



Immersion Heater Solution Guide

<u>SOLUTION</u>	<u>TYPE OF HEATER</u>	<u>SOLUTION</u>	<u>TYPE OF HEATER</u>
Acetic Acid.....	PTFE* or Quartz	Cobalt Plating	304 Stainless Steel
Actane 70, 80	PTFE*	Cobra Etch	PTFE*
Actane Salt	PTFE*	Copper Acid	PTFE* or Quartz
Acid Sulfate	PTFE* or Quartz	Copper Bright Acid	PTFE* or Quartz
Alcorite	PTFE* or Quartz	Copper Cyanide	304 Stainless Steel
Alkaline Cleaners (Electrified).....	304 Stainless Steel	Copper Fluoborate	PTFE*
Alkaline Soaking Cleaners	304 Stainless Steel	Copper Pyrophosphate	304 Stainless Steel
Alodine (most formulas)	316 Stainless Steel	Copper Strike	304 Stainless Steel
Alstan	304 Stainless Steel	Copper Sulfate	PTFE* or Quartz
Aluminum Bright Dip	PTFE* or Quartz	Cyanide	304 Stainless Steel
Aluminum Cleaners	304 Stainless Steel	Deionized Water	316 Stainless Steel or Titanium
Aluminum Chloride	PTFE* or Quartz	Deoxidizer (Etching)	PTFE* or Quartz
Aluminum Sulfate	304 Stainless Steel	Deoxidizer Non-Chromated	316 Stainless Steel
Ammonia	304 Stainless Steel	Dichromic Seal	Steel
Ammonia Persulfate	PTFE* or Quartz	Diethylene Glycol	304 Stainless Steel
Ammonium Bi Fluoride.....	PTFE*	Diversey, 511, 514	PTFE*
Ammonium Chloride	Titanium	Dow Therm	316 Stainless Steel
Ammonium Nitrate	316 Stainless Steel	Dye Solutions	304 Stainless Steel
Anodizing (Aluminum).....	PTFE* or Quartz	Ebonal C	Titanium
ARP 28, 80 Blackening Salts.....	PTFE* or Quartz	Electroless Copper	PTFE*
Arsenic	304 Stainless Steel	Electroless Nickel	PTFE* or Titanium
Barium Chloride	Quartz or Titanium	Electroless Tin (Acid)	PTFE* or Quartz
Benzoic Acid	Titanium	Electroless Tin (Alkaline)	316 Stainless Steel
Black Nickel	PTFE* or Quartz	Electro Cleaner	304 Stainless Steel
Black Oxide (Hi-Temp)	304 Stainless Steel	Electro Polishing	PTFE* or Quartz
Black Oxide (Low-Temp)	Titanium	Ethone 80 Acid	PTFE*
Bonderizing	316 Stainless Steel	Ethylene Glycol	Steel
Boric Acid	Titanium	Ferric Ammonium Oxide	316 Stainless Steel
Brass Cyanide	304 Stainless Steel	Ferric Chloride	PTFE*, Quartz, or Titanium
Bright Nickel	PTFE*, Quartz, or Titanium	Ferric Nitrate	304 Stainless Steel
Bright Copper Cyanide	304 Stainless Steel	Ferric Sulfate	304 Stainless Steel
Bronze (Alkaline).....	304 Stainless Steel	Fluoborate	PTFE*
Brown Oxide	Titanium	Formic Acid	316 Stainless Steel
Burnite	PTFE* or Quartz	Glycerol	304 Stainless Steel
Butyric Acid	Titanium	Immersion Gold	304 Stainless Steel
Cadmium Black	PTFE* or Quartz	Gold-Acid	PTFE*, Quartz, or Titanium
Cadmium (Alkaline)	304 Stainless Steel	Gold Cyanide	304 Stainless Steel
Cadmium Fluoborate	PTFE*	Grey Nickel	PTFE*, Quartz, or Titanium
Calcium Chloride	Titanium	Hot Seal Dichromate	316 Stainless Steel
Calcium Hypochlorite	Titanium	Hydrochloric Acid	PTFE* or Quartz
Carbonic Acid	Titanium	Hydrofluoric Acid	PTFE*
Caustic Etch	Steel	Hydrogen Peroxide	PTFE* or Quartz
Caustics	Steel	Indium	PTFE* or Quartz
Caustics (highly concentrated 20% and over)	Steel	Iridite (4-75,4-73,14,14-2,14-9).....	316 Stainless Steel
Chlorine/Wet	PTFE* or Quartz	Iridite (1,2,3,4-C,7,8,15)	PTFE* or Quartz
Chloride	PTFE*, Quartz or Titanium	Iron Fluoborate	PTFE*
Chlorosulfuric Acid	Titanium	Iron Phosphate	316 Stainless Steel
Chromic Anodizing	PTFE* or Quartz	Isoprep (186,187,188)	316 Stainless Steel
Chromic Acetate	PTFE* or Quartz	Isoprep Acid Salts	PTFE*
Chromic Nickel	PTFE* or Quartz	Jetal	304 Stainless Steel
Chromium (No Fluorides)	PTFE*, Quartz, or Titanium	Lead Acetate	304 Stainless Steel
Chromium (Fluoride)	PTFE*	Lime Saturated Water (Alkaline)	316 Stainless Steel
Citric Acid	Titanium	Linseed Oil	304 Stainless Steel
Clear Chromate	PTFE* or Quartz	Magnesium Hydroxide	304 Stainless Steel
Cobalt Nickel	PTFE*, Quartz, or Titanium	Magnesium Nitrate	PTFE* or Quartz

Solutions requiring derated heaters are indicated by red, bold, italicized type. *PTFE is a polytetrafluoroethylene fluoropolymer.

SOLUTION	TYPE OF HEATER
Manganese Phosphate	316 Stainless Steel
McDermid 629	PTFE*
Mercuric Chloride	Titanium
Muriatic Acid	PTFE* or Quartz
Nickel (Plating Solution) (Watts)	PTFE*, Quartz, or Titanium
Nickel Acetate Seal	316 Stainless Steel
Nickel Chloride	Titanium
Nitric Acid	PTFE* or Quartz
Nitric Hydrochloric Acids	PTFE* or Quartz
Nitric Phosphoric	Quartz
Oil	Steel
Oleic Acid	PTFE* or Quartz
Oxalic Acid	PTFE* or Quartz
Paint Stripper (Alkaline)	304 Stainless Steel
Perchloroethylene	316 Stainless Steel
Phosphoric Acid (No Fluoride)	PTFE* or Quartz
Phosphate Cleaner	304 Stainless Steel
Phosphate	316 Stainless Steel
Potassium Acid Sulfate	PTFE* or Quartz
Potassium Cyanide	304 Stainless Steel
Potassium Hydroxide	304 Stainless Steel
Potassium Hydrochloric	PTFE* or Quartz
Potassium Permanganate	PTFE* or Titanium
Rhodium	PTFE* or Quartz
Rochelle Salt Cyanide	304 Stainless Steel
Ruthenium Plating.....	PTFE* or Quartz
Salt (Actine)	PTFE*
Sea Water	Titanium
Silver Bromide	316 Stainless Steel
Silver Cyanide	304 Stainless Steel
Silver Lume	304 Stainless Steel
Silver Nitrate	316 Stainless Steel
Sodium Bisulfate	PTFE* or Quartz
Sodium Carbonate	Titanium

SOLUTION	TYPE OF HEATER
Sodium Chlorate	Titanium
Sodium Chloride	Titanium
Sodium Cyanide	304 Stainless Steel
Sodium Dichromate (Hot Seal)	316 Stainless Steel
Sodium Hydroxide	Steel
Sodium Hypochlorite	PTFE*
Sodium Persulfate	PTFE* or Quartz
Stannate	Steel
Stanostar	PTFE* or Quartz
Stearic Acid	Quartz
Sulfamate Nickel	PTFE*, Quartz, or Titanium
Sulfur	PTFE* or Quartz
Sulfur Peroxide	PTFE* or Quartz
Sulfuric Acid	PTFE* or Quartz
Sulphamic Acid	PTFE* or Quartz
Tannic Acid	Titanium
Tin Nickel	PTFE*
Tin Plating (Acid)(Stanus/Sulphate)	PTFE* or Quartz
Tin Plating Acid (Fluoborate)	PTFE*
Tin Plating (Alkaline)	304 Stainless Steel
Trichlorethylene	316 Stainless Steel
Trioxide (Pickle)	PTFE* or Quartz
Turco (4181, 4338)	316 Stainless Steel
Unichrome	PTFE* or Quartz
Water	316 Stainless Steel or Quartz
Wood's Nickel Strike	PTFE*, or Quartz
Yellow Dichromate	PTFE* or Quartz
Zinc Acid	PTFE* or Titanium
Zinc Ammonium Chloride	Quartz or Titanium
Zinc Cyanide	304 Stainless Steel
Zinc Phosphate	316 Stainless Steel
Zinc Phosphate (Fluoride).....	PTFE
Zincate	304 Stainless Steel

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PLEASE ENSURE APPLICABILITY OF HEATER BEFORE INSTALLATION SINCE WE CANNOT GUARANTEE HEATERS 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.

