

CORROSION DATA GUIDE

This guide was developed from general corrosion literature, standard references and field experiences.

Recommendations for corrosive service are given to assist the user in making the appropriate material choices for an application. This table must be regarded as indicative only and not as any guarantee for a specific service.

Any material will behave differently under the influence of such variables as pressure, temperature, flow rate, mixtures, concentrations and aeration of fluids, etc. For that reason the end user is responsible to choice of appropriate material in his own application. Nuova Fima S.p.A. cannot guarantee that a material is suited to a particular application and cannot accept responsibility for any problems caused from use of this data guide.

Nuova Fima S.p.A. remember moreover, that careless use of this document could be dangerous for people life and properties.

LEGEND:

| | | |
|---------------------|-------------------|---------------------------|
| A = Recommended | Best service life | Attack < 0,05 mm/year |
| B = Suitable | Good service life | Attack 0,05...0,5 mm/year |
| C = Not recommended | Fair service life | Attack 0,5...1,27 mm/year |
| D = Unsuitable | No service life | Attack > 1,27 mm/year |

(*) The symbol ● in this column indicated that Fluorolube is a liquid fill for gauges and diaphragm seals required for use with oxidizing substances

| CORROSIVE SUBSTANCE | TEMP. °F | TEMP. °C | CONCENTRATION | C. STEEL | AI SI 304 ST. ST. | AI SI 316 ST. ST. | BRONZE | BRASS | MONEL 400 | NICKEL | HASTELLOY B | HASTELLOY C276 | TANTALUM | PVC | HALAR | TEFLON | VITON | Fluorolube (*) |
|-----------------------------|----------|----------|---------------|----------|-------------------|-------------------|--------|-------|-----------|--------|-------------|----------------|----------|-----|-------|--------|-------|----------------|
| Acetic Acid | 200 | 93 | All | D | C | B | C | D | C | D | C | A | A | C | A | A | C | |
| Acetic Anhydride | 175 | 79 | All | D | D | B | D | D | C | C | B | A | A | D | A | A | C | |
| Acetone | 100 | 38 | All | B | B | B | A | A | A | A | A | A | A | D | A | A | C | |
| Acetylene, Dry | 400 | 204 | 100 | A | A | A | D | D | B | B | A | A | A | A | A | A | A | |
| Alcohols | 212 | 100 | All | B | B | A | A | A | A | A | A | A | A | A | A | A | A | |
| Alkali Cleaners | 212 | 100 | All | C | B | A | B | D | A | A | A | B | B | A | A | A | A | |
| Aluminium Chloride | 212 | 100 | All | D | D | D | D | D | D | D | A | B | A | A | A | A | A | |
| Aluminium Hydroxide | 212 | 100 | All | B | B | B | B | B | B | B | C | B | A | A | A | A | B | |
| Aluminium Sulphate | 212 | 100 | All | D | D | A | C | D | D | D | A | A | A | A | A | A | A | |
| Amil Acetate | 250 | 121 | All | B | B | A | A | A | A | A | A | A | A | D | C | A | C | |
| Ammonium Chloride | 212 | 100 | <40 | D | D | C | C | D | B | B | B | A | A | A | A | A | A | |
| Ammonium, Dry | 600 | 316 | 100 | A | A | A | D | D | A | A | A | A | C | A | A | A | C | |
| Ammonium Hydroxide | 212 | 100 | All | B | B | B | D | D | D | D | B | B | D | A | A | A | B | |
| Ammonium Nitrate | 212 | 100 | All | D | C | B | D | D | D | D | C | B | A | A | A | A | C | • |
| Ammonium Sulphate | 212 | 100 | <50 | D | D | B | C | D | B | B | C | B | A | A | A | A | C | |
| Aniline | 250 | 121 | 100 | A | A | A | D | D | B | B | B | B | A | D | C | A | C | |
| Argon | 300 | 149 | 100 | A | A | A | A | A | A | A | A | A | A | A | A | A | A | |
| Asphalt | 250 | 121 | | B | B | A | B | B | A | A | B | A | A | B | A | A | A | |
| Atmosphere, Ind. & Marine | | | | B | A | A | A | B | A | A | A | A | A | A | A | A | A | |
| Atmosphere, Rural | | | | B | A | A | A | A | A | A | A | A | A | A | A | A | A | |
| Bauxite & Water | 212 | 100 | All | B | B | A | B | B | B | B | B | B | A | A | A | A | A | |
| Benzene | 212 | 100 | All | B | B | B | A | B | A | A | B | B | A | C | C | A | B | |
| Benzidine | | | | B | B | B | B | B | B | B | B | B | A | C | A | A | B | |
| Benzoic Acid | | | | D | D | B | C | C | B | B | A | A | A | A | A | A | A | |
| Bier | 70 | 21 | | C | C | A | A | B | A | A | A | A | A | A | A | A | A | |
| Borax (sodium borate) | 212 | 100 | <50 | B | B | C | A | A | A | A | A | B | A | A | A | A | A | |
| Boric Acid | 212 | 100 | All | D | D | B | B | B | B | B | A | A | A | A | A | A | A | |
| Bromine, Dry | 125 | 52 | 100 | D | D | D | D | D | A | A | A | A | A | D | A | A | A | |
| Bromobenzene | 212 | 100 | 100 | C | B | B | B | B | B | B | B | B | A | C | B | A | B | |
| Butane | 212 | 100 | | A | A | A | A | A | A | A | A | A | A | B | A | A | A | |
| Butyl Alcohol | 212 | 100 | | B | A | A | A | A | A | A | A | A | A | A | A | A | A | |
| Butyric Acid | 212 | 100 | All | D | C | B | C | D | B | C | B | A | A | C | A | A | C | |
| Calcium Bisulphite | 212 | 100 | All | D | C | B | D | D | D | D | D | C | A | A | A | A | A | |
| Calcium Chloride | 212 | 100 | All | C | C | C | B | C | B | A | B | A | A | A | A | A | A | |
| Calcium Hydroxide | 212 | 100 | 10 | B | B | B | B | B | B | B | B | A | C | A | A | A | A | |
| Calcium Hypochlorite | 212 | 100 | All | D | D | D | C | C | D | D | C | B | A | A | A | A | B | • |
| Carbon Dioxide, Dry | 100 | 38 | | A | A | A | A | A | A | A | A | A | A | A | A | A | A | |
| Carbon Sulphide | 125 | 52 | | B | B | A | B | A | B | B | A | A | A | D | A | A | A | |
| Carbon Tetrachloride, Dry | 212 | 100 | 100 | C | A | A | A | C | A | A | D | B | A | D | C | A | A | |
| Carbon Tetrachloride, Moist | 212 | 100 | | D | D | C | D | D | A | A | D | B | A | D | C | A | A | |
| Carbonated Water | 212 | 100 | All | D | A | B | B | D | C | C | A | A | A | A | A | A | A | |
| Carbonic Oxide | 300 | 149 | | A | A | A | A | B | A | A | A | A | A | A | A | A | A | |
| Caustic Potassium | 212 | 100 | <50 | D | B | B | D | D | A | A | B | C | D | A | A | A | C | |
| Caustic Soda | 212 | 100 | All | C | C | C | D | D | B | B | B | C | D | A | A | A | C | |
| Caustic Soda | 212 | 100 | <40 | C | B | A | B | D | A | A | A | B | D | A | A | A | C | |
| Cement Slurry | 212 | 100 | All | B | A | A | B | B | B | B | B | B | C | A | A | A | C | |

| CORROSIVE SUBSTANCE | TEMP. °F | TEMP. °C | CONCENTRATION | C. STEEL | AISI 304 ST. ST. | AISI 316 ST. ST. | BRONZE | BRASS | MONEL 400 | NICKEL | HASTELLOY B | HASTELLOY C276 | TANTALUM | PVC | HALAR | TEFLON | VITON | Fluorolube (*) |
|------------------------------------|----------|----------|---------------|----------|------------------|------------------|--------|-------|-----------|--------|-------------|----------------|----------|-----|-------|--------|-------|----------------|
| Chloride | 500 | 260 | | B | A | A | D | D | B | C | B | A | A | A | A | A | C | |
| Chlorine Dioxide | 150 | 66 | | D | D | D | D | D | D | D | B | B | A | D | B | A | B | |
| Chlorine, Dry | 200 | 93 | 100 | B | B | C | B | C | B | B | C | A | A | C | A | A | A | • |
| Chlorine, Moist | 200 | 93 | All | D | D | D | D | D | D | D | D | A | A | C | A | A | A | • |
| Chloroacetic Acid | 212 | 100 | All | D | D | D | D | D | C | C | B | A | A | C | A | A | C | |
| Chlorobenzene | 150 | 66 | 100 | C | B | B | B | C | B | B | B | B | A | D | B | A | A | |
| Chloroform, Dry | 150 | 66 | 100 | A | B | C | B | B | A | A | B | B | A | C | B | A | A | |
| Chromic Acid | 212 | 100 | All | C | D | D | D | D | D | D | D | D | A | C | A | A | A | |
| Chromium Plating Solution | 212 | 100 | All | C | D | D | D | D | D | D | D | D | A | C | A | A | A | |
| Citric Acid | 212 | 100 | All | D | C | A | C | D | C | C | A | A | A | A | A | A | A | |
| Coffee | 212 | 100 | All | D | B | A | A | C | B | B | B | A | A | A | A | A | A | |
| Copper Chloride | 212 | 100 | All | D | D | D | C | D | D | D | D | D | A | A | A | A | A | |
| Copper Nitrate | 212 | 100 | All | D | B | B | D | D | D | D | D | D | A | A | A | A | A | • |
| Copper Plating Solutions (Acid) | 212 | 100 | All | D | C | B | D | D | B | B | C | C | A | A | A | A | A | |
| Copper Plating Solutions (cyanide) | 212 | 100 | All | B | A | A | D | D | B | B | B | A | A | A | A | A | A | |
| Copper Sulphate | 212 | 100 | <40 | D | C | B | C | D | D | D | C | A | A | A | A | A | A | |
| Corn Oil | 500 | 260 | All | D | B | A | A | C | B | B | A | A | A | A | A | A | A | |
| Creosol | 212 | 100 | All | B | A | A | B | C | B | B | B | A | A | D | A | A | A | |
| Creosote | 212 | 100 | | B | B | B | B | C | B | B | B | A | A | D | A | A | A | |
| Crude Oil | 300 | 149 | All | B | B | B | B | C | A | B | B | C | A | B | A | A | A | |
| Ethanol | 212 | 100 | All | B | A | A | A | A | A | A | B | A | A | A | A | A | A | |
| Ethyl Acetate | 212 | 100 | 100 | D | B | B | B | B | B | C | C | B | A | D | C | A | C | |
| Ethyl Chloride, Dry | 212 | 100 | | B | C | A | A | A | B | A | B | B | A | D | A | A | A | |
| Ethylene Glycol | 212 | 100 | All | C | B | B | B | B | B | B | A | A | A | A | A | A | A | |
| Ethylene Oxide | 75 | 24 | 100 | B | A | B | D | D | B | B | A | A | A | C | B | A | C | |
| Fatty Acids | 500 | 260 | 100 | D | C | A | C | C | B | A | A | A | A | A | A | A | A | |
| Ferric Chloride | 150 | 66 | <50 | D | D | D | D | D | D | D | D | B | A | A | A | A | A | |
| Ferric Sulphate | 150 | 66 | 10 | D | B | A | D | D | D | B | B | A | A | A | A | A | A | |
| Ferrous Chloride | 212 | 100 | <50 | D | D | D | C | D | D | D | B | B | A | A | A | A | A | |
| Ferrous Sulphate | 212 | 100 | All | D | C | B | C | D | C | D | B | B | A | A | A | A | A | |
| Fluorine, Gas | 300 | 149 | 100 | D | A | A | C | C | A | A | C | B | D | B | A | A | C | |
| Fluorine, Liquid | 75 | 24 | 100 | D | A | A | B | C | A | A | C | B | C | B | B | A | C | |
| Fluorosilicic Acid | 75 | 24 | 10 | D | B | B | C | C | A | B | B | A | C | A | A | A | B | |
| Formaldehyde | 212 | 100 | <50 | D | B | A | B | B | B | B | B | A | A | B | B | A | B | |
| Formic Acid | 212 | 100 | All | D | B | D | B | C | B | B | A | A | A | B | A | A | A | |
| Gasoline | 200 | 93 | | A | A | A | A | A | C | A | A | A | A | B | A | A | A | |
| Glucose | 300 | 149 | All | B | A | A | A | A | A | A | A | A | A | A | A | A | A | |
| Glue | 300 | 149 | All | C | A | A | A | B | A | A | A | A | A | A | A | A | A | |
| Glycerine | 212 | 100 | All | B | A | A | B | B | A | A | A | A | A | A | A | A | A | |
| Hexane, Dry | 212 | 100 | | A | A | A | A | A | A | A | A | A | A | A | A | A | A | |
| Hydrobromic Acid | 212 | 100 | All | D | D | D | D | D | D | D | B | D | A | B | A | A | A | |
| Hydrochloridric Acid | 212 | 100 | All | D | D | D | C | D | B | D | B | B | D | C | A | A | C | |
| Hydrofluoric Acid | 212 | 100 | All | D | D | D | C | D | B | D | B | B | D | C | A | A | C | |
| Hydrogen | 500 | 260 | | B | A | A | A | A | A | A | A | A | A | A | A | A | A | |
| Hydrogen Chloride | 400 | 204 | | D | C | C | D | D | A | A | A | A | A | A | A | A | A | |
| Hydrogen Fluoride, Dry | 200 | 93 | 100 | C | B | B | C | C | B | B | C | B | C | A | A | A | C | |

| CORROSIVE SUBSTANCE | TEMP. °F | TEMP. °C | CONCENTRATION | C. STEEL | AI SI 304 ST. ST. | AI SI 316 ST. ST. | BRONZE | BRASS | MONEL 400 | NICKEL | HASTELLOY B | HASTELLOY C276 | TANTALUM | PVC | HALAR | TEFLON | VITON | Fluorolube (*) |
|----------------------|----------|----------|---------------|----------|-------------------|-------------------|--------|-------|-----------|--------|-------------|----------------|----------|-----|-------|--------|-------|----------------|
| Hydrogen Peroxide | 212 | 100 | 30 | D | C | B | D | D | C | C | C | C | A | A | A | A | A | • |
| Hydrogen Peroxide | 212 | 100 | 100 | D | C | C | D | D | C | C | D | C | A | A | A | A | A | • |
| Kerosene | 300 | 149 | | A | A | A | A | A | A | A | A | A | A | A | A | A | A | |
| Lacquers & Thinners | 200 | 93 | All | B | A | A | A | B | A | A | A | A | A | D | C | A | C | |
| Lactic Acid | 212 | 100 | All | D | C | B | D | D | D | D | B | B | A | A | C | A | A | |
| Lime | 212 | 100 | All | B | B | B | B | B | B | B | B | A | A | A | A | A | A | |
| Linseed Oil | 75 | 24 | | A | A | A | B | C | B | B | B | B | A | A | A | A | A | |
| Magnesium Chloride | 212 | 100 | <40 | D | D | C | B | C | B | A | A | A | B | A | A | A | A | |
| Magnesium Oxide | 212 | 100 | All | B | B | B | A | B | B | A | B | B | D | A | A | A | A | |
| Magnesium Sulphate | 212 | 100 | <50 | B | A | A | A | B | A | A | C | A | A | A | A | A | A | |
| Mercuric Chloride | 75 | 24 | 10 | D | D | D | D | D | D | C | C | B | A | A | A | A | A | |
| Mercury | | | | A | A | A | D | D | C | B | B | B | A | A | A | A | A | |
| Methyl Chloride, Dry | 212 | 100 | 100 | A | B | A | A | B | B | B | B | B | A | D | A | A | A | |
| Methylene Chloride | 212 | 100 | 100 | C | C | C | C | B | B | C | A | A | A | D | C | A | B | |
| Milk | | | | D | A | A | B | C | C | A | B | B | A | A | A | A | A | |
| Naphta | 75 | 24 | 100 | B | A | A | A | A | A | A | B | A | A | B | A | A | A | |
| Naphtaline | 212 | 100 | 100 | A | A | A | B | B | B | B | B | B | A | C | A | A | A | |
| Nickel Chloride | 212 | 100 | <40 | D | D | C | D | D | B | C | A | B | A | A | A | A | A | |
| Nickel Sulphate | 212 | 100 | | D | C | B | B | C | B | B | B | B | A | A | A | A | A | |
| Nitric Acid | 75 | 24 | All | D | A | A | D | D | D | D | D | B | A | A | A | A | A | • |
| Nitric Acid | 212 | 100 | All | D | C | C | D | D | D | D | D | D | A | C | B | A | C | • |
| Oxalic Acid | 212 | 100 | All | D | D | D | B | C | B | C | B | B | A | A | A | A | A | |
| Oxygen | 300 | 149 | All | A | A | A | A | A | A | A | A | A | A | A | A | A | A | • |
| Perchloric Acid | 120 | 49 | All | D | D | D | D | D | D | D | C | D | A | D | A | A | A | |
| Phenol | 175 | 79 | 100 | B | B | A | A | B | A | A | A | A | A | C | A | A | A | |
| Phosphoric Acid | 212 | 100 | All | D | C | C | D | D | D | D | B | C | A | A | A | A | A | |
| Phthalic Anhydride | 250 | 121 | 100 | B | A | A | C | C | A | A | B | A | A | C | B | A | B | |
| Picric Acid | 212 | 100 | All | D | B | B | D | D | D | D | D | B | A | C | A | A | A | |
| Propan | 300 | 149 | | A | A | A | A | A | A | A | A | A | A | A | A | A | A | |
| Quinine | 212 | 100 | 100 | D | B | B | B | B | B | B | B | B | A | A | A | A | A | |
| Resin Solution | 150 | 66 | All | D | B | A | B | B | B | B | B | A | A | D | A | A | C | |
| Rochelle Salt | 212 | 100 | 100 | D | B | B | B | C | B | B | B | B | A | A | A | A | A | |
| Rosin | 700 | 371 | 100 | D | B | B | B | B | A | A | B | A | A | A | A | A | A | |
| Sea Water | 75 | 24 | | D | C | C | D | C | A | A | A | A | A | A | A | A | A | |
| Silicate Solutions | 212 | 100 | All | B | A | A | B | B | A | A | A | A | A | A | A | A | A | |
| Silicone Fluids | 212 | 100 | 100 | A | A | A | A | A | A | A | A | A | A | A | A | A | A | |
| Silver Nitrate | 212 | 100 | <60 | D | B | B | D | D | D | D | B | C | A | A | A | A | A | • |
| Soap & Detergents | 212 | 100 | All | B | A | A | A | B | A | A | A | A | A | A | A | A | A | |
| Sodium Bicarbonate | 212 | 100 | 20 | B | A | A | B | B | A | A | B | B | A | A | A | A | A | |
| Sodium Bisulphate | 212 | 100 | <10 | D | B | B | B | D | B | B | B | B | A | A | A | A | A | |
| Sodium Bisulphite | 212 | 100 | <40 | D | D | C | C | C | B | C | C | B | A | A | A | A | A | |
| Sodium Carbonate | 212 | 100 | <40 | B | B | B | B | C | B | B | B | B | A | A | A | A | A | |
| Sodium Chloride | 212 | 100 | <40 | C | C | C | B | B | B | B | B | B | A | A | A | A | A | |
| Sodium Cyanide | 212 | 100 | 10 | B | A | A | D | D | D | D | B | C | A | A | A | A | A | |
| Sodium Hydroxide | 180 | 82 | <60 | C | B | A | B | C | A | A | A | B | D | A | A | A | C | |
| Sodium Hypochlorite | 75 | 24 | 10 | D | D | D | D | D | D | D | C | A | A | A | A | A | A | • |

| CORROSIVE SUBSTANCE | TEMP. °F | TEMP. °C | CONCENTRATION | C. STEEL | AI SI 304 ST. ST. | AI SI 316 ST. ST. | BRONZE | BRASS | MONEL 400 | NICKEL | HASTELLOY B | HASTELLOY C276 | TANTALUM | PVC | HALAR | TEFLON | VITON | Fluorolube (*) |
|-----------------------------|----------|----------|---------------|----------|-------------------|-------------------|--------|-------|-----------|--------|-------------|----------------|----------|-----|-------|--------|-------|----------------|
| Sodium Nitrate | 212 | 100 | <50 | B | A | A | C | C | B | B | C | B | A | A | A | A | B | • |
| Sodium Nitrate | 212 | 100 | 60 | B | C | B | B | B | B | B | B | B | A | A | A | A | B | |
| Sodium Peroxide | 212 | 100 | 10 | B | B | B | C | D | B | B | B | B | A | A | A | A | A | • |
| Sodium Phosphate (Tribasic) | 212 | 100 | All | B | A | A | B | B | B | B | A | B | A | A | A | A | A | |
| Sodium Silicate | 212 | 100 | All | B | A | A | B | B | B | B | B | B | A | A | A | A | A | |
| Sodium Sulphate | 212 | 100 | <50 | B | B | B | B | B | B | B | B | B | A | A | A | A | A | |
| Sodium Sulphate | 212 | 100 | 10 | D | A | A | C | D | B | B | C | B | A | A | A | A | A | |
| Sodium Sulphide | 175 | 79 | 20 | D | A | A | D | D | B | B | B | B | D | A | A | A | A | |
| Steam | 800 | 427 | | A | A | A | D | D | B | B | B | B | A | C | A | A | B | |
| Sulphur Chloride, Dry | 212 | 100 | 100 | D | B | C | C | C | C | B | C | B | A | A | A | A | A | |
| Sulphur Dioxide, Dry | 500 | 260 | 100 | B | B | B | C | D | B | B | B | B | A | A | A | A | C | |
| Sulphur Trioxide, Dry | 300 | 149 | | B | B | B | C | C | B | B | A | B | D | A | A | A | A | |
| Sulphuric Acid | 212 | 100 | 10 | D | D | D | D | D | D | D | C | B | A | A | A | A | A | |
| Sulphuric Acid | 212 | 100 | <30 | D | D | D | D | D | D | D | B | C | A | B | A | A | A | |
| Sulphuric Acid | 212 | 100 | 100 | D | D | D | D | D | D | D | B | B | A | C | A | A | A | |
| Sulphuric Acid, Fuming | 175 | 79 | 100 | D | A | B | D | D | D | D | B | B | C | C | A | A | B | |
| Sulphurous Acid | 212 | 100 | All | D | C | C | C | C | C | C | B | B | A | A | A | A | A | |
| Tannic Acid | 212 | 100 | All | C | B | B | B | C | B | B | B | B | A | A | A | A | A | |
| Tartaric Acid | 212 | 100 | | D | A | A | B | C | B | B | B | B | A | A | A | A | A | |
| Tin Chloride | 125 | 52 | All | D | D | D | D | D | D | D | B | B | A | A | A | A | A | |
| Titanium Tetrachloride, Dry | 75 | 24 | 100 | A | B | B | D | D | B | B | B | B | A | A | A | A | A | |
| Toluene | 212 | 100 | | A | A | A | A | A | A | A | A | A | A | D | A | A | B | |
| Trichloroacetic Acid | 212 | 100 | All | D | D | D | D | D | B | C | B | B | A | D | C | A | C | |
| Trichloroethane, Dry | 125 | 52 | | A | A | A | A | A | A | A | A | A | A | D | C | A | B | |
| Trichloroethylene, Dry | 300 | 149 | | B | B | B | B | B | A | A | B | A | A | D | D | A | A | |
| Turpentine | 75 | 24 | 100 | B | A | A | A | B | A | B | A | A | A | C | A | A | A | |
| Urea | 100 | 38 | 50 | C | A | A | B | B | B | B | B | B | A | A | A | A | A | |
| Varnish | 250 | 121 | | A | A | A | B | B | A | A | A | A | A | D | A | A | A | |
| Vynil Chloride | 150 | 66 | 100 | C | B | B | C | C | A | A | B | A | A | D | A | A | A | |
| Water (demineralized) | 212 | 100 | | C | A | A | A | B | A | A | A | A | A | A | A | A | A | |
| Whiskey (hot mash) | 212 | 100 | | C | A | A | B | B | A | B | A | A | A | B | A | A | A | |
| Zinc Chloride | 212 | 100 | <40 | D | D | D | C | D | B | B | B | B | A | A | A | A | A | |
| Zinc Sulphate | 212 | 100 | <30 | D | A | A | B | D | B | B | B | B | A | A | A | A | A | |