

MATERIAL SELECTION INFORMATION

The following information is a guide line for selecting thermocouple, RTD and thermowell materials based on the process fluid. Factors such as catalytic reaction, contaminations and electrolysis are taken into consideration. However, in many cases there are even more variables which must be examined.

These suggestions are to be used only as guide lines and are based on the most economical material selection. JMS Southeast will not take any responsibility if these recommendations are not satisfactory for specific applications. Consult JMS Southeast for special applications and our engineering department will assist you in your selection.

SUBSTANCE	CONDITIONS	RECOMMENDED METAL	SUBSTANCE	CONDITIONS	RECOMMENDED METAL	SUBSTANCE	CONDITIONS	RECOMMENDED METAL
Acetate Solvents	Crude or Pure	Monel or Nickel	Ethyl Acetate		Monel	85% - 70°F	Hastelloy B
Acetic Acid	10% - 70°F	304 Stainless Steel	Ethyl Chloride	70°F	304 Stainless Steel	85% - 212°F	Hastelloy B
.. ..	50% - 70°F	304 Stainless Steel	Ethylene Glycol		Steel (C1018)	Picric Acid	70°F	304 Stainless Steel
.. ..	50% - 212°F	316 Stainless Steel	Ferric Chloride	1% - 70°F	316 Stainless Steel	Potassium Bromide	70°F	316 Stainless Steel
.. ..	99% - 70°F	430 Stainless Steel	5% - 70°F	Tantalum	Potassium Carbonate	1% - 70°F	304 Stainless Steel
.. ..	99% - 212°F	430 Stainless Steel	5% - Boiling	Tantalum	Potassium Chlorate	70°F	304 Stainless Steel
Acetic Anhydride		Monel	5% - 70°F	304 Stainless Steel	Potassium Chloride	5% - 70°F	304 Stainless Steel
Acetone	212°F	304 Stainless Steel	Ferrous Sulphate	Dilute 70°F	304 Stainless Steel	5% - 212°F	304 Stainless Steel
Acetylene		304, Monel, Nickel	Formaldehyde		304 Stainless Steel	Potassium Hydroxide	25% - 212°F	304 Stainless Steel
Alcohol Ethyl	70°F	304 Stainless Steel	Freon		Steel (C1018)	50% - 212°F	316 Stainless Steel
.. ..	212°F	304 Stainless Steel	Formic Acid	5% - 70°F	316 Stainless Steel	Potassium Nitrate	5% - 70°F	304 Stainless Steel
Alcohol Methyl	70°F	304 Stainless Steel	5% - 150°F	316 Stainless Steel	5% - 212°F	304 Stainless Steel
.. ..	212°F	304 Stainless Steel	Gallic Acid	5% - 70°F	Monel	Potassium Permanganate	5% - 70°F	304 Stainless Steel
Aluminum	Molten	Cast Iron	5% - 150°F	Monel	Potassium Sulphate	5% - 70°F	304 Stainless Steel
Aluminum Acetate	Saturated	304 Stainless Steel	Gasoline	70°F	304 Stainless Steel	5% - 212°F	304 Stainless Steel
Aluminum Sulphate	10% - 70°F	304 Stainless Steel	Glucose	70°F	304 Stainless Steel	Potassium Sulphide	70°F	304 Stainless Steel
.. ..	Saturated 70°F	304 Stainless Steel	Glycerol	70°F	304 Stainless Steel	Propane		304 Stainless Steel
.. ..	10% - 212°F	316 Stainless Steel	Heat Treating		446 Stainless Steel	Pyregallic Acid		304 Stainless Steel
.. ..	Saturated 212°F	316 Stainless Steel	Hydrobromic Acid	48% - 212°F	Hastelloy B	Quinine Bisulphate	Dry	316 Stainless Steel
Ammonia	All concentrations 70°F	304 Stainless Steel	Hydrochloric Acid	1% - 70°F	Hastelloy C	Quinine Sulphate	Dry	304 Stainless Steel
Ammonium Chloride	All concentrations 212°F	316 Stainless Steel	1% - 212°F	Hastelloy B	Resin	Molten	304 Stainless Steel
Ammonium Nitrate	All concentrations 70°F	304 Stainless Steel	5% - 70°F	Hastelloy C	Sea Water		Monel
.. ..	All concentrations 212°F	304 Stainless Steel	5% - 212°F	Hastelloy B	Salomoniac		Monel
Ammonium Sulphate	5% - 70°F	304 Stainless Steel	5% - 212°F	Hastelloy B	Salicylic Acid		Nickel
.. ..	10% - 212°F	316 Stainless Steel	Hydrocyanic Acid		316 Stainless Steel	Shellac		304 Stainless Steel
.. ..	Saturated 212°F	316 Stainless Steel	Hydrofluoric Acid		Hastelloy C	Soap	70°F	304 Stainless Steel
Aniline	All concentrations 70°F	304 Stainless Steel	Hydrogen Peroxide	70°F	316 Stainless Steel	Sodium Bicarbonate	All concentrations 70°F	304 Stainless Steel
Amylacetate		Steel (C1018)	212°F	316 Stainless Steel	5% - 150°F	304 Stainless Steel
Asphalt		Phosphor Bronze, Monel, Nickel	Hydogen Sulphide	Wet and dry	316 Stainless Steel	Sodium Bisulphate		Monel
Barium Carbonate	70°F	304 Stainless Steel	Iodine	70°F	Tantalum	Sodium Carbonate	5% - 70°F	304 Stainless Steel
Barium Chloride	5% - 70°F	Monel	Kerosene	70°F	304 Stainless Steel	5% - 150°F	304 Stainless Steel
.. ..	Saturated 70°F	Monel	Lactic Acid	5% - 70°F	304 Stainless Steel	Sodium Chloride	5% - 70°F	316 Stainless Steel
Barium Hydroxide		316 Stainless Steel	5% - 150°F	316 Stainless Steel	Sodium Chloride	5% - 150°F	316 Stainless Steel
Barium Sulphite		Steel (C1018)	Lacquer	70°F	Tantalum	Saturated - 70°F	316 Stainless Steel
Benzaldehyde		Nichrome	Latex		316 Stainless Steel	Saturated - 212°F	316 Stainless Steel
Benzene	70°F	Steel (C1018)	Lime Sulphur		Steel (C1018)	Sodium Fluoride	5% - 70°F	Monel
Benzine		Monel, Inconel	Linseed Oil	70°F	304 Stainless Steel	Sodium Hydroxide		304 Stainless Steel
Benzol	Hot	304 Stainless Steel	Magnesium Chloride	5% - 70°F	Monel	Sodium Hypochlorite	5% still	316 Stainless Steel
Boric Acid	5% Hot or Cold	304 Stainless Steel	5% - 212°F	Nickel	Sodium Nitrate	Fused	317 Stainless Steel
Bromine	70°F	Tantalum	Magnesium Sulphate	Cold and Hot	Monel	Sodium Peroxide		304 Stainless Steel
Buladiene		Brass, 304	Malic Acid	Cold and Hot	316 Stainless Steel	Sodium Phosphate		Steel (C1018)
Bulane	70°F	304 Stainless Steel	Mercury		Steel (C1018), 304, Monel	Sodium Silicate		Steel (C1018)
Bulyacetate		Monel	Methane	70°F	Steel (1020)	Sodium Sulphate	70°F	304 Stainless Steel
Bulyl Alcohol		Copper	Milk		304, Nickel	Sodium Sulphide	70°F	316 Stainless Steel
Bulylenes		Steel (C1018)	Mixed Acids (Sulphuric and Nitric — all temp. and %)		Monel	Sodium Sulphite	150°F	304 Stainless Steel
Butyric Acid	5% - 70°F	Phosphor Bronze	Molasses		Steel (C1018), 304, Monel, Nickel	Steam		304 Stainless Steel
.. ..	5% - 150°F	304 Stainless Steel	Muriatic Acid	70°F	Tantalum	Stearic Acid		304 Stainless Steel
Calcium Bisulfite	70°F	304 Stainless Steel	Naphtha	70°F	304 Stainless Steel	Sulphur Dioxide	Moist Gas - 70°F	316 Stainless Steel
Calcium Chlorate	Dilute 70°F	304 Stainless Steel	Natural Gas	70°F	304 Stainless Steel	Dry - 575°F	304 Stainless Steel
.. ..	Dilute 150°F	304 Stainless Steel	Neon	70°F	304 Stainless Steel	Sulphur	Dry - Molten	304 Stainless Steel
Calcium Hydroxide	10% - 212°F	304 Stainless Steel	Nickel Chloride	70°F	304 Stainless Steel	Wet	316 Stainless Steel
.. ..	20% - 212°F	304 Stainless Steel	Nickel Sulphate	Hot and Cold	304 Stainless Steel	Sulphuric Acid	5% - 70°F	Carp. 20, Hastelloy B
.. ..	50% - 212°F	317 Stainless Steel	Nitric Acid	5% - 70°F	304 Stainless Steel	5% - 212°F	Carp. 20, Hastelloy B
Carbolic Acid	All 212°F	316 Stainless Steel	20% - 70°F	304 Stainless Steel	10% - 70°F	Carp. 20, Hastelloy B
Carbon Dioxide	Dry	Steel (C1018), Monel	50% - 70°F	304 Stainless Steel	10% - 212°F	Carp. 20, Hastelloy B
Carbon Dioxide	Wet	Aluminum, Monel, Nickel	50% - 212°F	304 Stainless Steel	50% - 70°F	Carp. 20, Hastelloy B
Carbon Tetrachloride	10% - 70°F	Monel	65% - 212°F	316 Stainless Steel	50% - 212°F	Carp. 20, Hastelloy B
Chlorex Caustic		316SS, 317SS	Concentrated - 70°F	304 Stainless Steel	90% - 70°F	Carp. 20, Hastelloy B
Chlorine Gas	Dry 70°F	317 Stainless Steel	Concentrated - 212°F	304 Stainless Steel	Tannic Acid	90% - 212°F	Hastelloy D
.. ..	Moist 70°F	Hastelloy C	Nitrobenzene	70°F	304 Stainless Steel	70°F	304 Stainless Steel
.. ..	Moist 212°F	Hastelloy C	Nitrous Acid		304 Stainless Steel	Tar		Steel (C1018), 304, Monel, Nickel
Chromic Acid	5% - 70°F	304 Stainless Steel	Oleic Acid	70°F	316 Stainless Steel	Tartaric Acid	70°F	304 Stainless Steel
.. ..	10% - 212°F	316 Stainless Steel	Oleum	70°F	316 Stainless Steel	150°F	316 Stainless Steel
.. ..	50% - 212°F	316 Stainless Steel	Oxalic Acid	5% - Hot and Cold	304 Stainless Steel	Tin	Molten	Cast Iron
Citric Acid	15% - 70°F	304 Stainless Steel	10% - 212°F	Monel	Tolvene		Aluminum, Phosphor Bronze, Monel
.. ..	15% - 212°F	316 Stainless Steel	Oxygen	70°F	Steel (C1018)	Trichloroethylene		Steel (C1018)
.. ..	Concentrated 212°F	317 Stainless Steel	Oxygen	Liquid	304 Stainless Steel	Turpentine		304 Stainless Steel
Coal Tar	Hot	304 Stainless Steel	Palmitic Acid		316 Stainless Steel	Varnish		304 Stainless Steel
Coke Oven Gas		Aluminum	Petroleum Ether		304 Stainless Steel	Vegetable Oils		Steel (C1018), 304, Monel
Copper Nitrate		304, 316	Phenol		304 Stainless Steel	Vinegar		304 Stainless Steel
Copper Sulphate		304, 316	Pentane		304 Stainless Steel	Water	Fresh	Copper, Steel (C1018), Monel
Core Oils		316 Stainless Steel	Phosphoric Acid	1% - 70°F	304 Stainless Steel	Salt	Aluminum, Brass, Monel
Cottonseed Oil		Steel (C1018)	5% - 70°F	304 Stainless Steel	Whiskey, Wine		304, Nickel
Creosols		Monel, Nickel	10% - 70°F	304 Stainless Steel	Xylene		Copper
Creosote Crude		304 Stainless Steel	10% - 212°F	316 Stainless Steel	Zinc	Molten	Cast Iron
.. ..		Steel (C1018), Monel	30% - 70°F	304 Stainless Steel	Zinc Chloride		Monel
.. ..		Nickel	30% - 212°F	Hastelloy C	Zinc Sulphate	5% - 70°F	304 Stainless Steel
Cyanogen Gas		304 Stainless Steel		Hastelloy B	Saturated - 70°F	304 Stainless Steel
Dowtherm		Steel (C1018)		Hastelloy B	25% - 212°F	304 Stainless Steel
Epsom Salt	Hot and Cold	304 Stainless Steel		Hastelloy B		304 Stainless Steel
Ether	70°F	304 Stainless Steel		Hastelloy B		304 Stainless Steel

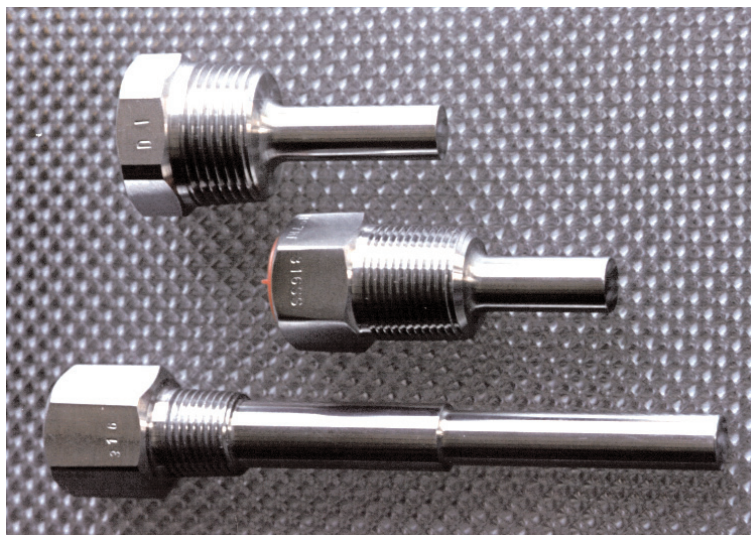
SECTION 5

MATERIAL SELECTION INFORMATION

METALLIC THERMOWELL MATERIALS

SUMMARY TABLE

DESIGNATION	NOMINAL COMPOSITION	MAXIMUM TEMP. (cont. serv. air)	MELTING POINT
304SS	18% Chromium 9% Nickel	1652°F	2600 - 2750°F
310SS	25% Chromium 20% Nickel	2100°F	2500 - 2550°F
316SS	18% Chromium 12% Nickel 2-3% Molybdenum	1700°F	2500 - 2550°F
304LSS	Similar to 304SS with reduced carbon	800°F	2600 - 2750°F
Inconel 600	76% Nickel 15.5% Chromium 8.0% Iron	2100°F	2470 - 2575°F
Inconel 617	44.5% Nickel 20-24% Cr 10-15% Co 8-10% Mo	2100°F (excursions to 2150 - 2200°F)	2430 - 2510°F
Hastelloy B3	65% Nickel 28 % Molybdenum 1.5% Cr 1.5% Iron	800°F	2500 - 2585°F
Hastelloy C276	57% Nickel 16% Molybdenum 15.5% Chromium 4% Tungsten 5% Iron	800°F	2415 - 2500°F
Haynes 230	57% Nickel 14% W 22% Cr 2% Mo	2100°F	2375 - 2500°F
Monel	65% Nickel 32% Copper	1000°F	2450°F



MATERIAL SELECTION INFORMATION

COMPARATIVE CORROSION RATINGS

For Carbon Steel, Inconel, Monel, Nickel, 303 Stainless Steel, 304 Stainless Steel, 316 Stainless Steel, and Teflon.

The data in this chart is reprinted here with the permission of Hoke, Inc., One Tenakill Park, Cresskill, New Jersey 07626.

This chart is a guide to the selection of a corrosion resistant protection tube. Changes in temperature, concentration, pressure, agitation, aeration, and impurities can nullify these ratings. The only way to determine the suitability of a protection material in a media is by performance tests. Mechanical strength of the protection tube must also be considered. Unless otherwise marked, all pressures and temperatures are atmospheric. This listing does not imply that other materials are not suitable for use in the media listed.

IDENTIFICATION OF TRADENAMED MATERIALS

Inconel, Monel International Nickel Co.
Teflon E.I. DuPont

RATINGS

- A Substantial Resistance-Preferred material of construction.
- B Moderate Resistance-Satisfactory for use under most conditions; very slight swelling for elastomers.
- C Questionable Resistance-Use with caution.
- D Inadequate Resistance-Not recommended.
- X No information available

LIMITATIONS

1. To 220° F.
2. Subject to stress corrosion at high temperatures and in concentrated solutions.
3. Subject to pitting at air solution line when solution is allowed to dry on metal surface.

SECTION 5

Corrosive Media	Carbon Steel	Inconel	Monel	Nickel	316 Stainless Steel	303 & 304 Stainless Steel	Teflon
Barium Chloride, 5%	C	A	A	A	A	A	A
Barium Chloride, >5%, Hot	D	B	A	A	C-3	B-3	A
Barium Hydroxide	C	A	A	A	A	A	A
Barium Nitrate	C	B	C	C	A	A	A
Beer, 160°F	C	A	A	A	A	A	A
Beet Sugar, Liquor, Hot	B	A	A	A	A	A	A
Benzene, Hot	B	A	A	A	A	A	A
Benzoic Acid	B	A	A	A	A	A	A
Blood	D	A	A	A	A	A	A
Borax, Hot	B	A	A	B	A	A	A
Boric Acid, 5%, Hot	D	A	B	B	B	B	A
Bromine, Dry Gas	D	B	A	A	D	D	A
Bromine, Moist Gas	D	D	C	C	D	D	A
Buttermilk	D	A	A	A	A	A	A
Butyric Acid, Dilute	X	A	A	A	A	A	A
Butyric Acid, Hot, Conc.	D	B	B	C	C	B	A
Calcium Bisulfite, Hot	D	D	D	D	C	B	A
Calcium Chloride, Dilute	C	A	A	A	B-3	A-3	A
Calcium Hydroxide, 10%, Boiling	D	A	A	A	A	A	A
Calcium Hydroxide, 20%, Boiling	D	A	A	A	A	A	A
Calcium Hydroxide, 30%, Boiling	D	A	A	A	C	B	A
Calcium Hypochloride, <2%	C	B	C	C	C-3	B-3	A
Carbolic Acid, 90%	C	A	B	A	A	A	A
Carbon Dioxide, Dry	B	A	A	A	A	A	A
Carbon Disulphide	B	A	B	B	A	A	A
Carbon Tetrachloride, Dry, Hot	C	A	A	A	B	A	A
Carbonic Acid, Saturated	D	A	A	A	A	A	A
Chloroacetic Acid	D	B	B	B	D	C	A
Chloric Acid	D	C	C	C	D	C	A
Chlorinated Water, Sat.	D	C	C	C	D	C-3	A
Chlorine, Dry Gas	B	A	A	A	B	B	A
Chlorine, Moist Gas	D	D	C	C	D	C	A
Chlorosulfonic Acid, Dilute	D	B	B	A	D	B	A
Chromic Acid, Dilute	B	B	B	B	B	A	A
Chromic Acid, >10%, Boiling	D	C	C	D	C	B	A
Chromic Acid, >10%, Boiling	D	C	D	D	D	C	A
Citric Acid, Dilute	D	A	A	B	A	A	A
Citric Acid, Hot, Concentrated	D	B	B	B	C	B	A
Copper Nitrate, Hot, Concentrated	D	C	D	D	A	A	A
Copper Sulfate, Hot, Concentrated	D	B	C	C	B	A	A
Creosote, Hot	B	A	A	A	A	A	A
Cupric Chloride, <2%	D	C	B	B	B-3	B-3	A
Cupric Chloride, 5%	D	D	D	C	D	C-3	A
Dichlorethane, Boiling	D	B	A	A	B	B	A
Ethyl Chloride	A	A	A	A	A	A	A
Ethylene Glycol	A	A	A	A	A	A	A
Fatty Acids, 145°F	C	A	A	A	B	A	A
Ferric Chloride, <1%	D	B	C	B	C-3	B-3	A
Ferric Chloride, >1%	D	D	D	D	D	D	A
Ferric Chloride, <1%, Boiling	D	D	D	D	D	D	A
Ferric Chloride, >1%, Boiling	D	D	D	D	D	D	A
Ferric Nitrate, 5%	D	C	D	D	B	A	A
Ferric Sulfate, 5%	D	B	C	C	B-3	A	A
Ferrous Sulfate, 10%	C	B	A	A	A	A	A
Fluorine, Dry Gas	C	A	A	A	C	B	A
Fluorine, Dry, 300°F	D	B	A	A	D	C	D
Fluorine, Moist Gas	D	B	A	B	O	D	A
Formaldehyde, 40%	C	A	A	A	B	A	A
Formic Acid, <50%	D	A	B	B	B	A	A
Formic Acid, >50%	D	B	B	B	B	A	A
Formic Acid, <50%, Hot	D	B	B	B	B	A	A
Formic Acid, >50%, Hot	D	B	B	B	C	B	A
Freon, Wet	C	B	A	A	C	C	A
Fuel Oil, 140°F	A	A	B	B	A	A	A
Furfural	B	B	B	B	B	B	A
Gasoline, refined	A	A	A	A	A	A	A
Glycerine	A	A	A	A	A	A	A
Hydrochloric Acid, <1%	D	B	B	B	D	B	A
Hydrochloric Acid, 1-20%	D	C	B	B	D	D	A
Hydrochloric Acid, >20%	D	D	D	C	D	D	A
Hydrochloric Acid, <1/2%, 175°F	D	C	B	B	D	D	A
Hydrochloric Acid, 1/2-2%, 175°F	D	D	C	C	D	D	A
Hydrochloric Acid, >2%, 175°F	D	D	D	D	D	D	A

Corrosive Media	Carbon Steel	Inconel	Monel	Nickel	303 & 304 Stainless Steel	316 Stainless Steel	Teflon
Acetate Solvents, Crude	D	A	B	B	A	A	A
Acetate Solvents, Pure	C	A	A	A	A	A	A
Acetaldehyde, 100%	X	B	A	B	A	A	A
Acetic Acid, 95%	D	A	A	A	B	A	A
Acetic Acid Vapors, 100%, Hot	B	B	B	B	D	E	A
Acetic Anhydride, Boiling	D	A	A	B	B	A	A
Acetone	B	A	A	A	A	A	A
Alcohols	B	A	A	A	A	A	A
Alum. Potassium, 10%	D	B	B	B	B-3	A	A
Aluminum Chloride, 10%	D	B	B	B	D	C-3	A
Aluminum Chloride, 10%, Boiling	D	C	C	B	D	D	A
Aluminum Sulfate, 10%	D	A	A	A	C	B	A
Aluminum Sulfate, <10%, Boiling	D	B	B	B	D	B	A
Aluminum Sulfate, >10%, Boiling	D	B	B	B	D	B	A
Amines	B	A	A	A	A	A	A
Ammonia, Anhydrous	B	A	A	A	A	A	A
Ammonium Chloride, 10%	C	A	A	A	B-3	A	A
Ammonium Chloride, <10%, Boiling	D	B	B	B	D	C-3	A
Ammonium Chloride, >10%, Boiling	D	C	B	B	D	C-3	A
Ammonium Hydroxide, Hot	B	A	D	D	A	A	A
Ammonium Nitrate	B	A	C	C	A	A	A
Ammonium Persulfate, 5%	D	A	D	D	A	A	A
Ammonium Phosphate, Dibasic, 5%	D	A	B	C	A	A	A
Ammonium Sulfate, <10%	C	B	A	B	B	B	A
Ammonium Sulfate, >10%, Boiling	D	B	B	B	C-3	B-3	A
Ammonium Sulfite, Boiling	D	D	C	D	C	B	A
Aniline Hydrochloride	D	B	B	B	D	C	A
Antimony Trichloride	D	B	B	B	D	C	A
Asphalt	B	A	A	B	A	A	A

MATERIAL SELECTION INFORMATION

Corrosive Media	Carbon Steel	Inconel	Monel	Nickel	303 & 304 Stainless Steel	316 Stainless Steel	Teflon
Hydrochloric Acid, <1/4%, Boiling	D	C	B	B	D	D	A
Hydrochloric Acid, 1/4-1%, Boiling	D	C	C	C	D	D	A
Hydrochloric Acid, >1%, Boiling	D	D	D	D	D	D	A
Hydrofluoric Acid, <40%	C	C	B	B	D	D	A
Hydrofluoric Acid, >40%	C	C	B	C	D	D	A
Hydrofluoric Acid, Boiling	D	D	B	C	D	D	A
Hydrofluosilic Acid	D	B	A	B	D	C	A
Hydrogen Chloride, Dry	B	A	A	A	D	C	A
Hydrogen Chloride, Moist	D	D	C	C	D	D	A
Hydrogen Fluoride, Dry	C	A	A	A	D	C	A-1
Hydrogen Peroxide, Boiling	D	B	B	B	C	B	A
Hydrogen Sulfide, Dry	B	A	A	A	A	A	A
Hydrogen Sulfide, Moist	C	A	B	B	B	A	A
Iodine, Dry	D	A	A	A	D	B	A
Kerosene	A	A	A	A	A	A	A
Lactic Acid, 5%	D	A	B	B	B	A	A
Lactic Acid, 10%	D	A	B	B	B	A	A
Lactic Acid, Boiling, 5%	D	B	C	C	C	B	A
Lactic Acid, Boiling, 10%	D	B	C	C	D	B	A
Lead Acetate, Hot	D	B	B	C	A	A	A
Magnesium Chloride, Hot, 5%	D	A	A	A	C-3	B-3	A
Magnesium Hydroxide	B	A	A	A	A	A	A
Magnesium Sulfate	B	B	A	B	A	A	A
Magnesium Sulfate, Boiling	C	C	A	B	A	A	A
Mercury	B	A	B-2	A	A	A	A
Mercuric Chloride, <2%	D	D	D	D	D	D	A
Mercuric Chloride, <1/2%, Boiling	D	D	D	D	D	D	A
Mercuric Cyanide	D	B	D	B	B	B	A
Methyl Chloride, Dry	D	A	A	A	B	B	A
Milk	D	A	B	B	A	A	A
Molasses	B	A	A	A	A	A	A
Naptha	B	A	A	A	A	A	A
Nickel Chloride	D	B	B	B	C-3	B-3	A
Nickel Sulfate, Boiling	D	B	A	A	C	C	A
Nitric Acid, 20%	D	B	D	D	A	A	A
Nitric Acid, Fuming	D	B	D	D	B	B	A
Nitric Acid, Boiling, 20%	D	C	D	D	A	A	A
Nitric Acid, Boiling, 65%	D	D	D	D	B	B	A
Nitric Acid, Boiling, Conc.	D	D	D	D	D	D	A
Nitrous Acid	D	B	C	C	B	B	A
Oxalic Acid, <10%	C	A	A	A	A	A	A
Oxalic Acid, 10%	C	A	A	A	A	A	A
Oxalic Acid, Boiling, 10%	D	A	A	B	D	C	A
Oxalic Acid, Boiling, 50%	D	B	B	C	D	C	A
Phosphoric Acid (Ortho), <10%	D	A	B	B	B	A	A
Phosphoric Acid (Ortho), 10-50%	D	A	B	C	C	A	A
Phosphoric Acid (Ortho), >50%	D	A	B	C	C	A	A
Phosphoric Acid (Ortho), <20%, 175°F	D	C	B	D	D	A	A
Phosphoric Acid (Ortho), >20%, 175°F	D	D	B	D	D	B	A
Phosphoric Acid (Ortho), <10%, Boiling	D	D	C	D	D	B	A
Phosphoric Acid (Ortho), 85%, Boiling	D	D	D	D	D	C	A
Picric Acid	C	D	D	D	A	A	A
Potassium Bromide	D	A	A	A	C-3	B-3	A
Potassium Carbonate	B	A	A	A	A	A	A
Potassium Chlorate	B	A	B	B	A	A	A
Potassium Chloride	D	A	A	B	A-3	A-3	A
Potassium Chloride, Hot	D	B	A	B	C-3	B-3	A
Potassium Cyanide	B	B	B	B	B	B	A
Potassium Dichromate, Conc.	C	B	B	C	A	A	A
Potassium Ferricyanide, 5%	C	B	B	B	A	A	A
Potassium Ferrocyanide, 5%	C	X	B	B	A	A	A
Potassium Hydroxide, 50%	B	A	A	A	A	A	A
Potassium Hydroxide, 30%, 175°F	D	A	A	A	A	A	A
Potassium Hydroxide, 50%, 175°F	D	A	A	A	B	A	A
Potassium Hydroxide, 30%, Boiling	D	A	A	A	B	A	A
Potassium Hydroxide, 50%, Boiling	D	A	A	A	B	A	A
Potassium Hypochlorite, Dilute	D	X	D	C	C-3	B-3	A
Potassium Permanganate, Dilute	B	B	A	A	A	A	A
Potassium Sulfate, Dilute	B	A	A	A	A	A	A
Potassium Sulfate, Dilute, Boiling	D	B	B	B	B	B	A
Potassium Sulfide, Saturated	C	A	C	A	A	A	A

Corrosive Media	Carbon Steel	Inconel	Monel	Nickel	303 & 304 Stainless Steel	316 Stainless Steel	Teflon
Propane, Liquid and Gas	B	A	A	A	A	A	A
Pyrogalllic Acid	B	B	A	A	A	A	A
Rosin, Molten	D	A	A	A	A	A	A
Salicylic Acid	D	B	B	B	B	B	A
Silver Bromide	D	C	B	C	B-3	A-3	A
Silver Chloride	D	C	B	C	D	D	A
Silver Nitrate	X	A	C	D	A	A	A
Sodium Acetate	C	A	A	A	A	A	A
Sodium Bisulfate	D	B	A	B	B	B	A
Sodium Bisulfate, 140°F	D	C	B	C	B	B	A
Sodium Bromide, Dilute	X	B	A	B	B-3	A-3	A
Sodium Carbonate, 5%, Hot	B	A	A	A	A	A	A
Sodium Chloride, Dilute	C	A	A	A	A	A	A
Sodium Chloride, Saturated, Boiling	D	A	A	A	C-3	B-3	A
Sodium Cyanide	B	B	A	B	B	B	A
Sodium Fluoride, 5%	D	B	A	A	B-3	A-3	A
Sodium Hydroxide, 50%	B	A	A	A	A	A	A
Sodium Hydroxide, <40%, 175°F	D	A	A	A	A	A	A
Sodium Hydroxide, 40-80%, 175°F	D	A	A	A	A	A	A
Sodium Hydroxide, <30%, Boiling	D	A	B	A	A	A	A
Sodium Hydroxide, >30%, Boiling	D	A	B	A	C	B	A
Sodium Hydroxide, Molten	D	B	B	A	D	D	D
Sodium Hypochlorite (Still), 5%	D	C	C	C	C-3	B-3	A
Sodium Hyposulfite	D	B	A	B	B	A	A
Sodium Nitrate	B	A	B	A	B	A	A
Sodium Perborate	C	A	B	B	A	A	A
Sodium Peroxide	C	A	B	B	A	A	A
Sodium Phosphate, Tribasic	C	A	A	A	A	A	A
Sodium Silicate	B	A	B	B	A	A	A
Sodium Sulfate (All concentrations)	B	B	A	B	A	B	A
Sodium Sulfate, Hot	D	B	A	B	C	B	A
Sodium Sulfide, Saturated	B	A	B	A	B-3	A	A
Sodium Sulfite, Hot	D	C	B	C	B	A	A
Sodium Thiosulfate	D	B	B	B	B	A	A
Stannic Chloride, <5%	D	D	B	B	D	D	A
Stannic Chloride, >5%	D	D	C	D	D	D	A
Stannic Chloride, SG 1.21, Boiling	D	D	D	D	D	D	A
Stannous Chloride, Saturated	D	B	B	B	D	B	A
Steam, 212°F	A	A	A	A	A	A	A
Steam, 600°F	C	A	A	A	A	A	D
Sulfite, Liquors	D	D	D	D	C	B	A
Sulfur, Molten, 266°F	B	A	A	A	B	B	A
Sulfur, Chloride	D	B	B	B	D	C	A
Sulfur Dioxide, 250°F, Dry	B	B	B	B	A	A	A
Sulfur Dioxide, Moist	D	D	D	D	B	A	A
Sulfuric Acid, <2%	D	B	B	B	C	B	A
Sulfuric Acid, 2-40%	D	B	B	B	D	D	A
Sulfuric Acid, 40%	D	B	B	B	D	D	A
Sulfuric Acid, Concentrated	B	B	D	D	B	B	A
Sulfuric Acid, <10%, Boiling	D	C	B	D	D	D	A
Sulfuric Acid, 10-80%, Boiling	D	D	C	D	D	D	A
Sulfuric Acid, Concentrated, Boiling	D	D	D	D	D	D	A
Sulfurous Acid, Saturated	D	D	D	D	B	B	A
Tannic Acid, 10%	D	B	A	A	A	A	A
Tar, Hot	B	A	B	B	A	A	A
Tartaric Acid, 120°F	D	A	A	A	B	A	A
Toluene	A	A	A	A	A	A	A
Trichlorethylene	B	A	A	A	A	A	A
Turpentine	B	A	A	A	A	A	A
Varnish, Hot	C	A	A	A	A	A	A
Vegetable Oils	B	A	B	B	A	A	A
Vinegar	D	A	A	A	A	A	A
Water, Acid Mine	D	A	C	C	A-3	A-3	A
Water, Boiler Feed	B	A	A	A	A	A	A
Water, Distilled	D	A	A	A	A	A	A
Water, Salt Sea	D	B	A	C	C-3	B-3	A
Whiskey, Boiling	D	A	C	B	A	A	A
Wine	D	A	C	B	A	A	A
Xylene, Boiling	X	A	A	B	A	A	A
Zinc Chloride, 5%	D	B	B	B	C-3	B-3	A
Zinc Chloride, 5%, Boiling	D	D	B	C	D	D	A
Zinc Sulfate, Boiling	D	B	A	B	A	A	A

SECTION 5