



Pump Tube Chemical Resistance Data

This bulletin provides chemical compatibility information for various pump tube materials. Not all tube materials are available for all pumps. This data is provided by tubing manufacturers and is published as a guideline rather than a guarantee. The ultimate suitability of a tube for an application is the user's responsibility. All compatibility ratings indicate tubing condition after exposure to the chemicals at 21°C (70°F). Both chemical resistance and mechanical resilience determine which tube is best for a given application. Pump tubing is not guaranteed. The best pump tube for a given application takes both factors into account. Beta Technology, Inc. doesn't warrant (neither expressed nor implied) that the information contained in this publication is accurate or complete.

To Test Tube Material

1. Measure the length, inside diameter, outside diameter and wall thickness of a sample piece of tubing.
2. Weigh the sample.
3. Immerse the sample in the chemical to be used for 72 hours in a closed vessel.
4. Dry the sample, then measure and weigh it.
5. Inspect carefully for signs of deterioration such as swelling, softness, cracking, brittleness or changes in weight and size.
6. If there are no signs of deterioration, test sample in the pump under actual service conditions.



Unless otherwise specified upon purchase, Beta Technology, Incorporated will ship pump systems equipped with standard tubing.

Legend

Chemical Compatibility
A = Little or no effect
B = Minor effect

C = Moderate effect (serviceable)
U = Unacceptable (severe effect)

Blank = No test information available

Tube Materials
Sili = Silicone
Norp = Norprene (Santoprene)
Cflex
BT = Beta Tube (Santoprene)
Flex
EPDM = Nordel
Viton (Flouorcarbon)
BW = Bi-Wall

CHEMICAL	TUBING MATERIALS							
	Sili	Norp	Cflex	BT	Flex	EPDM	Viton	BW
Acetaldehyde	B	A	B	A	C	B	U	C
Acetate LMW		A	C	A	U			U
Acetamide		C		C	A	C	A	A
Acetic Acid (< 5%)	A	A	B	A	A	A	A	A
Acetic Acid (> 5%)	A	A	C	A	A	A	B	A
Acetic Anhydride	U	A		A	A	B	U	A
Aceto Nitrile			A		U		B	U
Acetone	U	U	A	U	B	A	U	B
Acetyl Bromide		U	C	U	U			U
Acetyl Chloride	C	U	C	U	U	U	A	U
Aliphatic Hydrocarbons		C	U	C	U			U

CHEMICAL	TUBING							
	Sili	Norp	Cflex	BT	Flex	EPDM	Viton	BW
Aluminum Chloride	B	A	B	A	A	A	A	A
Aluminum Sulphate	A	A	B	A	A	A	A	A
Alums	A	A	A	A	A	A	U	A
Ammonia	U	A	B	A	A	B	U	A
Ammonium Acetate		B	B	B	A			A
Ammonium Carbonate	C	A	B	A	A	A		A
Ammonium Chloride	C	A	B	A	A	A	A	A
Ammonium Flouride	A				A	A	A	A
Ammonium Hydroxide	A	A	B	A	A	A	A	A
Ammonium Nitrate	C	A	B	A	A	A		A
Ammonium Phosphate	A	A	B	A	A	A		A
Ammonium Sulfate	A	A	B	A	A	A	A	A
Amyl Acetate	U	A	U	A	U	A	U	U
Amyl Alcohol	U	B	U	B	A	A	B	A
Amyl Chloride	U	A	U	A	U	U	A	U
Aniline	C	C		C	U	B	C	U
Aniline Hydrochloride		C		C	U	B	B	U
Antimony Salts		A		A	A			A
Arsenic Salts		B	B	B	A			A
Banana Oil/Turpine	U	U	U	U	B	U	A	B
Barium Salts	A	A	B	A	A	A	A	A
Benzaldehyde		C	U	C	C		U	C
Benzenesulfonic Acid	U	U	A	U	U		A	U
Benzoic Acid	B	B		B	U	U	A	U
Bleaching Liquors	B	A	B	A	A		A	A
Benzyl Alcohol		C	U	C	A	B	A	A
Borax	B				A	A	A	A
Boric Acid	A	A	B	A	A	A	A	A
Bromine	U	A	B	A	U	U	A	U
Butyl Alcohol (Butanol)	B	C	B	C	A	B	A	A
Butyl Acetate	U	U	U	U	U	B	U	U
Butyric Acid	U	A	B	A	U	B	B	U
Calcium Oxide	A	A	B	A	A		A	A
Calcium Salts	B	A	B	A	A	A		A
Carbon Bisulfide	U	U	U	U	U	U	A	U
Carbon Tetrachloride	U	U	U	U	U	U	A	U
Chloracetic Acid		A	B	A	A	B	U	A
Chlorine	U	U	B	U	C	B	B	C
Chlorobenzene	U	U	U	U	U	U	A	U
Chlorobromomethane	U	C	U	C		A	A	U
Chlorosulfonic Acid	U	U	B	U	U	U	C	U
Chromic Acid	U	A	B	A	A	C	A	A
Chromium Salts		A	B	A	A			A
Citric Acid		A		A	A		A	A
Citrus Oil/Turpine (d'limimene)	U	U	U	U	U	U	A	U
Cresol	U	U	U	U	A		A	A

Chemical Compatibility

A = Little or no effect
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Tube Materials

Sili = Silicone
 Norp = Norprene
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CHEMICAL	TUBING							
	Sili	Norp	Cflex	BT	Flex	EPDM	Viton	BW
Cyclohexane	U	U	U	U	C		A	C
Diacetone Alcohol		A	B	A	A	A	U	A
Diethylamine					A	B	U	A
Dimethyl Formamide		U	B	U	A	B	U	A
Essential Oils	C	B	B	B	U			U
Ethyl Alcohol (Ethanol)	B	C	B	C	A	U	A	A
Ethyl Acetate	U	C	B	C	U	B	U	U
Ethyl Bromide	U	U	B	U	U	U	A	U
Ethyl Chloride	U	U	B	U	U	A	A	U
Ethylamine	C	U	A	U	U			U
Ethylene Chlorohydrine	C	U	B	U	A	B	A	A
Ethylene Dichloride	U	U	B	U	U	C	A	U
Ethylene Glycol	A	A	B	A	A	A	A	A
Ethylene Oxide	U	B	B	B	A	C	U	A
Ferric Chloride	B	A	A	A	A	A	A	A
Ferric Sufate	C	A	A	A	A	A	A	A
Ferrous Chloride	C	A	A	A	A	A	A	A
Ferrous Sulfate	C	A	A	A	A	A	A	A
Fluoboric Acid	A	A	A	A	A	A		A
Fluoborate Salts		A	B	A	A	A	A	A
Fluosilicic Acid		A	A	A	A			A
Formaldehyde	B	A	A	A	C	A	U	C
Formamide		A		A	A			A
Formic Acid	C	A	B	A	A	A	C	A
Glycerine	A	A	B	A	A	A	A	A
Hydriodic Acid		U	B	U	A			A
Hydrobromic Acid (to 30%)	U	B	B	B	A	A	A	A
Hydrochloric Acid (diluted)	U	A	B	A	A	B	B	A
Hydrochloric Acid (med conc)	U		B		A	C	A	A
Hydrochloric Acid (conc)	U		B		A	U	A	A
Hydrocyanic Acid	C	A	B	A	A	A	A	A
Hydroflouric Acid (to 10%)	U	A		A	A	A	A	A
Hydroflouric Acid (to 20%)	U	A		A	A	A	A	A
Hydroflouric Acid (to 50%)	U	A		A	A	B	A	A
Hydroflouric Acid (to 75%)	U	B		B	B	C	B	B
Hydroflouric Acid (to 100%)	U	C		C	C	U	C	C
Hydrogen Peroxide (to 30%)	B	A	A	A	A	A	A	A
Hydrogen Peroxide (to 50%)	C	A	B	A	A	A	A	A
Hydrogen Peroxide (to 75%)	U	A	C	A	A	B	B	A
Hydrogen Peroxide (to 100%)	U	A	C	A	B	C	C	B
Hydrogen Sulfide	C	A	B	A	A	A		A
Hypochlorous Acid	U	A	A	A	A	B	A	A
Iodine Solutions	C	A	U	A	A	B	A	A
Isobutyl Alcohol	B	C		C	A	A	A	A
Isopropyl Alcohol	C	B	B	B	A	A	A	A
Lactic Acid	A	A	A	A	A	A	A	A
Lacquer Solvents	U	U	U	U	U	U	U	U

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Linseed Oil		B	U	B	B	C	A	B
Lithium Hydroxide	U	B	B	B	A			A
Magnesium Chloride	A	A	A	A	A	A	A	A
Magnesium Sulfate	A	A	A	A	A	A	A	A
Maleic Acid		A	B	A	C	U	A	C
Malic Acid	B	A	B	A	A	A	A	A
Manganese Salts	A	A	A	A	A	A	A	A
Mercury Salts	A	A	A	A	A	A	A	A
Methane	U	B	U	B	A	U	A	A
Methyl Alcohol (Methanol)	A	A		A	A		U	A
Methyl Bromide					U	U	A	U
Methyl Chloride	U		C		U	B	A	U
Methylene Chloride					U	U	B	U
Mineral Spirits	U	U	U	U	U	U	A	U
Molybdenum Disulfide			B		C			C
Monoethanolamine	B	B	A	B	U	B	U	U
Nitric Acid (diluted)	C	B	A	B	A	C	A	A
Nitric Acid (med conc)	U	C	B	C	A	U	A	A
Nitric Acid (conc)	U	U	C	U	A	U	A	A
Nitroethane	U	A		A	U	B	U	U
Nitrobenzene	U	U	U	U	U	U	B	U
Nitrogen Oxide	A	C	B	C	A	A	A	A
Nitrous Acid	A	A	A	A	A	A	A	A
Oils (animal)		A	B	A	B	B	A	B
Oils (mineral)	U	U	U	U	U	U	A	U
Oils (vegetable)	A	A		A	B	C	A	B
Oleic Acid	U	C	A	C	C	B	B	C
Oxalic Acid (cold)	B	A	A	A	A	A	A	A
Palmitic Acid	U	U	U	U	C		A	C
Perchloric Acid	U	U	A	U	A	B	A	A
Perchloroethylene	U	U	U	U	U	U	A	U
Phenol (Carbolic Acid)	U		U		A	B	A	A
Phthalic Acid	B	A	U	A	A			A
Plating Solutions	U	A	B	A	A	A	A	A
Phosphoric Acid	C	A	A	A	A	B	A	A
Polyglycol	A	B	B	B	A			A
Polyvinyl Alcohol		C		C	A			A
Potassium Carbonate		B	A	B	A			A
Potassium Chlorate		B	A	B	A			A
Potassium Hydroxide	C	A	A	A	A	A	B	A
Potassium Hypochlorite	A	A		A	A			A
Potassium Iodide		B	A	B	A			A
Potassium Metasilicate	U	A	A	A	A	B	B	A
Potassium Orthosilicate	U	A	A	A	A	B	B	A
Propanol (Propyl Alcohol)	A	C		C	A		B	A
Pyridine	U	C	U	C	C		U	C
Silicone Fluids	U	B	A	B	A	A	A	A
Silicone Oils	U	B	A	B	C	A	A	A

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Silver Nitrate	A	A	A	A	A	A	A	A
Sodium Acetate		B	B	B	A			A
Sodium Bicarbonate	A	A	A	A	A	A	A	A
Sodium Bisulfate		A	A	A	A	A		A
Sodium Bisulfite	A	A	A	A	A	A	A	A
Sodium Borate	A	A	A	A	A	A	A	A
Sodium Carbonate	A	A	A	A	A	A	A	A
Sodium Chlorate	C	A	A	A	A	A		A
Sodium Chlorite	A	A	A	A	A	A	A	A
Sodium Ferrocyanide	A	A	A	A	A	A	A	A
Sodium Fluorosilicate	U		A		A	B	A	A
Sodium Hydroxide (to 15%)	B	A	A	A	A	A	A	A
Sodium Hydroxide (to 30%)	C	C	B	C	A	B	A	A
Sodium Hydroxide (conc)	U	U	U	U	A	C	C	A
Sodium Hydrosulfite			A		A	A	A	A
Sodium Hypochlorite (<5%)	A	A	A	A	A	B	A	A
Sodium Hypochlorite (>5%)	B	A	A	A	A	B	A	A
Sodium Nitrate	A	A	A	A	A	A	A	A
Sodium Nitrilotriacetate	A		A		A	A	A	A
Sodium Metasilicate	U	A	A	A	A	A		A
Sodium Orthosilicate	U	A	A	A	A	A		A
Sodium Perborate	B	A	A	A	A	A	A	A
Sodium Peroxide	U		A		A	A	A	A
Sodium Phosphate	U		A		A	A	A	A
Sodium Sulfide	A	A	A	A	A	A	A	A
Sodium Sulfite	A	A	A	A	A	A	A	A
Sodium Thiosulfate	A				A	A	A	A
Stearic Acid	B	A	A	A	C	B		C
Sulfur Chloride	C	A	B	A	A	A	A	A
Sulfur Dioxide	B	A	B	A	A	A	A	A
Sulfur Hexafluoride	B		B			A	C	
Sulfur Trioxide	B	B	B	B	B	B	A	B
Sulfuric Acid (diluted)	U	A	A	A	A	B	A	A
Sulfuric Acid (med conc)	U	A	A	A	A	B	A	A
Sulfuric Acid (conc)	U	A	B	A	A	C	A	A
Sulfurous Acid	U	A	B	A	A	B	A	A
Tannic Acid	B	A	B	A	A	A	A	A
Tartaric Acid	A		A		A	A	A	A
Tetrahydrofuran		U		U	U	B		U
Toluene (toluol)	U	U	U	U	U	U	A	U
Trichloroacetic Acid	U	U	A	U	A	B	C	A
Trichloroethylene	U	U	U	U	U	U	A	U
Triphosphosphate	C				A	A	B	A
Trisodium Phosphate		A	A	A	A	A	A	A
Turpentine (and solvents)	U	C	U	C	U	U	A	U
Vinyl Plastisol			U		C			C
Xylene (xylol)	U	U	U	U	U	U	A	U
Zinc Acetate	U				A	A	A	A

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Zinc Chloride		B	A	B	A	A	A	A
Zinc Salts	A				A	A	A	A
Zinc Sulfate	A				A	A	A	A

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