BUCAN ELECTRIC HEATING DEVICES INC.

# CIRCULATION HEATERS

## Typical Heating Applications:

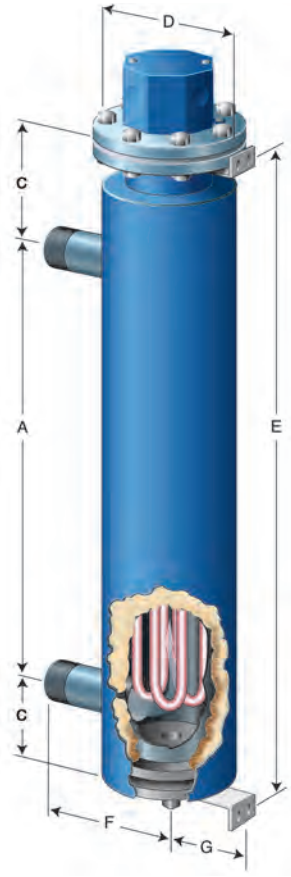
- *Hydraulic Oils*
- *Steam Super Heating*
- *Alkaline Cleaning Solutions*
- *Oils, Including Light to Heavy*
- *Water & Water Based Solutions*
- *De-mineralized or De-ionized Water*
- *Gasses (Air, Nitrogen, Natural Gas, Butane, Etc.)*

Circulation heaters are highly efficient heating cells designed to heat liquids and gases as they flow through a pipe body. These units are compact and easy to install; they offer primary heating or act as a back-up/start-up heating source to natural or forced circulation systems. Design specifications may require a unit to meet the boiler and pressure vessel code. Bucan can supply units that are designed, built and registered to the ASME code, with the applicable code stamps.

## General Construction:

Bucan circulation heaters have either a screw plug or flanged immersion heater installed into a pipe body (also called a pipe vessel), which has inlet and outlet connections. An insulation jacket (up to 2") around the pipe is standard; this reduces heat loss through the shell. This design concept incorporates the rugged and durable features of tubular heaters with the flexibility of a heat exchanger.

# BUCAN CIRCULATION HEATERS




## Standard Flanged Circulation Heaters

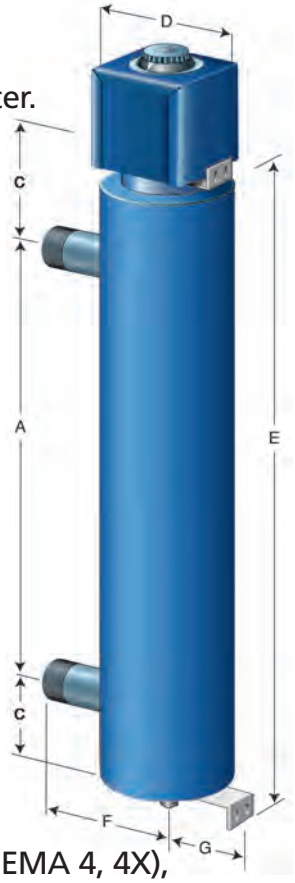
"A" is the heated length of the flanged immersion heater.

| Nominal vessel size | A | C | D | E | F | G | Inlet/Outlet size (NPT) |
|---|---|---|---|---|---|---|---|
| 3" | Heated section of the heater | 5.5 | 7.5 | A + 2xC + 2.25" | 9.5 | 5.5 | 1" |
| 4" | | 5.5 | 9.0 | | 10.50 | 6.25 | 1 1/2" |
| 5" | | 6.75 | 10.0 | | 11 | 7 | 1 1/2" |
| 6" | | 6.75 | 11.0 | | 12 | 7 | 1 1/2" |
| 8" | | 6.75 | 13.25 | | 13.5 | 8.5 | 2" |

## Standard Screw Plug Circulation Heaters

"A" is the heated length of the screw plug immersion heater.

| Nominal vessel size | A | C | D | E | F | G | Inlet/outlet size (NPT) |
|---|---|---|---|---|---|---|---|
| 1" | Heated section of the heater | 1 1/2" | 3 3/4" | A + 2xC + 2.25" | 5" | 5" | 1" |
| 1 1/4" | | 1 1/2" | 3 3/4" | | 5" | 5" | 1" |
| 1 1/2" | | 1 1/2" | 3 3/4" | | 5" | 5" | 1 1/4" |
| 2" | | 2 1/2" | 3 3/4" | | 5 1/2" | 5 1/2" | 1 1/4" |
| 2 1/2" | | 2 1/2" | 3 3/4" | | 5 1/2" | 5 1/2" | 1 1/4" |




## For design help call our technical staff and we can help guide you through the selection process.

- Sheath material : Selected to suit the liquid or gas being heated.
- Connections : NPT nipples or flanged inlet and outlet connections
- Flange pressure ratings : Selected based on temperature and pressure design conditions
- Terminal enclosures : General Purpose (NEMA 1), Weather Resistant (NEMA 4, 4X), Hazardous Location (NEMA 7, 7X)
- Passivation : When required
- Support frames : For stand-alone mounting
- Vessel materials : Steel, stainless steel, or other specialty metals
- Cross flow baffles : To improve heat transfer characteristics, when required
- Controls : Built-in thermostats, thermocouples, and high limit thermocouples

# BUCAN CIRCULATION HEATERS

## Installation and Maintenance

- Electric heaters must be installed by qualified personnel in accordance with all national and local electric codes.
- When the process temperature is equal to or exceeds 425°F, it is recommended to separate the terminal box from the circulation heater with a stilted section.
- NEMA 1 terminal boxes are standard on Bucan circulation heaters. When the circulation heater is to be utilized in a moist environment, a NEMA 4 terminal box should be selected. In hazardous locations, the heating cell should have a NEMA 7 terminal box and a construction adequate for that specific hazardous environment.
- In applications where forced flow of the liquid is necessary, the pump should be connected at the inlet of the unit.
- Circulation heaters are designed for a specific flow rate of the medium being heated. In order to prevent overheating, this flow should never be reduced, reversed or stopped during the process cycle.
- Adequate clearance is required in order to remove the immersion heater for cleaning or replacement.
- Temperature controls, high limit controls, flow switches and pressure relief valves are highly recommended.
- All maintenance must be performed while the heater is de-energized and the pressure reduced to atmospheric.
- Occasionally, inspect the following:
  - inside the terminal box for contamination
  - the electrical connections for tightness and/or signs of overheating
  - the piping for leaks
- Periodically, remove the immersed heater and inspect for scale build-up on the element surface as well as sludge at the bottom of the vessel. Clean as required.

## Vertical Mounting with terminal housing facing upwards

*(Recommended for liquids)*

The inlet pipe should be at the bottom.
This configuration will maintain the heating element immersed in liquid at all times.

## Horizontal Mounting

*(For liquids or gases)*

The inlet and outlet pipes should be installed at the top, oriented upwards, with the inlet pipe close to the terminal box. This configuration will maintain the heating element immersed at all times when liquids are heated and minimize the terminal housing temperature when gases are heated.

## Vertical Mounting with terminal housing at the bottom

*(Recommended for gases)*

The inlet pipe should be at the bottom. This configuration will minimize the terminal housing temperature.