



RAU-PA POLYAMID

MATERIAL DATA SHEET AV 0160 EN

Characteristic properties

Polyamides are semi-crystalline polycondensation products of organic acids and amines. They are usually employed where high thermal deformation and thermal ageing resistance are required. Other characteristic properties are the high resistance to chemicals, a balanced proportion of rigidity and toughness, good electrical properties and good sliding friction properties against metals and other polymer materials.

- Series 100: Polyamide 6 >PA6<
- Series 200: Polyamide 6.6 >PA66<
- Series 400: Polyamide 11 >PA11<
- Series 500: Polyamide 12 >PA12<
- Series 600: PA elastomers >PEBA< and special polyamides (amorphous, semi-aromatic, PPA, copolyamides etc.)
- Series 8000: Polyamide blends (e.g. >PA+PP< or >PA+ABS<)

Range and nomenclature

The type designation is RAU-PA followed by a 3-digit code. A 4-digit type designation only applies to PA blends (Series 8000) and medical grades. The RAU type is used for general characterisation only. Exact data, e.g. on the type and quantity of the contained fillers, plasticisers and the hardness cannot usually be derived from this. The table contains a selection of the most important types of our polyamide range.

Dependency of the properties on the state of conditioning

Polyamides are usually processed with a water content of less than 0.2%. Due to the high polarity of the carbonic acid amide group, there is a strong tendency to bind water molecules into the polymer structure. The water content at a state of balance differs between the different basic types, depending on the relative content of the amide groups in the polymer. At 23°C and a relative humidity of 50%, the values for the non-reinforced types of Series 100 are approx. 3.0%, 2.8% for Series 200, 0.9% for Series 400 and 0.7% for Series 500. The polyamide elastomers, the special polyamides and the polyamide blends usually have a lower water absorption capacity than the unmodified types. The water absorption falls accordingly with the types containing fillers or reinforcement due to the lower polymer content.

With a rising water content, the toughness and flexibility of the polyamides rises, which is particularly significant for fibreglass reinforced types. At the same time, the rigidity, strength, hardness, the thermal properties and the electrical insulation capability fall. The properties are therefore specified for the series RAU-PA 100 and 200 both in the dry „freshly produced“ and in the conditioned state (23 °C / 25 % RH). The thermal properties are generally specified in the dry state only, as the water content at balance falls at higher temperatures.

The water absorption of polyamide products occurs spontaneously depending on the ambient conditions; the higher the temperature and relative humidity, the faster. However, this can take weeks in articles with thick walls (particularly with Series 200). In specific cases, e.g. under conditions of heavy impact or if an improved flexibility is desired during processing, deliberate conditioning such as storage in water or in a climate-controlled cabinet must be considered. The use of impact modified products may also be a consideration.

Thermal properties

The short-term heat resistance is about 30 - 40 K beneath the crystallite melting range of the materials. The melting points of the types in Series 100 is approx. 220°C, approx. 260°C for Series 200, and approx. 175°C for Series 500. If high mechanical loads are exerted as well as the thermal load, fibreglass-reinforced products should be employed and the HDT/A values (Heat Distortion Temperature) should be regarded.

The long-term thermal resistance of all types without heat stabilisers is around 80°C. The long-term application temperature can be increased to 130°C up to a maximum of 160°C (5000 h index) by heat stabilisers.

However, the flexibility falls rapidly at high temperatures in products containing plasticisers.

The resistance to cold of the polyamides extends to approximately -40°C to -50°C, although the impact resistance falls perceptibly in the unmodified types. Types containing plasticisers and impact modified types retain a certain level of impact resistance even at low temperatures.

Mechanical properties

The rigidity and strength of polyamides can vary within a wide range. The highest values are achieved with the fibreglass reinforced types of Series 100 and 200 and the special semi-aromatic types. The upper limit of the fibreglass content is approx. 60%. Non-reinforced, impact modified types or types with plasticiser and the polyamide elastomers or flexible polyamide blends have low modulus and strength values and hardnesses in a range of D 25 - 70 Shore.

The rigidity/strength and toughness are usually inversely proportional. However, the impact toughness of polyamides is at a comparatively high level even for the non-plasticised reinforced and non-reinforced types. The conditioning state is important, particularly for the Series 100 and 200.

Polyamide has favourable abrasion and sliding friction properties against metals and other polymer materials.

Electrical properties

Polyamide is an electrically insulating polymer material. In the Series 100 and 200, the electrical properties are dependent on the water content. Permanently antistatic types with conductive carbon black filler can also be provided for special applications.

Fire characteristics / freedom from halogens

Nearly all types of the RAU-PA series achieve classification HB according to the fire standard UL 94 with a sample thickness of 1.6 mm and a burning rate of ≤ 100 mm/min according to FMVSS 302 (vehicle interior trim) at $d \geq 1.0$ mm. Special types with flame retardant achieve higher flame resistance values, e.g. incandescent wire resistance up to 960°C, classification V-1 or V-0 according to UL 94 or reduced smoke density and toxicity as well as flame resistance according to the aviation standard ABD 0031 / FAR 25.853.

All types that do not contain flame retardants and most flame retardant types are halogen-free according to DIN VDE 0472-815.

UV and weather resistance

RAU-PA is usually sufficiently light-resistant for normal interior applications, i.e. the colour and the mechanical properties do not change even after longer use.

For exterior use, or after many years of exposure to the weather, corresponding stabilisation is necessary. Carbon black coloured grades are particularly suitable. With fibreglass reinforced types, particularly Series 100 and 200, grey colouring occurs after long outdoor use because the abrasion of the outer polymer layer partially exposes the glass fibres. This is connected with a perceptible reduction of the notch impact resistance, but the rigidity is almost fully retained. Materials from Series 400 and 500 tend to be more favourable than Series 100 and 200 when exposed to the weather.

Optical properties / colouring capability

Due to their semi-crystalline structure, non-reinforced polyamides usually have an opaque, milky, translucent colour. This is usually more pronounced in Series 100 and 200 than in Series 400 and 500. Special amorphous types and special microcrystalline polyamides can also be transparent. The non-reinforced polyamides can therefore be coloured in nearly all opaque shades. Limitations only exist for reinforced and filled types as the fillers can have a perceptible influence on the intrinsic colour.

Physiological properties

Specific non-reinforced, unplasticised, natural coloured types from Series 100, 200, 400, 500 and 600 are suitable for contact with food, i.e. their composition (raw materials and additives) complies with the national and international guidelines and recommendations, e.g. RL 2002-72-EC, FDA, BgW recommendation X etc. For each individual application, it must be ensured that the demanded toxicological and sensory suitability exists for the end product, which often requires specific tests, e.g. migration tests. Separate requirements often exist for many physiological applications such as in beer pumps, drinking water conveyance, in food preparation machines, household appliances etc, which must be assessed in each specific case.

Special requirements exist in the medical sector. Consultation with our Applications Engineering department is essential in this case.

Gas permeability / diffusion characteristics

Polyamides have a good blocking effect against air, nitrogen, oxygen, aromatic and aliphatic hydrocarbons, fluorocarbons and CFC. The blocking characteristics against hydrogen, helium, ethyl oxide, water vapour and carbon dioxide are poorer. Hard types free of plasticisers have a better barrier effect than flexible, plasticised types. The influences of the wall thickness, temperature, pressure and concentration difference must be generally observed.

Resistance to chemicals

RAU-PA has good resistance to lubricants, fuels, hydraulic and cooling fluids, refrigerants, paints and lacquers, cleaning and degreasing agents, aliphatic and aromatic hydrocarbons and many other solvents even at high temperatures. RAU-PA is also resistant to the aqueous solutions of many inorganic chemicals (salts, alkalis). The excellent resistance against tension cracking is remarkable, e.g. in contact with wetting agents, essential oils and certain solvents (alcohols).

RAU-PA is attacked by mineral and organic acids even in low concentrations, by phenols and cresols and by specific oxidants and chlorocarbons, particularly at high temperatures. The sensitivity of Series 100 and 200 to specific heavy metal salt solutions, e.g. aqueous zinc chloride solution, must be noted. Fibreglass reinforced types are sensitive to alkalis as these attack the glass fibres. Long-term contact with hot water is critical for all polyamides. Series 500 tends to be more favourable due to its low water absorption.

The enclosed tables contain a summarised assessment of the chemical resistance of RAU-PA to the most important chemicals. The data is provided for orientation, but does not replace expressive function and approval tests in specific cases.

Processing / shrinkage and distortion

RAU-PA is mainly processed by injection moulding and extrusion methods. Extrusion blow moulding and thermoforming are also possible.

Tubes and profiles can be shaped in two or three dimensions by suitable methods.

All common welding methods such as vibration, ultrasonic or laser welding are possible to join injection mouldings together or to profiles or tubes.

For complex geometries of mouldings, the volume-dependent differences of the shrinkage and crystallisation processes must be taken into account. This anisotropy is particularly pronounced in fibreglass reinforced types because the glass fibres are drawn in the direction of flow of the molten material. In specific cases, it can therefore be beneficial to replace the glass fibres with isotopic fillers such as glass beads or mineral fillers.

Gluing

Adhesive solvents or lacquers such as those based on phenol or resorcin solutions, concentrated formic acid, solid adhesives with or without chemical crosslinking (reaction or two-component adhesives) and furthermore polymerisation adhesives and contact adhesives are particularly suitable for gluing RAU-PA, e.g. to bearing bushings into metal assemblies.

Printing, lettering, lacquering, metallising

RAU-PA can be printed without pre-treatment by the methods employed in paper printing. Injection mouldings should be mainly free of inherent strain and should be manufactured without silicone-based mould release agents if possible. Proven special printing inks are available for printing on RAU-PA.

Embossing methods or laser lettering can also be employed apart from printing.

Due to its excellent resistance to most solvents, RAU-PA can be lacquered in one or more coats with various lacquers, with good adhesion and

without impairing the mechanical properties. One and two-component lacquers are suitable, whose bonding agents must be chosen to match the material to be lacquered. The relationships depending on the geometry and the process (bond seams, wall thickness ratios, gate configuration, injection conditions, cylinder and die temperature etc) and the influences of fillers, mould release agents and lubricants and other additives and modifiers must be taken into account.

Various RAU-PA types can also be metallised after priming under high vacuum or, after suitable treatment, galvanically.

Table: General values for selected types of Series RAU-PA 100 and RAU-PA 200

Properties	Standard	Unit	RAU-PA 102		RAU-PA 122		RAU-PA 146		RAU-PA 202 RAU-PA 201		RAU-PA 246	
			dry	cond.	dry	cond.	dry	cond.	dry	cond.	dry	cond.
Density	ISO 1183	g/cm ³	1.13		1.07		1.36		1.13		1.36	
Fibreglass content	ISO 3451-4	%	---		---		30		---		30	
Moisture absorption 23°C, 50 % R.H.	in compliance with ISO 62	%	3.0		2.5		2.1		2.8		1.7	
Water absorption 23°C, in water	in compliance with ISO 62	%	9.5		8.0		6.6		8.5		5.5	
Melting point	ISO 3146	°C	220		220		220		260		260	
Shore D hardness	ISO 868		85	70	65	60	---	---	85	74	---	---
Yield stress	ISO 527	MPa	90	45	---	---	---	---	80	60	---	---
Yield elongation	ISO 527	MPa	4.5	20	---	---	---	---	4.2	20	---	---
Tensile stress at break	ISO 527	MPa	---	---	45	40	185	115	---	---	190	130
Elongation at break	ISO 527	%	>50	200	120	200	3,5	8,0	25	150	3,0	5,0
Tension E modulus	ISO 527	MPa	3000	1000	450	350	9500	6200	3200	1600	10000	7200
Charpy impact resistance 23°C	ISO 179/1eU	kJ/m ²	NB	NB	NB	NB	95	110	NB	NB	85	100
-30°C			NB	---	NB	NB	80	---	---	---	70	---
Charpy impact resistance 23°C	ISO 179/1eA	kJ/m ²	9	NB	110	NB	15	30	6	NB	13	22
-30°C			---	---	15	15	11	---	5,5	---	11	---
Heat distortion temperature HDT/A (1,80 MPa) / B (0.45 MPa)	ISO 75	°C	65 / >160		40 / 75		210 / 220 / 75 / 220		250 / 250			
Thermal coefficient of expansion 23°C - 80°C, longit/transv.	ISO 11359-1/2	10 ⁻⁴ /K	0.85 / 0.85		1.4 / 1.5		2.3 / 6.5		0.85 / 0.85		1.8 / 6.5	
Thermal conductivity	EN 12939	W/(m*K)	0.33		---		0.36		0.33		0.35	
Dielectric constant at 1 MHz	IEC 60250	---	3.5	7.0	---	---	3.8	6.8	3.2	5.0	3.5	5.6
Dielectric dissipation factor 1 MHz	IEC 60250	10 ⁻⁴	230	3000	---	---	230	2200	260	2000	140	3000
Volume resistivity	IEC 60093	Ohm*m	10 ¹³	10 ¹⁰	10 ¹²	10 ¹¹	10 ¹⁵	10 ¹²	10 ¹³	10 ¹⁰	10 ¹⁵	10 ¹²
Surface resistivity	IEC 60093	Ohm	10 ¹³	10 ¹⁰	10 ¹³	10 ¹²	10 ¹²	10 ¹⁰	10 ¹³	10 ¹⁰	10 ¹²	10 ¹⁰
CTI/A tracking resistance	IEC 60112	CTI	---	600	525	500	---	450	---	600	---	450
Dielectric strength	IEC 60243-1	kV/mm	35	40	31	29	40	35	30	35	40	35
Fire characteristics UL 94 (d = 1.6 mm)	IEC 60695-10-11	class	HB		HB		HB		HB		HB	

dry: freshly produced, moisture content <0.2%; cond.: conditioned, balance 23°C/50 % R.H.

NB: no brea

Table: General values for selected types of Series RAU-PA 400, RAU-PA 500 and RAU-PA 600 (PEBA)

Properties	Standard	Unit	RAU-PA 402 RAU-PA 4027	RAU-PA 502 RAU-PA 562	RAU-PA 522	RAU-PA 622	RAU-PA 622 RAU-PA 6625
Density	ISO 1183	g/cm ³	1.03	1.01	1.03	1.02	1.02
Moisture absorption 23°C, 50 % R.H.	In compliance with ISO 62	%	0.9	0.7	0.5	0.5	0.5
Water absorption 23°C, in water	In compliance with ISO 62	%	1.9	1.6	---	1.1	1.1
Melting point	ISO 3146	°C	189	178	171	165	160
Shore D hardness	ISO 886-2		72	72	62	62	55
Yield stress	ISO 527	MPa	38	38	22	22	---
Yield elongation	ISO 527	%	6	11	27	29	---
Tensile stress at break	ISO 527	MPa	---	---	---	42	38
Elongation at break	ISO 527	%	300	250	300	200	200
Tension E modulus	ISO 527	MPa	1250	1200	350	360	230
Charpy impact resistance 23°C	ISO 179/1eU	kJ/m ²	NB	NB	NB	NB	NB
-30°C			NB	NB	NB	NB	NB
Charpy impact resistance 23°C	ISO 179/1eA	kJ/m ²	25	55	NB	NB	NB
-30°C			13	10	6	NB	NB
Heat distortion temperature HDT/A (1.8 MPa) / /B (0.45 MPa)	ISO 75	°C	50 / 145	50 / 110	45 / 90	45 / 100	45 / 90
Thermal coefficient of expansion 23°C - 80°C, longit./transv.	ISO 11359-1/2	10 ⁻⁴ /K	1.4 / 1.4	1.4 / 1.4	1.8 / 1.7	2.0 / 2.0	2.0 / 2.0
Thermal conductivity	EN 12939	W/(K*m)	0.33	0.30	0.30	0.30	0.29
Dielectric constant at 1 MHz	IEC 60250	---	3.7	3.4	4.2	4.3	4.3
Dielectric dissip. factor at 1 MHz	IEC 60250	10 ⁻⁴	500	800	2000	1300	1100
Volume resistivity	IEC 60093	Ohm*m	10 ¹²	10 ¹²	10 ⁹	10 ¹⁰	10 ¹¹
Surface resistivity	IEC 60093	Ohm	10 ¹⁴	10 ¹⁵	10 ¹²	10 ¹⁴	10 ¹³
CTI/A tracking resistance	IEC 60112	CTI	600	600	600	600	600
Dielectric strength	IEC 60243-1	kV/mm	30	28	27	39	38
Fire characteristics UL 94 (d = 1.6 mm)	IEC 60695-10-11	class	HB	HB	HB	HB	HB

NB: no break

Chemical resistance of Series RAU-PA 100 (polyamide 6) and RAU-PA 200 (polyamide 6.6)

Medium, concentration	T (°C)	Stage	Medium, concentration	T (°C)	Stage
(1, 2-) Dichloroethane	RT	+	Butter, whey	RT	+
(1, 1, 1) trichloroethane (Chlorotheneâ)	45	+	Butyl acetate	RT	+
(epsilon) Caprolactam (aqueous solution), 50%	RT	+	Butyl acrylate	RT	+
(epsilon) Caprolactam (aqueous solution), 50%	150	0	Butyl glycolate (glycolic acid butyl ester)	RT	+
(epsilon) Caprolactam (molten)	>120	0	Butyl phthalate	RT	+
(gamma) Butyrol acton	RT	+	Butylene glycol, tech. pure	RT	0
(gamma) Butyrol acton	>90	0	Butylene glycols	RT	+
95 octane petrol	RT	+	Butylene glycols	>140	0
98 octane fuels	RT	+	Butyric acid, 20%	RT	0
98 octane petrol, see "Fuels"			Butyric acid, tech. pure	RT	0
Acetaldehyde 40%	RT	0	Calcium chloride (alcohol solution), 20%	RT	0
Acetamide 50%	RT	0	Calcium chloride sat	RT	+
Acetamide 50%	140	-	Calcium chloride sat	60	0
Acetic acid anhydride, tech. pure	RT	-	Calcium chloride, 10% aqueous	RT	+
Acetic acid, 10%	RT	0	Calcium chloride, 20% alcohol	RT	-
Acetic acid, 40% aqueous	RT	-	Calcium hydroxide sat	RT	+
Acetic acid, 5%	RT	+	Calcium hypochlorite and chloride of lime sat	RT	-
Acetic acid, 95%	RT	-	Camphor (alcohol solution), 50%	RT	+
Acetic acid, tech. pure	RT	-	Camphor, tech. pure	RT	+
Acetic ester, tech. pure	RT	+	Carbon dioxide	70	+
Acetone	RT	+	Carbon disulphide	RT	+
Acetone	60	+	Carbon disulphide	60	-
Acetophenon	RT	+	Carbon monoxide	70	+
Acetyl acetone	RT	+	Carbon tetrachloride	RT	+
Acetyl chloride	RT	-	Casein	RT	+
Acetylene	RT	+	Caustic soda, 40% aqueous	RT	+
Acrylic acid	>30	-	Cellulose lacquers	RT	+
Acrylic acid			Cellulose suspensions	<60	+
(solution in aliphatic hydrocarbons) 3%	81	0	Cellulose suspensions	95	-
Air	RT	+	Cement	RT	+
Alcohols, see ethanol, methanol etc.			Ceresines	RT	+
Aliphatic hydrocarbons	RT	+	Chloral hydrate	RT	-
Alkyl benzene (Shellsolâ A)	RT	+	Chloramines < 10%	RT	-
Allyl alcohol	RT	0	Chloride of lime, aqueous	RT	-
Alum, aqueous	RT	0	Chlorine difluoromethane, chlorine difluoroethane	RT	+
Aluminium acetate sat	RT	+	Chlorine gas, <5%, gaseous	RT	-
Aluminium hydroxide sat	RT	+	Chlorine gas, moist	RT	-
Aluminium salts of mineral acids (e.g. Al chloride, sulphate, nitrate) 20%	RT	0	Chlorine solution, <5% aqueous	RT	-
Aluminium salts of mineral acids (e.g. Al chloride, sulphate, nitrate) 20%	50	-	Chlorine, chlorine solution	RT	-
Amines, aliphatic	RT	+	Chloroacetyl acids, 10%	RT	-
Amino acids sat	RT	+	Chlorobenzene	20	+
Ammonia	RT	+	Chlorobenzene	50	+
Ammonia	70	0	Chlorobromic methane	RT	0
Ammonia, 20%	RT	+	Chlorodiphenyls, see also „Clophene A 60/petrol ether“	80	0
Ammonia, 20%	60	+	Chloroform	RT	0
Ammonium bicarbonate sat	RT	+	Chlorosulphonic acid < 10%	RT	-
Ammonium chloride, 10% aqueous	RT	+	Chlorothene®, see 1,1,1 trichloroethane		
Ammonium rhodanide sat	RT	+	Chlorotrifluoroethylene	RT	+
Ammonium salts of mineral acids, 10%	RT	+	Chrome baths, common	RT	-
Ammonium salts of mineral acids, 10%	50	0	Chromic acid, 1%	RT	0
Amyl acetate	RT	+	Chromic acid, 10%	RT	-
Amyl acetate	100	-	Chromium salts, aqueous	RT	+
Amyl alcohol	RT	+	Chromosulphuric acid, aqueous	RT	-
Aniline	RT	0	Chromyl chloride	RT	-
Anisol, tech. pure	RT	+	Citric acid, 10%	RT	+
Annealing lacquer, t = 30 min; fibreglass			Citric acid, 10%	50	+
reinforced types particularly suitable	150	+	Citric acid, 20%	80	+
Anodising baths (30% HNO3/10% H2SO4)	RT	0	Citrus fruit, citrus juices	RT	+
Anon, tech. pure	RT	+	Citrus oils	RT	+
Anthrachion	85	0	Cleaning agents: all-purpose cleaner	RT	+
Antifreeze, common	RT	+	Cleaning agents: bathroom cleaner (<3 pH)	RT	0
Antifreeze: see "Cooling fluids"			Cleaning agents: household cleaner (Ajax, ATA, Domestos, Rilan), 10%	RT	+
Antimony trichloride sat	RT	-	Cleaning agents: window cleaner	RT	+
Aqua regia (HCl/HNO3)	RT	-	Clophene A 60/petrol ether (1:1)	RT	+
Argon	RT	+	Cobalt salts, 20%	RT	0
Aromatic hydrocarbons	80	+	Coca cola, common	RT	+
Asphalt	RT	+	Cocoa, common	RT	+
Asphalt	>100	0	Coconut oil, common	RT	+
Aspirin, tech. pure	RT	+	Coffee, common	RT	+
Bacteria (DIN 53 739)	RT	+	Common salt, aqueous	RT	+
Barium salts of mineral acids	RT	0	Concrete	RT	+
Battery acid, 30% aqueous	RT	-	Cooling fluids: Glysantinâ/water 1:1	106	0
Beer, common	RT	+	Copper II salts, 10%	10	0
Benzaldehyde	RT	0	Cresols	RT	-
Benzaldehyde, 0.3% aqueous	RT	+	Crude oil, see "Mineral oil"		
Benzene	RT	+	Cumaron and cumaron resins	RT	+
Benzene	80	+	Cycloaliphatic hydrocarbons	RT	+
Benzoic acid 20%	RT	0	Cyclohexane, cycloheptane	RT	+
Benzoic acid sat	RT	-	Cyclohexanol (and its ester)	RT	+
Benzyl alcohol	RT	0	Cyclohexanon	RT	+
Beverages, see also "Fruit juices", „Brandy“, „Wine“			Decaline	RT	+
Bitumen (DIN 51 567)	RT	+	Decontamination solution (MIL-D-50030 F)		
Bitumen (DIN 51 567)	0	0	= diethyl-entriamine-NaOH-ethyl glycol		
Bleach lye (aqueous, 12.5% effective chlorine)	RT	-	monoethyl ether (70:2:28)	RT	+
Bone oil, tech. pure	RT	+	Detergent (for dishwashers), <10%	95	+
Borax, aqueous	RT	+	Detergents, common	RT	+
Boric acid, 10%	RT	0	Developer solution (Rodinalâ, Agfa, 11 pH)	RT	+
Boron trifluoride	RT	-	Dibutyl phthalate	RT	+
Brake fluid AT	RT	+	Dibutyl phthalate	60	+
Brake fluids	RT	+	Dichloroethylene	RT	+
Brake fluids (DOT 3-5, FMVSS 116)	125	0	Dichlorofluoromethane	RT	+
Brake fluids (SAE J 1703; DIN 53 521)	150	-	Dichloromethane: see "Methylene chloride"		
Brake fluids: Hydraulaná (BASF)	60	+	Dichlorotetrafluoroethane	RT	+
Brake fluids: Hydraulaná (BASF)	120	+	Diesel fuels: see "Fuels"		
Brandy	RT	+	Diesel oil, common	RT	+
Bromine (vapour)	RT	-	Diethyl ether, tech. pure	RT	+
Bromine chloride fluoromethane	RT	+	Diethyl glycol, see also "Glycol"	>140	-
Bromine solution sat	RT	-	Difluoromethane	RT	+
Bromine trifluoromethane	RT	+	Dimethyl acetamide	RT	+
Bromine, tech. pure	RT	-	Dimethyl acetamide	>150	-
Butadiene	RT	+	Dimethyl amine	RT	+
Butane	RT	+	Dimethyl ether	RT	+
Butanols (butyl alcohols)	RT	+	Dimethyl formamide	RT	+
Butene glycol	RT	+	Dimethyl formamide	90	0
Butene glycol	>160	0	Dimethyl formamide	>140	-
Butene-1, cis butene-2 (liquid gas DIN 51 622)	RT	+	Dimethyl silane	RT	+

Medium, concentration	T (°C)	Stage
Dimethyl sulphoxide (DMSO)	RT	+
Dimethyl sulphoxide (DMSO)	125	-
Dinitrous oxide	RT	+
Diocetyl phthalate	RT	+
Dioxane	RT	+
Dioxane	60	+
Diphyl (diphenyl, diphenyl ether)	80	+
Disinfectant (based on active chlorine) <10%	RT	0
Disinfectant (based on alcohols) <10%	RT	+
Disinfectant (based on aldehydes) <10%	RT	+
Disinfectant (based on phenols) <10%	RT	0
Disinfectant (based on quaternary ammonium compounds) <10%	RT	+
Disinfectant (based on quaternary phosphonium compounds) <10%	RT	+
Disinfection method: boiling	100	+
Disinfection method: gas sterilisation; see „Ethylene oxide“		+
Disinfection method: hot air/steam/hot air, see also „Water vapour (sterilisation)“		+
Disinfection method: radiation 25000 Gy, 6h		+
Disinfection method: VDV (fractionated vacuum method)		+
Dispersions, aqueous	RT	+
(Acronal®, Propiofan® from BASF)		+
Dixane lye, common	RT	+
Drill oils, see lubricating oils		
Edible fats, edible oils	100	+
Engine oils, see "Lubricating oils"		
Epichlorohydrine	RT	0
Essential oils	RT	+
Ethane	RT	+
Ethanol	RT	+
Ethanol, 40% by volume	RT	+
Ether, tech. pure	RT	+
Ethyl acetate	RT	+
Ethyl alcohol, tech. pure	RT	+
Ethyl carbonate	50	+
Ethyl carbonate	100	-
Ethyl chloride	RT	+
Ethyl chloride, tech. pure	RT	+
Ethyl chlorohydrine	RT	0
Ethyl diamine	RT	+
Ethyl ether	RT	+
Ethyl oxide	RT	+
Ethyl oxide	>80	-
Ethyl oxide (gas sterilisation)	0	
Ethylene	RT	+
Exhaust gases	RT	+
Fats and waxes, edible fats, see also „Lubricating greases“		+
Fatty acids	RT	+
Fatty alcohol sulphonates	RT	+
Fatty alcohols	RT	+
Fixing salt, aqueous	RT	+
Floor polishing paste	RT	+
Floor polishing wax, common	RT	+
Flour, common	RT	+
Fluorine	RT	-
Fluorocarbons	70	+
Fluorochlorocarbons, tech. pure	RT	+
Formaldehyde	RT	+
Formaldehyde solution, 30%	RT	0
Formaldehyde, 40% aqueous	RT	-
Formaline, aqueous	RT	0
Formamide	RT	+
Formamide	>150	-
Formamide, tech. pure	RT	0
Formic acid, 10%	RT	0
Formic acid, 10%	50	-
Formic acid, 40% aqueous	RT	-
Formic acid, 85% aqueous	RT	-
Freon, common	RT	+
Frigen, tech. pure	RT	+
Fruit juices	RT	+
Fruit preserves, common	RT	+
Fuel oil EL (DIN 51 603)	RT	+
Fuel oils, common	RT	+
Fuels (95/98 octane fuel)	RT	+
Fuels (95/98 octane fuel)	85	+
Fuels, common	RT	+
Fuels, FAM reference fuel (5% ethanol)	55	+
Fuels: aviation turbine fuel	85	+
Fuels: Diesel fuel	85	+
Fuels: high-performance fuel (decaline, perhydrofluorane)	85	+
Fuels: jet fuels (kerosine)	85	+
Fuels: M15 (98 octane/methanol 85:15)	55	+
Fuels: M15 (98 octane/methanol 85:15)	70	0
Fungi (DIN 53 739, ISO 846)		+
Furfural	RT	0
Furfuryl alcohol	RT	+
Furniture polish, common	RT	+
Galvanising baths, acid, see also		
"Anodising baths" and the pertaining metal salt solutions	RT	-
Galvanising baths, alkaline (cyanides)	RT	+
Gas sterilisation, see "Ethyl oxide (gas sterilisation)"		
Gearbox oil (EP, Hypoid, ATF, shift gearboxes), see also „Lubricating oils“	110	+
Gelatines	RT	+
Glue	RT	+
Glycerine	RT	+
Glycerine	170	-
Glycol, tech. pure	RT	+
Glycolic acid, 30%	RT	-
Glycols, alkyl glycol ether, see also „Brake fluids“, „Cooling fluids“	RT	+
Glycantin® (BASF), see "Cooling fluids"		
Groundnut oil, common	RT	+
Hair colorants	RT	0
Helium	RT	+
Heptane	RT	+
Hexachlorobenzene	80	+
Hexachloroethane	RT	+
Hexafluoroisopropanol	RT	-
Hexane	RT	+
Horseradish, common	RT	+

Medium, concentration	T (°C)	Stage
Humic acids	RT	0
Hydraulana (BASF), see "Brake fluids"		
Hydraulic fluid HLP (DIN 51 525)	100	+
Hydraulic fluid MIL-H 5606	100	+
Hydraulic fluid VDMA 24318	100	+
Hydraulic fluids	100	+
Hydrobromic acid, 10%	RT	-
Hydrochinon, 5%	RT	-
Hydrochloric acid > 20%	RT	-
Hydrochloric acid, 1% aqueous	RT	-
Hydrochloric acid, 10% aqueous	RT	-
Hydrochloric acid, 2%	RT	-
Hydrofluoric acid	RT	-
Hydrofluoric acid, 40%	RT	-
Hydrofluoric acid, 40% aqueous	RT	-
Hydrofluosilicic acid, 30%	RT	-
Hydrogen	RT	+
Hydrogen chloride, <2% aqueous	RT	-
Hydrogen chloride, >2% aqueous	RT	-
Hydrogen chloride, see also "Hydrochloric acid"	RT	-
Hydrogen iodide	RT	-
Hydrogen peroxide, 0.5%	RT	+
Hydrogen peroxide, 10% aqueous	RT	-
Hydrogen peroxide, 2% aqueous	RT	-
Hydrogen peroxide, 30%	RT	-
Hydrogen Phosphide (Phosphine)	RT	+
Hydrogen sulphide (dry)	RT	+
Hydrogen sulphide, <10%	RT	0
Hydrogen sulphide, <5% gaseous	RT	+
Impregnating oils	RT	+
Ink	RT	+
Ink, common	RT	+
Iodine (alkaline solution)	RT	-
Iodine tincture, alcohol	RT	-
i-propyl ether	RT	+
Iron III chloride sat	RT	-
Iron III chloride, acid 10%	RT	-
Iron III chloride, neutral 10%	RT	+
Iron III rhodanide, 10%	RT	0
Iron salts, 20% aqueous acid	RT	-
Iron salts, 20% aqueous neutral	RT	+
Isocyanates, aromatic	RT	+
Isooctane	80	+
Isooctane, tech. pure	RT	+
Isopropanol	RT	+
Isopropanol	60	+
Isopropyl alcohol, tech. pure	RT	+
Ketons (aliphatic)	RT	+
Lacquers, see "Solvents", "Annealing lacquers"		
Lactic acid	90	-
Lactic acid, 10%	10	0
Lactic acid, 5% aqueous	RT	0
Lactic acid, 50% aqueous	RT	-
Lactic acid, 90% aqueous	RT	-
Lanolin, common	RT	+
Laughing gas, see "Dinitrogen monoxide"		
Lavender oil, common	RT	+
Lead acetate, 10%	RT	+
Lead salts, tech. pure	RT	+
Lemon juice, common	RT	0
Lime, see "Cement"		
Linseed oil	RT	+
Liqueurs, common	RT	+
Liquid gas (DIN 51 622, see "Propane, propene"		
Liquid resin	RT	+
Lithium bromide, lithium chloride, 10%	RT	0
Lithium chloride (alcohol solution), 20%	RT	-
Lithium hydroxide, 10%	20	+
Lithium hydroxide, 10%	80	-
Lubricating greases (based on ester oils, diester oils, phosphate esters, synthetic oils)	110	0
Lubricating greases (based on polyphenyl ester)	110	+
Lubricating greases (based on silicone oils): see „Silicone oils“		
Lubricating greases: roller bearing greases, DIN 51 825 (based on metallic soaps)	110	+
Lubricating oils, greases and soaps, common	RT	+
Lubricating oils: engine oils HD, hydraulic fluids, transformer oils	130	+
Lubricating oils: gearbox oils (mild blended, e.g. ATF)	130	+
Lubricating oils: hypoid oil (high blended, with EP additives, MIL-L 2105 B)	110	+
Lubricating oils: hypoid oil (high blended, with EP additives, MIL-L 2105 B)	120	-
Lubricating oils: oils without HD or EP additives (ASTM standard oil)	100	0
Lutensit®, Lutensol® (BASF)	RT	+
Magnesium chloride, nitrate, sulphate, 10%	RT	+
Magnesium hydroxide, 10% aqueous	RT	+
Maleic acid, 25%	RT	0
Malic acid sat	RT	+
Malt	RT	+
Manganese chloride, manganese sulphate, 10%	RT	+
MAPP gas (C3, C4 aliphatic hydrocarbons)	RT	+
Margarine, common	RT	+
Mayonnaise, common	RT	+
Mercury	RT	+
Mercury II chloride sat	RT	-
Methane	RT	+
Methanol	RT	+
Methyl acetate	RT	+
Methyl alcohol	RT	+
Methyl amine	RT	+
Methyl aniline	RT	+
Methyl bromide	RT	+
Methyl chloride	RT	+
Methyl chloroform: see "Trichloroethane"		
Methyl ethyl keton	RT	+
Methyl formiate	RT	+
Methyl glycol	RT	+
Methylene chloride	RT	0
Microbial corrosion	RT	+
Milk	RT	+
Mineral oil, natural gas	RT	+
Mineral oils, common	RT	+

Medium, concentration	T (°C)	Stage
Mineral oils, see "Lubricating oils"		
Mineral salt, mineral salt solutions	RT	+
Molasses	RT	+
Mortar, see "Cement"		
Moth balls, common	RT	+
Mould fungi (DIN 53 739; ISO 846 A, B; MIL-T 18404)	RT	+
Nail varnish remover, common	RT	+
Nail varnish, common	RT	+
Naphtha	RT	+
Naphthalene	RT	+
Naphthalene sulphonic acids	RT	-
Naphthene acids	RT	+
Naphthenes	RT	-
n-butyl ether	RT	+
n-butyl glycol (glycol monobutyl ether)	RT	+
Nekani®, Nekal® brands (BASF) <10%	50	+
Neon	RT	+
Nickel baths, see "Galvanising baths"		
Nickel chloride, sulphate, 10%	RT	+
Nickel nitrate, 10%	RT	0
Nitric acid > 50%	RT	-
Nitric acid, 2%	RT	-
Nitric acid, aqueous	RT	-
Nitrilo acetic acid (sodium salt)	RT	+
Nitro lacquers (alcohol-bearing, hazard class A)	RT	0
Nitro lacquers (alcohol-free, hazard class A)	RT	+
Nitrobenzene, nitrotoluene	RT	0
Nitrobenzene, nitrotoluene	>100	-
Nitrogen (200 bar)	RT	+
Nitrogen oxides (nitrogen tetroxide)	RT	0
Nitrogen oxides (under pressure)	RT	-
Nitromethane, nitropropane	RT	0
Nitrous gases	RT	0
n-methyl pyrrolidone	RT	+
Noble gases (argon, helium, neon)	RT	+
Octanes, octenes	RT	+
Oil, No. 3 (ASTM), common	RT	+
Oils (vegetable, essential, mineral), see also „Lubricating oils“	RT	+
Oleic acid	RT	+
Oleum	RT	-
Olive oil, common	RT	+
Oxalic acid, 10%	RT	0
Oxalic acid, 10%	80	-
Oxygen	RT	+
Oxygen (under pressure)	RT	-
Ozone	RT	-
Ozone (1 ppm in water)	RT	+
Ozone (20 ppm in air)	RT	0
Ozone, < 1 ppm gaseous	RT	+
Palamol®, Palatinol® brands (BASF)	RT	+
Palmitic acid	80	+
Paraffins, paraffin oils	RT	+
Patalal® brands (BASF), see "Polyester resins" p-dichlorobenzene	RT	+
Peracetic acid	RT	-
Perchloroethylene, see "Tetrachloroethylene"		
Perfume (alcohol solution)	RT	+
Perhydrol, see "Hydrogen peroxide"		
Petrol ether, petroleum	80	+
Petrol, see fuels		
Phenol	>43	-
Phenol (alcohol solution), 70%	RT	0
Phenol ether (guajacol, cresol)	RT	-
Phenol, 88%	RT	-
Phenyl ethyl alcohol	RT	0
Phenyl ethyl alcohol	>160	-
Phosphate ester, see "Hydraulic fluids"		
Phosphates (inorganic, neutral or alkaline), 10%	RT	+
Phosphoric acid	RT	-
Phosphoric acid, 10%	RT	-
Phosphoric acid, 50% aqueous	RT	-
Photographic developer	RT	+
Photographic fixing baths	RT	+
Phthalic acid sat	RT	0
Pine needle oil, tech. pure	RT	+
Pineapple juice, common	RT	+
Plasticiser (phthalate, phosphate), common	RT	+
Plasticiser, see "Palamol®, Palatinol®"		
Plastomoll® (adipinic acid ester, BASF), DDA, NI, DIDA	RT	+
Polyester resin with styrene, common	RT	+
Polyester resins (e.g. Palatal® brands from BASF)	RT	+
Polyglycols, polyols	RT	+
Potash, aqueous	RT	+
Potassium bromide, 10%	RT	0
Potassium chlorate, 5% aqueous	RT	0
Potassium chlorate, 7% aqueous	RT	-
Potassium chloride, 10%	RT	+
Potassium chloride, 10%	70	+
Potassium dichromate, 5%	RT	0
Potassium hydroxide, 50%	RT	0
Potassium iodide, 10% aqueous	RT	+
Potassium nitrate, 10%	RT	+
Potassium permanganate, 1%	RT	-
Potassium rhodanide sat	RT	-
Potassium sulphate, 10% aqueous	RT	+
Propane, propene	RT	+
Propanol (n-, iso)	RT	+
Propanol (n-, iso)	>100	-
Propionic acid, 10%	RT	-
Propionic acid, 5%	RT	+
Propionic acid, 50%	RT	-
Protein solutions	RT	+
Pyridine	RT	+
Pyridine	80	0
Pyrollidone	RT	+
Pyrotterebic catechin, 6%	RT	-
Pyruvic acid, 10%	RT	0
Rain (acid)	RT	+
Refrigeration oils	RT	+

Medium, concentration	T (°C)	Stage
Resorcinol (alcohol solution), 50%	RT	-
Resorcinol, tech. pure	RT	-
Resorcinol/methanol/benzene/water (40:35:10:5) - adhesive solvent	RT	0
Rose oil, tech. pure	RT	+
Rum, common	RT	+
Salicylic acid sat	RT	+
Salt, aqueous	RT	+
Scale removers (based on formic, acetic, citric acid), 10%	RT	+
Scale removers (based on formic, acetic, citric acid), 10%	50	0
Scale removers (based on sodium hydrosulphate), 10%	RT	+
Seawater, see "Water"		
Shoe polish, common	RT	+
Silane (tetramethyl)	RT	+
Silicone oils	80	+
Silicone oils	>100	0
Silver salts, aqueous	RT	+
Soap solution, <10%	80	+
Soda lye, see "Sodium hydroxide"		
Soda solution, 10%	RT	+
Soda, aqueous	RT	+
Sodium bicarbonate, 10%	RT	+
Sodium bisulphate, 10%	RT	+
Sodium bisulphite, 10%	RT	+
Sodium bromide, 10%	RT	0
Sodium carbonate, 10% aqueous	RT	+
Sodium chlorate, 10%	RT	+
Sodium chloride, aqueous	RT	+
Sodium chlorite, 10%	RT	-
Sodium chlorite, 5% aqueous	RT	-
Sodium dodecyl benzene sulphonate	RT	+
Sodium hydroxide, 10%	RT	+
Sodium hydroxide, 10%	80	-
Sodium hydroxide, 50%	RT	0
Sodium hypochlorite, 10%	RT	0
Sodium hypochlorite, 5% aqueous	RT	-
Sodium hypophosphite, 10%	RT	+
Sodium lauryl sulphate (paste), 30%	RT	+
Sodium lignosulphate	RT	+
Sodium nitrate, 10% aqueous	RT	+
Sodium nitrotriacetate, 10%	RT	+
Sodium nitrite, 5% aqueous	RT	-
Sodium oleate	RT	+
Sodium pentachlorophenolate	RT	+
Sodium perborate, 5% aqueous	RT	0
Sodium phosphate, 10% aqueous	RT	+
Sodium pyrosulphite, 10%	RT	+
Sodium salts (neutral, e.g. chloride, nitrate, sulphate), 10%		+
Sodium sulphate, 10% aqueous	RT	+
Sodium sulphide, 10% aqueous	RT	+
Sodium sulphite, 10% aqueous	RT	+
Sodium thiosulphate, 10% aqueous	RT	+
Soil (acid: 3 pH), see also "Humic acid"	RT	+
Soil (neutral, alkaline: 10 pH), see also „Bacteria“, „Mould fungi“	RT	+
Soldering flux	RT	-
Solvent T (tetrahydrofurane)	RT	+
Solvents (for lacquers, paint etc.)	RT	+
Soya oil, common	RT	+
Starch, aqueous	RT	+
Stearic acid, stearates, alkyl stearates	RT	+
Sterilisation, sterilisation agents, see „Disinfectants“		
Styrene	80	+
Suet	RT	+
Sugar, aqueous	RT	+
Sulpholane (tetramethyl sulphoxide)	RT	+
Sulpholane (tetramethyl sulphoxide)	>80	-
Sulphonates (e.g. alkyl aryl sulphonates), <10%	RT	+
Sulphur	RT	+
Sulphur dioxide (dry)	RT	+
Sulphur dioxide (moist)	RT	0
Sulphur hexafluoride (20 bar)	RT	+
Sulphuric acid sat	RT	0
Sulphuric acid, >80%	RT	-
Sulphuric acid, 10% aqueous	RT	-
Sulphuric acid, 2%	RT	-
Sulphuric acid, 25% aqueous	RT	-
Sulphuric acid, tech. pure	RT	-
Sweat (DIN 54 020)	RT	+
Tallow oils	RT	+
Tar, see "Bitumen"		
Tartaric acid, 10%	RT	+
Tartaric acid, 50%	RT	0
Tea, common	RT	+
Termites	RT	+
Terpentine oil	RT	+
Test petrol, see also "Fuels"	RT	+
Tetrachloroethylene	RT	0
Tetrachloroethylene	80	-
Tetrafluoromethane	RT	+
Tetrafluoropropanol	RT	-
Tetrahydrofurane	RT	+
Tetraline	RT	+
Thionyl chloride, tech. pure	RT	-
Tin (II) salts of mineral acids, 10%	RT	0
Toluene	RT	+
Toluene	100	+
Toothpaste, common	RT	+
Transformer oil, common	RT	+
Transformer, converter, switch oil (DIN 51 507)	50	+
Trichloroacetic acid	RT	-
Trichloroacetic acid ethy ester	RT	0
Trichloroethanol, trifluoroethanol	RT	-
Trichloroethylene	RT	0
Trichloroethylene	>40	-
Trichlorotrifluoroethane	RT	+
Tricresyl phosphate	RT	+
Triethanolamine	RT	+
Trilon® A, B (BASF), 10%	RT	+
Trilon® A, B (BASF), 10%	60	+

Medium, concentration	T (°C)	Stage
Trimethyl amine	RT	+
Two-stroke oil	RT	+
Typewriter oil, common	RT	+
Uranium fluoride	RT	-
Urban gas (lamp gas, natural gas)	RT	+
Urea, 20% aqueous	RT	+
Ureic acid, 20%	RT	+
Urine	RT	+
Vacuum	RT	+
Vaseline	RT	+
Vinegar, common	RT	0
Vinyl chloride, vinyl bromide		
Vinyl fluoride	80	+
Vulcanisation	<180	+
Washing lyes, <10%	RT	+
Washing lyes, <10%	80	0
Water (river, sea, lake, drinking, condensation)	RT	+
Water (river, sea, lake, drinking, condensation)	80	0
Water (river, sea, lake, drinking, condensation), chlorinated (<0.5 mg/l)	80	0
Water glass	RT	+
Water vapour	100	0
Water vapour (50 µm films) 116 - molecular decay beginning after 5 cycles	116	-
Water vapour (sterilisation 50 cycles)	134	0
Wax	80	+
WC cleaner (<3 pH)	RT	0
Wine	RT	+
Xylene	RT	+
Xylene	100	+
Yeast	RT	+
Zinc (galvanised metal surfaces), exposed to weather	RT	+
Zinc chloride	RT	+
Zinc chloride, 10%	RT	0
Zinc chloride, 37%	RT	-
Zinc rhodanide, bromide, iodide, nitrate, 30%	RT	-

+: resistant, only small changes in weight, dimensions and properties

0: partly resistant, perceptible, irreversible changes after long periods

-: non-resistant, immediate attack, dissolution or stress cracking, irreversible damage

Chemical resistance of Series RAU-PA 400 (polyamide 11) and RAU-PA 500 (polyamide 12)

Medium, concentration	Temperature (°C)			
	20	40	60	90
95 octane petrol	+	+	+	
98 octane fuels	+			
98 octane petrol	+	+	+	
Acetaldehyde	+	0	-	
Acetaldehyde, 40% aqueous	+			
Acetamide, 50% aqueous	+			
Acetic acid	0	-	-	-
Acetic acid ester, tech. pure	+			
Acetic acid, 10% aqueous	0			
Acetic acid, 40% aqueous	-			
Acetic acid, tech. pure	-			
Acetone, pure	+	+	0	-
Acetylene	+	+	+	
Agricultural pesticides	+	+		
Alcohols, tech. pure	+			
Allyl alcohol, tech. pure	0			
Alum, aqueous	+			
Aluminium salts, aqueous	+			
Aluminium sulphoxide, aqueous	+	+	+	+
Ammonia (aqueous solution), concentrated	+	+	+	+
Ammonia, 10% aqueous	+			
Ammonia, gaseous	+			
Ammonia, liquid or gaseous	+	+		
Ammonium chloride, 10% aqueous	+			
Ammonium salts, tech. pure	+			
Ammonium sulphate, aqueous	+	+	0	
Amyl acetate	+	+	+	0
Amyl alcohol, tech. pure	+			
Anethol	+			
Aniline, pure	0	-	-	-
Anisol, tech. pure	+			
Anone, tech. pure	+			
Antifreeze, common	+			
Apple wine	+			
Aqua regia, tech. pure	-			
Aspirin, tech. pure	+			
Barium chloride, aqueous	+	+	+	+
Barium salts, aqueous	+			
Battery acid, 30% aqueous	0			
Beer, common	+			
Benzaldehyde	+	0	-	
Benzaldehyde, 0.3% aqueous	+			
Benzene, tech. pure	+			
Benzoic acid, aqueous	0			
Benzol	+	+	0	
Benzyl alcohol	0	-	-	-
Beverages, alcoholic	0			
Bitumen, common	+			
Bleach lye NaOCl + NaCl, 13% aqueous	-			
Bone oil, tech. pure	+			
Borax, aqueous	+			
Boric acid, 10% aqueous	+			
Brake fluid AT	+			
Brake fluid, common	+			
Brandy, common	+			
Bromine	+	+		
Butane	+	+	+	
Butanol, tech. pure	+			
Butter, common	+			
Butyl acetate	+	+	+	0
Butyl alcohol	+	+	+	
Butyl glycol, tech. pure	+			
Butyric acid, tech. pure	+			
Calcium arsenate, aqueous	+	+	+	
Calcium chloride, 10% aqueous	+			
Calcium chloride, 20% alcohol solution	-			
Calcium chloride, aqueous	+	+	+	+
Camphor, tech. pure	+			
Carbon disulphide	+	0	-	
Carbon tetrachloride	-			
Carbonated water	+	+	+	+
Caustic soda, 40% aqueous	+			
Chloride of lime, aqueous	-			
Chlorinated water, <5% aqueous	0			
Chlorine	-	-	-	-
Chlorine gas, <5% gaseous	0			
Chlorine gas, moist	-			
Chloroacetic acid, 10% tech. Pure	-			
Chlorobenzol, tech. pure	-			
Chlorobromomethane, tech. pure	0			
Chloroform, tech. Pure	-			
Chloromethyl	0	-		
Chrome baths, common	-			
Chromic acid, 1% aqueous	0			
Chromic acid, 10%	-	-	-	-
Chromium salts, aqueous	+			
Chromosulphuric acid, aqueous	-			
Citric acid	0	0	0	-
Coca cola, common	+			
Cocoa, common	+			
Coconut oil, common	+			
Coffee, common	+			
Common salt	+			
Common salt, aqueous	+			
Copper salts, 10% aqueous	+			
Copper sulphate	+			
Copper sulphate, aqueous	+	+	+	+
Cresols, tech. pure	-			
Crude oil	+	+	+	
Crude oil, common	+			
Cyclohexane	+	+	0	
Cyclohexanol, tech. Pure	+			
Cyclohexanon	+	0	-	
Decaline	+	+	+	0
Detergent, common	+			

Medium, concentration	Temperature (°C)			
	20	40	60	90
Diammonium phosphate, aqueous		+	+	0
Dibutyl phthalate, tech. Pure	+			
Diesel	+	+	+	
Diesel fuel	+			
Diesel oil, common	+			
Diethanolamine, 20%	+	+	+	0
Diethyl ether, tech. Pure	+			
Dimethyl formamide, tech. Pure	0			
Diocetyl phosphate	+	+	+	0
Diocetyl phthalate	+	+	+	
Dioxane, tech. Pure	+			
Dixane lye, tech. Pure	+			
Edible fats and oils, common	+			
Engine oils, common	+			
Ethanol	+			
Ether, tech. pure	+			
Ethyl acetate	+	+	+	
Ethyl alcohol, pure	+	+	+	
Ethyl alcohol, tech. pure	+			
Ethyl oxide	+	+	0	-
Ethylene chloride, tech. pure	0			
Ethylene oxide	+			
Fats	+	+	+	+
Fatty acid ester	+	+	+	+
Fixing salt, aqueous	+			
Floor polishing wax, common	+			
Flour, common	+			
Fluorine	-	-	-	-
Fluorine gas	-			
Fluorocarbons, tech. pure	+			
FORANE 12	+	+	+	
FORANE 22	+	+	+	
Formal, technical	+	0	-	
Formaldehyde, 40% aqueous	0			
Formaline, aqueous	0			
Formamide, tech. pure	0			
Formic acid	-	-	-	-
Formic acid, 10% aqueous	-			
Formic acid, 40% aqueous	-			
Formic acid, 85% aqueous	-			
Formic acid, concentrated	-			
Freon, common	+			
Frigen, liquid F12	+			
Frigen, liquid F22	+			
Fruit juice	+	+		
Fruit preserves, common	+			
Fuel oils, common	+			
Fuels, common	+			
Furfural	+	+	0	-
Furniture polish, common	+			
Glucose	+	+	+	+
Glycerine, pure	+	+	+	-
Glycerine, tech. pure	+			
Glycol	+	+	+	-
Glycol chlorohydrine	-	-		
Groundnut oil, common	+			
Heptane, tech. pure	+			
Hexane, tech. pure	+			
Horse radish, common	+			
Hydraulic fluid, common	+			
Hydrochloric acid, 1%	0	0	-	-
Hydrochloric acid, 10%	0	0	-	-
Hydrochloric acid, 36% aqueous	-			
Hydrofluoric acid, 40% aqueous	-			
Hydrogen	+	+	+	+
Hydrogen chloride, <2% aqueous	0			
Hydrogen chloride, >2% aqueous	-			
Hydrogen peroxide, 10% aqueous	0			
Hydrogen peroxide, 2% aqueous	0			
Hydrogen peroxide, 20%	0	0		
Hydrogen peroxide, 30% aqueous	-			
Hydrogen sulphide	+			
Hydrogen sulphide, <5% gaseous	+			
Ink, common	+			
Iodine tincture	-			
Iodine tincture, alcoholic	-			
Iron III chloride solution, 10%	+			
Iron salts, 20% aqueous acid	-			
Iron salts, 20% aqueous neutral	+			
Isocetane, tech. pure	+			
Isopropanol	+			
Isopropyl alcohol, tech. pure	+			
Kerosene	+	+	+	
Lactic acid	+	+	+	0
Lactic acid, 5% aqueous	+			
Lactic acid, 50% aqueous	0			
Lactic acid, 90% aqueous	0			
Lamp gas	+	+		
Lanolin, common	+			
Lavender oil, common	+			
Lead salts, tech. pure	+			
Lemon juice, common	0			
Lindane, DDT	+			
Linseed oil, common	+			
Liqueurs, common	+			
Lubricating oils, greases, soaps	+			
Magnesium chloride, 50%	+	+	+	+
Magnesium hydroxide, 10% aqueous	+			
Magnesium salts, 10% aqueous	+			
Margarine	+	+	+	+
Mayonnaise, common	+			
Mercury	+	+	+	+
Mercury salts, aqueous neutral	+			
Mercury, tech. pure	+			
Methane	+	+	+	

Medium, concentration	Temperature (°C)			
	20	40	60	90
Methanol, tech. pure	0			
Methyl acetate	+	+	+	
Methyl alcohol, pure	+	+	+	
Methyl bromide	+	-		
Methyl chloride, tech. pure	-			
Methyl ethyl keton	+	+	0	-
Methyl ethyl keton, tech. pure	+			
Methyl isobutyl keton	+	+	0	-
Methyl sulphate	+	0		
Milk	+	+	+	+
Mineral oils, common	+			
Moth balls, common	+			
Mustard	+			
Nail varnish remover, common	+			
Nail varnish, common	+			
Naphthaline	+	+	+	0
Nickel salts, aqueous	+			
Nitric acid, all concentrations	-	-	-	-
Nitric acid, aqueous	-			
Nitrobenzol, tech. pure	0			
Nitromethane, tech. pure	+			
Octane, tech. pure	+			
Oil, No. 3 (ASTM), common	+			
Oils	+	+	+	+
Oleic acid	+	+	+	0
Oleum, tech. pure	-			
Olive oil, common	+			
Oxalic acid	+	+	0	-
Oxalic acid, 10% aqueous	+			
Oxygen	+	+	0	-
Oxygen under pressure	-			
Ozone	0	-	-	-
Ozone, <1 ppm gaseous	+			
Ozone, gaseous	-			
Paraffin oil, tech. pure	+			
Perchloroethylene	0	-		
Perfume, common	+			
Petrol ether, tech. pure	+			
Petroleum, tech. pure	+			
Phenol	-			
Phenol, aqueous	-			
Phenols	-	-	-	-
Phenyl ethyl alcohol, tech. pure	-			
Phosphoric acid, 10% aqueous	0			
Phosphoric acid, 50%	0	0	-	-
Phosphoric acid, conc.	-			
Picric acid	0	-	-	-
Pine needle oil, tech. pure	+			
Pineapple juice, common	+			
Plasticisers (phthalate, phosphate)	+			
Polyester resin with styrene	+			
Potash lye, 10% aqueous	+			
Potash lye, 50% aqueous	+			
Potash, aqueous	+			
Potassium bromide, 10% aqueous	+			
Potassium carbonate, 50%	+	0	-	-
Potassium chlorate, 5% aqueous	+			
Potassium chlorate, 7% aqueous	0			
Potassium iodide, 10% aqueous	+			
Potassium nitrate, 10% aqueous	+			
Potassium permanganate	+			
Potassium permanganate, 1% aqueous	-			
Potassium permanganate, 5%	-	-		
Potassium sulphate, 10% aqueous	+			
Potassium sulphate, aqueous	+	+	+	+
Propane	+	+	+	
Propanol, tech. pure	0			
Pyridine, pure	0	-	-	-
Pyrotterebic catechin, 6% aqueous	0			
Resorcinol, alcohol solution	-			
Resorcinol, tech. pure	-			
Rose oil, tech. pure	+			
Rum, common	+			
Salicylic acid, tech. pure	+			
Salt, aqueous	+			
Saltpetre, aqueous	+	0	-	-
Seawater	+	+	+	+
Shoe polish, common	+			
Silicone oils, tech. pure	+			
Silver salts, aqueous	+			
Soap lye	+			
Soap solution	+			
Soap solution, 10% aqueous	+			
Soda bleach lye	0	-	-	-
Soda lye, 10%	+			
Soda lye, 40% aqueous	+			
Soda lye, 50%	+			
Soda, 10%	+			
Soda, 50%	+			
Soda, aqueous	+			
Sodium bicarbonate, aqueous	+			
Sodium bisulphite, 10% aqueous	+			
Sodium bromide, 10% aqueous	+			
Sodium carbonate, 10% aqueous	+			
Sodium carbonate, 50%	+	0	-	-
Sodium carbonate, aqueous	+	+	0	-
Sodium chloride, aqueous	+			
Sodium chloride, saturated	+	+	+	+
Sodium chlorite, 5% aqueous	-			
Sodium hydroxide, 40% aqueous	+			
Sodium hypochlorite, 5% aqueous	0			
Sodium nitrate, 10% aqueous	+			
Sodium nitrite, 5% aqueous	0			
Sodium perborate, 5% aqueous	+			
Sodium phosphate, 10% aqueous	+			
Sodium sulphate, 10% aqueous	+			

Medium, concentration	Temperature (°C)			
	20	40	60	90
Sodium sulphate, aqueous	+	0	0	
Sodium sulphate, concentrated	+			
Sodium sulphide, 10% aqueous	+			
Sodium sulphite, 10% aqueous	+			
Sodium thiosulphate, 10% aqueous	+			
Solvent naphtha	+	+	+	
Solvent T (tetrahydrofurane)	+			
Soya oil, common	+			
Starch	+			
Starch, aqueous	+			
Stearic acid	+	+	+	0
Stearine	+	+	+	
Styrene	+	+		
Suet, common	+			
Sugar, aqueous	+			
Sulphur	+	+		
Sulphur dioxide	0	-	-	-
Sulphur dioxide, <5%	0			
Sulphuric acid, 1%	+	0	0	-
Sulphuric acid, 10%	0	0	-	-
Sulphuric acid, 2% aqueous	0			
Sulphuric acid, 25% aqueous	-			
Sulphuric acid, concentrated	-	-		
Sulphuric ether	+			
Tar, tech. pure	+			
Tartaric acid, 10% aqueous	+			
Tartaric acid, saturated solution	+	+	+	0
Tea, common	+			
Terpentine oil	+	+	+	
Test petrol, tech. pure	+			
Tetraethyl lead	+			
Tetrahydrofurane, tech. pure	+			
Tetraline, tech. pure	+			
Thionyl chloride, tech. pure	-			
Toluene	+	+	0	0
Toothpaste, common	+			
Transformer oil, common	+			
Tributyl phosphate	+	+	+	0
Trichloroethane	0	-		
Trichloroethylene	0	-		
Trikresyl phosphate	+	+	+	0
Trisodium phosphate, aqueous	+	+	+	+
Two-stroke oil	+			
Typewriter oil, common	+			
Urea	+	+	0	0
Urea, 20% aqueous	+			
Ureic acid	+	+	+	0
Urine	+			
Vaseline, common	+			
Vinegar, common	+			
Water	+	+	+	+
Water glass	+			
Water glass, aqueous	+			
Wax, common	+			
Whey, common	+			
Xylene	+	+	0	0
Zinc chloride, 10% aqueous	+			
Zinc chloride, aqueous	+			
Zinc chloride, saturated	+	+	0	-

+: resistant, only small changes in weight, dimensions and properties

0: partly resistant, perceptible, irreversible changes after long periods

-: non-resistant, immediate attack, dissolution or stress cracking, irreversible damage

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