

RATINGS

- 1 - EXCELLENT
- 2 - GOOD
- 3 - FAIR

CHEMICAL CORROSION GUIDE

STAINLESS STEELS CHARACTERISTICS

Substance	Stainless Steel			Brass and Naval Bronze	Silicon Bronze	Monel	Aluminum
	410 416	302 303 304	316				
Natural Gas	1	1	1	2	1	1	1
Nickel Chloride	—	3	2	—	3	2	—
Nickel Sulfate	3	2	1	3	2	1	—
Nitric Acid	2	2	2	—	—	—	3
Oxalic Acid	3	2	1	—	2	1	—
Oxygen	1	1	1	1	1	1	1
Petroleum Oils (Untreated)	3	1	1	3	—	—	—
Petroleum Oils (Refined)	1	1	1	1	1	1	1
Phosphoric Acid 25%	—	—	1	—	2	2	—
Phosphoric Acid 25% 50%	—	—	2	—	2	2	—
Phosphoric Acid 50% 85%	—	—	2	—	2	2	1
Picric Acid	2	1	1	—	—	—	3
Potassium Chloride	3	2	1	3	2	1	—
Potassium Hydroxide	1	1	1	—	3	1	—
Potassium Sulfate	1	1	1	2	1	1	1
Propane	—	—	—	1	1	1	1
Rosin (Dark)	1	1	1	2	2	1	1
Rosin (Light)	1	1	1	—	—	2	2
Shellac	1	1	1	2	1	1	1
Soda Ash (Sodium Carbonate)	1	1	1	2	2	1	—
Sodium Bicarbonate	1	1	1	1	1	1	2
Sodium Bisulfate	—	—	1	—	2	1	3
Sodium Chloride	3	2	1	3	2	1	2
Sodium Cyanide	1	1	1	—	—	2	—
Sodium Hydroxide	1	1	1	—	3	1	—
Sodium Metaphosphate	2	1	1	3	2	1	3
Sodium Nitrate	1	1	1	3	2	1	1
Sodium Perborate	1	1	1	3	2	1	3
Sodium Peroxide	1	1	1	3	2	1	3
Sodium Phosphate (Alkaline)	1	1	1	3	2	1	3
Sodium Phosphate (Neutral)	1	1	1	2	1	1	—
Sodium Phosphate (Acid)	—	2	1	—	2	1	—
Sodium Silicate	1	1	1	3	2	1	2
Sodium Sulfate	1	1	1	2	1	1	1
Sodium Sulfide	1	1	1	—	—	2	—
Sodium Thiosulfate	1	1	1	—	—	2	1
Sludge Acid	—	—	3	—	2	2	—
Sugar Beet Liquors	2	1	1	2	1	1	1
Sulfate Liquors	1	1	1	—	—	2	—
Sulphur	1	1	1	3	3	3	1
Sulphur Chloride	—	3	2	—	—	2	—
Sulphur Dioxide (Dry)	1	1	1	3	1	1	2
Sulphur Dioxide (Wet)	—	2	1	—	2	—	3
Sulphuric Acid 15%	—	—	2	—	2	2	—
Sulphuric Acid 20%, 75%	—	—	—	—	3	3	—
Sulphuric Acid 80%, 95%	3	3	2	—	—	—	—
Sulphuric Acid 95%	2	2	2	—	3	—	3
Sulphurous Acid	—	3	2	—	2	1	—
Tar	2	1	1	2	1	2	1
Tartaric Acid	3	2	1	—	2	1	2
Toluene or Toluol	1	1	1	1	1	1	1
Trichloroethylene	1	1	1	1	1	1	1
Trichloromonofluoromethane	1	1	1	1	1	1	2
Turpentine	3	1	1	3	1	1	1
Varnish	1	1	1	2	2	1	1
Vegetable Oils	1	1	1	2	2	1	1
Vinegar	3	2	1	—	2	2	1
Water (Fresh)	1	1	1	—	2	1	1
Water (Salt)	—	2	2	—	2	1	2
Whiskey	3	1	1	2	2	2	3
Wines	3	1	1	2	2	2	3
Xylene or Xylol	1	1	1	1	1	1	1
Zinc Chloride	—	—	—	—	2	1	—
Zinc Sulfate	3	2	2	3	2	1	2

THE FAMILY OF STAINLESS STEELS IS DIVIDED INTO THREE GENERAL CLASSIFICATIONS.

"AUSTENITIC" STAINLESS STEELS MAKE UP THE GENERAL GROUP OF THE 18-8 (OR 300) SERIES. THEY ARE THE CHROMIUM-NICKEL TYPE CONTAINING UPWARDS OF 8% NICKEL. THEY ARE NOT HARDENABLE BY HEAT TREATMENT, NON-MAGNETIC FOR PRACTICAL PURPOSES AND OFFER THE GREATEST DEGREE OF CORROSION RESISTANCE. "MARTENSITIC" STAINLESS STEELS CONTAIN FROM 12 TO 20% CHROMIUM. THEY ARE MAGNETIC AND HARDENABLE. TYPE 410 AND 416, COMMON FASTENING ALLOYS, ARE MARTENSITIC STAINLESS STEELS. "FERRITIC" ALLOYS ARE ALSO CHROMIUM STAINLESS STEEL ALLOYS. THEY ARE MAGNETIC AND NOT HARDENABLE BY HEAT TREATMENT. TYPE 430 IS AN EXAMPLE.

TYPE 304: AN 18-8 GRADE GENERALLY USED FOR COLD HEADED PRODUCTS. IT IS SOMEWHAT SUPERIOR TO TYPE 302 IN CORROSION RESISTANCE AND FOR THAT REASON IS NOW THE ALLOY USED BY HARPER FOR MANY STANDARD HEADED FASTENERS.

TYPE 309: A CHROMIUM-NICKEL GRADE WITH APPROXIMATE RATIO OF 12% NICKEL AND 22% CHROME. THE ADDITIONAL AMOUNT OF NICKEL AND CHROME MAKE IT DESIRABLE ON HIGH TEMPERATURE APPLICATIONS. IT IS DIFFICULT TO MACHINE BUT CAN BE USED FOR SOME COLD HEADED PRODUCTS.

TYPE 316: SOMETIMES REFERRED TO AS SMO STAINLESS STEEL. IT DIFFERS FROM 304 MAINLY BY ITS MOLYBDENUM CONTENT AND HAS QUALITIES WHICH GIVE IT SUPERIOR CORROSION RESISTANCE TO OTHER CHROMIUM NICKEL STEELS WHEN EXPOSED TO SEA WATER AND MANY TYPES OF CHEMICAL ATMOSPHERES. IT IS ALSO A SUPERIOR STAINLESS STEEL FOR STRENGTH AT HIGH TEMPERATURES. MANY OF OUR STOCK ITEMS ARE MADE FROM TYPE 316 STAINLESS STEEL.

TYPE 410: A STRAIGHT CHROMIUM ALLOY CONTAINING NO NICKEL. IT IS A GENERAL PURPOSE CORROSION AND HEAT RESISTING, HARDENABLE CHROMIUM STEEL. IT CAN BE EASILY HEADED AND HAS FAIR MACHINING PROPERTIES.