

# CIRCULATION HEATERS

## Selection Guidelines

### SELECTING A CIRCULATION HEATER

Selecting the proper circulation heater component requires critical engineering judgement and careful evaluation of the application. After determining the heat requirement for a specific heat application, the proper selection of the flange and vessel material, heating element sheath material, and correct watt density is critical to achieve long heater life. The ultimate selection of equipment is determined by the knowledge of the process and Engineering acumen of the designer or plant engineer.

### APPLICATION FACTORS

Heater selection is influenced by the following parameters.

- ① The heated medium, viscosity, specific heat, density and corrosive properties.
- ② The presence of contaminants in the medium.
- ③ The corrosion resistant properties of the heater sheath material.
- ④ The sheath watt density of the heating elements — the watts per square inch, and the flow rate of the heated medium.
- ⑤ The vessel design and material — pressure and temperature of the fluid being heated.

### CORROSION POLICY

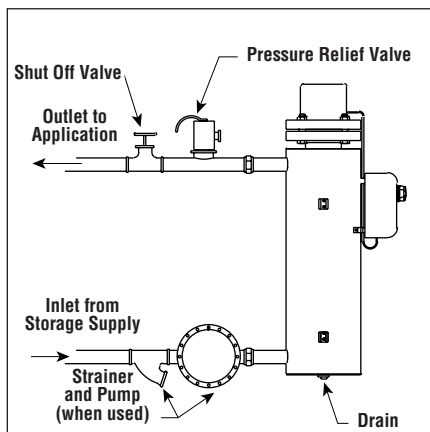
OMEGALUX will not warrant any electric heater against failure by sheath corrosion if such failure is the result of operating conditions beyond the control of the heater manufacturer. It is the responsibility of the purchaser to make the ultimate choice of sheath material based on his knowledge of the chemical composition of the corrosive solution, character of materials entering the solution, and controls by which he maintains the process.

### Circulation Heaters — Selection Guidelines

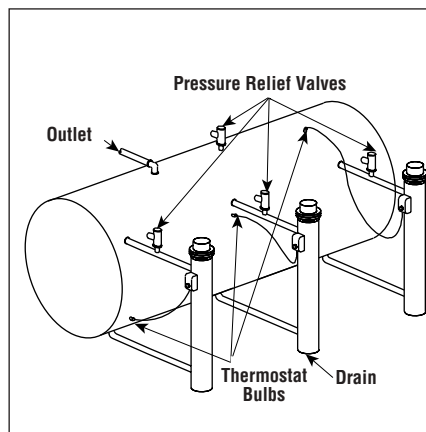
Application	①	②	③	④	⑤
	Solution or Heater Type	Alkaline or Acid Content (Est. % by Volume)	Sheath Material	Watt Density (W/in <sup>2</sup> )	Vessel Material
Water	Clean Water	pH6 to pH8 (Neutral)	Copper	45 - 100	Galvanized Steel
Mild Solutions	Process Water and Very Weak Solutions Weak Solutions Deminerzalized, De-ionized or Pure Water	pH5 to pH9 (2 - 3%) 5 - 6% —	INCOLOY INCOLOY INCOLOY	45 - 86 45 - 75 45 - 75	Stainless Steel Stainless Steel Stainless Steel
Corrosive & High Viscous Solutions	Mildly Corrosive Solutions More Severe Corrosive Solutions Severely Corrosive Solutions	5 - 15% 10 - 25% 30 - 60%	INCOLOY INCOLOY INCOLOY	20 - 25 20 - 25 10 - 20	Stainless Steel Stainless Steel Stainless Steel
Oil	Low Viscosity Oils Medium Viscosity Oils High Viscosity Oils (Fuel Oil)	— — —	Steel Steel Steel	20 - 25 10 - 20 5 - 15	Steel Steel Steel
Air, Gases & Steam	Medium Temperatures to 750°F High Temperatures to 1400°F	— —	INCOLOY INCOLOY	20 - 25 10 - 20	Steel Stainless Steel

### TYPICAL APPLICATIONS

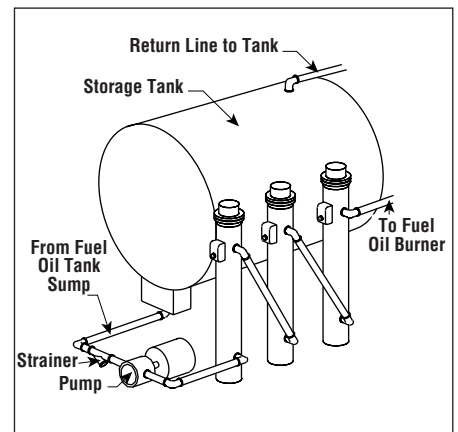
**Inline Heating** — Where demands for heated water or oil are nearly constant, circulation heaters may be installed directly in the fluid line, eliminating the need for storage tanks and their related heat losses.



**Side Arm** — Requirements of large storage tanks can be satisfied by using a number of circulation heaters, providing flexibility in temperature control and reducing power demand.



**Closed-Loop Fuel Oil Heating** — Requirements may be provided by a number of circulation units individually adjustable to temperature and fluid flow, reducing electrical demand on your utility bill.



# CIRCULATION HEATERS

## Selection Guidelines (cont.)

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Application	Heater/Vessel Material	kW Rating	Feature	Model No.	Page
Clean Water	Copper/Galv. Steel	3 - 5 3 - 18 6 - 500	Oval Flange Screw Plug Flanged	NWHA NWHMT NWH	G-9 G-10 G-11
	Copper/Steel or Brass	1.5 - 3	Booster	NWHJR	G-13
Clean Water & Oil	INCOLOY/ Cast Iron or Galvanized	0.5 - 40	Field Adjustable	NWHSRG NWHORG	G-14 G-15
Pure Water & Mildly Corrosive	Stainless/ Stainless	3 - 18	Screw Plug	NWHMTSS	G-36
Corrosive & High Viscous Solutions	INCOLOY/ Stainless INCOLOY/ CPVC	6 - 200	Flanged	NWHIS NWHOIS CVCHS	G-37 G-38 G-16
		2 - 30	Reduced Watt Density		
		1.5 - 3	Non-Metallic Body		
Oil	Steel/Steel Light Medium	1.5 - 2.5	Oval Flange	NWHOA NWHMTO NWHMTOR NWHO NWHOB NWHOR NWHORB	G-18 G-19 G-20 G-21 G-23 G-24 G-26
		3 - 9	Screw Plug		
		1 - 9	Reduced Watt Density		
	3 - 120	Flanged			
	30 - 120	Baffled			
	3 - 120	Reduced Watt Density			
Heavy	20 - 70	Baffled			
	30 - 40	Suction, Pump Mount	SHO	G-27	
Fuel Oil & Asphalt					
Steam, Air & Gas Med. Temp	INCOLOY/ Steel	1 - 1.5	Oval Flange	GCHAI GCHMTI GCHMTIR	G-29 G-30 G-31
		1 - 9	Screw Plug		
High Temp	INCOLOY/ Stainless	1 - 9	Reduced Watt Density	GCHI GCHIS GCHISB	G-32 G-39 G-39
		3 - 350	Flanged		
		2 - 200	Flanged		
		30 - 50	Baffled		

### CODES & STANDARDS

#### ASME Certification to Sections I, IV and VIII, Division 1 —

OMEGALUX is the leader in providing ASME (American Society of Mechanical Engineers) certification for pressure vessel applications.

**Underwriters Laboratories** — UL Listing available for many circulation heaters.

**Canadian Standards Association** — CSA certification available including NRTL/C.

**National Electrical Code (NEC)** — All OMEGALUX circulation heaters are built to allow NEC installation requirements.

### SPECIAL FEATURES

**Kilowatt Ratings** — Large kilowatt circulation heaters (500 kW and above) are available as single chambers or with multiple chambers in series. Skid mounting and integral control panels are also available.

**Vessel Construction** — Chamber size available in 10, 12, 14, 16, 18" and above for larger kilowatt capacities.

**Pressure Ratings** — 150, 300, 400, 600, 900, 1,500 and 2,500 Lb. Class.

**Materials** — 304, 316, 321, 347 stainless steel, INCONEL and more.

**Thermocouples** can be provided on element sheath for overtemperature protection and/or mounted in the outlet nozzle for process control.

**Inlet and Outlet Nozzles** — Available with flanged or threaded connections, smaller or larger pipe sizes and different orientations.

**Baffles** mounted on element bundle inside chamber to increase fluid or gas velocity.

**Terminal Standoffs** in 4, 6 and 8" allow the terminal enclosure housing and the field wiring connection to operate at lower temperatures in high temperature heaters. Standoffs are frequently

used in heat transfer and gas heating applications.

**Mounting Saddles** for horizontally mounted circulation heaters.

**Weatherproof Insulation Jacket** for outdoor unprotected installations.



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### • Flow and Level

Air Velocity Indicators, Doppler Flowmeters, Level Measurement, Magnetic Flowmeters, Mass Flowmeters, Pitot Tubes, Pumps, Rotameters, Turbine and Paddle Wheel Flowmeters, Ultrasonic Flowmeters, Valves, Variable Area Flowmeters, Vortex Shedding Flowmeters

### • pH and Conductivity

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Auto-Dialers and Alarm Monitoring Systems, Communication Products and Converters, Data Acquisition and Analysis Software, Data Loggers Plug-in Cards, Signal Conditioners, USB, RS232, RS485 and Parallel Port Data Acquisition Systems, Wireless Transmitters and Receivers

### • Pressure, Strain and Force

Displacement Transducers, Dynamic Measurement Force Sensors, Instrumentation for Pressure and Strain Measurements, Load Cells, Pressure Gauges, Pressure Reference Section, Pressure Switches, Pressure Transducers, Proximity Transducers, Regulators, Strain Gages, Torque Transducers, Valves

### • Heaters

Band Heaters, Cartridge Heaters, Circulation Heaters, Comfort Heaters, Controllers, Meters and Switching Devices, Flexible Heaters, General Test and Measurement Instruments, Heater Hook-up Wire, Heating Cable Systems, Immersion Heaters, Process Air and Duct, Heaters, Radiant Heaters, Strip Heaters, Tubular Heaters