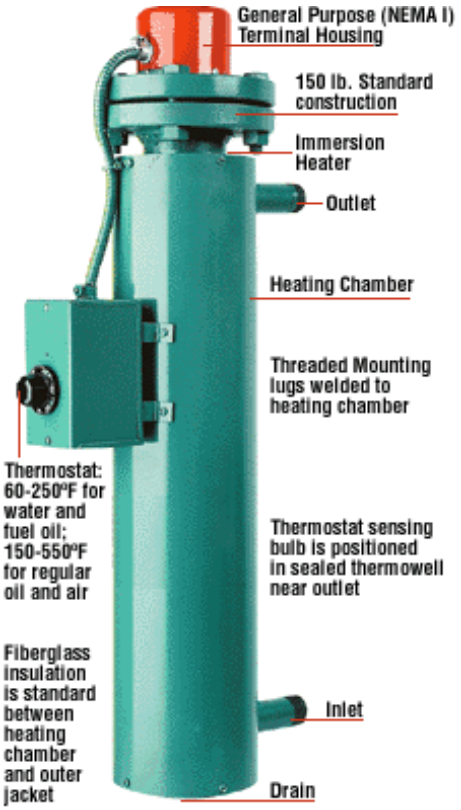
Southeast Thermal Systems LLC Circulation Heaters



Compact and efficient, circulation heaters may be used in forced or natural circulation systems to heat flowing gasses or liquids. Pipe plug or Flanged immersion heater, vessel, insulation, terminal enclosure, mounting brackets and inlet and outlet connections are included. Installation is simple with only basic wiring and piping connections required. An integral thermostat is available if required. An installation and maintenance manual is supplied with each Circulation Heater.

Applications:

Heat transfer oils- Molding dies and platens, closed loop heat transfer systems for heat sensitive materials

Fuel oil heating- Pre-heating for delivery to burners, pre-heating to pumping viscosity

Water- Dishwashing and rinsing, hot water storage tanks, process water, jacketed kettles.

Air, gasses, steam- Process air, boosting temperatures of gasses, steam superheating

Options:

-Special rating or size
- Moisture resistant/explosion resistant terminal enclosure
- Flexitallic gasket
- Flanges on inlet and outlet on certain sizes
- Stainless steel heating chamber
- 300 lb. or 600 lb. heating chamber and flange construction
- Baffles in chamber to increase material velocity
- High temperature insulation (over 500 ° F application temperatures)
- Stand-off terminal enclosures to locate the termination from the flange surface on higher temperature processes (over 500 ° F)
- Thermostat available in various temperature ranges. Also available with over-temperature cut-out with manual reset.
- Thermocouple mounted near outlet for precise process control and/or welded to element sheath for high-limit protection
- Passivation of wetted parts
- Weatherproof outer jacket
- Solid State Controls/Control Panels
- ASME Certification

Be certain that the sheath material and watt density selected are compatible with the material being heated and operating temperature.

Southeast Thermal Systems LLC — Circulation Heaters

Water Heating:
- Clean Water- Copper elements 45 watts/sq. in.
- Process Water- Stainless steel 45 watts/sq. in.
- Solution Water- Incoloy elements 45 watts/sq. in.

Regular Oil Heating:
- Steel sheath elements 22 watts/sq. in.

Fuel Oil Heating:
- Steel sheath elements 12 watts/sq. in.

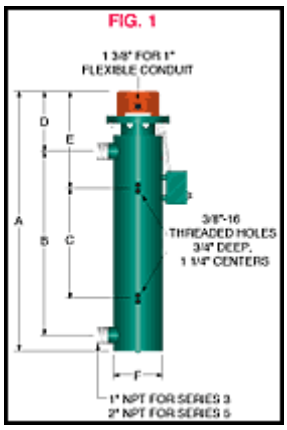
Heavy Weight Oil Heating:
- Steel sheath elements 6.5 watts/sq. in.

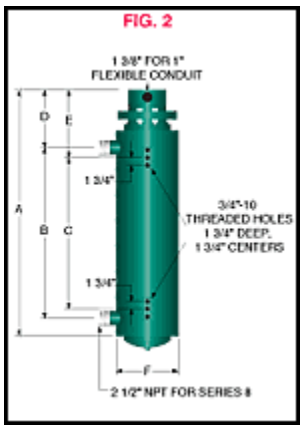
Corrosive Solution Heating:
- Incoloy sheath elements– All other wetted parts, passivated 304 stainless steel 15 watts/sq. in.

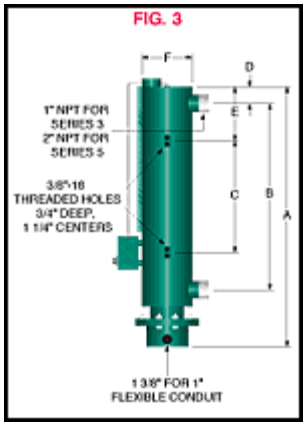
Circulation Heaters with sanitary fittings. USDA approved.

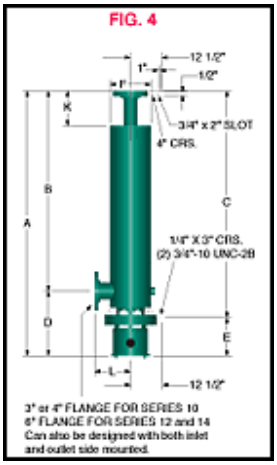
650kw Circluation Heater: 24", 300 lb. Seamless construction with 20", 300 lb. inlet and outlet. Overall length is 12 feet with 180 seamless Incoloy elements. Process heats nitrogen to over 500°F.

Ordering Information:
- Rating
- Vessel Size
- Vessel Material
- Inlet and Outlet Size
- Inlet and Outlet Length
- Heater Enclosure
- Flange or Pipe Plug Size
- Flange or Pipe Plug Material
- Flange Rating
- Sheath Material
- Number of Elements
- Thermostat Mounted on Tank
- Over Temperature Cut Out
- Thermostat Enclosure
- A.S.M.E.
- Agency Approvals
- Other Special Features
- Application
- Heated Medium
- Operating Temperature
- Operating Pressure
- Installation Environment
- Hazardous– See classification of hazardous atmosphere chart in general engineering and technical information section.









Southeast Thermal Systems LLC Circulation Heaters

FIG. 5

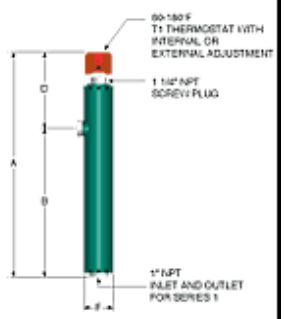
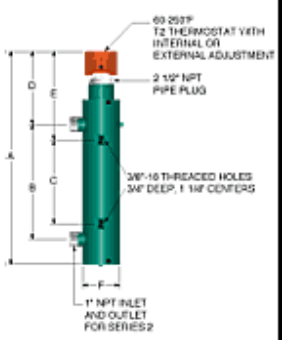


FIG. 6



Heating Air:

Air:

$$kw = \frac{\text{scfm}^* \times \text{Temperature Rise (°F)}}{3000}$$

* Measured at normal temperature and pressure.

Compressed Air:

$$kw = \frac{\text{scfm}^{**} \times \text{Density}^{**} \times \text{Temperature Rise (°F)}}{228}$$

** Measured at heater system inlet temperature and pressure

Temperature Rise °F (kw):

Cu. ft./minute (scfm)	50°	100°	150°	200°	250°	300°	350°	400°	450°	500°	600°
100	1.7	3.3	5	6.7	8.3	10.0	11.7	13.3	15.0	16.7	20.0
200	3.3	6.7	10.0	13.3	16.7	20.0	23.3	26.7	30.0	33.3	40.0
300	5.0	10.0	15.0	20.0	25.0	30.0	35.0	40.0	45.0	50.0	60.0
400	6.7	13.3	20.0	26.7	33.3	40.0	46.7	53.3	60.0	66.7	80.0
500	8.3	16.7	25.0	33.3	41.7	50.0	58.3	66.7	75.0	83.3	100.0
600	10.0	20.0	30.0	40.0	50.0	60.0	70.0	80.0	90.0	100.0	120.0
700	11.7	23.3	35	46.7	58.3	70.0	81.7	93.3	105.0	116.7	140.0
800	13.3	26.7	40	53.3	66.7	80.0	93.3	106.7	120.0	133.3	160.0
900	15.0	30.0	45.0	60.0	75.0	90.0	105.0	120.0	135.0	150.0	180.0
1000	16.7	33.3	50	66.7	83.3	100.0	116.7	133.3	150.0	166.7	200.0
1100	18.3	36.7	55	73.3	91.7	110.0	128.3	146.7	165.0	183.3	220.0
1200	20	40	60	80.0	100.0	120.0	140.0	160.0	180.0	200.0	240.0

Southeast Thermal Systems LLC

Circulation Heaters

Temperature Rise °F (kw to heat in 1 hr.):

cu. ft.	gal.	20°	40°	60°	80°	100°	120°	140°
.66	5	0.3	0.5	0.8	1.1	1.3	1.6	1.9
1.3	10	0.5	1.1	1.6	2.1	2.7	3.2	3.7
2.0	13	0.8	1.6	2.4	3.2	4	4.8	5.6
2.7	20	1.1	2.2	3.2	4.3	5.3	6.4	7.5
3.3	25	1.3	2.7	4	5.3	6.7	8	9.3
4.0	30	1.6	3.2	4.8	6.4	8	9.6	12
5.3	40	2.1	4	6.4	8.5	11	13	15
6.7	50	2.7	5.4	8	10.7	13	16	19
8.0	60	3.3	6.4	9.6	12.8	16	19	22
9.4	70	3.7	7.5	11.2	15	19	22	26
10.7	80	4.3	8.5	13	17	21	26	30
12.0	90	5	10	14.5	19	24	29	34
13.4	100	5.5	11	16	21	27	32	37
16.7	125	7	13	20	27	33	40	47
20.0	150	8	16	24	32	40	48	56

Heating Water:

$$kw = \frac{\text{gal./hr. x 8.34 x Temperature Rise (°F)}}{3412}$$

$$\text{gal./hr.} = \frac{\text{kw x 3412}}{\text{8.34 x Temperature Rise (°F)}}$$

Temperature Rise °F (kw to heat in 1 hr.):

cu. ft.	gal.	50°	100°	200°	300°	400°	500°
.5	3.74	.3	.5	1	2	2	3
1	7.48	.5	1	2	3	4	6
2	14.96	1	1	2	4	6	11
3	22.25	2	3	6	9	12	16
4	29.9	2	4	8	12	16	22
5	37.4	3	4	9	15	20	25
10	74.8	5	9	18	29	40	52
15	112.5	7	14	28	44	60	77
20	149.6	9	18	37	58	80	102
25	187	11	22	46	72	100	127
30	222.5	13	27	56	86	120	151
35	252	16	31	65	100	139	176
40	299	18	36	74	115	158	201
45	336.5	20	40	84	129	178	226
50	374	22	45	93	144	197	252

Heating Oil:

Add 5% for un-insulated tanks.

$$kw = \frac{\text{Gallons x Temperature Rise (°F)}}{\text{800 x Process Start-up Time (hrs.)}}$$