Material Suitability for Pumpage

TECHNICAL DATA

CAST IRON, BRONZE AND 316 STAINLESS STEEL

GOULDS WATER TECHNOLOGY
a xylem brand

This chart is intended as a guide in the selection of economical materials. It must be kept in mind that corrosion rates may vary widely with temperature, concentration and the presence of trace elements or abrasive solids. Blank spaces indicate a lack of accurate corrosion information for those specific conditions.

Code

1 – Fully Satisfactory **2 –** Useful Resistance **3 –** Limited Use **4 –** Unsuitable

CI – Cast Iron, ASTM A48. **Brz. –** Anti-Acid Bronze, Similar to ASTM B143A2.**316SS –** Stainless Steel, ASTM A744 Gr. CF-8M, AISI 316.

Corrosive	C.I.	Brz.	316SS
Acetaldehyde, 70° F.	2	1	1
Acetic acid, 70° F.	4	1	1
Acetic acid, < 50%, to boiling	4	2	1
Acetic acid, > 50%, to boiling	4	4	2
Acetone, to boiling	1	1	1
Aluminum chloride, < 10%, 70° F.	4	2	3
Aluminum chloride, > 10%, 70° F.	4	4	3
Aluminum chloride, < 10%, to boiling	4	4	4
Aluminum chloride, > 10%, to boiling	4	4	4
Aluminum sulphate, 70° F.	4	2	1
Aluminum sulphate, < 10%, to boiling	4	2	2
Aluminum sulphate, > 10%, to boiling	4	3	3
Ammonium Chloride, 70° F.	4	4	2
Ammonium chloride, < 10%, to boiling	4	4	2
Ammonium chloride, > 10%, to boiling	4	4	4
Ammonium fluosilicate, 70° F.	4	4	3
Ammonium sulphate, < 40%, to boiling	4	4	2
Arsenic acid, to 225° F.	4	4	3
Barium chloride, 70° F. < 30%	4	2	3
Barium chloride, < 5%, to boiling	4	2	3
Barium chloride, > 5%, to boiling	4	3	4
Barium hydroxide, 70° F.	2	4	1
Barium nitrate, to boiling	3	4	2
Barium sulphide, 70° F.	3	4	2
Benzoic acid	4	3	2
Boric acid, to boiling	4	3	2
Boron trichloride, 70° F. dry	2	2	2
Boron trifluoride, 70° F. 10%, dry	2	2	2
Brine (acid), 70° F.	4	4	4
Bromine (dry), 70° F.	4	4	4
Bromine (wet), 70° F.	4	4	4
Calcium bisulphite, 70° F.	4	4	2
Calcium bisulphite, to hot	4	4	3
Calcium chloride, 70° F.	2	3	2
Calcium chloride, < 5%, to boiling	3	3	2
Calcium chloride, > 5%, to boiling	4	3	3
Calcium hydroxide, 70° F.	2	2	2
Calcium hydroxide, < 30%, to boiling	3	2	2
Calcium hydroxide, > 30%, to boiling	4	4	3
Calcium hypochlorite, < 2%, 70° F.	4	4	4
Calcium hypochlorite, > 2%, 70° F.	4	4	4
Carbolic acid, 70° F. (phenol)	3	2	1
Carbon bisulphide, 70° F.	2	2	1
Carbonic acid, 70° F.	2	3	1
Carbon tetrachloride, dry to boiling	2	2	1

Corrosive	C.I.	Brz.	316SS
Chloric acid, 70° F.	4	4	4
Chlorinated water, 70° F.	3	3	2
Chloroacetic acid, 70° F.	4		4
Chlorosulphonic acid, 70° F.	4	4	4
Chromic acid, < 30%	4	4	3
Citric acid	4	3	1
Copper nitrate, to 175° F.	4	4	2
Copper sulphate, to boiling	4	3	3
Cresylic acid	3	3	2
Cupric chloride	4	3	4
Cyanohydrin, 70° F.	3		2
Dichloroethane	3	2	2
Diethylene glycol, 70° F.	1	2	1
Dinitrochlorobenzene, 70° F. (dry)	3	2	1
Ethanolamine, 70° F.	2	4	2
Ethers, 70° F.	2	2	2
Ethyl alcohol, to boiling	1	1	1
Ethyl cellulose, 70° F.	1	2	2
Ethyl chloride, 70° F.	3	2	2
Ethyl mercaptan, 70° F.	3	4	2
Ethyl sulphate, 70° F.	3	2	2
Ethylene chlorohydrin, 70° F.	3	2	2
Ethylene dichloride, 70° F.	3	2	2
Ethylene glycol, 70° F.	2	2	2
Ethylene oxide, 70° F.	3	4	2
Ferric chloride, < 5%, 70° F.	4	4	4
Ferric chloride, > 5%, 70° F.	4	4	4
Ferric nitrate, 70° F.	4	4	2
Ferric sulphate, 70° F.	4	4	3
Ferrous sulphate, 70° F.	4	3	3
Formaldehyde, to boiling	2	2	1
Formic acid, to 212° F.	4	3	4
Freon, 70° F.	1	1	1
Hydrochloric acid, < 1%, 70° F.	4	4	3
Hydrochloric acid, 1-20%, 70° F.	4	4	4
Hydrochloric acid, > 20%, 70° F.	4	4	4
Hydrochloric acid, < ½%, 175° F.	4	4	3
Hydrochloric acid, ½-2%, 175° F.	4	4	4
Hydrocyanic acid, 70° F.	4	4	3
Hydrogen peroxide, < 30% < 150° F.	3	4	2
Hydrofluoric acid, < 20%, 70° F.	4	2	4
Hydrofluoric acid, > 20%, 50° F.	4	3	4
Hydrofluoric acid, to boiling	4	4	4
Hydrofluorsilicic acid, 70° F.	4		3

Corrosive	C.I.	Brz.	316SS
Lactic acid, < 50%, 70° F.	4	2	1
Lactic acid, > 50%, 70° F.	4	2	2
Lactic acid, < 5%, to boiling	4	4	3
Lime slurries, 70° F.	2	2	2
Magnesium chloride, 70° F.	3	3	2
Magnesium chloride, < 5%, to boiling	4	3	3
Magnesium chloride, > 5%, to boiling	4	3	4
Magnesium hydroxide, 70° F.	2	1	2
Magnesium sulphate	3	3	2
Maleic acid	3	3	2
Mercaptans	1	4	1
Mercuric chloride, < 2%, 70° F.	4	4	4
Mercurous nitrate, 70° F.	3	4	2
Methyl alcohol, 70° F.	1	1	1
Naphthalene sulphonic acid, 70° F.	4	3	2
Naphthalenic acid, to hot	3	3	2
Nickel chloride, 70° F.	4	4	3
Nickel sulphate	4	3	2
Nitric acid	4	4	2
Nitrobenzene, 70° F.	1	3	1
Nitroethane, 70° F.	1	1	1
Nitropropane, 70° F.	1	1	1
Nitrous acid, 70° F.	4	4	4
Nitrous oxide, 70° F.	3	3	3
Oleic acid	3	3	2
Oleum, 70° F.	2	4	2
Oxalic acid	4	3	3
Palmitic acid	2	2	2
Phenol (see carbolic acid)			
Phosgene, 70° F.	3	3	2
Phosphoric acid, < 10%, 70° F.	4	3	1
Phosphoric acid, > 10-70%, 70° F.	4	3	1
Phosphoric acid, < 20%, 175° F.	4	3	2
Phosphoric acid, > 20%, 175° F. < 85%	4	3	3
Phosphoric acid, > 10%, boil, < 85%	4	3	4
Phthalic acid, 70° F.	3	2	2
Phthalic anhydride, 70° F.	2	3	1
Picric acid, 70° F.	4	4	3
Potassium carbonate	2	2	1
Potassium chlorate	2	3	1
Potassium chloride, 70° F.	3	3	2
Potassium cyanide, 70° F.	2	4	2
Potassium dichromate	2	2	1
Potassium ferricyanide	3	2	2

Corrosive	C.I.	Brz.	316SS
Potassium ferrocyanide, 70° F.	4	2	2
Potassium hydroxide, 70° F.	3	3	2
Potassium hypochlorite	4	3	3
Potassium iodide, 70° F.	3	2	2
Potassium permanganate	2	2	2
Potassium phosphate	3	3	2
Sea water, 70° F.	3	2	2
Sodium bisulphate, 70° F.	4	3	3
Sodium bromide, 70° F.	2	3	2
Sodium carbonate	2	2	2
Sodium chloride, 70° F.	3	2	2
Sodium cyanide	2	4	2
Sodium dichromate	2	4	2
Sodium ethylate	2	1	1
Sodium fluoride	3	3	2
Sodium hydroxide, 70° F.	2	2	2
Sodium hypochlorite	4	4	3
Sodium lactate, 70° F.	2	3	3
Stannic chloride, <5 %, 70° F.	4	3	4
Stannic chloride, > 5%, 70° F.	4	4	4
Sulphite liquors, to 175° F.	4	3	2
Sulphur (molten)	2	4	1
Sulphur dioxide (spray), 70° F.	3	3	2
Sulphuric acid, < 2%, 70° F.	4	3	2
Sulphuric acid, 2-40%, 70° F.	4	3	3
Sulphuric acid, 40%, to 90%, 70° F.	4	4	4
Sulphuric acid, 93-98%, 70° F.	2	4	2
Sulphuric acid, < 10%. 175° F.	4	3	4
Sulphuric acid, 10-60% & > 80%, 175° F.	4	4	4
Sulphuric acid, 60-80%, 175° F.	4	4	4
Sulphuric acid, < ¾%, boiling	4	4	3
Sulphuric acid, ¾-40%, boiling	4	4	4
Sulphuric acid, 40-65% & > 85%, boil	4	4	4
Sulphuric acid, 65-85%, boiling	4	4	4
Sulphurous acid, 70° F.	4	3	3
Titanium tetrachloride, 70° F.	3		3
Tirchlorethylene, to boiling	2	3	2
Urea, 70° F.	3	3	2
Vinyl acetate	2	2	2
Vinyl chloride	2	3	2
Water, to boiling	2	1	1
Zinc chloride	3	3	2
Zinc cyanide, 70° F.	4	2	2
Zinc sulphate	4	3	1

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2) a leading global water technology company.

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