SYNHEAT

Manufacturer of Electric Heating Elements and Controls

Over The Side Immersion Heaters

Over the Side Heaters are used in applications where drilling a hole into the tank wall is not possible or desirable. The heater can be installed resting at the bottom of the tank or hanging from the lip. Over the side heaters are available in a variety of sizes, materials and configurations The heating elements are offered in a number of materials suited to a variety of fluid heating applications. Terminal housings are available for indoor and outdoor (weather-proof) environments. Many options are available including thermostats, high limit and process thermocouples or RTD sensors. We can custom made to order a large selection of sizes and configurations as per your requirements. Please contact us for assistance with your application.

OPTIONAL CONSTRUCTION

Single Element Design L-Shape Immersion Teflon Heater

3 Element Design L-Shape Tubular Immersion Heater

Single Tube L-Shape Immersion Heater

Single Tube Vertical Immersion Heater

3 Tube Vertical Immersion Heater

L-Shape 3 Tube Horizontal Immersion Heater

Over The Side Semi-Band Tubular Immersion Heater

6 Element Vertical Teflon Immersion Heater

Spiral Coil Vertical Teflon Immersion Heater

Over the side immersion heater

Over the side ceramic immersion heaters are mainly used for heating of chemical baths an liquids in different types of vessels.

Over the side ceramic immersion heaters consist of ceramic elements mounted in tubes of porcelain, acid-proof steel, steel, titanium or quartz glass. The heater has a optional terminal box of protection class IP55 and supply cord.

As an alternative, over the side immersion heaters can be made of tubular heating elements in acid-proof steel and an adjustable thermostat.

Application fields:

- Different types of baths
- Electrical water heater

Standard product range

Tube from steel stainless

Non-Heating Zone 150 mm. Diameter 2”
1500 mm with flexible connection cable.

Power W	Voltage V	Insertion-length mm
1000	240 or 415	280
2000	240 or 415	430
3000	240 or 415	590
4000	240 or 415	740
5000	240 or 415	900
6000	240 or 415	1020
9000	240 or 415	1380
12000	240 or 415	1750

Three Tube from stainless steel

Non-Heating Zone 150 mm. Diameter 2”
1500 mm with flexible connection cable

Power W	Voltage V	Insertion-length mm
3000	240 or 415	280
6000	240 or 415	430
9000	240 or 415	590
12000	240 or 415	740
15000	240 or 415	900
18000	240 or 415	1020
24000	240 or 415	1200

3 Element Stainless Steel Immersion Heaters

Non-Heating Zone 150 mm. Diameter 11.2mm
1500 mm with flexible connection cable.

Power W	Voltage V	Insertion-length mm
1000	240 or 415	300
2000	240 or 415	370
3000	240 or 415	450
4000	240 or 415	530
5000	240 or 415	620
6000	240 or 415	720
9000	240 or 415	1000
12000	240 or 415	1300

6 Element Stainless Steel Immersion Heaters

Non-Heating Zone 150 mm. Diameter 2”
1500 mm with flexible connection cable.

Power W	Voltage V	Insertion-length mm
3000	240 or 415	300
6000	240 or 415	430
9000	240 or 415	580
12000	240 or 415	730
15000	240 or 415	880
18000	240 or 415	1000
24000	240 or 415	1260
27000	240 or 415	1450

3 Element Teflon Insulated Immersion Heaters

Non-Heating Zone 150 mm. Diameter 13mm
1500 mm with flexible connection cable.

Power W	Voltage V	Insertion-length mm
3000	240 or 415	1000
6000	240 or 415	2000
7500	240 or 415	2200

6 **Element Teflon Insulated Immersion Heaters**

Non-Heating Zone 150 mm. Diameter 13mm
1500 mm with flexible connection cable

Power W	Voltage V	Insertion-length mm
3000	240 or 415	600
6000	240 or 415	900
9000	240 or 415	1280
12000	240 or 415	1600
15000	240 or 415	1850
18000	240 or 415	2200

Determining Specific Heating Requirements for Electric Heaters

To determine the heating requirement of a tank, first obtain the following information:

1. **Total cubic feet of tank**. (Multiply the inside dimensions of the tank - depth x width x length.)
2. **Total gallons of solution**. (Multiply by 7.48 the cubic feet of the tank occupied by the solution. *If the solution is normally 6" below the top of the tank, allow this when figuring*.)
3. **Average ambient (room) temperature** at which the tank will be used.
4. **Temperature level** at which the solution is to be held.
5. **Heat up time desired**.

After this information is known, the following calculations can be made:

Formula: $\frac{A \times 1.0^{*} \times 8.35^{**} \times B}{3412 \times C} = K$

$D \times E = W$

* Specific heat of water. Insert specific heat of your solution here.
**Weight of water. Insert specific weight of your solution here.

A = Total gallons of solution.
B = Difference between ambient temperature and desired solution temperature.

C = Desired heat-up time (hours).
D = Heat loss of tank - refer to the chart below.
E = Square feet of top of tank (multiply *length x width*).

Add the results of both calculations. The total is the Kilowatt requirement of the tank.

K + W = KW

Sample Problem

Tank Specifications:

- Dimensions: 4' deep x 3' wide x 5' long *or* 448 gallons
- Operating Temperature: 160°
- Heat-Up Time: 6 hours

Assume tank heat-up to be from room temperature (70°F to 160°F).

Initial Heat-Up Formula Application

$$\frac{448 \text{ gallons} \times 1.0 \times 8.35 \times 90}{3412 \times 6 \text{ hours}} = \frac{336672}{20472} = 16\text{KW}$$

Surface Loss Calculation:

15 sq. ft. (surface area) x .34 (open tank surface loss factor) = 5KW
Total KW needed = 16KW + 5KW = **21KW**

IMMERSION HEATER SOLUTION GUIDE

SOLUTION TYPE OF HEATER

Acetic ..... PTFE* or Quartz
Actane 70, 80 ..... PTFE*
Actane Salt ..... PTFE*
Acid Sulfate ..... PTFE* or Quartz
Alcorite ..... PTFE* or Quartz
Alkaline Cleaners (Electrified)..... 304 St. Steel
Alkaline Soaking Cleaners ..... 304 St. Steel
Alodine (most formulas) ..... 316 St. Steel
Alstan ..... 304 St. Steel
Aluminum Bright Dip ..... PTFE* or Quartz
Aluminum Cleaners ..... 304 St. Steel
Aluminum Chloride ..... PTFE* or Quartz
Aluminum Sulfate ..... 304 St. Steel
Ammonia ..... 304 St. Steel
Ammonia Persulfate ..... PTFE* or Quartz
Ammonium Bi Fluoride..... PTFE*
Ammonium Chloride ..... Titanium
Ammonium Nitrate ..... 316 St. Steel
Anodizing (Aluminum) .....PTFE* or Quartz
ARP 28, 80 Blackening Salts.. PTFE* or Quartz
Arsenic ..... 304 St. Steel
Barium Chloride ..... Quartz or Titanium
Benzoic Acid ..... Titanium
Black Nickel ..... PTFE* or Quartz
Black Oxide (Hi-Temp) ..... 304 St. Steel
Black Oxide (Low-Temp) ..... Titanium
Bonderizing ..... 316 St. Steel
Boric Acid ..... Titanium
Brass Cyanide ..... 304 St. Steel
Bright Nickel ..... PTFE*, Quartz, Titanium
Bright Copper Cyanide ..... 304 St. Steel
Bronze ..... 304 St. Steel
Brown Oxide ..... Titanium
Burnite ..... PTFE* or Quartz
Butyric Acid ..... Titanium
Cadmium Black ..... PTFE* or Quartz
Cadmium (Alkaline) ..... 304 St. Steel
Cadmium Fluoborate ..... PTFE*
Calcium Chloride ..... Titanium
Calcium Hypochlorite ..... Titanium
Carbonic Acid ..... Titanium
Caustic Etch ..... Steel
Caustics ..... Steel
Caustics (highly concentrated 20% and over)..... Steel
Chlorine/Wet ..... PTFE* or Quartz
Chloride ..... PTFE*, Quartz or Titanium

Chlorosulfuric Acid ..... Titanium
Chromic Anodizing ..... PTFE* or Quartz
Chromic Acetate ..... PTFE* or Quartz
Chromic Nickel ..... PTFE* or Quartz
Chromium(No Fluorides) PTFE*,Quartz,Titanium
Chromium (Fluoride) ..... PTFE*
Citric Acid ..... Titanium
Clear Chromate ..... PTFE* or Quartz
Cobalt Nickel ..... PTFE*, Quartz, Titanium
Cobalt Plating ..... 304 St. Steel
Cobra Etch ..... PTFE*
Copper Acid ..... PTFE* or Quartz

SOLUTION TYPE OF HEATER

Copper Bright Acid ..... PTFE* or Quartz
Copper Cyanide ..... 304 St. Steel
Copper Fluoborate ..... PTFE*
Copper Pyrophosphate ..... 304 St. Steel
Copper Strike ..... 304 St. Steel
Copper Sulfate ..... PTFE* or Quartz
Cyanide ..... 304 St. Steel
Deionized Water ..... 316 St. Steel or Titanium
Deoxidizer (Etching) ..... Quartz
Deoxidizer Non-Chromated ..... 316 St. Steel
Dichromic Seal .....316 St. Steel
Diethylene Glycol ..... 304 St. Steel
Diversey, 511, 514 ..... PTFE*
Dow Therm ..... 316 St. Steel
Dye Solutions ..... 304 St. Steel
Ebonal C ..... Titanium
Electroless Copper ..... PTFE*
Electroless Nickel ..... PTFE or Titanium*
Electroless Tin (Acid) ..... PTFE* or Quartz
Electroless Tin (Alkaline) ..... 316 St. Steel
Electro Cleaner ..... 304 St. Steel
Electro Polishing ..... PTFE* or Quartz
Enthone 80 Acid ..... PTFE*
Ethylene Glycol ..... Steel
Ferric Nitrate ..... 304 St. Steel
Ferric Sulfate ..... 304 St. Steel
Ferric Ammonium Oxide ..... 316 St. Steel
Ferric Chloride ..... PTFE*, Quartz, Titanium
Fluborate ..... PTFE*
Formic Acid ..... 316 St. Steel
Glycerol ..... 304 St. Steel
Immersion Gold ..... 304 St. Steel
Gold-Acid ..... PTFE*, Quartz, Titanium
Gold Cyanide ..... 304 St. Steel
Grey Nickel ..... PTFE*, Quartz, Titanium
Hot Seal Dichromate ..... 316 St. Steel
Hydrogen Peroxide ..... PTFE or Quartz*

Hydrochloric Acid ..... PTFE* or Quartz
Hydrofluoric Acid ..... PTFE*
Indium ..... PTFE* or Quartz
Iridite (4-75,4-73,14,14-2,14-9). 316 St. Steel
Iridite (1,2,3,4-C,7,8,15) ..... PTFE* or Quartz
Iron Fluoborate ..... PTFE*
Iron Phosphate ..... 316 St. Steel
Isoprep (186,187,188) ..... 316 St. Steel
Isoprep Acid Salts ..... PTFE*
Jetal ..... 304 St. Steel
Lead Acetate ..... 304 St. Steel
Lime Saturated Water (Alkaline) ..... 316 St. Steel
Linseed Oil ..... 304 St. Steel
Magnesium Hydroxide ..... 304 St. Steel
Magnesium Nitrate ..... PTFE* or Quartz
Manganese Phosphate ..... 316 St. Steel
McDermid 629 ..... PTFE*
Mercuric Chloride ..... Titanium
Muriatic Acid ..... PTFE* or Quartz
Nickel (Plating Solution)
(Watts) ..... PTFE*, Quartz, Titanium
Nickel Acetate Seal ..... 316 St. Steel
Nickel Chloride ..... Titanium
SOLUTION TYPE OF HEATER
Nitric Acid ..... PTFE* or Quartz
Nitric Hydrochloric Acids .... PTFE* or Quartz
Nitric Phosphoric ..... Quartz
Oil ..... Steel
Oleic Acid ..... PTFE* or Quartz
Paint Stripper (Alkaline) ..... 304 St. Steel
Perchlorethylene ..... 316 St. Steel
Phosphoric Acid (No Fluoride) ... PTFE or Quartz*
Phosphate Cleaner ..... 304 St. Steel
Phosphate ..... 316 St. Steel
Potassium Acid Sulfate ..... PTFE* or Quartz
Potassium Cyanide ..... 304 St. Steel
Potassium Hydroxide ..... 304 St. Steel
Potassium Hydrochloric ..... PTFE* or Quartz
Potassium Permanganate ..... PTFE or Titanium*
Rhodium ..... PTFE* or Quartz
Rochelle Salt Cyanide ..... 304 St. Steel
Ruthenium ..... PTFE* or Quartz
Salt (Actine) ..... PTFE*
Sea Water ..... Titanium
Silver Bromide ..... 316 St. Steel
Silver Cyanide ..... 304 St. Steel
Silver Lume ..... 304 St. Steel
Silver Nitrate ..... 316 St. Steel
Sodium Bisulfate ..... PTFE* or Quartz
Sodium Carbonate ..... Titanium

Sodium Chlorate ..... Titanium
Sodium Chloride ..... Titanium
Sodium Cyanide ..... 304 St. Steel
Sodium Dichromate (Hot Seal) ... 316 St. 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, Titanium
Sulfur ..... PTFE* or Quartz
Sulfuric Acid ..... PTFE* or Quartz
Sulfur Peroxide ..... 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 (Fluborate) ..... PTFE*
Tin Plating (Alkaline) ..... 304 St. Steel
Trichlorethylene ..... 316 St. Steel
Trioxide (Pickle) ..... PTFE* or Quartz
Turco (4181, 4338) ..... 316 St. Steel
Unichrome ..... PTFE* or Quartz
Water ..... 316 St. Steel or Quartz
Wood's Nickel Strike .. Titanium, PTFE*,Quartz
Yellow Dichromate ..... PTFE* or Quartz
Zinc Acid ..... PTFE* or Titanium
Zinc Ammonium Chloride. Quartz or Titanium
Zinc Cyanide ..... 304 St. Steel
Zinc Phosphate ..... 316 St. Steel
Zinc Phosphate (Fluoride) ..... PTFE
Zincate ..... 304 St. Steel

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INVOLVING SOLUTION CONCENTRATIONS EXCEEDING 50%, CONSULT FACTORY FOR WATT DENSITY RECOMMENDATIONS