KUNDERT Polyurethane systems

Resistance to chemicals and solvents

TECHNICAL DOCUMENTATION

Polyurethanes have excellent oil and fuel resistance; this is particularly true of polyester polyurethanes. Chlorinated hydrocarbons, strong polar solvents and many short-chain aromatic solvents usually have a strong negative influence on the quality. Acids, hot water or other hydrolyzing media usually destroy polyester polyurethanes, while polyether polyurethanes often still exhibit sufficient resistance.

The table below is intended to give a rough overview of the chemical and solvent resistance of the two polyurethane systems. It must be pointed out that the table can only serve as a guide. The best way to determine the optimum properties of a material for a given application is to test it in the actual application. If this is not possible, then test methods must be developed which simulate the actual conditions of use as accurately as possible.

Chemicals	Polyester-PUR	Polyether-PUR
Acetaldehyde	3	3
Acetone	3	3
Acetyl bromide	3	2-3
Acetyl chloride	3	2-3
Acetylene	2-3	2
Adipic acid	1-2	1
Aethyl acetate	3	3
Aethyl alcohol	2	2–3
Aethylene glycol	2	2
Aluminum chloride	2-3	1-2
Aluminum sulfate	2-3	1-2
Aluminum sulfide	2-3	1-2
Formic acid	3	3
Ammonia solution 10%	3	1

Chemicals	Polyester-PUR	Polyether-PUR
Amylacetate	3	3
Amyl alcohol	3	2-3
Amyl chloride	3	2-3
Aminobenzene	3	3
ASTM oil No.1	1	1-2
ASTM oil No.3	1	1-2
Atlantic oil	1-2	1
Barium carbonate	1-2	1-2
Barium hydroxide	2	1
Cottonseed oil	1-2	1
Bitter almond oil	2	3
Gasoline	1	1-2
Benzene	3	3
Benzoic acid	3	2-3
Lead acetate	1-2	1-2
Boric acid	2	1
Bromine water	1-2	1-2
Bunker oil	1-2	1
Butyl acetate	3	3
Butyl alcohol	2	1
Butane	2	1
Castor oil	2	1-2
Chlorine	2-3	2-3
Chloroacetic acid	3	2-3
Chloroform	3	3
Cyclohexanone	3	3
Chromic acid	3	2-3
Cyclohexane	2	2-3
Diamide	3	3
Dibutyl phthalate	3	2-3

Chemicals	Polyester-PUR	Polyether-PUR
Dibutyl ether	1-2	1-2
Dichlorobezol	2-3	2-3
Dimethylacetamide	3	3
Dimethylformamide	3	3
Ferric chloride	1-2	1-2
Ferrous nitrate	1-2	1-2
Ferrous sulfate	1-2	1-2
Acetic acid 20%	3	2
Ethyl acetate (acetic ester)	3	3
Ethanol (ethyl alcohol)	2-3	3
Ethyl bromide	2-3	3
Ethyl chloride	2-3	3
Ethylene glycol	2-3	1-2
Acetic anhydride	3	3
Esso No.90 Lub. Oil	1-2	1
Hydrofluoric acid	2-3	2
Formaldehyde (methanal)	1-2	2
Freon	1-3	1-3
Tannic acid	1-2	1
Glycerin	1	1
Glycols	2	2
Fuel oil	1	2
Heptane	1-2	1
n-Hexane	1-2	1
Hydraulic oils	1-2	2
Isooctane (2,2,4-trimethylpentane)	1-2	1-2
Isopropyl acetate	3	3
Isopropyl alcohol (isopropanol)	2	1-2
Isopropyl ether	2-3	2
Iodine solution	1-2	1-2

Chemicals	Polyester-PUR	Polyether-PUR
JP-4 oil	3	2-3
JP-5 and 6 oil	3	3
Potassium hydroxide solutions	3	1
Potassium cyanide	1-2	1
Calcium carbonate	1-2	1-2
Calcium chloride	1-2	1
Calcium hydroxide	1-2	1
Calcium nitrate	1-2	1-2
Calcium sulfate	1-2	1-2
Kerosene	1	2
Silica	1-2	1
Carbon dioxide	1	1
Carbon disulfide	2-3	2-3
Carbon monoxide	1	1
Carbon tetrachloride	3	2-3
Copper chloride	1-2	2
Copper nitrate	1-2	1-2
Copper sulfate	1-2	1-2
Paint solvent	3	3
Linseed oil	1	2
Magnesium hydroxide	1	1
Sea water	1-2	1
Methyl ethyl ketone	3	3
Methyl alcohol	2	3
Methylene chloride	3	3
Lactic acid (2-hydroxypropionic acid)	1-2	1-2
MIL-D-5606 oil	2-3	2
MIL-L-7808 oil	2	1
Mineral oil	1	1-2
Mobile Arctic Oil	1-2	1

Chemicals	Polyester-PUR	Polyether-PUR
Naphtal	2	2
Sodium hydroxide 50%	3	1
Sodium acetate	1-2	1
Sodium bicarbonate	1-2	1-2
Sodium bisulfate	1-2	1-2
Sodium chlorate	1-2	1-2
Sodium chloride	1-2	1-2
Sodium hypochlorite (bleaching lye)	3	3
Sodium cyanide	1-2	1-2
Sodium fluoride	2	1-2
Sodium nitrate	1-2	1-2
Sodium hydroxide solution	1-2	1-2
Nitrobenzene	3	3
Oleic acid	1-2	1
Oxalic acid	1	1
Ozone	1	1
Palmitic acid	1-2	1
Perchloroethylene	3	3
Perchloric acid	3	3
Petrol	2	1-2
Phenol	3	3
Phenylethylene	1-2	1-2
Phosphoric acid	3	2-3
Propane	1-2	1-2
Propylene glycol	1-2	1-2
Mercury	1-2	1
Castor oil	1	1
SAE No.10 oil	1	1
Hydrochloric acid (20%)	3	2
Oxygen	1	1

Chemicals	Polyester-PUR	Polyether-PUR
Lubricating oils	2	2
Sulfur dioxide	2-3	1-2
Sulfuric acid (10-50%)	3	2-3
Soap solutions	2-3	2
Silver nitrate	1-2	1-2
Nitrogen	1	1
Skydrol oil (500)	2	3
Soda (washing soda)	1-2	1-2
Turpentine oil	2	3
Carbon tetrachloride	3	3
Animal fat and oil	2	2
Toluene (Toluene)	3	3
Transformer oil	2-3	2
Trichloroethylene	3	3
Trichloroacetic acid	3	3
Trisodium phosphate	1-2	1-2
Water 50°C	3	1
Steam (Hot)	3	4
Hydrogen	2	1
Hydrogen peroxide	1-2	1-2
Hydrogen sulfide	3	2-3
Hydrogen acid	1-2	1-2
Tartaric acid	2	1
Xylene	2-3	3
Xylene	3	2-3
Zinc chloride	1-2	1-2
Zinc sulfate	1-2	1-2
Citric acid	2	1

Evaluation

1 = Little or no effect

2 = Low to moderate effect (use still possible)

3 = Strong effect up to complete destruction (use mostly no longer possible)