mm	1.3/*	%	Sim. to ISO 62
Water absorption, 2mm	3.4/*[DS]	%	Sim. to ISO 62
Density	1600/-	kg/m³	ISO 1183
Water Absorption, Immersion 24h	0.6/*[3]	%	Sim. to ISO 62

[DS]: Derived from similar grade

[3]: thickness,2mm

VDA Properties

Emission of organic compounds	4.7	µgC/g	VDA 277
Odour	4.5	class	VDA 270

Injection

Drying Recommended	yes	
Drying Temperature	80	°C
Drying Time, Dehumidified Dryer	2 - 4	h
Processing Moisture Content	≤0.2	%
Melt Temperature Optimum	290	°C
Min. melt temperature	280	°C
Max. melt temperature	300	°C
Max. screw tangential speed	0.2	m/s
Mold Temperature Optimum	100	°C
Min. mould temperature	70	°C
Max. mould temperature	120	°C
Hold pressure range	50 - 100	MPa
Hold pressure time	3	s/mm
Ejection temperature	210	°C

Characteristics

Additives	Flame retardant

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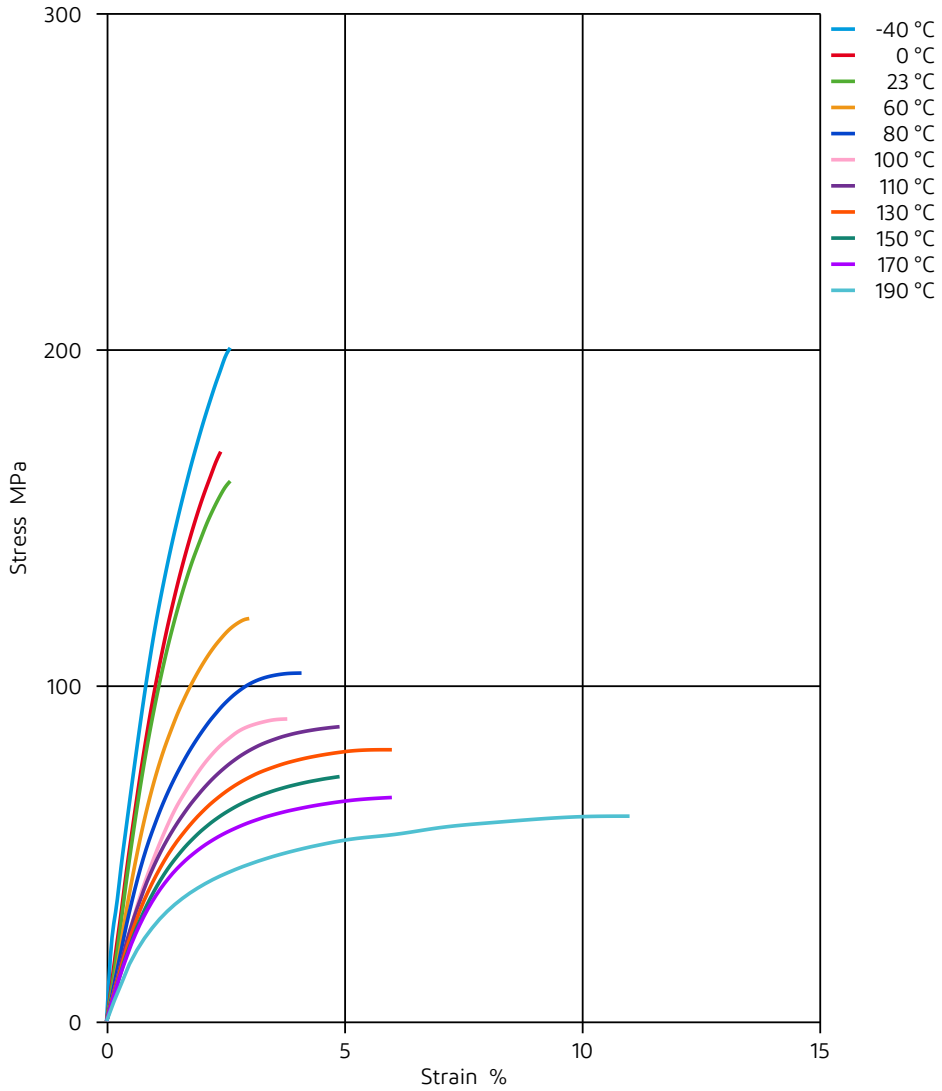
Stress-strain (dry)



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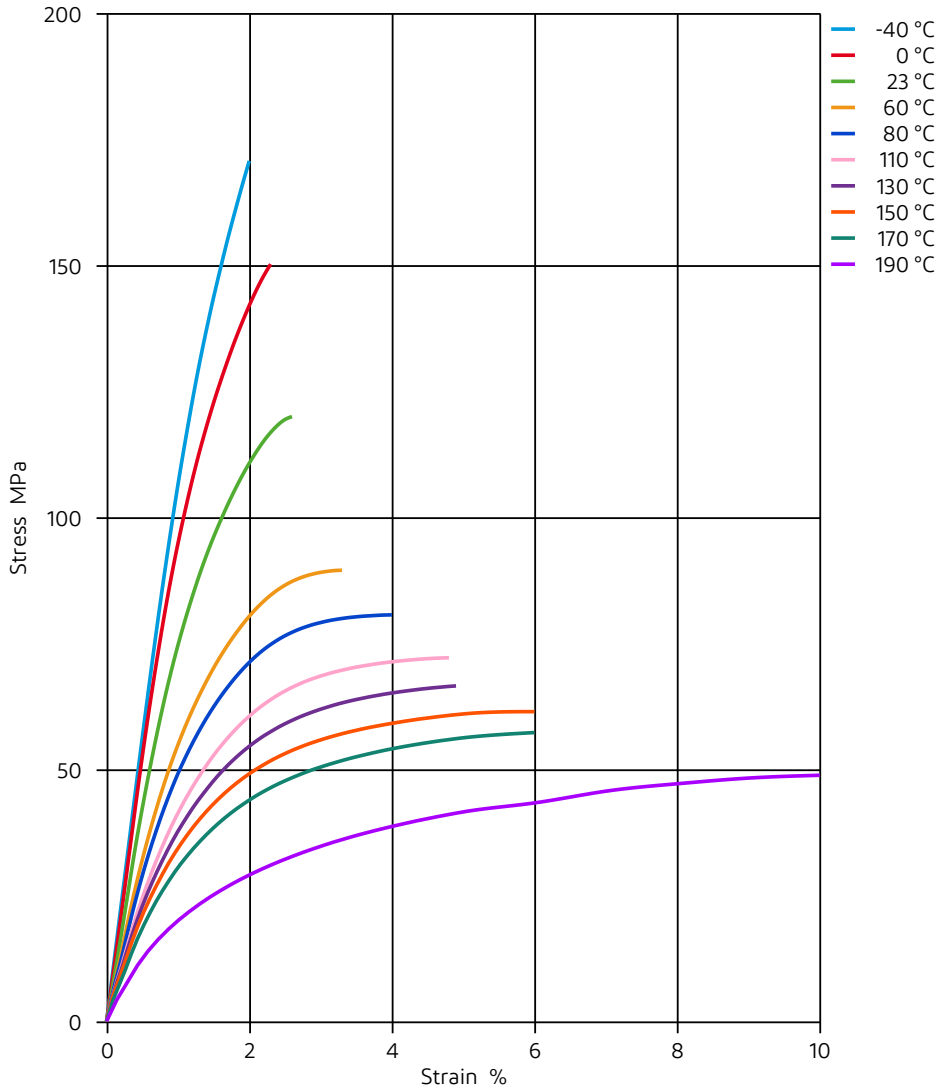
NYLON RESIN

Stress-strain (cond.)



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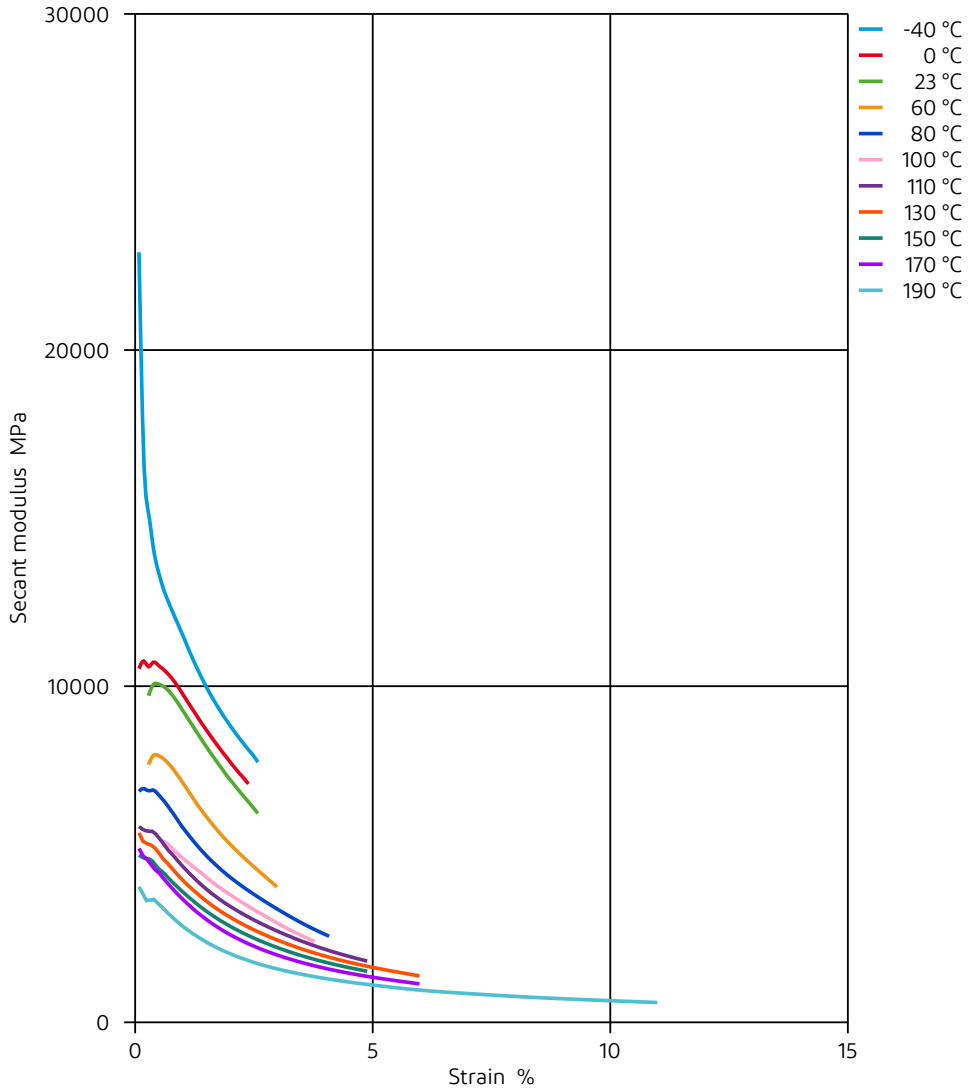
NYLON RESIN

Secant modulus-strain (dry)



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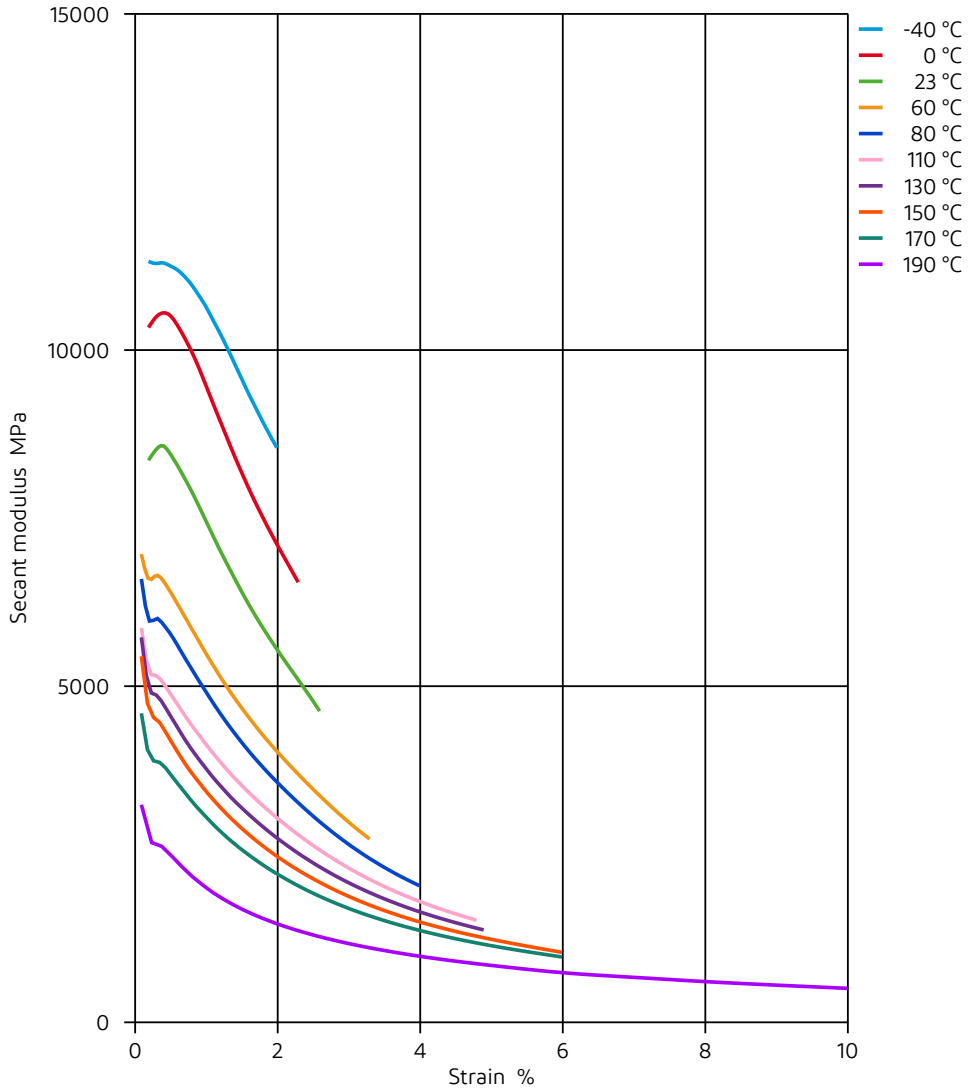
NYLON RESIN

Secant modulus-strain (cond.)



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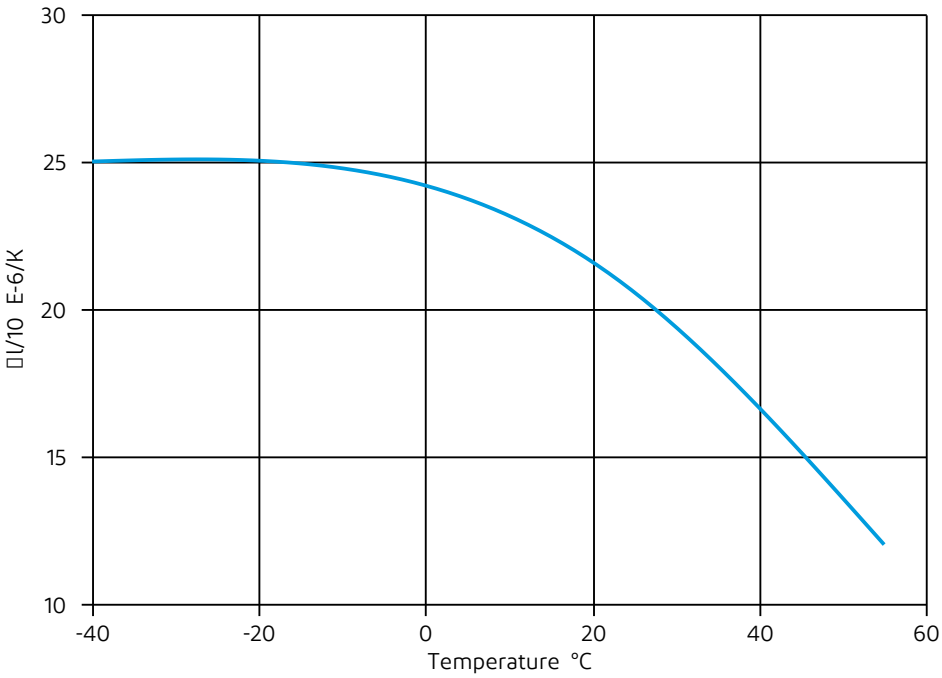
Coeff. of linear thermal expansion



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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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