

# Spilt body Flange ball valve

TC-205MFF-PN1640  
Series  
PED Category I,II



## TC-205MFF-PN1640 User Manual English Version

Use for company in Europe who will place the product on the market,  
please amend which necessary.

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a. Material Selection:

The possibility of material deterioration in service and the need for periodic inspections is depended on the contained fluid. Carbide phase conversion to graphite, oxidation of ferrite materials, decrease in ductility of carbon steels at low temperature (even in applications above  $-29^{\circ}\text{C}$ ) are among those items. Even information about corrosion data is provided in this user manual, the user is requested to take attention or consideration to determine the suitability of material in their application.

b. Pressure-Temperature rating:

The Pressure-Temperature rating is considered for static pressure. Please refer to P & T rating section on page 9 for working precaution. The allowable temperature is between R.T. and  $160^{\circ}\text{C}$  do not exceed the temperature range to avoid danger accident happen.

c. Fluid thermal expansion:

It is possible, when the ball valve is in closed condition, the sealed cavity within the valve body to be filled with liquid. If this liquid is not released, by partially opening the valve or some other means, and it is subject to a temperature increase, excessive pressure sufficient to cause pressure boundary failure can be generated. However our products have pressure self-relief seat to prevent pressure built up, user is recommended to prevent that the pressure in the valve will not exceed that allowed pressure, by means of piping design, installation, or operation procedure.

d. Static electric effect:

The ball valves are provided with anti-static devices for ball-stem-body. When service conditions require electrical continuity to prevent static discharge, the user is responsible for specifying static grounding.

e. Fire safe condition:

Generally, the application of the valve shall comply with the Pressure-Temperature rating range. If the risk of fire is major effect, user is recommended to select our fire-safe products, which with API-607 approval. Contact to the valve distributor or manufacturer for details.

f. Liquids with high fluid velocity:

When ball valves must be operated frequently on liquids with very high velocity, a check shall be made with the valve distributor or manufacturer for appropriate advice to minimize the possibility of seat deformation, especially when they are highly pressurized on high-temperature line.

g. Throttling service: Ball valves are generally not recommended for throttling service, where both the fluid flow and the leading edge of the ball can damage or deform the resilient ball seats causing leakage. High fluid velocity or the presence of solid particles in suspension will further reduce seat life in throttling applications.

- h. Do not open the bonnet or cap when bearing pressure. Valve is not equipped with pressure access device. User should check it by other method through its piping system.
- i. No touch the surface of valve on high temperature.
- j. Not allowed for unstable fluid, otherwise specified with category III in Declaration of conformity or/and in this user manual.
- k. Lock design on the handle to avoid the valve operated by non-related people is optional requested by the user.

## 2. Product Description

### 2.1 Feature

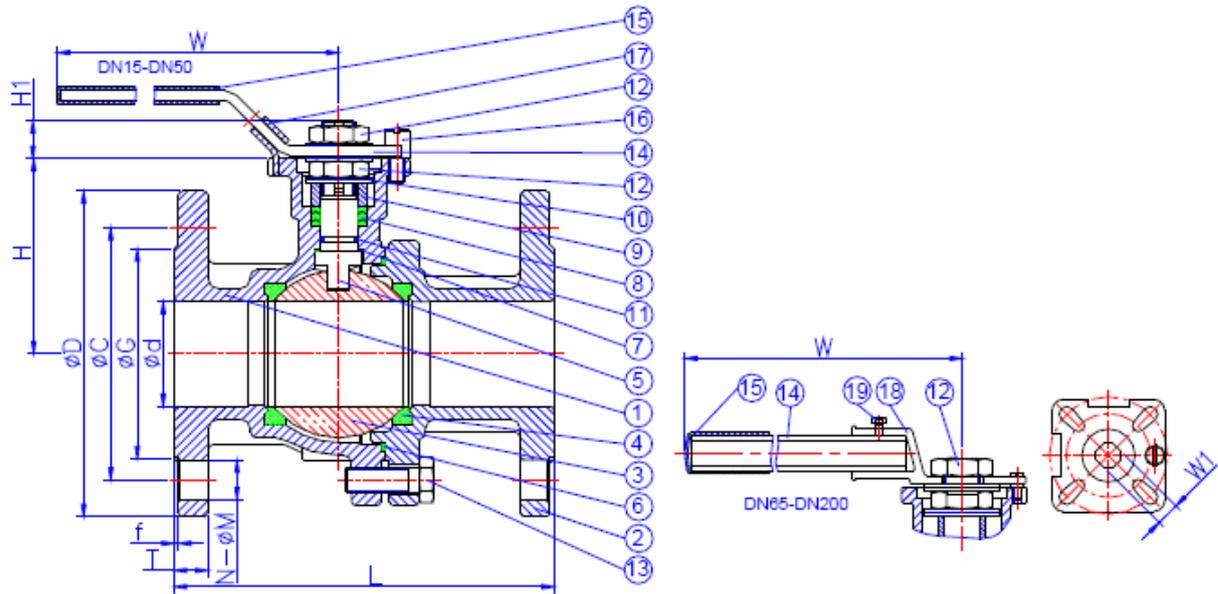
- a. FULL BORE ball valve.
- b. Direct-mounting of actuator to valves, low cost and easy automation
- c. Bottom Entry Blow-Out Proof Stem design Provides Maximum Safety.
- d. Anti-static devices for ball-stem-body.
- e. Integral Twin pattern ISO 5211 mounting pad for double active & spring return actuator.
- f. Heavy-duty body & end cap construction with traceable heat number.
- g. Self-adjusting stem packing assembly with Belleville spring for temperature fluctuations, vibration, and is secured.
- h. Pressure self-relief seat to prevent pressure built up.
- i. Lock design on the handle is optional requirement.

### 2.2 Product specification

The scope of product specifications are as following. The category levels we used , and in according to group 1 , gas fluid , because we are hard to know the application of end user sizes under and including DN 25 or 1” valves will not be bean a CE mark in according to the PED directive.

PN	Art.3 Para3 of PED No CE Marking	Category I	Category II
16	DN15,20,25	DN 32, 40, 50	DN 65, 80, 100, 125, 150, 200

### 2.3 Material of construction and Common dimension



PN 16															
Size	d	L	H	W	H1	W1	D	C	G	f	t	N	M	ISO 5211	Torque (N-M)
15	15	115	55	123	9	9	95	65	45	2	16	4	14	F03/F04	14.5
20	20	120	66.5	123	11	9	105	75	58	2	18	4	14	F03/F04	17.2
25	25	125	66.5	152	11	11	115	85	68	2	18	4	14	F04/F05	20
32	32	130	74	152	11	11	140	100	78	2	18	4	18	F04/F05	30.4
40	40	140	85.5	182	15	14	150	110	88	3	18	4	18	F05/F07	35.2
50	50	150	92.5	182	15	14	165	125	102	3	20	4	18	F05/F07	35.2
65	65	170	113	326	18	17	185	145	122	3	18	4	18	F07/F10	102
80	80	180	124.5	326	18	17	200	160	138	3	20	8	18	F07/F10	126.5
100	100	190	142.5	440	23	22	220	180	158	3	20	8	18	F10/F12	156
125	125	325	182	753	28	27	250	210	188	3	22	8	18	F10/F12	322
150	150	350	201	753	28	27	285	240	212	3	22	8	22	F10/F12	347
200	200	400	259	962	25	36	340	295	268	3	24	12	22	F12	390

PN 40															
Size	d	L	H	W	H1	W1	D	C	G	f	t	N	M	ISO 5211	Torque (N-M)
15	15	115	55	123.3	9	9	95	65	45	2	16	4	14	F03/F04	14.5
20	20	120	66.5	123.3	11	9	105	75	58	2	18	4	14	F03/F04	17.2
25	25	125	66.5	152	11	11	115	85	68	2	18	4	14	F04/F05	20
32	32	130	74	152	11	11	140	100	78	2	18	4	18	F04/F05	30.4
40	40	140	85.5	182	15	14	150	110	88	3	18	4	18	F05/F07	35.2
50	50	150	92.5	182	15	14	165	125	102	3	20	4	18	F05/F07	35.2
65	65	170	113	326	18	17	185	145	122	3	22	4	18	F07/F10	102
80	80	180	124.5	326	18	17	200	160	138	3	24	8	18	F07/F10	126.5
100	100	190	142.5	440	23	22	235	190	162	3	24	8	18	F10/F12	156
125	125	325	182	753	28	27	270	220	188	3	26	8	18	F10/F12	322
150	150	350	201	753	28	27	300	250	218	3	28	8	22	F10/F12	347
200	200	400	259	962	25	36	375	320	285	3	34	12	22	F12	390

#### MATERIALS LIST:

NO	PART NAME	MATERIAL	NO	PART NAME	MATERIAL
1	BODY	1.4408 / 1.4308/ 1.0619	11	O-Ring	Viton
2	END CAP	1.4408 / 1.4308/ 1.0619	12	NUT	SS304
3	SOLID BALL	SS316	13	BOLT	SS304
4	BALL SEAT	PTFE	14	HANDLE	SS304
5	STEM	SS316	15	SLEEVE	PLASTIC
6	BODY SEAL	PTFE	16	STOP PIN	SS304
7	THRUST WASHER	PTFE	17	LOCKING DEVICE	SS304
8	STEM PACKING	PTFE	18	HANDLE ADAPTER	SS304
9	GLAND	SS304	19	BOLT	SS316
10	BELLEVILLE SPRING	SUS301	20		

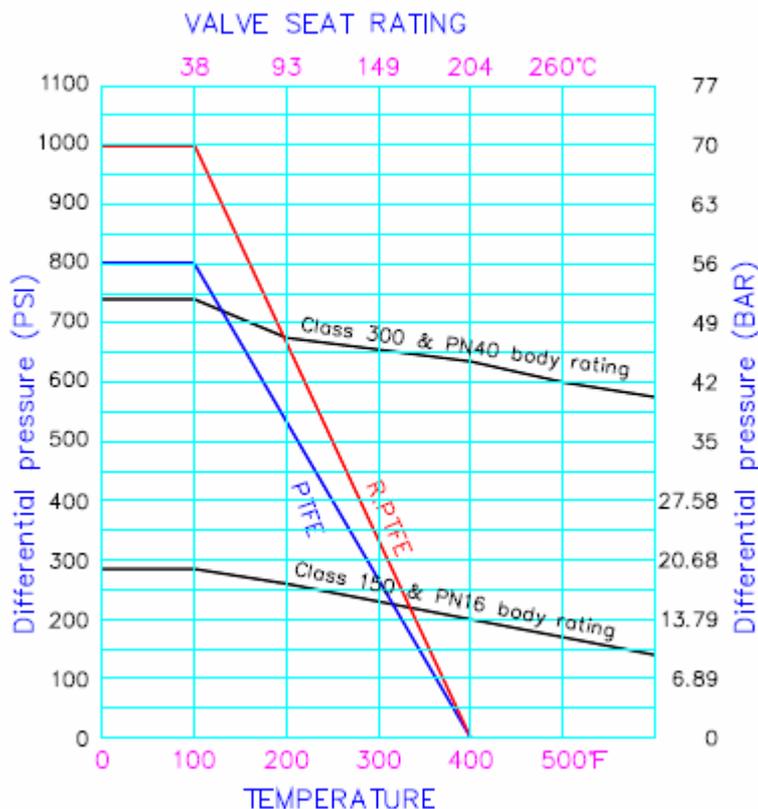
### 3. Design Specification

Items	Standards/Codes
Standards of Design (P-T rating)	Pr EN12516-1
Testing	Pr EN12266-1
Connection (Flanged type)	DIN 2501/1 PN10-40 Facing DIN 2526 Form C
Face to Face	DIN 3202 F4/ F5
Mounting Pad	ISO-5211
Material of Casting (Body, Cap, Ball)	EN10213-4 for 1.4308 & 1.4408 EN10213-2 for 1.0619
Bolt and Nut	ISO-3506 (A2-70)

### 4. Pressure Temperature Ratings

The pressure-temperature rating of ball valves are determined, not only by valve shell materials, but also by sealing materials used for ball seats, stem packings, and body seal. Sealing materials may be high molecule, elasticity and hardness, however, the choice is limited by the characteristics of the service fluid, temperature, pressure, velocity of fluid, frequency of valves operation and sizes of ball valves etc, Followings are the general

rating charts for non-shock fluid service for floating ball valves distinguished by sizes and seating materials, please refer to section 1, General precaution.



## 5. Delivery Condition and Storage

Valves stay in the open condition during the transportation. For incoming QC, it must check:

- a. Packing condition: Is there any damaged during the transportation.
- b. The bolts of cap and yoke: to make sure the bolt does not loose tightness when it arrived.

Valves must store in an indoor warehouse to avoid dusts and other foreign object, do not exposed in an open space without to put a cover over or take off the packing under an unnecessary situation.

## 6. Installation and Operation

### 6.1 Handling

During the ball valve installation, it must follow the procedure to hand at the both side of the bodies, the cable must be strong enough to ensure the safety during the installation.

### 6.2 Cleaning

Even the valves was transported under a clean environment, operator must check is there any foreign body

or dusts inside the bore. If yes, clean it before installation. Operator clean the valves by water, compression air, or steam (automation valve shall be cleaned only with water or steam, the compression air is not allowed.) For cleaning operation, first step is put the valve bore perpendicular to the ground and clean, ensure all the dusts can be removed from the bore. The second step is checking and clean all the connecting pipe bore and connection area. No flush, rust and foreign bodies allow to avoid the blocking and leakage.

### 6.3 Valve Installation (Install to the pipeline system)

#### a. Direction

Most of the valves do not restrict the flow direction.

#### b. Position

The body, cap and gasket are in the connection area of ball valve and pipeline. The bear weight ability and gradient are very important to the pipe installation. Do not make the pressure from the pipeline and stress to concentrate on the connecting area of body and cap. It will cause the deformed and leakage, and the ball, seat, and stem will stick, leaking, and damaged.

#### c. Fittings

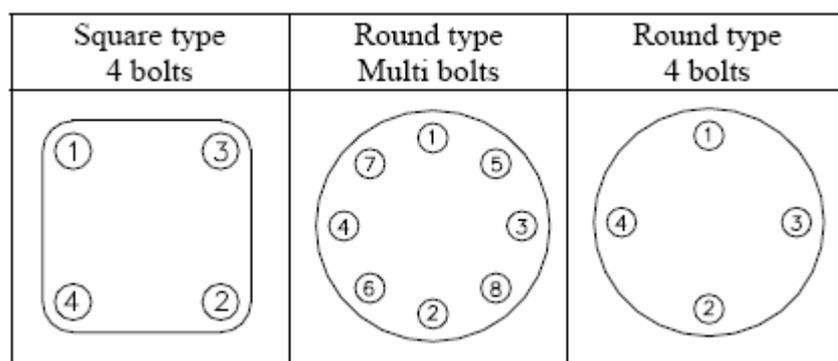
Select the correct specification of bolts to fasten the flange with pipeline.

Following table show fitting information, which is according to DIN 2545 & DIN 2543.

Nominal Pipe Size	Diameter of Bolt Holes	Diameter of Bolts
DN15	$\phi$ 14-4 hole	M12
DN20	$\phi$ 14-4 hole	M12
DN25	$\phi$ 14-4 hole	M12

DN32	$\phi$ 18-4 hole	M16
DN40	$\phi$ 18-4 hole	M16
DN50	$\phi$ 18-4 hole	M16
DN65	$\phi$ 18-4 hole	M16
DN80	$\phi$ 18-8 hole	M16
DN100	$\phi$ 18-8 hole	M16
DN125	$\phi$ 18-8 hole	M16
DN150	$\phi$ 22-8 hole	M20
DN200	$\phi$ 22-12 hole	M20

To tight the bolts of the flange end caps, the force must distribute on the every single bolt evenly. The order to tight the bolts need to install symmetrically. See the drawings below. Please see the drawings below for the order of bolts installation.



Torque data are provided in table as following table for information.

For ISO-3506(A2-70)

Thread diameter	Friction coefficient	Tightening torque (N-m)		
		50	70	80
M12	0.2	34.8	74	100
M16	0.2	86	183	245
M20	0.2	173	370	494

#### d. Systems hydrostatic test

Before delivery, valves are tested 1.5 times the allowable pressure at ambient temperature in open position. After installation, the piping system may subject to system tests, as condition not to exceed the above mentioned pressure.

#### 6.4 Actuator installation

The ball valves are provided with ISO 5211 actuator attachment. Following is the flange type against sizes of the ball valves.

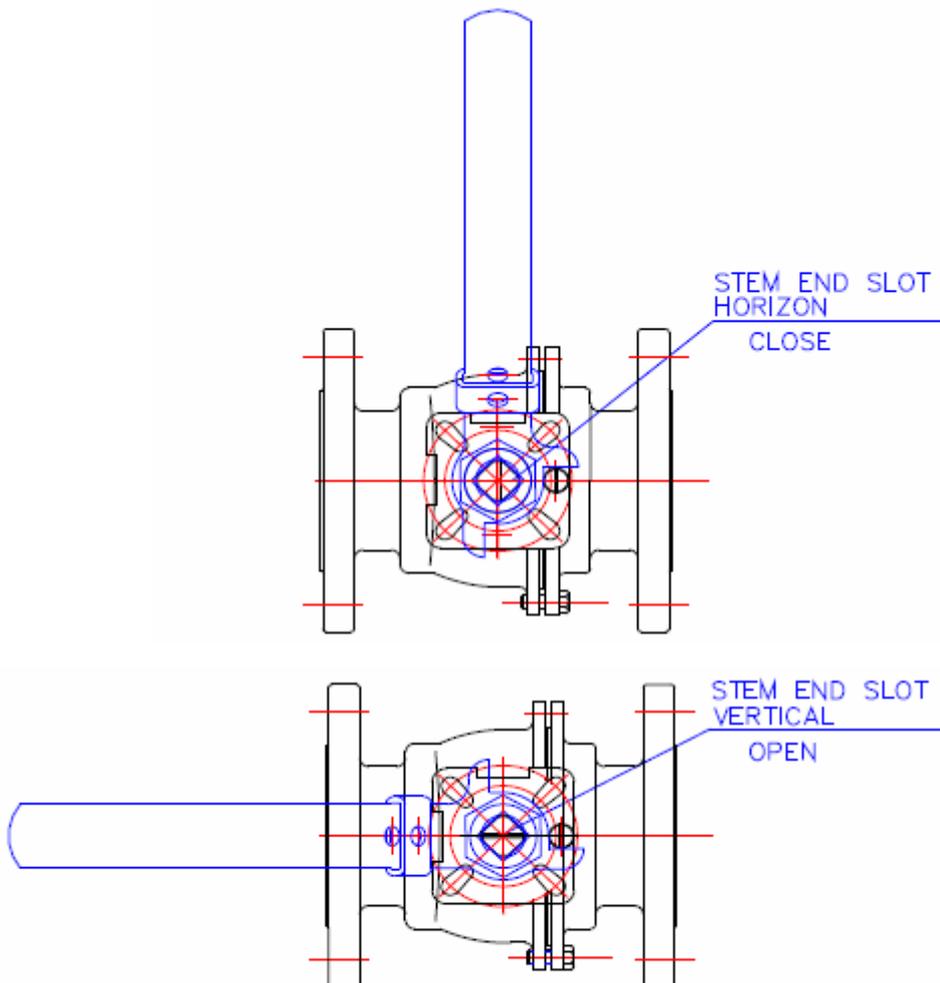
SIZE	Mounting Pad
DN15~20	F03, F04
DN25~32	F04, F05
DN40~50	F05, F07

DN65~80	F07, F10
DN100~150	F10, F12
DN200	F12

The sizes of actuator and setting of the input power or pressure of actuator are depended on the operation torque. The following table lists the maximum torque values of each flange type. User is recommended to refer to the instruction of actuator supplier. Overload torque applied by the actuator may transfer the un-intended load to ball valve itself or to the piping joints. Setting of the input power or pressure of the actuator is better not to exceed 1.5 times of the operation torque data.

### 6.5 Operation

- a. For manual operation, shift the handle in counter clockwise direction for close and clockwise for opening.
- b. If the handle is in parallel position with the flow direction, the valve is open. If the handle is in right angle position with the flow direction, the valve is close.
- c. When installing actuator or the valve is operated with removable handle, the user should ensure the position of the valve whether open or close. There is sign at the top of stem for square type stem. Following with the fig-4. Showing how to access the position of ball valve.



## 7. Put into service

7.1 After install to the pipe line, it is necessary to check the function of the product. Thus, operate the valve about 3 times to ensure the function.

7.2 The whole pipe line system may be tested with a proper pressure. User shall take care that the testing pressure shall not be exceeded 1.5 times the allowed working pressure.

7.3 After pressure testing, user shall operate the valve again about 3 times to ensure the function.

## 8. Dangers of inappropriate use

8.1 Never use the product exceed its allowed condition, such as pressure, temperature and fluid.

8.2 If the product have any inappropriate use, the product was damage however there are no signal occur immediately. User shall change the product to avoid danger in the future.

## 9. Maintenance

### 9.1 Maintenance frequency

The maintenance frequency is determined upon the application of ball valve. User shall consider the time interval depend on the kinds of fluid, flow velocity, operation frequency, high-pressure effect and high-temperature effect etc. minimum wall thickness acc to tab 3.2 etc.

### 9.2 Disassembly

a. The user should check the kit of TC-205MFF-PN16 if available in the local market, if not, please do not disassembly the valve, otherwise, please make a order from the original manufactory for the kit of TC-205MFF-PN16.

b. To dismantle the valve must follow the procedure and drawings below.

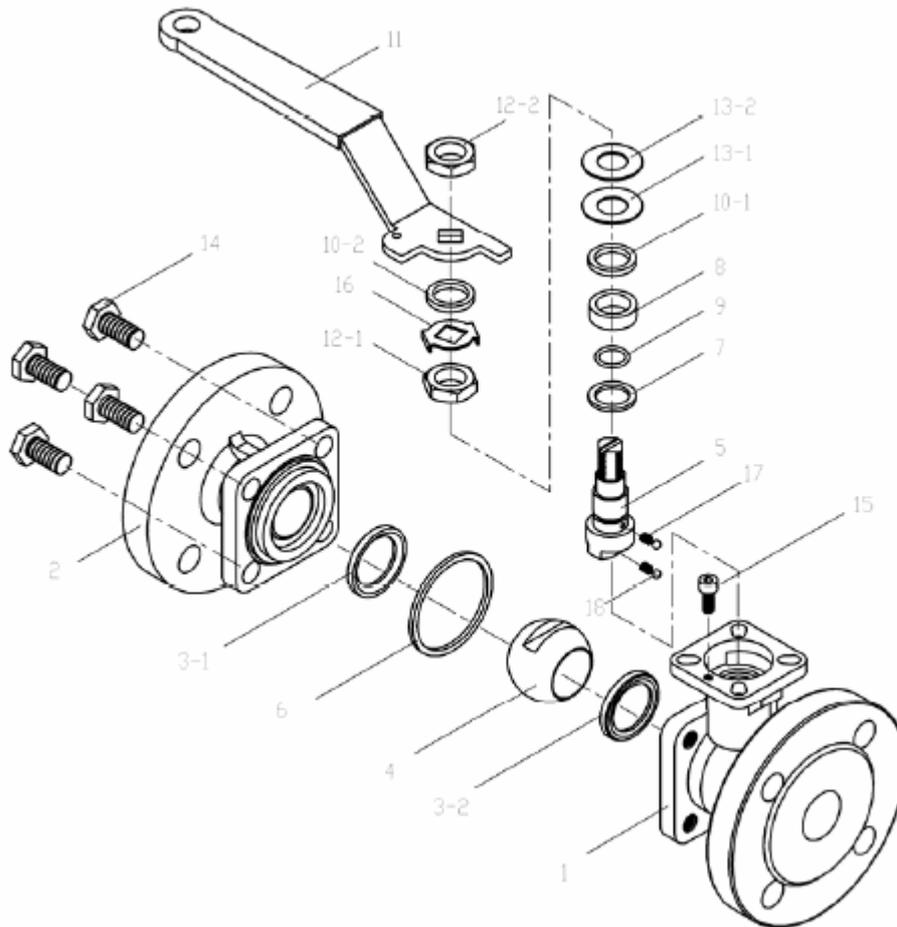
c. It doesn't matter where is the position of valve located, usually it contained the seal up fluid, so operator must be very carefully when move the valve on the pipe. It must open the ball a little and let the fluid come out slowly, it also need to watch out the poisonous and inflammability objects if there is any.

d. It must turn the ball in the close position before dismantle the valve. The ball cannot be taken out from valve body if the ball is in the open or semi-open position. The right position for store the valve is put the flange end on the ground. If it is a valve with the hand wheel, than it must dismantle the hand wheel from the valve first than put the valve flange end on the ground. This procedure is protecting the surface of the ball.

e. To dismantle the valve body and end cap, release the bolts symmetrically.

It must be careful to dismantle the ball to avoid the seat retainer fall down from end cap.

f. To lift the ball by hoist, it must make the protection on corner to avoid the ball damaged by metal contacted.



### 9.3 Parts inspection, maintenance and replacement:

- a. Check the surface of ball is it scraped? It may use the PT for inspection if necessary. If there is any damaged on the surface, than found out the root cause such as the dirt fluid...etc. It must avoid the damage factors as far as possible.
- b. The damaged of the ball surface, to gauge is it located on the contacting area of ball and ball seat? If it is the case, than the ball must take a fine milling. If it cause a heavy damaged, than it must welded and re-machined again. If it cannot be repaired than change a new ball.
- c. If the scraped area is not at the location described in the item b above, than it must re-fine milling the damage area again. Otherwise, the ball will damage the soft seat during the open and close operation or it will dig out the ball seat and cause a heavy damage to ball and seat.
- d. To inspect the surface of soft seat, has it any scrape mark, concave, dusts (including weld dregs, iron bit, sands...etc.), abrasion, abnormal press scrape, and a tiny scrape. Usually, the scrape mark and damage by dusts will occur the same time as ball damaged. It is the root cause for leakage. If leakage occur before repairing, than suggest to change a new soft seat. The mark from press or fine scrape is happen in an abnormal operation pressure. It must reconsider to choice a right valve.

- e. The stem packing may be replaced by the new parts after dismantle the valve. User shall make sure that the your distributor able to serve the same packing of your valve if you do not have a service pack. To tight the bolt and nut, please see Section 8 for torque data.
- f. To do the final inspection for a valve, it must operate 10 times of open and close to ensure all the parts are assemble correctly. To ensure the torque in a same value during the open/close operation. If the torque is not the same in operation, than it may has some parts in a not corrected position or interference. It must dismantle and re-assembly. Otherwise, it is easy to damage if let this valve works on a pipeline under higher pressure.

#### 9.4 Assembly

For assembly process, it takes the opposite way of dismantle process. The must in the close position during assembling the body and end cap, the stopper must be located at the right place, otherwise, the open and close operation will be opposite.

## 10. Torque Data

### Stem Nut

SIZE	Torque of Tightness(kgf-cm)	Tolerance
DN15;DN20	35	+10%
DN25;DN32	40	
DN40;DN50	55	
DN65	60	
DN80	60	
DN100	60	
DN125	100	
DN150	150	
DN200	150	

### Bolt

SIZE	Bolt Type	Torque of Tightness (kgf-cm)	Tolerance
DN15;DN20	M8	220	±10%
DN25;DN32	M10	450	
DN40;DN50	M12	450	
DN65	M12	450	
DN80	M12	750	
DN100	M12	750	
DN125	M12	750	
DN150	M16	750	
DN200	M16	1850	

## Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kel-F ( PCTFE )	Grafoil	Teflon&Filled Teflon	Peek	UHMWPE
Acetaldehyde	C	C	A	Ⓔ	A	A	A	D	C	A	Ⓔ	A	A	A	D
Acetamine	B	B	B	Ⓔ	Ⓔ	Ⓔ	A	Ⓔ	Ⓔ	Ⓔ	Ⓔ	A	A	A	Ⓔ
Acetate Solvents	B	A	A	Ⓔ	Ⓔ	A	A	D	A	D	Ⓔ	A	A	A	Ⓔ
Acetic Acid, aerated	D	D	A	Ⓔ	Ⓔ	A	A	C	Ⓔ	D	A	A	A	A	Ⓔ
Acetic Acid, Air Free	B	D	A	A	A	A	A	D	Ⓔ	D	A	A	A	A	Ⓔ
Acetic Acid, crude	C	C	A	A	A	B	A	D	Ⓔ	D	A	A	A	A	Ⓔ
Acetic Acid, glacial	Ⓔ	Ⓔ	D	A	Ⓔ	Ⓔ	A	D	A	D	A	A	A	A	Ⓔ
Acetic Acid, pure	C	D	A	A	A	D	A	D	A	B	A	A	A	A	C
Acetic Acid, 10%	C	C	A	A	A	B	A	D	A	Ⓔ	A	A	A	A	A
Acetic Acid, 80%	C	C	A	A	A	B	A	D	A	D	A	A	A	A	C
Acetic Acid Vapors	D	Ⓔ	D	D	B	C	A	Ⓔ	A	Ⓔ	Ⓔ	A	A	A	Ⓔ
Acetic Anhydride	D	D	B	B	B	B	A	D	A	C	A	A	A	A	C
Acetone	A	A	A	A	A	A	A	D	A	A	A	A	A	A	A
Other Ketones	A	A	A	A	A	A	A	D	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Acetyl Chloride	A	Ⓔ	C	Ⓔ	Ⓔ	B	A	A	A	D	Ⓔ	A	A	A	Ⓔ
Acetylene	B	A	A	A	A	A	A	A	A	A	Ⓔ	A	A	A	Ⓔ
Acid Fumes	D	D	B	Ⓔ	B	Ⓔ	Ⓔ	Ⓔ	Ⓔ	D	A	C	A	A	Ⓔ
Acrylonite	A	A	A	Ⓔ	B	A	A	C	Ⓔ	D	Ⓔ	A	A	A	Ⓔ
Air	A	A	Ⓔ	A	A	A	A	A	Ⓔ	A	A	B	A	A	A
Alcohol, Amyl	B	B	A	Ⓔ	B	B	B	B	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Alcohol, Butyl	B	B	A	Ⓔ	A	A	A	A	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Alcohol, Diacetone	A	A	A	Ⓔ	A	B	A	D	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Alcohol, Ethyl	B	B	B	Ⓔ	A	B	A	A	Ⓔ	A	Ⓔ	A	A	A	A
Alcohol, Fatty	B	B	A	Ⓔ	A	Ⓔ	A	Ⓔ	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Alcohol, Isopropyl	B	B	B	Ⓔ	A	B	B	A	Ⓔ	A	Ⓔ	A	A	A	Ⓔ

Ratings : A-Satisfactory B-Fair C-poor D-Unsatisfactory Ⓔ-No information

## Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kel-F ( PCTFE )	Grafoil	Teflon&Filled Teflon	Peek	UHMWPE
Alcohol, Methyl	B	B	A	☐	A	A	A	C	☐	A	☐	A	A	A	☐
Alcohol, Propyl	A	B	A	☐	A	A	A	A	☐	A	☐	A	A	A	☐
Alumina	A	☐	A	☐	☐	C	A	☐	☐	A	☐	A	A	A	☐
Aluminum Acetate	D	☐	A	B	B	B	B	D	A	D	☐	A	A	A	A
Aluminum Chloride dry	B	C	C	☐	D	☐	B	A	A	A	A	A	A	A	A
Aluminum Chloride solution	☐	☐	D	C	B	B	A	A	A	D	A	A	A	A	A
Aluminum Fluoride	☐	D	C	☐	☐	B	A	A	A	C	☐	A	A	A	A
Aluminum Hydroxide	A	D	A	B	B	B	B	A	A	C	☐	A	A	A	A
Aluminum Nitrate	D	☐	C	☐	B	C	B	A	A	D	☐	B	A	A	☐
Aluminum Oxalate	☐	☐	D	☐	A	B	A	☐	A	☐	☐	☐	A	A	A
Alum ( Alum. Potassium Sulphate )	D	☐	B	C	B	C	A	D	A	D	☐	A	A	A	A
Aluminum Sulfate	C	D	B	A	B	C	A	A	A	D	☐	A	A	A	A
Amines	B	B	A	A	A	B	B	D	A	C	☐	A	A	A	☐
Ammonia, Alum	☐	☐	A	☐	A	☐	A	☐	☐	C	☐	A	A	A	☐
Ammonia, Anhydrous Liquid	D	A	A	A	A	B	A	D	A	D	A	A	A	D	☐
Ammonia, Aqueous	D	A	A	☐	A	B	B	A	A	D	☐	A	A	A	☐
Ammonia, Gas, hot	D	☐	A	☐	A	B	B	D	A	D	☐	A	A	A	A
Ammonia Liquor	☐	☐	A	☐	A	☐	B	☐	☐	☐	☐	A	A	A	☐
Ammonia Solutions	D	B	A	☐	A	B	B	D	☐	D	☐	A	A	A	☐
Ammonium Acetate	D	☐	B	☐	A	B	B	D	A	D	☐	A	A	A	☐
Ammonium Bicarbonate	B	C	B	☐	B	B	☐	A	A	A	☐	A	A	A	A
Ammonium Bromide 5%	☐	☐	B	☐	B	B	☐	☐	A	A	☐	A	A	A	A
Ammonium Carbonate	B	B	B	☐	B	B	☐	A	A	D	☐	A	A	A	A
Ammonium Chloride	D	D	C	C	B	B	B	A	A	C	☐	A	A	A	A
Ammonium Hydroxide 28%	D	C	B	A	A	D	B	A	A	D	A	A	A	A	A

Ratings : A-Satisfactory B-Fair C-poor D-Unsatisfactory ☐-No information

## Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kel-F ( PCTFE )	Grafoil	Teflon&Filled Teflon	Peek	UHMWPE
Ammonium Hydroxide	D	C	B	A	A	C	B	A	A	D	⊞	A	A	A	A
Ammonium Monosulfate	⊞	⊞	A	⊞	B	B	B	⊞	⊞	D	⊞	⊞	A	A	A
Ammonium Nitrate	D	D	A	A	B	D	B	A	A	D	⊞	B	A	A	A
Ammonium Oxalate 5%	⊞	⊞	A	⊞	A	B	⊞	⊞	A	A	⊞	⊞	A	A	A
Ammonium Persulfate	C	⊞	A	⊞	A	D	⊞	B	A	D	A	⊞	A	A	A
Ammonium Phosphate	D	D	B	⊞	B	C	⊞	D	A	C	⊞	A	A	A	A
Ammonium Phosphate Di-basic	C	D	B	⊞	B	C	B	A	A	A	⊞	A	A	A	⊞
Ammonium Phosphate Tri-basic	C	D	B	⊞	B	C	B	A	A	A	⊞	A	A	A	⊞
Ammonium Sulfate	C	C	B	B	B	B	B	D	A	B	A	A	A	A	A
Ammonium Sulfide	D	D	B	⊞	B	B	⊞	D	A	A	⊞	A	A	A	A
Ammonium Sulfite	C	C	A	⊞	B	D	⊞	A	A	A	⊞	A	A	A	⊞
Amyl Acetate	B	C	B	A	A	B	A	D	A	A	A	A	A	A	A
Amyl Chloride	B	⊞	A	⊞	A	B	B	A	A	A	⊞	A	A	A	D
Aniline	D	C	B	⊞	A	B	B	C	A	D	A	A	A	A	A
Aniline Dyes	C	C	A	⊞	A	A	⊞	B	A	A	⊞	A	A	A	⊞
Apple Juice	C	D	B	⊞	A	A	⊞	A	⊞	A	⊞	A	A	A	⊞
Aqua Regia ( Strong Acid )	D	D	B	⊞	B	⊞	⊞	D	A	D	A	D	A	C	C
Aromatic Solvents	A	C	A	⊞	A	B	⊞	⊞	A	A	⊞	A	A	A	⊞
Arsenic Acid	D	D	B	⊞	B	D	B	A	A	D	A	A	A	A	A
Asphalt Emulsion	A	B	A	⊞	A	A	A	A	⊞	A	⊞	A	A	A	⊞
Asphalt Liquid	A	B	A	⊞	A	A	A	A	⊞	A	⊞	A	A	A	⊞
Barium Carbonate	B	B	B	⊞	B	B	A	A	A	A	⊞	A	A	A	A
Barium Chloride	B	C	B	B	C	B	⊞	A	A	A	⊞	A	A	A	A
Barium Cyanide	C	⊞	B	⊞	B	D	⊞	B	A	A	⊞	A	A	A	⊞
Barium Hydrate	D	⊞	A	⊞	A	B	⊞	⊞	⊞	A	⊞	A	A	A	⊞

Ratings : A-Satisfactory B-Fair C-poor D-Unsatisfactory ⊞-No information

## Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kal-F ( PCTFE )	Grafoil	Teflon&Filled Teflon	Peek	UHMWPE
Barium Hydroxide	C	C	B	A	A	B	E	A	A	A	E	A	A	A	A
Barium Nitrate	E	E	A	E	A	E	E	E	A	A	E	B	A	A	E
Barium Sulfate	C	C	A	E	A	B	E	A	A	A	E	A	A	A	A
Barium Sulfide	D	C	B	E	B	C	E	A	A	A	E	A	A	A	A
Beer	B	D	A	A	A	A	E	A	E	A	E	A	A	A	A
Beet Sugar Liquors	A	B	A	E	A	A	E	A	E	A	E	A	A	A	E
Benzaldehyde	A	A	A	E	A	B	B	D	E	A	A	A	A	A	D
Benzene ( Benzol )	B	B	B	B	A	A	B	A	A	C	A	A	A	A	D
Benzoic Acid	B	D	B	A	B	B	A	A	A	A	A	A	A	A	A
Beryllium Sulfate	B	E	B	E	A	B	E	B	A	A	E	A	A	A	E
Bleaching Powder wet	B	E	C	E	B	D	A	B	E	D	A	A	A	A	A
Blood ( Meat Juices )	B	E	A	A	A	B	E	B	E	A	E	A	A	A	E
Borax ( Sodium Borate )	D	C	A	E	E	A	A	A	E	A	E	A	A	A	A
Bordeaux Mixture	E	E	A	E	A	E	E	A	E	A	E	A	A	A	E
Borax Liquors	A	C	B	E	A	A	B	A	E	A	E	A	A	A	E
Boric Acid	C	D	B	E	B	B	A	A	A	A	E	A	A	A	A
Brake Fluid	B	E	B	A	E	B	E	D	E	B	E	A	A	A	E
Brines, saturated	B	D	B	E	B	B	A	A	A	A	E	A	A	A	A
Bromine, dry	B	D	D	E	B	A	A	A	A	D	A	B	A	C	D
Bunker Oils ( Fuel )	B	B	A	E	A	A	E	A	E	A	E	A	A	A	D
Butadiene	C	B	A	E	A	C	B	A	E	A	E	A	D	A	D
Butane	A	B	A	E	A	B	A	A	E	A	E	A	A	A	A
Butter	E	E	A	E	A	E	E	A	E	A	E	A	A	A	A
Buttermilk	D	D	A	E	A	D	E	A	E	A	E	A	A	A	B
Butyl Acetate	B	E	B	E	A	B	B	D	A	B	B	A	A	A	D

Ratings : A-Satisfactory B-Fair C-poor D-Unsatisfactory E-No information

## Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kel-F ( PCTFE )	Grafoil	Teflon&Filled Teflon	Peek	UHMWPE
Butylene	A	A	A	Ⓜ	A	A	Ⓜ	A	Ⓜ	A	Ⓜ	A	A	A	Ⓜ
Butyric Acid	C	C	B	Ⓜ	B	B	A	B	C	A	Ⓜ	A	A	A	D
Calcium Bisulfite	C	D	B	Ⓜ	B	D	B	B	A	D	Ⓜ	A	A	A	Ⓜ
Calcium Carbonate	C	D	B	Ⓜ	B	B	B	A	A	A	Ⓜ	A	A	A	A
Calcium Chlorate	D	Ⓜ	B	Ⓜ	B	B	Ⓜ	B	A	D	Ⓜ	B	A	A	A
Calcium Chloride	B	C	B	B	B	B	A	A	A	A	A	A	A	A	A
Calcium Hydroxide	C	C	B	Ⓜ	B	A	A	A	A	A	Ⓜ	A	A	A	A
Calcium Nitrate	Ⓜ	Ⓜ	B	Ⓜ	B	Ⓜ	Ⓜ	A	A	C	Ⓜ	B	A	A	A
Calcium Phosphate	C	Ⓜ	B	Ⓜ	B	Ⓜ	Ⓜ	A	A	B	Ⓜ	A	A	A	A
Calcium Silicate	C	Ⓜ	B	Ⓜ	B	Ⓜ	Ⓜ	A	Ⓜ	A	Ⓜ	A	A	A	Ⓜ
Calcium Sulfate	C	C	B	B	B	B	B	A	A	A	Ⓜ	A	A	A	A
Caliche Liquor	Ⓜ	B	A	Ⓜ	A	Ⓜ	Ⓜ	A	Ⓜ	A	Ⓜ	A	A	A	Ⓜ
Camphor	C	Ⓜ	B	Ⓜ	C	C	Ⓜ	B	A	A	Ⓜ	A	A	A	D
Cane Sugar Liquors	B	Ⓜ	A	Ⓜ	A	B	Ⓜ	A	Ⓜ	A	Ⓜ	A	A	A	Ⓜ
Carbonated Beverages	B	D	B	B	B	C	Ⓜ	B	Ⓜ	A	Ⓜ	A	A	A	Ⓜ
Carbonated Water	B	B	A	B	A	B	Ⓜ	A	Ⓜ	A	Ⓜ	A	A	A	A
Carbon Bisulfide	C	B	B	Ⓜ	B	B	Ⓜ	A	Ⓜ	A	Ⓜ	A	A	A	D
Carbon Dioxide, Dry	A	A	A	A	A	A	Ⓜ	A	A	A	Ⓜ	A	A	A	A
Carbon Acid Phenol	D	D	B	B	A	B	Ⓜ	A	A	A	Ⓜ	A	A	A	Ⓜ
Carbon Monoxide	A	Ⓜ	A	A	A	A	A	A	A	A	Ⓜ	A	A	A	A
Carbon Tetrachloride, dry	C	B	A	A	A	A	A	B	B	A	D	A	A	A	D
Carbon Tetrachloride, wet	D	D	B	Ⓜ	B	B	B	B	B	B	D	A	A	A	D
Casein	C	Ⓜ	B	Ⓜ	B	C	Ⓜ	B	A	A	Ⓜ	A	A	A	Ⓜ
Castor Oil	A	B	A	Ⓜ	A	A	A	A	Ⓜ	A	Ⓜ	A	A	A	A
Caustic Potash	Ⓜ	Ⓜ	A	Ⓜ	A	B	Ⓜ	Ⓜ	Ⓜ	D	Ⓜ	A	A	A	Ⓜ

Ratings : A-Satisfactory B-Fair C-poor D-Unsatisfactory Ⓜ-No information

## Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kel-F ( PCTFE )	Grafoil	Teflon&Filled Teflon	Peek	UHMWPE
Caustic Soda	E	B	A	E	A	A	E	B	A	D	E	A	A	A	E
Cellulose Acetate	B	E	B	E	E	B	B	D	A	C	E	A	A	A	E
China Wood Oil ( Tung )	C	C	A	E	A	A	A	A	E	A	E	A	A	A	E
Chlorinated Solvents	C	C	A	E	A	B	E	A	E	A	E	A	A	A	E
Chlorinated Water	E	E	C	D	A	D	D	A	E	D	E	A	A	D	C
Chlorine Gas, dry	C	B	B	C	A	A	A	B	A	D	A	A	A	A	D
Chlorobenzene, dry	B	B	A	E	A	B	B	A	A	B	D	A	A	A	D
Chloroform, dry	B	B	A	B	A	A	B	A	A	A	D	A	A	A	E
Chlorophyll, dry	B	E	B	E	A	B	E	B	E	E	E	A	A	A	E
Chlorosulfonic Acid, dry	C	B	B	E	B	B	A	D	A	D	A	E	A	D	D
Chrome Alum	C	B	A	E	A	B	E	A	A	B	E	A	A	A	A
Chromic Acid < 50%	D	D	C	C	B	C	B	C	A	D	A	A	A	A	A
Chromic Acid > 50%	D	D	C	D	B	D	B	C	A	D	A	A	A	D	E
Chromium Sulfate	C	E	B	E	C	B	E	B	E	C	E	A	A	A	E
Cider	E	E	A	E	B	A	E	E	E	A	E	A	A	A	A
Citric Acid	C	D	B	C	A	B	A	A	E	A	E	A	A	A	A
Citrus Juices	B	D	B	E	A	A	E	A	E	A	E	A	A	A	E
Coca-Cola Syrup	E	E	A	E	A	E	E	B	E	A	E	A	A	A	A
Coconut Oil	B	C	B	E	A	B	E	A	E	A	E	A	A	A	A
Coffee	A	E	A	E	A	B	E	A	E	A	E	A	B	A	A
Coffee Extracts, hot	B	C	A	E	A	A	E	E	E	A	E	A	A	A	E
Coke Oven Gas	C	B	A	E	A	B	E	A	E	D	E	A	A	A	E
Cooking Oil	B	B	A	E	A	A	E	A	E	A	E	A	A	A	E
Copper Acetate	D	D	A	E	A	C	B	D	A	D	E	A	A	A	E
Copper Carbonate	E	E	A	E	A	E	E	E	A	A	E	A	A	A	E

Ratings : A-Satisfactory B-Fair C-poor D-Unsatisfactory E-No information

# Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kel-F ( PCTFE )	Grafoil	Teflon&Filled Teflon	Peek	UHMWPE
Copper Cyanide	D	ⓔ	A	ⓔ	A	C	ⓔ	A	A	A	ⓔ	A	A	A	A
Copper Nitrate	D	D	B	ⓔ	B	D	ⓔ	A	A	A	ⓔ	B	A	A	A
Copper Sulfate	D	D	B	B	B	C	A	A	A	A	ⓔ	A	A	A	A
Corn Oil	B	C	B	ⓔ	B	B	ⓔ	A	ⓔ	A	ⓔ	A	A	A	A
Cottonseed Oil	B	C	B	ⓔ	B	B	ⓔ	A	ⓔ	A	ⓔ	A	A	A	A
Cresol	ⓔ	ⓔ	B	ⓔ	B	ⓔ	ⓔ	B	A	D	A	A	A	A	D
Creosote Oil	B	B	B	B	A	B	B	A	A	D	ⓔ	A	A	A	D
Cresylic Acid	C	C	B	ⓔ	B	B	ⓔ	A	A	D	ⓔ	A	A	A	A
Crude Oil, sour	C	B	A	ⓔ	A	B	ⓔ	A	ⓔ	A	ⓔ	A	A	A	ⓔ
Crude Oil, sweet	B	B	A	ⓔ	A	A	ⓔ	A	ⓔ	A	ⓔ	A	A	A	ⓔ
Coupric Nitrate	ⓔ	ⓔ	A	ⓔ	A	D	ⓔ	ⓔ	ⓔ	D	ⓔ	B	A	A	ⓔ
Cutting Oils, Water Emulsions	A	B	A	ⓔ	A	ⓔ	A	A	ⓔ	A	ⓔ	A	A	A	ⓔ
Cyanide	D	ⓔ	B	ⓔ	B	D	B	B	A	D	ⓔ	ⓔ	A	A	ⓔ
Cyclohexane	A	A	A	ⓔ	A	B	A	A	A	A	ⓔ	A	A	A	C
Cyclohexanone	B	ⓔ	A	ⓔ	A	B	D	D	A	A	A	A	A	A	D
Detergents, synthetic	B	ⓔ	B	ⓔ	A	B	ⓔ	A	ⓔ	A	ⓔ	A	A	A	A
Dextrin	B	ⓔ	B	ⓔ	B	B	ⓔ	B	ⓔ	A	ⓔ	A	A	A	A
Dichloroethane	ⓔ	ⓔ	C	ⓔ	B	B	ⓔ	ⓔ	A	D	A	A	A	A	ⓔ
Dichloroethyl Ether	B	ⓔ	B	ⓔ	B	ⓔ	ⓔ	D	ⓔ	D	ⓔ	ⓔ	A	A	ⓔ
Diesel Oil Fuels	A	A	A	ⓔ	A	A	ⓔ	A	A	A	ⓔ	A	A	A	ⓔ
Diethylamine	B	A	A	ⓔ	A	C	ⓔ	D	ⓔ	A	C	A	A	A	ⓔ
Diethyl Benzene	ⓔ	ⓔ	B	ⓔ	B	ⓔ	ⓔ	ⓔ	A	C	ⓔ	A	A	A	ⓔ
Diethylene Glycol	B	ⓔ	A	ⓔ	A	B	ⓔ	A	A	A	ⓔ	A	A	A	A
Diethyl Sulfate	B	ⓔ	B	ⓔ	B	B	ⓔ	B	ⓔ	A	ⓔ	A	A	A	ⓔ
Dimethyl Formamide	B	ⓔ	A	ⓔ	A	B	ⓔ	D	A	A	A	A	A	A	ⓔ

Ratings : A-Satisfactory B-Fair C-poor D-Unsatisfactory ⓔ-No information

# Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kel-F ( PCTFE )	Grafoil	Teflon&Filled Teflon	Peek	UHMWPE
Dimethyl phthalate	Ⓔ	Ⓔ	D	Ⓔ	Ⓔ	Ⓔ	Ⓔ	B	A	C	Ⓔ	A	A	A	Ⓔ
Dioxane	B	Ⓔ	B	Ⓔ	B	B	Ⓔ	D	A	C	A	A	A	A	Ⓔ
Dipentane ( Pinene )	A	Ⓔ	A	Ⓔ	A	Ⓔ	Ⓔ	B	A	A	Ⓔ	A	A	A	Ⓔ
Disodium Phosphate	Ⓔ	Ⓔ	B	Ⓔ	B	C	Ⓔ	B	Ⓔ	A	Ⓔ	A	A	A	A
Dowtherm	A	B	A	Ⓔ	A	A	Ⓔ	A	A	A	Ⓔ	A	A	A	Ⓔ
Drilling Mud	B	B	A	Ⓔ	A	B	Ⓔ	A	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Dry Cleaning Fluids	C	B	A	Ⓔ	A	B	Ⓔ	A	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Drying Oil	C	C	B	Ⓔ	B	B	Ⓔ	Ⓔ	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Enamel	A	Ⓔ	A	Ⓔ	Ⓔ	Ⓔ	Ⓔ	Ⓔ	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Epsom Salts ( MgSo4 )	B	C	B	Ⓔ	B	B	Ⓔ	A	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Ethane	B	C	B	Ⓔ	B	B	Ⓔ	A	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Ethers	B	A	A	B	A	B	Ⓔ	C	Ⓔ	C	Ⓔ	A	A	A	D
Ethyl Acetate	C	B	B	A	B	B	B	D	A	C	C	A	A	A	C
Ethyl Acrylate	B	C	A	Ⓔ	A	B	A	D	A	B	Ⓔ	A	A	A	Ⓔ
Ethyl Benzene	Ⓔ	Ⓔ	B	Ⓔ	A	Ⓔ	A	A	A	A	Ⓔ	A	A	A	Ⓔ
Ethyl Bromide	A	Ⓔ	B	Ⓔ	C	B	Ⓔ	A	A	A	Ⓔ	A	A	A	Ⓔ
Ethyl Chloride, dry	B	B	A	A	A	B	B	B	A	A	Ⓔ	A	B	A	D
Ethyl Chloride, wet	C	D	B	Ⓔ	B	B	B	B	A	A	Ⓔ	A	A	A	D
Ethylene Chloride	Ⓔ	Ⓔ	A	Ⓔ	A	B	B	B	A	A	A	A	A	A	Ⓔ
Ethylene Dichloride	Ⓔ	Ⓔ	B	Ⓔ	A	B	Ⓔ	A	A	C	Ⓔ	A	A	A	D
Ethylene Glycol	B	B	B	A	A	B	A	A	A	A	A	A	A	A	A
Ethylene Oxide	C	B	B	Ⓔ	B	B	A	D	A	A	D	A	A	A	C
Ethyl Ether	B	Ⓔ	A	Ⓔ	A	A	B	D	Ⓔ	A	C	A	A	A	Ⓔ
Ethyl Silicate	B	Ⓔ	B	Ⓔ	B	B	Ⓔ	A	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Ethyl Sulfate	Ⓔ	Ⓔ	B	Ⓔ	B	Ⓔ	Ⓔ	A	Ⓔ	A	Ⓔ	A	A	C	Ⓔ

Ratings : A-Satisfactory B-Fair C-poor D-Unsatisfactory Ⓔ-No information

## Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kel-F ( PCTFE )	Grafoil	Teflon&Filled Teflon	Peek	UHMWPE
Fatty Acids	C	D	A	Ⓔ	A	B	A	A	A	A	Ⓔ	A	A	A	A
Ferric Hydroxide	Ⓔ	Ⓔ	A	Ⓔ	A	A	Ⓔ	Ⓔ	A	A	Ⓔ	A	A	A	Ⓔ
Ferric Nitrate	D	D	C	B	A	D	B	A	A	A	Ⓔ	B	A	A	A
Feric Sulfate	D	D	B	B	A	D	Ⓔ	A	A	A	Ⓔ	A	A	A	A
Ferrous Ammonium Citrate	Ⓔ	Ⓔ	B	Ⓔ	B	Ⓔ	Ⓔ	Ⓔ	A	A	Ⓔ	A	A	A	A
Ferrous Chloride	B	D	D	Ⓔ	D	D	D	A	A	A	A	A	A	A	A
Ferrous Sulfate	B	D	B	Ⓔ	B	B	B	A	A	A	A	A	A	A	A
Ferrous Sulfate, Saturated	C	C	A	Ⓔ	A	B	B	B	Ⓔ	A	A	A	A	A	Ⓔ
Fertilizer Solutions	C	B	B	Ⓔ	B	B	Ⓔ	Ⓔ	Ⓔ	Ⓔ	Ⓔ	A	A	A	Ⓔ
Fish Oil	B	B	A	Ⓔ	A	A	Ⓔ	A	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Flourine Gas, dry	Ⓔ	Ⓔ	B	Ⓔ	A	A	A	Ⓔ	Ⓔ	Ⓔ	A	Ⓔ	A	A	Ⓔ
Flue Gases	B	Ⓔ	A	Ⓔ	A	B	Ⓔ	C	Ⓔ	C	Ⓔ	A	A	A	Ⓔ
Fluoboric Acid	Ⓔ	Ⓔ	B	Ⓔ	A	Ⓔ	Ⓔ	Ⓔ	A	D	Ⓔ	Ⓔ	A	D	A
Fluorosilicic Acid	B	D	B	Ⓔ	B	A	B	C	A	C	Ⓔ	Ⓔ	A	D	A
Formaldehyde, cold	A	A	A	A	A	A	B	D	A	A	Ⓔ	A	A	A	A
Formaldehyde, hot	B	D	C	Ⓔ	B	B	B	Ⓔ	A	A	B	A	A	A	A
Formic Acid, cold	B	D	B	D	B	B	A	B	B	D	A	A	A	A	A
Formic Acid, hot	B	D	B	D	B	B	B	A	B	D	B	A	A	A	A
Freon Gas, dry	B	B	A	A	A	A	B	C	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Fredn 11, MF, 112, BF	B	Ⓔ	A	Ⓔ	A	B	B	D	D	A	C	A	A	A	Ⓔ
Freon 12, 13, 32, 114, 115	A	Ⓔ	A	Ⓔ	A	B	B	D	D	A	C	A	A	A	Ⓔ
Fredon 21, 31	B	Ⓔ	A	Ⓔ	A	B	B	D	A	A	C	A	A	A	Ⓔ
Freon 22	A	Ⓔ	A	Ⓔ	A	Ⓔ	B	D	C	A	C	A	A	A	Ⓔ
Freon 113, TF	B	Ⓔ	A	Ⓔ	A	B	B	C	D	A	C	A	A	A	Ⓔ
Freon, wet	D	Ⓔ	C	B	B	B	B	D	Ⓔ	A	Ⓔ	A	A	A	Ⓔ

Ratings : A-Satisfactory B-Fair C-poor D-Unsatisfactory Ⓔ-No information

## Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kel-F ( PCTFE )	Grafoil	Teflon&Filled Teflon	Peek	UHMWPE
Fruit Juices	B	D	A	ⓔ	A	B	ⓔ	A	ⓔ	A	ⓔ	ⓔ	A	A	A
Fuel Oil	B	B	A	ⓔ	A	B	ⓔ	A	ⓔ	A	ⓔ	A	A	A	D
Fumaric Acid	ⓔ	ⓔ	ⓔ	ⓔ	A	ⓔ	ⓔ	A	A	A	ⓔ	ⓔ	A	A	ⓔ
Furfural	A	A	A	B	A	B	B	D	ⓔ	A	ⓔ	A	A	A	D
Gallic Acid 5%	C	D	B	ⓔ	B	B	B	A	A	A	A	ⓔ	A	A	A

Gas, Manufactured	B	B	B	ⓔ	B	A	ⓔ	A	ⓔ	A	A	A	A	A	ⓔ
Gas, Natural	B	B	A	ⓔ	B	A	ⓔ	A	ⓔ	A	ⓔ	A	A	A	ⓔ
Gas, Odorizers	A	B	B	ⓔ	A	B	ⓔ	A	ⓔ	A	ⓔ	A	A	A	ⓔ
Gasoline, Aviation	A	A	A	ⓔ	A	A	A	A	A	A	ⓔ	A	A	A	D
Gasoline, Leaded	A	A	A	ⓔ	A	B	A	A	A	A	ⓔ	A	A	A	D

Gasoline, Motor	A	A	A	A	A	A	A	A	A	A	ⓔ	A	A	A	D
Gasoline, Refined	B	B	A	ⓔ	A	B	A	A	A	A	ⓔ	A	A	A	D
Gasoline, Sour	B	B	A	ⓔ	A	C	A	A	ⓔ	A	ⓔ	A	A	A	D
Gasoline Unleaded	A	A	A	ⓔ	A	A	A	A	A	A	ⓔ	A	A	A	D
Gelatin	A	D	A	ⓔ	A	B	ⓔ	A	ⓔ	A	ⓔ	A	A	A	A

Glucose	A	B	A	ⓔ	A	A	A	A	A	A	ⓔ	A	A	A	A
Glue	B	A	B	ⓔ	A	B	A	A	A	A	ⓔ	A	A	A	A
Glycerin ( Glycerol )	B	C	A	A	A	A	A	A	A	A	ⓔ	A	A	A	A
Glycol Amine	D	ⓔ	B	A	ⓔ	ⓔ	D	D	ⓔ	C	ⓔ	A	ⓔ	A	ⓔ
Glycol	B	C	B	ⓔ	A	B	ⓔ	A	ⓔ	C	ⓔ	A	A	A	A

Graphite	B	ⓔ	B	ⓔ	A	B	ⓔ	B	ⓔ	A	ⓔ	A	A	A	ⓔ
Grease	C	A	A	ⓔ	A	B	ⓔ	A	A	A	ⓔ	A	A	A	ⓔ
Helium Gas	B	ⓔ	A	ⓔ	A	B	A	A	ⓔ	A	ⓔ	A	A	A	A
Heptane	A	B	A	ⓔ	A	B	A	A	A	A	ⓔ	A	A	A	C
Hexane	B	B	A	ⓔ	A	B	A	A	ⓔ	A	C	A	A	A	D

Ratings : A-Satisfactory B-Fair C-poor D-Unsatisfactory ⓔ-No information

## Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kel-F ( PCTFE )	Grafoil	Teflon&Filled Teflon	Peek	UHMWPE
Hexanol, Tertiary	A	A	A	Ⓔ	A	A	A	B	A	A	Ⓔ	A	A	A	A
Hydraulic Oil, Petroleum Base	B	A	A	Ⓔ	A	A	Ⓔ	A	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Hydrazine	D	Ⓔ	B	Ⓔ	B	D	Ⓔ	D	A	D	Ⓔ	Ⓔ	A	A	Ⓔ
Hydrocyanic Acid	D	D	A	Ⓔ	A	C	B	A	A	D	Ⓔ	Ⓔ	A	A	A
Hydrofluosilicic Acid	A	D	C	Ⓔ	B	B	Ⓔ	A	A	A	Ⓔ	A	A	D	Ⓔ
Hydrogen Gas, cold	B	B	A	Ⓔ	A	A	Ⓔ	A	Ⓔ	A	Ⓔ	A	A	A	A
Hydrogen Gas, hot	Ⓔ	B	B	Ⓔ	A	Ⓔ	A	A	Ⓔ	A	Ⓔ	A	A	A	A
Hydrogen Peroxide > 25%	D	D	B	Ⓔ	B	D	D	B	A	D	A	D	A	A	C
Hydrogen Peroxide < 25%	C	C	B	Ⓔ	B	D	D	A	A	D	A	C	A	A	A
Hydrogen Sulfide, Dry	C	B	A	B	B	B	B	A	A	C	A	A	A	A	A
Hydrogen sulfide, Wet	D	C	B	Ⓔ	B	C	D	A	A	C	A	A	A	A	A
Hypo ( Sodium Thiosulfate )	C	D	B	Ⓔ	B	B	Ⓔ	A	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Illuminating Gas	A	A	A	Ⓔ	A	A	Ⓔ	A	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Ink-Newsprint	C	D	A	Ⓔ	A	B	Ⓔ	A	A	A	Ⓔ	A	A	A	A
Iodoform	C	B	A	Ⓔ	A	C	Ⓔ	A	C	A	Ⓔ	Ⓔ	A	A	Ⓔ
Iso-Butane	Ⓔ	Ⓔ	B	Ⓔ	B	Ⓔ	Ⓔ	Ⓔ	A	A	Ⓔ	A	A	A	Ⓔ
Iso-Octane	A	A	A	Ⓔ	A	A	Ⓔ	A	A	A	Ⓔ	A	A	A	Ⓔ
Isopropyl Acetate	Ⓔ	Ⓔ	B	Ⓔ	A	Ⓔ	Ⓔ	D	A	A	Ⓔ	A	A	A	Ⓔ
Isopropyl Ether	A	A	A	Ⓔ	A	B	A	D	A	A	A	A	A	A	Ⓔ
JP-4 Fuel	A	A	A	Ⓔ	A	A	A	A	A	A	Ⓔ	A	A	A	Ⓔ
JP-5 Fuel	A	A	A	Ⓔ	A	A	A	A	A	A	Ⓔ	A	A	A	Ⓔ
JP-6 Fuel	A	A	A	Ⓔ	A	A	A	A	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Kerosene	A	B	A	Ⓔ	A	A	A	A	A	A	Ⓔ	A	A	A	C
Ketchup	D	D	A	Ⓔ	A	B	Ⓔ	A	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Ketones	A	A	A	Ⓔ	A	A	Ⓔ	D	Ⓔ	A	Ⓔ	A	A	A	Ⓔ

Ratings : A-Satisfactory B-Fair C-poor D-Unsatisfactory Ⓔ-No information

## Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kel-F ( PCTFE )	Grafoil	Teflon&Filled Teflon	Peek	UHMWPE
Laquer ( and Solvent )	A	C	A	⊞	A	A	⊞	D	A	A	⊞	A	A	A	⊞
Lactic Acid Concentrated Cold	D	D	A	D	A	D	A	A	A	D	⊞	A	A	A	A
Lactic Acid Concentrated Hot	D	D	B	D	A	D	B	B	A	D	⊞	A	A	A	A
Lactic Acid Dilute Cold	D	D	A	B	A	C	A	A	A	D	⊞	A	A	A	A
Lactic Acid dilute Hot	D	D	A	D	A	D	B	D	A	D	⊞	A	A	A	A
Lactose	B	⊞	B	⊞	B	B	⊞	B	⊞	A	⊞	A	A	A	⊞
Lard	B	⊞	A	⊞	A	⊞	⊞	A	⊞	A	⊞	A	A	A	A
Lard Oil	B	C	B	⊞	A	B	⊞	A	⊞	A	⊞	A	A	A	A
Lead acetate	C	D	B	⊞	B	B	⊞	D	A	A	⊞	A	A	A	A
Lead Sulfate	C	⊞	B	⊞	B	B	⊞	B	⊞	A	⊞	A	A	A	⊞
Lecithin	C	⊞	B	⊞	B	B	⊞	B	⊞	A	⊞	⊞	A	A	⊞
Linoleic acid	B	B	A	⊞	A	B	⊞	B	⊞	A	⊞	A	A	A	⊞
Linseed Oil	B	A	A	⊞	A	B	⊞	A	⊞	A	⊞	A	A	A	A
Lithium Chloride	B	⊞	B	⊞	A	B	⊞	B	A	A	⊞	A	A	A	⊞
LPG	A	B	B	⊞	B	B	⊞	A	⊞	A	⊞	A	A	A	⊞
Lubricating Oil Petroleum Base	B	A	A	⊞	A	B	⊞	A	⊞	A	⊞	A	A	A	C
Ludox	D	⊞	B	⊞	B	B	⊞	B	⊞	B	⊞	⊞	A	A	⊞
Magnesium Bisulfate	B	B	A	⊞	A	B	⊞	B	⊞	A	⊞	A	A	A	⊞
Magnesium Bisulfide	D	⊞	B	⊞	B	B	⊞	B	⊞	A	⊞	A	A	A	⊞
Magnesium Carbonate	B	⊞	A	⊞	A	B	⊞	B	⊞	A	⊞	A	A	A	A
Magnesium Chloride	B	C	B	C	B	B	A	A	⊞	A	⊞	A	A	A	A
Magnesium Hydroxide	B	B	A	A	A	B	B	A	A	A	⊞	A	A	A	A
Magnesium Hydroxide Hot	D	B	A	A	A	A	B	A	A	A	⊞	A	A	A	A
Magnesium Nitrate	⊞	⊞	A	⊞	A	B	⊞	B	⊞	A	⊞	B	A	A	A
Magnesium Sulfate	B	B	A	A	A	B	A	A	⊞	A	⊞	A	A	A	A

Ratings : A-Satisfactory B-Fair C-poor D-Unsatisfactory ⊞-No information

## Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kel-F ( PCTFE )	Grafoil	Teflon&Filled Teflon	Peek	UHMWPE
Maleic Acid	B	B	B	ⓔ	B	B	A	A	A	A	ⓔ	A	A	A	A
Maleic anhydrde	B	ⓔ	B	ⓔ	B	B	B	A	A	C	ⓔ	A	A	A	ⓔ
Malic acid	B	D	B	ⓔ	B	B	ⓔ	A	A	A	ⓔ	A	A	A	ⓔ
Malt Beverages	ⓔ	ⓔ	A	ⓔ	B	A	ⓔ	A	ⓔ	A	ⓔ	A	A	A	ⓔ
Manganese Carbonate	ⓔ	ⓔ	B	ⓔ	A	ⓔ	ⓔ	ⓔ	A	A	ⓔ	A	A	A	ⓔ
Manganese Sulfate	B	ⓔ	A	ⓔ	A	B	ⓔ	B	A	A	ⓔ	A	A	A	ⓔ
Mayonnaise	D	D	A	ⓔ	A	B	ⓔ	A	ⓔ	A	ⓔ	A	A	A	ⓔ
Meat Juices	D	ⓔ	A	ⓔ	A	ⓔ	ⓔ	ⓔ	ⓔ	A	ⓔ	A	A	A	A
Melamine Resins	ⓔ	ⓔ	C	ⓔ	C	ⓔ	ⓔ	ⓔ	ⓔ	A	ⓔ	A	A	A	ⓔ
Mercuric Chloride	D	D	B	ⓔ	B	D	B	A	A	A	A	A	A	A	A
Mercuric Cyanide	D	D	A	ⓔ	A	C	B	A	A	A	ⓔ	A	A	A	A
Mercurous Nitrate	D	ⓔ	A	ⓔ	A	D	ⓔ	B	A	A	ⓔ	B	A	A	A
Mercury	D	A	A	ⓔ	A	B	B	A	A	A	ⓔ	A	A	A	A
Methane	A	B	A	ⓔ	A	B	A	A	ⓔ	A	ⓔ	A	A	A	ⓔ
Methanol	B	ⓔ	A	ⓔ	A	B	ⓔ	D	A	C	A	A	A	A	ⓔ
Methyl Acetate	A	B	A	ⓔ	A	B	A	D	A	B	A	A	A	A	ⓔ
Methyl Acetone	A	A	A	ⓔ	A	A	ⓔ	D	ⓔ	B	ⓔ	A	A	A	ⓔ
Methylamine	D	B	A	ⓔ	A	C	B	D	A	A	ⓔ	A	A	A	ⓔ
Methyl Bromide 100%	C	ⓔ	B	ⓔ	A	B	ⓔ	A	A	A	ⓔ	A	A	A	D
Methyl Cellosolve	A	B	A	ⓔ	A	B	B	D	ⓔ	A	ⓔ	A	A	A	ⓔ
Methyl Cellulose	ⓔ	ⓔ	A	ⓔ	A	ⓔ	B	D	ⓔ	A	ⓔ	A	A	A	ⓔ
Methyl Chloride	B	B	A	ⓔ	A	B	ⓔ	A	A	A	C	A	A	A	D
Methyl Ethyl Ketone	A	A	A	ⓔ	A	A	B	D	A	A	A	A	A	A	D
Methylene Chloride	A	B	A	ⓔ	A	B	B	B	A	A	ⓔ	A	A	A	D
Methyl Formate	A	C	B	ⓔ	A	B	B	D	ⓔ	A	A	A	A	A	ⓔ

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## Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kel-F ( PCTFE )	Grafoil	Teflon&Filled Teflon	Peek	UHMWPE
Methyl Isobutyle Ketone	Ⓔ	Ⓔ	A	Ⓔ	A	Ⓔ	Ⓔ	D	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Milk & Milk Products	B	D	A	Ⓔ	A	B	Ⓔ	A	Ⓔ	A	Ⓔ	A	A	A	B
Mineral Oils	B	B	A	Ⓔ	A	A	Ⓔ	A	Ⓔ	A	A	A	A	A	D
Mineral Spirits	B	B	B	Ⓔ	B	B	Ⓔ	A	Ⓔ	A	Ⓔ	A	A	A	D
Mixed Acids ( cold )	D	C	B	Ⓔ	B	C	Ⓔ	B	Ⓔ	D	Ⓔ	Ⓔ	A	A	Ⓔ
Molasses, crude	A	A	A	Ⓔ	A	A	Ⓔ	A	Ⓔ	A	Ⓔ	A	A	A	B
Molasses, edible	A	C	A	Ⓔ	A	A	Ⓔ	A	Ⓔ	A	Ⓔ	A	A	A	B
Molybdc Acid	Ⓔ	Ⓔ	A	Ⓔ	A	Ⓔ	Ⓔ	Ⓔ	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Monochloro Benzene Dry	Ⓔ	Ⓔ	B	Ⓔ	B	B	Ⓔ	A	Ⓔ	C	Ⓔ	A	A	A	Ⓔ
Morpholine	B	Ⓔ	A	Ⓔ	A	B	Ⓔ	D	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Mustard	A	B	A	Ⓔ	A	A	Ⓔ	A	Ⓔ	A	Ⓔ	A	A	A	Ⓔ
Naptha	B	B	B	Ⓔ	B	B	A	A	A	A	Ⓔ	A	A	A	D
Naphthalene	B	B	B	Ⓔ	B	B	B	A	A	A	Ⓔ	A	A	A	D
Natural Gas, Sour	B	B	A	Ⓔ	A	D	A	A	A	A	Ⓔ	A	A	A	A
Nickel Ammonium Sulfate	D	D	A	Ⓔ	A	C	Ⓔ	D	A	C	A	A	A	A	Ⓔ
Nickel Chloride	D	D	B	Ⓔ	A	B	A	A	A	D	Ⓔ	A	A	A	A
Nickel Nitrate	D	D	B	Ⓔ	A	B	Ⓔ	A	A	C	Ⓔ	B	A	A	A
Nickel Sulfate	D	D	B	Ⓔ	A	B	B	A	A	C	Ⓔ	A	A	A	A
Nicotinic Acid	A	B	A	Ⓔ	A	A	Ⓔ	B	Ⓔ	C	Ⓔ	A	A	A	A
Nitric Acid 10%	D	D	A	A	A	D	Ⓔ	A	A	D	A	A	A	A	A
Nitric Acid 30%	D	D	A	D	A	D	Ⓔ	A	A	D	A	B	A	A	A
Nitric Acid 80%	D	D	A	D	A	D	Ⓔ	B	A	D	A	C	A	D	D
Nitric Acid 100%	D	D	A	D	A	D	Ⓔ	B	A	D	A	D	A	D	D
Nitric Acid Anhydrous	D	D	A	D	A	D	Ⓔ	A	Ⓔ	D	Ⓔ	D	A	D	Ⓔ
Nitrobenzene	D	B	A	Ⓔ	A	B	B	B	A	B	A	A	A	A	D

Ratings : A-Satisfactory B-Fair C-poor D-Unsatisfactory Ⓔ-No information

## Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kel-F ( PCTFE )	Grafoil	Teflon.&Filled Teflon	Peek	UHMWPE
Nitrogen	A	A	A	Ⓜ	A	A	Ⓜ	A	A	A	Ⓜ	A	A	A	A
Nitrous Acid 10%	D	D	B	Ⓜ	B	D	Ⓜ	A	A	B	Ⓜ	A	A	A	Ⓜ
Nitrous Gases	D	B	A	Ⓜ	A	D	Ⓜ	Ⓜ	Ⓜ	B	Ⓜ	A	A	A	Ⓜ
Nitrous Oxide	B	B	B	Ⓜ	B	D	B	A	Ⓜ	A	Ⓜ	A	A	A	Ⓜ
Oils & Fats	Ⓜ	Ⓜ	A	Ⓜ	A	Ⓜ	Ⓜ	Ⓜ	Ⓜ	A	Ⓜ	A	A	A	Ⓜ
Oils, Animal	A	A	A	Ⓜ	A	B	A	B	Ⓜ	A	Ⓜ	A	A	A	Ⓜ
Oils, Petroleum Refined	B	A	A	Ⓜ	A	A	A	A	A	A	Ⓜ	A	A	A	Ⓜ
Oils, Petroleum Sour	C	B	A	Ⓜ	A	A	A	A	A	A	Ⓜ	A	A	A	Ⓜ
Oils, Water Mixture	A	B	A	Ⓜ	A	Ⓜ	A	A	A	A	Ⓜ	A	A	A	Ⓜ
Olaic Acid	Ⓜ	Ⓜ	B	Ⓜ	B	A	Ⓜ	C	Ⓜ	C	Ⓜ	A	A	A	Ⓜ
Oleic Acid	B	C	B	Ⓜ	A	B	B	B	A	C	Ⓜ	A	A	A	C
Oleum	C	B	B	Ⓜ	B	C	B	A	A	D	Ⓜ	Ⓜ	A	D	D
Oleum Spirits	D	Ⓜ	B	Ⓜ	B	D	Ⓜ	A	Ⓜ	D	Ⓜ	Ⓜ	A	D	Ⓜ
Olive Oil	C	B	A	Ⓜ	A	A	Ⓜ	A	Ⓜ	A	Ⓜ	A	A	A	A
Oxalic Acid	B	D	B	D	B	B	Ⓜ	A	Ⓜ	C	A	A	A	A	A
Oxygen	A	B	A	A	A	A	A	A	A	D	Ⓜ	D	A	A	A
Ozone, Dry	A	A	A	Ⓜ	A	A	A	A	Ⓜ	C	A	Ⓜ	A	A	C
Ozone, Wet	B	C	A	Ⓜ	A	A	A	A	Ⓜ	C	A	Ⓜ	A	A	C
Paints & Sovents	A	A	A	Ⓜ	A	A	Ⓜ	B	Ⓜ	A	Ⓜ	A	A	A	Ⓜ
Palmitic Acid	B	C	B	Ⓜ	B	B	Ⓜ	A	A	A	Ⓜ	A	A	A	Ⓜ
Palm Oil	B	C	B	Ⓜ	A	A	Ⓜ	A	Ⓜ	A	Ⓜ	A	A	A	A
Paper Pulp	B	Ⓜ	A	Ⓜ	A	B	Ⓜ	B	Ⓜ	A	Ⓜ	A	A	A	Ⓜ
Paraffin	A	B	A	Ⓜ	A	A	A	A	A	A	Ⓜ	A	A	A	C
Paraform-aldehyde	B	B	B	Ⓜ	B	B	Ⓜ	Ⓜ	C	A	Ⓜ	A	A	A	Ⓜ
Paraldehyde	Ⓜ	Ⓜ	B	Ⓜ	B	Ⓜ	Ⓜ	Ⓜ	Ⓜ	A	Ⓜ	A	A	A	Ⓜ

Ratings : A-Satisfactory B-Fair C-poor D-Unsatisfactory Ⓜ-No information

## Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kel-F ( PCTFE )	Grafoil	Teflon&Filled Teflon	Peek	UHMWPE
Pentane	A	B	A	ⓔ	A	B	ⓔ	A	A	A	ⓔ	A	A	A	ⓔ
Perchloro-thylene, Dry	C	B	A	ⓔ	A	B	B	A	C	B	ⓔ	A	A	A	ⓔ
Petrolatum ( Vaseline Pet. Jelly )	B	C	B	ⓔ	A	A	ⓔ	A	ⓔ	A	ⓔ	A	A	A	A
Phenol	B	D	A	B	A	A	A	A	A	C	A	A	A	A	D
Phosphate Ester	D	A	A	ⓔ	A	A	ⓔ	ⓔ	ⓔ	A	ⓔ	A	A	A	ⓔ
Phosphoric Acid 10%	D	D	D	B	B	D	ⓔ	A	A	D	A	A	A	A	A
Phosphoric Acid 50% Cold	D	D	B	B	B	C	ⓔ	A	A	D	A	A	A	A	A
Phosphoric Acid 50% Hot	D	D	D	D	B	C	ⓔ	A	A	D	A	A	A	A	A
Phosphoric Acid 85% Cold	D	B	A	C	B	A	ⓔ	B	A	D	A	A	A	B	A
Phosphoric Acid 85% Hot	D	C	B	D	B	ⓔ	ⓔ	ⓔ	A	D	A	A	A	B	A
Phosphoric Anhydride	ⓔ	ⓔ	A	ⓔ	A	ⓔ	ⓔ	B	ⓔ	B	ⓔ	A	A	A	ⓔ
Phosphorous Trichloride	ⓔ	B	A	ⓔ	A	ⓔ	ⓔ	A	ⓔ	D	ⓔ	A	A	A	A
Phthalic Acid	B	C	B	ⓔ	B	A	B	A	ⓔ	B	ⓔ	A	A	A	ⓔ
Phthalic Anhydride	B	C	B	ⓔ	B	A	A	A	ⓔ	A	ⓔ	A	A	A	A
Picric Acid	C	D	B	C	B	D	B	B	ⓔ	D	ⓔ	ⓔ	A	A	A
Pineapple Juice	C	C	A	ⓔ	A	A	ⓔ	A	ⓔ	A	ⓔ	A	A	A	ⓔ
Pine Oil	B	B	A	ⓔ	A	B	ⓔ	A	ⓔ	A	ⓔ	A	A	A	D
Pitch ( Bitumen )	ⓔ	ⓔ	A	ⓔ	A	ⓔ	ⓔ	ⓔ	ⓔ	A	ⓔ	A	A	A	ⓔ
Polysulfide Liquor	D	ⓔ	B	ⓔ	A	B	ⓔ	B	ⓔ	D	ⓔ	A	A	A	ⓔ
Polyvinyl Acetate	B	ⓔ	B	ⓔ	B	B	ⓔ	ⓔ	A	A	ⓔ	A	A	A	ⓔ
Polyvinyl Chloride	B	ⓔ	B	ⓔ	B	B	ⓔ	ⓔ	A	A	ⓔ	A	A	A	ⓔ
Potassium Bicarbonate	ⓔ	ⓔ	A	ⓔ	A	B	ⓔ	ⓔ	A	A	ⓔ	A	A	A	A
Potassium Bichromate	ⓔ	ⓔ	A	ⓔ	A	A	ⓔ	B	A	B	ⓔ	A	A	A	ⓔ
Potassium Bisulfate	ⓔ	ⓔ	A	ⓔ	A	B	ⓔ	A	A	A	ⓔ	A	A	A	ⓔ
Potassium Bisulfite	C	D	B	ⓔ	B	D	ⓔ	A	A	A	ⓔ	A	A	A	ⓔ

Ratings : A-Satisfactory B-Fair C-poor D-Unsatisfactory ⓔ-No information

# Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kel-F ( PCTFE )	Grafoil	Teflon&Filled Teflon	Peek	UHMWPE
Potassium Bromide	C	D	A	C	B	B	⊞	A	A	A	⊞	A	A	A	A
Potassium Carbonate	B	B	B	A	B	B	⊞	A	A	A	⊞	A	A	A	A
Potassium Chlorate	B	B	B	B	B	C	⊞	A	A	A	⊞	C	A	A	A
Potassium Chloride	C	C	B	B	A	B	B	A	A	A	⊞	A	A	A	A
Potassium Chromate	B	⊞	B	⊞	B	B	⊞	B	A	A	⊞	⊞	A	A	A
Potassium Cyanide	D	B	B	⊞	B	B	B	A	A	A	⊞	A	A	A	A
Potassium Dichromate	D	C	B	⊞	A	B	⊞	A	A	A	A	⊞	A	A	A
Potassium Ferricyanide	D	C	A	B	B	B	⊞	A	A	A	⊞	A	A	A	A
Potassium Ferrocyanide	B	C	B	⊞	B	A	⊞	A	A	A	⊞	A	A	A	A
Potassium Hydroxide Dilute Cold	D	A	B	B	B	A	⊞	D	A	D	A	A	A	A	A
Potassium Hydroxide 70% Cold	D	B	B	C	B	A	⊞	D	A	D	A	A	A	A	A
Potassium Hydroxide Dilute Hot	D	B	B	C	B	A	⊞	⊞	A	D	A	A	A	A	A
Potassium Hydroxide 70% Hot	D	A	B	D	B	A	⊞	⊞	A	D	A	A	A	A	A
Potassium Iodide	D	C	B	B	B	C	⊞	A	A	A	⊞	A	A	A	⊞
Potassium Nitrate	B	B	B	B	B	B	B	A	A	A	⊞	B	A	A	A
Potassium Oxalate	⊞	⊞	A	⊞	A	⊞	⊞	⊞	A	A	⊞	A	A	A	⊞
Potassium Permanganate	B	B	B	B	B	B	B	A	A	A	A	⊞	A	A	A
Potassium Phosphate	C	⊞	B	⊞	B	B	B	A	A	A	⊞	A	A	A	⊞
Potassium Phosphate Di-basic	B	A	A	⊞	A	B	B	A	A	A	⊞	A	A	A	⊞
Potassium Phosphate Tri-basic	⊞	A	B	⊞	B	B	⊞	⊞	A	⊞	⊞	A	A	A	⊞
Potassium Sulfate	B	B	A	A	A	B	⊞	A	A	A	⊞	A	A	A	A
Potassium Sulfide	B	B	A	⊞	A	C	A	B	A	A	⊞	A	A	A	A
Potassium Sulfite	B	B	A	⊞	A	C	B	A	A	A	⊞	A	A	A	A
Producer Gas	B	B	B	A	B	A	⊞	A	⊞	A	⊞	A	A	A	⊞
Propane Gas	A	B	B	A	A	B	A	A	A	A	⊞	A	A	A	A

Ratings : A-Satisfactory B-Fair C-poor D-Unsatisfactory ⊞-No information

## Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kel-F ( PCTFE )	Grafoil	Teflon&Filled Teflon	Peek	UHMWPE
Propyl Bromide	B	Ⓜ	B	Ⓜ	A	B	Ⓜ	B	Ⓜ	A	Ⓜ	A	A	A	Ⓜ
Propylene Glycol	B	B	B	Ⓜ	B	B	Ⓜ	A	A	C	Ⓜ	A	A	A	A
Pyridine	Ⓜ	Ⓜ	B	Ⓜ	A	Ⓜ	Ⓜ	D	A	D	A	A	A	A	Ⓜ
Pyrogallic Acid	B	B	B	B	A	B	Ⓜ	A	A	A	A	Ⓜ	A	A	Ⓜ
Quench Oil	B	B	A	Ⓜ	A	Ⓜ	Ⓜ	A	Ⓜ	A	Ⓜ	A	A	A	Ⓜ
Quinine, Sulfate, Dry	Ⓜ	Ⓜ	A	B	A	B	Ⓜ	Ⓜ	A	A	Ⓜ	A	A	A	Ⓜ
Resins & Rosins	A	C	A	B	A	A	Ⓜ	A	Ⓜ	A	Ⓜ	A	A	A	Ⓜ
Resorcinol	Ⓜ	Ⓜ	B	Ⓜ	B	Ⓜ	Ⓜ	Ⓜ	Ⓜ	Ⓜ	Ⓜ	A	A	A	A
Road Tar	A	A	A	Ⓜ	A	A	Ⓜ	A	Ⓜ	A	Ⓜ	A	A	A	Ⓜ
Roof Pitch	A	A	A	Ⓜ	A	A	Ⓜ	A	Ⓜ	A	Ⓜ	A	A	A	Ⓜ
Rosin Emulsion	B	C	A	Ⓜ	A	A	Ⓜ	B	Ⓜ	A	Ⓜ	A	A	A	Ⓜ
R P-1 Fuel	A	A	A	Ⓜ	A	A	Ⓜ	A	Ⓜ	A	Ⓜ	A	A	A	Ⓜ
Rubber Latex Emulsions	A	B	A	Ⓜ	A	Ⓜ	Ⓜ	A	Ⓜ	A	Ⓜ	A	A	A	Ⓜ
Rubber Solvents	A	A	A	Ⓜ	A	A	Ⓜ	D	Ⓜ	C	Ⓜ	A	A	A	Ⓜ
Salad Oil	B	C	B	Ⓜ	A	B	Ⓜ	A	Ⓜ	A	Ⓜ	A	A	A	Ⓜ
Salicylic Acid	C	D	A	Ⓜ	B	B	Ⓜ	A	A	A	Ⓜ	A	A	A	A
Salt ( NaCl )	B	C	B	Ⓜ	A	A	Ⓜ	A	Ⓜ	A	Ⓜ	A	A	A	Ⓜ
Salt Brine	B	Ⓜ	B	Ⓜ	B	B	Ⓜ	B	Ⓜ	A	Ⓜ	A	A	A	A
Sauerkraut Arine	Ⓜ	Ⓜ	B	Ⓜ	B	Ⓜ	Ⓜ	Ⓜ	Ⓜ	C	Ⓜ	A	A	A	Ⓜ
Sea Water	C	D	B	Ⓜ	B	A	Ⓜ	A	A	A	Ⓜ	A	A	A	A
Sewage	C	C	B	A	B	B	Ⓜ	A	A	B	Ⓜ	A	A	A	A
Shellac	A	A	A	Ⓜ	A	A	Ⓜ	Ⓜ	A	A	Ⓜ	A	A	A	Ⓜ
Silicone Fluids	B	Ⓜ	B	Ⓜ	B	Ⓜ	Ⓜ	B	A	A	A	A	A	A	C
Silver Bromide	Ⓜ	Ⓜ	A	C	A	B	Ⓜ	Ⓜ	A	D	Ⓜ	A	A	A	Ⓜ
Silver Cyanide	D	Ⓜ	A	Ⓜ	A	B	Ⓜ	B	A	D	Ⓜ	A	A	A	Ⓜ

Ratings : A-Satisfactory B-Fair C-poor D-Unsatisfactory Ⓜ-No information

## Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kal-F ( PCTFE )	Grafoil	Teflon&Filled Teflon	Peek	UHMWPE
Silver Nitrate 10%	D	D	A	⊞	A	D	⊞	A	A	A	⊞	B	A	A	A
Silver Plating Sol.	⊞	⊞	A	⊞	A	⊞	⊞	⊞	⊞	D	⊞	⊞	A	A	⊞
Soap Solutions ( Stearates )	A	A	A	⊞	A	A	⊞	A	A	A	⊞	A	A	A	⊞
Sodium Acetate	B	C	B	⊞	B	B	B	D	A	A	⊞	A	A	A	A
Sodium Aluminate	B	C	A	⊞	B	B	B	A	A	A	⊞	A	A	A	⊞
Sodium Benzoate	⊞	⊞	B	⊞	B	B	⊞	⊞	A	B	⊞	A	A	A	A
Sodium Bicarbonate	B	C	B	⊞	A	B	⊞	A	A	B	⊞	A	A	A	A
Sodium Bichromate	⊞	⊞	B	⊞	B	⊞	⊞	⊞	A	A	⊞	⊞	A	A	⊞
Sodium Bisulfate 10%	B	D	A	⊞	A	B	⊞	A	A	D	A	A	A	A	A
Sodium Bisulfite 10%	B	D	A	⊞	B	B	B	A	A	D	A	A	A	A	A
Sodium Borate	B	C	B	⊞	B	B	⊞	A	A	A	A	A	A	A	A
Sodium Bromide 10%	B	C	B	⊞	B	B	⊞	A	A	A	⊞	A	A	A	A
Sodium Carbonate ( Soda Ash )	B	B	A	⊞	A	B	B	A	A	A	A	A	A	A	A
Sodium Chlorate	B	C	B	⊞	B	C	B	A	A	A	⊞	B	A	A	A
Sodium Chloride	B	C	B	⊞	A	A	B	A	A	A	A	A	A	A	A
Sodium Chromate	C	B	A	⊞	B	B	⊞	A	A	A	⊞	⊞	A	A	⊞
Sodium Citrate	⊞	⊞	B	⊞	B	⊞	⊞	⊞	A	A	⊞	A	A	A	⊞
Sodium Cyanide	D	B	A	B	A	B	⊞	A	A	A	⊞	A	A	A	⊞
Sodium Ferricyanide	⊞	⊞	A	⊞	A	B	⊞	⊞	A	A	⊞	A	A	A	A
Sodium Fluoride	C	D	B	B	A	B	⊞	A	A	A	⊞	A	A	A	A
Sodium Hydroxide 20% Cold	A	A	A	A	B	A	⊞	B	A	D	A	A	A	A	A
Sodium Hydroxide 20% Hot	A	B	A	C	A	A	⊞	C	A	D	A	A	A	A	A
Sodium Hydroxide 50% Cold	A	A	A	B	A	A	⊞	C	A	D	A	A	A	A	A
Sodium Hydroxide 50% Hot	A	B	A	C	A	B	⊞	C	A	D	A	A	A	A	A
Sodium Hydroxide 70% Cold	A	A	A	B	B	A	⊞	C	⊞	D	A	A	A	A	A

Ratings : A-Satisfactory B-Fair C-poor D-Unsatisfactory ⊞-No information

## Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kel-F ( PCTFE )	Grafoil	Teflon&Filled Teflon	Peek	UHMWPE
Sodium Hydroxide 70% Hot	B	B	A	C	B	B	E	C	E	D	A	A	A	A	A
Sodium Hypochlorite ( Bleach )	D	D	D	D	C	D	A	A	A	D	E	A	A	A	A
Sodium Hyposulfite	E	E	B	E	B	B	E	E	A	A	E	A	A	A	E
Sodium Lactate	E	E	A	E	A	B	E	E	A	A	E	A	A	A	E
Sodium Meatap-hosphate	C	B	B	B	B	E	A	A	A	B	E	A	A	A	E
Sodium Metasilicate Cold	B	C	A	E	A	A	E	B	A	A	E	A	A	A	E
Sodium Metasilicate Hot	B	D	A	E	A	A	A	E	E	A	E	A	A	A	E
Sodium Nitrate	B	B	A	B	A	B	B	A	A	A	E	A	A	E	E
Sodium Nitrite	E	E	B	E	B	C	B	B	A	B	E	B	A	A	A
Sodium Perborate	B	B	B	B	B	B	B	A	A	A	E	A	A	A	E
Sodium Peroxide	D	C	B	B	B	B	B	A	A	A	E	A	A	A	E
Sodium Phosphate	C	C	B	B	B	B	B	A	A	B	A	A	A	A	A
Sodium Phosphate Di-basic	C	C	B	E	B	B	B	A	A	A	E	A	A	A	E
Sodium Phosphate Tri-basic	C	C	B	E	B	B	B	A	A	A	E	A	A	A	E
Sodium Polyphosphate	E	E	B	E	B	B	B	E	A	E	E	A	A	A	E
Sodium Salicylate	E	E	A	E	A	E	E	E	A	A	E	A	A	A	E
Sodium Silicate	B	B	B	E	B	B	E	A	A	A	E	A	A	A	A
Sodium Silicate, Hot	C	C	B	E	B	B	E	E	E	A	E	A	A	A	A
Sodium Sulfate	B	B	A	B	A	A	E	A	A	A	E	A	A	A	A
Sodium Sulfide	D	B	B	A	B	B	E	A	A	A	E	A	A	A	A
Sodium Sulfite	C	E	A	A	A	B	B	A	A	A	E	A	A	A	A
Sodium Tetraborate	E	E	A	E	A	E	E	E	A	A	E	A	A	A	E
Sodium Thiosulfate	C	B	B	A	B	B	E	A	A	A	E	A	A	A	E
Soybean Oil	B	C	A	E	A	A	E	A	E	B	E	A	A	A	A
Starch	B	C	B	E	A	A	E	A	A	A	E	A	A	A	A

Ratings : A-Satisfactory B-Fair C-poor D-Unsatisfactory E-No information

# Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kel-F ( PCTFE )	Grafoil	Teflon&Filled Teflon	Peek	UHMWPE
Steam ( 212F )	A	A	A	A	A	B	⊞	D	A	D	⊞	A	A	A	A
Stearic Acid	C	C	B	⊞	B	B	A	A	A	A	⊞	A	A	A	A
Styrene	A	A	A	⊞	A	B	A	B	A	A	⊞	A	A	A	⊞
Sugar Liquids	A	B	A	⊞	A	A	⊞	A	⊞	A	⊞	A	A	A	A
Sugar, Syrups & Jam	B	⊞	A	A	A	⊞	⊞	⊞	⊞	A	⊞	A	A	A	A
Sulfate, Black Liquor	C	C	B	A	B	B	⊞	C	A	C	⊞	A	A	A	⊞
Sulfate, Green Liquor	C	C	B	A	B	B	⊞	C	A	A	⊞	A	A	A	⊞
Sulfate, White Liquor	C	C	B	B	D	C	⊞	C	A	D	⊞	A	A	A	⊞
Sulfur	D	C	B	⊞	A	B	⊞	A	A	A	⊞	A	A	A	A
Sulfur Chlorides	B	D	D	⊞	A	B	⊞	A	A	A	⊞	A	A	A	⊞
Sulfur Dioxide, Dry	B	B	A	A	B	B	A	D	A	A	⊞	A	A	A	A
Sulfur Dioxide, Wet	D	⊞	A	C	B	A	B	D	A	D	⊞	A	A	A	A
Sulfur Hexafluoride	B	⊞	A	⊞	A	⊞	⊞	⊞	C	A	⊞	A	A	A	⊞
Sulfur, Molten	D	C	B	⊞	A	D	B	A	⊞	D	⊞	A	A	D	⊞
Sulfur Trioxide	B	B	B	B	B	⊞	B	B	A	D	⊞	D	A	A	⊞
Sulfur Trioxide, Dry	B	B	B	B	B	B	B	A	A	A	⊞	D	A	A	⊞
Sulfuric Acid 0 to 77%	C	D	C	⊞	B	B	⊞	A	A	D	A	A	A	A	B
Sulfuric Acid 100%	C	C	A	B	A	D	⊞	B	A	D	A	D	A	D	D
Sulfurous Acid	D	D	B	⊞	B	D	B	A	A	C	⊞	A	A	A	A
Tall Oil	B	B	B	⊞	B	B	A	A	⊞	A	⊞	A	A	A	⊞
Tannic Acid ( Tannin )	B	C	B	B	B	B	B	A	A	A	⊞	A	A	A	A
Tanning Liquors	⊞	⊞	B	⊞	B	⊞	⊞	⊞	⊞	D	⊞	⊞	A	A	⊞
Tar & Tar Oils	A	A	A	A	A	A	⊞	A	A	A	⊞	A	A	A	⊞
Tartaric Acid	B	D	A	A	A	B	B	A	A	A	⊞	A	A	A	A
Tetraethyl Lead	B	C	B	⊞	B	A	⊞	A	⊞	A	⊞	A	A	A	⊞

Ratings : A-Satisfactory B-Fair C-poor D-Unsatisfactory ⊞-No information

## Corrosion Data

	Brass	Carbon Steel	316Stainless Steel	17-4PH	Alloy20	Monel	Hastelloy C	Viton	Heatcom	Delrin	Kel-F ( PCTFE )	Grafoil	Teflon&Filled Teflon	Peek	UHMWPE
Tolu ( Toluene )	A	A	A	ⓔ	A	A	A	A	A	C	A	A	A	A	D
Tomato Juice	C	C	A	ⓔ	A	B	ⓔ	A	ⓔ	A	ⓔ	A	A	A	ⓔ
Transformer Oil	B	A	A	ⓔ	A	A	ⓔ	A	ⓔ	A	ⓔ	A	A	A	C
Tributyl Phosphate	A	A	A	ⓔ	A	A	ⓔ	D	A	A	ⓔ	A	A	A	ⓔ
Trichlo-rethylene	B	B	B	A	B	B	A	A	B	A	C	A	A	A	D
Trichloroactic Acid	B	ⓔ	D	ⓔ	B	B	A	C	C	D	A	ⓔ	A	A	C
Triethanolamine	ⓔ	ⓔ	B	ⓔ	B	B	A	ⓔ	A	A	ⓔ	A	A	A	C
Triethylamine	B	ⓔ	B	ⓔ	B	ⓔ	A	ⓔ	A	C	ⓔ	ⓔ	A	A	ⓔ
Trisodium Phosphate	ⓔ	ⓔ	B	ⓔ	B	ⓔ	A	B	ⓔ	A	ⓔ	A	A	A	A
Tung Oil	B	B	A	ⓔ	A	C	A	A	ⓔ	A	ⓔ	A	A	A	ⓔ
Turpentine	B	B	B	A	B	B	A	A	A	A	ⓔ	A	A	A	D
Urea	B	C	B	ⓔ	B	B	A	D	A	A	ⓔ	A	A	A	A
Uric Acid	ⓔ	ⓔ	A	ⓔ	A	ⓔ	A	ⓔ	A	B	ⓔ	A	A	A	ⓔ
Varnish	A	C	A	ⓔ	A	A	A	A	A	A	ⓔ	A	A	A	ⓔ
Vegetable Oils	B	B	A	ⓔ	A	B	A	A	ⓔ	A	ⓔ	A	A	A	ⓔ
Vinegar	B	D	A	ⓔ	A	B	A	C	ⓔ	B	ⓔ	A	A	A	A
Vinyl Acetate	B	ⓔ	B	ⓔ	B	B	A	ⓔ	A	D	ⓔ	A	A	A	ⓔ
Water, Distilled	A	D	A	A	A	A	A	B	A	A	ⓔ	A	A	A	A
Water, Fresh	A	C	A	A	A	A	A	B	A	A	ⓔ	A	A	A	A
Water, Acid Mine	D	D	B	B	ⓔ	D	C	D	A	A	ⓔ	A	A	A	A
Waxes	A	A	A	ⓔ	A	A	A	A	ⓔ	A	ⓔ	A	A	A	ⓔ
Whiskey& Wines	B	D	A	ⓔ	A	A	A	A	ⓔ	A	ⓔ	A	A	A	A
Xylene ( Xylol ) , Dry	A	B	A	ⓔ	A	A	A	A	A	A	A	A	A	A	D
Zinc Bromide	B	ⓔ	B	ⓔ	B	B	A	B	ⓔ	A	ⓔ	A	A	A	ⓔ
Zinc Hydrosulfite	C	A	A	ⓔ	A	B	A	A	A	A	ⓔ	ⓔ	A	A	ⓔ
Zinc Sulfate	B	D	B	ⓔ	A	B	A	A	A	A	ⓔ	A	A	A	A

Ratings : A-Satisfactory B-Fair C-poor D-Unsatisfactory ⓔ-No information