

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

Viscosity number	dry/cond. 150 / * _[DS,1]	cm ³ /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

Tensile Modulus	dry/cond. 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/m ²	ISO 179/1eU
Charpy impact strength, -40°C	50 / - _[DS]	kJ/m ²	ISO 179/1eU
Charpy notched impact strength, 23°C	8.4 / -	kJ/m ²	ISO 179/1eA
Charpy notched impact strength, -40°C	7.9 / -	kJ/m ²	ISO 179/1eA
Poisson's ratio	0.34 / -	-	

[DS]: Derived from similar grade

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Thermal properties

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	
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

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

Volume resistivity
Electric strength
Comparative tracking index

[DS]: Derived from similar grade

dry/cond.
>1E13 / 2.7E10 Ohm.m
24 / 22[DS] kV/mm
275/-[DS] -

IEC 62631-3-1
IEC 60243-1
IEC 60112

Other properties

Humidity absorption, 2mm
Water absorption, 2mm
Density
Water Absorption, Immersion 24h

[DS]: Derived from similar grade

[3]: thickness, 2mm

dry/cond.
1.3 / * %
3.4 / [DS] %
1600 / - k g / m³
0.6 / [3] %

Sim. to ISO 62
Sim. to ISO 62
ISO 1183
Sim. to ISO 62

VDA Properties

Emission of organic compounds
Odour

4.7 µgC/g
4.5 class

VDA 277
VDA 270

Injection

Drying Recommended
Drying Temperature
Drying Time, Dehumidified Dryer
Processing Moisture Content
Melt Temperature Optimum
Min. melt temperature
Max. melt temperature
Max. screw tangential speed
Mold Temperature Optimum
Min. mould temperature
Max. mould temperature
Hold pressure range
Hold pressure time
Ejection temperature

yes
80 °C
2 - 4 h
≤0.2 %
290 °C
280 °C
300 °C
0.2 m/s
100 °C
70 °C
120 °C
50 - 100 MPa
3 s/mm
210 °C

Characteristics

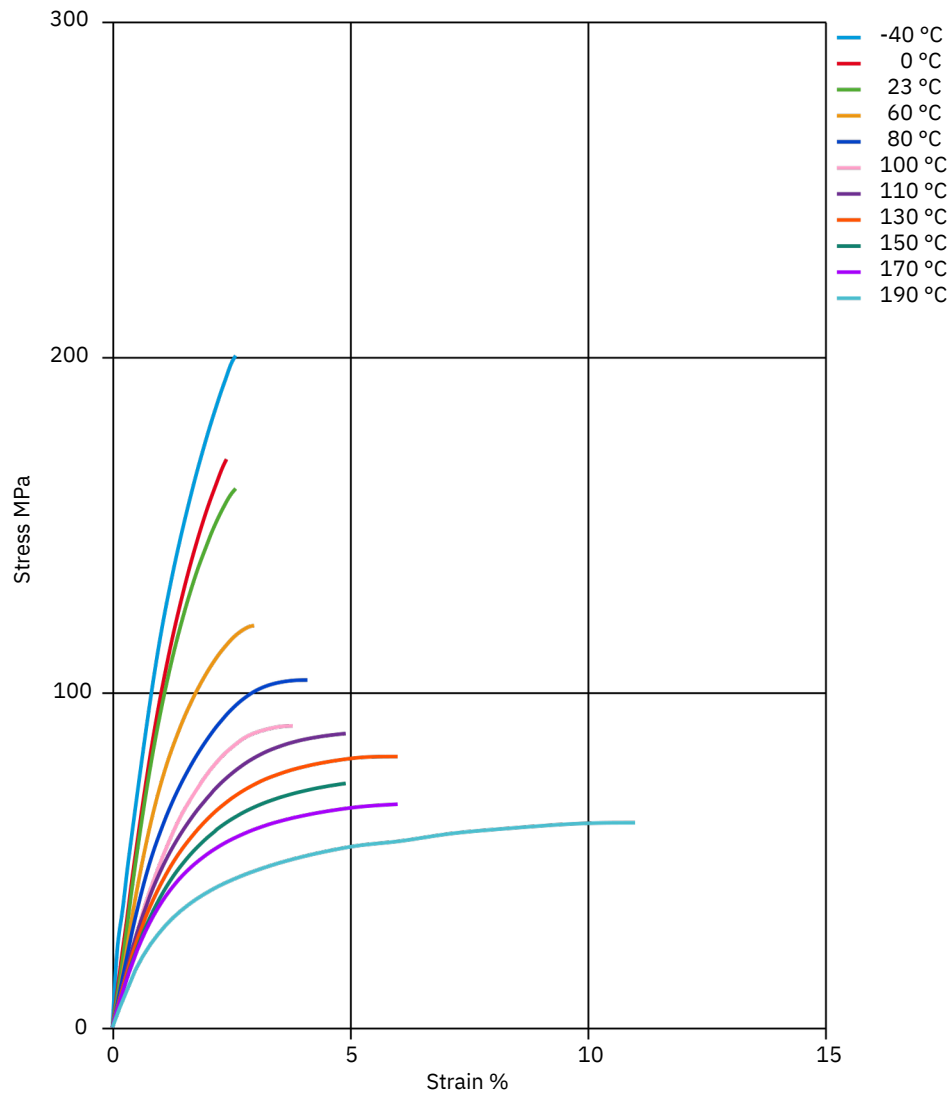
Additives

Flame retardant

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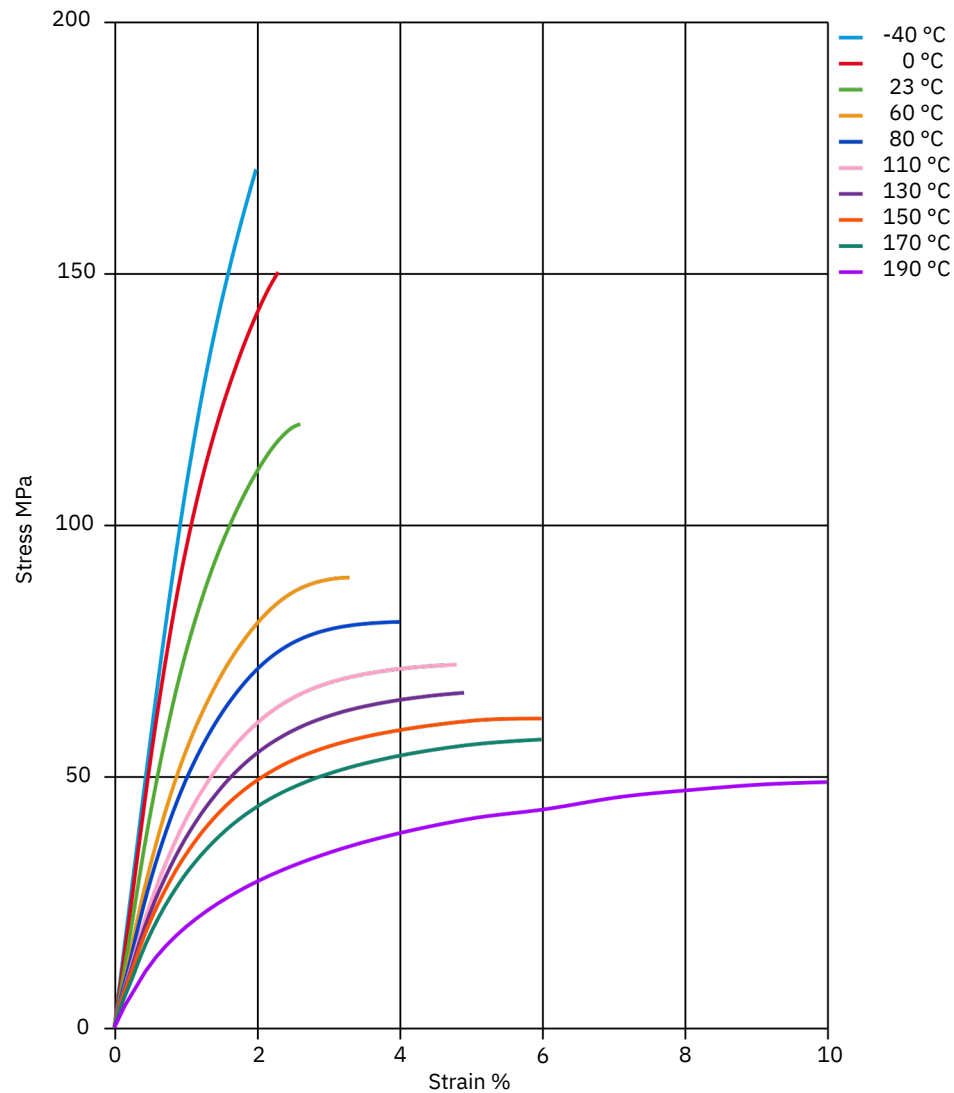
Stress-strain (dry)



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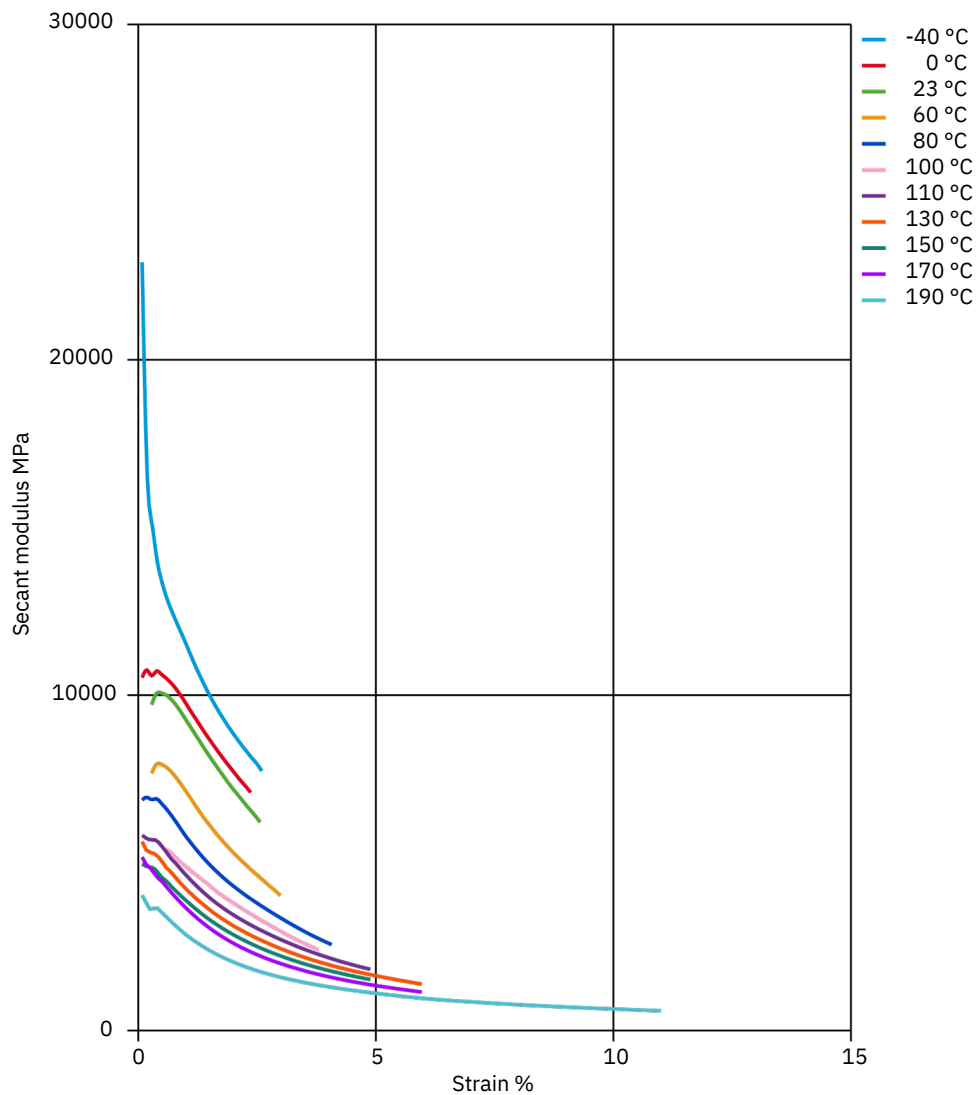
Stress-strain (cond.)



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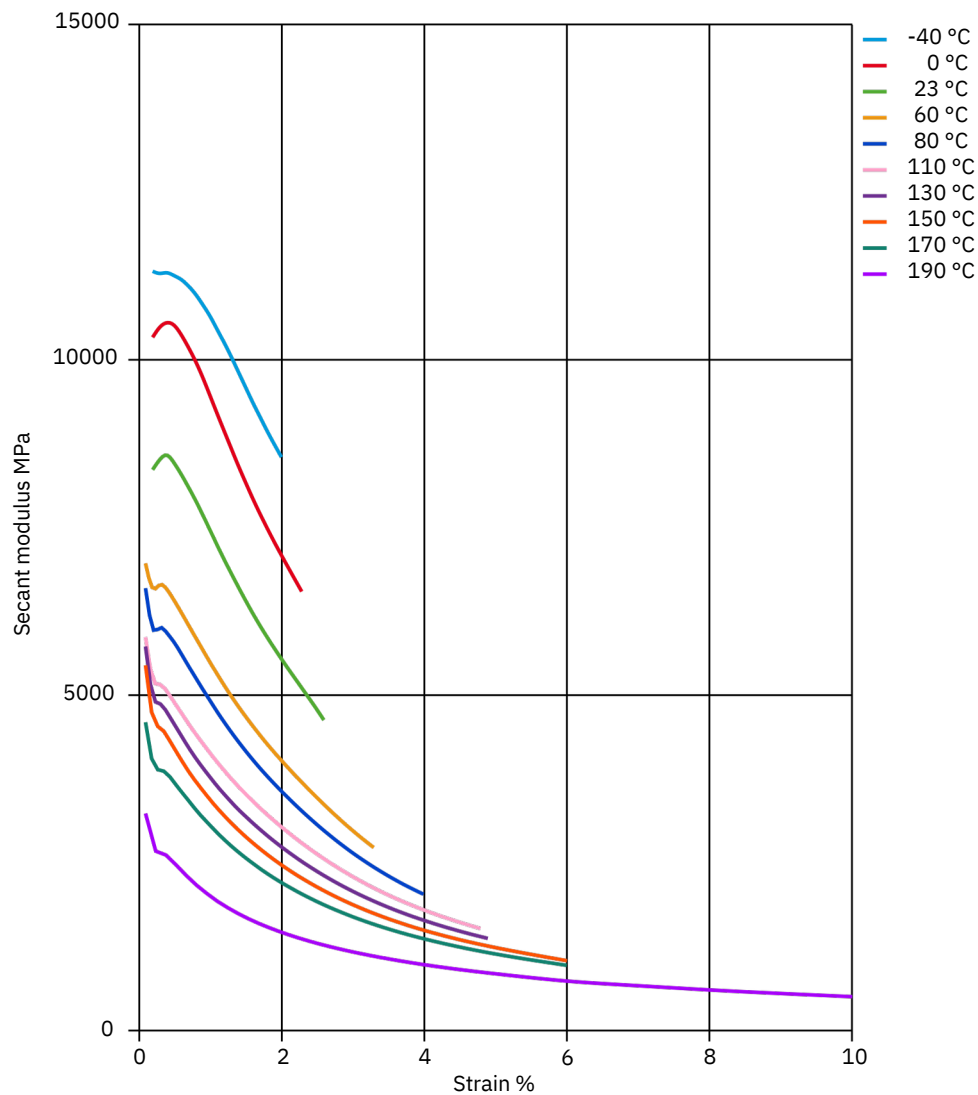
Secant modulus-strain (dry)



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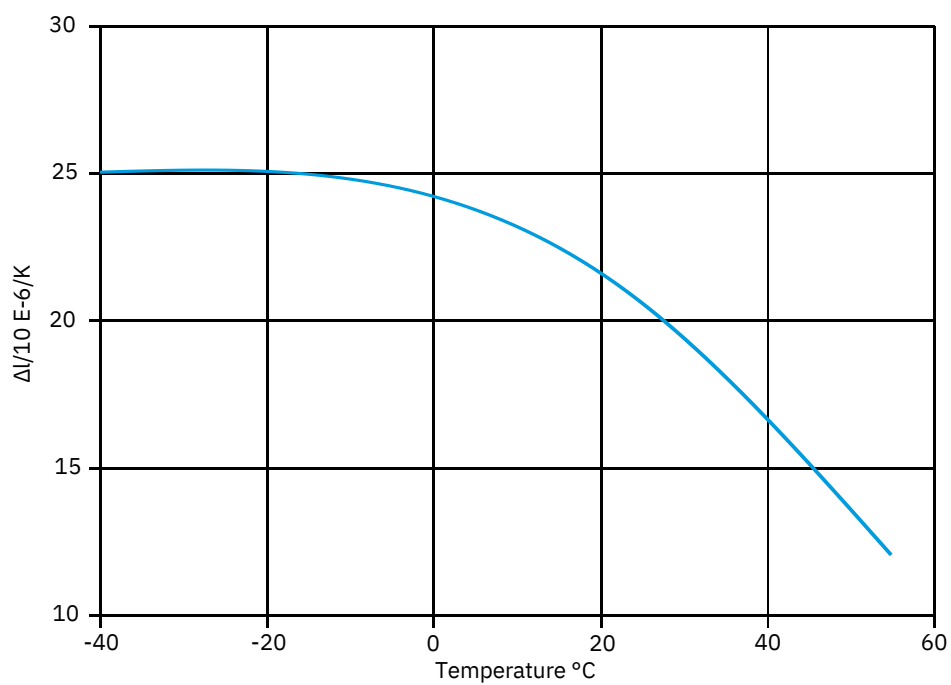
Secant modulus-strain (cond.)



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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).