# CORROSION RESISTANCE OF METALS IN VARIOUS CHEMICAL MEDIA

INCLUDING

**316 Stainless Steel**

**Inconel**

**Monel**

**Alloy C**

**Alloy B**

**Titanium**

**Zirconium**

**Niobium**

**Tantalum**

TITAN®
METAL FINISHING

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# Corrosion Resistance of Metals in Various Chemical Media

***The information enclosed in this must be used as a general suggestion and not as a guarantee. The final selection of a material must be based on the actual evaluation of the metal in the corrosive medium under study.***

| Legend | | | |
|---|---|---|---|
| A | Fully Resistant | * | Subject to pitting at air line or when allowed to dry |
| B | Slightly Resistant | | |
| C | Unsatisfactory | + | May attack when sulfuric acid is present |

## Salts

| Chemical | Concentration | Temperature °F | Tantalum | Niobium | Zirconium | Titanium | Alloy B | Alloy C | Monel | Inconel | 316 SS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetyl Chloride | | Cold & Boiling | | | | | | | AB | | B |
| Aluminum Acetate | Saturated | | A | | | | A | A | AB | AB | B |
| Aluminum Chloride | 5% | Room | A | A | A | A | A | A | AB | | C |
| Aluminum Fluoride | 5% | Room | C | C | C | C | A | A | AB | | B |
| Aluminum Hydroxide | Saturated | | A | | | | | | AB | | A |
| Aluminum Oxalate | | | | | | | A | A | AB | | |
| Aluminum Potassium Sulfate | 2% | Room | A | | | | | | AB | | A |
| Aluminum Potassium Sulfate | 10% | Room | A | | | | | A | AB | | A |
| Aluminum Potassium Sulfate | 10% | Boiling | A | | | | | | C | | A |
| Aluminum Potassium Sulfate | Saturated | Boiling | A | | | | | | C | | B |
| Aluminum Sulfate | 10% | Room | A | | A | | A | A | AB | | A |
| Aluminum Sulfate | 10% | Boiling | A | | A | | A | A | C | | A |
| Aluminum Sulfate | Saturated | Room | A | | | | A | A | AB | | A |
| Aluminum Sulfate | Saturated | Boiling | A | | | | | | C | | A |
| Ammonia (Anhydrous Dry) | | | | | | | A | A | AB | A | A |
| Ammonium Alum | | | A | | | | A | A | | AB | A |
| Ammonium Alum (Slightly Ammonialcal) | | | A | | | | A | A | | AB | A |
| Ammonium Bicarbonate | | Hot | A | | | | | | AB | A | A |
| Ammonium Bromide | 5% | Room | A | | | | A | A | AB | | A |
| Ammonium Carbonate | All Conc. | Hot & Cold | A | | | | A | A | A | A | A |
| Ammonium Chloride | 1% | Room | A | | A | A | A | A | A | | A |
| Ammonium Chloride | 10% | Boiling | A | | A | A | A | A | AB | | A |

## Salts

| Chemical | Concentration | Temperature °F | Tantalum | Niobium | Zirconium | Titanium | Alloy B | Alloy C | Monel | Inconel | 316 SS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Ammonium Chloride | 28% | Boiling | A | | A | | A | A | AB | | A |
| Ammonium Chloride | 50% | Boiling | A | | A | | | A | AB | | A |
| Ammonium Hydroxide | | | | | A | A | A | A | C | A | A |
| Ammonium Monosulfate | | | A | | | | A | A | AB | | A |
| Ammonium Nitrate | 5% | Room | A | | | | C | A | | AB | A |
| Ammonium Oxalate | 5% | Room | A | | | | A | A | AB | AB | A |
| Ammonium Persulfate | 5% | Room | A | | | | C | A | C | AB | A |
| Ammonium Phosphate | 5% | Room | A | | | | A | A | AB | AB | A |
| Ammonium Sulfate | 1% to 5% Agitated, Aerated | Room | A | | A | | A | A | AB | | A |
| Ammonium Sulfate | 10% | Boiling | A | | | | A | B | AB | | A |
| Ammonium Sulfate | Saturated | Boiling | A | | | | A | B | AB | | A |
| Ammonium Sulfite | Saturated | Cold & Boiling | A | | | | | | C | C | A |
| Amyl Acetate | | | A | | | | A | A | AB | AB | |
| Amyl Chloride | | | A | | | | A | A | | | |
| Aniline Hydrochloride | 5% | Room | A | | A | | A | A | | | C |
| Antimony Trichloride | | Room | A | | | | | | AB | C | |
| Barium Carbonate | | Room | A | | | | A | A | AB | | A |
| Barium Chloride | 5% to Sat. | Room | A | | A | A | A | A | AB | | A |
| Barium Chloride | Aqueous Sol. | Hot | A | | A | | | | AB | | A |
| Barium Hydrate | | | | | | | A | A | AB | AB | A |
| Barium Nitrate | Aqueous Sol. | Hot | A | | | | | | | AB | A |
| Barium Sulfate | | Room | A | | | | | | AB | | A |
| Butyl Acetate | | | A | | | | A | A | AB | | |
| Calcium Carbonate | | Room | A | | | | A | A | A | A | A |
| Calcium Chlorate | Dilute | Hot or Cold | A | | | | | A | AB | AB | A |
| Calcium Chloride | Dil. Or Conc. | Room | A | | A | A | A | A | AB | AB | A |
| Calcium Hydroxide | 10% to 20% | Boiling | A | | | | A | A | A | A | A |
| Calcium Hydroxide | 50% | Boiling | | | | | A | A | A | A | B |
| Calcium Hypochlorite | 2% | Room | | | B | A | C | A | C | C | A |
| Calcium Sulfate | Saturated | Room | A | | | | | | AB | | A |
| Carbon Bisulfide | | Room | A | | | | | | AB | AB | A |
| Carbon Tetrachloride | Pure | Room | A | | A | A | A | A | A | A | A |
| Carbon Tetrachloride | 5% to 10% Aqueous Sol. | Room | | | A | A | A | A | A | | B |
| Chlorebenzene(Pure) | Concentrated | Room | | | | | | | A | | A |



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## Salts

| Chemical | Concentration | Temperature °F | Tantalum | Niobium | Zirconium | Titanium | Alloy B | Alloy C | Monel | Inconel | 316 SS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Copper Acetate | Saturated | Room | A | | | | A | A | | AB | A |
| Copper Carbonate | Sat. Sol. | | A | | | | A | A | | AB | A |
| Copper Chloride | 1% Agitated & Aerated | Room | A | | | | A | A | C | C | A |
| Copper Carbonate | Sat. Sol. | | A | | | | A | A | | AB | A |
| Copper Chloride | 1% Agitated & Aerated | Room | A | | | | A | A | C | C | A |
| Copper Chloride | 5% Agitated | Room | A | | | | A | A | C | C | B |
| Copper Chloride | 5% Aerated | Room | A | | | | A | A | C | C | C |
| Copper Cyanide | Saturated | Boiling | A | | | | A | A | C | C | A |
| Copper Nitrate | 1% to 5% | Room | A | | | | C | A | C | B | A |
| Copper Nitrate | 50% Aqueous | Room | A | | | | C | A | C | C | A |
| Copper Sulfate | 5% | Room | A | | | A | A | A | B | B | A |
| Copper Sulfate | Saturated | Boiling | A | | | A | C | A | C | C | C |
| Cupric Chloride | | 105 F | A | | C | A | C | A | C | C | C |
| Cupric Nitrate | | | A | | | | C | A | C | C | A |
| Ethyl Acetate | | | A | | | | A | A | A | A | |
| Ethyl Chloride | 5% | Room | A | | | | A | A | AB | | A |
| Ethylene Chloride | | Room | A | | AB | | | | AB | | A |
| Ferric Chloride | 1% Still | Room | A | | C | A | C | A | C | C | A |
| Ferric Chloride | 1% Still | Boiling | A | | C | A | C | A | | | C |
| Ferric Chloride | 5% Still | Room | A | | C | A | C | A | C | C | C |
| Ferric Chloride | 5% Agitated | Room | A | | C | A | C | A | | | C |
| Ferric Chloride | 5% Aerated | Room | A | | C | A | C | A | C | C | C |
| Ferric Hydroxide | | Room | A | | | | C | A | AB | A | A |
| Ferric Nitrate | 1% to 5% | Room | A | | | | C | A | C | C | A |
| Ferric Sulfate | 1% to 5% | Room | A | | | | C | A | C | C | A |
| Ferrous Chloride | | Room | A | | | | A | A | C | C | |
| Ferrous Sulfate | Dilute | Room | A | | | | A | A | C | C | A |
| Ferrous Ammonium Citrate | | | A | | | | A | A | | AB | |
| Hydrogen Peroxide | | Room | A | | A | A | B | A | AB | AB | +A |
| Hydrogen Peroxide | | Boiling | A | | | A | B | A | | | +A |
| Hydrogen Sulfide | Dry | Room | A | | | A | B | A | AB | AB | A |
| Hyposulfite Soda(Hypo) | | | A | | | | | | AB | AB | A |
| Lactic Acid Salts | | | A | | | | A | A | AB | AB | A |
| Lead Acetate | | | A | | | | A | A | AB | | A |
| Manganese Carbonate | | | A | | | | | | AB | AB | A |

## Salts

| Chemical | Concentration | Temperature °F | Tantalum | Niobium | Zirconium | Titanium | Alloy B | Alloy C | Monel | Inconel | 316 SS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Manganese Chloride | 10% to 50% Aqueous Sol. | Boiling | A | | | A | | | AB | AB | A |
| Magnesium Carbonate | | | A | | | | A | A | AB | AB | A |
| Magnesium Chloride | 1% to 5% Still | Room | A | | A | A | A | A | AB | AB | A |
| | | | | | | | | | | | |
| Magnesium Chloride | 1% to 5% Still | Hot | A | | A | A | A | A | AB | AB | B |
| | | | | | | | | | | | |
| Magnesium Hydroxide | Thick Suspension | Room | A | | | | A | A | A | A | A |
| Magnesium Nitrate | | | A | | | | C | A | | AB | A |
| Magnesium Sulfate | 5% | Hot | A | | | | A | A | A | A | A |
| Methylene Chloride | 40% | Room to Boiling | | | | | A | A | AB | | A |
| Mercuric Bichloride | 0.07% | Room | A | | | | C | C | | | A |
| Mercuric Chloride | Dilute | Room | A | | A | A | C | A | AB | AB | C |
| Mercuric Cyanide | | | A | | | | C | A | | AB | A |
| Mercurous Nitrate | | | A | | | | C | A | | | A |
| Nickel Chloride | | Room | A | | AB | A | C | A | AB | | A |
| Nickel Nitrate | 10% | Room | A | | | | Ab | A | C | C | A |
| Nickel Sulfate | 10% | Room | A | | | | A | A | AB | AB | A |
| Nitrous Oxide | Dry | | A | | | | C | A | C | C | A |
| Phosphoric Anhydride | Dry | Room | A | | | | | | | | A |
| Phosphorous Trichloride | | | A | | | | C | A | | | A |
| Potassium Bichromate | Neutral | Room | A | | | | C | A | | AB | A |
| Potassium Bromide | 5% | Room | A | | | | A | A | AB | | A |
| Potassium Carbonate | 1% | Room | A | | | | A | A | AB | AB | A |
| Potassium Chlorate | | | A | | | | C | A | AB | AB | A |
| Potassium Chloride | 1% to 5% | Room | A | | | A | A | A | AB | | A |
| Potassium Chloride | 1% to 5% | Boiling | A | | | | C | A | AB | | A |
| Potassium Cyanide | | | A | | | | A | A | AB | | A |
| Potassium Dichromate | Neutral | | A | | | | A | A | | AB | A |
| Potassium Ferricyanide | 5% | Room | A | | | | A | A | AB | | A |
| Potassium Ferrocyanide | 5% | Room | A | | | | A | A | A | A | A |
| Potassium Hydrate | | | | | | | A | A | A | A | A |
| Potassium Hydroxide | 5% | Room | A | | A | | A | A | A | A | A |
| Potassium Hydroxide | 27% | Boiling | C | | A | | A | A | A | A | A |
| Potassium Hydroxide | 50% | Boiling | C | | | | A | A | A | A | A |
| Potassium Hypochlorite | | | | | | | C | A | C | C | C |



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## Salts

| Chemical | Concentration | Temperature °F | Tantalum | Niobium | Zirconium | Titanium | Alloy B | Alloy C | Monel | Inconel | 316 SS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Potassium Iodide | | | A | | | | A | A | AB | | A |
| Potassium Nitrate | 5% | Room | A | | | | C | A | AB | | A |
| Potassium Oxalate | | | A | | | | A | A | | | A |
| Potassium Permanganate | Neutral | | A | | | | C | A | AB | AB | A |
| Potassium Sulfate | 1% to 5% | Room | A | | | | A | A | AB | | A |
| Potassium Sulfate | 1% to 5% | Hot | A | | | | | | AB | | A |
| Potassium Sulfide (Salt) | | | A | | | | | | | | A |
| Quinine Bisulfate (Dry) | | | A | | | | A | A | AB | | A |
| Quinine Sulfate (Dry) | | | A | | | | A | A | AB | | A |
| Silver Bromide | | | A | | | | A | A | AB | | A |
| Silver Chloride | | | A | | | | C | A | | | C |
| Silver Cyanide | | | A | | | | A | A | AB | | A |
| Silver Nitrate | | | A | | | | AB | AB | | AB | A |
| Sodium Acetate (Moist) | 5% | Room | A | | | | A | A | AB | | A |
| Sodium Benzoate | | | A | | | | A | A | AB | | |
| Sodium Bicarbonate | All Conc. | 150 | A | | | | A | A | A | A | A |
| Sodium Bichromate | Neutral | | A | | | | C | A | | AB | A |
| Sodium Bisulfate | | | A | | | | A | A | AB | | A |
| Sodium Borate | | | A | | | | A | A | AB | | A |
| Sodium Bromide | 5% | Room | A | | | | A | A | AB | | A |
| Sodium Carbonate | All Conc. | Room | A | | | A | A | A | A | A | A |
| Sodium Chlorate | 25% | | A | | | A | C | A | | AB | A |
| Sodium Chloride | 5% Still | Room to 150 | A | | A | A | A | A | A | | A |
| Sodium Chloride | 20% Aerated | Room | A | | | A | A | A | A | | A |
| Sodium Chloride | Saturated | Room | A | | | A | A | A | A | | A |
| Sodium Chloride | Saturated | Boiling | A | | | A | A | A | A | | A |
| Sodium Citrate | | | A | | | | A | A | | AB | A |
| Sodium Ferricyanide | | | A | | | | A | A | AB | AB | A |
| Sodium Ferrocyanide | | | A | | | | | | | | |
| Sodium Fluoride | 5% | Room | C | | | | A | A | AB | | B |
| Sodium Hydrosulfite | | | A | | | | B | A | AB | AB | |
| Sodium Hydroxide | 10% | Room | C | | A | B | A | A | A | A | A |
| Sodium Hypochlorite | 5% | Room | | | B | B | C | A | C | C | A |
| Sodium Hyposulfite | Dilute | Room | A | | | | A | A | AB | AB | A |
| Sodium Lactate | | | A | | | | A | A | AB | | A |
| Sodium Nitrate | All Conc. | Room | A | | | A | C | A | AB | AB | A |
| Sodium Nitrite | | | A | | | | | | | | A |

## Salts

| Chemical | Concentration | Temperature °F | Tantalum | Niobium | Zirconium | Titanium | Alloy B | Alloy C | Monel | Inconel | 316 SS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Sodium Peroxide | | 212 | C | | | | C | A | AB | AB | A |
| Sodium Phosphate | 5% | Room | A | | | A | A | A | AB | | A |
| Sodium Silicate | | | A | | | | A | A | AB | | A |
| Sodium Sulfate | 5% Still | Room | A | | | | A | A | AB | AB | A |
| Sodium Sulfate | Concentrated | Room | A | | | | A | A | AB | | A |
| Sodium Sulfide | Saturated | Room | A | | | | A | A | | AB | A |
| Sodium Sulfite | 5% | Room | A | | | | C | A | B | | A |
| Stannic Chloride | 5% | Room | A | | A | A | A | A | C | C | C |
| Stannous Chloride | 5% | Room | A | | | | A | A | AB | AB | B |
| Sulfur Chloride | Dry | | A | | | | A | A | AB | | C |
| Sulfur Dioxide | Dry | Room | A | | | A | C | A | A | A | A |
| Sulfur Dioxide | Moist | Room | A | | | A | C | A | C | C | A |
| Titanium Tetrachloride | | | A | | | | C | A | AB | | |
| Zinc Chloride | 5% Still | Room | A | | A | A | A | A | AB | | B |
| Zinc Chloride | 5% Still | Boiling | A | | A | A | AB | AB | AB | | B |
| Zinc Sulfate | 5% | Room | A | | | | A | A | AB | AB | A |
| Zinc Sulfate | Saturated | Room | A | | | | A | A | AB | | A |
| Zinc Sulfate | 25% | Boiling | A | | | | A | A | AB | | A |

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## Acids

| Chemical | Concentration | Temperature °F | Tantalum | Niobium | Zirconium | Titanium | Alloy B | Alloy C | Monel | Inconel | 316 SS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetic Acid | 5% Unaerated | Room | A | | A | A | A | A | AB | AB | A |
| Acetic Acid | 20% Unaerated | Room | A | | A | A | A | A | AB | AB | A |
| Acetic Acid | 50% Unaerated | Room | A | | A | A | A | A | AB | AB | A |
| Acetic Acid | 50% Unaerated | Boiling | A | | A | A | A | A | AB | | B |
| Acetic Acid | 100% Unaerated | Room | A | | A | A | A | A | AB | AB | A |
| Acetic Acid | 100% Unaerated | Boiling | A | | A | A | A | A | AB | C | B |
| Acetic Anhydride | Unaerated | Room | | | A | A | A | A | | AB | A |
| Acetic Anhydride | Unaerated | Boiling | | | A | A | A | A | B | B | A |
| Acetic Vapors | 100% Unaerated | Hot | | | | | A | A | AB | AB | C |
| Arsenic Acid | 90% | 225° | | | | | | | | B | B |
| Benzoic Acid | 5% | Room | A | | | | A | A | AB | AB | A |
| Boric Acid | 5% | Boiling | A | | | | A | A | AB | | A |
| Butyric Acid | 5% | Room | A | | | | A | A | | AB | A |
| Carbonic Acid | | | A | | | | A | A | AB | AB | A |
| Carbolic Acid, C.P. | | Room | A | | | A | A | A | | | A |
| Chloroacetic Acid | | Room | A | | A | A | A | A | AB | AB | C |
| Chloric Acid | | Room | | | | | | | | | C |
| Chlorosulfonic Acid | 10% | | A | | | | A | A | AB | AB | C |
| Chromic Acid | 5% | Room | A | A | | A | C | A | | AB | A |
| Chromic Acid, C.P. | 10% | Boiling | A | A | | A | C | A | C | C | B |
| Chromic Acid | 50% | Boiling | A | A | | B | C | B | C | C | C |
| Citric Acid | 5% Still | 150° | A | | A | A | A | A | AB | AB | A |
| Citric Acid | 15% | Room | A | | A | A | A | A | AB | AB | A |
| Citric Acid | 15% | Boiling | A | | A | A | A | A | | AB | A |
| Citric Acid | Concentrated | Boiling | A | | AB | A | A | A | | | B |
| Fatty Acids | | | A | | | | A | A | AB | AB | |
| Formic Acid | 5% Still | Room to 150° | A | | A | | A | A | AB | AB | A |
| Gallic Acid | 5% | Room to Boiling | | | | | A | A | | AB | A |
| Hydrobromic Acid | | Boiling | A | | | | A | B | C | C | C |
| Hydrochloric Acid | 5% Unaerated | Room | A | A | A | B | B | A | AB | | C |
| Hydrochloric Acid | 10% Unaerated | Room | A | | A | B | A | A | B | C | C |

## Acids

| Chemical | Concentration | Temperature °F | Tantalum | Niobium | Zirconium | Titanium | Alloy B | Alloy C | Monel | Inconel | 316 SS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Hydrochloric Acid | 20% Unaerated | Room | A | | A | C | A | A | | | C |
| Hydrochloric Acid | All | 100° | A | | A | C | A | A | | | C |
| Hydrochloric Acid | All | 122° | A | | A | C | B | B | | | C |
| Hydrochloric Acid | All | 160° | A | | A | C | A | B | | | C |
| Hydrochloric Acid Fumes | Concentrated | 100°A | A | | C | C | | | | | C |
| Hydrocyanic Acid | | | A | | | | A | A | AB | | A |
| Hydroflouric Acid | All | All | C | C | C | C | A | A | AB | | C |
| Hydrofluoric Acid Vapor | | 212° | C | C | C | C | A | A | AB | | C |
| Hydrofluosilicic Acid | 5% | 70° | C | C | | C | A | A | AB | | C |
| Hydrofluosilicic Acid Vapors | | 212° | | | | | | | AB | | C |
| Lactic Acid | 5% | Room | A | A | A | A | A | A | AB | AB | A |
| Lactic Acid | 5% | 150° | A | A | A | A | A | A | | | A |
| Lactic Acid | 10% | 150° to Boiling | A | | AB | A | A | A | | | B |
| Malic Acid | | Cold & Hot | A | | | | A | A | AB | AB | A |
| Molybdic Acid | 5% | Room | A | | | | A | A | | | A |
| Muriatic Acid | | Room | A | | | | A | A | | | C |
| Nitric Acid | 5% | Room | A | A | A | A | C | A | C | C | A |
| Nitric Acid | 20% | Room | A | A | A | A | C | A | C | C | A |
| Nitric Acid | 50% | Room | A | A | A | A | C | A | C | AB | A |
| Nitric Acid | 50% | Boiling | A | A | A | A | C | C | C | C | A |
| Nitric Acid | 65% | Boiling | A | A | A | A | C | C | C | C | B |
| Nitric Acid | 95% | Room | A | A | A | A | C | A | | | |
| Nitric Acid | Concentrated | Room | A | A | A | A | C | A | | | A |
| Nitric Acid | Concentrated | Boiling | A | A | A | A | C | C | | | B |
| Nitric Acid | Fuming | Room | | | A | A | C | A | | | A |
| Nitrous Acid | 5% | Room | A | | | | | | | | A |
| Oleic Acid | | Room | A | | | A | A | A | AB | AB | A |
| Oleic Acid | 5% | Cold & Hot | A | | | C | A | A | AB | | A |
| Oleic Acid | 10% | Room | A | | AB | A | A | A | AB | | A |
| Oleic Acid | 10% | Boiling | A | | AB | C | B | A | AB | | C |
| Phosphoric Acid | 1% | Room | A | | A | A | A | A | AB | | +A |
| Phosphoric Acid | 5% | Room | A | A | A | A | A | A | AB | | A |
| Phosphoric Acid | 10% Still | Room | A | A | A | A | A | A | AB | AB | A |
| Phosphoric Acid | 10% Agitated | Room | A | A | A | A | A | A | AB | | A |
| Phosphoric Acid | 10% Aerated | Room | A | A | A | A | A | A | | | A |
| Picric Acid | Concentrated | Room | | | | | A | A | AB | | A |



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## Acids

| Chemical | Concentration | Temperature °F | Tantalum | Niobium | Zirconium | Titanium | Alloy B | Alloy C | Monel | Inconel | 316 SS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Pyrogallic Acid | | | | | | | A | A | | | A |
| Salicylic Acid | | | A | | | | A | A | AB | | |
| Stearic Acid | Concentrated | 200° | A | | | A | A | A | AB | AB | A |
| Succinic Acid | | Molten | | | | | B | B | | AB | |
| Sulfuric Acid | 5% | Room | A | | A | B | A | A | AB | AB | B |
| Sulfuric Acid | 5% | Boiling | A | | A | C | A | B | C | C | C |
| Sulfuric Acid | 10% | Room | A | | A | B | A | A | AB | | B |
| Sulfuric Acid | 10% | Boiling | A | | A | C | A | B | C | C | C |
| Sulfuric Acid | 50% | Room | A | | A | B | A | A | AB | | C |
| Sulfuric Acid | 50% | Boiling | A | | A | C | A | C | C | C | C |
| Sulfuric Acid | Concentrated | Room | A | | C | C | A | A | AB | | A |
| Sulfuric Acid | Concentrated | Boiling | C | C | C | C | C | C | C | C | C |
| Sulfuric Acid | Concentrated | 300° | C | C | C | C | C | C | C | C | C |
| Sulfuric Acid | Fuming | Room | C | | | | A | B | C | C | B |
| Sulfuric Anhydride | Dry | Room | C | | | | A | A | C | C | |
| Sulfurous Acid | Saturated | 375° | C | | B | | C | A | C | C | B |
| Sulfurous Spray | | Room | A | | | | C | A | C | C | C |
| Tannic Acid | 10% | Room | A | A | A | A | A | A | AB | AB | A |
| Tannic Acid | | 150° | A | A | A | A | A | A | AB | AB | A |
| Tartaric Acid | 10% | Room | A | | B | A | A | A | AB | | A |
| Tartaric Acid | | 150° | A | | B | A | A | A | AB | | A |
| Trichioroacetic Acid | | Room | A | | | A | A | A | | | A |
| Uric Acid | Concentrated | | | | | | A | A | | AB | A |

***The information enclosed in this must be used as a general suggestion and not as a guarantee. The final selection of a material must be based on the actual evaluation of the metal in the corrosive medium under study.***

## Miscellaneous Solutions

| Chemical | Concentration | Temperature °F | Tantalum | Niobium | Zirconium | Titanium | Alloy B | Alloy C | Monel | Inconel | 316 SS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Acetone | | Boiling | A | A | | | A | A | A | A | A |
| Alcohol – Methyl, Propyl, Butyl, Ethyl | | Room | A | A | A | A | A | A | A | A | A |
| Alkaform | | Room | | | | | A | A | | | A |
| Aluminum | | Molten | C | C | C | C | C | C | C | C | C |
| Aniline | Concentrated | Room | A | | | | A | A | | | A |
| Baking Oven Gases | | | A | | | | A | A | | AB | A |
| Beer | | | A | | | | A | A | AB | | A |
| Benzene | | Room | A | | | A | A | A | AB | AB | A |
| Benzol | | Hot | A | | | | A | A | AB | AB | A |
| Bleaching Powder | Solution | Hot | C | | | | C | A | C | C | AB |
| Blood (Meat Juices) | | Cold | A | | | A | A | A | A | A | A |
| Borax | | Fused | C | | | | A | A | AB | | A |
| Bromine | Dry | | A | | | | C | A | A | A | C |
| Bromine Water | | Room | A | | C | | C | A | C | C | C |
| Buttermilk | | Room | A | A | | | A | A | | A | A |
| Camphor | | Room | A | | | | A | A | | | A |
| Carbonated Beverages | | | A | A | | | A | A | AB | AB | A |
| Carbon Monoxide Gas | | 900° | C | C | C | C | A | A | A | A | A |
| Cadmium | | Molten | A | | | | C | C | C | C | C |
| Caustic Lime | | | A | A | A | A | A | A | A | A | A |
| Caustic Soda | | | C | | | | A | A | A | A | A |
| Chlorinated Water | Saturated | Room | A | | C | A | C | A | C | C | B |
| Chlorine Gas Dry | | Room | A | | B | C | A | A | A | A | C |
| Chlorine Gas Moist | | Room | A | | C | A | C | A | | | C |
| Chlorine Gas Moist | | 212° | A | | | A | C | C | C | C | C |
| Chloroform | | Room | A | A | A | A | A | A | A | A | A |
| Chromium Plating Bath | | Room | A | | | | | | C | C | AB |
| Cider | | Room | A | A | A | A | A | A | A | A | A |
| Coffee | | Boiling | A | | | | A | A | AB | | A |
| Copal Varnish | | | A | | | | A | A | AB | | A |
| Cream of Tartar | | | A | | | | | | | | A |
| Creosote | | Hot | A | | | | | | | A | A |
| Crude Oil | | | A | | | | A | A | AB | | +A |
| Developing Solutions | | Room | A | | | | A | A | | A | A |
| Distillery Wort | | | A | | | | | | | | A |
| Dyewood, Liquor | | | A | | | | | | | | A |
| Ether | | Room | A | | | A | A | A | AB | AB | A |



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## Miscellaneous Solutions

| Chemical | Concentration | Temperature °F | Tantalum | Niobium | Zirconium | Titanium | Alloy B | Alloy C | Monel | Inconel | 316 SS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Flue Gases | | | A | | | | B | A | | AB | AB |
| Fluorine | | | C | C | C | C | | | A | A | C |
| Food Pastes | | | A | | | | A | A | AB | AB | A |
| Formaldehyde | | Room | A | A | | A | A | A | B | AB | *A |
| Fuel Oil | | Hot | A | | | | A | A | AB | AB | A |
| Fuel Oil (w/ $H_2SO_4$) | | | A | | | | A | A | AB | AB | A |
| Fruit Juices | | Room | A | A | | | A | A | AB | AB | A |
| Furfural | | | A | | A | | A | A | AB | | A |
| Gasoline | | | A | A | | | A | A | AB | AB | A |
| Glauber's Salt | Solution | | A | | | | A | A | AB | | A |
| Glue (Dry) | | | A | A | A | A | A | A | A | A | A |
| Glue (Solution Acid) | | Hot | A | | | | A | A | | AB | A |
| Glycerine | | Room | A | | | | A | A | AB | | A |
| Gypsum | | | A | | | | | | | | A |
| Hydrocarbons | | | A | | | | A | A | AB | AB | |
| Ink | | | A | A | A | A | A | A | AB | AB | A |
| Iodine | | | | | | | | | | | |
| Iodoform | | | A | | | | | | | | A |
| Kerosene | | Room | A | A | | | A | A | AB | | A |
| Ketchup | | Room | A | A | | | A | A | AB | | A |
| Lard | | Room | A | A | | | A | A | | | A |
| Lead | | Molten | A | | | | A | A | C | C | C |
| Linseed Oil | | | A | | | | A | A | AB | A | A |
| Lye (Caustic) | 34% | 230° | C | C | | | A | A | A | A | A |
| Lysol | | 212° | A | A | A | A | A | A | A | A | A |
| Mayonnaise | | Cold & Hot | A | A | | | A | A | AB | AB | A |
| Meats (Unsalted) | | Room | A | | | | A | A | | | A |
| Mash | | Hot | A | | | | A | A | | | A |
| Mercury | | | A | | | | A | A | AB | A | A |
| Milk | | Hot or Cold | A | A | | | A | A | A | A | A |
| Mine Water – Acid | | | A | | | | A | A | C | C | A |
| Molasses | | | A | | | | A | A | A | A | A |
| Mustard | | Room | A | | | | A | A | AB | | A |
| Naptha | | | A | A | | | A | A | AB | AB | A |
| Nitre Cake | | Fused | C | C | C | C | | | | | A |
| Oils – Crude | | Hot & Cold | A | A | | | A | A | AB | | *A |
| Oils – Mineral or Vegetable | | Hot & Cold | A | | | | A | A | AB | AB | A |
| Parafin | | Molten | A | A | | | A | A | AB | | A |

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## Miscellaneous Solutions

| Chemical | Concentration | Temperature °F | Tantalum | Niobium | Zirconium | Titanium | Alloy B | Alloy C | Monel | Inconel | 316 SS |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Paragoric Compound | | | A | | | | A | A | | | A |
| Petroleum Ether | | | A | A | | | A | A | | | A |
| Phenol | | | A | A | A | A | A | A | A | A | A |
| Phenolic Resins | | | A | A | | | A | A | | | A |
| Pine Tar Oil | | | A | | | | A | A | AB | | A |
| Potash | Solution | Hot | C | C | | | A | A | A | A | A |
| Resin | | Molten | A | | | | A | A | | AB | A |
| Sal Ammoniac | 20% | Boiling | A | | | | A | A | AB | | B |
| Salt | Saturated | Room | A | A | A | A | A | A | A | A | *A |
| Salt Brine | Saturated | Hot | A | | | A | A | A | AB | AB | *A |
| Sea Water | | | A | A | A | A | A | A | AB | AB | *A |
| Sewage | | | A | | | | | | | | +A |
| Soaps | | Room | A | | | | A | A | AB | | A |
| Soy Bean Oil | | | A | | | | A | A | AB | | A |
| Soda Pulp | | | | | | | A | A | A | A | |
| Starch | Solution | | A | | | | | | | | A |
| Steam | | 212° | A | A | | | | | A | A | A |
| Sugar Juice | | | A | A | | | A | A | A | A | A |
| Sulfur – Dry | | Molten | A | | | | A | A | C | C | A |
| Sulfur – Wet | | | A | | | | | | C | C | A |
| Tin | | Molten | A | | | | A | A | C | C | C |
| Tomato Juice | | Room | A | A | | | A | A | AB | AB | *A |
| Turpentine Oil | | | A | A | | | A | A | AB | | A |
| Tung Oil | | | A | | | | A | A | | AB | A |
| Varnish | | | A | | | | A | A | AB | AB | A |
| Vegetable Juices | | Room | A | A | | | A | A | AB | AB | A |
| Vinegar – Still | | Room | A | | A | | A | A | AB | AB | A |
| Vinegar – Agitated | | Room | A | | | | A | A | | AB | A |
| Vinegar – Aerated | | Room | A | A | | | A | A | | AB | A |
| Vinegar – Fumes | | | A | | | | A | A | | AB | *A |
| Vinegar & Salt | | | A | | | | A | A | | AB | |
| Water | | | A | A | A | A | A | A | A | A | A |
| Water | | Hot | A | A | A | A | A | A | A | A | A |
| Water – Salt | | | A | A | A | A | A | A | AB | AB | *A |
| Water – Sea | | | A | A | A | A | A | A | AB | AB | *A |
| Whiskey | | | A | A | | | | | A | A | A |
| Zinc | | Molten | A | | | | C | C | C | C | C |



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