



Polybutene
Piping Systems Association

Polybutene-1 Chemical Resistance Guide

Chemical Listings and Ratings



Polybutene-1 Chemical Resistance Guide

Polybutene-1, like most olefin based resins, is highly resistant to solvents and chemicals. The results of extensive laboratory and field tests of PB-1's chemical resistance are reported below and also available for download. This data is periodically updated, however for any application where the intention is to use products made from Polybutene-1, it is recommended that users make their own independent determination that the product is suitable for the intended use

Polybutene-1 Chemical Resistance Data

The information provided on PBPSA.com and this document is confined to the effects that various products have on Polybutene-1 (PB-1), not the other way round. While indicative of the general resistance of Polybutene-1 to various products, the data were obtained by laboratory methods which may or may not be representative of the actual conditions of use encountered in specific end-use applications.

In the assessment presented here, chemical resistance has been evaluated through several observations on a test sample:

- The surface is visually analysed for evidence of oxidative attack, environmental stress cracking, staining and dimensional distortion.
- Any weight gain in the sample is evidence of swelling caused by solvent absorption.
- The sample is tested for signs of physical deterioration, such as embrittlement, softening, decreased yield stress and increased yield elongation.

Rating Definition

In the table pages following, overall chemical resistance is evaluated through the use of three rating symbols, S, M and U, which represent the following ratings:

S - Satisfactory

Little or no noticeable effect with no indication that serviceability has been impaired.

M - Marginal

Noticeable effect, but not necessarily indicating a lack of serviceability or useful life.

Further testing is strongly recommended to determine suitability in a specific application.

U - Unsatisfactory

Severe effect and not recommended for service applications.

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S – Satisfactory
M – Marginal
U – Unsatisfactory



Reagent

(Solids in saturated solution unless indicated otherwise)

Chemical Exposure Performance

Temperature
23°C 60°C

Reagent	23°C	60°C
Acetaldehyde	M	U
Acetate solvents - crude	S	M
Acetate solvents - pure	S	M
Acetic acid - 0-10%	S	S
Acetic acid - 10-20%	S	S
Acetic acid - 20-30%	S	S
Acetic acid - 30-60%	S	M
Acetic acid - 80%	S	–
Acetic acid - glacial	M	U
Acetic acid vapours	S	M
Acetic anhydride	U	U
Acetone	S	S
Acetylene	M	U
Adipic acid	S	M
Alcohol (see type)	–	–
Allyl alcohol - 96%	S	S
Allyl chloride	S	S
Alum	M	U
Aluminium chloride	S	S
Aluminium fluoride	S	S
Aluminium hydroxide	S	S
Aluminium oxychloride	S	S
Aluminium nitrate	S	S
Aluminium sulphate	M	U

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Reagent

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Chemical Exposure Performance

	Temperature	
	23°C	60°C
Ammonia - dry gas	S	S
Ammonia - liquid	S	M
Ammonium bifluoride	S	S
Ammonium carbonate	S	S
Ammonium chloride	S	S
Ammonium fluoride - 25%	S	M
Ammonium hydroxide - 28%	S	S
Ammonium metaphosphate	S	S
Ammonium nitrate	S	S
Ammonium persulphate	S	S
Ammonium phosphate - ammoniacal	S	S
Ammonium phosphate - neutral	S	S
Ammonium sulphate	S	S
Ammonium sulphide	S	S
Ammonium thiocyanate	S	S
Amyl acetate	S	–
Amyl alcohol	S	S
Amyl chloride	M	M
Aniline	M	M
Aniline chlorohydrate	U	U
Aniline hydrochloride	U	U
Anthraquinone	M	U
Anthraquinonesulphonic acid	M	U
Antimony trichloride	S	S

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Reagent

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Chemical Exposure Performance

	Temperature	
	23°C	60°C
Aqua regia	U	U
Arsenic acid - 80%	S	S
Asphalt	S	S
Barium carbonate	S	S
Barium chloride	S	S
Barium hydroxide	S	S
Barium sulphate	S	S
Barium sulphide	S	S
Beer	S	S
Beet - sugar liquor	S	S
Benzaldehyde	M	U
Benzene	U	U
Benzoic acid	S	S
Benzol	U	U
Bismouth carbonate	S	S
Black liquor (paper industry)	S	S
Bleach - 12.5% active Cl	S	S
Borax	S	S
Boric acid	S	S
Boron trifluoride	S	S
Breeder pellets - derived from fish	S	S
Brine	U	S
Bromic acid	M	S
Bromine - liquid	U	U

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Chemical Exposure Performance

Temperature
23°C 60°C

Reagent	23°C	60°C
Bromine - water	M	U
Butane	U	U
Butanol - primary	S	–
Butanol - secondary	S	–
Butyl acetate	M	U
Butyl alcohol	S	S
Butyric acid - 20%	S	M
Calcium bisulphite	S	S
Calcium carbonate	S	S
Calcium chlorate	S	S
Calcium chloride	S	S
Calcium hydroxide	S	S
Calcium hypochlorite	S	S
Calcium nitrate	S	S
Calcium sulphate	S	S
Cane sugar liquors	S	S
Carbon bisulphide	U	U
Carbon dioxide - aqueous solution	S	S
Carbon dioxide gas - wet	S	S
Carbon monoxide	S	S
Carbon tetrachloride	U	U
Carbonic acid	S	S
Casein	S	S
Castor oil	S	S

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Chemical Exposure Performance

	Temperature	
	23°C	60°C
Caustic potash	S	M
Caustic soda	S	M
Cellosolve	S	S
Chloracetic acid	U	U
Chloral hydrate	U	U
Chlorine gas - dry	U	U
Chlorine gas - moist	U	U
Chlorine water	S	S
Chlorobenzene	M	U
Chloroform	U	U
Chlorosulphonic acid	S	U
Chrome alum	S	S
Chromic acid - 10%	S	S
Chromic acid - 25%	S	S
Chromic acid - 30%	S	S
Chromic acid - 40%	S	–
Chromic acid - 50%	S	–
Citric acid	S	S
Coconut oil	S	S
Copper chloride	S	S
Copper cyanide	S	S
Copper fluoride - 2%	S	S
Copper nitrate	S	S
Copper sulphate	S	S

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Chemical Exposure Performance

Temperature
23°C 60°C

Reagent	23°C	60°C
Core oils	S	S
Cottonseed oil	S	S
Cresol	U	U
Cresylic acid - 50%	U	U
Crude oil - sour	M	U
Crude oil - sweet	M	U
Cyclohexanol	S	M
Cyclohexanon	U	U
Demineralized water	S	S
Dextrin	S	S
Dextrose	S	S
Diazo salts	S	S
Diglycolic acid	S	S
Dimethylamine	U	U
Diocetylphthalate	M	U
Disodium phosphate	S	S
Distilled water	S	S
Ethers	U	U
Ethyl acetate	M	U
Ethyl alcohol - 0-50%	S	S
Ethyl alcohol - 50-98%	S	S
Ethyl ether	M	U
Ethylene bromide	U	U
Ethylene chlorohydrin	U	U

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Chemical Exposure Performance

Temperature
23°C 60°C

Reagent	23°C	60°C
Ethylene dichloride	S	S
Ethylene glycol	S	S
Fatty acids	S	S
Ferric chloride	S	S
Ferric nitrate	S	S
Ferric sulphate	S	S
Ferrous chloride	S	S
Ferrous sulphate	S	S
Fish solubles	S	S
Fluorine gas - dry	M	U
Fluorine gas - wet	M	U
Fluoroboric acid	S	S
Fluorosilicic acid	S	S
Food products - such as milk, molasses, salad oils	S	S
Formaldehyde	S	S
Formic acid	S	S
Freon-12	S	S
Fructose	S	S
Fruit pulps and juices	S	S
Fuel oil - containing H ₂ SO ₄	U	U
Gallic acid	S	S
Gas - coke oven	S	S
Gas - manufactured	S	S
Gas - natural - dry	S	S

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Chemical Exposure Performance

	Temperature	
	23°C	60°C
Gas - natural - wet	S	S
Gasoline - refined	U	U
Gasoline - sour	U	U
Gelatine	S	S
Glucose	S	S
Glycerine - glycerol	S	S
Glycol	S	S
Glycolic acid - 30%	S	S
Green liquor (paper industry)	S	S
Heptane	U	U
Hexane	U	U
Hexanol - tertiary	S	S
Hydrobromic acid - 20%	S	S
Hydrochloric acid - 0-25%	S	S
Hydrochloric acid - 25-40%	S	S
Hydrocyanic acid (or hydrogen cyanide)	S	S
Hydrofluoric acid - 4%	S	S
Hydrofluoric acid - 10%	S	S
Hydrofluoric acid - 48%	S	S
Hydrofluoric acid - 60%	S	S
Hydrofluorosilicic acid	S	S
Hydrogen	S	S
Hydrogen peroxide - 30%	S	S
Hydrogen peroxide - 50%	U	U

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Chemical Exposure Performance

Temperature
23°C 60°C

Reagent	23°C	60°C
Hydrogen peroxide - 90%	U	U
Hydrogen phosphide	S	S
Hydrogen sulphide - aqueous solution	S	S
Hydrogen sulphide - dry	S	S
Hydroquinone	S	S
Hypochlorous acid	S	S
Iodine - in alcohol	S	U
Isopropylalcohol	S	S
Kerosene	M	U
Kraft liquor (paper industry)	S	S
Lactic acid - 28%	S	S
Lard oil	S	M
Lauryl chloride	S	M
Lead acetate	S	S
Lime sulphur	S	S
Linoleic acid	S	M
Linseed oil	S	S
Liquors	S	S
Lubricating oils	S	S
Magnesium carbonate	S	S
Magnesium chloride	S	S
Magnesium hydroxide	S	S
Magnesium nitrate	S	S
Magnesium sulphate	S	S

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Chemical Exposure Performance

	Temperature	
	23°C	60°C
Maleic acid	S	S
Malic acid	S	S
Mercuric chloride	S	S
Mercuric cyanide	S	S
Mercurous nitrate	S	S
Mercury	S	S
Methyl alcohol	S	S
Methyl chloride	U	U
Methyl ethyl ketone	S	M
Methyl sulphuric acid	S	S
Methylene chloride	S	M
Milk	S	S
Mineral oils	M	U
Molasses	S	S
Naphthalene	M	U
Nickel acetate	S	S
Nickel chloride	S	S
Nickel nitrate	S	S
Nickel sulphate	S	S
Nicotine	S	S
Nicotine acid	S	S
Nitric acid - 10%	M	U
Nitric acid - 20%	U	U
Nitric acid - 35%	U	U

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Chemical Exposure Performance

	Temperature	
	23°C	60°C
Nitric acid - 40%	U	U
Nitric acid - 60%	U	U
Nitric acid - 68%	U	U
Nitric acid - anhydrous	U	U
Oils and fats	S	S
Oleum	U	U
Oxalic acid	S	S
Perchloric acid - 10%	M	U
Perchloric acid - 70%	U	U
Phenol	S	M
Phosphoric acid - 0-25%	S	S
Phosphoric acid - 25-50%	S	S
Phosphoric acid - 50-75%	S	M
Photographic chemicals	S	S
Picric acid	S	M
Potassium acid sulphate	S	S
Potassium bicarbonate	S	S
Potassium bichromate	M	U
Potassium borate - 1%	S	S
Potassium bromate - 10%	S	S
Potassium bromide	S	S
Potassium carbonate	S	S
Potassium chlorate	S	S
Potassium chloride	S	S

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Chemical Exposure Performance

	Temperature	
	23°C	60°C
Potassium chromate - 40%	S	S
Potassium cuprocyanide	S	S
Potassium cyanide	S	S
Potassium dichromate - 40%	S	S
Potassium ferricyanide	S	S
Potassium fluoride	S	S
Potassium hydroxide - 10%	S	S
Potassium hydroxide - 20%	S	S
Potassium nitrate	S	S
Potassium perborate	S	S
Potassium perchlorite	S	S
Potassium permanganate - 10%	S	S
Potassium persulphate	S	S
Potassium sulphate	S	S
Potassium sulphide	S	S
Potassium thiosulphate	S	S
Propane	S	–
Propyl alcohol	S	S
Rayon coagulating bath	S	S
Salt water	S	S
Selenic acid	S	S
Silicic acid	S	S
Silver cyanide	S	S
Silver nitrate	M	U

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Reagent

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Chemical Exposure Performance

Temperature
23°C 60°C

Reagent	23°C	60°C
Silver plating solutions	S	S
Soaps	S	S
Sodium acetate	S	S
Sodium acid sulphate	S	S
Sodium antimonate	S	S
Sodium arsenite	S	S
Sodium benzoate	S	S
Sodium bicarbonate	S	S
Sodium bisulphate	S	S
Sodium bisulphite	S	S
Sodium bromide	S	S
Sodium carbonate - soda ash	S	S
Sodium chlorate	S	S
Sodium chloride	S	S
Sodium cyanide	S	S
Sodium dichromate	S	S
Sodium ferricyanide	S	S
Sodium ferrocyanide	S	S
Sodium fluoride	S	S
Sodium hydroxide - 10%	S	S
Sodium hydroxide - 35%	S	S
Sodium hydroxide saturated	S	S
Sodium hypochlorite	S	S
Sodium nitrate	S	S

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Chemical Exposure Performance

	Temperature	
	23°C	60°C
Sodium nitrite	S	S
Sodium phosphate - acid	S	S
Sodium silicate	S	S
Sodium sulphate	S	S
Sodium sulphide	S	S
Sodium sulphite	S	S
Sodium thiosulphate - hypo	S	S
Stannic chloride	S	S
Stannous chloride	S	S
Stoddards solvent	S	S
Stearic acid	S	S
Sulphur	S	S
Sulphur dioxide gas - wet	S	M
Sulphuric acid - 0-10%	S	S
Sulphuric acid - 10-30%	S	S
Sulphuric acid - 30-50%	S	S
Sulphuric acid - 50-75%	M	U
Sulphuric acid- 75-90%	M	U
Sulphuric acid - 95%	U	U
Sulphurous acid	S	S
Sulphyr trioxide	M	U
Tannic acid	S	S
Tanning liquors	S	S
Tartaric acid	S	S

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Chemical Exposure Performance

Temperature
23°C 60°C

Reagent	23°C	60°C
Tetrahydrofurane	M	U
Thionyl chloride	S	S
Toluol or toluene	U	U
Trichloroethylene	U	U
Triethanolamine	S	M
Trisodium phosphate	S	S
Turpentine	U	U
Urea	S	S
Urine	S	S
Vinegar	S	S
Water - acid mine water	S	S
Water - distilled	S	S
Water - fresh	S	S
Water - salt	S	S
Whiskey	S	S
White gasoline	U	U
Wines - still	S	S

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The Polybutene Piping Systems Association (PBPSA) is an international association of companies committed to the use of the thermoplastic material Polybutene-1 for piping systems specified globally for major commercial, industrial and domestic construction projects. Each corporate PBPSA member is a leader in its respective markets including the production of PB-1 material grades, and the manufacture and marketing of piping and component systems worldwide.



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