POLYPROPYLENE Chemical Resistance Guide

FIRST EDITION

PP CHEMICAL RESISTANCE GUIDE

Thermoplastics:
Polypropylene (PP)

IPEX

Chemical Resistance Guide

Polypropylene (PP)

1st Edition

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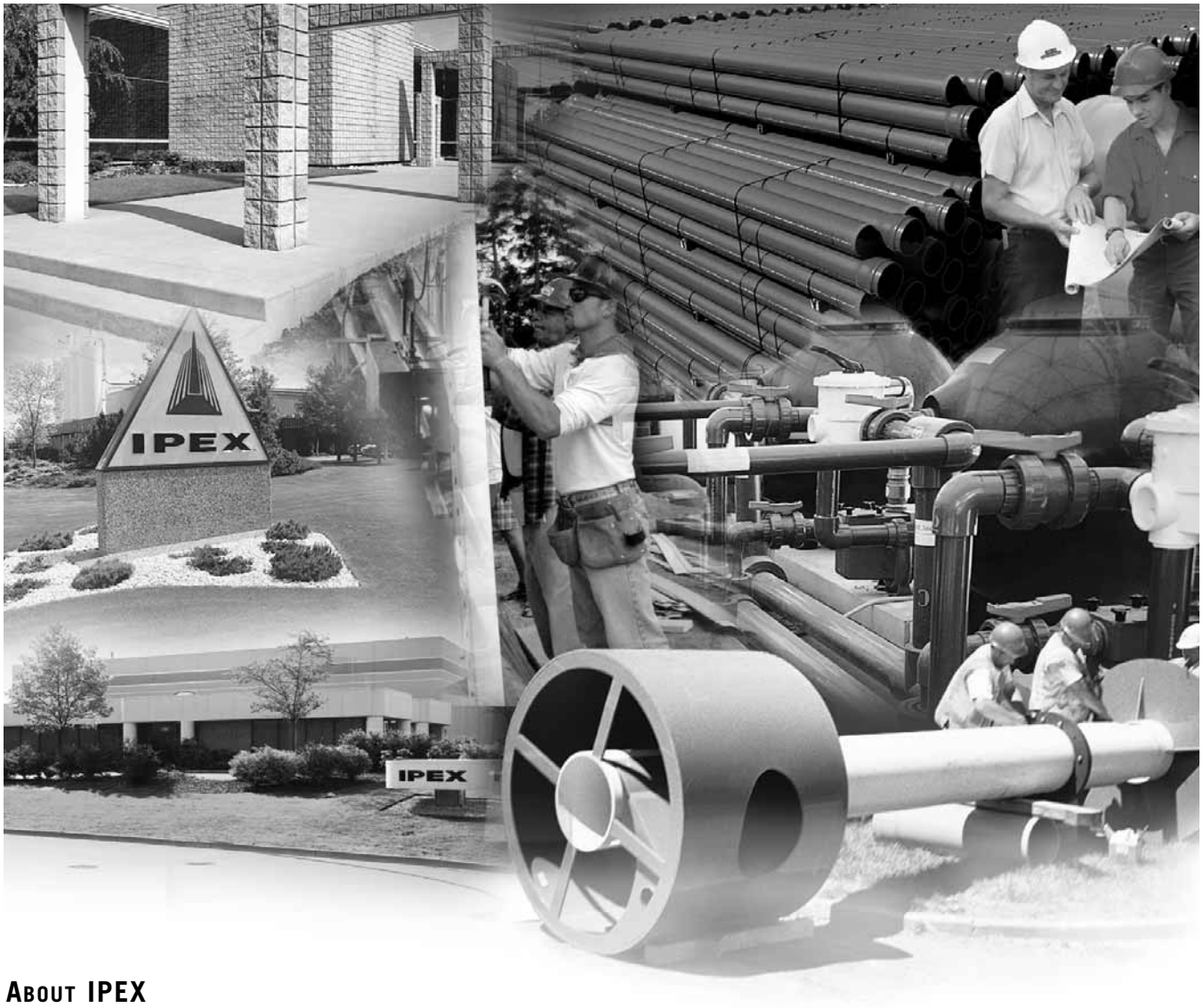

About IPEX

At IPEX, we have been manufacturing non-metallic pipe and fittings since 1951. We formulate our own compounds and maintain strict quality control during production. Our products are made available for customers thanks to a network of regional stocking locations from coast-to-coast. We offer a wide variety of systems including complete lines of piping, fittings, valves and custom-fabricated items.

More importantly, we are committed to meeting our customers' needs. As a leader in the plastic piping industry, IPEX continually develops new products, modernizes manufacturing facilities and acquires innovative process technology. In addition, our staff take pride in their work, making available to customers their extensive thermoplastic knowledge and field experience. IPEX personnel are committed to improving the safety, reliability and performance of thermoplastic materials. We are involved in several standards committees and are members of and/or comply with the organizations listed on this page.

For specific details about any IPEX product, contact our customer service department.

INTRODUCTION

Thermoplastics and elastomers have outstanding resistance to a wide range of chemical reagents. The chemical resistance of plastic piping is basically a function of the thermoplastic material and the compounding components. In general, the less compounding components used the better the chemical resistance. Thermoplastic pipes with significant filler percentages may be susceptible to chemical attack where an unfilled material may be affected to a lesser degree or not at all.

Some newer piping products utilize a multi-layered (composite) construction, where both thermoplastic and non-thermoplastic materials are used for the layers. Layered composite material pipe may have chemical resistance that differs from the chemical resistance of the individual material. Such resistance however, is a function both of temperatures and concentration, and there are many reagents which can be handled for limited temperature ranges and concentrations. In borderline cases, it will be found that there is limited attack, generally resulting in some swelling due to absorption. There are also many cases where some attack will occur under specific conditions, but for many such applications, the use of plastic will be justified on economic grounds when considered against alternative materials. Resistance is often affected (and frequently reduced) when handling a number of chemicals or compounds containing impurities. For this reason, when specific applications are being considered, it may be worthwhile to carry out tests using the actual product that will be encountered in service. The listing that follows does not address chemical combinations.

The information is based on immersion tests on unstressed coupons, experiments and, when available, actual process experience as well as data from tests inclusive of stress from temperature and pressure. The end user should be aware of the fact that actual service conditions will affect the chemical resistance.

Chemicals that do not normally affect the properties of an unstressed thermoplastic may cause completely different behavior (such as stress cracking) when under thermal or mechanical stress (such as constant internal pressure or frequent thermal or mechanical stress cycles). Chemical resistance data from immersion tests cannot be unconditionally applied to thermoplastic piping components subjected to continuous or frequent mechanical or thermal stresses.

When the pipe will be subject to a continuous applied mechanical or thermal stress, or to combinations of chemicals, testing that duplicates the expected field conditions, as closely as possible, should be performed on representative samples of the pipe product to properly evaluate plastic pipe for use in this application.

RATINGS

Ratings are according to the product and suppliers.

The absence of any class indication for any given materials, signifies the absence of data for such material(s) with respect to the specific chemical(s), temperature(s) and concentration(s).

Note: Chemical resistance data is found in a laboratory setting and cannot account for all possible variables of an installed application. It is up to the design engineer or final user to use this information as guidance for a specific application design.

If a material is chemically resistant to the concentrated form of a specific chemical, it should be resistant to the diluted form of that same chemical.

All Chemical Resistance data for Polypropylene (PP) contained within this manual has been provided, with written consent, by Durapipe.

NOTES

POLYPROPYLENE (PP)

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Material:

- Polypropylene (PP)

Chemical Resistance and Performance Data:

- Strong mineral acids
- Caustic and ammoniacal solutions
- Inorganic salt solutions
- Many organics
- Detergents
- Temperature range: 32ºF to 212ºF (0ºC to +100ºC)

Typical Applications:

- Hot chemical applications
- Acid waste drainage

Unsuitable for Following Uses:

- Strong oxidizing acids and halogens

* Note, temperatures given are for guidance only; please check before specifying

Thermoplastic Pipe - Guidance for Correct Usage:
Chemical resistance is affected by the following factors:

- temperature
- fluid concentration
- aeration
- flow velocity
- turbulence
- duration of exposure
- pressure

Fire:

The use of thermoplastic material to convey flammable substances may be unacceptable due to fire hazard.

Foodstuffs:

A resistant classification does not imply absolute suitability (e.g. certain foodstuffs may require gaskets to meet organoleptic requirements).

Thread Sealants:

Some adhesive thread sealants can chemically attack some plastics and must not be used.

Please refer to *Volume III: Acid Waste Piping Systems Technical Manual* for further details.

Label Adhesive:

It is possible that label adhesives will contain stress cracking agents.

We recommend that other methods are used to mark pipe or that adequate checks are made to ensure suitability.

POLYPROPYLENE (PP)

These notes are to be read in conjunction with the Chemical Resistance tables:

1. See under Allyl, Amyl, Butyl, Ethyl, Furfuryl, Methyl, or iso-Propyl
2. These are compounds whose general formula is either $(R1)_2SO_4(R2)_2(SO_4)_6.24\ H_2O$ or $(R1)(R2)(SO_4)_2.\ 12\ H_2O$, where R1 represents an atom of Potassium, Sodium, Ammonium, Rubidium, Caesium, Silver, or Thallium; and R2 represents an atom of Aluminium, Iron, Chromium, Manganese or Thallium.
3. This substance is insoluble in pure water. If conveyed aqueous it would always be in the form of a suspension.
4. This substance decomposes in hot water. Unless suitability is indicated refer to IPEX.
5. Substances which are generally categorised can have widely variable compositions, and therefore each needs to be tested for suitability. Refer to IPEX.
6. This substance is only sparingly soluble in water. If conveyed aqueous it would usually be in the form of a suspension.
7. Solutions other than sea water and aqueous Sodium chloride should be referred to IPEX for suitability tests.
8. This substance is sparingly soluble in water, which then reacts with it.
9. A solution of Chromium trioxide in water, often produced by the action of concentrated Sulphuric acid on Sodium dichromate.
10. This substance is explosive and would not normally be considered suitable for conveyance in plastic pipework.
11. Oils can contain variable amounts of aromatic hydrocarbons and additives. Refer to IPEX for a specific recommendation.
12. Most plasticizers are not suitable for conveyance in plastics.
13. Not for conveyance in the presence of Bromide.
14. Not for conveyance in the presence of Bromate.
15. Not for conveyance in the presence of Iodide.
16. Not for conveyance in the presence of Iodate.
17. The substance decomposes in cold water. Unless suitability is indicated, refer to IPEX.
18. Some of this group of chemicals could be very aggressive towards plastics and rubbers, but others would be quite harmless. Refer to IPEX for a specific recommendation.
19. See under either Ferrous or Ferric.

Classification

+	Resistant
*	Likely to be resistant
o	Unlikely to be resistant
–	Not resistant
blank	No data available

In some instances an asterix (*) has been used where extensive usage by IPEX customers indicates suitability, but where confirmation by in-house testing is not possible.

Where data is not currently available, but where samples can be supplied by potential customers, IPEX will then conduct chemical suitability tests and make recommendations accordingly.

POLYPROPYLENE (PP)
CHEMICAL RESISTANCE DATA

Chemical & Concentration	Usage	20ºC (68ºF)	40ºC (104ºF)	60ºC (140ºF)	80ºC (176ºF)	100ºC (212ºF)
A						
Acetaldehyde	Usual technical	O	O	O	O	O
Acetamide 5%	Aqueous					
Acetic acid 10%	Aqueous	+	+			
Acetic acid 50%	Aqueous	+	+			
Acetic acid 80%	Aqueous	+	+			
Acetic acid glacial	Usual technical	+	+			
Acetic anhydride	Usual technical	*				
Acetone	Usual technical	+	+	+		
Acetophenone	Usual technical	+				
Acetyl chloride	Usual technical					
Acrylonitrile	Usual technical	*	*	*		
Adipic acid	Saturated aqueous	*	*	*		
Alcohol ***(see note 1)***	Usual technical					
Allyl alcohol	Usual technical	*	*	*		
Allyl chloride	Usual technical	O	O	O	O	O
Alum (s) ***(see note 2)***	Saturated aqueous	+	+	+	+	
Aluminium chloride	Saturated aqueous	+	+	+	+	
Aluminium fluoride	Saturated aqueous	+	+	+		
Aluminium hydroxide ***(see note 3)***	Suspended aqueous	+	+	+	+	
Aluminium nitrate	Saturated aqueous	+	+	+		
Aluminium oxalate ***(see note 3)***	Suspended aqueous	+	+	+		
Aluminium sulphate	Saturated aqueous	+	+	+		
Ammonia 35% Sp. gr. = 0.88	Aqueous	+	+	+		
Ammonia dry gas	Usual commercial	+	+	+		
Ammonia liquid	Usual commercial					
Ammonium carbonate ***(see note 4)***	Saturated aqueous	+				
Ammonium chloride ***(see note 4)***	Saturated aqueous	+	+	+		
Ammonium fluoride ***(see note 4)***	Saturated aqueous	+				
Ammonium hydroxide Sp. gr. = 0.88	Aqueous	*	*	*		
Ammonium molybdate	Saturated aqueous	*				
Ammonium nitrate	Saturated aqueous	+	+	+		
Ammonium persulphate	Saturated aqueous	+	+	+		
Ammonium phosphate(s)	Saturated aqueous	+	+	+		
Ammonium sulphate	Saturated aqueous	+	+	+		
Ammonium thiocyanate	Saturated aqueous	O	O	O	O	O
n-Amyl acetate	Usual technical	O	O	O	O	O
n-Amyl alcohol	Usual technical	+	+	+		
Aniline	Usual technical	+				
Animal glue, oils ***(see note 5)***	Usual commercial					

+ Resistant * Likely to be Resistant O Unlikely to be Resistant – Not Resistant (Blank) No data available

POLYPROPYLENE (PP)
CHEMICAL RESISTANCE DATA

Chemical & Concentration	Usage	20ºC (68ºF)	40ºC (104ºF)	60ºC (140ºF)	80ºC (176ºF)	100ºC (212ºF)
Antifreeze *(see note 5)*	Usual proprietary					
Antimony trichloride	Saturated aqueous	+	+	+		
Aqua regia	Usual technical	–	–	–	–	
Aromatic hydrocarbons	Various blends	–	–	–	–	–
B						
Barium bromide	Saturated aqueous	+	+	+	+	
Barium carbonate *(see note 6)*	Saturated aqueous	+	+	+	+	
Barium chloride	Saturated aqueous	+	+	+	+	
Barium hydroxide	Saturated aqueous	+	+	+	+	
Barium sulphate *(see note 6)*	Saturated aqueous	+	+	+	+	
Battery acid Sp. gr. = 1.18	Aqueous	+	+	+		
Beer	Usual commercial	+				
Benzaldehyde	Usual technical	*				
Benzene	Usual technical	–	–	–	–	–
Benzoyl chloride	Usual technical	O	O	O	O	
Benzyl chloride	Usual technical	O	O	O	O	
Borax	Saturated aqueous	+	+	+	+	
Boric acid	Saturated aqueous	+	+	+	+	
Brake fluids *(see note 5)*	Usual proprietary					
Brine *(see note 7)*	Usual proprietary	+	+	+	+	
Bromine	Anhydrous liquid	–	–	–	–	–
Bromine water	Saturated aqueous	–	–	–	–	–
Bromine, trace levels	Aqueous, for sterilization	+				
Butane	Gaseous					
2-Butoxyethanol	Usual technical					
Buttermilk	Usual commercial	+				
n-Butyl acetate	Usual technical	O	O	–	–	
n-Butyl alcohol	Usual technical	+	*	*		
n-Butyric acid	Usual technical					
C						
Cab O-Sil *(see note 3)*	Suspended aqueous	+	+	+	+	
Calcium bromide	Saturated aqueous	+	+	+	+	
Calcium carbonate *(see note 6)*	Saturated aqueous	+	+	+	+	
Calcium chloride	Saturated aqueous	+	+	+	+	
Calcium hydroxide *(see note 6)*	Usual industrial	+	+	+	+	
Calcium nitrate	Saturated aqueous	+	+	+	+	

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POLYPROPYLENE (PP)
CHEMICAL RESISTANCE DATA

Chemical & Concentration	Usage	20ºC (68ºF)	40ºC (104ºF)	60ºC (140ºF)	80ºC (176ºF)	100ºC (212ºF)
Calcium oxide *(see note 6)*	Powder	+	+	+	+	
Calcium sulphate	Saturated aqueous	+	+	+	+	
Carbon dioxide	Gaseous	+	+	+	+	
Carbon disulphide	Liquid	–	–	–	–	–
Carbon monoxide	Gaseous	+	+	+	+	
Carbon tetrachloride	Usual commercial	–	–	–	–	–
Castor oil	Usual commercial	+	*	*	–	–
Caustic potash 20%	Aqueous	+	+	+	+	
Caustic Potash	Saturated aqueous	+	+	+	+	
Caustic soda 20%	Aqueous	+	+	+	+	
Caustic soda	Saturated aqueous	+	+	+	+	
Cellosolve	Usual commercial					
Cellosolve acetate	Usual commercial					
Chloral hydrate	Usual technical	0	0	0	0	0
Chlorine gas (dry) trace levels	Usual industrial	–	–	–	–	–
Chlorine gas (wet)	Usual industrial	–	–	–	–	–
Chlorine liquid	Usual industrial	–	–	–	–	–
Chlorine dioxide, trace levels	Aqueous, for sterilization	+				
Chlorobenzene	Usual technical	–	–	–	–	–
Chloroform	Usual technical	–	–	–	–	–
Chromic acid *(see note 9)*	Saturated aqueous	–	–	–	–	–
Cider	Usual commercial	+				
Citric acid 10%	Aqueous	+	+	+	+	
Coca-Cola	Usual proprietary	+				
Cooking salt	Saturated aqueous	+	+	+	+	
Copper chloride(s)	Saturated aqueous	+	*	*	*	
Copper nitrate	Saturated aqueous	+	+	+		
Copper sulphate	Saturated aqueous	+	+	+	+	
Corn oil	Usual commercial	+	+	+		
Cottonseed oil	Usual commercial	+	+	+		
Creosote	Usual commercial	0	0	0	0	0
Cresol(s)	Usual commercial	+	*	*	*	
Cutting fluids *(see note 5)*	Usual industrial					
Cyclohexane	Usual technical	–	–	–	–	–
Cyclohexanol	Usual technical	*				
Cyclohexanone	Usual technical			–	–	–
D						
Dekalin	Usual technical	0	0	0	0	0

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CHEMICAL RESISTANCE DATA

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Detergents *(see note 5)*	Usual proprietary					
Developers, photographic *(see note 5)*	Usual industrial					
Dextrins	Saturated aqueous	+	+	+	+	
Dextrose	Saturated aqueous	+	+	+		
Di-*iso*-butyl ketone	Usual technical			0	0	0
Di-*n*-butyl phthalate	Usual technical	0	0	0	0	0
Dichlorobenzene(s)	Usual technical	–	–	–	–	–
1,2-Dichloroethane	Usual technical	–	–	–	–	–
1,1-Dichloroethylene	Usual technical	–	–	–	–	–
Dichloromethane	Usual technical	–	–	–	–	–
1,2-Dichloropropane	Usual technical	–	–	–	–	–
Diesel	Usual commercial					
Diethanolamine	Usual technical	+	+	+	+	
Diethyl ether	Usual technical	0	0	0	0	0
Diethyl phthalate	Usual technical	0	0	0	0	0
Dimethylformamide	Usual technical			0	0	0
Di-octyl phthalate	Usual commercial	0	0	0	0	0
1,4-Dioxan	Usual technical					
Drinking Water	Usual domestic	+	+	+	+	
E						
EDTA	Saturated aqueous	+	+	+		
Emulsifiers *(see note 5)*	Usual proprietary					
Emulsions photographic *(see note 5)*	Usual industrial					
2-Ethoxyethanol	Usual commercial					
2-Ethoxyethyl acetate	Usual commercial					
Ethyl acetate	Usual technical					
Ethyl acrylate	Usual technical					
Ethyl alcohol	Usual technical	+				
Ethyl chloride	Usual technical	–	–	–	–	–
Ethyl ether	Usual technical	0	0	0	0	0
Ethylene glycol	Usual commercial	+	+	+		
Ethylene oxide	Usual commercial	–	–	–	–	–
Expandite PJ700	Proprietary mastic					
F						
Fatty acids *(see note 18)*	Usual technical					
Ferric chloride	Saturated aqueous	+	+	+		

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Ferric nitrate	Saturated aqueous	+	+	+		
Ferric sulphate *(see note 4)*	Saturated aqueous	+				
Ferrous chloride	Saturated aqueous	+	+	+		
Ferrous sulphate	Saturated aqueous	+	+	+		
Fixing solutions *(see note 5)*	Usual industrial					
Fluorine	Pure gas	–	–	–	–	–
Fluorosilicic acid 35%	Aqueous	+	+	+		
Flutec PP3	Usual technical	+				
Formalin	Usual technical	*				
Formic acid 3%	Aqueous	+	+	+		
Formic acid 50%	Aqueous	+				
Formic acid 90%	Usual technical	*				
Fructose	Usual technical	+	+	+		
Furfural	Usual technical	–	–	–	–	
Furfuryl alcohol	Usual technical	*				
G						
Gasoline	Usual commercial	–	–	–	–	–
Gelatin(e)	Usual commercial	+	+	+		
Glucose, D or L	Saturated aqueous	+	+	+		
Glycerin(e)	Usual commercial	+	+	+		
Gypsum *(see note 6)*	Saturated aqueous	+	+	+	+	
H						
n-Heptane	Usual technical	O	O	O	O	O
n-Hexane	Usual technical	O	O	O	O	O
Hydrazine *(see note 10)*	Usual technical					
Hydrazine hydrate	Usual technical	*				
Hydrochloric acid 10%	Aqueous	+	+	+		
Hydrochloric acid 30%	Aqueous	+	+	+		
Hydrochloric acid 37%	Aqueous	+	+	+		
Hydrofluoric acid 40%	Aqueous	+	+	+		
Hydrofluoric acid 60%	Aqueous	+	+	+		
Hydrofluoric acid anhydrous	anhydrous					
Hydrogen	Gaseous	+	+	+	+	
Hydrogen peroxide 3%	10 vols aqueous	+	+	+		
Hydrogen peroxide 30%	100 vols aqueous	+	*	*		
Hydrogen sulphide	Gaseous	+	+	+		

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CHEMICAL RESISTANCE DATA

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Hypochlorous acid 14%	14% AV Chlorine	+				
I						
IMS	Usual industrial	*	*	*		
Ink ***(see note 5)***	Usual industrial					
Iodine, tincture of	Usual commercial					
Iron salts ***(see note 19)***	Usual technical					
K						
Kerosene	Usual commercial					
L						
Lactic acid 10%	Aqueous	+	+			
Lactic acid 75%	Aqueous	O	O	O	O	O
Lanolin	Usual commercial	+	+	+		
Latex, natural	Unadulterated emulsion	+				
Latex, synthetic ***(see note 5)***	Emulsion					
Lead acetate	Saturated aqueous	+	+	+		
Lemon juice	Usual commercial	+	+	+	+	
Lemonade	Usual commercial	+				
Lime *(see note 6)*	Powder	+	+	+	+	
Linseed oil	Raw or boiled	+	+	+		
M						
Magnesium carbonate ***(see note 6)***	Saturated aqueous	+	+	+	+	
Magnesium chloride	Saturated aqueous	+	+	+	+	
Magnesium hydroxide ***(see note 6)***	Saturated aqueous	+	+	+	+	
Magnesium nitrate	Saturated aqueous	+	+	+	+	
Magnesium sulphate	Saturated aqueous	+	+	+	+	
Mercuric chloride	Saturated aqueous	+	+	+		
Mercurous nitrate	Saturated aqueous	+	+	+		
Mercury	Metallic liquid	+				
Mesityl oxide	Usual technical					
Metallic soaps	Suspended aqueous	+	+	+		
Methane	Landfill gas					
Methyl acetate	Usual technical					

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Methyl alcohol	Usual technical	+				
Methyl carbitol	Usual commercial					
Methyl cellosolve	Usual commercial					
Methyl ethyl ketone	Usual technical					
Methyl-*iso*-butyl ketone	Usual technical					
Methyl methacrylate	Usual technical	0	0	0	0	0
Methylated spirits (industrial)	Usual commercial	*	*	*		
Milk	from any animal	+	+	+	+	
Mineral oil ***(see note 11)***	Usual proprietary					
Molasses	Usual commercial	+	+	+		
MSG	Saturated aqueous	+	+			
N						
Naphtha	Usual commercial	0	0	0	0	0
Nickel chloride	Saturated aqueous	+	+	+		
Nickel nitrate	Saturated aqueous	+	+	+		
Nickel sulphate	Saturated aqueous	+	+	+	+	
Nitric acid, fuming	Nitric acid, fuming	–	–	–	–	
Nitric acid, 10%	Usual technical	+	*	*		
Nitric acid, 40%	Usual technical	–	–	–	–	–
Nitric acid, 50%	Usual technical	–	–	–	–	–
Nitric acid, 70%	Usual technical	–	–	–	–	–
Nitrobenzene	Usual technical	*				
Nitrotuluene	Usual technical					
O						
Oleic acid	Usual technical					
Oleum	Usual technical	–	–	–	–	
Olive Oil	Usual commercial	+	+	+		
Orange juice	Usual commercial	+	+	+	+	
Oxalic acid	Saturated aqueous					
Oxygen	Gaseous	+	+	+		
Ozone, trace levels	Aqueous, for sterilization	+				
P						
Paint ***(see note 5)***	Usual proprietary					
Palmitic acid	Usual technical	+				

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Paraffin (Liquid)	Ususal technical					
Paraffin fuel	Usual commercial					
n-Pentane	Usual technical	–	–	–	–	–
Pepsi-cola	Usual proprietary	+				
Peracetic acid, trace levels	Aqueous, for sterilization	+				
Perfume ***(see note 5)***	Usual commercial					
Peroxyacetic acid, trace levels	Aqueous, for sterilization	+				
Petrol	Usual commercial	–	–	–	–	–
Petroleum	Natural crude					
Petroleum ether	Boiling 30-90ºC	–	–	–	–	–
Petroleum jelly	Usual commercial	*	*	*		
Phosphoric acid 85%	Usual technical	+	+	+		
Plaster of Paris ***(see note 6)***	Saturated aqueous	+	+	+	+	
Plasticizers ***(see note 12)***	Usual industrial					
Polish ***(see note 5)***	Usual proprietary					
Potable water	Usual domestic	+	+	+	+	
Potash	Saturated aqueous	+	+	+	+	
Potassium bicarbonate	Saturated aqueous	+	+	+	+	
Potassium bisulphate	Saturated aqueous	+	+	+	+	
Potassium bisulphite	Saturated aqueous	+	+	+	+	
Potassium bromate ***(see note 13)***	Saturated aqueous	+	+	+	+	
Potassium bromide ***(see note 14)***	Saturated aqueous	+	+	+	+	
Potassium carbonate	Saturated aqueous	+	+	+	+	
Potassium chlorate	Saturated aqueous	+	+	+	+	
Potassium chloride	Saturated aqueous	+	+	+	+	
Potassium cyanide	Saturated aqueous	+	+	+	+	
Potassium dichromate	Saturated aqueous	+	+	+	+	
Potassium ferricyanide	Saturated aqueous	+	+	+	+	
Potassium ferrocyanide	Saturated aqueous	+	+	+	+	
Potassium fluoride	Saturated aqueous	+	+	+	+	
Potassium hydroxide 20%	Saturated aqueous	+	+	+	+	
Potassium hydroxide	Saturated aqueous	+	+	+	+	
Potassium iodate ***(see note 15)***	Saturated aqueous	+	+	+	+	
Potassium iodide ***(see note 16)***	Saturated aqueous	+	+	+	+	
Potassium metaborate	Saturated aqueous	+	+	+	+	
Potassium nitrate	Saturated aqueous	+	+	+	+	
Potassium permanganate	Saturated aqueous	+		+	–	
Potassium persulphate	Saturated aqueous	+	+	+	+	
Potassium sulphate	Saturated aqueous	+	+	+	+	
Potassium sulphite	Saturated aqueous	+	+	+	+	

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Potassium thiosulphate	Saturated aqueous	+	+	+	+	
Propionic acid	Usual technical	*				
iso-Propyl alcohol	Usual technical	+	+	+		
Propylene glycol	Usual technical	+				
Pyridine	Usual technical	–	–	–	–	–
R						
Rectified spirit	Usual commercial	+				
Refrigerant 22	Usual commercial					
S						
Saltpetre	Saturated aqueous	+	+	+	+	
Sea water	From anywhere	+	+	+	+	
Slaked lime ***(see note 6)***	Saturated aqueous	+	+	+	+	
Soda water	Usual commercial	+				
Sodium acetate	Saturated aqueous	*	*	*	*	
Sodium aluminate	Saturated aqueous	*	*	*	*	
Sodium benzoate	Saturated aqueous	*	*	*	*	
Sodium bicarbonate	Saturated aqueous	+	+	+	+	
Sodium bisulphate	Saturated aqueous	+	+	+	+	
Sodium bisulphite	Saturated aqueous	+	+	+	+	
Sodium bromate ***(see note 13)***	Saturated aqueous	+	+	+	+	
Sodium bromide ***(see note 14)***	Saturated aqueous	+	+	+	+	
Sodium carbonate	Saturated aqueous	+	+	+	+	
Sodium chlorate	Saturated aqueous	+	+	+	+	
Sodium chloride	Saturated aqueous	+	+	+	+	
Sodium cyanide	Saturated aqueous	+	+	+	+	
Sodium dichromate	Saturated aqueous	+	+	+	+	
Sodium ferrocyanide	Saturated aqueous	+	+	+	+	
Sodium fluoride	Saturated aqueous	+	+	+	+	
Sodium hydroxide 20%	Aqueous	+	+	+	+	
Sodium hydroxide	Saturated aqueous	+	+	+	+	
Sodium hypochlorite 14%	14% Av Chlorine	–	–	–	–	–
Sodium iodide ***(see note 16)***	Saturated aqueous	+	+	+	+	
Sodium metabisulphite	Saturated aqueous	+	+	+	+	
Sodium metaborate ***(see note 17)***	Saturated aqueous	+	+	+	+	
Sodium nitrate	Saturated aqueous	+	+	+	+	
Sodium nitrite	Saturated aqueous	+	+	+	+	

+ Resistant * Likely to be Resistant O Unlikely to be Resistant – Not Resistant (Blank) No data available

POLYPROPYLENE (PP)
CHEMICAL RESISTANCE DATA

Chemical & Concentration	Usage	20ºC (68ºF)	40ºC (104ºF)	60ºC (140ºF)	80ºC (176ºF)	100ºC (212ºF)
Sodium phosphate(s)	Saturated aqueous	+	+	+	+	
Sodium silicate	Saturated aqueous	+	+	+	+	
Sodium sulphate	Saturated aqueous	+	+	+	+	
Sodium sulphite	Saturated aqueous	+	+	+	+	
di-Sodium tetraborate	Saturated aqueous	+	+	+	+	
Sodium thiosulphate	Saturated aqueous	+	+	+	+	
Soft soap	Emulsified in water	+	+	+	+	
Spindle oil *(see note 5)*	Usual industrial					
Stannic chloride	Saturated aqueous	+	+	+		
Stannous chloride	Saturated aqueous	+	*	*		
Starch	Saturated aqueous	+	+	+	+	
Steam	Usual industrial					
Stearic acid *(see note 3)*	Suspended aqueous	+	+	+		
Stoddard solvent	Usual commercial	–	–	–	–	–
Sulphamic acid	Saturated aqueous	+	+	+		
Sulphur *(see note 3)*	Suspended aqueous	+				
Sulphur dioxide gas (dry)	Usual technical	+	*	*	*	
Sulphur dioxide gas (wet)	Usual technical	+	*	*		
Sulphur dioxide liquid	Usual technical					
Sulphuric acid 10%	Aqueous	+	+	+	+	
Sulphuric acid 30%	Aqueous	+	+	+		
Sulphuric acid 50%	Aqueous	+	+	+		
Sulphuric acid 70%	Aqueous	+	+	+		
Sulphuric acid 90%	Aqueous	+				
Sulphuric acid 95%	Aqueous	+				
Sulphuric acid 98%	Aqueous					
Sulphuric acid, Oleum	Usual technical	–	–	–	–	–
Surfactants *(see note 18)*	Usual proprietary					
T						
Tannin	10% Aqueous	+				
Tartaric acid	Saturated Aqueous	+	+	+		
1,1,1,2,2,-Tetrachloroethane	Usual technical	–	–	–	–	–
Tetrahydrofuran	Usual technical	0	0	0	0	0
Tetralin	Usual technical	–	–	–	–	–
Thionyl chloride	Usual technical	–	–	–	–	–
Toluene	Usual technical	–	–	–	–	–
Tomato Juice	Usual commercial	+				
Transformer oil *(see note 5)*	Usual industrial					

+ Resistant * Likely to be Resistant 0 Unlikely to be Resistant – Not Resistant (Blank) No data available

POLYPROPYLENE (PP)
CHEMICAL RESISTANCE DATA

Chemical & Concentration	Usage	20ºC (68ºF)	40ºC (104ºF)	60ºC (140ºF)	80ºC (176ºF)	100ºC (212ºF)
Tri-*n*-butyl phosphate	Usual technical					
Trichlorobenzene(s)	Usual technical	O	O	O	O	O
Trichloroethylene	Usual technical	–	–	–	–	–
Tricresyl phosphate	Usual industrial	O	O	O	O	O
Turpentine	Usual commercial	–	–	–	–	–
U						
Urea	Saturated aqueous	+	+	+		
Uric acid ***(see note 3)***	Suspended aqueous	+	+	+	+	
V						
Vaseline	Usual technical					
Vinegar	Usual commercial	+	*			
Vinoleo 77/14	Proprietary grease	+	+	+	+	
Vinyl acetate	Usual industrial					
W						
Water	Technical/Domestic & Ultra Pure	+	+	+	+	
Water glass	Saturated aqueous	+	+	+		
Wetting agents ***(see note 5)***	Usual proprietary					
White sprit	Usual commercial	–	–	–	–	–
X						
Xylene	Usual technical	–	–	–	–	–
Y						
Yeast	Suspended aqueous	+				
Z						
Zinc bromide 40%	Aqueous	*				
Zinc bromide 60%	Aqueous	*				
Zinc carbonate ***(see note 6)***	Saturated aqueous	+	+	+	+	
Zinc chloride 40%	Aqueous	*				
Zinc chloride 60%	Aqueous	*				

+ Resistant * Likely to be Resistant O Unlikely to be Resistant – Not Resistant (Blank) No data available

POLYPROPYLENE (PP)

CHEMICAL RESISTANCE DATA

Chemical & Concentration	Usage	20ºC (68ºF)	40ºC (104ºF)	60ºC (140ºF)	80ºC (176ºF)	100ºC (212ºF)
Zinc nitrate	Saturated aqueous	+	+	+		
Zinc oxide *(see note 6)*	Saturated aqueous	+	+	+	+	
Zinc phosphate(s) *(see note 3)*	Suspended aqueous	+	+	+	+	
Zinc sulphate	Saturated aqueous	+	+	+	+	

+ Resistant * Likely to be Resistant O Unlikely to be Resistant – Not Resistant (Blank) No data available

NOTES

NOTES

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