



Chemical Resistance Overview

When evaluating materials for a new product or component, there are four important considerations to keep in mind:

- **Successful operation** – The first key consideration should be about the physical properties required for the product or component to fulfill its operational purpose. Sometimes, chemicals, oils and other substances play key roles in the operation of the product being designed.

- **Maintenance and service life** – Designers must consider the expected service life of the product or component, along with any maintenance requirements. In this regard it is important to understand the environment in which the product or component will operate, including any chemicals it may contact.

- **Scalability of manufacturing process** – All products should be designed with a manufacturing method in mind. Making prototypes requires different capabilities from making full production volumes.

- **Overall cost of use** – Last, but not least, designers must consider the overall cost of use of a material. This includes material cost, tooling costs, the cost structure of the manufacturing process, and the expected service life of the material.

MPC's Durethane® materials, as well as other thermoset polyurethanes, are well known for their superior physical properties and resistance to some chemicals.

This chemical resistance makes polyurethane a great choice for corrosive environments, especially those in which other materials may not suffice. The chemical composition of the polyurethane will determine the material's ability to maintain its integrity in the presence of chemicals.

The table provided includes general industry information regarding the resistance of thermoset polyurethanes to a wide range of chemicals. It must be emphasized that the information provided represents general guidelines, and in no manner represents how a specific material would perform in a specific application. Chemical resistance depends on several variables, including:

- Specific polyurethane chemistry
- Operational temperature ranges
- Aeration
- Length of time exposed

In order to obtain details for a specific material and application, it is recommended that materials be thoroughly tested in the expected operational environment, and in the presence of applicable chemicals.



Chemical	Rating	Chemical	Rating	Chemical	Rating	Chemical	Rating
Acetic acid, 20%	B	Chlorobenzene	X	Hydrochloric acid, 37%	X	Phenol	C
Acetic anhydride	T	Chloroform	C	Hydrocyanic acid	T	Phosphoric acid, 20%	T
Acetone	C	Chlorosulfonic acid	X	Hydrogen	A	Picric acid	T
Aluminum chloride solutions	T	Chromic acid, 10%-50%	X	Hydrogen peroxide, 88.5%	T	Potassium dichromate solutions	T
Aluminum sulfate solutions	T	Citric acid solutions	T	Hydrogen peroxide, 90%	T	Potassium hydroxide solutions	A
Ammonia, anhydrous	T	Copper chloride solutions	A	Hydrogen sulfide	T	SAE #10 oil	A (158°F)
Ammonium chloride solutions	T	Copper sulfate solutions	A	Isooctane	B (158°F)	SKYDROL 500	C (122°F)
Ammonium hydroxide solutions	A	Cottonseed oil	A	Isopropyl alcohol	C	Soap solutions	A
Ammonium sulfate solutions	T	Creosote oil	T	Isopropyl ether	B	Sodium dichromate, 20%	T
Amyl acetate	C (122°F)	Cyclohexane	A	JP-4	C	Sodium hydroxide, 20%	T
Amyl alcohol	T	Dibutyl phthalate	C (158°F)	JP-5	C	Sodium hydroxide, 46.5%	A
ASTM hydrocarbon test fluid	T	Diethyl sebacate	C	JP-6	X	Sodium hypochlorite, 20%	X
ASTM oil #1	A (158°F)	Diethyl phthalate	C	Kerosene	C	Sodium peroxide solutions	T
ASTM oil #3	B (158°F)	Dowtherm A	B	Lacquer solvents	X	Soybean oil	B
ASTM reference fuel A	A	Ethyl acetate	C (122°F)	Lactic acid	T	Stannic chloride	T
ASTM reference fuel B	B (122°F)	Ethyl alcohol	C	Linseed oil	B	Stannous chloride, 15%	T
ASTM reference fuel C	C	Ethyl chloride	C	Lubricating oils	B	Stearic acid	A
Barium hydroxide solutions	A	Ethylene dichloride	C	Magnesium chloride solutions	A	Sulfur dioxide, liquid	T
Benzene	C (158°F)	Ethylene glycol	B	Magnesium hydroxide solutions	A	Sulfur trioxide	T
Benzoyl chloride	T	Ethylene oxide	T	Mercury	A	Sulfur, molten	T
Borax solutions	A	Ferric chloride solutions	T	Methyl alcohol	C	Sulfuric acid, 50%-95%	C
Boric acid solutions	A	Fluosilicic acid	T	Methyl ethyl ketone	C (122°F)	Sulfuric acid, fuming (20% oleum)	C
Bromine, anhydrous liquid	X	Formaldehyde, 37%	X	Methylene chloride	C	Sulfuric acid, up to 50%	T
Butane	A	Formaldehyde, 40%	X	Mineral oil	A	Sulfurous acid	T
Butyl acetate	C	Formic acid	X	Mixed acids	C	Tannic acid, 10%	A
Butyraldehyde	T	FREON-11	B (130°F)	Naphtha	B	Tartaric acid	A
Calcium bisulfite solutions	A	FREON-12	A (130°F)	Naphthalene	B	Toluene	C (122°F)
Calcium chloride solutions	T	FREON-22	C (130°F)	Nitric acid, 10%	C	Tributyl phosphate	C
Calcium hydroxide solutions	A	FREON-113	T (130°F)	Nitric acid, 30%	C	Trichloroethylene	C
Calcium hypochlorite, 5%	T	FREON-114	T (130°F)	Nitric acid, 60%	C	Tricresyl phosphate	B
Carbon bisulfide	T	Fuel oil	B	Nitric acid, 70%	C	Triethanolamine	T
Carbon dioxide	A	Furfural	C	Nitric acid, red fuming	C	Trisodium phosphate solutions	A
Carbon monoxide	A	Gasoline	B	Nitrobenzene	C	Tung oil	B
Carbon tetrachloride	C (122°F)	Glue	A	Oleic acid	B	Turpentine	C
Castor oil	A	Glycerin	A	Oleum, 20%	C	Water	A (122°F)
Chlorine gas, dry	X	n-Hexane	B (122°F)	Oleum, 25%	C	Xylene	C
Chlorine gas, wet	X	Hydraulic oils	B	Palmitic acid	A	Zinc chloride solutions	T
Chloroacetic acid	X	Hydrochloric acid, 20%	B	Perchloroethylene	C	---	---

Note: Concentrations of aqueous solutions, unless specified, are understood to be saturated. Temperatures, unless specified, are understood to be room temperature.

A – Little to no effect
B – Minor to moderate effect
C – Severe effect to complete destruction
T – Test before using. No data, but most likely to be satisfactory
X – No data, but most likely to be unsatisfactory