

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. Consult the Technical section of this catalog for circulation heater calculations and guidelines.

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

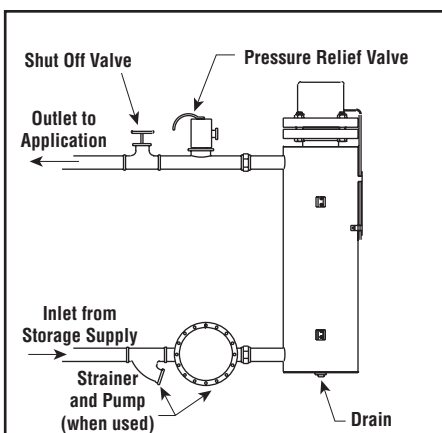
Chromalox will not warrant any electric heater against failure by sheath corrosion if such failure is the result of operating conditions beyond the control of the heater manufacturer. It is the responsibility of the purchaser to make the ultimate choice of sheath material based on his knowledge of the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

Circulation Heaters — Selection Guidelines

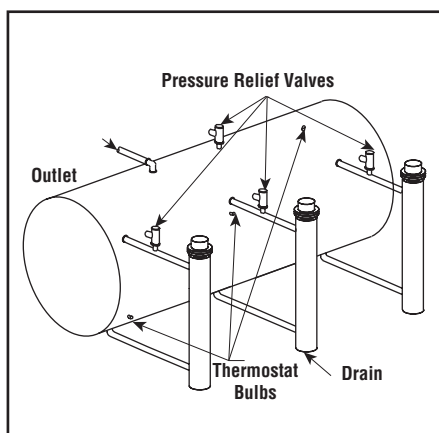
Application	①	②	③	④	⑤
	Solution or Heater Type	Alkaline or Acid Content (Est. % by Volume)	Sheath Material	Watt Density (W/In ²)	Vessel Material
Water	Clean Water	pH6 to pH8 (Neutral)	Copper	45 - 100	Galvanized Steel
Mild Solutions	Process Water and Very Weak Solutions Weak Solutions DeminerIALIZED, 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

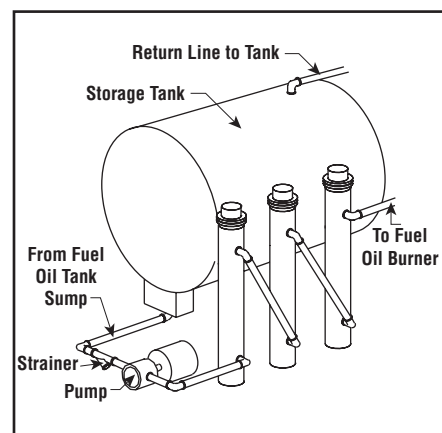
Inline Heating — Where demands for heated water or oil are nearly constant, circulation heaters may be installed directly in the fluid line, eliminating the need for storage tanks and their related heat losses.



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.



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Selection Guidelines (*cont'd.*)

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Application	Heater/Vessel Material	kW Rating	Feature	Model	Page
Clean Water	Copper/Steel or Brass	1.5 - 3	Booster	NWHJR	C-13
	Copper/Galv. Steel	3 - 18 6 - 500	Screw Plug Flanged	NWH	C-11
Clean Water or Oil	INCOLOY®/ Galvanized	0.5 - 40	Field Adjustable	NWHSRG	C-14
Corrosive & High Viscous Solutions	INCOLOY®/ Stainless INCOLOY®/ CPVC	6 - 200	Flanged Reduced Watt Density Non-Metallic Body	NWHIS	C-29
		2 - 30		NWHOIS	C-30
		1.5 - 3		CVCHS	C-16
Oil Light Medium	Steel/Steel	3 - 120	Flanged Baffled	NWHSR	C-19
		30 - 120		NWHO	C-17
				NWHOB	C-18
Heavy	Steel/Steel	3 - 120	Reduced Watt Density Baffled	NWHOR	C-21
		20 - 70		NWHORB	C-21
Steam, Air & Gas	INCOLOY®/ Steel INCOLOY®/ Stainless	30 - 50	Low Flow Flanged Flanged Baffled	GCHCIS	C-33
		0.5 - 3.0		GCHI	C-24
		3 - 350		GCHIS	C-32
		2 - 200		GCHISB	C-32
Pre-engineered Packages — Wired & Skid Mounted					C-34
ASME & Custom Engineering Specifications (SDS)					C-35

Codes & Standards

ASME Certification to Sections I, III, IV and VIII, Division 1 or PED — Chromalox is the leader in providing ASME (American Society of Mechanical Engineers or PED) certification for pressure vessel applications.

Underwriters Laboratories — UL Listing available for many circulation heaters. Consult your Local Chromalox Sales office.

ATEX Directive — Many Chromalox products are approved for use in explosive atmospheres.

Canadian Standards Association — CSA certification available.

National Electrical Code (NEC and IEC) — All Chromalox circulation heaters are built to allow NEC installation requirements.

Special Features Available

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.