Fastener Mart™

SELECTING CORROSION RESISTANT ALLOYS FOR FASTENERS 1

RATINGS

1 - EXCELLENT
2 - GOOD
3 - FAIR

CHEMICAL CORROSION GUIDE

Substance	Stainless Steel			Brass and Naval Bronze	Silicon Bronze	Monel	Aluminum
	410 416	302 303 304	316				
Acetate Solvents, Crude	2	1	1	3	2	2	1
Acetate Solvents, Refined	1	1	1	1	1	1	1
Acetic Acid, Crude	—	2	1	—	2	2	2
Acetic Acid, Refined	—	2	1	—	2	2	1
Acetic Anhydride	—	2	1	—	2	2	1
Acetone	1	1	1	1	1	1	1
Acetylene	1	1	1	—	—	2	1
Alcohols	1	1	1	2	1	1	2
Aluminum Sulfate	—	3	2	—	2	2	3
Alums	—	3	2	—	2	2	1
Ammonia Gas	1	1	1	—	—	—	1
Ammonium Chloride	3	3	1	—	2	1	—
Ammonium Hydroxide	1	1	1	—	—	3	2
Ammonium Nitrate	1	1	1	—	3	3	1
Ammonium Phosphate	1	1	1	—	—	2	—
Ammonium Phosphate (Neutral)	2	1	1	3	3	2	3
Ammonium Phosphate (Acid)	3	2	1	—	3	2	3
Ammonium Sulfate	2	1	1	—	3	2	—
Asphalt	2	1	1	2	1	1	1
Beer	—	1	1	2	2	1	1
Benzene or Benzol	1	1	1	1	1	1	1
Benzine	1	1	1	1	1	1	1
Borax	1	1	1	2	2	1	2
Boric Acid	3	2	1	—	2	1	1
Calcium Bisulfite	—	2	1	—	2	—	—
Calcium Hypochlorite	—	3	2	3	3	3	—
Cane Sugar Liquors	2	1	1	2	1	1	1
Carbon Dioxide Gas	1	1	1	1	1	1	1
Carbon Disulfide	2	1	1	3	—	3	1
Carbon Tetrachloride	1	1	1	1	1	1	2
Chlorine Gas	2	2	2	2	2	1	—
Chlorine (Wet)	—	—	3	—	3	3	—
Chromic Acid	3	2	1	—	—	3	—
Citric Acid	3	2	1	—	2	2	2
Coke Oven Gas	1	1	1	3	3	2	2
Copper Sulfate	1	1	1	—	3	3	—
Core Oils	1	1	1	1	1	1	1
Cottonseed Oil	1	1	1	1	1	1	1
Creosote	1	1	1	3	2	1	2
Ethers	1	1	1	1	1	1	1
Ethylene Glycol	1	1	1	2	1	1	2
Ferric Sulfate	1	1	1	—	3	3	2
Formaldehyde	1	1	1	—	2	1	2
Formic Acid	—	2	1	—	2	2	—
Freon	1	1	1	1	1	1	2
Furfural	1	1	1	2	2	1	1
Gasoline	1	1	1	1	1	1	1
Glucose	1	1	1	1	1	1	1
Glue	1	1	1	3	1	1	3
Glycenne	1	1	1	2	1	1	1
Hydrogen Cyanide	3	1	1	—	—	2	1
Hydrofluoric Acid	—	—	—	—	3	1	—
Hydrogen Fluoride	3	2	2	3	2	1	—
Hydrogen	1	1	1	1	1	1	1
Hydrogen Peroxide	1	1	1	—	3	2	2
Hydrogen Sulfide (Dry)	2	1	1	—	—	—	1
Hydrogen Sulfide (Wet)	3	2	1	3	—	3	1
Lacquer Solvents	1	1	1	3	1	1	1
Lime-Sulphur	2	1	1	—	3	2	—
Magnesium Chloride	3	2	1	3	2	1	—
Magnesium Hydroxide	1	1	1	2	1	1	3
Magnesium Sulfate	1	1	1	2	1	1	2
Mercury	1	1	1	—	—	2	—
Milk	2	1	1	3	3	3	1
Molasses	2	1	1	2	1	1	1

GALVANIC CORROSION

(ELECTROCHEMICAL)

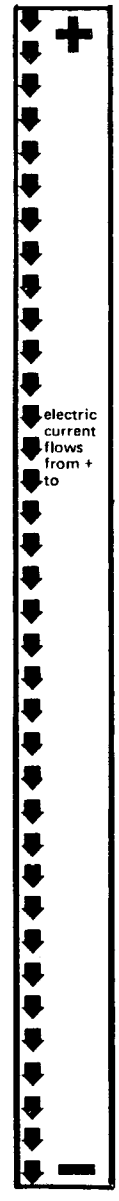
GALVANIC ATTACK

1 IF POSSIBLE, USE THE SAME OR SIMILAR METALS IN AN ASSEMBLY, ESPECIALLY WHERE AN ELECTROLYTE MAY BE PRESENT.

2 WHEN DISSIMILAR METALS ARE USED TOGETHER IN THE PRESENCE OF AN ELECTROLYTE, SEPARATE THEM WITH A DIALECTRIC MATERIAL SUCH AS INSULATION, PAINT OR COATING.

GALVANIC SERIES CHART

THIS REPRESENTATIVE SAMPLE OF DISSIMILAR METALS INDICATES RELATIVE POTENTIAL FOR GALVANIC CORROSION. COUPLING METALS WIDELY SEPARATED ON THE CHART IS MOST LIKELY TO CAUSE CORROSION.



Magnesium
Magnesium alloys

Zinc

Aluminum 1100

Cadmium

Aluminum 2024-T4

Steel or Iron
Cast Iron

Chromium Iron
(active)

Ni-Resist

Type 304 Stainless
(active)
Type 316 Stainless
(active)

Lead Tin Solders
Lead
Tin

Nickel (active)
Inconel

Brasses
Copper
Bronzes
Copper-nickel alloys
Monel

Silver Solder

Nickel (passive)
Inconel (passive)

Chromium-iron
(passive)

Type 304 Stainless
(passive)
Type 316 Stainless
(passive)

Silver

Titanium

Graphite
Gold
Platinum