PRODUCT INFORMATION

CORROSION DATA GUIDE
DRAWING NO. 96A121 REVISED

The attached revised Corrosion Data Guide supersedes drawing No. 96121, Rev. B, previously issued on Product Information page ASH/PI-14, dated 10/01/80.

This guide has been extensively revised and is based upon an in-depth review of available material, general corrosion literature, field experiences, laboratory tests and material suppliers' recommendations. The guide represents a much more cautious approach reflecting the current legal climate.

The Stratford Engineering Department will provide assistance when necessary, but the customer's engineers should always be consulted first. If Dresser Ashcroft Engineering is to be questioned, please be prepared to supply the following information:

Pressure
Temperature
Concentrations of each constituent
Impurities
Adjacent piping material
Location
Inhibitors used
Name and phone number of the facility engineer or technical contact

As stated on sheet #1 of drawing 96A121, this corrosion data guide is intended to be used solely as a general guide in the recommendation of materials used on corrosive services. It is regarded as an indicator only and not as a basis of absolute guarantee.

CORROSION DATA GUIDE FOR PRESSURE INSTRUMENTS AND DIAPHRAGM SEALS
NOTE – WARNING – NOTE

This guide is the only document to be used in making recommendations for corrosive service for Instrument Division products.

Careless use of this table could result in an accident endangering life and property. Most process plants or refineries have chemical or corrosion engineers, who are very capable of specifying instrument materials, since they are familiar with the details and past history of their own applications. This table should be used only when the customer has no such resource.

The table is intended to serve solely as a general guide in the recommendation of materials for corrosive services and must be regarded as indicative only and not as any guarantee. There are many conditions which cannot be covered by a simple tabulation, such as this. More detailed information is contained in standard references, such as the National Association of Corrosion Engineers Corrosion Data Survey, Metals Section or Non-Metals Section, available from:

NAGE, P.O. Box 218340
Houston, TX 79231
Phone (713) 492-0535

Many of the chemicals listed are dangerous or toxic. Non material recommendation should be made when there is insufficient information, a high degree of risk, or an extremely dangerous chemical. The user is responsible for securing the services of a qualified engineer to recommend materials.

As noted in ANSI B40.1 1985, Paragraph 4.3.3 and 4.3.4:

> The elastic element is generally a thin walled member, which of necessity operates under high stress conditions and must, therefore, be carefully selected for compatibility with the pressure medium being measured. None of the common element materials is impervious to every type of chemical attack. The potential for corrosive attack is established by many factors, including the concentration, temperature and contamination of the medium. . . .
>
> In addition to the factors discussed above, the capability of the pressure element is influenced by the design, materials and fabrication of the joints between its parts.

The Stratford Engineering Department will provide assistance when necessary, but the customer's engineers should always be consulted first. If Dresser Ashcroft Engineering is to be questioned, please be prepared with the following information.

Pressure	Temperature
Concentration % of each constituent.	Impurities
Adjacent piping material Hazardous Location?	Inhibitors used

Name and phone number of the facility engineer or technical contact.

Be sure of the chemical name of the corrodant; seemingly minor differences in name can mean entirely different substances. For example, sodium nitrite is quite different from sodium nitrate. Cupric chloride has corrosion properties different from cuprous chloride.

Since a bourdon tube is a spring, it may encounter corrosion fatigue. Minimize stresses by selecting a gauge with a pressure range twice the maximum operating pressure and installing suitable accessories to prevent damage from pulsation, or vibration. To repeat ANSI B40.1 in part:

> 4.3.1 Operating pressure. The pressure gauge selected should have a range such that the operating pressure occurs in the middle half ... of the scale. A good rule of thumb is to select a gauge with a full-scale pressure two times the intended operating pressure.

Do not use a steel bourdon tube if the adjacent piping is a more corrosion resistant material; avoid mixing dissimilar metal alloys.

A diaphragm seal made of suitably corrosion resistant materials should be used where there is potential for corrosion of pressure elements; for clogging by solids, or abnormal temperature.

Table Expansion:

O An open circle means the material is OK for the service. Corrosion rate is less than .002 per year, and there is no tendency for pitting or stress corrosion. A bourdon tube, bellows, diaphragm or lower housing of this material may be used.

L The letter “L” indicates the corrosion rate is less than .020 inches per year, and the material is suitable only for a diaphragm seal lower housing. It is NOT for a bourdon tube, bellows or diaphragm.

R The letter “R” indicates an “R” gauge system (carbon steel socket, 316 SS bourdon tube) is permissible if the adjacent piping is iron or steel. There may be some rusting.

Cross (X) in box: material is not recommended. There is insufficent information, or there are complex restrictions that cannot be addressed in this simple table. The Stratford Materials Department has more detailed corrosion information and may be consulted if there are questions and there is no facility engineer available.

Observe the temperature limitations in the table for rubber and plastic components. These may be lower than temperature listed for the corrodant.

Halar, Kalrez, Teflon and Viton are trademarks of DuPont.

Kynar is a trademark of the Pennwalt Corporation.

Liquid Fill for Gauges and Diaphragm Seals Used With Oxidizing Agents

Leakage of strong oxidizing agents may cause fires or violent reactions with gauges or diaphragm seals filled with glycerine or silicone. If a fill is used, HALOCARBON is required for use with dry or moist Chlorine, Oxygen or Ozone. Add variation XGX to the product code for gauges, or variation XCF for diaphragm seals. Halocarbon is a DuPont trade name for chlorotrifluoroethylene (CTFE).

HALOCARBON is recommended for aqueous solutions with over 10% of the following compounds:

- organic and inorganic peroxides
- permanganates
- perrhenates
- chlorates
- perchlorates
- persulfates
- organic and inorganic nitrites
- periodates
- bromates
- perselenates
- perbromates
- chromates
- dichromates
- perborates

Dilute water solutions (over 90% water) as these chemicals do not normally behave as oxidizing agents. The customer's facility engineer is responsible for deciding whether a solution could be hazardous.

Chemicals in the corrosion chart followed by ▲ are oxidizing agents and Halocarbon fill should be used as discussed above.

If in doubt, consult the facility engineer, Stratford Engineering, or a reference such as Dangerous Properties of Industrial Materials, N.I. Sax, Van Nostrand Reinhold, or the U.S. Department of Transportation Hazardous Materials Table in 49CFR 172.101 and other publications.

Gauges and Pressure Products for Sour Gas or Oil Service (NACE Gauges)

See product bulletin DU/PI-63 for a more complete discussion of this subject. The term “sour” when used in reference to oil or gas, means Hydrogen Sulfide (H S) is present as an impurity. Hydrogen sulfide is a foul smelling, deadly poisonous gas which causes many metals to fail by stress corrosion cracking. It occurs naturally in many oil and gas fields. Metallic pressure products for use in sour petroleum service must comply with the national association of Corrosion Engineers, (NACE) Material Requirement MR-01-75. This requirement specifies both materials and a limiting hardness. Pressure gauges meeting NACE MR-01-75 are:

Monel Duragauges and General Service Gauges 12-20,000 psi

Monel Type 1082 Test Gauges 12-4000 psi

The 5000 and 10,000 psi test gauges use hardened bourdon tubes which do not meet NACE MR-01-75 even though they are Monel. These systems are stamped “PH” on the socket wrench flat; “P” indicating Monel and “H” that the systems were hardened.

No gauges above 20,000 psi comply with the specification. These are the only pressure gauges meeting the requirements of NACE MR-01-75 and must be supplied when customers request a NACE gauge, have an application covered by the standard, or have an application involving hydrogen sulfide as an impurity.

The preferred diaphragm seal for sour gas/oil service is a Hastalloy C (C276) diaphragm and lower housing.

While non-metals are not yet covered by a NACE standard, Teflon TFE and Kalrez are highly rated.

CORRODENT	CORRODENT TEMP °F MAX.	CONC % IN H_2O	403/410 SS [SE]	CARBON STEEL [B]	304 SS [C]	316 SS [S]	CARP 20 Cb 3 [D]	PHOS BRONZE [A]	BRASS [AA]	MONEL [P or M]	NICKEL [N]	INCONEL 600 [W] 800 [WW]	HAST B2 [G]	HAST C276 [H]	TANTALUM [U]	PVC (–40/140°F) [V]	KYNAR (180°F) (PVDF) [KY]	HALAR (250°F) (ECTFE) [HH]	TEFLON (400°F) (PTFE) [T]	NEOPRENE (140°F) (CR) [CR]	VITON (300°F) (FPM) [Y]	BUNA "N" (150°F) (NBR) [E]	KALREZ (200°F) [K]	"R" SYSTEMS	COMMENTS
Acetic Acid	200	<40	X	X	X	O	O	X	X	X	X	X	X	O	O	O	O	O	O	X	X	X	O	X	
Acetic Anhydride	200	-	X	X	X	O	O	X	X	X	X	X	X	O	O	O	O	O	O	X	X	X	O	X	
Acetone	150	-	X	X	O	O	O	O	O	O	O	O	O	O	O	O	X	O	O	X	X	X	O	R	316 OK 8 100%
Acetylene (Dry)	200	100	O	O	O	O	O	X	X	X	O	O	O	O	O	O	X	X	O	X	X	X	O	R	Explosive in Cu
Acrolein	200	100	X	X	L	L	L	X	X	L	L	L	L	O	O	O	X	X	O	X	X	X	O	X	
Aluminum Chloride	150	>10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	X	Teflon 200°F Max
Aluminum Sulfate	200	10-50	X	X	O	O	O	X	X	X	X	X	X	O	O	O	L	O	X	O	X	X	O	X	
Ammonia (Dry)	300	100	O	O	O	O	O	X	X	X	X	O	O	O	O	O	X	O	X	O	X	X	O	X	
Ammonium Chloride	200	<40	X	X	L	L	L	X	X	L	L	L	L	O	O	O	X	X	X	X	X	X	O	R	Wet. See A. Hydroxide
Ammonium Hydroxide	200	<30	X	X	L	L	L	X	X	L	L	L	L	O	O	O	X	X	X	O*	O	X	O	X	Teflon 200°F Max
Ammonium Nitrate ▲	200	<50	O	L	O	O	O	X	X	X	X	X	X	O	O	O	X	X	X	O*	O	X	O	X	
Ammonium Sulfate	200	<60	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	O	O	X	O	R	
Amyl Acetate	250	-	X	O	O	O	O	X	X	X	X	L	L	X	O	O	X	X	X	O	O	X	O	R	
Aniline		>99	X	X	O	O	O	X	X	X	X	L	L	X	O	O	X	X	X	O	O	X	O	R	
Beer	200	-	X	X	O	O	O	X	X	X	X	X	X	X	O	O	X	O	O	X	X	X	O	X	
Benzene	200	<50	X	L	O	O	O	X	X	O	X	X	X	L	O	O	X	X	X	X	X	X	O	R	
Benzidine	200	>99	X	L	L	L	L	X	X	L	L	L	L	L	L	L	X	X	X	X	X	X	O	X	
Benzoic Acid	200	<70	X	X	L	O	L	X	X	L	L	L	L	X	O	O	X	O	O	X	X	X	O	X	
Boric Acid		<25	X	X	O	O	O	X	X	X	X	X	X	O	O	O	X	O	O	X	X	X	O	X	
Bromine (Dry)	200	>99*	X	X	X	X	X	X	X	X	X	O	O	X	O	O	X	X	X	X	X	X	O	X	*H_2O <57ppm
Bromobenzene	200	>99	X	X	O	O	O	X	X	X	X	O	O	X	O	O	X	X	X	X	X	X	O	R	
Butane	200	-	O	L	O	O	O	X	X	X	X	O	O	X	O	O	X	X	X	X	X	X	O	R	ND H_2S
Butyl Alcohol	200	-	X	X	O	O	O	X	X	X	X	O	O	X	O	O	X	X	X	X	X	X	O	R	
Butyric Acid	200	<10	X	X	L	O	L	X	X	X	X	O	O	X	O	O	X	X	X	X	X	X	O	R	
Butadiene	200	>99	O	O	O	O	O	X	X	X	X	O	O	X	O	O	X	X	X	X	X	X	O	R	
Calcium Bisulfite	250	>90	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Calcium Chloride	200	<80	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Calcium Hydroxide	200	<50	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Calcium Hypochlorite ▲	75<	<10	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Carbon Dioxide	200	-	X	X	O	O	O	X	X	X	X	O	O	X	O	O	X	X	X	X	X	X	O	X	
Carbon Monoxide	200	>99	X	X	O	O	O	X	X	X	X	O	O	X	O	O	X	X	X	X	X	X	O	R	
Chlorine (Dry) ▲	200	>99	X	X	X	X	X	X	X	X	X	O	O	X	O	O	X	X	X	X	X	X	O	X	*Con. Engr. †200°F Max
Chlorine (Moist) ▲	160	>90	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Chloroacetic Acid	150	<30	X	X	X	X	X	X	X	L	X	X	X	L	L	L	X	X	X	X	X	X	O	X	
Chloroform (Dry)	200	>99	X	X	O	O	O	X	X	X	X	O	O	X	O	O	X	X	X	X	X	X	O	X	

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Chromic Acid		200	I	X	X	X	O	X	X	X	X	X	X	X	X	X	X	O	X	O	X	O	X	O	
Citric Acid		200	10-50	X	X	X	O	X	X	X	X	X	X	X	X	X	X	O	X	O	X	O	X	O	
Cupric Chloride		200	<40	X	X	X	O	X	X	X	X	X	X	X	X	X	X	O	X	O	X	O	X	O	
Copper Nitrate ▲		200	<10	X	X	X	O	X	X	X	X	X	X	X	X	X	X	O	X	O	X	O	X	O	
Copper Sulfate		200	<30	X	X	X	O	X	X	X	X	X	X	X	X	X	X	O	X	O	X	O	X	O	
Corn Oil		300	I	X	X	X	O	X	X	X	X	X	X	X	X	X	X	O	X	O	X	O	X	O	
Cresol		200	>99	O	X	O	O	O	O	L	O	O	O	O	O	O	X	O	X	O	X	O	X	O	
Creosote		200	I	X	L	L	L	L	L	L	L	L	L	L	L	L	X	O	X	O	X	O	X	O	
Crude Oil (Sweet)		200	I	X	L	O	O	O	X	X	O	O	O	O	O	O	X	O	X	O	X	O	X	O	
Dowtherm A		200	I	O	O	O	O	O	O	X	O	O	O	O	O	O	X	O	X	O	X	O	X	O	
Ethyl Acetate		<200	I	X	L	X	O	O	O	X	O	X	O	O	O	O	X	O	X	O	X	O	X	O	
Ethyl Chloride (Dry)			>99	O	O	O	O	O	O	X	O	X	O	O	O	O	X	O	X	O	X	O	X	O	
Ethanol		200		O	O	O	O	O	O	X	O	X	O	O	O	O	X	O	X	O	X	O	X	O	
Ethylene Glycol			I	X	X	O	O	O	X	X	L	X	O	O	O	O	X	O	X	O	X	O	X	O	
Ethylene Oxide		100	>99	X	X	O	O	O	X	X	O	X	O	O	O	O	X	O	X	O	X	O	X	O	
Ferric Chloride		200	<40	X	X	X	O	X	X	X	X	X	X	X	X	X	X	O	X	O	X	O	X	O	
Ferric Sulfate		150	<10	X	X	X	O	X	X	X	X	X	X	X	X	X	X	O	X	O	X	O	X	O	
Ferrous Chloride		200	<30	X	X	X	O	X	X	X	X	X	X	X	X	X	X	O	X	O	X	O	X	O	
Ferrous Sulfate		200	<50	X	X	X	O	X	X	X	X	X	X	X	X	X	X	O	X	O	X	O	X	O	
Fluorine Gas (Dry)		200	>99	X	X	X	O	X	X	X	X	X	X	X	X	X	X	O	X	O	X	O	X	O	
Fluorine, Liquid		<50	>99	O	X	O	O	O	O	X	O	X	O	O	O	O	X	O	X	O	X	O	X	O	
Formaldehyde		200	I	X	X	X	O*	O	X	X	X	X	X	X	X	X	X	O	X	O	X	O	X	O	*316 OK below 95%
Formic Acid		<150	I	X	X	X	X	O	X	X	X	X	X	X	X	L	X	O	X	O	X	O	X	O	
Furfural		200	<10	X	X	X	X	O	X	X	X	X	X	X	X	L	X	O	X	O	X	O	X	O	
Glucose		300	I	X	X	O	O	O	O	O	O	O	O	O	O	O	X	O	X	O	X	O	X	O	
Glycerin		200	I	X	X	O	O	O	O	L	O	L	O	O	O	O	X	O	X	O	X	O	X	O	
Hexane, Dry		200	>99	O	O	O	O	O	O	L	O	L	O	O	O	O	X	O	X	O	X	O	X	O	
Hydrazine		100	I	X	X	X	O	X	X	X	X	X	X	X	X	X	X	O	X	O	X	O	X	O	
Hydrobromic Acid		200	I	X	X	X	O	X	X	X	X	X	X	X	X	X	X	O	X	O	X	O	X	O	
Hydrochloric Acid		100	<35	X	X	X	O	X	X	X	X	X	X	X	X	X	X	O	X	O	X	O	X	O	
Hydrofluoric Acid		150	<65	X	X	X	O	X	X	X	X	X	X	X	X	X	X	O	X	O	X	O	X	O	
Hydrogen Chloride (Anhydrous HCL)		200	100	X	O	O	O	O	O	X	O	X	O	O	O	O	X	O	X	O	X	O	X	O	

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Hydrogen Fluoride (Dry)	100	100	X	O	O	O	O	X	X	O	O	O	O	O	O	X	O	X	O	X	X	X	X	X	No H_2O
Hydrogen Peroxide ▲	200	<50	X	X	L	O	X	X	X	X	X	X	X	X	O	X	O	X	O	X	X	X	O	X	
Kerosene	200	>99	O	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X	O	X	X	X	O	R	
Lactic Acid	<100	<70	X	X	O	O	O	X	X	X	X	X	X	X	O	X	O	O	O	X	O	X	O	X	
Magnesium Chloride	200	<40	X	X	X	X	X	X	X	X	X	X	X	O	O	X	X	X	O	O	O	O	X	X	
Magnesium Sulfate	200	<40	X	X	O	O	O	O	O	O	O	O	O	O	O	X	O	O	O	O	O	O	O	R	
MEK	120	–	X	L	O	O	O	X	X	X	X	X	O	X	X	X	X	X	O	X	X	X	O	R	
Mercurlc Chloride	200	<60	X	X	X	X	X	X	X	X	X	X	X	X	O	X	O	O	O	O	O	O	O	X	
Mercury	200	<99	O	O	O	O	O	X	X	X	O	X	X	X	O	X	X	O	X	O	O	O	O	R	
Methane (Dry, no H_2S)	200	–	O	O	O	O	O	O	O	O	O	O	O	O	O	X	O	O	O	X	O	O	O	R	
Milk			X	X	O	O	X	X	X	X	X	O	X	O	X	O	X	X	O	O	X	O	O	X	
Morpholine	200	>99	O	O	O	O	O	O	O	O	O	O	O	O	X	X	X	X	O	X	X	X	O	R	
Naphtha	200	>99	O	O	O	O	O	O	O	O	O	O	O	O	O	X	O	O	O	O	X	O	O	R	
Naphthalene		>99	O	O	O	O	X	X	X	X	X	X	X	X	X	X	O	O	O	X	O	X	O	R	
Nickel Chloride	200	>99	X	X	X	X*	X	X	X	X	O	O	O	O	O	O	O	X	O	O	X	O	O	X	* 316 OK if <10%
Nickel Sulfate	200	–	X	X	O	O	O	X	X	X	X	X	X	X	X	L	O	X	O	O	X	O	O	X	
Nitric Acid ▲	<100	<95	X	X	O	O	O	X	X	X	X	X	X	X	O	X	O	X	O	X	X	X	X	X	
Nitrous Oxide	<100	>97	X	O	L	L	X	L	L	X	X	X	X	L	O	X	O	X	O	X	X	X	O	X	
Oleic Acid	200	–	X	X	L	O	O	O	O	L	O	O	L	O	O	X	O	X	O	X	X	O	O	X	
Oxalic Acid	140		X	X	X	X	X	X	X	X	X	X	X	L	O	L	O	X	O	X	X	X	O	X	
Oxygen (Gas) ▲	120	–	O	X	O	O	O	O	O	O	X	O	O	O	O	O	O	X	O	X	X	X	X	X	
Palmitic Acid	160	>99	X	X	O	O	X	X	X	X	X	X	X	O	X	X	O	X	O	X	O	O	O	R	
Phenol	120	>98	X	X	O	O	O	X	X	X	O	O	O	O	O	X	X	X	O	X	O	X	O	R	
Phosphoric Acid	100	<80	X	X	O	O	X	X	X	X	X	X	X	X	O	O	O	O	O	X	X	X	O	X	
Phthalic Anhydride	200	>99	X	O	O	O	O	X	X	O	O	O	O	O	O	X	X	X	O	X	X	X	O	R	
Picric Acid	200	<10	X	X	O	O	X	X	X	X	X	X	X	X	O	X	O	X	O	X	O	X	O	X	
Potassium Hydroxide	160	<50	X	L	L	L	X	X	X	O	O	L	L	L	X	O	O	O	O	O	X	X	O	X	
Potassium Nitrite ▲	200	–	L	L	L	L	L	L	L	L	L	L	L	L	O	O	X	X	O	O	X	X	O	X	
Propane (Dry, no H_2S)	200	>99	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	X	O	X	O	O	O	R	
Rosin	200	–	X	X	L	O	O	L	L	O	O	X	X	O	X	X	X	X	O	O	X	O	O	R	

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CORRODENT		CORRODENT TEMP °F MAX.	CONC % IN H_2O	403/410 SS [SE]	CARBON STEEL [B]	304 SS [C]	316 SS [S]	CARP 20 Cb 3 [D]	PHOS BRONZE [A]	BRASS [AA]	MONEL [P or M]	NICKEL [N]	INCONEL 600 [W] 800 [WW]	HAST B2 [G]	HAST C276 [H]	TANTALUM [U]	PVC (–40/140°F) [V]	KYNAR (180°F) (PVDF) [KY]	HALAR (250°F) (ECTFE) [HH]	TEFLON (400°F) (PTFE) [T]	NEOPRENE (140°F) (CR) [CR]	VITON (300°F) (FPM) [Y]	BUNA "N" (150°F) (NBR) [E]	KALREZ (200°F) [K]	"R" SYSTEMS	COMMENTS
Sea Water		200	-	X	X	X	X	X	X	X	O*	X	O	X	O	O	O	X	O	O	L	O	O	X	*Rowing–Not for Diaphragms
Silver Nitrate* ▲		200	<70	L	X	L	O	O	X	X	X	X	X	X	X	O	O	X	O	O	O	X	L	X	*Acid Free
Skydrol		200	100	X	X	O	O	O	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Sodium Bicarbonate		<200	<20	O	L	O	O	L	L	L	O	L	O	L	L	X	O	X	O	O	O	X	O	R	
Sodium Bisulfate		<200	<30	X	X	X	X	O	L	L	L	L	X	L	L	X	O	X	O	O	X	X	O	X	
Sodium Bisulfate		<150	<40	X	X	X	X	X	L	O	X	L	X	L	L	X	O	X	O	O	X	X	O	X	
Sodium Carbonate		<200	<40	X	X	X	X	X	X	L	O	L	O	L	L	X	O	X	O	O	X	X	O	X	
Sodium Chloride		<200	<30	X	X	X	X	X	X	X	L	X	L	X	X	X	X	X	X	X	X	X	O	X	
Sodium Chromate ▲		<200	<80	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	R	* <20%
Sodium Cyanide		<140	-	X	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	R	
Sodium Hydroxide		<150	<40	X	X	X	X	O	O	O	O	O	O	L	L	X	O	X	O	O	X	X	O	X	
Sodium Hypochlorite ▲		100	<25	X	X	X	X	X	X	X	O	X	O	X	X	X	X	X	X	X	X	X	X	R	
Sodium Nitrate ▲		<200	-	X	X	X	O	O	X	X	O	X	O	X	X	X	X	X	X	X	X	X	X	R	
Sodium Nitrite ▲		<200	<60	O	X	O	O	O	X	X	O	X	O	X	X	X	X	X	X	X	X	X	X	R	
Sodium Peroxide ▲		<200	<10	O	X	O	O	O	X	X	L	X	L	X	X	X	X	X	X	X	X	X	X	R	
Sodium Phosphate, (Tribasic)		<200	<60	O	O	O	O	O	L	O	O	O	O	L	L	X	O	X	O	O	X	X	O	R	
Sodium Silicate				O	O	O	O	O	X	X	O	X	O	X	X	X	X	X	X	X	X	X	O	R	
Sodium Sulfate		<200	<30	O	X	O	O	O	L	L	L	L	L	L	L	X	O	X	O	O	X	X	O	R	
Sodium Sulfide		<200	<50	X	X	X	X	O	L	L	L	L	L	X	X	X	O	X	O	O	X	X	O	X	
Sodium Sulfite		<200	<50	X	X	X	X	O	L	L	L	L	L	X	X	X	O	X	O	O	X	X	O	X	
Sodium Thiosulfate		<200	-	X	X	X	X	O	L	L	L	L	L	X	X	X	O	X	O	O	X	X	O	X	
Sour Gas/Oil*		<200	<5	X	X	X	X	O	X	X	X	X	X	X	X	X	O	X	O	O	X	X	O	X	*See SHT-3
Steam		<300	-	O	O	O	O	O	X	X	X	X	X	O	O	X	O	X	O	O	X	X	O	X	
Stearic Acid		<200	-	X	X	O	O	O	X	X	X	X	X	O	O	X	O	X	O	O	X	X	O	X	
Stoddard Solvent		<150	-	O	O	O	O	O	X	X	X	X	X	O	O	X	O	X	O	O	X	X	O	R	*150°F Max
Sulfur		250	>95	X	X	L	O	L	X	X	X	X	X	L	L	X	O	X	O	O	X	X	O	R	
Sulfur Dioxide (Dry)		250	>89	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	
Sulfur Trioxide (Dry)		200	>89	X	X	L	L	L	X	X	X	X	X	L	L	X	O	X	O	O	X	X	O	X	*<200°F
Sulfurous Acid		200	-	X	X	X	X	L	X	X	X	X	X	L	L	X	O	X	O	O	X	X	O	X	
Tannic Acid		<150	<80	O	O	O	O	O	O	O	O	O	O	L	L	X	O	X	O	O	X	X	O	R	
Tartaric Acid		<200	<50	X	X	X	O	O	X	X	X	X	X	L	L	X	O	X	O	O	X	X	O	X	
Tin Chloride (Stannous)		<200	<10	X	X	O	O	O	X	X	X	X	X	O	L	X	O	X	O	O	X	X	O	X	
Toluene (Toluol)		<200	>99	O	O	O	O	O	O	O	O	O	O	O	O	X	O	X	O	O	X	X	O	R	
Trichloracetic Acid		<200	>50	X	X	X	X	X	X	X	L	X	L	O	L	X	O	X	O	O	X	X	O	X	
Trichloroethylene (Dry)		<200	>98	X	O	O	O	L	X	X	L	X	L	O	L	X	O	X	O	O	X	X	O	R	

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Vinyl Chloride		Urea		Turpentine	Trichloroethane (Dry)	CORRODENT	
<100		<200		>200	<150	CORRODENT TEMP °F MAX.	
>99		<50		>98	>98	CONC % IN H_2O	
X		X		O	O	403/410 SS	[SE]
O		X		O	O	CARBON STEEL	[B]
L		X		O	O	304 SS	[C]
O		X		O	O	316 SS	[S]
O		X		O	O	CARP 20 Cb 3	[D]
X		X		O	O	PHOS BRONZE	[A]
X		X		O	O	BRASS	[AA]
O		X		O	O	MONEL	[P or M]
X		X		O	O	NICKEL	[N]
X		X		O	O	INCONEL 600 800	[W] [WW]
L		X		O	O	HAST B2	[G]
O		X		O	O	HAST C276	[H]
X		X		O	O	TANTALUM	[U]
X		L		X	X	PVC (–40/140°F)	[V]
X		O		O	X	KYNAR (180°F) (PVDF)	[KY]
X		X		O	X	HALAR (250°F) (ECTFE)	[HH]
O*		O		O	O*	TEFLON (400°F) (PTFE)	[T]
X		L		X	X	NEOPRENE (140°F) (CR)	[CR]
X		X		O	X	VITON (300°F) (FPM)	[Y]
X		X		X	X	BUNA "N" (150°F) (NBR)	[E]
O		X		O	O	KALREZ (200°F)	[K]
X		X		R	R	"R" SYSTEMS	
*<200°F					*<200°F	COMMENTS	

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