

### Chemical Compatibility Guide

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



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Isoprep Acid Salts	PTFE	Silver Lume	304 Stainless Steel
Jetal	304 Stainless Steel	Silver Nitrate	316 Stainless Steel
Lead Acetate	304 Stainless Steel	Sodium Bisulfate	PTFE or Quartz
<b>Lime Saturated Water (Alkaline)</b>	<b>316 Stainless Steel</b>	Sodium Carbonate	Titanium
Linseed Oil	304 Stainless Steel	Sodium Chlorate	Titanium
<b>Magnesium Hydroxide</b>	<b>304 Stainless Steel</b>	Sodium Chloride	Titanium
Magnesium Nitrate	PTFE or Quartz	Sodium Cyanide	304 Stainless Steel
<b>Manganese Phosphate</b>	<b>316 Stainless Steel</b>	Sodium Dichromate (Hot Seal)	316 Stainless Steel
McDermid 629	PTFE	Sodium Hydroxide	Steel
Mercuric Chloride	Titanium	Sodium Hypochlorite	PTFE
Muriatic Acid	PTFE or Quartz	Sodium Persulfate	PTFE or Quartz
Nickel (Plating Solution) (Watts)	PTFE, Quartz or Titanium	Stannate	Steel
Nickel Acetate Seal	316 Stainless Steel	Stanostar	PTFE or Quartz
Nickel Chloride	Titanium	Stearic Acid	Quartz
Nitric Acid	PTFE or Quartz	Sulfamate Nickel	PTFE, Quartz or Titanium
Nitric Hydrochloric Acids	PTFE or Quartz	Sulfur	PTFE or Quartz
<b>Nitric Phosphoric</b>	<b>Quartz</b>	Sulfur Peroxide	PTFE or Quartz
<b>Oil</b>	<b>Steel</b>	Sulfuric Acid	PTFE or Quartz
Oleic Acid	PTFE or Quartz	Sulphamic Acid	PTFE or Quartz
Oxalic Acid	PTFE or Quartz	Tannic Acid	Titanium
<b>Paint Stripper (Alkaline)</b>	<b>304 Stainless Steel</b>	Tin Nickel	PTFE
<b>Perchlorethylene</b>	<b>316 Stainless Steel</b>	Tin Plating (Acid) (Fluoborate)	PTFE
<b>Phosphate</b>	<b>316 Stainless Steel</b>	Tin Plating (Acid) (Stanus/Sulphate)	PTFE or Quartz
<b>Phosphate Cleaner</b>	<b>304 Stainless Steel</b>	Tin Plating (Alkaline)	304 Stainless Steel
<b>Phosphoric Acid (No Fluoride)</b>	<b>PTFE or Quartz</b>	<b>Trichlorethylene</b>	<b>316 Stainless Steel</b>
Potassium Acid Sulfate	PTFE or Quartz	Trioxide (Pickle)	PTFE or Quartz
Potassium Cyanide	304 Stainless Steel	<b>Turco (4181, 4338)</b>	<b>316 Stainless Steel</b>
Potassium Hydrochloric	PTFE or Quartz	Unichrome	PTFE or Quartz
Potassium Hydroxide	304 Stainless Steel	Water	316 Stainless Steel or Quartz
<b>Potassium Permanganate</b>	<b>PTFE or Titanium</b>	Wood's Nickel Strike	PTFE, Quartz or Titanium
Rhodium	PTFE or Quartz	Yellow Dichromate	PTFE or Quartz
Rochelle Salt Cyanide	304 Stainless Steel	Zinc Acid	PTFE or Titanium
Ruthenium	PTFE or Quartz	Zinc Ammonium Chloride	Quartz or Titanium
Salt (Actine)	PTFE	Zinc Cyanide	304 Stainless Steel
Sea Water	Titanium	<b>Zinc Phosphate</b>	<b>316 Stainless Steel</b>
Silver Bromide	316 Stainless Steel	Zinc Phosphate (Fluoride)	PTFE
Silver Cyanide	304 Stainless Steel	Zincate	304 Stainless Steel

Solutions requiring derated heaters are indicated in red type.

PTFE is the abbreviation for PolyTetraFluoroEthylene.



**Note:** The data listed is provided as a reference and is offered as a guide only. It is not intended to be used as the sole basis of design or to establish specification limits. **Tempco Electric Heater Corporation** assumes no obligation or liability for any advice furnished by it or for results obtained from its use. Due to the complexities of solutions and applications, it is the customer's responsibility to contact their chemical supplier for heater material compatibility and recommendations. Ultimate responsibility lies with the user.

**Do not use electric immersion heaters to heat flammable solutions!**



Please insure 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 buildup
- Aeration
- Stagnant or turbulent flow of the solution
- Presence of oxygen or an oxidizing agent in the solution
- Erosion
- High Pressures or Vacuum Conditions