Corrosion Resistance

GUIDE TO MATERIAL SELECTION

STAINLESS STEEL

Stainless steel performs excellently under oxidising conditions. This is due to a firmly adhering passive surface layer. Aqueous chlorine solutions will attack the layer and may cause localised corrosion.

The stainless steels used are resistant against intergranular corrosion either by virtue of stabilising elements included or due to low carbon contents.

HASTELLOY B2

Hastelloy B2 is particularly resistant against localised corrosion, pitting and stress corrosion cracking. It performs excellently with hot hydrochloric acid of any concentration, gaseous hydrogen chloride, sulphuric acid, acetic acid, phosphorous acid and other reducing agents. Corrosion resistance of Hastelloy B2 reduces considerably with oxidising agents or in presence of oxidising compounds such as Fe(III)-salt or Cu(II)-salt. Its use under such conditions is not recommended.

HASTELLOY C4/C22/C276

These alloys are predominantly used in chemical process plant construction where good corrosion resistance under various conditions is required.

Performance is good or very good with various impure mineral acids at elevated temperature, most solvents, chlorine and media containing chlorous impurities, formic and acetic acid, seawater and saliferous solutions.

INCOLLOY ALLOY 825

Incolloy 825 is a titanium-stabilised nickel alloy with low carbon contents and additives of chromium, iron, molybdenium and copper. Corrosion resistance is excellent with inorganic and organic acids under oxidising as well as under reducing conditions and temperatures up to boiling point. Also most alkaline solutions can be handled.

INCOLLOY 600

This alloy is particularly resistant against alkalines, oxidising acidous solutions and ultra purified water. It resists chlorine induced stress cracking.

MONEL ALLOY 400/K500

Both materials are widely resistant against organic and inorganic acids caustic solutions and salts. Performance under reducing conditions is somewhat better than under oxidising conditions. Uses are predominantly found in the marine and petroleum industry.

NICKEL (purity > 99.2%)

Corrosion resistance of nickel is good under reducing conditions. It is also suitable with weak oxidising media due to oxides building up a passive protecting film. This surface film provides good resistance against caustic alkalis. Chlorinated solutions of caustic alkalis will not induce stress corrosion cracking. Nickel may be used for food processing equipment.

GUIDE TO MATERIAL SELECTION (CONTINUED)

PLATINUM

Used as the diaphragm material for special applications such as the fluoric chemical industry.

TANTALUM

The excellent corrosion resistance of tantalum closely equals that of glass and platinum. At room temperature it performs well with most organic and inorganic substances. Tantalum resists chemical attack by virtue of a firmly adhering surface layer of tantalum pentoxide. This layer, however, disintegrates at temperatures exceeding 300°C. This will cause embrittlement of the material. Embrittlement will also occur if atomic hydrogen is able to penetrate. This can be avoided by a very thin platinum coating (0,5µm).

TITANIUM

The corrosion resistance of titanium is predominantly due to a passive surface of film of oxides. Titanium resists strong oxidising media, also in presence of free chlorine ions.

However, resistance against chlorine is only provided, if a water content of no less than 0.5% is maintained. Titanium alloys containing palladium are also suitable with non-oxidising acidous media.

ZIRCONIUM

Corrosion resistance of zirconium is very similar to titanium.

PTFE = Polytetrafluor Ethylene

Internationally used abbreviation for the highly resistant plastic materials commonly known by the registered brand names of their respective manufacturers, such as Teflon, Hostaflon TF, Algoflon, Fluon, Soreflon, Polyflon and others. PTFE resists almost any chemical substance and is only attacked by liquid sodium and fluoride compounds at high pressure. WIKA PTFE diaphragms are not porous but chemicals such as Chlorine, Bromine, HCL, and Vinyl can penetrate into the PTFE and under certain process conditions (i.e. quick change of static pressure) the lined diaphragm will be separated from the metallic diaphragm behind it, causing the seal not to work correctly. If in doubt a metallic diaphragm should be used.

DIN Standards - Diaphragm Materials

Stainless Steel	**1.4404 (316L)**	Incolloy Alloy 825	**2.4858**
	1.4435 (316L)	Incolloy Alloy 600	**2.4816**
	1.4541 (321)		
	1.4571 (316Ti)	Monel Alloy 400	**2.4360**
Hastelloy B2	**2.4617**	Monel Alloy K500	**2.4375**
Hastelloy C4	**2.4610**		
Hastelloy C22	**2.4602**	Nickel	**2.4066**
Hastelloy C276	**2.4819**	Titanium	**3.7035**

CORROSION RESISTANCE TABLES FOR DIAPHRAGMS

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Abietic Acid	1	1	0	0	0	0	0	0	0
Acetanilide	0	0	0	0	0	0	0	0	0
Acetic acid	2	1	1	0	2	1	1	0	0
Acetic aldehyde	0	1	0	0	0	0	0	0	0
Acetonacetic ester		1	0	0	0	0	0	0	0
Acetoncyanhydrine		1			0	0	0	0	0
Acetone	0	0	0	0	0	0	0	0	0
Acetonphenetidine	0	2	0	0	0	0	0	0	0
Acetonophenone	0	0	0	0	0	0	0	0	0
Acetylacetone			0		0	0	0	0	0
Acetylcellulose	1	2	0	0	0	0	0	0	0
Acetylchloride	2	1	1	1	0	0	0	0	
Acetylene (Cu < 65%)	0	0	0	0	0	0	0	0	0
Acetylsalicyclic acid		2	0	0	0	0	0	0	0
Acetylthiopropene		1	0					0	0
Acid blends	2	1	1	0	2	2	2	0	1
Acid pit water			0		2	2			
Acid sodium sulphate			0	0					
Acridine		0	0				0	0	
Acroleine	0	0	0	0	1	1	0	0	0
Acrylic acid ethyl ester				0					
Acrylic silicate	0	0	0	0	0	0	0		
Acrylonitrile	0	0	0	0	0	0	0	0	0
Adipic acid		0	0	0	0	0	0	0	
Aktivin (chloramines T)			0						
Alcane-sulfonic acid	2	2	0	0		1	0	0	
Alcoholic Beverages	0	2	0	0	0	0	0	0	0
Alizarine		0	0	0	0	0	0	0	
Alkyd resins	0	1	0	0	0	0	0	0	0
Alkylaryl-sulfonates	0	0	0	0	0	0	0	0	0
Alkylation		0	0		0	0			
Alkylchloride ether		1			1	1	0	0	
Alkylnaphthalinesulphonic acid		1				0	0	0	
Allyl amine	2	0	0	0				0	
Allyl chloride	0	0	0	1	0	0	0	0	
Allyl sulphide	1	0	0						
Allylic alcohol	1	0	0	0	0	0	0	0	0
Aloe		2	0		0	0	0	0	
Aluminium acetate		2	0		0	0	0	0	0

Code

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CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Aluminium alkyle			0	0		0	0	0	
Aluminium chlorate			0	0	0	0	0	0	
Aluminium chloride	2	1	1	0	1	1	0	0	1
Aluminium ethylate		0	0		0	0	0	0	
Aluminium fluoride		1		0	0	0	0		
Aluminium formiate		1	0	0	0	0	0	0	0
Aluminium melts	2	0	2	2	2	2			
Aluminium nitrate		2	0	0	0	0	0		0
Aluminium oxide & hydroxide	0	0	0	0	0	0	0	0	0
Aluminium salts				0					
Aluminium silicofluoride	0	2	0		0	0	0		
Aluminium sulphate	2	2	1	0	2	1	0	0	0
Amines & amination	2	1	0	0	0	0	0	0	
Amino acid blends		2	0		0	0	0	0	
2-aminoanthrachinone		0	0		0	0	0		
p-aminobenzene		1		0	1		0	0	
m-aminobenzenesulphonic acid		0	0	0	0	0	0	0	
p-aminobenzenesulphonic acid		0	0	0	0	0	0	0	
Aminobenzonic acid		0	0	0	0	0	0	0	0
5-amino-2-oxybenzoic acid		0	0	0	0	0	0	0	
m-aminophenole		0	0		0	0	0	0	
c- & p-aminophenole		0	0		0	0	0	0	
Aminoplastics	0	1	0	0	0	0	0	0	
2-aminopyridine	1	1	0		0	0	0		
p-aminosalycyclic acid		1	0	0	0	0	0	0	
Ammoniac-ammonium hydroxide	1	0	0	0	1	1	0	1	0
Ammonium acteate		1	0		0	0	0		
Ammonium alum			1						
Ammonium bicarbonate	2	0	0	0	2	2			
Ammonium bromide		1	0	0	0	0	0	0	
Ammonium carbonate			0	0	0				
Ammonium carbonate-,carbonat	2	1	0	0	2	0		0	
Ammonium chloride	2	1	0	0	0	0	0	0	0
Ammonium citrate		1	0	0	0	0	0	0	0
Ammonium difluoride			0		1	1			
Ammonium diphosphate	1	1	0	0	0	0	0	0	0
Ammonium disulphite		1	0	0	0	0	0	0	
Ammonium flouride	1	1	1	1	1	1			
Ammonium fluorsilicate		1	0		0	0	0		

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CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Ammonium formiate		1	0	0	0	0	0	0	0
Ammonium molybdate		0	0	0					
Ammonium monophosphate	1	1	0	0	0	0	0	0	
Ammonium nitrate	2	1	0	0	2	2	0	0	0
Ammonium oxalate		1	0		0	0		0	
Ammonium perchlorate		1	0				0	0	
Ammonium persulphate	2	2	1		0	2		0	
Ammonium phosphate				0	1	1		0	
Ammonium picrate		1	0		0	0	0		
Ammonium rhodanide	2	1	0	0	0	0	0		
Ammonium sulphaminate	0	0	0	0	0	0	0	0	0
Ammonium sulphate	2	1	0	0	0	0	0	0	0
Ammonium (poly)-sulphide	2	1	0	0	0	0	0		
Ammonium sulphite		1	0	0	2	2	1	0	
Ammonium tungstate		0	0	0	2	2			
Amyl acetate	0	1	0	1	0	0	0	0	0
Amyl alcohol	0	1	0	0	0	0	0	0	0
Amyl amine	2	1	0	0	0	0	0		
Amyl borate				0					
Amyl chloride	0*	1	1		0	1	0	0	
Amyl laurate	0	0	0	0	0	0	0	0	0
Amyl mercaptane		1	0		0	0	0		
Amyl nitrate		0	0						
Amyl nitrite		0	0						
p-amyl phenole	0	1	0		0	0	0	0	0
Amyl propionate	0	1	0		0	0	0	0	0
Aniline	1	1	0	0	1	1	1	0	0
Aniline black	0	1	0	0	0	0	0		
Aniline hydrochloride	2	2		0	2	2	0		
Aniline sulphate		2	0	0	0	0	0		
Aniline sulphite	1	1	0	0			0		
Anis aldehyde	0	1	0	0	0	0	0	0	0
Anisidine	0	1	0	0	0	0	0	0	
Anis oil	0	1	0	0	0	0	0	0	0
Anisol	0	0	0	0	0	0	0	0	0
Anthracene, oil	0	0	0	0	0	0	0	0	0
Antimony chloride		2	2		0	0	0	0	
Antimony melt			2	2					
Antrachinone	0	0	0		0	0	0	0	

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Final selection of material is the responsibility of the user
*without water

CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Antrachinonesulphone acids		1	0	0	0	0	0	0	0
Apple juice, - pulp	2	2	0	0	0	0		0	
Aqua regia	2	2	2	0	2	2	2	0	0
Aquasal sol.				0					
Arachic acid	1	1	0	0	0	0	0	0	
Aralene		1	0	0	0	0	0	0	0
Argon	0	0	0	0	0	0	0	0	0
Arsenic		1	0		1				
Arsenic acid, pentoxide	1	1	0	0	1	1	0	0	
Arsenous acids	2	2	0	0	0	0	0	0	
Arsenous chloride	2	1			0	0	0	0	
Arsenic trioxide		0	0	0	0	0	0		
Asordine				0					
Aspartic acid	2	0	0	0			0	0	
Asphalt	1	1	0		0	0	0		
ASTM oil 1,2,3					0				
Atmosphere (air)	0	1	0	0	0	0	0	0	0
Azobenzene	0	0	0	0	0	0	0	0	0
Azo yellow	1	2	0						
Bacitracine		2	0				0		
Baking powder	1	1	0	0	0	0	0	0	0
Barium carbonate	0	1	0	0					
Barium chlorate	0	1	0	0	0	0	0	0	
Barium chloride	2	1	0	0	1	1	0	0	0
Barium cyanide	2	0	0	0	0	2		2	
Barium hydroxide	0	0	0	0	0	0	0	0	
Barium nitrate	1	1	0	0	0		0		
Barium oxide		1	0			0	0		
Barium peroxide	2	1	1	0	1	1		2	
Barium salts				0					
Barium sulphate	0	0	0	0	0	0	0	0	0
Barium (poly)-sulphide	1	1	0	0	1	0		2	
Basileum FG (TM)				0					
Batoxin (TM)				0					
Battery acid				0					
Beer	0	2	0	0	0	0	0	0	0
Bees' wax	0	1	0	0	0	0	0	0	0
Beer wort	0	0	0	0	0	0	0	0	0
Benzaldehyde	1	1	0	0	1	1	0	0	

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CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
1,2,4-benzaldehyde disulphonic acid		0	0	0	0	0	0	0	
Benzamide	2	1	0	0	0	0	0	0	0
Benzanthrene	0	0	0	0	0	0	0	0	
Benzine	0	1	0	0	0	0	0	0	0
Benzene	1	1	0	0	0	0	0	0	0
Benzene-1.3-disulphonic acid		1	0			0	0	0	
Benzene peroxide			0		0	0	0		
Benzene-sulphonic acid		1	0	0	1	0	0	0	
Benzidine	0	0	0	0	0	0	0	0	0
2.2-benzidine disulphonic acid	0	0	0	0	0	0	0		
Benzidine-3-sulphonic acid	0	0	0	0	0	0	0	0	0
Benzile	0	0	0	0	0	0	0	0	0
Benzilic acid	1	1	0	0	0	0	0		
Benzoic acid	1	1	0	0	0	1	0	0	0
Benzoic acid anhydride	0	2	0	0	0	0	0		
2-(4-benzylechloride)-benzoic acid	0	1	0	0	0	0	0	0	0
Benzoic acid sulphimide		1	0		0	0	0	0	
Benzoine		0	0		0	0	0		
Benzonitrile	0	0	0	0	0	0	0	0	0
1.4-benzoquinone		1	0		0	0	0		
Benzotrichloride		1		2	0	0	0		
Benzotrifluoride		0	0		0	0	0		
o-benzoylbenzoic acid	0	0	0	0	0	0	0	0	
Benzyl chloride		1		0	1	1	0	0	
Benzyl acetate		1	0		0	0	0	0	
Benzyl alcohol	0	1	0	0	0	0	0	0	
Benzyl amine		0	0		0	0	0		
Benzyl benzoate	0	0	0		0	0	0	0	
Benzyl butylphtalate	0	0	0	0	0	0	0	0	0
Benzyl cellulose		0	0	0	0	0	0	0	
Benzyl chloide	0	2	0		0	0	0	0	
Benzyl ethylaniline	0	0	0	0	0	0	0	0	0
Benzyl phenol	0	1	0		0	0	0	0	
Benzyl salicylate	0	1	0	0	0	0	0	0	0
Benzyl sulphanil acid	0	1	0	0	0	0	0	0	0
Bergamot oil	1	1	0		0	0	0	0	
Beryllium chloride		1	1	0	1	1	0	0	
Beryllium fluoride	0	1	0		0	0	0		
Beryllium sulphate			0	0	0	0	0	0	

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CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Bitumen		1	0	0	0	0	0		
Black iron ink			0						
Black ive				0					
Bleaching liquid	2							0	
Blood	0	2	0	0	0	0	0	0	0
Borax	0		0	0					
Bordeaux liquor	1	1	0	0	0	0	0		
Boric acid	1	1	1	0	1	1	0	1	0
Borneol	0	2	0		0	0	0	0	0
Bornyl acetate	0	1	0		0	0	0	0	
Bornyl chloride	0				0	0	0	0	
Bornyl formiate			0		0	0	0	0	
Boron phosphate	1	1			2	2	2		
Boron trifluoride		1	0	0		0			
Brackish water	1	1			1	1			
Brake fluid	0	0	0	0	0	0	0	0	0
Brandy	1	1	0						
'Brindi' acid conc.				0					
Bromic acid	2	2	2		2	2			
Bromine	1	1	2	2*	1	1	1	0	2
Bromine trifluoride		0	0		0	0		2	
Bromobenzene	0	1	0	0	0	0	0	0	0
Bromoform		1	0		0	0	0	0	
1.3-butadiene		1	0	0					
Butane	1	1	0	0	0	0	0		
Butane diol	0	1	0	0	0	0	0	0	
1.4-butine-2-diol	0	1	0	0	0	0	0	0	0
Butter	2	2	0	0				0	0
Buttermilk	1	2	0	0	1	1		0	
Butyl acetate	1	1	0	1	1	1	0	0	0
Butyl alcohol	0	1	0	0	0	0	0	0	0
Butylamine	2	1	0		0	0	0		
Butyl benzoate	0	0	0	0	0	0	0		
Butyl butyrate		1	0		0	0	0	0	
Butyl chloride		1	1		0	0	0	0	
Butylene	0	1	0	0	0	0	0	0	0
1.4-butylen-2-diol	0	0	0	0	0	0	0	0	0
n-butyl ether	0	0	0	0	0	0	0	0	0
Butyl glycolate	0	1	0	0	0	0	0	0	0

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* PTFE diaphragm not attacked, but is porous to Bromine - DO NOT USE

CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
n-butyl glycol	0	0	0	0	0	0	0	0	0
Butyl mercaptane	2	1	0		0		0		
Butyl oxatale	0	1	0	0	0	0	0	0	
Butyl phenol (tertiary)	0	1	0		0	0	0		
Iso-butyl phosphate	0	1	0		0	0	0	0	
Butyl phthalate		1	0		0	0	0	0	
Butyl stearate	1	1	0	0	0	0	0	0	0
Butyl urethane		0	0		0	0	0	0	
Butyldehyde	0	1	0	0	0	0	0	0	0
Butyric acid	1	2	0	0	2	1	0	0	0
n-butyric acid anhydride		1	0		0	0	0	0	
Butyric acid chloride		1		1	0	0	0		
y-butyrolactone	0	1	0		0	0	0	0	0
Cadmium chloride		2	0	0	1		0	0	
Cadmium cyanide		2		0	2				
Cadmium melts	2	0	1	2					
Cadmium sulphate	0	1	0	0	0	0	0	0	
Caffeine	0	1	0	0	0	0	0	0	0
Calcium		0	0						
Calcium acetate	0	1	0	0	0	0	0	0	0
Calcium arseniate	0	0	0						
Calcium benzoate	0	1	0	0	0	0	0	0	0
Calcium bicarbonate	0	1	0	0	0	0	0	0	0
Calcium bisulphite	2	2	0	0	2	2	0	0	0
Calcium bromide	1	1	1	0	1	1	0	0	0
Calcium carbonate	0	1	0	0	0	0	0	0	0
Calcium chlorate	0	1	0	0	1	0	0		0
Calcium chloride	2	1	1	0	0	0	0	0	0
Calcium chromate	0	0	0	0	0	0	0		
Calcium fluoride	0	0	0	0	0	0	0	2	
Calcium gluconate	0	0	0	0	0	0	0	0	0
Calcium hydride	0	0	0		0	0	0		
Calcium hydroxide	0	0	0	0	0	0	0	0	
Calcium hypochloride (+calcium chloride)	2	1	1		1	1		0	0
Calcium lactate		1	0	0	0	0	0	0	0
Calcium nitrate	0	1	1	0	1	0	0		0
Calcium oxalate	0	1	0	0	0	0	0	0	
Calcium oxide	0	0	0		0	0	0		
Calcium permanganate		1	0	0	0	0	0		0

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CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Calcium peroxide		1	0	0					
Calcium phosphate	0	1	0	0	0	0	0	0	0
Calcium rhodanide	0	1	1	0	0	0	0		
Calcium stearate	0	1	0	0	0	0	0	0	0
Calcium sulphaminate		0	0	0	0	0	0	0	0
Calcium sulphate	0	1	0	0	0	0	0	0	0
Calcium sulphide	2	0	0	0	1				
Calcium sulphite	1	1	0	0	1	1		0	0
Calcium tungstate			0	0	0	0	0		
Camphene	0	0	0	0	0	0	0	0	0
Camphor	0	0	0	0	0	0	0	0	0
Camphoric acid	0	2	0	0	0	0	0	0	0
d-camphor sulphonic acid		1	1	0	1	1	0	0	
n-capric acid	1	1	0	0	1	1	0	0	0
E-caprolactame		1	0		0	0	0		
Capronic acid	1	1	0	0	1	1	0	0	0
Capronic aldehyde	0	1	0	0	0	0	0	0	0
Caprylic acid	1	0	0	1	1	0	0	0	
Caprylic alcohol	0	1	0	0	0	0	0	0	0
Capsaicin (TM)		1	0		0	0	0		
Carbazole		0	0		0	0	0	0	0
Carbitol	0	0	0	0	0	0	0	0	0
Cabolic acid	1		0	0	1	1	0	0	0
Carbolineum	0	0	0	0	0	0	0	0	0
Carbon dioxide	1	1	0	0	1	1	0	1	1
Carbonized mass		2		0		0	0		
Carbon monoxide	1	1	0	0	1	1	0	1	1
Carbon sulphide	1	0	0	0	0	1	0	0	0
Carbon tetrachloride	1	1	0	0	0	0	0		0
N-(4carboxyhenyl)-y-acid			0	0	0	0	0		0
Carnallite	1	1	0	0	0	0	0	0	0
Caro acid		2		0				0	
Carotene	0	0	0	0	0	0	0	0	0
Cascara	0	1	0	0	1				
Caseine			0	0	0	0	0	0	0
Cashew	0	1	0	0					0
Castor oil	0	1		0					
Cavit		2	0		0	0	0	0	0
Cesium chloride		1	1		0	0	0		

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CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Cesium hydroxide		1	1		1	1			
Celluloid	0	1	0	0	0	0	0	0	0
Cellulose acetobutyrate	0	1	0		0	0	0	0	0
Cellulose ether		1	0	0					
Cellulose nitrate	0	1	0		0	0	0		
Cellulose paints	1	1	0	0	0	0	0	0	0
Cellulose tripropionate	0	1	0		0	0	0	0	0
Ceresine	0	0	0	0	0	0	0	0	0
Cerium chloride		1		0	0			0	
Cerium fluoride		1		0				0	
Cerium sulphate		1		0	0				
Cetylic alcohol	0	1	0		0	0	0	0	0
Chaulmooga acid	1	1	0	0	0	0	0		
Cheese			0						
Chloracetic acid	2	1	1	0	1	1	1	0	0
Chloramine	0	1	0	0	0	0	0		
Chloraminebenzoic acid		1	0	0	0	0	0	0	0
Chloramphenicol		2	0	0				0	0
Chloranile	0	0	0	0	0	0		0	0
Chloraniline	1	1	0		0	0		0	0
Chloranthraquinone		0	0		0	0	0	0	
Chlordane	1	1	0		0		0		
Chlorhydrine	1	1	0	0	0	0	0	0	
Chloric acid	2	2	2	0	2	2		0	
Chlorinated water			1	0					
Chlorine	1	1	1	2*	1	1	1	0	1
Chlorine alum				0					
Chlorine cresol	0	1	0		0		0	0	
Chlorine dioxide		1	1	0		0	2	0	
Chlorine diphenyl	0	0	0		0	0	0	0	
Chlorobenzene	0	1	0	0	0	1	0	0	0
Chlorobenzenetrifluoride		0	0		0	0	0		
Chlorobenzoic aldehyde		1	0	0	0	0	0	0	
Chloroethenebenzene		1	1		0	0	0	0	
Chloroform	1	1	0	0	0	0	0	0	0
Chloroformic acid ester	0	1						0	
4-chloro-2-nitraline		1	0		0	0	0		
Chloronitrobenzenes	1	0	0		0	0	0	0	0
4-chloronitrobenzene-3-sulphonic acid		1	0	0	1	0	0	0	

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***** PTFE diaphragm not attacked, but is porous to Chlorine - DO NOT USE

CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Chloronitrobenzoic acid		1	0	0	0	0	0	0	0
4-chloro-2-nitrophenol		1	0		0	0	0		
Chlorophenol	0	1	0		0	0	0	0	
Chlorophenoxyacetic acid		1	0	0	0	0	0	0	
Chlorophylle, Chlorophylline	0	0	0	0	0	0	0	0	0
Chloropikrine	1	0	0		0	0	0	0	
Chloroprene		1	0		0	0	0		
Chlorosilane		0	0		0	0	0	0	
Chlorosulphonic acid		1	1	0	1	1	0	0	0
Chlorotoluene	0	0	0	0	0	0	0	0	0
Chlorotoluidine	1	1	0		0	0	0		
Chlorotrifluoroethylene	0	1	0	2	0	0	0		
Chloroxylene	0	1	0		0	0	0	0	
Chocolate			0						
Cholesterin	0	0	0	0	0	0	0	0	0
Choline	2	1	0	0					
Choline chloride	2	1					0		
Chromic acid, oxide	2	1	0	0	2	2	2	0	0
Chromium alum	1	2	1	0	1	1	0	0	0
Chromium baths (galvanic)				0					
Chromium chloride		2	1	0	1		0	0	
Chromium fluoride	2	2				0		0	
Chromium glucosate		0	0		0	0		0	0
Chromium nitrate			0	0					0
Chromium oxide, hydroxide	0	0	0	0	0	0	0	0	0
Chromium phosphate		1	0	0	0	0	0	0	
Chromium sulphate	1	2	1	0	1	1	0	0	
Chromyl chloride		0	0		0	0	0	0	0
Cider	1	2	0	0	0	0	0	0	
Citral	0	1	0	0	0	0	0	0	0
Citric acid	2	2	0		0	1		0	
Citronellal	0	1	0		0	0	0	0	0
Citronellol	0	1	0	0	0	0	0	0	0
Citrus fruit	1	2	0	0	1	1	0	0	0
Citrus oil	0	1	0	0	0	0	0	0	0
City gas	1	0	0	0	1	1	0	0	0
Clophene				0					
Clupanadioc acid	1	2	0	0	1	0	0	0	0
Cocaine	0	1	0	0	0	0	0	0	

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CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Codeine	0	2	0	0				0	
Codein salts	0	2	1	0	0	0	0	0	
Cod-liver oil	1	1	0	0	0	0	0	0	0
Coffee	0		0		0	0			
Colza oil				0					
Concrete	0	1	0	0	0	0	0	0	
Coniferylic alcohol	0	1	0	0	0	0	0	0	0
Copal	0	1	0		0	0	0	0	0
Copper acetate	1	1	0	0	0	0	0	0	
Copper carbonate	1	1	0	0	0	0	0	0	0
Copper chloride	2	1	2	0	1	1	2	0	0
Copper cyanide			0						
Copper nitrate	2		0						
Copper oxide	1	1	0		0	0			
Copper sulphate	2	1	0	0	1	1	1	0	0
Copper tetramine compound	2	1	1	0	0	0	0	0	
Corn oil				0					
Cortex cascarae sagradae	1	2	0		0	0	0		
Cotton seed oil	2	1	0	0	0	0	0		
Creosote	1		0	0					
Cresol	0	1	0	0	0	1	0	0	0
Croton aldehyde	0	1	0	0	0	0	0	0	
Crotonic acid	0	2	0		0	0	0	0	0
Cumaric algehyde			0	0	0	0	0	0	0
Cumarine			0		1	2		0	0
Cumarone, resin	0	0	0	0	0	0	0	0	0
Cumene	0	1	0	0	0	0	0	0	0
Cumohydroperoxide	2	0	0		0	0	0	0	
Cyanacetic acid	2	1	1	0				0	0
Cyanacetic acid ethyl ester	0	1	0	0	0	0	0	0	
Cyan amide		0	0	0	0	0	0		0
Cyanic chloride		2	0		0	0		0	
Cyanogen chloride		1	0	0	0	0	0	0	
Cyanogen, Dicyanogen		1	0	0				0	
Cyclohexane	0	0	0	0	0	0	0	0	0
Cyclohexanol	0	0	0	0	0	0	0	0	0
Cyclohexanol ester	0	1	0	0	0	0	0	0	0
Cyclohexanone	1	1	0	0	0	0	0	0	0
Cyclohexanone oxime		1	0	0				0	0

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CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Cyclohexene	0	1	0	0	0	0	0	0	0
Cyclohexylamine	2	0	0	0	1	1			
Cyclohexylamine carbonate	1	0	0						
Cyclohexylaminelaurate		0	0		0	0	0	0	0
Cyclopentane, Cyclopentadiene	0	0	0		0	0	0	0	0
Cyclopolyolefins			0	0					
p-cymol	0	1	0	0	0	0	0	0	0
Cynacetamide		0	0						
Cystine	1	1	0	0				0	0
DDD		1	0		0	0	0	0	0
DDT, and DFDT	1	1	0		0	1	0	0	0
Dekalin (TM)				0					
Delegol (TM)				0					
Desmodur T (TM)				0					
Desmophen 2000 (TM)				0					
Deuterium oxide	0	0	0		0	0	0		0
Developer (phot.)			0						
Dextrane			0	0		0	0	0	0
Dextrine	0	0	0	0	0	0	0	0	0
Dextrose	0	1	0	0	0	0	0	0	0
Diacetone alcohol				0					
Dialkyl sulphate	0	1	0	0	0	0	0	0	0
Diazo compounds		1	1	0				0	
Dibenzyle	0	0	0	0	0	0	0	0	0
Dibenzylether				0					
Dibutylmethylenedithioglucolate			0					0	0
Dibuthylphthalate	0	0	0	0	0	0	0	0	0
Dibuthlythiodiglucolate			0					0	0
Dibuthlythiourea		0	0						0
Dichlorbenzene				0					
Dichlorobutylene				0					
Dichloroethane				0	0	0			
Dichloroethylene	0	1	0	0	0	0	0	0	0
Di(p-chlorophenyle) methacarbinole	0	0	0	0	0	0	0	0	0
Dicyclohexyleammoniumnitrite	1	0		0	0				
Diethyl amine	2	1	0	0	1	1		1	0
Diethyl aniline, & dimenthyl aniline	1	1	0	0	0	0	0	0	0
Diethylene glycol				0					
Diethyl ether				0					

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Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Diethyl sebacate				0					
Diglycolic acid		1	1	0	1	1	0	0	0
Diglycolic acid dibuthylester	0	1	1	0	0	0	0	0	0
Dilsobutyle	0	0	0	0	0	0	0	0	0
Disopropylectone				0					
Dimenthyl aniline				0					
Dimenthylphenylcarbinole	0	0	0		0	0		0	0
Dimenthyl ether	0	0	0	0	0	0	0	0	0
Dimenthylformamide				0					
Dioctylphthalate				0					
Dioxane	0	0	0	0	0	0	0	0	0
Dipentene				0					
Diphenyl	0	0	0	0	0	0	0	0	0
Dipenyl amine	1	0	0		0	0	0	0	0
Diphenylene oxide	0	0	0	0	0	0	0	0	0
Diphenylketone	0	0	0	0	0	0	0	0	0
Diphenyl propane	0	0	0	0	0	0	0	0	0
Dipydoxidiphenyle sulphone		0	0						
DMDT		1	0		0	0	0	0	0
Drilling oil	0	0	0	0	0				
Dye bath			0						
Eggs, egg powder		0	0		0	0		0	
Enamels	0	1	0	0					
Essential oils	1	1	0	0	0	0	0	0	0
Ethane	0	0	0	0	0	0	0	0	0
Ethanol	0	0	0	0	0	0	0	0	0
Ethanolamine		0	0					0	0
Ether				0					
Ethyl acetate	0	0	0	1	1	1	0	0	0
Ethyl acrylate				0					
Ethyl benzene	0	0	0	0	0	0	0	0	0
Ethylbutyrate	0	0	0	0	0	0	0	0	0
Ethyl cellulose			0	0	1	1	0	0	0
Ethyl chloride	0	1	0	0	0	0	0	0	0
Ethyl ether	0	1	0	0	0	0	0	0	0
Ethyl glycol	0	0	0	0	0	0	0	0	0
Ethyl lactate	0	0	0	0	0	0	0	0	0
Ethylene	0	0	0	0	0	0	0	0	0
Ethylene bromide	1	1	0	0	0	0	0	0	0

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CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Ethylenechlorhydrine	0	0	0	0	0	0	0	0	0
Ethylen chloride		0	0	1	0	0	0	0	0
Ethylenecyanhydrine		0	0		0	0	0	0	0
Ethylenediamine		1	0				1	0	
Ethylenedichloride				0					
Ethyleneformiate	0	1	0	0	0	0	0	0	0
Ethyleneglycol		1	0	0	1	1			
Ethyleneimine		0	0						
Ethylenemercaptane		1	0		1		0		
Ethyl nitrite		0	0						
Ethyleneoxide	0	0	0	0	0	0	0	0	0
Ethyl silicate				0					
Ethyl stearate	0	0	0	0	0	0	0	0	0
Ethyl sulphuric acid		2					0	0	
Eukalin (TM)				0					
Extremely pure water	0	1	0	0	0	0	0	0	0
Fatty acids	1	1	0	0	0	0	0	0	0
Fatty alcohol	0	1	0	0	0	0	0	0	0
Fatty alcohol sulphates	2	1	0	0	0	0	0	0	0
Fats & Waxes	1	1	0	0	0	0	0	0	0
Ferric chloride	2	1	2	0	2	2	2	0	0
Ferric potassium cyanide	0	1	1	0	0	0	0	0	
Ferric sulphate	2	1	0	0	2	2	2	0	0
Ferrous chloride	2	1	1	0	1	1	0	0	0
Ferrous potassium cyanide		0	0	0	0	0	0	0	
Ferrous sulphate	2	1	0	0	0	0	0	0	0
Fish oil				0					
Fixing salts			0						
Fluorbenzene				0					
Fluoric acid	1	1	2	0	1	1	1	2	2
Fluorhydrocarbon	0	0	0	2	0	0	0	1	1
Fluorine	1	1	1	1	1	1		2	1
Fluoroboric acid				0					
Fluorocarbon	0	1	1	0	0	0	0		
Fluorocarbonic acids & halogen		1	1	0	1	1	0	1	
Fluorochlorocarbon	0	1	1	0	0	0	0		
Formaldehyde, formaline & metaldehyde	1	1	0	0	0	0	0	0	0
Formamide		1	0	0	1	0	0	0	0
Formic acid	2	2	0	0	1	1	0	0	0

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CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Freon (TM)	0		0						
Fruit			0						
Fruit juices	2		0	0					
Furane				0					
Furfurol	1	1	1	0	1	1	0	0	0
Gallic acid			0						
Gelatin	1	1	0	0	0	0	0	0	0
Generator gas				0					
Genodyn (TM)				0					
Glacial acetic anhydride	2	1	0	0					
Glacial acetobromic acid				0					
Gluconic acid	0	1	0	0	0	0	0	0	0
Glucose				0	0	0			
Glue	1	1	0	0					
Glutamic acid	2	1	0	0	1	0		0	0
Glycerine	1	1	0	0	0	0	0	0	0
Glycol acid	1	1	1	0	1	1	0	0	0
Glycol, diethyleneglycol	1	1	0	0	0	0	0	0	0
Glycoxy acid		2	0	0	1	1	0	0	
Grease			0						
Halowaxoil (TM)				0					
Hemp & Jute	1	1	0	0	0	0	0	0	
Heptane	0	0	1	0	0	0	1	0	0
Hexachlorobutadiene				0					
Hexachloroethane	1	1	1	0	1	1	1	0	
Hexaldehyde				0					
Hexamethylenetetramine	1	1	0	0	1	2	0	0	0
Hexane				0					
Humic acid	0	1	0	0	0	0	0	0	0
Hydraxylaminesulphate			0						
Hydrazine		1	1		2	2	1		
Hydrazine sulphate			1						
Hydrobromic acid				0	2	2	1	0	
Hydrochloric acid	2	1	1	0	1	1	0	0	1
Hydrocyanic acid	2	1	0	0	2	2	0	0	0
Hydrogen	0	1	1	0					
Hydrogen bromide		1	2	0	1		1	0	
Hydrogen gas				0					
Hydrogen iodide, iodic acid	1	1	1	0	1	1	0	0	0

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CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Hydrogen peroxide	1	1	0	0	1	2	2	0	2
Hydrogen sulphide	1	1	0	0	1	0	0	0	0
Hydroquinone		1	0	0	0	0	0	0	0
Hypochloric acid	2	2	2	0				0	
Impregnating oils	0	1	0	0	0	0	0	0	0
Indol	0	0	0	0	0	0	0	0	0
Ink (Ferrogallic)		1		0					
Iodine	2	1	1	0	1	1	1	0	1
Iodoform		1	1		0	0	0	0	0
Iron nitrate	2	2	0	0	2	2		0	
Iron phosphate			0						
Isatine, derivates	0	1	0	0	0	0	0	0	0
Isobutyl alcohol				0					
Isopropyl acetate				0					
Isopropyl alcohol				0					
Isopropyl chloride				0					
Isopropyl ether				0					
Kerosene				0					
Lactame				0					
Lactic acid	1	1	1	0	2	2	1	0	0
Lactose		1	0	0	0	0	0	0	0
Lead acetate	1	2	0	0	1	1	0		
Lead arseniate	0		0	0	0	0	0	0	
Lead baths (electrolyt.)		1		0		0			
Lead bromide		2	1				1		
Lead carbonate	0	1	0	0	0	0	0	0	
Lead chloride		1	0	0		0	0	0	
Lead chromate	0	0	0	0	0	0	0	0	
Lead dioxide	0	0	0	0	0	0	0	1	
Lead (molten)	2	1	1	2	2	2			
Lead nitrate		1	0	0	0	0	0	0	
Lead nitride	0		0	0	0	0	0		
Lead oxide		1	1				1	1	
Lead rhodanide	0	2		0	0	0	0	0	
Lead sulphate	0	1	0	0	0	0	0		
Lead sulphide	2	1	1		2				
Lead tetraacetate			0				0		
Lead trinitroresorcinate			0	0		0	0		
Lecithine		1	0	0	0	0	0	0	0

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CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Levulic acid		2	1	0	1	1	0	0	
Lignite tar	1	1	0		0	0	0		
Lime milk			0	0					
Limonene	1	1	0	0	0	0	0	0	0
Linseed oil	1		0	0	0	0			
Liqueur			0						
Lithium bromide				0					
Lithium carbonate		1	0	0	0	0	0		
Lithium chloride	1	1	1	0	1	1	0	0	1
Lithium hydride		1	0	1	1				
Lithium hydroxide	2	1	0	1	1	0			
Lithium (molten)	2	1	1	0	1	2		0	
Lithium sulphate	0	1	0	0	0	0	0	0	0
Litopone	0	1	0	0	0				
Lysoform			0						
Lysol			0						
Magnesium bisulphite		2	1	0	1	1	0	0	0
Magnesium carbonate	0	1	0	0	0	0	0	0	0
Magnesium chloride	2	1	1	0	1	0	0	0	0
Magnesium fluoride	1	1	1	0	1	1		1	
Magnesium hydroxide				0	0	0			
Magnesium (molten)	2	1	1	0					
Magnesium nitrate	1	1	0	0	2	2	2	0	0
Magnesium oxide	1	0	0	0	0	0	0	0	1
Magnesium oxychloride	1	1	1	0	0	0	0	0	0
Magensium silicofluoride		1	0	0		1		2	
Magnesium sulphite	0	1	0	0	0	0	0	0	0
Magensium sulphate	1	1	0		0	0	0	0	0
Maleic acid	1	1	0	0	0	0	0	0	0
Maleic acid, anhydride	2	1	0	0	0	0	0	0	0
Maleic anhydride				0					
Malic acid	0	2	0	0	0	0	0	0	0
Malonic acid	1	1	0	0	1	1	1	0	1
Malt	0	1	0	0	0	0	0		0
Maltose	0	0	0	0	0	0	0	0	0
Manganese dioxide		1	0	0	1	1		1	0
Manganese sulphate	1	1	0	0	0	0	0	0	0
Manganic chloride		1	1	0	1	1		0	0
Manganous chloride			0						

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CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Meat			0						
Menthol	1	1	0		0	0	0	0	0
Mercaptane	1	2	0	0	1	1	0	0	0
Mercury	2	1	0	0	0	2	1	0	1
Mercury chloride	2	2	1	0	2	2			
Mercury cyanide	2	2	0		2	2			
Mercury nitrate	2	2	0		2	2			
Mercury salts	2	2						0	
Mersolates		1	1	0	0	0	0	2	
Mesamoll (TM)				0					
Methane	0	1	1	0	1	0	0	1	1
Methane chlorobromide		0	0	0	0	0	0	0	
Methanol	1	1	1	0	0	0	0	1	1
Methyl acetate	1	1	1	1	1	0	0	0	0
Methyl acrylate				0					
Methyl alcohol	0		0	0	0	0			
Methyl aldehyde	1	1	0	0					
Methyl amine	2	1	1	0	1	2			0
Methyl bromide	0	1	1	0	0	0	0	0	
Methyl chloride	1	1	1	0	0	0	0	0	0
Methyl ethyl acetone	0	1	0	0	0	0	0	0	0
Methyl formiate	0	0	0	0	0	0	0		0
Methylisobutyl acetone				0					
Methylmethacrylate				0					
Methyl salicylate				0					
Methylene chloride	1	1	1	0	0	0	0	0	0
Milk	1		0	0	1	1			
Molasses	1	1	0	0	0	0	0	0	0
Monobrombenzene				0					
Morphine		2	0	0				0	0
Morpholine	0	0	0	0	0	0	0	0	
Mortar	1	1	1	0	0	0	0	0	
Mustard		2	0						
Naphtaline	0	0	0	0	0	0	0	0	0
Naphtaline sulphonic acid		1	1	0	1	1	1	0	1
Naphtenic acid	1	1	0	0	0	0	0	0	0
Naphtochinoline		0	0	0				0	0
Naphtol		1	0	0	0	0	0	0	0
Naphtolen 2 D (TM)				0					

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CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Naphtylamine	1	0	0	0				0	0
Naphtylaminesulphonic acid	1	1	0	0				0	
Nibren wax				0					
Nickel chloride	2		1	0	1	0	0	0	0
Nickel nitrate			0		1	1	1	0	0
Nickel salts		2	0	0					
Nickel sulphate	1		0	0	1	1	0	0	0
Nitric acid	2	1	0	0	2	2	2	0	1
Nitric acid, strong conc.	2		1						
Nitrobenzene		0	0	0	0	0	0	0	0
Nitrogen	0	1	0	0	0	0	0	0	0
Nitrous acid			1						
Nitrous oxide gas				0					
Novocaine			0						
Oak extract	1	1	0	0	0	0	0	0	0
Oleic acid	1	1	0	0	1	1			
Olein				0					
Oleum				0	1	1	1	1	2
Olive oil				0					
Oxalic acid	2		1		2	1	0	0	1
Oxygen	0	1	0	0					
Oysters		2	0			0			
Ozone		1	0	0	1	1		0	0
Palm oil acid		0	0	0	0	0			
Paraffine	0	0	0	0	0	0			
Peanut butter		0	0		0	0	0		
Pentachlorodiphenyle				0					
Pentane				0					
Perchlorethylene	1	1	0	0	0	0	0	0	0
Perchloric acid	2	2	2	0					
Petrol ether			0						
Petrol, natural gas	1	1	0	0	1	1	0	0	
Petroleum	1	0	0	0					
Phenol	1		0	0	1	1	0	0	0
Phenyl benzene				0					
Phenyl ether				0					
Phenyl hydrazine				0					
Phosphoric acid	2	1	0	0	1	1	1	0	1
Phosphoric acid anhydride			0						

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CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Phosphorous chloride				0					
Phtalic acid	0	1	0	0	1	1	1	0	0
Pickling liquid			0						
Picric acid	2	1	0	0	2	2			
Pine oil				0					
Piperidine				0					
Polyglycol				0					
Potash lye	1	1	1	0	0	0	1	1	1
Potassium			0						
Potassium acetate	0	0	0	0	0	0	0	0	0
Potassium bisulphite	0	1	0	0	1	1		0	
Potassium bisulphate			1	0					
Potassium bitartrate			1						
Potassium bromide	0	1	1	0	0	0	0	0	0
Potassium carbonate	1	0	0	0	0	0			
Potassium chlorate		1	0	0	0	0		0	0
Potassium chloride	2	1	1	0	0	0	0	0	1
Potassium chromesulphate	1	2	1	0	1	1	0	0	0
Potassium cyanate			0						
Potassium cyanide	2	1	0	0	1	0	1	0	2
Potassium dichromate	0	1	0	0	0	0		0	0
Potassium difluoride			0						
Potassium fluoride	0	0	0	0	0	0	0		
Potassium hydrogen fluoride	1	1	0	0	0	0	0		2
Potassium hydroxide	1	1	1	0	0	0	1	1	1
Potassium hypochlorite		1	1	0	1	1		1	0
Potassium iodate		1	0	0				0	0
Potassium iodide		1	1	0	0		0	0	0
Potassium monochromate	0	1	0	0	0	0		0	0
Potassium nitrate	1	1	1	0	0	0		0	0
Potassium nitrite	1	1	1	0	0	0		1	1
Potassium oxalate			0						
Potassium perchlorate		1	0	0	0	0		1	1
Potassium permanganate	1	1	0	0	1	1		1	
Potassium peroxide	2	1	1	0	1	0	1	2	
Potassium persulphate				0	2	0	0	0	
Potassium phosphate	1	1	1	0	0	0	1	0	1
Potassium rhodanide		1	0	0	0	0	0	0	
Potassium silicate	0	1	0	0	0	0	0	1	0

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CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Potassium sulphate	0	1	0	0	0	0	0	0	0
Potassium sulphide, sulphite	1	1	0	0	1	1	1	0	
Propane	0	0	0	0	0	0			
Propane chlorobromide	1	1	0		0	0	0	0	
Propylene chlorobromide	1	1	0		1	1	0	0	
Propylene oxide		1	0	0					
Protein solutions	1	1	0	0	0	0	0	0	0
Pydraul (TM)				0					
Pyridine	1	0	0	0	0	0	0	0	0
Pyrocatechin		1	0		0	0	0	0	0
Pyrogallol			0						
Pyrrole				0					
Pyruvic acid		2	0		0	0	0	0	
Quinic acid	0	2	0	0	0	0	0	0	0
Quinine	0	1	0	0	0	0	0	0	0
Quinine disulphate	0	2	0	0			0		
Quinine hydrochloride		2	2				0	0	
Quinine monosulphate	0	2	0	0	0	0	0	0	
Quinine sulphate			0						
Quinine tartrate	0	1	0	0	0	0	0	0	
Quinizarine		0	0		0	0	0	0	0
Quinoline	0	1	0	0	0	0	0		
Rape oil				0					
Rhodinol	0	1	0	0					
Sagrotan (TM)				0					
Salicylic acid	0	2		0	0	0			
Sea water	1	2	0	0	0	0	2	0	0
Siliccofluorhydric acid	2	2	1	0	1	2	1	2	2
Silver bromide	2		0						
Silver nitrate		2	0	0	2	2		0	
Skydrol (TM)				0					
Sodium	1	1	1	1	1	1	1	0	1
Sodium acetate	1	1	0	0	0	0	0	0	0
Sodium aluminate	0	1	0	0	0	0			
Sodium aluminium fluoride		0	0	0	0	0	0		2
Sodium aluminium sulphate	1	2	1	0	1	1	0	0	
Sodium arseniate, arsenite	0	0	0	0	0	0	0		
Sodium benzoate	0	0	0	0	0	0	0	0	0
Sodium bicarbonate	1	1	0	0	0	0	1		0

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CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Sodium bisulphite	2	2	0	0	1	0		0	0
Sodium bisulphate	2	1	1	0	1	1	1	0	1
Sodium borate	1	1	1	0	1	0	0	1	0
Sodium boron hydride			0						
Sodium bromate		1	0	0				0	
Sodium bromide		1	1	0	0	0	0	0	0
Sodium bromite			0	0	0				
Sodium carbonate	1	1	0	0	1	1	0	1	1
Sodium chlorate		1	0	0	1	1		0	0
Sodium chloride	1	1	1	0	1	1	0	0	1
Sodium chlorite	1	2	1	0	1	1	2	1	0
Sodium chloroacetate	1	1	0	0	0	0	0	0	
Sodium chromate	0	1	1	0	0	0	0	0	0
Sodium citrate		1	0	0	1		2	0	
Sodium cyanamide	1	1	0			0			
Sodium cyanate	2	1	0	0	1				0
Sodium cyanide				0	1	1		1	1
Sodium dichromate	2				0	0	2	1	1
Sodium diphenylsulphonate		1	0	0	0	0			
Sodium dithionite	2	2	0	0	0	0	0	0	
Sodium duodecylebenzenesulphonate	1	1	0	0	0	0	0		
Sodium ethylate		0	0	0	0	0			
Sodium ethylene diamine tetraacetate		0	0	0	0	0	0		
Sodium fluoroacetate		0	0	0	0	0			
Sodium fluorophosphate	0	0	0	0					
Sodium formiate	0	0	0	0	0	0	0	0	
Sodium glutamate	2	1	0	0	0	0	0		
Sodium hydrochloride	2		1	0	1	1	1	1	1
Sodium hydrogen sulphide	2	1	0	0			0		
Sodium hydroxide	2		1	0	1	1	1	1	1
Sodium hypochlorite	2	1	1	0	1	1		0	0
Sodium iodide		1	1	0	1	0		0	0
Sodium nitrate	1		0	0	1	1	1	0	0
Sodium perborate			0	0	0				
Sodium perchlorate			0		0	0		1	1
Sodium peroxide	2		0		1	0	0		2
Sodium phosphate	1		0	0	1	1	1	0	
Sodium & potassium alloys	1	1	1	0	0	1	0	0	1
Sodium pyrosulphite			0	0		0			

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CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Sodium salicylate			0	0	0	0	0	0	
Sodium silicate	1		0	0	0	0	0	0	
Sodium sulphite	2		0	0	0	0	0	0	0
Sodium sulphate	1		0	0	1	1	1	0	1
Sodium sulphide	1		1	0	1	1	1	1	0
Sodium thiosulphate	1		0	0	0	0	0		0
Soft soap, suds	1	0	0	0					
Solder flux	1	1	1	0	0	1			
Spinning bath			1	0					
Stannous chloride	2	2	1	0				0	
Stearic acid	1	2	0	0	0	0			
Styrene				0					
Succinic acid	0	1	0	0	0	0	0	0	0
Sugar beet juice					0				
Sugar solution	1	1	0		0	1			
Sulphite lye	2	2	0	0	2	2	0	0	0
Sulphur	1	1	0	0	1	1	1	0	0
Sulphur, boiling	1	1	1						
Sulphur chloride (dry)	0								
Sulphur dioxide	1	1	0	0	1	0	1	0	1
Sulphur trioxide *									
Sulphuric acid	2	2	1	0	1	1	1	0	1
Sulphuric anhydride		2		0					
Sulphurous acid	2	1	0	0					
Sulphurous chloride	1	0	0	0	0	0		0	2
Tannin	1	1	0	0	1	1			
Tar, Pure	1	2	0	0					
Tartaric acid	2		1	0	1	1			
Tetrachloroethane	1	1	1	0					
Tetrachloroethylene				0					
Tetrahydrofurane				0					
Tetraline				0					
Tin chloride		2	1	0	1	1	0	0	0
Tin chloride solution				0					
Tin, molten, 300°C	2	2	0						
Tin, molten, 500°C	2	2	2						
Titanium tetrachloride				0					
Toluene	0	1	0	0	0	0			
Transformer oil				0					

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***** Sulphur trioxide can be porous to PTFE diaphragms

CORROSION RESISTANCE TABLES FOR DIAPHRAGMS (CONTINUED)

Aggressive Substances	Cu alloy	Steel	Steel 1.4571	PTFE	Nickel	Monel	Hastelloy	Tantalum	Titanium
Tributoxyethylphosphate				0					
Tributyl phosphate				0					
Trichloracetic acid			2	0					
Trichloroethane				0					
Trichloroethylene	1	1	0	0	0	0	0		1
Trichloroethylphosphate				0					
Tricresylphosphate				0	0		0		
Triethanolamine				0					
Triethyl glycol				0					
Trisodiumphosphate			0						
Turpentine	0	1	0	0	0	0			
Uranium fluorides					0	0	1	2	
Urea	1	1	0	0	1	1	0	0	0
Urea resins	0	1	0		0	0	0		
Uric acid		2	0	0	0	0	0	0	
Urine			0						
Varnish	0	1	0	0	0	0	0	0	
Vaseline			0						
Vegetables			0						
Vegetal tar, charcoal	0	1	0	0	0	0	0	0	
Vinegar			0	0					
Vinyl acetate			0	0					
Vinyl acetate acetic acid				0					
Vinyl chloride				0	1	1	1	0	
Viscose				0					
Wash oil		1	0			0	0		
Water	1	2	0	0	0	0			
Wine	1	2	0	0					
White lye				0					
Wood's alloy				0					
Xylamone				0					
Xylene			0	0	1	1			
Xylene-dimenthylformamide				0					
Yeast	1	1	0	0	0	0	0	0	0
Zinc chloride	2	1	1	0	1	0	1	0	1
Zinc, molten, 300°C	2	2	0						
Zinc, molten, 500°C	2	2	2						
Zinc salts				0					
Zinc sulphate	2	2	0	0	1	1			

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CORROSION RESISTANCE TABLES FOR PLASTICS / ELASTOMERS

Aggressive Substances	Buna "N"	Teflon	Viton
Acetate Solvents, Crude & Pure	D	A	C
Acetaldehyde, 100%	D	A	C
Acetic Acid, 95%	C	A	C
Acetic Acid Vapours, 100%, Hot	B[2]	A	C
Acetic Anhydride, Boiling	D	A	C
Acetone	B	A	C
Alcohols	B[4]	A	A
Aluminium Potassium, 10%	B	A	A
Aluminium Chloride, 10%	B	A	A
Aluminium Chloride, 10%, Boiling	D	A	A
Aluminium Sulphate, 10%	B	A	A
Aluminium Sulphate, Boiling	D	A	A
Amines	X	A	C
Ammonia, Anhydrous	B	A	C
Ammonium, Chloride, 10%	B	A	A
Ammonium Chloride, Boiling	D	A	A
Ammonium Hydroxide, Hot	B[2]	A	A
Ammonium Nitrate	X	A	A
Ammonium Persulphate, 5%	B	A	A
Ammonium Phosphate, Dibasic, 5%	B	A	A
Ammonium Sulphate, < 10%	B	A	A
Ammonium Sulphate, > 10%, Boiling	B[2]	A	A
Ammonium Sulphite, Boiling	B[2]	A	A
Aniline Hydrochloride	B	A	A
Antimony Trichloride	X	A	A
Asphalt	X	A	A
Barium Chloride, 5%	X	A	A
Barium Chloride, > 5%, Hot	D	A	A
Barium Hydroxide	B	A	A
Barium Nitrate	B	A	A
Beer, 160°F	B[2]	A	A

Code

A = Substantial Resistance - Preferred material of construction
B = Moderate Resistance - Satisfactory for use under most conditions, very slight swelling for elastomers
C = Questionable Resistance
D = Inadequate Resistance - Not Recommended
X = No Information available
1 = To 220°F
2 = To 150°F
4 = B rating for Amyl, Ethyl, Methyl and Propyl Alcohols at 70°F

Final selection of material is the responsibility of the user

CORROSION RESISTANCE TABLES FOR PLASTICS / ELASTOMERS
(CONTINUED)

Aggressive Substances	Buna "N"	Teflon	Viton
Beet Sugar Liquor, Hot	B[2]	A	A
Benzene, Hot	D	A	B
Benzoic Acid	X	A	A
Blood	X	A	A
Borax, Hot	B[2]	A	A
Bromine, Dry & Moist Gas	X	A	A
Buttermilk	X	A	A
Butyric Acid, Dilute	B	A	A
Butyric Acid, Conc., Hot,	D	A	A
Calcium Bisulphite, Hot	B[2]	A	A
Calcium Chloride, Dilute	B	A	A
Calcium Hydroxide, 10-30%, Boiling	B[2]	A	B
Calcium Hypochloride, < 2%	B	A	A
Carbolic Acid, 90%	D	A	A
Carbon Dioxide, Dry	B	A	A
Carbon Disulphide	D	A	A
Carbon Tetrachloride, Dry, Hot	D	A	A
Carbonic Acid, Sat.	B	A	A
Chloroacetic Acid	D	A	B
Chloric Acid	D	A	B
Chlorinated Water, Sat.	C	A	A
Chlorine, Dry Gas	D	A	A
Chlorine, Moist Gas	C	A	A
Chlorosulphonis Acid, Dilute	D	A	D
Chromic Acid, Dilute	D	A	C
Chromic Acid, Boiling	D	A	C
Citric Acid, Dilute	B	A	A
Citric Acid, Conc., Hot	D	A	X
Copper Nitrate, Conc., Hot	B[2]	A	A
Copper Sulphate, Conc., Hot	B[2]	A	A
Creosote, Hot	D	A	A

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C = Questionable Resistance
D = Inadequate Resistance - Not Recommended
X = No Information available
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CORROSION RESISTANCE TABLES FOR PLASTICS / ELASTOMERS
(CONTINUED)

Aggressive Substances	Buna "N"	Teflon	Viton
Cupric Chloride, 0-5%	B	A	A
Dichlorethane, Boiling	D	A	X
Ethyl Chloride	D	A	X
Ethylene Glycol	B	A	A
Fatty Acids, 145°F	C	A	A
Ferric Chloride, < 1%	B	A	A
Ferric Chloride, > 1%	X	A	A
Ferric Chloride, Boiling	D	A	A
Ferric Nitrate, 5%	B	A	A
Ferric Sulphate, 5%	B	A	A
Ferrous Sulphate, 10%	B	A	A
Fluorine, Dry Gas	X	A	A
Fluorine, Dry, 300°F	D	D	A
Fluorine, Moist Gas	X	A	A
Formaldehyde, 40%	B	A	A
Formic Acid, < 50%	B	A	C
Formic Acid, > 50%	X	A	C
Formic Acid, Hot	D	A	D
Freon, Wet	X	A	A
Fuel Oil, 140°F	X	A	A
Furfural	X	A	D
Gasoline, Refined	B	A	A
Glycerine	B	A	A
Hydrochloric Acid	B	A	A
Hydrochloric Acid, 175°F	D	A	A
Hydrochloric Acid, Boiling	D	A	A
Hydrofluoric Acid, < 40%	B	A	A
Hydrofluoric Acid, > 40%	D	A	A
Hydrofluoric Acid, Boiling	D	A	B
Hydrofluosilicic Acid	B	A	X
Hydrogen Chloride, Dry & Moist	X	A	A

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CORROSION RESISTANCE TABLES FOR PLASTICS / ELASTOMERS
(CONTINUED)

Aggressive Substances	Buna "N"	Teflon	Viton
Hydrogen Fluoride, Dry	X	A[1]	A
Hydrogen Peroxide, Boiling	B[2]	A	B
Hydrogen Sulphide, Dry	X	A	X
Hydrogen Sulphide, Moist	B	A	X
Iodine, Dry	X	A	A
Kerosene	B	A	A
Lactic Acid, 5-10%	B	A	A
Lactic Acid, 5-10%, Boiling	D	A	A
Lead Acetate, Hot	B[2]	A	A
Magnesium Chloride, 5%, Hot	B[2]	A	A
Magnesium Hydroxide	B	A	A
Magnesium Sulphate	B	A	A
Magnesium Sulphate, Boiling	D	A	A
Mercury	X	A	A
Mercuric Chloride, < 2%	B	A	A
Mercuric Chloride, < 1/2%, Boiling	D	A	A
Mercuric Cyanide	X	A	A
Methyl Chloride, Dry	D	A	B
Milk	X	A	A
Molasses	X	A	A
Naptha	X	A	A
Nickel Chloride	B	A	A
Nickel Sulphate, Boiling	B[2]	A	A
Nitric Acid, 20%	B	A	A
Nitric Acid, Fuming	D	A	B
Nitric Acid, 20%, Boiling	D	A	B
Nitric Acid, 65%, Boiling	D	A	C
Nitric Acid, Conc., Boiling	D	A	C
Nitrous Acid	X	A	A
Oxalic Acid, 0-10%	B	A	X
Oxalic Acid, 10-50%, Boiling	D	A	X

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Aggressive Substances	Buna "N"	Teflon	Viton
Phosphoric Acid (Ortho), 0-50%	B	A	A
Phosphoric Acid (Ortho), > 50%	D	A	A
Phosphoric Acid (Ortho), 175°F	D	A	A
Phosphoric Acid (Ortho), < 10%, Boiling	D	A	A
Phosphoric Acid (Ortho), 85%, Boiling	D	A	X
Picric Acid	X	A	X
Potassium Bromide	X	A	A
Potassium Carbonate	B	A	A
Potassium Chlorate	B	A	A
Potassium Chloride	B	A	A
Potassium Chloride, Hot	D	A	A
Potassium Cyanide	B	A	A
Potassium Dichromate, Conc.	X	A	A
Potassium Ferricyanide, 5%	X	A	A
Potassium Ferrocyanide, 5%	X	A	A
Potassium Hydroxide, 50%	B	A	A
Potassium Hydroxide, 30-50%, 175°F	D	A	C
Potassium Hydroxide, 30-50%, Boiling	D	A	D
Potassium Hypochlorite, Dilute	B	A	A
Potassium Permanganate, Dilute	X	A	A
Potassium Sulphate, Dilute	B	A	A
Potassium Sulphate, Dilute, Boiling	D	A	A
Potassium Sulphide, Sat.	C	A	A
Propane, Liquid & Gas	X	A	A
Pyrogallic Acid	X	A	A
Rosin, Molten	D	A	A
Salicylic Acid	B	A	A
Silver Bromide	X	A	A
Silver Chloride	X	A	A
Silver Nitrate	X	A	A
Sodium Acetate	X	A	A

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(CONTINUED)

Aggressive Substances	Buna "N"	Teflon	Viton
Sodium Bisulphate	B	A	A
Sodium Bisulphate, 140°F	B	A	A
Sodium Bromide, Dilute	X	A	A
Sodium Carbonate, 5%, Hot	B[2]	A	A
Sodium Chloride, Dilute	B	A	A
Sodium Chloride, Sat., Boiling	D	A	A
Sodium Cyanide	B	A	A
Sodium Fluoride, 5%	X	A	A
Sodium Hydroxide, 50%	C	A	A
Sodium Hydroxide, < 40%, 175°F	D	A	C
Sodium Hydroxide, 40-80%, 175°F	D	A	D
Sodium Hydroxide, Boiling	D	A	D
Sodium Hydroxide, Molten	D	D	D
Sodium Hypochlorite (Still), 5%	B	A	A
Sodium Hyposulphite	X	A	A
Sodium Nitrate	X	A	A
Sodium Perborate	B	A	A
Sodium Peroxide	X	A	A
Sodium Phosphate, Tribasic	B	A	A
Sodium Silicate	B	A	A
Sodium Sulphate (All Conc.)	B	A	A
Sodium Sulphate, Hot	D	A	A
Sodium Sulphide, Sat.	C	A	A
Sodium Sulphite, Hot	B[2]	A	A
Sodium Thiosulphate	B	A	A
Stannic Chloride,	B	A	A
Stannic Chloride, SG 1.21, Boiling	D	A	A
Stannous Chloride, Sat.	B	A	A
Steam, 212°F	D	A	A
Steam, 600°F	D	D	D
Sulphite Liquors	B	A	A

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Sulphur, Molten, 266°F	D	A	A
Sulphur Chloride	X	A	A
Sulphur Dioxide, Dry, 250°F	D	A	A
Sulphur Dioxide, Moist	B	A	A
Sulphuric Acid, 0-40%	C	A	A
Sulphuric Acid, >40%	D	A	A
Sulphuric Acid, Conc.	D	A	A
Sulphuric Acid, 0-80%, Boiling	D	A	A
Sulphuric Acid, Conc., Boiling	D	A	A
Sulphurous Acid, Sat.	B	A	A
Tannic Acid, 10%	B	A	A
Tar, Hot	D	A	A
Tartaric Acid, 120°F	B	A	A
Toluene	X	A	A
Trichlorethylene	D	A	A
Turpentine	B	A	A
Varnish, Hot	D	A	X
Vegetable Oils	B	A	A
Vinegar	B	A	A
Water, Acid Mine	B	A	A
Water, Boiler Feed	X	A	A
Water, Distilled	A	A	A
Water, Salt Sea	B	A	A
Whiskey, Boiling	D	A	A
Wine	C	A	A
Xylene, Boiling	D	A	B
Zinc Chloride, 5%	B	A	A
Zinc Chloride, 5%, Boiling	D	A	A
Zinc Sulphate, Boiling	B[2]	A	A
Boric Acid, 5%, Hot	B[2]	A	A

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