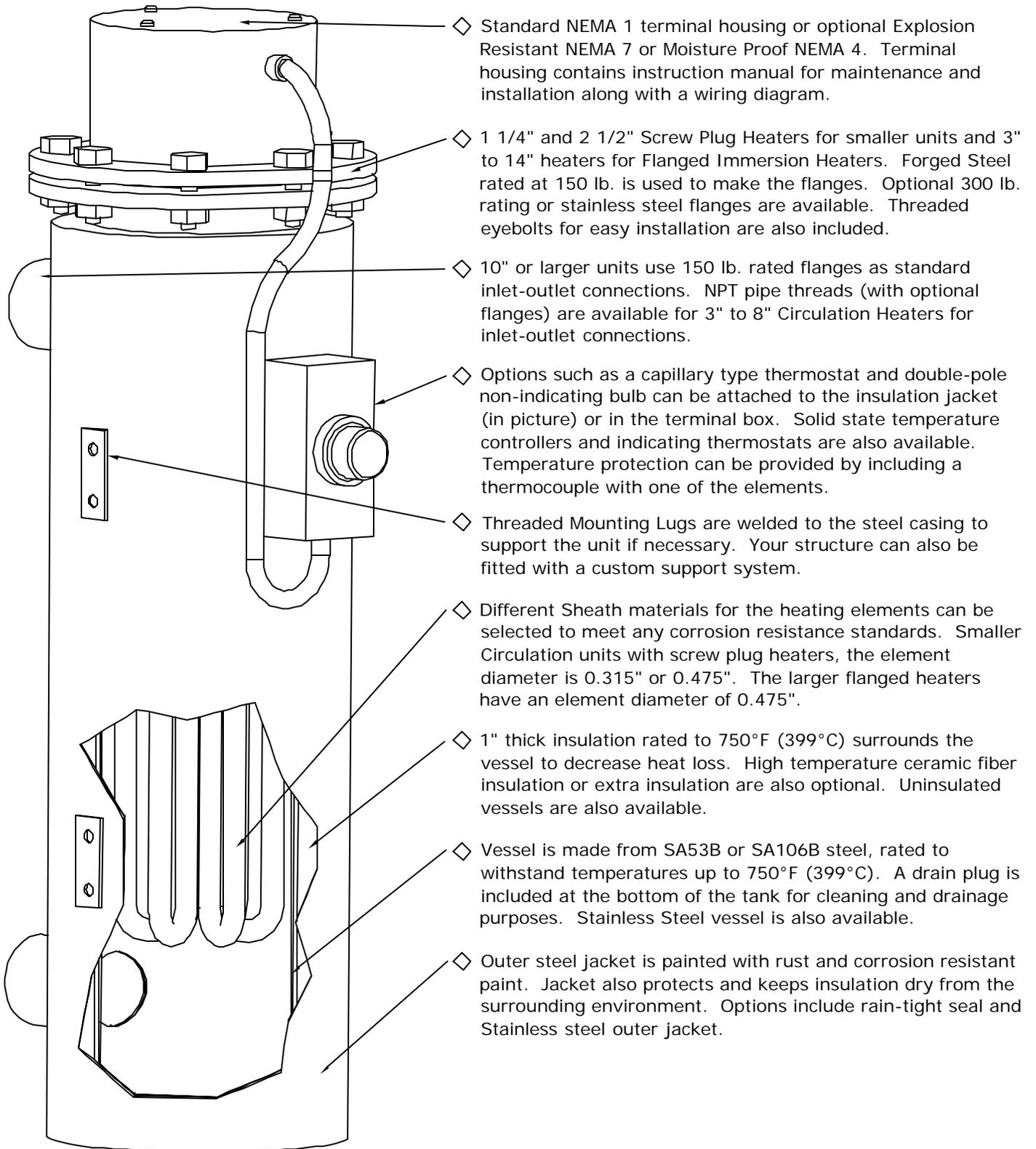


# CIRCULATION HEATERS



- ◇ Standard NEMA 1 terminal housing or optional Explosion Resistant NEMA 7 or Moisture Proof NEMA 4. Terminal housing contains instruction manual for maintenance and installation along with a wiring diagram.
- ◇ 1 1/4" and 2 1/2" Screw Plug Heaters for smaller units and 3" to 14" heaters for Flanged Immersion Heaters. Forged Steel rated at 150 lb. is used to make the flanges. Optional 300 lb. rating or stainless steel flanges are available. Threaded eyebolts for easy installation are also included.
- ◇ 10" or larger units use 150 lb. rated flanges as standard inlet-outlet connections. NPT pipe threads (with optional flanges) are available for 3" to 8" Circulation Heaters for inlet-outlet connections.
- ◇ Options such as a capillary type thermostat and double-pole non-indicating bulb can be attached to the insulation jacket (in picture) or in the terminal box. Solid state temperature controllers and indicating thermostats are also available. Temperature protection can be provided by including a thermocouple with one of the elements.
- ◇ Threaded Mounting Lugs are welded to the steel casing to support the unit if necessary. Your structure can also be fitted with a custom support system.
- ◇ Different Sheath materials for the heating elements can be selected to meet any corrosion resistance standards. Smaller Circulation units with screw plug heaters, the element diameter is 0.315" or 0.475". The larger flanged heaters have an element diameter of 0.475".
- ◇ 1" thick insulation rated to 750°F (399°C) surrounds the vessel to decrease heat loss. High temperature ceramic fiber insulation or extra insulation are also optional. Uninsulated vessels are also available.
- ◇ Vessel is made from SA53B or SA106B steel, rated to withstand temperatures up to 750°F (399°C). A drain plug is included at the bottom of the tank for cleaning and drainage purposes. Stainless Steel vessel is also available.
- ◇ Outer steel jacket is painted with rust and corrosion resistant paint. Jacket also protects and keeps insulation dry from the surrounding environment. Options include rain-tight seal and Stainless steel outer jacket.

# SELECTING THE PROPER CIRCULATION HEATER

The longevity and trouble-free service of a Circulation Heater depend on selecting proper sheath materials, watt densities, and operation temperatures.

## Standard Element Sheath Materials

**Incoloy® 800** - A Nickel (30-35%), Chromium (19-23%), Iron alloy. The high nickel content of this alloy contributes to its resistance to scaling and corrosion. Used in air heating and immersion heating of potable water and other liquids that are not corrosive to an Incoloy 800 sheath. Sheath temperatures to 1600°F (871°C).

**Low Carbon Steel** - Applications include fluid heat transfer media, tar, high to low viscosity petroleum oils, asphalt, wax, molten salt, and other solutions not corrosive to steel sheath. Sheath temperatures to 750°F (399°C).

**316 Stainless Steel** - A Chromium (16-18%), Nickel (11-14%), Iron Alloy with Molybdenum (2-3%) added to improve corrosion resistance in certain environments, especially those which would tend to cause pitting due to the presence of chlorides. Applications include deionized water. Sheath temperatures to 1200°F (649°C).

**Copper** - Mainly used in clean water heating for washrooms, showers, rinse tanks and freeze protection of storage tanks. Sheath temperatures to 350°F (177°C).

## Optional Element Sheath Materials

**304 Stainless Steel** - A Chromium (18-20%), Nickel (8-11%), Iron Alloy used in the food industry, sterilizing solutions, air heating, and many organic and inorganic chemicals. Sheath temperatures to 1200°F (649°C).

**321 Stainless Steel** - A Chromium (17-20%), Nickel (9-13%), Iron Alloy modified with the addition of titanium to prevent carbide precipitation and resulting intergranular corrosion that can take place in certain mediums when operating in the 800-1200°F (427-649°C) temperature range. Sheath temperatures to 1200°F (649°C).

## Installation

1. Flange heaters are supplied with two drilled and tapped holes for threaded eye bolts, providing ease of handling during installation and flange removal during maintenance cleaning or heater replacement.
2. Replacement of a heater is inevitable. Therefore, provided adequate space for installation, allowing ample room to remove the flange heater for cleaning or replacement.
3. In applications, requiring the circulation heater to be fed by an inline pump, install the pump at the inlet end.
4. To maintain the lowest possible temperature at the terminal box, place the outlet at the end opposite to the terminal box. If your process temperature is circulating at 450°F (232°C) or above (at the nozzle closest to the flange), stand off terminal box construction is recommended.
5. To prevent temperature and/or pressure buildup on closed loop circulation heater systems, adequate and strategically located thermocouples for temperature controllers and pressure relief valves should be installed. Never over-rate pressure relief valves beyond the pressure temperature rating of the flange being used.
6. During the process cycle, flow rate of the medium being heated should never be interrupted or reduced, thus creating and overheating condition. Excess temperature can result in damage to the medium being processed and premature heater failure.
7. Make sure that your circulation heater is being used. NEMA 1-General purpose, NEMA 4-Moisture resistant, and NEMA 7-Explosion resistant.

# SELECTING THE PROPER CIRCULATION HEATER

## Wiring

1. All heater installations must be properly earth grounded to eliminate electric shock hazard. Electrical wiring must be in accordance with Local and/or National Electrical Codes.
2. Circulation heaters are supplied standard with NEMA 1 terminal housings. All power to heaters must be disconnected before removing the terminal housing cover and performing any type of service.
3. Electrical connections on heater terminals must be kept tight. Loose connections will create arcing, over-heating, and eventually will destroy the heater terminal and cause premature heater failure.
4. If the amperage rating of your circulation heater exceeds the amperage capacity of the supplied thermostat, mercury relays or magnetic contactors should be used with the thermostat.
5. Over-temperature protection thermocouples require a second conduit to the control panel for the thermocouple wire.

## Maintenance

1. Never perform any type of service on the unit prior to disconnecting all electrical power and shutting off all intake lines.
2. Remove sludge deposits through the drain plug.
3. Check the flange bolts for tightness.
4. Check the terminal connections for tightness.
5. Check thermocouple or thermostat bulb for response to temperature changes. If defective, replace immediately.
6. Check for leaks.
7. Depending on operating conditions and medium being processed, the flange or screw plug heater should be periodically removed for physical inspection and cleaning of the element bundle.