Transmitter Material Selection Guide

This TI rates the corrosion resistance of various process-wetted parts (flanges, diaphragms, gaskets, etc.) of Foxboro pressure-type transmitters when exposed to different process fluids. The data is a compilation of many sources (among them, the NACE Corrosion Data Guide, 6th Edition) and is considered accurate; however, Foxboro cannot guarantee the accuracy.

The degree of chemical resistance is indicated by a letter (A, B, C, X, or V), and in some cases additional qualifying data is indicated by a superscript number (1 through 6) at the listing of the process fluid. These ratings are defined in the table below. The absence of a rating indicates that data is not generally available.

EXPLANATION OF RATINGS		
A	Generally considered best choice. Corrosion rate of metals <0.05 mm (0.002 in) per year.	
B	Frequently used, slight corrosion expected. Corrosion rate of metals <0.5 mm (0.02 in) per year.	
C	Occasionally used, corrosion expected. Use with care.	
X	Not recommended; generally considered unsuitable.	
V	Corrosion varies greatly with concentration and temperature.	
–	Data not generally available.	
1	May cause stress cracking.	Rating is shown as superscript number at process fluid listing, where applicable.
2	May pit.	
3	Combination is explosive.	
4	Temperature is important.	
5	May be subject to local safety regulations.	
6	These specifications apply to forged and rolled Hastelloy C. Do not use for IFOA or Vortex Meter bodies.	

The following factors must be considered in using this TI:

1. All data is based on a temperature of 20°C (70°F), normal room temperature (RT), unless otherwise noted.
2. The ratings of materials are to be used only as a general guide since the factors that affect chemical resistance vary greatly.
3. There is no assurance that a material with an “A” rating will give satisfactory service in all cases. Chemical resistance is affected by such factors as temperature, pressure, impurities, aeration, velocity, etc. A combination of these factors can cause unforeseen effects.
4. If a transmitter material has satisfactory chemical resistance when used with food or pharmaceutical fluids, it must also be ascertained that the material does not contaminate the fluid.

NOTE

1. Due to generalized nature of this data, Foxboro makes no warranty as to suitability of any transmitter material in the user's process. Responsibility for selection of materials is solely that of the user.
2. Refer to TI 37-078 for further information regarding cobalt-nickel-chrome alloy sensor diaphragm material.

PROCESS FLUID	BODY, PROCESS FLANGE					SENSOR DIAPHRAGM						GASKETS, COATINGS						
	CARBON STEEL	316 ss	KYNAR	MONEL	HASTELLOY C6	316 ss	MONEL	HASTELLOY C6	CO, NI, CR ALLOY	NI/PERMANICKEL	TANTALUM	SILICONE	BUNA-N	VITON	TEFLON	RYTON	NEOPRENE	KEL-F
Acetic Acid (100%, 65°C {150°F} max)	X	B	A	B	A	B	B	A	A	X	A	X	C	C	A	A	X	A
Acetic Acid (<50%, boil.)	X	A	C	X	A	A	X	A	A	X	A	X	X	X	A	B	X	A
Acetic Acid (>50%, boil.)	X	B	C	X	A	C	X	A	A	X	A	X	X	X	A	B	X	A
Acetic Anhydride (boil.)	X	B	X	B	A	B	B	A	A	B	A	C	X	X	A	B	X	A
Acetone	B	A	X	A	A	A	A	A	A	A	A	X	B	C	A	A	X	A
Acetylene (<120°C {250°F} max)	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	A	B	A
Alcohols	B	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	A	A
Allyl Chloride (ambient)	X	B	A	B	–	X	–	–	B	A	A	X	X	A	A	A	X	A
Alum Solution (dil., 120°C {250°F} max)	C	C	A	B	A	C	B	A	A	B	A	–	C	A	A	–	–	A
Alum Solution (conc., 120°C {250°F} max)	X	B	A	–	A	–	–	B	A	B	A	–	C	A	A	–	–	A
Aluminum Acetate	X	B	A	B	B	B	B	B	A	B	A	X	B	X	A	C	B	A
Aluminum Chloride (dil.)	X	C	A	B	A	C	B	A	B	C	A	B	B	A	A	A	A	A
Aluminum Chloride (boil.)	X	C	X	X	B	X	X	B	B	X	X	X	X	X	A	X	X	A
Aluminum Hydroxide	B	A	A	B	B	B	B	B	A	B	X	B	B	A	A	A	B	A
Aluminum Sulfate (<10%, boil.)	X	A	B	B	A	A	C	A	A	C	A	A	X	A	A	B	A	A
Aluminum Sulfate (>10%, boil.)	X	X	X	C	B	X	X	B	B	X	A	A	X	A	A	B	A	A
Amines	A	A	C	A	A	A	A	A	A	A	A	B	X	X	A	A	B	A
Ammonia (anhydrous)[1]	B	A	A	A	A	A	A	A	A	A	–	B	B	X	A	A	A	A
Ammonium Bicarbonate	C	A	A	X	A	B	X	B	A	X	A	A	X	A	A	A	A	A
Ammonium Bisulfite	X	B	A	C	B	C	C	B	A	C	A	C	A	A	A	A	A	A
Ammonium Carbonate	B	B	A	B	B	B	B	B	A	B	A	A	X	A	A	A	A	A
Ammonium Chloride (<50%, boil.)[1,2]	X	C	B	B	C	X	B	C	B	C	A	–	X	A	A	A	C	A
Ammonium Hydroxide (conc.)	X	B	A	X	B	B	X	B	A	X	X	A	X	C	A	A	A	A
Ammonium Nitrate (sat.)[3]	B	A	A	X	A	A	X	B	A	X	A	B	A	A	A	A	A	A
Ammonium Oxylate	X	B	A	B	B	B	X	B	A	X	A	A	A	A	A	A	A	A
Ammonium Persulfate (5%)	X	B	A	X	A	B	X	B	A	X	A	B	X	A	A	A	A	A
Ammonium Phosphate (5%)	X	B	A	B	A	B	B	B	A	B	A	A	B	A	A	A	A	A
Ammonium Sulfate (10%, boil.)[2]	X	B	A	B	B	C	C	B	A	C	A	B	X	A	A	A	A	A
Ammonium Sulfite (boil.)	X	B	X	X	A	C	X	B	A	X	A	B	X	A	A	A	A	A
Amyl Acetate	B	A	A	A	A	A	A	A	A	A	A	X	X	X	A	A	X	A

PROCESS FLUID	BODY, PROCESS FLANGE					SENSOR DIAPHRAGM						GASKETS, COATINGS						
	CARBON STEEL	316 ss	KYNAR	MONEL	HASTELLOY C6	316 ss	MONEL	HASTELLOY C6	CO, NI, CR ALLOY	NI/PERMANICKEL	TANTALUM	SILICONE	BUNA-N	VITON	TEFLON	RYTON	NEOPRENE	KEL-F
Amyl Chloride (anhydrous)[1,2]	A	A	A	B	A	A	B	A	A	B	A	X	B	A	A	A	X	A
Aniline (<40°C {100°F})	A	A	B	B	B	B	C	B	A	C	A	X	X	X	A	A	X	A
Aniline Hydrochloride	X	X	A	C	B	X	C	–	B	C	A	X	B	B	A	B	X	A
Animal Fat and Oil	A	A	A	–	A	A	A	A	A	–	A	B	A	A	A	A	B	A
Antimony Trichloride	X	X	A	B	A	X	B	B	A	X	A	B	B	B	A	A	A	A
Arsenic Acid (<40°C {100°F})	X	B	A	X	B	B	X	B	A	X	A	A	A	A	A	A	A	A
Barium Carbonate (<40°C {100°F})	C	B	A	B	A	C	B	B	A	B	A	A	A	A	A	A	A	A
Barium Chloride (<5%, <90°C {200°F})	C	B	A	B	A	B	B	A	A	B	A	A	A	A	A	A	A	A
Barium Chloride (>5%, >90°C {200°F})[1,2]	X	B	A	B	A	B	B	A	A	B	A	A	A	A	A	A	A	A
Barium Hydroxide	B	A	A	A	B	A	B	B	A	A	X	A	A	A	A	A	A	A
Barium Nitrate	C	B	A	B	B	A	B	B	A	X	A	A	B	A	A	A	A	A
Barium Sulfate	B	B	A	B	B	B	B	B	A	B	A	A	A	A	A	A	A	A
Barium Sulfide	C	B	A	–	–	B	–	–	A	–	A	A	A	A	A	A	A	A
Beer	X	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Benzoic Acid (10%)	X	B	A	B	A	B	B	A	A	B	A	X	X	A	A	A	X	A
Benzene (benzol)	B	A	A	A	B	B	A	B	A	A	A	X	X	B	A	A	X	C
Black Liquor (sulfate)[1,2,4]	C	B	A	–	A	B	–	A	A	–	A	B	C	B	A	B	C	A
Blood	X	A	A	A	A	A	A	A	A	A	A	A	X	A	A	A	A	A
Boric Acid (10%)	X	A	A	B	A	A	B	A	A	B	A	A	A	A	A	A	A	A
Brines (calcium, dil.)[2]	X	B	A	B	A	X	C	A	A	B	A	A	A	A	A	A	A	A

EXPLANATION OF RATINGS			
A	Generally considered best choice. Corrosion rate of metal <0.05 mm (0.002 in) per year.	1	May cause stress cracking.
B	Frequently used, slight corrosion expected. Corrosion rate of metal <0.5 mm (0.02 in) per year.	2	May pit.
C	Occasionally used, corrosion expected. Use with care.	3	Combination is explosive.
X	Not recommended; generally considered unsuitable.	4	Temperature is important.
V	Corrosion varies greatly with concentration and temperature.	5	May be subject to local safety regulations.
–	Data not generally available.	6	These specifications apply to forged and rolled Hastelloy C. Do not use for IFOA or Vortex Meter bodies.
			Numerical rating above is indicated as superscript number at process fluid listing, where applicable.

PROCESS FLUID	BODY, PROCESS FLANGE					SENSOR DIAPHRAGM						GASKETS, COATINGS						
	CARBON STEEL	316 ss	KYNAR	MONEL	HASTELLOY C6	316 ss	MONEL	HASTELLOY C6	CO, NI, CR ALLOY	NI/PERMANICKEL	TANTALUM	SILICONE	BUNA-N	VITON	TEFLON	RYTON	NEOPRENE	KEL-F
Brines (sodium)[2]	X	B	A	A	A	X	A	A	A	–	A	A	A	A	A	A	A	A
Bromine Water	X	X	A	X	C	X	X	C	C	X	A	X	X	B	A	C	X	A
Butyl Acetate	A	B	A	B	A	B	B	A	A	B	A	X	X	X	A	A	X	A
Butyric Acid (dil.)	X	B	A	C	A	B	C	A	A	C	A	C	B	A	A	A	X	A
Butyric Acid (conc.)	X	B	A	B	A	B	B	A	A	C	A	C	X	B	A	B	X	A
Calcium Bisulfate	C	A	A	X	A	B	X	B	A	X	A	A	A	A	A	A	A	A
Calcium Carbonate	B	A	A	B	B	A	B	B	A	B	A	A	A	A	A	A	A	A
Calcium Chloride (<20%)[2]	C	A	A	B	A	B	B	A	A	A	A	A	A	A	A	A	A	A
Calcium Hydroxide (10%, boil)	B	A	X	B	A	B	B	A	A	B	A	C	X	B	A	A	C	A
Calcium Hydroxide (30%, boil)	X	B	X	X	A	C	X	A	A	B	A	C	X	B	A	A	C	A
Calcium Hydroxide (sat. boil)	X	B	X	X	A	B	X	B	A	B	A	C	X	B	A	A	X	A
Calcium Hypochlorite (<5%)	X	X	A	X	B	X	X	B	A	X	A	B	B	A	A	A	B	A
Calcium Sulfate (sat.)	C	B	A	B	B	B	B	B	A	B	A	A	A	A	A	A	A	A
Carbolic Acid (phenol, 90%)	C	A	A	A	A	B	A	A	A	A	A	X	X	A	A	B	X	A
Carbonated Beverage	X	A	A	A	A	A	X	A	A	A	A	A	A	A	A	A	A	A
Carbonic Acid (>90%)	X	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	A	A
Carbon Bisulfide	B	A	A	B	A	B	B	B	A	B	A	A	X	A	A	A	X	A
Carbon Dioxide (gas)	A	A	A	A	A	A	A	A	A	A	A	B	A	B	A	A	B	A
Carbon Disulfide	B	B	A	B	A	A	B	B	A	C	A	A	X	A	A	A	X	A
Carbon Monoxide (gas)	A	A	A	A	A	A	A	A	A	X	A	A	A	A	A	A	B	A
Carbon Tetrachloride (dry)[4]	B	A	A	A	A	A	A	A	A	A	A	X	C	A	A	A	X	B
Carbon Tetrachloride (wet)[4]	X	B	A	A	A	B	A	A	A	A	A	X	C	A	A	C	X	A
Cellulose Acetate	C	B	A	B	B	B	B	B	A	B	A	X	X	X	A	A	X	A
Chloroacetic Acid	X	X	A	C	B	X	C	B	A	C	A	X	X	X	A	A	X	A
Chloric Acid (<20%)	X	X	A	X	A	X	X	A	–	X	A	X	X	X	A	A	X	A
Chlorinated Water (sat)[2]	X	X	A	B	C	X	C	B	A	C	A	C	X	A	A	A	X	A
Chlorine Gas (dry)	X	C	A	B	A	C	B	X	A	X	A	X	X	B	A	C	X	B
Chlorine Gas (wet)[2]	X	X	A	X	X	X	X	X	B	X	A	X	X	X	A	C	X	B
Chlorine Gas (liq. anhydrous)	X	X	A	B	B	X	B	B	B	–	A	X	X	B	A	C	X	B
Chlorobenzene (dry)	B	B	A	B	B	B	B	B	A	B	A	X	X	A	A	A	X	A

PROCESS FLUID	BODY, PROCESS FLANGE					SENSOR DIAPHRAGM						GASKETS, COATINGS						
	CARBON STEEL	316 ss	KYNAR	MONEL	HASTELLOY C6	316 ss	MONEL	HASTELLOY C6	CO, NI, CR ALLOY	NI/PERMANICKEL	TANTALUM	SILICONE	BUNA-N	VITON	TEFLON	RYTON	NEOPRENE	KEL-F
Chloroform (dry, 100%)	A	A	A	A	B	A	A	B	A	A	A	X	X	C	A	A	X	A
Chromic Acid (<10%, boil.)	X	X	A	X	C	X	X	C	B	X	A	X	X	X	A	A	X	A
Chromic Acid (>10%, boil.)	X	X	X	X	X	X	X	X	B	X	A	X	X	X	A	A	X	A
Citric Acid (dil., 50°C {125°F})	X	A	B	B	A	A	B	A	A	B	A	A	B	A	A	A	A	A
Citric Acid (<50%, 50°C {125°F})	X	X	B	C	A	X	C	A	A	C	A	A	A	A	A	A	A	A
Copper Acetate (<20%)	X	A	A	B	B	A	B	B	A	B	A	X	B	B	A	A	B	A
Copper Chloride (5%)[1,2]	X	X	A	X	B	X	X	B	B	X	A	A	A	A	A	A	B	A
Copper Nitrate (conc., 90°C {200°F})	X	B	A	X	X	B	X	X	B	X	A	A	B	A	A	A	B	A
Copper Sulphate (<40%, 90°C {200°F})	X	B	A	X	A	B	X	A	A	X	A	A	B	A	A	A	A	A
Creosote (l00°C {212°F})	B	B	C	B	B	B	B	B	A	B	A	X	X	A	A	A	X	A
Cresylic Acid (50%)	B	A	–	–	A	A	–	A	A	B	A	X	X	B	A	A	X	B
Cupric Chloride (<5%, 400°C {750°F})[1,2]	X	X	X	X	B	X	X	B	B	X	A	X	X	X	X	X	X	X
Cyanide Solution (plating)	B	A	–	B	B	B	B	B	A	B	A	–	–	–	–	–	–	–
Cyanogen Gas (100%, 25°C {75°F})	–	B	–	–	–	B	–	–	A	–	A	–	–	–	–	–	–	–
Dichloroethane (100%, 100°C {212°F})	X	A	B	A	A	A	A	B	A	A	A	X	X	B	A	B	X	C
Ethers	B	A	A	A	B	B	B	B	A	B	A	X	X	X	A	A	X	A
Ethyl Acetate	C	A	A	A	A	B	B	B	A	C	A	B	X	X	A	A	X	A
Ethyl Chloride (dry)	A	A	A	B	B	A	B	B	A	X	A	X	B	A	A	A	X	B
Ethyl Chloride (wet)	X	A	A	A	B	B	B	C	B	A	A	X	A	A	A	A	A	A
Ethylene Dichloride (dry)[1,2]	X	C	A	C	B	C	C	B	B	–	A	X	X	A	A	A	X	A

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		2	May pit.
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C	Occasionally used, corrosion expected. Use with care.	5	May be subject to local safety regulations.
X	Not recommended; generally considered unsuitable.	6	These specifications apply to forged and rolled Hastelloy C. Do not use for IFOA or Vortex Meter bodies.
V	Corrosion varies greatly with concentration and temperature.		
–	Data not generally available.		
			Numerical rating above is indicated as superscript number at process fluid listing, where applicable.

PROCESS FLUID	BODY, PROCESS FLANGE					SENSOR DIAPHRAGM						GASKETS, COATINGS						
	CARBON STEEL	316 ss	KYNAR	MONEL	HASTELLOY C6	316 ss	MONEL	HASTELLOY C6	CO, NI, CR ALLOY	NI/PERMANICKEL	TANTALUM	SILICONE	BUNA-N	VITON	TEFLON	RYTON	NEOPRENE	KEL-F
Ethylene Glycol	B	A	A	B	A	A	B	A	A	B	A	A	A	A	A	A	A	A
Ethylene Oxide	C	B	A	–	–	C	–	–	A	–	–	X	X	X	A	A	X	A
Fatty Acid (100°C {212°F})	C	A	A	B	A	A	B	A	A	A	A	C	C	A	A	A	C	A
Ferric Chloride (<1%)[2]	X	X	A	C	A	X	X	A	A	X	A	B	A	A	A	A	B	A
Ferric Chloride (>1%)[2]	X	X	A	C	A	X	X	A	A	X	A	B	A	A	A	A	B	A
Ferric Chloride (hot, <1%, boil.)[2]	X	X	A	X	X	X	X	X	B	X	A	B	X	A	A	A	C	A
Ferric Chloride (hot, >1%, boil.)[2]	X	X	A	X	X	X	X	X	X	X	A	B	X	A	A	A	X	A
Ferric Hydroxide	C	B	A	B	B	B	–	–	A	–	A	B	A	A	A	A	B	A
Ferric Nitrate (5%)	X	B	A	X	A	B	X	B	A	X	A	B	A	A	A	A	A	A
Ferric Sulfate (5%)	X	A	A	X	A	A	X	A	A	X	A	B	A	A	A	A	A	A
Ferrous Chloride (10%)[2]	X	X	A	X	B	X	X	B	A	X	A	B	A	A	A	A	A	A
Ferrous Sulfate (10%)	C	B	A	X	B	B	X	B	A	X	A	B	A	A	A	A	A	A
Fluorine Gas (dry)	C	B	A	A	B	A	A	B	A	A	X	–	–	A	A	–	–	A
Fluorine Gas (wet)	X	X	A	X	B	X	X	B	B	C	X	X	X	A	A	B	X	A
Formaldehyde (40%)	X	A	A	A	B	A	A	B	A	A	A	B	B	A	A	A	C	A
Formic Acid (<50%	X	B	A	C	A	C	C	A	A	A	A	X	X	C	A	A	X	A
Formic Acid (>50%)	X	A	A	C	A	B	C	A	A	A	A	X	X	C	A	A	X	A
Formic Acid (<50%, hot)	X	B	B	B	B	C	C	B	A	C	C	X	X	C	A	A	X	A
Formic Acid (>50%, hot)	X	C	B	C	B	X	X	C	B	X	A	X	X	C	A	A	X	A
Foods	X	A	A	X	A	A	X	A	A	A	A	A	A	A	A	A	A	A
Fuel Oil	A	A	A	A	A	A	A	A	A	A	A	X	A	A	A	A	B	A
Freon (gas, wet)	C	A	A	A	A	A	A	A	A	A	A	X	B	A	A	A	A	C
Furfural	B	B	A	B	B	B	B	B	A	B	A	X	X	X	A	A	X	B
Gallic Acid	X	B	A	B	B	B	C	B	A	C	A	X	A	B	A	A	B	A
Gasoline, refined	A	A	A	A	A	A	A	A	A	A	A	X	A	A	A	A	C	A
Glucose	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Glycerol	X	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Green Liquor (NaOH)[1,2,4]	C	A	A	A	A	A	A	A	A	A	X	B	X	B	A	B	B	A
Hydrochloric Acid (<1%)	X	X	A	B	B	X	B	B	B	B	A	X	C	A	A	A	C	A
Hydrochloric Acid (>2%, RT to hot)	X	X	A	X	C	X	X	X	C	X	A	X	X	A	A	X	X	A

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Hydrocyanic Acid[2,3]	C	C	A	X	B	C	X	B	–	X	A	X	C	B	A	A	X	A
Hydrofluoric Acid (<40%)	X	X	A	B	A	X	B	B	B	B	X	X	X	A	A	B	X	A
Hydrofluoric Acid (>40%)	X	X	A	B	B	X	B	B	C	C	X	X	X	B	A	B	X	A
Hydrogen Chloride (gas, dry)[1]	A	B	A	B	A	B	B	A	A	B	A	C	B	A	A	A	B	B
Hydrogen Chloride (gas, wet)[1]	A	B	A	B	C	–	X	–	B	X	A	X	X	A	A	C	X	A
Hydrogen Fluoride (100% dry)	X	A	A	A	A	A	B	B	A	A	X	X	X	A	A	A	B	B
Hydrogen Sulfide (dry)[1]	X	A	A	X	A	A	X	A	A	B	A	X	A	A	A	A	A	A
Hydrogen Sulfide (wet)[1]	X	B	A	X	B	B	X	A	A	B	A	X	X	A	A	A	A	A
Iodine (dry, 100%)	X	A	A	A	A	B	A	A	A	A	A	–	C	A	A	A	X	A
Kerosene	A	A	A	A	A	A	A	A	A	A	A	X	B	A	A	A	C	A
Lactic Acid (5%)	X	A	A	X	B	A	X	B	A	X	A	B	B	A	A	A	A	A
Lactic Acid (10%)	X	B	A	X	B	B	X	B	A	X	A	B	X	A	A	A	X	A
Lactic Acid (10%, hot)	X	B	A	X	B	B	X	B	A	X	A	C	X	A	A	A	X	A
Lead Acetate	X	B	A	B	B	B	B	B	A	B	A	X	B	B	A	A	B	A
Magnesium Bisulfite	C	B	A	B	B	B	B	B	A	B	B	A	A	A	A	A	A	A
Magnesium Chloride (5%)	B	B	A	B	A	B	B	A	B	B	A	A	B	A	A	A	B	A
Magnesium Hydroxide	B	B	A	B	B	B	B	B	A	A	A	B	B	A	A	A	B	A
Magnesium Sulfate	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Mercury	A	A	A	X	A	X	X	B	B	X	A	A	A	A	A	A	A	A
Mercuric Chloride (<2%)	X	X	A	X	B	X	X	C	B	X	A	A	A	A	A	A	A	A

EXPLANATION OF RATINGS			
A	Generally considered best choice. Corrosion rate of metal <0.05 mm (0.002 in) per year.	I	May cause stress cracking.
		2	May pit.
B	Frequently used, slight corrosion expected. Corrosion rate of metal <0.5 mm (0.02 in) per year.	3	Combination is explosive.
		4	Temperature is important.
C	Occasionally used, corrosion expected. Use with care.	5	May be subject to local safety regulations.
X	Not recommended; generally considered unsuitable.	6	These specifications apply to forged and rolled Hastelloy C. Do not use for IFOA or Vortex Meter bodies.
V	Corrosion varies greatly with concentration and temperature.		
–	Data not generally available.		
			Numerical rating above is indicated as superscript number at process fluid listing, where applicable.

PROCESS FLUID	BODY, PROCESS FLANGE					SENSOR DIAPHRAGM						GASKETS, COATINGS						
	CARBON STEEL	316 ss	KYNAR	MONEL	HASTELLOY C6	316 ss	MONEL	HASTELLOY C6	CO, NI, CR ALLOY	NI/PERMANICKEL	TANTALUM	SILICONE	BUNA-N	VITON	TEFLON	RYTON	NEOPRENE	KEL-F
Mercuric Chloride (>2%, boil.)	X	X	A	X	C	X	X	X	C	X	A	C	C	B	A	B	X	A
Methanol	A	A	A	A	A	B	B	A	A	B	A	A	A	C	A	A	A	A
Methyl Chloride (dry)	X	A	A	B	A	B	B	B	A	B	A	X	X	B	A	B	X	A
Mine Water (acid)	X	B	A	B	A	C	C	A	A	–	A	X	B	A	A	A	B	A
Molybdic Acid (<5%)	X	B	–	X	B	X	X	X	B	X	A	–	–	–	–	–	–	–
Naphtha Petroleum	A	A	A	A	A	A	A	A	A	A	A	X	B	A	A	B	X	A
Natural Gas (liquid)	–	A	A	–	A	A	–	A	A	–	A	A	A	A	A	A	A	A
Nickel Chloride[1,2]	X	X	A	C	A	X	X	B	A	C	A	A	B	A	A	A	B	A
Nickel Sulfate	X	A	A	–	A	B	X	B	A	B	A	A	B	A	A	A	A	A
Nitric Acid (20%)	X	A	A	X	A	A	X	X	A	X	A	X	X	A	A	X	X	A
Nitric Acid (20%, boil.)	X	A	B	X	X	B	X	X	B	X	A	X	X	B	A	X	X	A
Nitric Acid (65%, boil.)	X	B	C	X	X	X	X	X	C	X	A	X	X	C	A	X	X	A
Nitric Acid (conc., hot)	X	X	X	X	C	X	X	X	C	X	A	X	X	X	A	X	X	A
Nitric Acid (fuming)	X	A	B	X	B	A	X	B	B	X	A	X	X	C	A	X	X	A
Nitro Benzene (100%)	A	A	A	A	A	A	A	A	A	–	A	X	X	B	A	A	X	A
Nitrous Acid	X	B	A	X	C	C	X	C	A	X	A	X	X	A	A	C	X	A
Oleum (sulfuric acid, fuming)	X	B	X	X	B	C	X	C	B	X	X	X	X	B	A	C	X	A
Oxalic Acid (10%)	X	B	A	B	B	B	C	B	A	B	A	B	B	A	A	A	B	A
Oxalic Acid (10%, boil.)	X	X	B	B	B	X	C	B	A	C	A	C	X	B	A	C	X	A
Oxalic Acid (50%, boil.)	X	X	B	B	C	X	X	C	B	X	A	C	X	C	A	C	X	A
Oxygen[5]	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	A	A
Perchloroethylene	B	A	A	A	A	A	A	A	A	A	A	X	C	A	A	A	X	A
Phenol	A	B	A	B	A	B	B	A	A	B	A	X	X	A	A	A	X	A
Phosphoric Acid (10%)	X	A	A	X	A	A	X	A	A	B	A	B	B	A	A	A	B	A
Phosphoric Acid (10 to 50%)	X	A	A	X	A	A	X	A	A	C	A	C	B	A	A	A	B	A
Phosphoric Acid (>50%)	X	C	A	X	B	C	X	B	A	X	A	C	X	A	A	A	B	A
Phosphoric Acid (>20%, 80°C {175°F})	X	C	A	X	C	B	X	C	B	X	A	X	X	A	A	A	X	A
Phosphoric Acid (<10%, boil.)	X	C	A	X	C	C	X	C	A	X	A	X	X	A	A	A	X	A
Phosphoric Acid (85%, boil.)	X	X	B	X	X	X	X	X	C	X	A	X	X	A	A	A	X	A
Phosphorous Trichloride (dry, 100%)	A	A	A	C	A	A	C	A	A	B	A	B	X	A	A	A	X	B

PROCESS FLUID	BODY, PROCESS FLANGE					SENSOR DIAPHRAGM						GASKETS, COATINGS						
	CARBON STEEL	316 ss	KYNAR	MONEL	HASTELLOY C6	316 ss	MONEL	HASTELLOY C6	CO, NI, CR ALLOY	NI/PERMANICKEL	TANTALUM	SILICONE	BUNA-N	VITON	TEFLON	RYTON	NEOPRENE	KEL-F
Phthalic Anhydride (100%)	A	A	A	A	A	A	A	A	A	A	A	–	–	A	A	–	–	–
Picric Acid (<40°C {100°F})	X	B	A	X	B	C	X	C	A	X	A	C	A	A	A	A	A	A
Polyvinylchloride (ambient)	A	A	A	–	–	–	–	–	A	B	–	X	X	A	A	A	X	A
Potassium Bromide (<40%)[1,2]	X	B	A	C	B	B	C	B	A	C	A	A	A	A	A	A	A	A
Potassium Carbonate	B	B	A	B	B	B	B	B	A	B	X	A	A	A	A	A	A	A
Potassium Chlorate (<40%, <90°C {200°F})[1]	X	B	A	X	B	B	X	B	A	X	A	A	C	A	A	A	B	A
Potassium Chloride (<40%, <90°C {200°F})[1,2]	X	A	A	C	A	A	C	A	A	C	A	A	C	A	A	A	B	A
Potassium Cyanide	C	B	A	B	B	B	B	B	A	B	A	A	A	A	A	A	A	A
Potassium Ferricyanide (<20%)	X	B	A	B	B	B	B	B	A	B	A	A	A	A	A	A	A	A
Potassium Hydroxide (50%)[1]	X	B	A	A	B	B	A	B	A	A	X	C	B	X	A	A	B	A
Potassium Hydroxide (30%, 80°C {175°F})[1]	X	B	C	A	B	B	A	B	A	A	X	X	X	X	A	A	C	A
Potassium Hydroxide (50%, boil.)[1]	X	X	X	B	B	X	B	B	B	A	X	X	X	X	A	A	X	B
Potassium Hypochlorite (dil.)	X	C	A	–	B	–	–	B	B	–	A	B	B	A	A	A	B	A
Potassium Iodide	X	B	A	B	B	B	B	B	A	B	A	B	A	A	A	A	A	A
Potassium Nitrate	B	B	A	B	B	B	B	B	A	B	V	A	A	A	A	A	A	A
Potassium Permanganate (dil.)	B	B	A	B	B	B	B	B	A	B	A	A	C	A	A	A	A	A
Potassium Sulfate (dil.)	B	A	A	A	B	A	A	B	A	B	A	A	B	A	A	A	A	A
Potassium Sulfate (dil., boil.)	X	A	A	A	B	A	A	B	A	B	A	A	X	A	A	A	X	A
Potassium Sulfide (sat.)	C	B	A	X	B	B	X	B	B	X	A	A	A	A	A	A	A	A
Propane (liq. gas) 100%	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	A	B	A

EXPLANATION OF RATINGS			
A	Generally considered best choice. Corrosion rate of metal <0.05 mm (0.002 in) per year.	I	May cause stress cracking.
		2	May pit.
B	Frequently used, slight corrosion expected. Corrosion rate of metal <0.5 mm (0.02 in) per year.	3	Combination is explosive.
		4	Temperature is important.
C	Occasionally used, corrosion expected. Use with care.	5	May be subject to local safety regulations.
X	Not recommended; generally considered unsuitable.	6	These specifications apply to forged and rolled Hastelloy C. Do not use for IFOA or Vortex Meter bodies.
V	Corrosion varies greatly with concentration and temperature.		
–	Data not generally available.		
			Numerical rating above is indicated as superscript number at process fluid listing, where applicable.

PROCESS FLUID	BODY, PROCESS FLANGE					SENSOR DIAPHRAGM						GASKETS, COATINGS						
	CARBON STEEL	316 ss	KYNAR	MONEL	HASTELLOY C6	316 ss	MONEL	HASTELLOY C6	CO, NI, CR ALLOY	NI/PERMANICKEL	TANTALUM	SILICONE	BUNA-N	VITON	TEFLON	RYTON	NEOPRENE	KEL-F
Propionic Acid	X	B	A	C	A	B	C	A	A	–	A	C	–	A	A	A	–	A
Propylene Oxide (<60°C {140°F})	A	A	X	–	–	A	–	–	A	–	–	X	X	X	A	A	X	A
Pyrogallic Acid (<40°C {100°F})	B	A	–	B	B	A	B	B	A	–	A	–	–	A	A	A	–	A
Pyroligneous Acid (<20%)	X	B	–	B	–	B	B	–	A	–	A	X	X	X	A	A	X	A
Quinine Bisulfate (wet)	X	B	–	B	B	B	B	B	A	B	A	–	–	–	–	–	–	–
Quinine Sulfate	X	B	–	B	B	B	B	B	A	B	A	–	–	–	–	–	–	–
Rosin (molten)	X	A	–	A	A	B	A	A	A	A	A	–	X	A	A	A	–	A
Salicylic Acid	X	A	A	B	B	B	B	B	A	B	A	B	B	A	A	A	X	A
Sewage	X	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	A
Silver Bromide (<20%)[2]	X	X	A	C	A	X	C	A	A	C	A	A	B	A	A	A	A	A
Silver Chloride	X	X	A	B	B	X	C	C	B	X	A	A	B	A	A	A	B	A
Silver Nitrate	X	A	A	X	C	B	X	C	A	X	A	A	B	A	A	A	A	A
Sodium Bisulfite (ambient to <82°C {180°F})	X	A	A	B	B	B	B	B	B	B	A	A	A	A	A	A	A	A
Sodium Chlorate	X	B	A	A	B	C	A	B	A	A	A	X	X	A	A	A	X	A
Sodium Cyanide	B	A	A	X	A	B	X	B	A	X	A	A	B	A	A	A	A	A
Sodium Fluoride (5%)[2]	X	B	A	A	C	B	B	C	A	B	X	A	A	A	A	A	A	A
Sodium Hydroxide (50%)[1,2]	B	A	A	A	A	A	A	A	A	A	X	A	C	C	A	A	A	A
Sodium Hydroxide (<40%, 80°C {175°F})[1]	C	X	C	B	B	X	B	B	A	A	X	A	X	C	A	A	C	A
Sodium Hydroxide (40-75%, 80°C {175°F})[1]	X	X	X	B	B	X	B	B	A	A	X	B	X	X	A	A	X	A
Sodium Hydroxide (molten)[1]	X	C	X	C	X	X	C	X	X	B	X	X	X	X	X	X	X	X
Sodium Hypochlorite (<10%)	X	X	A	C	B	X	C	B	B	X	A	B	B	A	A	C	X	A
Sodium Hyposulfite	X	B	A	A	A	C	A	B	A	A	A	–	–	A	A	A	–	A
Sodium Nitrate	B	A	A	B	B	A	B	B	A	A	A	X	B	A	A	A	B	A
Sodium Perborate (<20%)	B	A	A	B	B	B	B	B	A	B	A	B	B	A	A	A	B	A
Sodium Peroxide	A	A	A	B	B	B	B	B	A	B	V	X	A	A	A	A	B	A
Sodium Phosphate	B	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	A
Sodium Salicilate (<20%)	C	B	A	A	A	B	A	A	A	A	A	B	B	A	A	A	B	A
Sodium Stannate (<50%, 90°C {200°F})	B	B	–	B	B	B	B	B	A	B	A	–	–	–	A	A	X	A
Sodium Sulfate (<40%, 100°C {212°F})	B	A	A	B	B	B	C	C	A	C	A	A	B	A	A	A	B	A
Sodium Sulfide (dil., <90°C {200°F})	X	A	A	B	B	A	B	B	A	B	A	A	B	A	A	A	B	A

PROCESS FLUID	BODY, PROCESS FLANGE					SENSOR DIAPHRAGM						GASKETS, COATINGS						
	CARBON STEEL	316 ss	KYNAR	MONEL	HASTELLOY C6	316 ss	MONEL	HASTELLOY C6	CO, NI, CR ALLOY	NI/PERMANICKEL	TANTALUM	SILICONE	BUNA-N	VITON	TEFLON	RYTON	NEOPRENE	KEL-F
Sodium Sulfite (<20%, <80°C {175°F})	X	A	A	B	A	A	B	B	A	B	A	A	B	A	A	A	B	A
Sodium Thiosulfate (<20%, <80°C {175°F})	X	A	A	A	B	A	A	B	B	B	A	A	B	A	A	A	A	A
Stannic Chloride (<5%)[2]	X	B	A	C	C	C	C	C	B	C	A	A	B	A	A	A	B	A
Stannic Chloride (>5%)[2]	X	X	A	X	C	X	–	–	B	–	A	B	B	A	A	A	X	A
Stannous Chloride (<20%, <80°C {175°F})[1,2]	X	A	A	X	A	A	X	A	C	–	A	B	B	A	A	A	A	A
Steam (<260°C {500°F})	A	A	X	A	A	A	A	A	A	A	A	X	X	B	A	A	X	A
Sulfate Pulp Liquor (<90°C {200°F})	C	A	A	X	A	B	X	A	A	X	A	–	A	A	A	B	–	A
Sulfite Pulp Liquor (<90°C {200°F})	X	A	A	X	A	A	X	A	A	X	A	X	X	A	A	B	–	A
Sulfur (molten, dry, ll0°C {230°F})	B	A	A	B	A	A	B	A	A	A	A	X	X	A	A	A	A	A
Sulfur Chloride	X	X	A	X	B	X	X	B	A	X	A	X	X	A	A	A	X	A
Sulfur Dioxide (dry)	B	B	A	X	C	B	X	C	A	X	A	B	X	B	A	A	X	A
Sulfur Dioxide (wet)	X	A	A	X	A	B	X	B	A	X	A	B	B	B	A	A	B	A
Sulfuric Acid (<2%)	X	B	A	B	C	B	B	C	A	X	A	X	A	A	A	A	A	A
Sulfuric Acid (2 to 40%)	X	X	A	B	C	X	B	C	X	X	A	X	B	A	A	A	A	A
Sulfuric Acid (conc. >95%)	X	X	X	X	C	X	X	C	B	X	A	X	X	A	A	A	X	A
Sulfuric Acid (10% to conc. boil.)	X	X	X	X	X	X	X	X	X	X	A	X	X	A	A	X	X	A
Sulfurous Acid	X	B	A	X	B	B	X	B	A	X	A	X	B	A	A	B	B	A
Tannic Acid (sat.)	A	A	A	A	B	A	A	B	A	A	A	B	B	A	A	A	B	A
Tartaric Acid	X	A	A	A	B	A	B	B	A	B	A	A	B	A	A	A	B	A
Trichloroethylene (no moisture)	A	A	A	A	A	A	A	A	A	A	A	X	X	B	A	B	X	X

EXPLANATION OF RATINGS

A	Generally considered best choice. Corrosion rate of metal <0.05 mm (0.002 in) per year.	l	May cause stress cracking.
		2	May pit.
B	Frequently used, slight corrosion expected. Corrosion rate of metal <0.5 mm (0.02 in) per year.	3	Combination is explosive.
		4	Temperature is important.
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Turpentine	A	A	A	A	A	A	A	A	A	B	A	X	B	A	A	A	X	A
Water, Fresh	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	B	A
Water, Sea[1,2]	X	C	A	A	A	C	A	A	A	B	A	A	B	A	A	A	B	A
Water, Mine[2]	X	B	A	C	A	B	C	A	A	X	A	A	B	A	A	A	B	A
Water, Distilled	X	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	A
White Liquor	C	A	A	–	A	A	–	A	A	–	A	–	A	A	A	A	–	A
Zinc Chloride (5%)[2]	X	X	A	B	A	X	B	A	A	B	B	–	B	A	A	A	A	A
Zinc Chloride (5%, boil.)	X	X	A	B	A	X	B	A	B	B	B	–	X	A	A	B	X	A
Zinc Sulfate	X	A	A	A	A	A	B	A	A	C	A	A	B	A	A	A	A	A

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MB 010 Printed in U.S.A. 1186