

METAL CHARACTERISTICS

Aluminum

This silver white metal is very malleable and quite corrosion resistant, since the surface reacts with oxygen to form a protective aluminum oxide coating. This coating is quite resistant to many chemicals—even acids, but can be penetrated by alkaline substances. It is lightweight and easy to machine, forge and cast. Alloys of aluminum are formed by adding a variety of other elements such as copper, manganese, zinc to produce products that can vary in strength, corrosion resistance, weight, and ease of forging.

Brass

Brass is an alloy primarily of copper and zinc with trace elements typically including silicon and iron. Brass is a golden yellow and weathers to a green color but is relatively corrosion resistant.

Bronze

An alloy of primarily copper and tin with traces typically including silicon and iron. Bronze was the first widely used metal strong enough for weapons and tools (hence the Bronze Age). Bronze is a reddish color and weathers to green but is relatively corrosion resistant. Adding beryllium produces an alloy hard enough for production of springs and hand tools.

Cast Iron

Also called pig iron, cast iron describes a wide range of irons with 2% or more carbon. The high carbon content makes cast iron somewhat brittle. Cast iron cannot be forged, but must be formed by casting or machining.

Copper

Copper is element #29, a reddish metal that is the primary metal in alloys of brass, bronze, and monel. Small amounts of copper added to aluminum, silver, and gold make those metals harder, and added to steel copper gives corrosion resistance. Copper pennies were actually bronze, not copper, since copper is too soft. Many modern copper coins are now zinc with a copper coating.

Ductile Iron

Also known as malleable iron, this product is made from cast iron by adding magnesium during the casting process. The magnesium causes the carbon to collect as graphite specks, so that the surrounding iron is low enough to be ductile to some extent. (Ductile means capable of being hammered out thin without cracking). Many items identified as cast iron are actually ductile iron. Ductile iron can be arc welded.

Iron

Pure iron is a soft ductile metal that rusts rapidly. Adding up to 1.5% carbon creates steel which can be hardened. Adding more carbon gives cast iron which is hard but brittle.

Stainless Steel

Stainless steel is a generic name for a class of steels that are used primarily because of their corrosion resistance. All stainless steel alloys contain a minimum of 10.5% chromium. Other elements, particularly nickel and manganese, are added to produce different physical and mechanical properties such as hardness, ease of machining, and ease of welding. Molybdenum may be added to further increase corrosion resistance. While there are many grades of stainless, 70% of production is Type 304 (also known as 18/8, since it is 18% chromium and 8% nickel). The amounts of various elements affect other characteristics. Basically, alloys of principally chromium and iron are known as 400 series and are all magnetic. Alloys with both chromium and nickel are 300 series, and chromium, nickel, manganese alloys are known as 200 series. These two series are generally non-magnetic. For hose fittings and clamps, the major types are:

Type 201 and 202

Uses manganese in place of some of the nickel. Similar to 301 and 302 in corrosion resistance. Commonly found as band material for clamps.

Type 301, 302, and 304

General use stainless steel.

Type 316

For most chemicals — has a very high corrosion resistance. Used where harsh cleaning chemicals are used, or where chemical concentrations are high.

Type 410 and 420

Easily hardened by heat treatment. Used in machine parts and cutters as well as clamps.

Steel

Iron with a small percentage of carbon is steel. The more carbon, the harder the steel can be made by heat treatment. Mild steel is 0.18 to 0.20% carbon. High carbon steels start at roughly 0.75% carbon and go up to around 1.5%. Alloy steels contain other ingredients for special purposes such as corrosion resistance.

Wrought Iron

True wrought iron is pure iron with thin layers of silica slag that gives a grainy appearance. Wrought iron was the primary ductile form of iron for thousands of years, but it is no longer in common use. Today the term wrought iron is used to describe low carbon steel pipe and also decorative ironwork made of any metal.

Zinc

Element #30 is a bluish white ductile metal that is the secondary alloy in brass. Zinc is used to harden aluminum alloys, and aluminum is used to make light strong zinc alloys.

TECHNICAL INFORMATION

THREAD DIMENSIONS

The following tables give the actual outside dimension of male threads in inches as well as the pitch given in threads per inch. For fire hose thread dimensions, see detail listings next to G81 in our Fire Section.

PIPE, STRAIGHT PIPE, & GARDEN HOSE THREADS

Pipe Size	Tapered Pipe		Straight Iron Pipe		Garden Hose	
	(NPT) O.D.	(NPSH) Pitch	O.D.	(GHT) Pitch	O.D.	Pitch
1/16"	0.312"	27				
1/8"	0.405	27				
1/4"	0.540	18				
3/8"	0.675	18				
1/2"	0.840	14				
3/4"	1.050	14	1.035"	14	1.062"	11-1/2
1"	1.315	11-1/2	1.295	11-1/2		
1-1/4"	1.660	11-1/2	1.639	11-1/2		
1-1/2"	1.900	11-1/2	1.878	11-1/2		
2"	2.375	11-1/2	2.352	11-1/2		
2-1/2"	2.875	8	2.841	8		
3"	3.500	8	3.470	8		
3-1/2"	4.000	8	3.970	8		
4"	4.500	8	4.470	8		
5"	5.563	8				
6"	6.625	8				
8"	8.625	8				
10"	10.750	8				
12"	12.750	8				

TUBE FITTING THREADS

Tube O.D.	Brass Compression		SAE 45° Flare		Inverted Flare	
	O.D.	Pitch	O.D.	Pitch	O.D.	Pitch
1/8"	5/16"	24	5/16"	24	5/16"	28
3/16"	3/8	24	3/8	24	3/8	24
1/4"	7/16	24	7/16	20	7/16	24
5/16"	1/2	24	1/2	20	1/2	20
3/8"	9/16	24	5/8	18	5/8	18
7/16"	5/8	24	11/16	16	11/16	18
1/2"	11/16	20	3/4	16	3/4	18
5/8"	13/16	18	7/8	14	7/8	18
3/4"	1	18	1-1/16	14	1-1/16	16
7/8"	1-1/8	18	1-1/4	12	1-3/16	16
1"	1-1/4	16	1-3/8	12		

DIMENSIONS OF 150lb ANSI FLANGES

Nominal Size	Flange O.D.	Flange Thickness	No. of Bolts	Bolt Size	Dia. of Bolt Holes	Dia. of Bolt Circle
1"	4.25"	9/16"	4	1/2"	5/8"	3-1/8"
1"	5	11/16	4	1/2	5/8	3-7/8
2"	6	3/4	4	5/8	3/4	4-3/4
2"	7	7/8	4	5/8	3/4	5-3/4
3"	7.5	15/16	4	5/8	3/4	6
4"	9	15/16	8	5/8	3/4	7-1/2
5"	10	15/16	8	3/4	7/8	8-1/2
6"	11	1	8	3/4	7/8	9-1/2
8"	13.5	1-1/8	8	3/4	7/8	11-3/4
10"	16	1-3/16	12	7/8	1	14-1/4
12"	19	1-1/4	12	7/8	1	17

HOW TO MEASURE A MALE FIRE HOSE THREAD

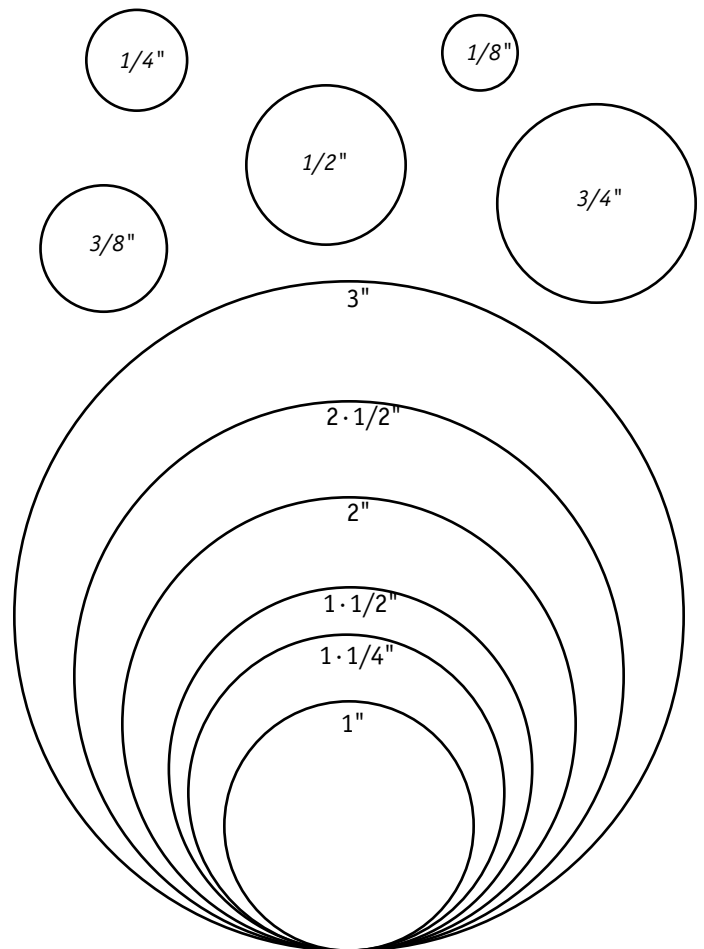
Take a strip of paper about 1" wide and wrap it around the male thread snugly so that it overlaps. Where the two ends overlap, use a pin to pierce the paper so that there is a hole in both ends. Press your thumb against the paper so that the threads leave an impression. Remove the paper and measure the distance between the pinholes. This distance, divided by 3.1416, equals the thread o.d. Count the number of thread impressions showing on the paper and divide by the total width of the impressions (in inches). This figure is the pitch in threads per inch.

PRESSURE/TEMPERATURE RATINGS FOR MALLEABLE IRON FITTINGS

The standard malleable fittings shown in this catalog are Class 150 and meet the working pressures shown here for that class. Heavier Class 300 parts are available on special order.

°C	°F	Class 150	Class 300		
		Working Pressure All sizes	Working Pressure 1/4"-1"	1 1/4"-2"	2 1/2"-3"
		300 psi	2000	1500	1000
93	200	265	1785	1350	910
121	250	225	1575	1200	825
149	300	185	1360	1050	735
185	366	150	1150	900	650
204	400	N/A	935	750	560
232	450	N/A	725	600	475
260	500	N/A	510	450	385
288	550	N/A	300	300	300

ACTUAL MALE PIPE THREAD OUTSIDE DIAMETERS:



CHEMICAL RESISTANCE CHART

Recommendations in this chart are based upon careful examination of published data. However please remember that chemical resistance is affected by temperature, concentration,

environment, exposure to multiple chemicals, and other conditions. Other requirements, such as agency standards (CSA, FDA, etc may also dictate selection. Therefore this table must only be used as a general guide.

Chart key:

- E... excellent, no effect
- G... good, minor effect only
- C... conditional, moderate effect, may be suitable in limited applications
- X... severe effect, not recommended
- I... no data available

	302SS	304SS	316SS	440SS	Aluminum	Cast Bronze	Brass	Cast Iron	Carbon Steel	Teflon	Nylon	Polyethylene	Polypropylene	Buna N Seal *	Viton Seal *
acetaldehyde	E	E	E	I	G	X	I	I	C	E	E	C	G	G	X
acetamide	I	G	E	I	I	I	I	I	C	I	I	I	I	E	E
acetate solvent	E	G	E	G	G	E	C	G	E	E	E	G	X	X	X
acetic acid	I	G	E	G	G	C	C	X	C	E	X	G	E	C	C
acetic acid 20%	I	G	E	I	I	I	C	I	I	E	X	I	E	C	E
acetic acid 80%	I	G	E	I	I	I	C	I	I	E	X	I	G	C	E
acetic acid, glacial	I	G	E	E	G	C	C	X	E	E	X	G	G	X	X
acetic anhydride	G	E	E	G	G	C	X	G	X	E	X	E	E	E	X
acetone	E	E	E	G	E	E	E	E	E	E	E	C	G	X	X
acetyl chloride	I	C	E	I	I	X	I	I	I	E	I	I	I	I	E
acetylene	E	E	E	E	E	G	I	E	E	I	E	I	X	E	E
acrylonitrile	E	E	C	I	G	E	I	C	I	I	I	I	G	X	C
alum potassium sulfate (alum), 10%	I	E	I	I	E	I	I	X	E	E	E	E	I	I	E
alum potassium sulfate (alum), 100%	I	X	E	G	G	C	I	I	E	E	X	G	E	E	E
aluminum chloride	C	X	C	I	X	C	I	X	G	E	X	I	E	E	E
aluminum chloride 20%	I	X	C	X	G	X	I	X	E	I	E	G	E	E	E
aluminum fluoride	I	X	C	X	I	I	I	I	E	E	X	G	E	E	E
aluminum hydroxide	I	E	E	E	E	E	I	X	E	E	E	I	E	E	E
aluminum sulfate	I	C	C	E	E	C	C	X	E	E	E	G	E	E	E
amines	E	E	E	I	E	G	I	E	G	E	E	I	I	X	X
ammonia 10%	I	I	E	I	I	I	I	I	I	E	E	I	E	X	E
ammonia, anhydrous	E	G	E	E	G	X	I	X	G	E	E	G	E	G	X
ammonia, liquids	I	E	E	E	X	X	I	E	E	E	I	X	E	G	X
ammonia, nitrate	I	E	E	E	C	X	I	I	E	I	I	I	E	E	I
ammonium bifluoride	I	C	E	I	X	I	I	I	I	I	I	I	E	E	E
ammonium carbonate	G	E	E	E	C	G	I	C	G	E	E	I	E	X	G
ammonium casenite	I	I	E	I	I	I	I	I	I	I	I	I	I	I	I
ammonium chloride	C	E	C	E	C	X	C	X	X	E	E	G	E	E	E
ammonium hydroxide	E	E	E	E	C	X	X	E	C	E	E	G	E	G	G
ammonium nitrate	E	E	E	E	G	X	X	E	X	E	X	G	E	E	X
ammonium oxalate	I	E	E	E	I	I	I	I	E	I	I	I	I	E	I
ammonium persulfate	I	E	E	E	C	E	I	X	E	E	X	I	E	E	C
ammonium phosphate, dibasic	G	E	E	E	G	C	I	I	X	E	E	G	E	E	E
ammonium phosphate, monobasic	I	E	E	E	G	X	I	I	E	E	E	G	E	E	E
ammonium phosphate, tribasic	G	E	E	E	G	C	I	C	X	E	E	G	E	E	E
ammonium sulfate	C	X	G	E	G	G	C	C	C	E	X	G	E	E	X
ammonium thio-sulfate	I	I	E	I	I	I	I	X	E	I	I	I	I	E	I
amyl alcohol	E	E	E	I	C	E	G	C	C	E	E	G	G	E	E
amyl alcohol	I	E	E	I	G	E	I	I	E	E	E	G	E	G	G
amyl chloride	I	C	G	I	X	E	I	I	E	E	C	X	X	X	E
amyl-acetate	G	E	E	C	G	C	I	I	C	E	G	X	X	X	X
aniline	G	E	E	E	C	C	I	I	C	E	C	C	G	X	C
aniline oil	I	E	E	I	C	E	I	E	I	E	C	I	E	X	E
anise oil	I	E	E	I	I	I	I	I	I	I	I	I	I	I	I
anti-freeze	I	E	E	I	E	G	G	G	C	E	E	G	E	E	E
antimony trichloride	I	X	X	I	X	I	I	I	I	E	X	E	I	I	E
aqua regia (80%, hcl, 20%, hno)	I	X	X	I	X	X	I	I	I	E	X	X	C	X	C
aromatic hydrocarbons	I	I	E	I	E	E	I	E	E	I	I	C	I	X	E
arsenic acid	G	E	E	I	X	X	G	X	X	E	E	G	E	E	E
asphalt	I	G	E	I	C	E	I	C	I	I	E	I	E	G	E
barium carbonate	G	E	E	E	G	G	I	G	G	E	E	G	E	E	E
barium chloride	C	X	E	E	X	G	I	I	C	E	G	G	E	E	E
barium cyanide	I	I	E	I	I	C	I	I	E	I	I	G	I	C	E
barium hydroxide	G	C	E	E	X	G	I	C	C	E	E	G	E	E	E
barium nitrate	I	E	E	I	I	X	I	E	E	I	I	I	I	E	E
barium sulfate	G	E	E	E	X	C	I	C	C	E	E	G	E	E	E
beet sugar liquids	E	E	E	I	E	E	G	E	I	E	E	I	E	E	E

* NOTE: The ratings given for BUNA N and VITON rubber are based on their use as seals in couplings. For Chemical Resistance of Hose components refer to the tables in our Hose Catalog.

CHEMICAL RESISTANCE CHART

	302SS	304SS	316SS	404SS	Aluminum	Cast Bronze	Brass	Cast iron	Carbon Steel	Teflon	Nylon	Polyethylene	Polypropylene	Buna N Seal *	Viton Seal *
benzaldehyde	E	E	E	I	G	E	I	G	E	E	C	X	X	X	X
benzene	G	E	E	E	G	G	E	G	C	E	E	X	X	X	E
benzoic acid	G	E	E	E	G	G	I	X	I	E	X	G	X	X	E
benzol	I	E	E	I	G	G	E	I	I	E	E	I	E	X	X
benzyl alcohol	I	E	E	I	G	E	C	I	I	I	E	X	E	X	E
bone oil	I	E	E	I	I	E	I	I	I	I	I	I	I	E	E
borax (sodium borate)	I	E	E	E	C	E	G	E	C	E	E	G	E	G	E
boric acid	G	E	E	E	G	G	C	X	I	E	E	G	E	E	E
brewery slop	I	I	E	I	I	E	I	E	I	I	I	I	I	E	E
bromine (wet)	X	X	X	X	X	C	I	X	X	E	X	X	X	X	E
butadiene	E	E	E	I	E	C	E	C	C	E	E	I	I	E	E
butane	E	E	E	I	E	E	E	C	C	E	E	C	X	E	E
butanol	I	E	E	I	E	E	I	I	I	E	I	I	I	I	I
butter	I	G	E	I	E	X	I	X	I	I	I	I	I	E	E
buttermilk	E	E	E	E	E	X	I	X	I	E	E	I	I	E	E
butyl acetate	I	I	C	I	E	E	I	I	E	I	C	X	G	E	X
butyl alcohol	E	E	E	I	G	G	C	C	C	E	E	G	G	E	E
butylene	E	G	E	I	E	E	E	E	E	E	I	I	I	G	E
butyric acid	G	G	E	E	G	C	I	X	I	E	X	I	E	X	X
calcium bisulfate	C	X	E	I	X	X	X	X	I	E	E	I	I	E	E
calcium bisulfide	I	I	G	I	C	C	I	I	I	E	E	G	E	E	E
calcium bisulfite	I	G	E	I	C	C	I	I	I	E	E	I	E	E	E
calcium carbonate	G	E	E	E	C	C	I	X	I	E	E	G	E	E	E
calcium chlorate	I	G	E	I	I	C	I	I	I	E	E	E	I	E	E
calcium chloride	C	E	X	C	C	G	I	C	I	E	E	G	E	E	E
calcium hydroxide	G	E	E	I	C	G	I	I	I	E	E	G	E	E	E
calcium hypochlorite	X	X	C	C	C	X	I	X	I	E	X	G	E	G	E
calcium sulfate	G	E	E	E	G	G	I	I	I	E	E	G	E	E	E
calgon	I	E	E	I	I	C	I	X	I	I	I	I	E	E	E
cane juice	I	E	E	I	G	G	C	E	I	I	E	I	X	E	I
carbolic acid (see phenol)	I	I	I	I	I	I	I	I	I	I	I	I	I	I	I
carbon bisulfide	G	E	E	E	E	C	I	G	I	E	I	I	X	X	E
carbon dioxide (wet)	I	E	E	I	C	C	C	C	I	E	I	I	I	I	I
carbon monoxide	I	E	E	I	E	I	I	I	I	I	E	G	E	E	E
carbon tetrachloride	G	G	G	E	C	C	E	C	X	E	E	X	X	C	E
carbonated water	G	E	E	E	E	G	I	X	I	I	E	I	E	E	E
carbon disulfide	I	G	E	I	C	C	C	G	C	E	E	X	X	X	E
carbonic acid	G	E	G	E	E	G	I	X	I	E	E	G	E	G	E
castor oil	I	E	E	I	E	E	I	E	I	I	I	I	I	E	E
chloroacetic acid	X	X	X	X	C	X	I	X	I	E	X	X	X	X	X
chloric acid	I	X	X	I	I	I	I	I	I	E	I	I	I	X	I
chlorinated glue	I	E	E	I	X	C	I	X	I	I	C	I	I	C	E
chlorine (dry)	G	E	E	I	X	E	G	E	I	E	I	I	I	I	X
chlorine water	X	I	X	I	X	X	X	X	I	E	X	I	X	X	E
chlorine, anhydrous liquid	I	X	X	X	X	X	I	C	I	E	X	X	X	X	E
chlorobenzene (mono)	E	E	E	I	G	G	I	G	C	E	E	X	X	X	E
chloroform	E	E	E	E	X	G	I	X	C	E	C	X	X	X	E
chlorosulfonic acid	X	X	I	X	X	X	I	I	X	E	X	X	X	X	X
chlorox (bleach)	I	E	E	I	C	E	I	X	C	E	X	I	X	C	E
chocolate syrup	I	E	E	I	E	I	I	X	I	I	E	I	E	E	E
chromic acid 10%	I	G	I	I	I	I	X	I	I	E	X	I	E	X	E
chromic acid 30%	I	G	I	I	I	I	X	I	I	E	X	I	E	X	E
chromic acid 5%	I	E	E	G	C	X	X	X	I	I	X	G	E	X	E
chromic acid 50%	C	G	G	I	C	X	X	X	I	E	X	C	G	X	E
cider	I	E	E	E	G	E	I	X	I	I	I	G	I	E	E
citric acid	I	E	E	E	C	X	C	X	I	E	C	G	I	X	E
citric oils	I	E	E	I	C	G	I	I	I	I	I	I	E	E	E
cod liver oil	I	E	E	I	G	I	I	I	I	I	E	I	E	E	E
coffee	E	E	E	E	E	G	I	C	I	E	E	I	E	E	E
copper chloride	C	X	X	G	X	X	I	X	I	E	X	G	E	E	E
copper cyanide	I	E	E	E	X	C	I	X	I	E	E	G	E	G	E
copper fluoroborate	I	X	X	I	X	X	I	X	I	E	I	E	I	G	E
copper nitrate	G	E	E	G	X	X	I	I	I	E	X	G	E	E	E
copper sulfate	G	G	I	I	I	C	X	I	I	E	C	I	E	G	E
copper sulfate (5% sol)	I	E	E	E	X	X	X	X	I	E	X	G	E	E	E
corn oil	I	E	E	E	G	G	I	E	I	I	E	I	E	E	E
cotton seed oil	G	E	E	E	G	G	I	E	C	E	E	I	E	E	E

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	302SS	304SS	316SS	404SS	Aluminum	Cast Bronze	Brass	Cast iron	Carbon Steel	Teflon	Nylon	Polyethylene	Polypropylene	Buna N Seal *	Viton Seal *
cream	I	E	E	I	E	C	I	X	I	I	E	I	E	E	E
creosote	I	E	E	I	E	I	I	I	I	I	I	I	X	E	E
cresols	I	E	E	I	G	X	C	I	I	I	I	X	C	X	X
cresylic acid	G	E	E	I	C	C	I	I	I	E	X	C	I	X	E
cyanic acid	I	E	I	I	I	I	I	I	I	I	I	I	I	C	I
cyclohexane	I	E	I	I	E	E	I	I	E	I	I	I	X	E	E
detergents	I	E	E	I	E	E	I	I	E	I	E	G	E	E	E
diacetone alcohol	I	E	E	I	E	E	C	I	E	I	E	I	X	X	X
dichlorethane	I	E	E	I	I	I	I	I	I	E	E	X	I	I	G
diesel fuel	E	E	E	I	E	E	I	E	E	I	I	I	X	E	E
diesel fuel (2d, 3d, 4d, 5d)	I	E	E	I	E	E	I	I	I	I	E	I	E	E	E
diethylamine	E	E	I	I	E	E	I	I	I	E	I	I	C	G	X
diethylene glycol	I	E	I	I	I	E	I	I	I	I	E	G	I	E	E
diphenyl oxide	I	E	I	I	I	E	I	I	I	I	I	I	I	X	E
dyes	I	E	E	I	G	C	I	I	I	I	I	I	I	I	E
epsom salts (magnesium sulfate)	G	E	E	E	E	G	I	I	I	I	I	I	E	E	E
ethane	E	E	I	I	E	E	I	I	I	I	I	I	I	E	E
ethanol	I	E	E	E	G	E	C	E	E	I	E	G	E	E	E
ethanolamine	I	E	E	I	I	I	I	I	C	I	I	I	I	G	X
ether	E	E	E	E	E	G	E	I	G	I	C	I	I	X	C
ethyl acetate	I	E	E	I	G	G	I	I	C	E	E	C	C	X	X
ethyl chloride	I	E	E	E	G	G	I	C	X	E	E	X	X	X	E
ethyl sulfate	I	X	I	I	I	I	I	I	I	I	I	I	I	E	E
ethylene chloride	I	E	E	I	C	E	I	C	C	E	I	I	X	X	E
ethylene dichloride	I	E	E	I	X	C	I	I	C	E	E	X	E	X	E
ethylene glycol	I	E	E	I	E	G	G	G	C	E	E	G	E	E	E
ethylene oxide	I	I	E	I	E	E	I	I	I	E	E	I	I	X	X
fatty acids	I	E	E	I	G	C	I	X	I	E	E	G	E	C	E
ferric acid	I	X	X	X	X	X	X	X	I	E	X	G	E	X	E
ferric nitrate	I	E	E	E	X	X	I	I	I	E	X	G	E	E	E
ferric sulfate	I	E	C	E	X	X	X	X	I	E	E	I	E	G	E
ferrous chloride	I	X	X	I	X	C	I	X	I	E	X	G	E	G	E
ferrous sulfate	G	E	C	I	X	C	I	X	X	E	X	G	E	G	E
fluoboric acid	I	X	G	I	I	I	I	X	I	E	C	G	E	G	E
fluorine	X	X	X	I	X	X	I	X	X	C	X	C	I	I	I
fluosilicic acid	I	I	G	I	X	I	I	X	I	E	X	G	E	E	G
formaldehyde	E	E	E	I	E	E	G	X	E	E	E	G	E	C	X
formaldehyde 40%	I	I	E	I	I	I	I	I	I	E	X	I	E	G	X
formic acid	C	E	G	G	X	C	C	X	X	E	X	G	E	X	G
freon 11	E	I	E	I	G	G	I	C	G	E	E	C	I	C	G
freon 113	I	I	E	I	G	G	I	I	I	I	E	I	I	E	C
freon 12 (wet)	I	I	X	I	G	G	I	I	I	E	E	C	E	E	E
freon 22	I	I	E	I	G	G	I	I	I	I	E	I	I	X	X
freon t.f.	I	I	E	I	G	G	I	I	I	I	E	I	X	E	G
fruit juice	E	E	E	E	G	G	I	X	X	X	E	G	E	E	E
fuel (1,2,3,5a, 5b, 6)	I	E	E	I	E	E	I	I	I	E	I	I	G	G	E
fuel oils	E	E	E	I	E	G	I	C	G	E	E	X	G	E	E
furan resin	I	E	E	I	E	E	I	E	E	E	I	I	I	X	E
furfural	E	E	E	I	E	E	I	I	E	E	E	X	X	X	X
gallic acid	G	E	E	I	E	E	I	X	X	E	E	I	I	E	G
gasoline	E	E	E	E	E	E	I	E	E	E	E	X	C	E	E
gelatin	E	E	E	E	E	E	C	X	X	E	E	I	E	E	E
glucose	E	I	E	I	E	E	E	G	G	E	E	G	E	E	E
glue p.v.a.	G	G	E	I	G	E	I	I	E	E	E	I	I	E	E
glycerine	E	E	E	E	E	E	G	G	G	E	E	I	E	E	E
glycolic acid	I	I	I	I	I	I	I	I	I	I	I	G	E	E	E
gold monocyanide	I	I	E	I	I	E	I	X	I	I	I	I	I	E	E
grape juice	I	E	E	I	G	G	I	X	I	I	I	G	I	E	E
grease	E	E	E	I	E	G	I	E	E	E	E	I	I	E	E
heptane	E	I	E	I	E	E	I	I	G	E	E	X	X	E	E
hexane	E	E	E	I	E	G	I	I	G	E	E	I	C	E	E
hexyl alcohol	I	E	E	I	E	E	C	I	E	I	E	I	E	E	E
honey	I	E	E	I	E	E	I	E	I	I	E	I	E	E	E
hydraulic oils (petroleum)	E	E	E	I	E	G	I	E	E	E	E	I	X	E	E
hydraulic oils (synthetic)	I	E	E	I	E	E	I	E	I	I	E	I	X	C	E
hydrazine	I	E	E	I	I	I	I	C	I	I	I	I	I	G	E
hydrobromic acid	X	X	X	X	X	X	I	X	X	E	X	G	G	X	E

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CHEMICAL RESISTANCE CHART

	302SS	304SS	316SS	404SS	Aluminum	Cast Bronze	Brass	Cast iron	Carbon Steel	Teflon	Nylon	Polyethylene	Polypropylene	Buna N Seal*	Viton Seal
hydrobromic acid 20%	I	I	X	I	I	I	I	I	I	E	X	I	E	X	E
hydrochloric acid (dry gas)	X	C	E	I	X	I	I	I	X	E	I	I	I	I	I
hydrochloric acid 100%	I	X	X	I	X	X	I	X	I	E	X	E	I	X	C
hydrochloric acid 20%	I	X	X	X	X	X	I	X	I	E	X	E	E	C	E
hydrochloric acid 37%	I	X	X	X	X	X	I	X	I	E	X	E	E	C	E
hydrocyanic acid	E	E	E	C	E	X	X	I	C	E	E	G	E	C	E
hydrocyanic acid (gas 10%)	I	X	X	I	I	I	I	I	I	E	I	I	I	I	I
hydrofluoric acid 100%	X	X	X	I	X	X	I	X	X	E	I	X	I	X	I
hydrofluoric acid 20%	I	X	X	X	X	X	I	X	I	E	X	C	E	X	E
hydrofluoric acid 75%	I	C	X	I	X	X	I	X	I	E	X	C	G	X	E
hydrofluosilicic acid	I	X	X	I	C	X	I	I	I	E	I	I	I	I	I
hydrofluosilicic acid 20%	I	X	X	I	X	E	I	X	I	E	X	I	E	G	E
hydrogen gas	E	E	E	I	E	E	I	G	G	E	I	I	I	I	E
hydrogen peroxide	I	E	G	E	E	X	X	X	X	E	X	G	E	X	E
hydrogen peroxide 10%	I	C	C	I	E	X	X	X	I	E	X	E	I	E	E
hydrogen peroxide 30%	I	I	G	I	I	I	X	I	I	E	X	I	E	X	E
hydrogen sulfide (dry)	E	C	E	I	X	X	C	G	G	E	X	I	I	I	X
hydrogen sulfide, aqueous solution	I	X	E	C	C	X	C	X	I	E	X	G	E	C	X
hydroxyacetic acid (70%)	I	I	I	I	X	I	I	I	I	I	I	I	I	E	E
indium sulfamate plating r.t.	I	I	C	I	I	I	I	I	I	E	X	I	E	E	E
ink	E	E	E	I	C	C	I	X	X	I	E	G	I	E	E
iodine	I	X	X	X	X	X	I	X	I	E	X	X	X	G	E
iodine (in alcohol)	I	I	G	I	I	I	I	I	I	E	X	I	G	X	E
iodoform	G	C	E	I	E	C	I	C	G	E	E	I	I	I	E
isobutyl alcohol	I	E	E	I	G	E	C	I	E	I	E	I	E	C	E
isopropyl acetate	I	I	G	I	C	I	I	I	I	I	I	I	I	X	X
isopropyl alcohol	I	E	E	I	G	E	C	C	E	I	E	I	E	C	E
isopropyl ether	E	I	E	I	E	E	I	I	E	E	I	I	X	G	X
isotane	I	I	I	I	E	I	I	I	I	I	I	I	X	E	E
jet fuel (jp#, jp4, jp5)	E	E	E	I	E	E	I	E	E	E	E	I	X	E	E
kerosene	E	E	E	E	E	E	E	E	G	E	E	X	X	E	E
ketones	E	E	E	I	G	E	I	E	E	E	E	X	X	X	X
lacquer thinners	I	I	E	I	I	I	C	I	I	E	E	I	G	X	I
lacquers	E	E	E	I	E	E	C	C	C	I	E	I	E	X	X
lactic acid	E	E	G	C	C	X	I	X	X	E	C	G	E	G	G
lard	G	E	E	E	E	E	I	E	C	I	E	I	E	E	E
latex	I	E	E	I	E	E	I	I	I	I	E	G	I	E	E
lead acetate	G	E	E	I	X	C	I	I	X	E	E	G	E	G	X
lead sulfamate	I	I	I	I	I	I	I	I	I	I	I	I	E	G	E
lime	I	E	E	I	C	E	I	E	I	I	I	I	I	E	E
linseed oil	I	E	E	E	E	E	I	E	I	I	E	I	E	E	E
lubricants	I	E	E	I	E	G	I	I	I	E	E	I	E	E	E
magnesium carbonate	I	E	E	E	I	I	I	I	I	I	I	G	E	E	I
magnesium chloride	G	G	G	E	X	G	C	X	C	E	E	G	E	E	E
magnesium hydroxide	E	E	E	I	X	C	G	G	G	E	E	G	E	E	E
magnesium nitrate	I	E	E	E	I	I	I	I	I	E	E	G	E	E	E
magnesium oxide	I	E	E	I	I	I	I	I	I	I	I	I	I	E	I
magnesium sulfate	G	G	E	I	G	G	G	C	G	E	E	G	E	E	E
maleic acid	C	E	E	E	G	C	I	I	G	E	E	I	C	X	E
maleic anhydride	I	I	I	I	I	I	I	I	I	I	I	I	I	X	E
malic acid	G	E	E	I	C	X	I	I	X	E	E	I	I	I	G
melamine	I	X	X	I	I	X	I	I	I	I	I	I	I	C	I
mercuric cyanide	E	E	E	I	X	X	I	I	X	E	I	G	E	E	I
mercuric chloride (dilute solution)	X	X	X	X	X	X	X	X	X	E	E	G	E	E	E
mercury	E	E	E	E	C	X	X	E	E	E	E	G	E	E	E
methanol	I	E	E	E	G	E	C	E	E	E	E	G	E	G	C
methyl acetate	E	I	E	I	E	E	I	I	G	E	I	I	I	X	X
methyl acetone	E	I	E	I	E	E	I	E	E	E	I	I	I	X	X
methyl acrylate	I	I	I	I	I	I	I	I	I	I	I	I	I	X	X
methyl alcohol 10%	E	I	E	I	C	C	I	I	G	E	E	I	I	G	I
methyl bromide	I	I	I	I	I	I	I	I	I	I	I	X	I	G	E
methyl butyl ketone	I	I	E	I	E	I	I	I	I	I	I	I	I	X	X
methyl cellosolve	I	I	I	I	E	E	I	I	I	I	I	I	E	X	X
methyl chloride	I	E	E	I	X	E	I	I	I	E	E	X	X	X	E
methyl dichloride	I	I	I	I	I	I	I	I	I	I	I	I	I	X	E
methyl ethyl ketone	I	E	E	I	E	E	I	I	I	E	E	X	E	X	X
methyl isobutyl ketone	I	I	E	I	I	I	I	I	I	E	E	I	C	X	X

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CHEMICAL RESISTANCE CHART

	302SS	304SS	316SS	440SS	Aluminum	Cast Bronze	Brass	Cast iron	Carbon Steel	Teflon	Nylon	Polyethylene	Polypropylene	Buna N Seal *	Viton Seal *
methyl isopropyl ketone	I	I	E	I	I	I	I	I	I	I	E	I	I	X	X
methyl methacrylate	I	I	I	I	I	I	I	I	I	I	I	I	I	X	X
methylamine	E	I	E	I	E	X	I	G	G	I	I	I	I	G	I
methylene chloride	E	E	E	E	E	E	C	I	G	E	X	X	X	X	X
milk	E	E	E	E	E	C	C	X	X	I	E	G	E	E	E
mineral oil	E	E	E	E	E	E	I	E	G	I	E	I	G	E	E
molasses	E	E	E	E	E	E	G	E	E	I	E	G	E	E	E
naphtha	E	E	E	E	E	G	I	G	G	E	E	X	E	G	E
naphthalene	G	E	G	I	G	C	I	G	E	E	I	X	G	X	G
nickel chloride	I	E	G	I	X	X	I	X	I	E	E	G	E	E	E
nickel sulfate	G	E	G	I	X	C	C	X	X	E	E	G	E	E	E
nitric acid (10% solution)	E	E	E	E	X	X	I	X	X	E	X	G	E	X	E
nitric acid (20% solution)	I	E	E	E	X	X	I	X	I	E	X	G	E	X	E
nitric acid (50% solution)	I	E	E	E	X	X	I	X	I	E	X	C	X	X	E
nitric acid (concentrated solution)	I	X	G	E	G	X	X	X	I	E	X	X	X	X	G
nitrobenzene	G	E	G	I	C	X	I	G	G	E	C	X	C	X	X
octyl alcohol	I	E	E	I	E	E	C	I	E	I	E	I	I	G	E
oleic acid	G	E	E	G	G	G	C	C	C	E	E	X	C	G	X
oleum	G	I	E	I	G	C	C	I	G	E	I	I	X	C	E
oleum 25%	I	I	I	I	I	I	I	I	I	E	I	I	I	X	E
olive oil	E	E	E	I	E	G	I	E	G	E	E	I	E	E	E
oxalic acid (cold)	C	E	G	E	C	G	C	X	X	E	X	E	E	G	E
paraffin	E	E	E	E	E	E	I	G	G	E	E	I	E	E	E
peanut oil	I	E	E	I	E	E	I	E	I	I	I	I	X	E	E
pentane	E	C	C	I	E	E	I	G	G	E	E	I	I	E	E
perchloroethylene	G	E	E	I	E	C	I	G	G	E	I	I	X	C	E
petrolatum	E	I	E	I	G	G	I	C	C	E	E	I	I	E	E
phenol (carbolic acid)	G	E	E	E	G	G	X	X	X	E	X	X	G	X	E
phenol 10%	G	E	E	I	E	C	I	G	X	E	X	I	I	X	G
phosphoric acid (crude)	I	X	C	C	X	X	X	X	X	E	X	C	I	X	E
phosphoric acid (to 40% solution)	I	G	E	E	X	X	X	X	I	E	X	G	E	X	E
phosphoric anhydride (dry or moist)	I	E	E	I	I	I	X	I	I	E	I	I	I	X	X
photographic (developer)	I	C	E	C	I	I	I	X	I	I	I	G	E	E	E
phosphoric acid (40-100% solution)	I	C	G	G	X	X	X	X	I	E	X	C	E	X	E
phosphoric anhydride (molten)	I	E	E	I	X	X	X	I	I	E	E	X	I	C	X
phthalic anhydride	G	E	G	I	G	G	I	C	C	E	E	I	I	C	E
picric acid	G	E	E	I	C	X	X	X	X	E	E	E	I	E	E
pine oil	E	E	E	I	E	X	I	C	G	E	I	I	I	E	E
plating solutions:															
- antimony plating 130°f	I	I	E	I	I	I	I	I	I	E	X	I	E	E	E
- arsenic plating 110°f	I	I	E	I	I	I	I	I	I	E	E	I	E	E	E
- brass bath 100°f	I	I	E	I	I	I	I	I	I	E	E	I	E	E	E
- bronze	I	I	E	I	I	I	I	I	I	E	E	I	E	E	E
- cadmium cyanide bath 90°f	I	I	E	I	I	I	I	I	I	E	E	I	E	E	E
- cadmium fluoborate bath 100°f	I	I	E	I	I	I	I	I	I	E	X	I	E	G	E
- chromium barrel chrome bath 95°f	I	I	X	I	I	I	I	I	I	E	X	I	E	X	C
- chromium black chrome bath 115°f	I	I	C	I	I	I	I	I	I	E	X	I	E	X	C
- chromium chromic-sulfuric bath 130°f	I	I	C	I	I	I	I	I	I	E	X	I	E	X	C
- chromium fluoride bath 130°f	I	I	X	I	I	I	I	I	I	E	X	I	E	X	C
- chromium fluosilicate bath 95°f	I	I	C	I	I	I	I	I	I	E	X	I	E	X	C
- copper (electroless) 140°f	I	I	I	I	I	X	I	I	I	E	E	I	E	X	E
- copper acid fluoborate bath 120°f	I	I	X	I	I	I	I	I	I	E	X	I	E	G	E
- copper acid sulfate bath r.t.	I	I	X	I	I	I	I	I	I	E	X	I	E	E	E
- copper cyanide rochelle salt bath 150°f	I	I	E	I	I	I	I	I	I	E	E	I	E	E	E
- copper cyanide high speed bath 180°f	I	I	E	I	I	I	I	I	I	E	E	I	E	E	E
- copper pyrophosphate 140°f	I	I	E	I	I	I	I	I	I	E	E	I	E	E	E
- gold acid 75°f	I	I	C	I	I	I	I	I	I	E	E	I	E	E	E
- gold cyanide 150°f	I	I	E	I	I	C	I	I	I	E	E	I	E	E	E
- gold neutral 75°f	I	I	C	I	I	I	I	I	I	E	E	I	E	E	E
- iron ferrous am. sulfate bath 150°f	I	I	C	I	I	I	I	I	I	E	X	I	E	E	E
- iron ferrous chloride bath 190°f	I	I	X	I	I	I	I	I	I	E	X	I	C	G	E
- iron ferrous sulfate bath 150°f	I	I	C	I	I	I	I	I	I	E	X	I	E	E	E
- iron fluoborate bath 145°f	I	I	X	I	I	I	I	I	I	E	X	I	E	G	E
- iron sulfamate 140°f	I	I	X	I	I	I	I	I	I	E	X	I	E	E	E
- iron sulfate-chloride bath 160°f	I	I	X	I	I	I	I	I	I	E	X	I	E	G	E
- lead fluoborate	I	I	C	I	I	I	I	I	I	E	X	I	E	G	E
- nickel electroless 200°f	I	I	I	I	I	I	I	I	I	E	X	I	X	X	E

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CHEMICAL RESISTANCE CHART

	302SS	304SS	316SS	440SS	Aluminum	Cast Bronze	Brass	Cast Iron	Carbon Steel	Teflon	Nylon	Polyethylene	Polypropylene	Buna N Seal *	Viton Seal *
plating solutions:															
- nickel fluoborate 100-170°f	I	I	C	I	I	X	I	I	I	E	X	I	E	G	E
- nickel high chloride 130-160°f	I	I	C	I	I	I	I	I	I	E	X	I	E	E	E
- nickel sulfamate 100-140°f	I	I	C	I	I	I	I	I	I	E	E	I	E	E	E
- nickel watts type 115-160°f	I	I	C	I	I	I	I	I	I	E	E	I	E	E	E
- rhodium plating 120°f	I	I	X	I	I	I	I	I	I	E	X	I	E	E	E
- silver plating 80-120°f	I	I	E	I	I	I	I	I	I	E	E	I	E	E	E
- tine-lead plating 100°f	I	I	C	I	I	I	I	I	I	E	X	I	E	E	E
- tin-fluoborate plating 100°f	I	I	C	I	I	I	I	I	I	E	X	I	E	G	E
- zinc acid chloride 140°f	I	I	X	I	I	I	I	I	I	E	X	I	E	E	E
- zinc acid fluoborate bath r.t.	I	I	I	C	I	I	I	I	I	E	X	I	E	G	E
- zinc acid sulfate bath 150°f	I	I	C	I	I	I	I	I	I	E	X	I	E	E	E
- zinc alkaline cyanide bath r.t.	I	I	I	E	I	I	I	I	I	E	E	I	E	E	E
potash	I	E	I	E	C	C	I	G	I	I	E	G	E	E	E
potassium bicarbonate	I	E	I	G	C	G	I	X	I	E	E	G	E	E	E
potassium bromide	E	E	I	G	C	C	I	X	X	E	C	G	E	E	E
potassium carbonate	G	E	I	E	C	C	I	G	G	E	E	G	E	G	E
potassium chlorate	G	E	E	E	G	G	I	G	G	E	X	G	E	E	E
potassium chloride	C	E	E	G	G	C	C	G	G	E	G	G	E	E	E
potassium chromate	I	I	G	G	E	E	I	E	I	I	I	G	I	E	E
potassium cyanide solutions	G	E	G	E	X	X	I	G	G	E	E	G	E	E	G
potassium dichromate	G	E	E	E	E	C	I	G	C	E	X	G	E	E	G
potassium ferrocyanide	G	E	I	E	C	E	I	I	C	E	E	E	I	X	I
potassium hydroxide (50%)	E	G	G	G	X	X	X	C	E	E	E	G	E	G	X
potassium nitrate	G	E	G	E	G	G	I	I	G	E	C	G	E	E	G
potassium permanganate	G	E	G	G	G	G	I	G	G	E	X	G	G	E	G
potassium sulfate	G	E	G	G	E	G	G	G	G	E	C	G	E	E	E
potassium sulfide	E	E	I	E	G	G	I	G	G	E	I	I	I	E	E
propane (liquified)	E	E	I	E	E	E	E	I	G	E	E	I	X	E	E
propyl alcohol	I	E	E	I	E	E	I	I	E	E	E	I	E	E	E
propylene glycol	G	G	I	E	E	G	I	G	G	E	G	G	I	E	E
pyridine	I	C	I	G	G	I	I	G	E	E	I	C	G	X	X
pyrogalllic acid	G	E	E	E	G	G	I	G	G	E	E	I	I	E	E
rape seed oil	I	E	E	I	I	E	I	I	I	I	I	I	I	G	E
rosins	E	E	E	E	E	E	C	I	C	E	E	I	E	E	I
sea water	E	E	C	E	C	C	I	I	X	E	E	G	E	E	E
shellac (bleached)	E	E	I	E	E	E	G	G	E	E	E	I	E	E	I
shellac (orange)	E	E	I	E	E	E	C	C	E	E	E	I	E	E	I
silicone	I	G	I	E	G	E	I	I	I	I	E	I	E	E	E
silicone oil	I	E	E	I	I	E	I	E	I	I	E	I	E	E	E
silver bromide	I	C	C	G	X	I	I	I	I	I	I	I	I	I	I
silver nitrate	G	E	G	E	X	X	I	X	X	E	E	G	E	C	E
soap solutions	E	E	C	E	G	E	I	G	G	E	E	E	E	I	G
sodium acetate	G	E	E	G	G	G	I	C	C	E	E	G	E	X	X
sodium aluminate	G	I	I	E	C	G	I	I	C	E	E	I	I	E	E
sodium bicarbonate	G	E	E	E	E	G	E	C	C	E	E	G	E	E	E
sodium bisulfate	E	E	I	E	X	C	C	X	X	E	C	G	E	E	G
sodium bisulfate	I	E	I	E	E	C	I	X	I	E	X	G	E	E	E
sodium borate	G	E	I	E	C	E	I	C	C	E	E	E	I	I	E
sodium carbonate (soda ash)	G	E	G	G	C	G	G	G	G	E	E	G	E	E	E
sodium chlorate	G	E	I	E	G	G	I	I	C	E	E	G	E	X	E
sodium chloride	G	E	C	G	C	G	C	G	C	E	E	G	E	E	E
sodium chromate	E	E	E	I	X	G	I	G	G	E	E	I	E	E	G
sodium cyanide	G	E	I	E	X	X	X	G	G	E	C	G	E	E	E
sodium fluoride	G	C	I	C	C	C	I	X	X	E	E	C	I	X	G
sodium hydrosulfite	I	I	I	I	E	C	I	I	I	E	E	I	I	I	E
sodium hydroxide (20%)	I	E	E	E	X	C	X	E	I	E	C	E	E	E	E
sodium hydroxide (50% solution)	I	E	G	I	X	C	X	G	I	E	C	C	E	X	X
sodium hydroxide (80% solution)	I	E	X	I	X	C	X	C	I	E	C	C	E	X	G
sodium hypochlorite	X	I	E	I	X	X	I	X	X	E	E	I	E	G	G
sodium hypochlorite (to 20%)	I	C	C	C	C	X	X	X	I	E	E	G	X	C	E
sodium hyposulfate	I	E	E	I	X	X	I	I	I	E	I	I	I	I	I
sodium metaphosphate	E	I	E	I	E	C	C	G	G	E	E	I	X	E	E
sodium metasilicate	E	I	E	I	G	G	I	C	C	E	I	I	I	E	E
sodium nitrate	G	E	E	E	E	G	C	E	G	E	E	G	E	C	X
sodium perborate	G	I	C	I	G	C	C	G	G	E	E	I	E	G	E

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CHEMICAL RESISTANCE CHART

	302SS	304SS	316SS	440SS	Aluminum	Cast Bronze	Brass	Cast iron	Carbon Steel	Teflon	Nylon	Polyethylene	Polypropylene	Buna N Seal *	Viton Seal *
sodium peroxide	G	E	E	I	C	C	C	X	C	E	X	I	I	C	E
sodium polyphosphate (mono, di, tribasic)	I	E	E	I	X	C	I	I	I	E	I	I	I	E	E
sodium silicate	G	E	G	E	C	C	C	I	G	E	E	I	E	E	E
sodium sulfate	G	E	E	C	G	G	G	E	G	E	E	G	E	E	E
sodium sulfide	G	E	G	I	X	X	X	E	G	E	E	G	E	C	E
sodium sulfide	I	C	C	I	C	C	I	E	I	E	X	E	I	E	E
sodium tetraborate	I	I	E	I	I	I	I	I	I	I	I	I	I	E	E
sodium thiosulphate ("hypo")	E	E	E	I	G	X	X	C	G	E	E	I	E	G	E
sorghum	I	E	E	I	I	I	I	E	I	I	E	I	I	E	E
soy sauce	I	E	E	I	E	E	I	X	I	I	E	I	I	E	E
soybean oil	I	E	E	I	E	G	I	E	I	I	E	I	E	E	E
stannic chloride	X	X	X	I	X	X	I	X	X	E	E	G	E	E	E
stannic fluoborate	I	I	E	I	I	I	I	X	I	I	I	I	I	E	E
stannous chloride	X	X	C	I	X	X	I	X	X	E	X	E	I	C	G
starch	G	E	E	I	E	G	I	C	C	E	E	G	I	E	E
stearic acid	G	E	E	E	G	C	C	C	C	E	E	G	X	G	E
stoddard solvent	E	E	E	E	E	E	E	G	G	E	E	X	X	G	E
styrene	E	E	E	I	E	E	I	I	E	E	I	I	I	X	G
sugar (liquids)	E	E	E	E	E	E	I	G	G	E	E	I	E	E	E
sulfate liquors	I	C	C	I	G	C	I	I	I	I	I	I	E	I	E
sulfur chloride	I	X	X	X	X	C	X	I	I	E	E	E	X	X	E
sulfur dioxide	I	E	E	C	E	G	I	I	I	E	X	C	X	X	X
sulfur dioxide (dry)	E	E	E	I	E	E	C	E	G	E	E	X	I	I	X
sulfur trioxide (dry)	E	E	C	I	E	G	I	G	G	E	X	I	I	X	E
sulfuric acid (to 10%)	I	X	C	C	C	X	X	X	I	E	X	G	E	C	E
sulfuric acid 10%-75%	I	X	X	X	X	X	X	X	I	E	X	C	E	X	E
sulfuric acid 75%-100%	I	I	X	I	I	I	X	I	I	E	X	I	G	X	E
sulfurous acid	C	C	G	C	C	X	I	X	X	E	X	G	E	C	E
sulfuryl chloride	I	I	I	I	I	I	I	I	I	E	I	I	I	I	I
syrup	I	E	E	E	E	X	I	I	I	I	E	I	E	E	E
tallow	I	E	E	I	E	I	I	I	I	I	E	C	I	E	E
tannic acid	G	E	E	E	C	G	I	C	C	E	X	G	E	X	E
tanning liquors	I	E	E	I	C	E	I	I	I	E	I	I	E	C	E
tartaric acid	G	E	G	G	C	E	C	X	X	E	E	G	E	X	E
tetrachlorethane	I	I	E	I	I	I	I	I	I	E	E	I	E	X	E
tetrahydrofuran	I	E	E	I	X	X	I	X	E	E	E	X	C	X	X
toluene, toluol	E	E	E	I	E	E	E	E	E	E	E	X	X	X	C
tomato juice	E	E	E	I	E	C	I	C	C	E	E	I	E	E	E
trichlorethane	I	C	E	I	C	C	I	C	I	E	I	I	I	X	E
trichlorethylene	G	E	E	I	G	G	E	C	G	E	C	X	X	X	E
trichloropropane	I	I	E	I	I	E	I	I	I	I	I	I	I	E	E
tricresylphosphate	I	I	E	I	I	E	I	I	I	E	I	I	I	X	G
triethylamine	I	I	I	I	I	E	I	I	I	I	I	I	I	E	E
turbine oil	I	E	E	I	E	E	I	E	I	I	I	I	I	E	E
turpentine	G	E	E	I	C	G	C	G	G	E	E	X	G	X	E
varnish	E	E	E	E	E	E	G	I	C	E	E	I	E	G	E
vegetable juice	I	E	E	I	E	C	I	X	I	I	E	I	I	E	E
vinegar	E	E	E	E	X	G	G	C	X	E	E	G	C	E	E
water, acid, mine	I	E	E	I	C	C	X	C	I	I	E	I	E	E	E
water, distilled, lab grade 7	I	E	E	I	G	E	I	X	I	E	E	I	E	E	E
water, fresh	E	E	E	I	E	E	C	G	I	E	E	X	E	E	E
water, salt	I	E	E	I	G	G	C	X	I	I	E	I	E	E	E
weed killers	I	E	E	I	C	C	I	I	I	I	E	I	I	G	E
whey	I	E	E	I	G	I	I	I	I	I	I	I	I	E	E
whiskey & wines	E	E	E	E	X	G	G	X	X	E	E	G	E	E	E
white liquor (pulp mill)	I	E	E	I	I	X	I	C	I	E	E	I	E	E	E
white water (paper mill)	I	E	E	I	I	E	I	I	I	I	E	I	E	I	E
xylene	E	E	E	I	E	E	E	E	G	E	E	X	X	X	E
zinc chloride	X	X	G	G	X	X	X	X	X	E	E	G	E	E	E
zinc hydrosulphite	I	I	E	I	X	X	I	X	I	I	I	I	I	E	E
zinc sulfate	G	E	E	E	X	G	C	C	X	E	E	G	E	E	E

* NOTE: The ratings given for BUNA N and VITON rubber are based on their use as seals in couplings. For Chemical Resistance of Hose components refer to the tables in our Hose Catalog.

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400PF	125	C1B	116	C508H	135	CP25-42	119	G0716BS	90	G1600VB	91
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400PM	125	C20	118	C509H	135	CP25-45	119	G07Y77BV	89,152	G1601TVL	156
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G18V	15	G3	53	G4333	108	G65F	18	G7ETM	45	P-1000	50
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G20B90	83	G34FV	8	G6008	105	G65PE	24	G85	31	V12	75,76
G20BT	83	G34FVL	8	G6016	105	G65PF	24	G85B	31	V14	77
G20M	4	G34FVS	8	G6016N	81	G65R	20	G86	31	V16	77
G20N	3,79	G34L	7	G6016P	112	G65SC	20	G87	31	V201	70
G20N90	79	G34P	8	G6046	106	G65SSA	25	G87S	31	V201PVC	78
G20NT	80	G35FH	9	G6060	105	G65SSB	25	G88	31	V202	70
G20NTM	80	G35FP	9	G6060P	112	G65SSC	25	G88C	31	V202L	71
G20S	3	G35G	9	G6090	105	G65SSD	25	G88R	31	V203	72
G20SM	4,12	G35MH	9	G6090N	81	G65SSDC	26	G88W	31	V205	72
G21B	83	G35MP	9	G6090P	112	G65SSDP	26	G89	46	V207	73
G21B45	83	G35SC	9	G6096	106	G65SSE	26	G8L	45	V302	70
G21B90	83	G36BFH	85	G6096N	81	G65SSF	26	G8M	43	V302L	71
G21BL	84	G36BLF	85	G6096P	113	G65SSY	20	G9	160	V302LB	71
G21BLM	84	G36BLM	85	G6098	106	G65SSZ	20	G91JM	35	V302W	70
G21BRI	84	G36BM	85	G60T00	106	G65ST	20	G91MC	34	V303	72
G21BRS	84	G36NF	81	G60T00P	113	G65VS	20	G92	47	V305	72
G21C	27	G36NM	81	G60T06	107	G65VX	20	G92JM	35	V306	73
G21CRLM	27	G36RG	85,89	G60T06P	113	G65X	20	G92MC	34	V307	73
G21N	79	G36SG	85,89	G60T60	107	G65Y	20	G92-RACK	48	V308	73
G21N90	80	G36VG	85,89	G60T60P	113	G66LC	19	G94	48	V401	74
G21SAE	84	G37	32	G61	28	G66LD	19	G95NK	34	V402	74
G21SS	27	G37-GHT	32,152	G6100	104	G66LDC	19	G95SZ	35	V432	74
G21TVB	156	G37JM	37	G6100P	113	G67	29	G97	32	V601	74
G21XS	156	G37MC	37	G6103	104	G67BS	29	G97B	32	V605	74
G21Z	27	G37NK	37	G62	28	G68	29	G97G	32	V610	74
G22B	84	G37NST	37	G63	28	G6HD	56	G97-GHT	32,152	V611	74
G22BFS	84	G37P	32	G65A	17	G6N	55	G97JM	36	V611M	74
G22N	80	G37SZ	37	G65AA	19	G7	43	G97MC	36	V803	78
G22SAE	85	G37T	37	G65AW	19	G7000	109	G97NK	36	V825	78
G22TVB	156	G37TMC	36	G65B	17	G7001	109	G97SZ	36	XP100	158
G23S	11	G37TNK	36	G65BRA	21	G7008	109	G98JM	38		
G23SSX	152	G37TNST	36	G65BRB	21	G7016	109	G98JMA	37		
G23T	40	G38	41	G65BRC	21	G7046	110	G98JMC	38		