

# Heat Exchanger Solution Guide

<u>SOLUTION</u>	<u>TYPE OF HEAT EXCHANGER</u>	<u>SOLUTION</u>	<u>TYPE OF HEAT EXCHANGER</u>
Acetic .....	Fluoropolymer, Hastelloy C®, or Zirconium	Cobalt Plating .....	316 Stainless Steel
Actane 70, 80 .....	Fluoropolymer	Cobra Etch .....	Fluoropolymer
Actane Salt .....	Fluoropolymer	Copper Acid .....	Fluoropolymer
Acid Sulfate .....	Fluoropolymer	Copper Bright Acid .....	Fluoropolymer
Alcorite .....	Fluoropolymer	Copper Cyanide .....	316 Stainless Steel
Alkaline Cleaners (Electrified).....	316 Stainless Steel	Copper Fluoborate .....	Fluoropolymer
Alkaline Soaking Cleaners .....	316 Stainless Steel	Copper Pyrophosphate .....	316 Stainless Steel
Alodine (most formulas) .....	316 Stainless Steel	Copper Strike .....	316 Stainless Steel
Alstan .....	316 Stainless Steel	Copper Sulfate .....	Fluoropolymer
Aluminum Bright Dip .....	Fluoropolymer	Cyanide .....	316 Stainless Steel
Aluminum Cleaners .....	316 Stainless Steel	Deionized Water .....	316 Stainless Steel or Titanium
Aluminum Chloride .....	Fluoropolymer	Deoxidizer (Etching) .....	Fluoropolymer
Aluminum Sulfate .....	316 Stainless Steel	Deoxidizer Non-Chromated .....	316 Stainless Steel
Ammonia .....	316 Stainless Steel	Dichromic Seal .....	Steel
Ammonia Persulfate .....	Fluoropolymer	Diethylene Glycol .....	316 Stainless Steel
Ammonium Bi Fluoride.....	Fluoropolymer	Diversey, 511, 514 .....	Fluoropolymer
Ammonium Chloride .....	Titanium	Dow Therm .....	316 Stainless Steel
Ammonium Nitrate .....	316 Stainless Steel or Tantalum	Dye Solutions .....	316 Stainless Steel
Anodizing (Aluminum).....	Fluoropolymer	Ebonal C .....	Titanium
ARP 28, 80 Blackening Salts.....	Fluoropolymer	Electroless Copper .....	Fluoropolymer
Arsenic .....	316 Stainless Steel	Electroless Nickel .....	Fluoropolymer or Titanium
Barium Chloride .....	Titanium	Electroless Tin (Acid) .....	Fluoropolymer
Benzoic Acid .....	Titanium	Electroless Tin (Alkaline) .....	316 Stainless Steel
Black Nickel .....	Fluoropolymer	Electro Cleaner .....	316 Stainless Steel
Black Oxide (Hi-Temp) .....	316 Stainless Steel	Electro Polishing .....	Fluoropolymer
Black Oxide (Low-Temp) .....	Titanium	Enthone 80 Acid .....	Fluoropolymer
Bonderizing .....	316 Stainless Steel	Ethylene Glycol .....	Steel
Boric Acid .....	Titanium	Ferric Ammonium Oxide .....	316 Stainless Steel
Brass Cyanide .....	316 Stainless Steel	Ferric Chloride .....	Fluoropolymer or Titanium
Bright Nickel .....	Fluoropolymer or Titanium	Ferric Nitrate .....	316 Stainless Steel or Titanium
Bright Copper Cyanide .....	316 Stainless Steel	Ferric Sulfate .....	316 Stainless Steel or Titanium
Bronze (Alkaline).....	316 Stainless Steel	Fluoborate .....	Fluoropolymer
Brown Oxide .....	Titanium	Formic Acid .....	316 Stainless Steel
Burnite .....	Fluoropolymer	Glycerol .....	316 Stainless Steel
Butyric Acid .....	Titanium	Immersion Gold .....	316 Stainless Steel
Cadmium Black .....	Fluoropolymer	Gold-Acid .....	Fluoropolymer or Titanium
Cadmium (Alkaline) .....	316 Stainless Steel	Gold Cyanide .....	316 Stainless Steel
Cadmium Fluoborate .....	Fluoropolymer	Grey Nickel .....	Fluoropolymer or Titanium
Calcium Chloride .....	Titanium or Zirconium	Hot Seal Dichromate .....	316 Stainless Steel
Calcium Hypochlorite .....	Titanium	Hydrochloric Acid .....	Fluoropolymer or Tantalum
Carbonic Acid .....	Titanium	Hydrofluoric Acid .....	Fluoropolymer
Caustic Etch .....	Steel	Hydrogen Peroxide .....	Fluoropolymer or Titanium
Caustics .....	Steel	Indium .....	Fluoropolymer
Caustics (highly concentrated 20% and over) .....	Steel	Iridite (4-75,4-73,14,14-2,14-9).....	316 Stainless Steel
Chlorine/Wet .....	Fluoropolymer	Iridite (1,2,3,4-C,7,8,15) .....	Fluoropolymer
Chloride .....	Fluoropolymer or Titanium	Iron Fluoborate .....	Fluoropolymer
Chlorosulfuric Acid .....	Titanium	Iron Phosphate .....	316 Stainless Steel
Chromic Anodizing .....	Fluoropolymer	Isoprep (186,187,188) .....	316 Stainless Steel
Chromic Acetate .....	Fluoropolymer	Isoprep Acid Salts .....	Fluoropolymer
Chromic Nickel .....	Fluoropolymer	Jetal .....	316 Stainless Steel
Chromium (No Fluorides) .....	Fluoropolymer or Titanium	Lead Acetate .....	316 Stainless Steel
Chromium (Fluoride) .....	Columbium or Fluoropolymer	Lime Saturated Water (Alkaline) .....	316 Stainless Steel
Citric Acid .....	Titanium	Linseed Oil .....	316 Stainless Steel
Clear Chromate .....	Fluoropolymer	Magnesium Hydroxide .....	316 Stainless Steel
Cobalt Nickel .....	Fluoropolymer or Titanium	Magnesium Nitrate .....	Fluoropolymer

<u>SOLUTION</u>	<u>TYPE OF HEAT EXCHANGER</u>
Manganese Phosphate .....	316 Stainless Steel
McDermid 629 .....	Fluoropolymer
Mercuric Chloride .....	Titanium
Muriatic Acid .....	Fluoropolymer or Tantalum
Nickel (Plating Solution) (Watts) .....	Fluoropolymer or Titanium
Nickel Acetate Seal .....	316 Stainless Steel
Nickel Chloride .....	Titanium
Nitric Acid .....	Fluoropolymer or Zirconium
Nitric Hydrochloric Acids .....	Fluoropolymer
Nitric Phosphoric .....	Fluoropolymer
Oil .....	Steel
Oleic Acid .....	Fluoropolymer
Oxalic Acid .....	Fluoropolymer
Paint Stripper (Alkaline) .....	316 Stainless Steel
Perchlorethylene .....	316 Stainless Steel
Phosphoric Acid (No Fluoride) .....	Fluoropolymer or Tantalum
Phosphate Cleaner .....	316 Stainless Steel
Phosphate .....	316 Stainless Steel
Potassium Acid Sulfate .....	Fluoropolymer
Potassium Cyanide .....	316 Stainless Steel
Potassium Hydroxide .....	316 Stainless Steel
Potassium Hydrochloric .....	Fluoropolymer
Potassium Permanganate .....	Fluoropolymer or Titanium
Rhodium .....	Fluoropolymer
Rochelle Salt Cyanide .....	316 Stainless Steel
Ruthenium Plating.....	Fluoropolymer
Salt (Actine) .....	Fluoropolymer
Sea Water .....	Titanium or Zirconium
Silver Bromide .....	316 Stainless Steel
Silver Cyanide .....	316 Stainless Steel
Silver Lume .....	316 Stainless Steel
Silver Nitrate .....	316 Stainless Steel
Sodium Bisulfate .....	Fluoropolymer
Sodium Carbonate .....	Titanium

<u>SOLUTION</u>	<u>TYPE OF HEAT EXCHANGER</u>
Sodium Chlorate .....	Titanium
Sodium Chloride .....	Titanium
Sodium Cyanide .....	316 Stainless Steel
Sodium Dichromate (Hot Seal) .....	316 Stainless Steel
Sodium Hydroxide .....	Steel
Sodium Hypochlorite .....	Fluoropolymer
Sodium Persulfate .....	Fluoropolymer
Stannate .....	Steel
Stanostar .....	Fluoropolymer
Stearic Acid .....	Fluoropolymer
Sulfamate Nickel .....	Fluoropolymer or Titanium
Sulfur .....	Fluoropolymer
Sulfur Peroxide .....	Fluoropolymer
Sulfuric Acid .....	Fluoropolymer
Sulphamic Acid .....	Fluoropolymer
Tannic Acid .....	Titanium
Tin Nickel .....	Fluoropolymer
Tin Plating (Acid)(Stanus/Sulphate) .....	Fluoropolymer
Tin Plating Acid (Fluoborate) .....	Fluoropolymer
Tin Plating (Alkaline) .....	316 Stainless Steel
Trichlorethylene .....	316 Stainless Steel
Trioxide (Pickle) .....	Fluoropolymer
Turco (4181, 4338) .....	316 Stainless Steel
Unichrome .....	Fluoropolymer
Water .....	316 Stainless Steel
Wood's Nickel Strike .....	Fluoropolymer or Titanium
Yellow Dichromate .....	Fluoropolymer
Zinc Acid .....	Fluoropolymer or Titanium
Zinc Ammonium Chloride .....	Fluoropolymer or Titanium
Zinc Cyanide .....	316 Stainless Steel
Zinc Phosphate .....	316 Stainless Steel
Zinc Phosphate (Fluoride).....	Fluoropolymer
Zincate .....	316 Stainless Steel

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**PLEASE ENSURE APPLICABILITY OF HEAT EXCHANGER BEFORE INSTALLATION SINCE WE CANNOT GUARANTEE HEAT EXCHANGERS AGAINST PREMATURE FAILURE DUE TO CORROSION OR CHEMICAL DESTRUCTION CAUSED BY UNUSUAL CONDITIONS OVER WHICH WE HAVE NO CONTROL, SUCH AS:**

- ◆ Excessively high solution temperatures.
- ◆ The concentration of the solution.
- ◆ The presence of inhibitors.
- ◆ The presence of other acids causing a secondary reaction.
- ◆ Stray electrical currents.
- ◆ Flux floating on the surface.
- ◆ The presence of dissolved gases.
- ◆ Excessive sludge build-up.
- ◆ Stagnant or turbulent flow of the solution.
- ◆ Aeration.
- ◆ Presence of oxygen or an oxidizing agent in the solution.
- ◆ Erosion.
- ◆ High pressures.
- ◆ Vacuum conditions.



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