Zytel® 70G13L NC010

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, we recommend, 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® 70G13L is a 13% glass fibre reinforced polyamide 66 resin for injection moulding.

Product information

Resin Identification	PA66-GF13	ISO 1043
Part Marking Code	>PA66-GF13<	ISO 11469
ISO designation	ISO 16396-PA66,GF13,MGNR,S14-050	

Rheological properties

	dry/cond.		
Moulding shrinkage, parallel	0.7 / -	%	ISO 294-4, 2577
Moulding shrinkage, normal	1.2 / -	%	ISO 294-4, 2577

Typical mechanical properties

	dry/cond.		
Tensile modulus	5500 / 3500	MPa	ISO 527-1/-2
Tensile stress at break, 5mm/min	120 / 75	MPa	ISO 527-1/-2
Tensile strain at break, 5mm/min	3 / 13	%	ISO 527-1/-2
Flexural modulus	4800 / 2900	MPa	ISO 178
Flexural stress at 3.5%	165 / 90	MPa	ISO 178
Tensile creep modulus, 1h	* / 3300	MPa	ISO 899-1
Tensile creep modulus, 1000h	* / 2200	MPa	ISO 899-1
Charpy impact strength, 23 °C	40 / 70	kJ/m²	ISO 179/1eU
Charpy impact strength, -30 °C	40 / 30	kJ/m²	ISO 179/1eU
Charpy notched impact strength, 23 °C	5.4 / 6	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -30 °C	4.5 / 4	kJ/m²	ISO 179/1eA
Charpy notched impact strength, -40 °C	4.5 / 4	kJ/m²	ISO 179/1eA
Izod notched impact strength, 23 °C	4.5 / 4	kJ/m²	ISO 180/1A
Izod notched impact strength, -30 °C	4.5 / 3.0	kJ/m²	ISO 180/1A
Izod notched impact strength, -40 °C	4.5 / 3.0	kJ/m²	ISO 180/1A
Izod impact strength, 23 °C	40 / 55	kJ/m²	ISO 180/1U
Izod impact strength, -30 °C	35 / 28	kJ/m²	ISO 180/1U
Poisson's ratio	0.35 / 0.37		
Abrasion resistance	10 / *	mm³	ISO 4649

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Thermal properties

	dry/cond.		
Melting temperature, 10°C/min	262 / *	°C	ISO 11357-1/-3
Glass transition temperature, 10°C/min	80 / 20	°C	ISO 11357-1/-3
Temperature of deflection under load, 1.8 MPa	235 / *	°C	ISO 75-1/-2
Temperature of deflection under load, 0.45 MPa	255 / *	°C	ISO 75-1/-2
Vicat softening temperature, 50°C/h 50N	205 / *	°C	ISO 306
Ball pressure test	220 / -	°C	IEC 60695-10-2
Coeff. of linear therm. expansion, parallel, -40-23°C	42 / *	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), parallel	40 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, parallel, 55-160°C	26 / *	E-6/K	ISO 11359-1/-2
Coeff. of linear therm. expansion, normal, -40-23°C	77 / *	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal	93 / *	E-6/K	ISO 11359-1/-2
Coefficient of linear thermal expansion (CLTE), normal, 55-160°C	149 / *	E-6/K	ISO 11359-1/-2
RTI, electrical, 0.75mm	125	°C	UL 746B
RTI, electrical, 1.5mm	125	°C	UL 746B
RTI, electrical, 3.0mm	125	°C	UL 746B
RTI, impact, 0.75mm	120	°C	UL 746B
RTI, impact, 1.5mm	120	°C	UL 746B
RTI, impact, 3.0mm	120	°C	UL 746B
RTI, strength, 0.75mm	125	°C	UL 746B
RTI, strength, 1.5mm	125 / *	°C	UL 746B
RTI, strength, 3.0mm	125	°C	UL 746B

Flammability

	dry/cond.		
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	0.71 / *	mm	IEC 60695-11-10
UL recognition	yes / *		UL 94
Oxygen index	24 / *	%	ISO 4589-1/-2
Glow Wire Flammability Index, 0.75mm	650 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 1.5mm	650 / -	°C	IEC 60695-2-12
Glow Wire Flammability Index, 3.0mm	800 / -	°C	IEC 60695-2-12
Glow Wire Ignition Temperature, 0.75mm	675 / -	°C	IEC 60695-2-13
FMVSS Class	B		ISO 3795 (FMVSS 302)
Burning rate, Thickness 1 mm	27	mm/min	ISO 3795 (FMVSS 302)

Electrical properties

	dry/cond.		
Relative permittivity, 100Hz	3.9 / -		IEC 62631-2-1
Relative permittivity, 1MHz	3.2 / -		IEC 62631-2-1
Dissipation factor, 100Hz	130 / -	E-4	IEC 62631-2-1
Dissipation factor, 1MHz	150 / -	E-4	IEC 62631-2-1
Volume resistivity	>1E13 / -	Ohm.m	IEC 62631-3-1
Surface resistivity	* / 1E15	Ohm	IEC 62631-3-2

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Electric strength	25 / -	kV/mm	IEC 60243-1
Electric Strength, Short Time, 2mm	25 / -	kV/mm	IEC 60243-1

Physical/Other properties

	dry/cond.		
Humidity absorption, 2mm	2.2 / *	%	Sim. to ISO 62
Water absorption, 2mm	7.6 / *	%	Sim. to ISO 62
Water absorption, Immersion 24h	1.7[1] / *	%	Sim. to ISO 62
Density	1230 / -	kg/m³	ISO 1183

[1]: 3.2mm wall thickness

VDA Properties

Emission of organic compounds	6	µgC/g	VDA 277

Injection

Drying Recommended	yes	
Drying Temperature	80	°C
Drying Time, Dehumidified Dryer	2 - 4	h
Processing Moisture Content	≤0.2	%
Melt Temperature Optimum	300	°C
Min. melt temperature	290	°C
Max. melt temperature	305	°C
Screw tangential speed	≤0.2	m/s
Mold Temperature Optimum	95	°C
Min. mould temperature	65	°C
Max. mould temperature	120	°C
Hold pressure range	50 - 100	MPa
Hold pressure time	3	s/mm
Ejection temperature	224	°C

Characteristics

Additives	Release agent

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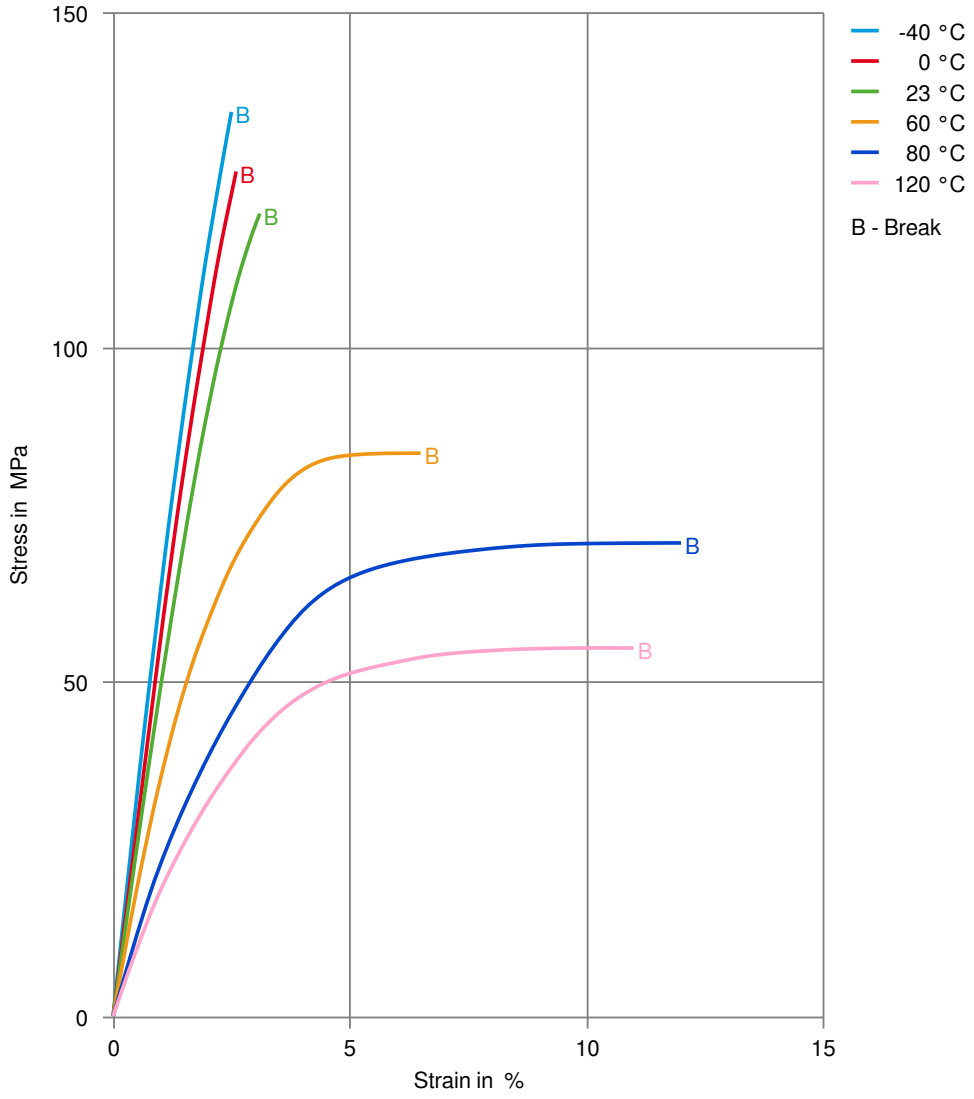
Stress-strain (dry)



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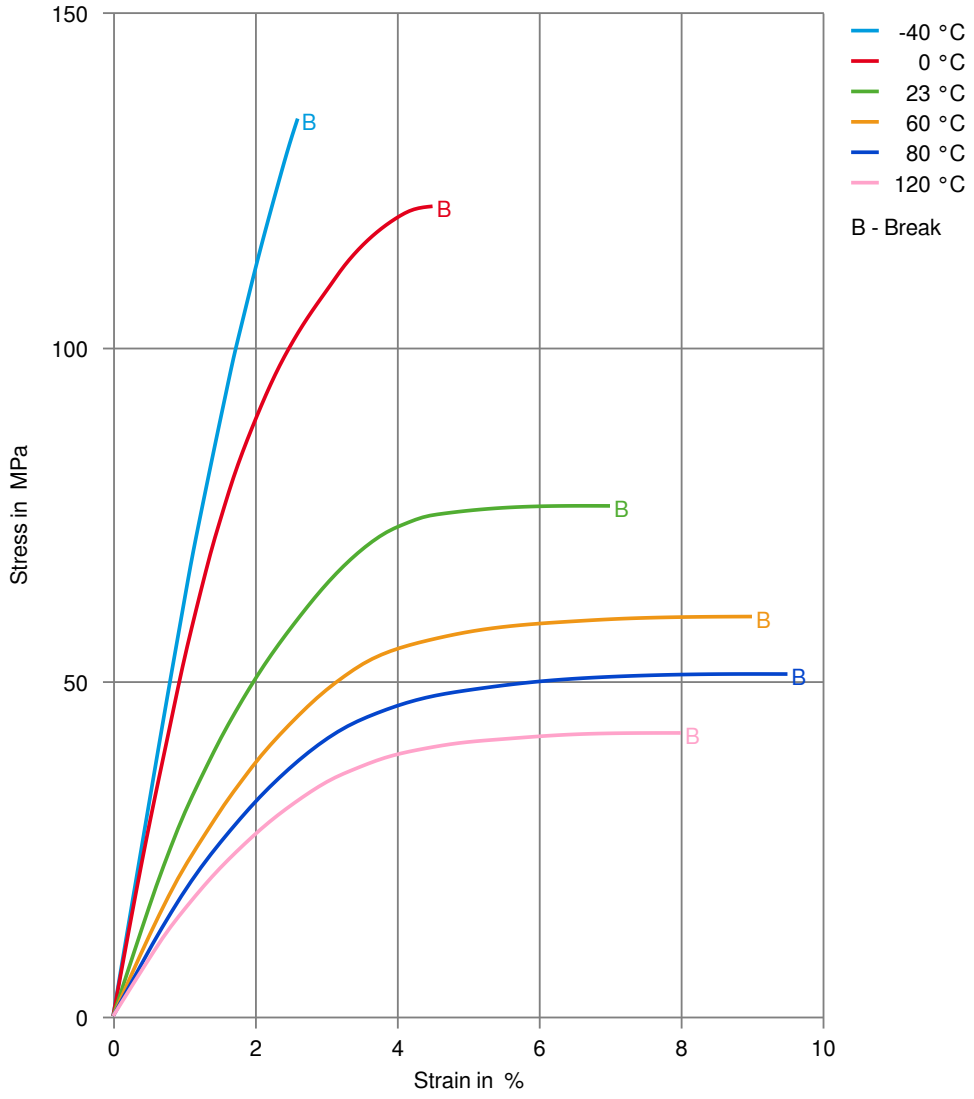
NYLON RESIN

Stress-strain (cond.)



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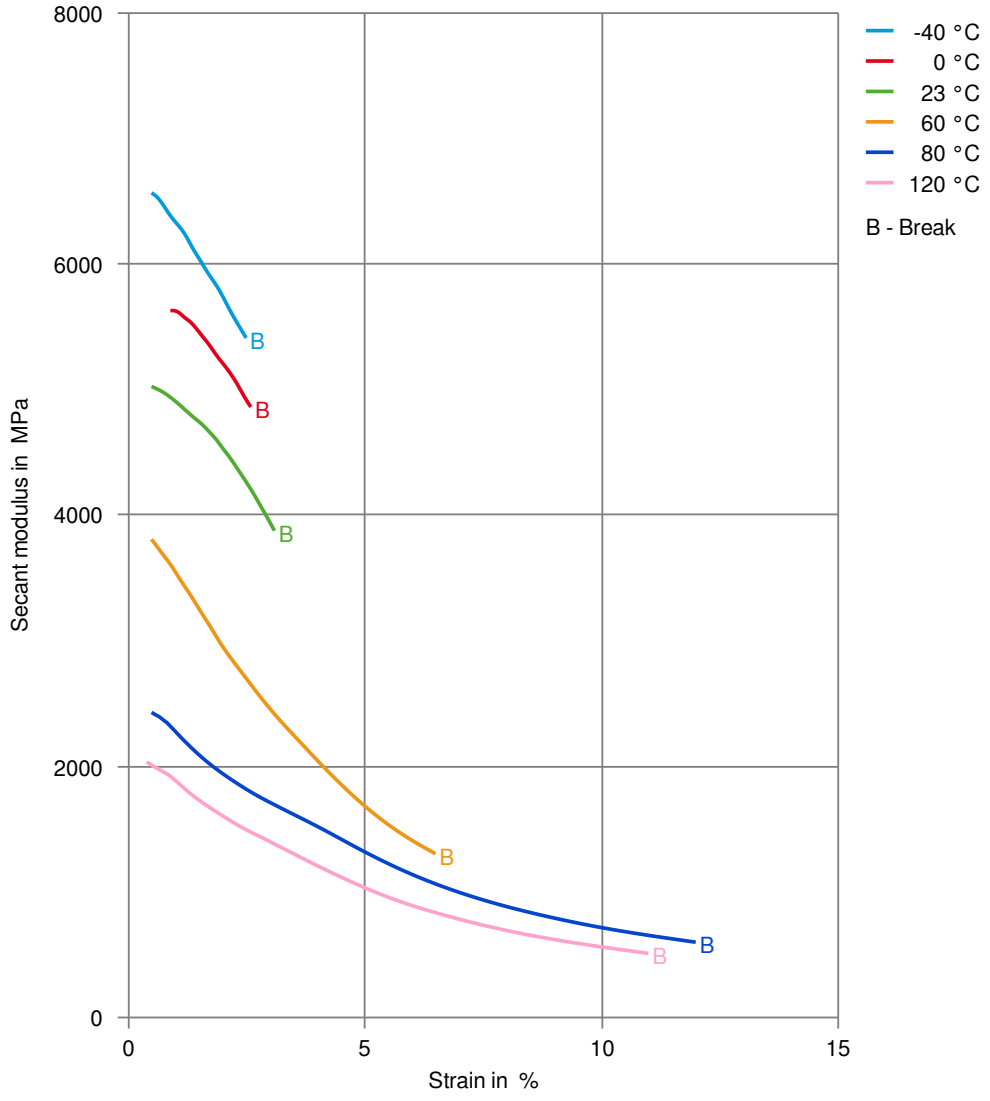
NYLON RESIN

Secant modulus-strain (dry)



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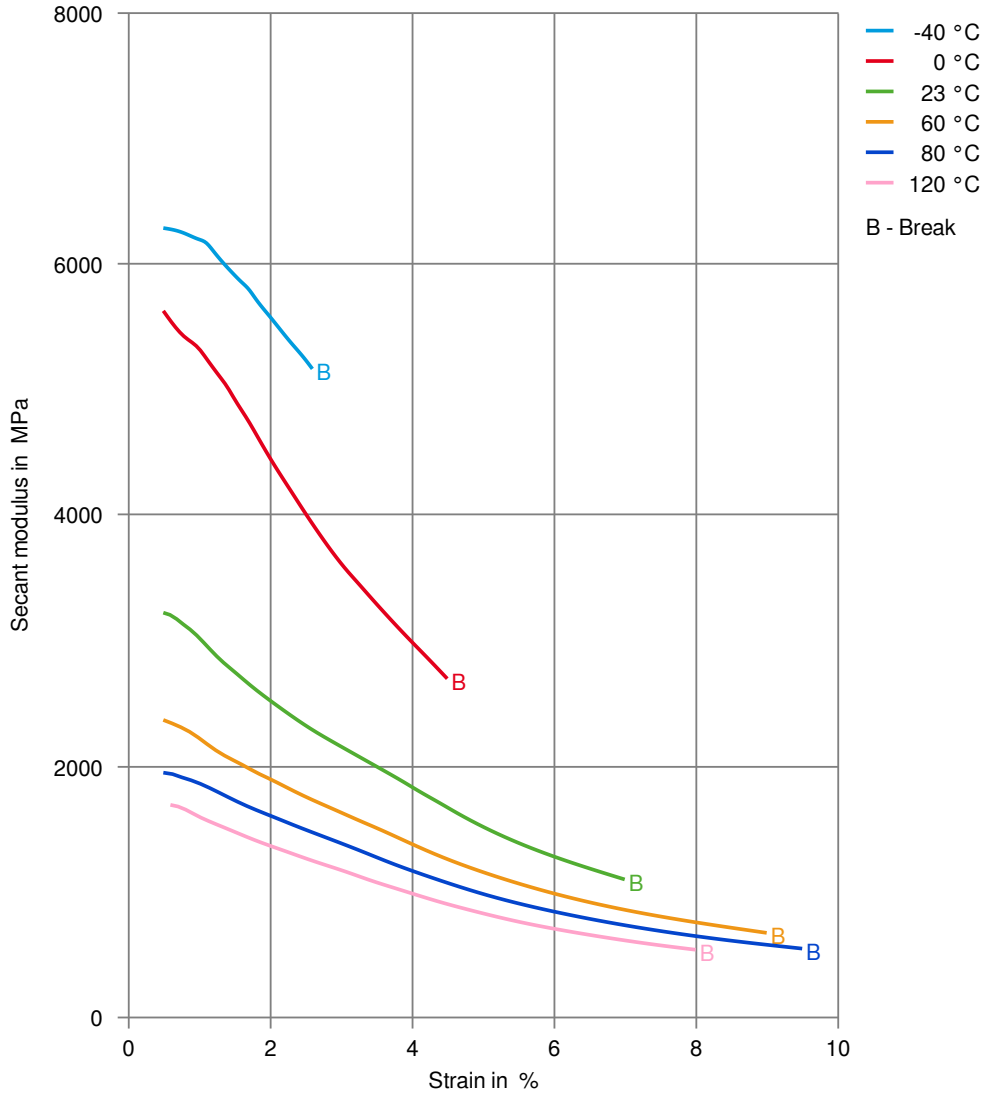
NYLON RESIN

Secant modulus-strain (cond.)



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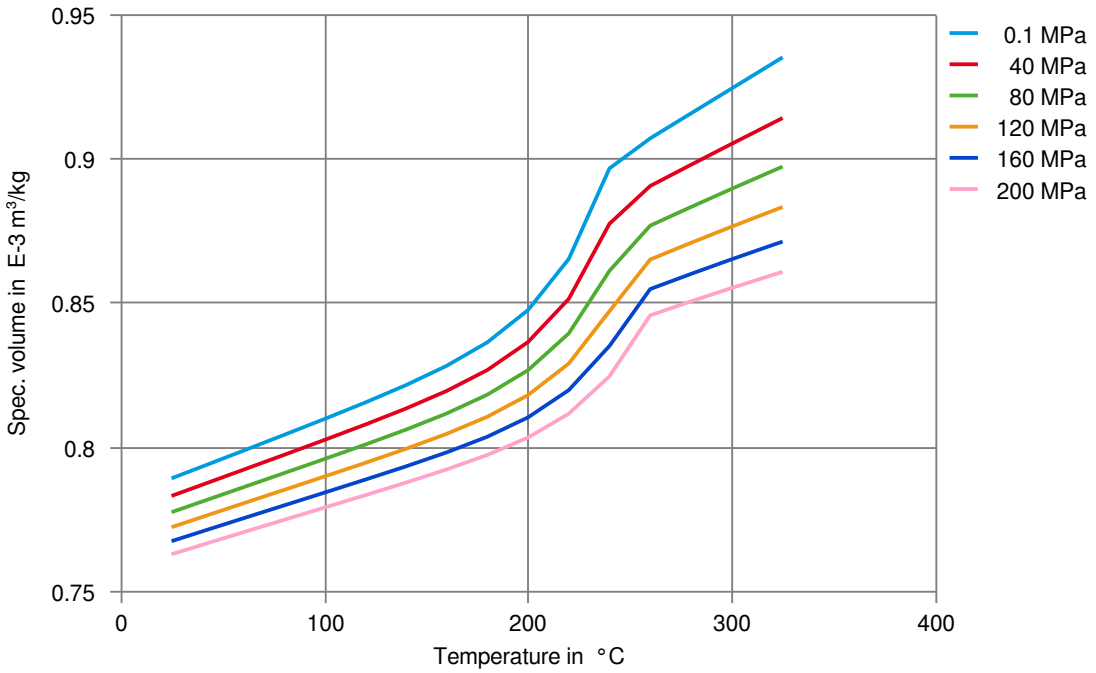
Specific volume-temperature (pvT)



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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

Salt solutions

- ✔ Sodium Chloride solution (10% by mass), 23°C
- ✘ Sodium Hypochlorite solution (10% by mass), 23°C

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- ✔ 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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