

Circulation Heaters - EX

Application

Caloritech™ circulation heaters are suitable for use in forced flow and natural flow heating loops where a safe, Clean, reliable, and efficient heating source is required.

Liquid Heating

Virtually any liquid may be heated provided that the system design ensure that the heater vessel remains completely full of liquid when in use. Forced flow heating (with circulator pump) is mandatory when heating heavier liquids or heating liquids to high temperatures. Natural flow systems are generally limited to “side arm” water heating applications where the heater is mounted vertically and the top of the heater is well below the minimum tank liquid level.

Gas Heating

In gas heating applications, such as steam superheating, heating compressed air, nitrogen, ammonia, etc., flow must be sufficient to ensure that the maximum allowable vessel and sheath temperatures are not exceeded. CCI Thermal engineers will assist in the selection of the best heater for your particular application. Call, email or write factory, or contact your nearest Caloritech™ representative or distributor.

Registration

Circulation heaters may be classified as boilers or pressure vessels depending on fluid being heated, kW rating, vessel size, operating pressure and outlet temperature. Registration requirements are imposed by the jurisdiction where the heater is to be installed.

CCI Thermal registered vessels are authorized to bear the S, H or U stamp depending on the Code classification.



Figure 1 - Standard EX Unit Mounted on Optional Stand

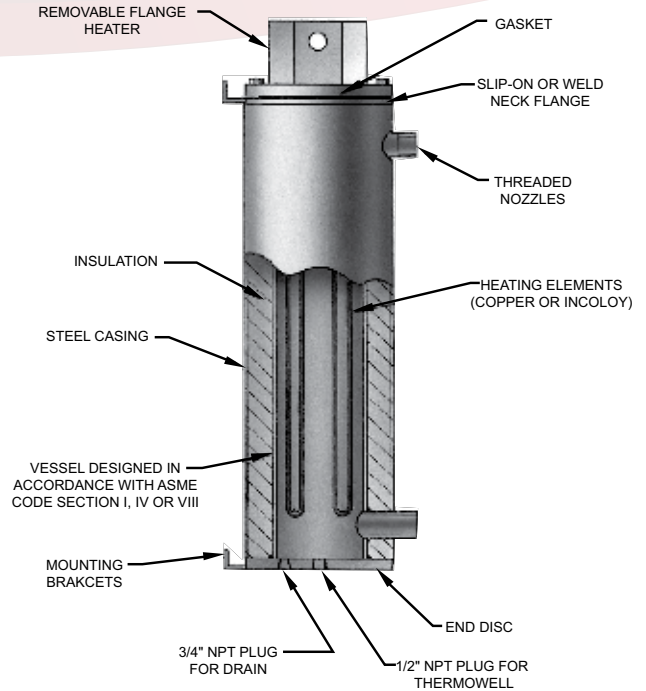


Figure 2 - Construction Details

Construction

Circulation heaters are essentially flange heaters mounted in welded vessels.

Standard sizes use steel vessels fitted with 150 lb. flanges. Units with larger vessels and heavier flanges are available.

For closed systems the heaters are designed to Sect. I, IV, or VIII of the ASME Code.

For high temperature use, heaters can be provided with stainless steel wetted parts and specially designed terminal boxes protected from excessive heat. Consult factory.

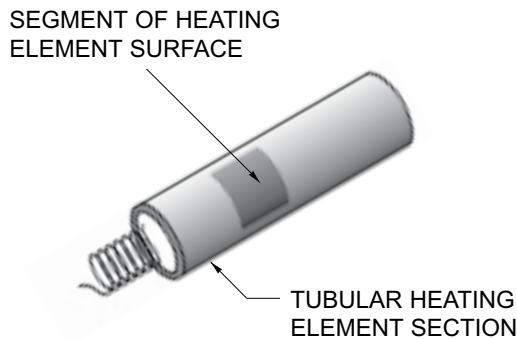
Built-In Limits and Thermostats

Built-in high limits and thermostats are available.

Standard built-in thermostat is a one pole device limited to 240V 25 amp. Whenever the heater voltage exceeds 240V or the heater current exceeds 25 amps or for three phase supply, the thermostat is intended for pilot duty only and is not factory wired to the elements. See Section F of the Caloritech™ catalog for selection of the contactor and control transformer you may require in these instances.

Watt Density

Watt density refers to the wattage output of a heater divided by the total surface area of the heated section of all heating elements in the heater.



Note:

All heat produced by the element is transferred to the work.

It is important to understand the basic terminal difference between an electric immersion heater and a steam or liquid heat exchanger. Unlike the steam or liquid heat exchanger, all of the heat produced by an electric heater will leave the heater. Even though the surface area in contact with the work is fixed, the heating element sheath temperature will continue to rise until the heat produced is equal to the heat transferred to the process.

A detailed understanding of this behaviour and the system parameters will allow the design of a suitable heater to heat virtually any liquid or gas with the only limitation being its ability to resist corrosion in highly active solutions.

As a general rule, low watt density heaters will provide longer service life than high density heaters, especially when the fluid being heated is viscous or stagnant. However, low density heaters are initially more expensive and in larger systems it is best to check with the factory for assistance in optimizing the heater selection.

See page D50 for recommended watt densities for some of the more common fluids.

CAUTION - IMPROPER SELECTION OF WATT DENSITY CAN RESULT IN DAMAGE TO THE PRODUCT AND FAILURE OF THE HEATER.

Installation

The heaters are generally suitable for horizontal or vertical vessel orientation as shown in Figures 3, 4 and 5.

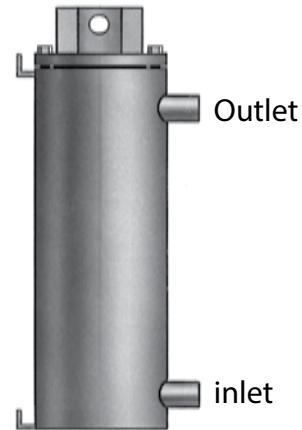


Figure 3 - Liquid Heating or Low Temperature Gas Heating (Vertical Installation)

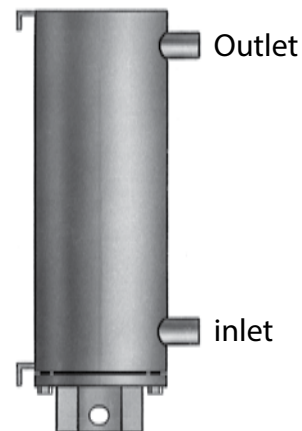


Figure 4 - High Temperature Gas Heating (Vertical Installation)

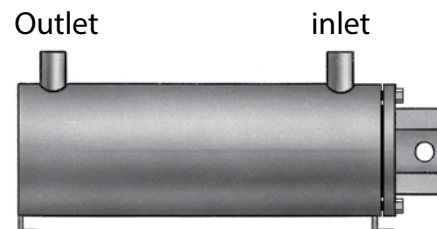
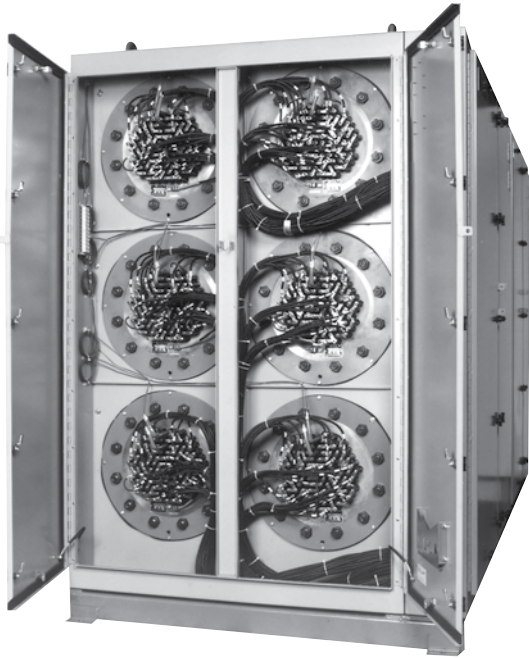


Figure 5 - Gas or Liquid Heating (Horizontal Installation)

EX

Circulation Heaters Custom Designed Assemblies

Skidded circulation heater assemblies are available for process heating in chemical processing, mining, refining, etc.



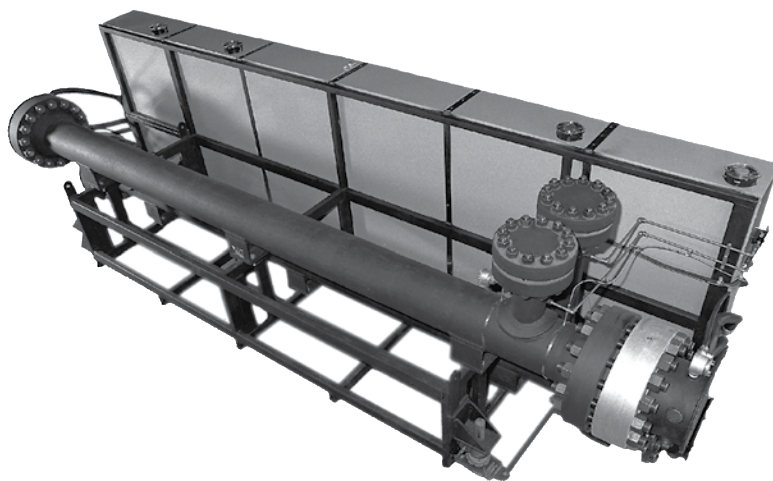
Our complete in-house capability... elements, vessels, CNC equipped machine shop, panel shop, CAD design... directed by a team of highly skilled professionals ensures that our products will provide value.

Registered engineers are available for start-up supervision anywhere in the world.

Multiple staged assemblies with control panel, valving, pumps or fans, chillers, expansion tanks, etc. can be engineered and fabricated by CCI Thermal using state-of-the-art technology and manufacturing procedures



If it can be done electronically, chances are we've done it before. Design proposals are submitted without cost or obligation on receipt of the bid request and specifications.



EX

Miniature Circulation Heaters

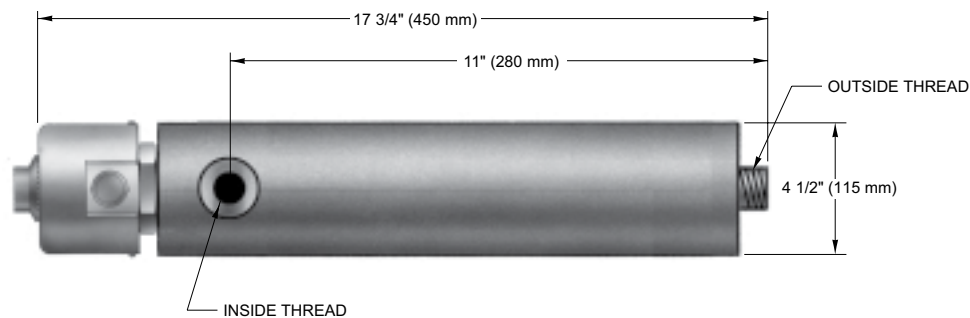
Miniature circulation heaters provide an economical source of heat in many applications. In stationary systems, these heaters do not normally require mounting support other than the inlet and outlet piping connections.

Construction

The basic construction of this series of heaters is a one inch or one and a quarter inch pipe fitted with a pipe "T" to accept a suitable screwplug heater. The pipe is insulated with 1 1/4" (32 mm) to 1 1/2" (38 mm) of FSK insulation protected by a 20-gauge steel casing.

Units are available with or without thermostats and with general purpose, moisture resistant or explosion-proof terminal housings.

If the outlet liquid or gas temperature exceeds 300°F (150°C), use the end away from the terminal box as the outlet. Otherwise, use the outside threaded connection as the system inlet.



Type EXC

All wetted parts in brass or copper. Used for heating water, glycol water solutions or other liquids of low viscosity which will not corrode the heater materials.

Type EXF

Incoloy® elements with steel screwplug and vessel. Used for heating oils, low pressure steam, preheating instrument air, etc. Select lower watt density listings for heavier liquids.

Special Features

- Stainless steel wetted parts
- Moisture resistant or explosion-proof housings
- Special wattage (length will increase for same watt density)
- Special thermostat range

Miniature Circulation Heaters

kW	Standard Voltages 1 Phase only	Watt Density		Without Thermostat	With Thermostat	Net Weight	
		W/cm ²	W/in ²	Catalog Number	50-250°F (10 - 120°C) Catalog Number	lbs	kg
Type EXC - Copper Sheath (Brass Plug & Vessel With 1" NPT Connections)							
1.0	120, 280, 240			EXC110P1	EXCT110P1		
1.5	-			EXC115P1	EXCT115P1		
2.0	-	80	12.4	EXC120P1	EXCT120P1	13.2	6
3.0	208,240			EXC130P1	EXCT130P1		
Type EXF - Incoloy® Sheath (Steel Plug & Vessel With 1 1/4" NPT Connections)							
0.6	120, 208, 240	15	2.3	EXF206P12	EXFT206P12	17.6	8
1.0	-	25	3.9	EXF210P12	EXFT210P12		

EX

3" Circulation Heaters

Type EXC

Used primarily for heating water or aqueous solutions which are not corrosive to the steel vessel or the copper sheathed elements.

Type EXI

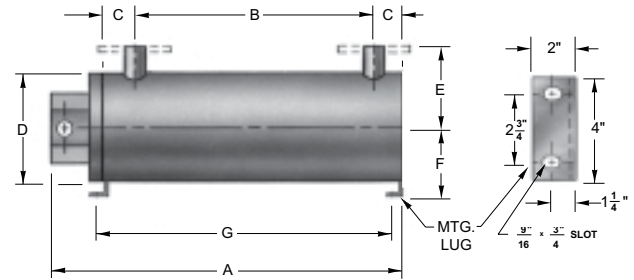
May also be used to heat water, especially in rinse tanks and spray washing systems where the chemical additives would be corrosive to copper.

Type EXF

To heat circulated oils or process liquids which are not corrosive to steel and Incoloy®. To heat compressed air or other gases. Lower density heaters should be specified for high viscosity liquids or high temperature, low flow steam or gas heating systems. Consult factory for technical assistance.

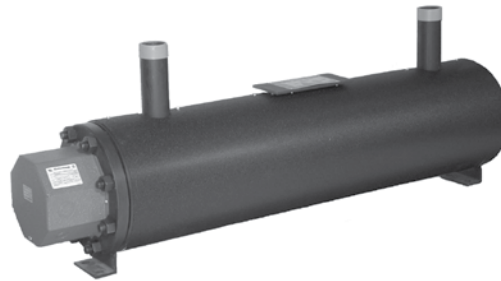
Dimensions - in (mm)

Vessel Size	A	B	C	D	E	F	G
3"	41.7 (1060)	30.7 (780)	3.3 (85)	7.5 (790)	9.3 (235)	5.3 (135)	37.2 (945)



To Order Specify

Quantity, catalog number, voltage, phase, wattage, special features, fluid to be heated, operating temperature and pressure, ultimate owner's name and address, installation location name and address.



kW	B' Dimensions Inlet/Outlet in mm		Standard Voltages				Watt Density W/in ² W/cm ²		Without Thermostat		With Thermostat 50°F to 250°F (10°C to 120°C)		Net Weight lbs kg	
			208V, 240V		480V, 600V				Catalog Number	Part Number	Catalog Number	Part Number		
			1Ø	3Ø	1Ø	3Ø								
3" - 150 lb Flanged Steel Vessel With 1" (25 mm) Inlet And Outlet														
High Density - Copper Sheath														
6.0							60	9.3	EXC306F3	NWH-3-306	EXCT306F3		108.6	47.0
9.0							55	8.5	EXC309F3	NWH-3-309	EXCT309F3		105.8	48.0
12.0	30.7	780	✓	✓	✓	✓	54	8.4	EXC312F3	NWH-3-312	EXCT312F3	—	105.8	48.0
18.0							55	8.5	EXC618F3	—	EXCT618F3		112.4	51.0
24.0							54	8.4	EXC624F3	—	EXCT624F3		112.4	51.0
High Density - Incoloy® Sheath														
6.0							60	9.3	EXI306F3		EXIT306F3		108.6	47.0
9.0							55	8.5	EXI309F3		EXIT309F3		105.8	48.0
12.0	30.7	780	✓	✓	✓	✓	54	8.4	EXI312F3	—	EXIT312F3	—	105.8	48.0
18.0							55	8.5	EXI618F3		EXIT618F3		112.4	51.0
24.0							54	8.4	EXI624F3		EXIT624F3		112.4	51.0
Medium Density - Incoloy® Sheath														
3.0							30	4.6	EXF303F3	—	EXFT303F3		108.6	47.0
4.5	30.7	780	✓	✓	✓	✓	27	4.2	EXF304F3	—	EXFT304F3	—	105.8	48.0
6.0							27	4.2	EXF306F3	NWHO-3-306	EXFT306F3		105.8	48.0
Low Density - Incoloy® Sheath														
3.0	30.7	780	✓	✓	✓	✓	14	2.1	EXF303F332	NWHO-3L-303	EXFT303F332	—	105.8	48.0

4" Circulation Heaters

Type EXC

Used primarily for heating water or aqueous solutions which are not corrosive to the steel vessel or the copper sheathed elements.

Type EXI

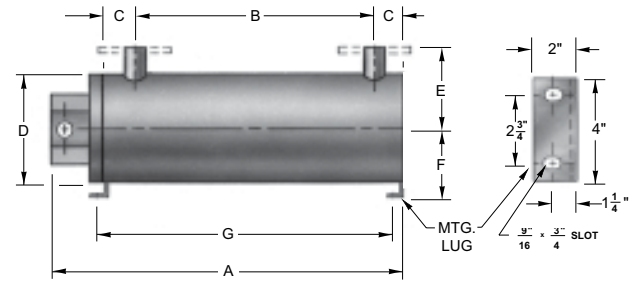
May also be used to heat water, especially in rinse tanks and spray washing systems where the chemical additives would be corrosive to copper.

Type EXF

To heat circulated oils or process liquids which are not corrosive to steel and Incoloy®. To heat compressed air or other gases. Lower density heaters should be specified for high viscosity liquids or high temperature, low flow steam or gas heating systems. Consult factory for technical assistance.

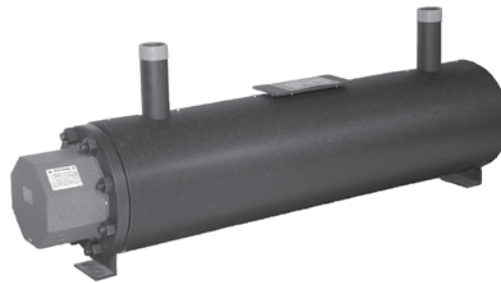
Dimensions - in (mm)

Vessel Size	A	B	C	D	E	F	G
4"	48.0 (1220)	30.7 (780)	5.7 (145)	9.1 (230)	10.2 (260)	6.1 (155)	41.9 (1065)



To Order Specify

Quantity, catalog number, voltage, phase, wattage, special features, fluid to be heated, operating temperature and pressure, ultimate owner's name and address, installation location name and address.



kW	B' Dimensions Inlet/Outlet		Standard Voltages				Watt Density		Without Thermostat		With Thermostat		Net Weight	
			208V, 240V		480V, 600V				Catalog Number	Part Number	50°F to 250°F (10°C to 120°C)			
			1Ø	3Ø	1Ø	3Ø					W/in ²	W/cm ²		
4" - 150 lb Flanged Steel Vessel With 1 1/2" (38 mm) Inlet And Outlet														
High Density - Copper Sheath														
12.0							60	8.4	EXC612F4		EXCT612F4		138.9	63.0
15.0	30.7	780	✓	✓	✓	✓	57	8.8	EXC615F4	—	EXCT615F4	—	141.1	64.0
18.0							55	8.5	EXC618F4		EXCT618F4		141.1	64.0
24.0							54	8.4	EXC624F4		EXCT624F4		141.1	64.0
18.0							60	9.3	EXC918F4		EXCT918F4		147.7	67.0
27.0	30.7	780	✓	✓	✓	✓	55	8.5	EXC927F4	—	EXCT927F4	—	149.9	68.0
36.0							54	8.4	EXC936F4		EXCT936F4		152.1	69.0
High Density - Incoloy® Sheath														
12.0							60	8.4	EXI612F4		EXIT612F4		138.9	63.0
15.0	30.7	780	✓	✓	✓	✓	57	8.8	EXI615F4	—	EXIT615F4	—	141.1	64.0
18.0							55	8.5	EXI618F4		EXIT618F4		141.1	64.0
24.0							54	8.4	EXI624F4		EXIT624F4		141.1	64.0
18.0							60	9.3	EXI918F4		EXIT918F4		147.7	67.0
27.0	30.7	780	✓	✓	✓	✓	55	8.5	EXI927F4	—	EXIT927F4	—	149.9	68.0
36.0							54	8.4	EXI936F4		EXIT936F4		152.1	69.0
Medium Density - Incoloy® Sheath														
6.0							30	4.6	EXF606F4		EXFT606F4		138.9	63.0
9.0	30.7	780	✓	✓	✓	✓	27	4.2	EXF609F4	—	EXFT609F4	—	143.3	65.0
12.0							27	4.2	EXF612F4		EXFT612F4		143.3	65.0
9.0							30	4.6	EXF909F4		EXFT909F4		149.9	68.0
13.5	30.7	780	✓	✓	✓	✓	27	4.2	EXF913F4	—	EXFT913F4	—	152.1	69.0
18.0							27	4.2	EXF918F4		EXFT918F4		154.3	70.0
Low Density - Incoloy® Sheath														
6.0							14	2.1	EXF606F432		EXFT606F432		143.3	65.0
9.0	30.7	780	✓	✓	✓	✓	14	2.1	EXF909F432	—	EXFT909F432	—	152.1	69.0

EX

5" Circulation Heaters

Type EXC

Used primarily for heating water or aqueous solutions which are not corrosive to the steel vessel or the copper sheathed elements.

Type EXI

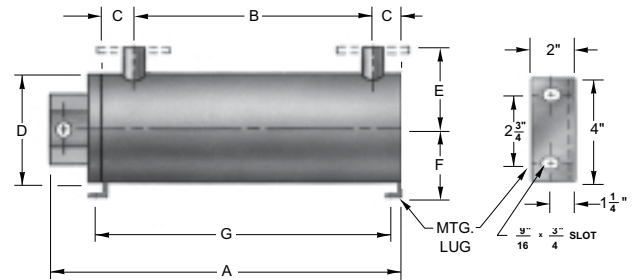
May also be used to heat water, especially in rinse tanks and spray washing systems where the chemical additives would be corrosive to copper.

Type EXF

To heat circulated oils or process liquids which are not corrosive to steel and Incoloy®. To heat compressed air or other gases. Lower density heaters should be specified for high viscosity liquids or high temperature, low flow steam or gas heating systems. Consult factory for technical assistance.

Dimensions - in (mm)

Vessel Size	A	B	C	D	E	F	G
5"	48.0 (1220)	30.7 (780)	5.7 (145)	10.0 (255)	10.6 (270)	6.7 (170)	41.9 (1065)



To Order Specify

Quantity, catalog number, voltage, phase, wattage, special features, fluid to be heated, operating temperature and pressure, ultimate owner's name and address, installation location name and address.



kW	B' Dimensions Inlet/Outlet		Standard Voltages				Watt Density		Without Thermostat		With Thermostat		Net Weight	
			208V, 240V		480V, 600V				Catalog Number	Part Number	Catalog Number	Part Number		
			1Ø	3Ø	1Ø	3Ø								
in	mm									lbs	kg			
5" - 150 lb Flanged Steel Vessel With 2" (51 mm) Inlet And Outlet														
High Density - Copper Sheath														
12.0							60	8.4	EXC612F5	—	EXCT612F5		138.9	63.0
15.0							57	8.8	EXC615F5	—	EXCT615F5		141.1	64.0
18.0	30.7	780	✓	✓	✓	✓	55	8.5	EXC618F5	—	EXCT618F5	—	141.1	64.0
24.0							54	8.4	EXC624F5	NWH-5-624	EXCT624F5		141.1	64.0
18.0							60	9.3	EXC918F5	—	EXCT918F5		147.7	67.0
27.0	30.7	780	✓	✓	✓	✓	55	8.5	EXC927F5	—	EXCT927F5	—	149.9	68.0
36.0							54	8.4	EXC936F5	—	EXCT936F5		152.1	69.0
High Density - Incoloy® Sheath														
12.0							60	8.4	EXI612F5	—	EXIT612F5		138.9	63.0
15.0							57	8.8	EXI615F5	—	EXIT615F5		141.1	64.0
18.0	30.7	780	✓	✓	✓	✓	55	8.5	EXI618F5	—	EXIT618F5	—	141.1	64.0
24.0							54	8.4	EXI624F5	—	EXIT624F5		141.1	64.0
18.0							60	9.3	EXI918F5	—	EXIT918F5		147.7	67.0
27.0	30.7	780	✓	✓	✓	✓	55	8.5	EXI927F5	—	EXIT927F5	—	149.9	68.0
36.0							54	8.4	EXI936F5	—	EXIT936F5		152.1	69.0
Medium Density - Incoloy® Sheath														
6.0							30	4.6	EXF606F5	—	EXFT606F5		138.9	63.0
9.0	30.7	780	✓	✓	✓	✓	27	4.2	EXF609F5	—	EXFT609F5	—	143.3	65.0
12.0							27	4.2	EXF612F5	NWHO-5-612	EXFT612F5		143.3	65.0
9.0							30	4.6	EXF909F5	—	EXFT909F5		149.9	68.0
13.5	30.7	780	✓	✓	✓	✓	27	4.2	EXF913F5	—	EXFT913F5	—	152.1	69.0
18.0							27	4.2	EXF918F5	—	EXFT918F5		154.3	70.0
Low Density - Incoloy® Sheath														
6.0							14	2.1	EXF606F532	—	EXFT606F532		143.3	65.0
9.0	30.7	780	✓	✓	✓	✓			EXF909F532	—	EXFT909F532	—	152.1	69.0

EX

6" Circulation Heaters

Type EXC

Used primarily for heating water or aqueous solutions which are not corrosive to the steel vessel or the copper sheathed elements.

Type EXI

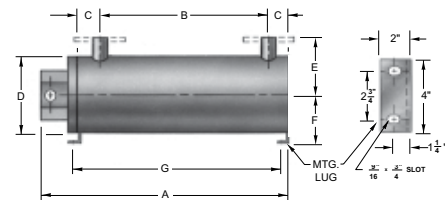
May also be used to heat water, especially in rinse tanks and spray washing systems where the chemical additives would be corrosive to copper.

Type EXF

To heat circulated oils or process liquids which are not corrosive to steel and Incoloy®. To heat compressed air or other gases. Lower density heaters should be specified for high viscosity liquids or high temperature, low flow steam or gas heating systems. Consult factory for technical assistance.

Dimensions - in (mm)

Vessel Size	A	B	C	D	E	F	G
6"	48.0	30.7	5.7	11.0	11.4	7.1	41.9
	(1220)	(780)	(145)	(280)	(290)	(180)	(1065)
	60.6	43.3	5.7	11.0	11.4	7.1	54.5
	(1540)	(1100)	(145)	(280)	(290)	(180)	(1385)



To Order Specify

Quantity, catalog number, voltage, phase, wattage, special features, fluid to be heated, operating temperature and pressure, ultimate owner's name and address, installation location name and address.

kW	B' Dimensions Inlet/Outlet in mm		Standard Voltages				Watt Density W/in ² W/cm ²		Without Thermostat		With Thermostat 50°F to 250°F (10°C to 120°C)		Net Weight lbs kg	
			208V, 240V		480V, 600V				Catalog Number	Part Number	Catalog Number	Part Number		
			1Ø	3Ø	1Ø	3Ø								
6" - 150 lb Flanged Steel Vessel With 2" (51 mm) Inlet And Outlet														
High Density - Copper Sheath														
36.0	30.7	780	✓				55	8.5	EXC1236F6	—	EXCT1236F6		200.6	91.0
48.0	30.7	780	—	✓	✓	✓	54	8.4	EXC1248F6	NWH-6-1248	EXCT1248F6	—	202.8	92.0
60.0	43.3	1100	—				54	8.4	EXC1260F6	NHW-6-1260	EXCT1260F6	—	209.4	95.0
72.0	43.3	1100	—				53	8.2	EXC1272F6	NWH-6-1272	EXCT1272F6	—	211.6	96
45.0	30.7	780		✓			55	8.5	EXC1545F6	—	EXCT1545F6	—	205.0	93.0
60.0	30.7	780		✓			54	8.4	EXC1560F6	—	EXCT1560F6	—	211.6	96.0
75.0	43.3	1100	—	✓	✓	✓	54	8.4	EXC1575F6	—	EXCT1575F6	—	240.3	109.0
90.0	43.3	1100		—			53	8.2	EXC1590F6	—	EXCT1590F6	—	246.9	112.0
90.0	43.3	1100		—			54	8.4	EXC1890F6	—	EXCT1890F6	—	246.9	112.0
High Density - Incoloy® Sheath														
36.0	30.7	780	✓				55	8.5	EXI1236F6	—	EXIT1236F6	—	200.6	91.0
48.0	30.7	780	—	✓	✓	✓	54	8.4	EXI1248F6	—	EXIT1248F6	—	202.8	92.0
60.0	43.3	1100	—				54	8.4	EXI1260F6	—	EXIT1260F6	—	209.4	95.0
72.0	43.3	1100	—				53	8.2	EXI1272F6	—	EXIT1272F6	—	211.6	96.0
45.0	30.7	780		✓			55	8.5	EXI1545f6	—	EXIT1545f6	—	205.0	93.0
60.0	30.7	780		✓			54	8.4	EXI1560F6	—	EXIT1560F6	—	211.6	96.0
75.0	43.3	1100	—	✓	✓	✓	54	8.4	EXI1575f6	—	EXIT1575f6	—	240.3	109.0
90.0	43.3	1100		—			53	8.2	EXI1590F6	—	EXIT1590F6	—	246.9	112.0
90.0	43.3	1100		—	✓		54	8.4	EXI1890F6	—	EXIT1890F6	—	246.9	112.0
120.0	43.3	1100	—	—	—	✓	70	10.9	EXI15120F6	—	EXIT15120F6	—	251.3	114.0
144.0	43.3	1100	—	—	—	✓	70	10.9	EXI18144F6	—	EXIT18144F6	—	260.2	118.0
Medium Density - Incoloy® Sheath														
18.0	30.7	780					27	4.2	EXF1218F6	NWHO-6-1218	EXFT1218F6	—	202.8	92.0
24.0	30.7	780	✓	✓	✓	✓	27	4.2	EXF1224F6	NWHO-6-1224	EXFT1224F6	—	207.2	94.0
30.0	43.3	1100					27	4.2	EXF1230F6	NWHO-6-1230	EXFT1230F6	—	233.7	106.0
36.0	43.3	1100					26	4.1	EXF1236F6	NWHO-6-1236	EXFT1236F6	—	238.1	108.0
22.5	30.7	780	✓				27	4.2	EXF1522F6	—	EXFT1522F6	—	209.4	95.0
30.0	30.7	780	✓	✓	✓	✓	27	4.2	EXF1530F6	—	EXFT1530F6	—	213.9	97.0
37.5	43.3	1100	✓				27	4.2	EXF1537F6	—	EXFT1537F6	—	240.3	109.0
45.0	43.3	1100	—				26	4.1	EXF1545F6	—	EXFT1545F6	—	246.9	112.0
Low Density - Incoloy® Sheath														
12.0	30.7	780					14	2.1	EXF1212F6	—	EXFT1212F6	—	202.8	90.0
18.0	43.3	1100	✓	✓	✓	✓	16	2.5	EXF1218F639	NWHO-6L-1218	EXFT1218F639	—	233.7	106.0
24	43.3	1100					18	2.7	EXF1224F647	—	EXFT1224F647	—	244.7	111
15	30.7	780					14	2.1	EXF1515F6	—	EXFT1515F6	—	209.4	95
22.5	43.3	1100	✓	✓	✓	✓	16	2.5	EXF1522F639	—	EXFT1522F639	—	242.5	110
30	43.3	1100					18	2.7	EXF1530F647	—	EXFT1530F647	—	253.5	115

EX

8" Circulation Heaters

Dimensions - in (mm)

Type EXC

Used primarily for heating water or aqueous solutions which are not corrosive to the steel vessel or the copper sheathed elements.

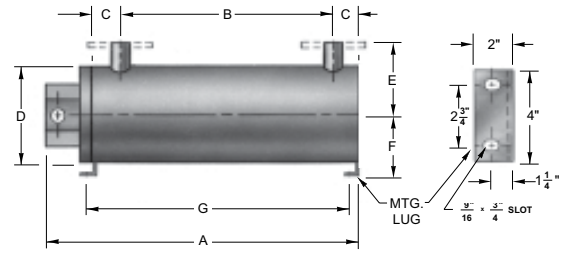
Type EXI

May also be used to heat water, especially in rinse tanks and spray washing systems where the chemical additives would be corrosive to copper.

Type EXF

To heat circulated oils or process liquids which are not corrosive to steel and Incoloy®. To heat compressed air or other gases. Lower density heaters should be specified for high viscosity liquids or high temperature, low flow steam or gas heating systems. Consult factory for technical assistance.

Vessel Size	A	B	C	D	E	F	G
8"	62.2 (1580)	43.3 (1100)	6.5 (165)	13.6 (345)	13.0 (330)	8.5 (215)	56.1 (1425)



To Order Specify

Quantity, catalog number, voltage, phase, wattage, special features, fluid to be heated, operating temperature and pressure, ultimate owner's name and address, installation location name and address.

kW	B' Dimensions Inlet/Outlet in mm		Standard Voltages				Watt Density W/in ² W/cm ²		Without Thermostat		With Thermostat 50°F to 250°F (10°C to 120°C)		Net Weight	
			208V, 240V		480V, 600V				Catalog Number	Part Number	Catalog Number	Part Number	lbs	kg
			1Ø	3Ø	1Ø	3Ø								
8" - 150 lb Flanged Steel Vessel With 2 1/2" (64 mm) Inlet And Outlet														
High Density - Copper Sheath														
54.0	43.3	1100	—	✓	✓	✓	55	8.5	EXC1854F8	—	EXCT1854F8	—	233.7	106.0
72.0			—	—	—	—	54	8.4	EXC1872F8	—	EXCT1872F8	—	240.3	109.0
90.0			—	—	—	—	54	8.4	EXC1890F8	—	EXCT1890F8	—	313.6	142.0
108.0			—	—	—	—	53	8.2	EXC18108F8	—	EXCT18108F8	—	317.5	144.0
81.0	43.3	1100	—	✓	✓	—	55	8.5	EXC2781F8	—	EXCT2781F8	—	326.3	148.0
108.0			—	—	—	—	54	8.4	EXC27108F8	—	EXCT27108F8	—	335.1	152.0
135.0			—	—	—	—	54	8.4	EXC27135F8	—	EXCT27135F8	—	346.1	157.0
162.0			—	—	—	—	53	8.2	EXC27162F8	—	EXCT27162F8	—	352.7	160.0
High Density - Incoloy® Sheath														
54.0	43.3	1100	—	✓	✓	✓	55	8.5	EXI1854F8	—	EXIT1854F8	—	233.7	106.0
72.0			—	—	—	—	54	8.4	EXI1872F8	—	EXIT1872F8	—	240.3	109.0
90.0			—	—	—	—	54	8.4	EXI1890F8	—	EXIT1890F8	—	313.6	142.0
108.0			—	—	—	—	53	8.2	EXI18108F8	—	EXIT18108F8	—	317.5	144.0
81.0	43.3	1100	—	✓	✓	—	55	8.5	EXI2781F8	—	EXIT2781F8	—	326.3	148.0
108.0			—	—	—	—	54	8.4	EXI27108F8	—	EXIT27108F8	—	335.1	152.0
135.0			—	—	—	—	54	8.4	EXI27135F8	—	EXIT27135F8	—	346.1	157.0
162.0			—	—	—	—	53	8.2	EXI27162F8	—	EXIT27162F8	—	352.7	160.0
120.0	43.3	1100	—	—	—	—	70	10.9	EXI15120F8	—	EXIT15120F8	—	313.6	142.0
144.0			—	—	—	—	70	10.9	EXI18144F8	—	EXIT18144F8	—	319.7	145.0
168.0			—	—	—	—	70	10.9	EXI21168F8	—	EXIT21168F8	—	326.3	148.0
192.0			—	—	—	—	70	10.9	EXI24192F8	—	EXIT24192F8	—	332.9	151.0
216.0	43.3	1100	—	—	—	—	70	10.9	EXI27216F8	—	EXIT27216F8	—	339.5	154.0
240.0			—	—	—	—	70	10.9	EXI30240F8	—	EXIT30240F8	—	346.1	157.0
Medium Density - Incoloy® Sheath														
36.0	43.3	1100	✓	—	—	—	27	4.2	EXF1836F8	—	EXFT1836F8	—	304.2	138.0
54.0			—	✓	✓	✓	26	4.1	EXF1854F8	—	EXFT1854F8	—	319.7	145.0
63.0			—	—	—	—	26	4.1	EXF2163F8	—	EXFT2163F8	—	328.5	149.0
72.0			—	—	—	—	26	4.1	EXF2472F8	—	EXFT2472F8	—	335.1	152.0
81.0	43.3	1100	—	—	✓	✓	26	4.1	EXF2781F8	—	EXFT2781F8	—	341.7	155.0
90.0			—	—	—	—	26	4.1	EXF3090F8	—	EXFT3090F8	—	348.3	158.0
Low Density - Incoloy® Sheath														
27.0	43.3	1100	—	—	—	—	16	2.5	EXF1827F8	—	EXFT1827F8	—	313.6	142.0
31.5			✓	✓	✓	✓	16	2.5	EXF2131F8	—	EXFT2131F8	—	317.5	144.0
36.0			—	—	—	—	16	2.5	EXF2436F8	—	EXFT2436F8	—	321.9	146.0
36.0			—	—	—	—	17	2.7	EXF1836F847	—	EXFT1836F847	—	321.9	146.0
40.5	43.3	1100	—	—	—	—	16	2.5	EXF2740F8	—	EXFT2740F8	—	328.5	149.0
45.0			—	✓	✓	✓	16	2.5	EXF3045F8	—	EXFT3045F8	—	335.1	152.0
54			—	—	—	—	17	2.7	EXF2754F8	—	EXFT2754F8	—	343.9	156.0

10" Circulation Heaters

Type EXC

Used primarily for heating water or aqueous solutions which are not corrosive to the steel vessel or the copper sheathed elements.

Type EXI

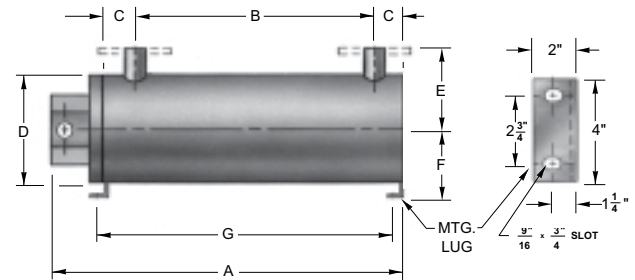
May also be used to heat water, especially in rinse tanks and spray washing systems where the chemical additives would be corrosive to copper.

Type EXF

To heat circulated oils or process liquids which are not corrosive to steel and Incoloy®. To heat compressed air or other gases. Lower density heaters should be specified for high viscosity liquids or high temperature, low flow steam or gas heating systems. Consult factory for technical assistance.

Dimensions - in (mm)

Vessel Size	A	B	C	D	E	F	G
10"	65.0 (1650)	43.3 (1100)	7.1 (180)	16.0 (405)	14.8 (375)	9.9 (250)	57.1 (1450)



To Order Specify

Quantity, catalog number, voltage, phase, wattage, special features, fluid to be heated, operating temperature and pressure, ultimate owner's name and address, installation location name and address.



kW	B' Dimensions Inlet/Outlet		Standard Voltages				Watt Density		Without Thermostat		With Thermostat		Net Weight	
			208V, 240V		480V, 600V				Catalog Number	Part Number	50°F to 250°F (10°C to 120°C)			
			1Ø	3Ø	1Ø	3Ø	W/in ²	W/cm ²			Catalog Number	Part Number	lbs	kg
10" - 150 lb Flanged Steel Vessel With 3" (76 mm) Inlet And Outlet														
High Density - Copper Sheath														
180.0	43.3	1100	—	—	—	✓	63	9.8	EXC36180F10	—	EXCT36180F10	—	485.0	220.0
216.0	43.3	1100	—	—	—	✓	60	9.3	EXC36216F10	—	EXCT36216F10	—	498.2	226.0
252.0	43.3	1100	—	—	—	✓	60	9.3	EXC42252F10	—	EXCT42252F10	—	520.3	236.0
High Density - Incoloy® Sheath														
180.0	43.3	1100	—	—	—	✓	63	9.8	EXI36180F10	—	EXIT36180F10	—	485.0	220.0
216.0	43.3	1100	—	—	—	✓	60	9.3	EXI36216F10	—	EXIT36216F10	—	498.2	226.0
252.0	43.3	1100	—	—	—	✓	60	9.3	EXI42252F10	—	EXIT42252F10	—	520.3	236.0
288.0	43.3	1100	—	—	—	✓	80	12.3	EXI36288F10	—	EXIT36288F10	—	498.2	226.0
336.0	43.3	1100	—	—	—	✓	80	12.3	EXI42336F10	—	EXIT42336F10	—	520.3	236.0
384.0	43.3	1100	—	—	—	✓	80	12.3	EXI48384F10	—	EXIT48384F10	—	542.3	246.0
Medium Density - Incoloy® Sheath														
108.0	43.3	1100	—	—	✓	✓	30	4.6	EXF36108F10	—	EXFT36108F10	—	498.2	226.0
126.0	43.3	1100	—	—	—	✓			EXF42126F10	—	EXFT42126F10	—	520.3	236.0
144.0	43.3	1100	—	—	—	—			EXF48144F10	—	EXFT48144F10	—	537.9	244.0
Low Density - Incoloy® Sheath														
72.0	43.3	1100	—	✓	✓	✓	20	3.1	EXF3672F10	—	EXFT3672F10	—	498.2	226.0
84.0	43.3	1100	—	✓	✓	✓			EXF4284F10	—	EXFT4284F10	—	520.3	236.0
96.0	43.3	1100	—	✓	✓	✓			EXF4896F10	—	EXFT4896F10	—	537.9	244.0

EX

12" Circulation Heaters

Type EXC

Used primarily for heating water or aqueous solutions which are not corrosive to the steel vessel or the copper sheathed elements.

Type EXI

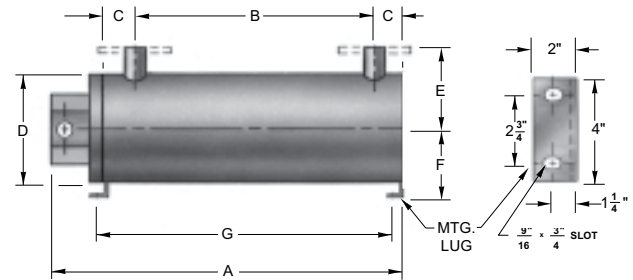
May also be used to heat water, especially in rinse tanks and spray washing systems where the chemical additives would be corrosive to copper.

Type EXF

To heat circulated oils or process liquids which are not corrosive to steel and Incoloy®. To heat compressed air or other gases. Lower density heaters should be specified for high viscosity liquids or high temperature, low flow steam or gas heating systems. Consult factory for technical assistance.

Dimensions - in (mm)

Vessel Size	A	B	C	D	E	F	G
12"	65.1 (1655)	43.3 (1100)	7.1 (180)	19.0 (480)	16.1 (410)	11.5 (290)	57.1 (1450)



To Order Specify

Quantity, catalog number, voltage, phase, wattage, special features, fluid to be heated, operating temperature and pressure, ultimate owner's name and address, installation location name and address.



kW	B' Dimensions Inlet/Outlet		Standard Voltages				Watt Density		Without Thermostat		With Thermostat		Net Weight	
			208V, 240V 480V, 600V						50°F to 250°F (10°C to 120°C)					
			1Ø	3Ø	1Ø	3Ø			W/in ²	W/cm ²	Catalog Number	Part Number		
12" - 150 lb Flanged Steel Vessel With 3" (76 mm) Inlet And Outlet														
High Density - Copper Sheath														
240.0	43.3	1100				✓	63	9.8	EXC48240F12		EXCT48240F12		690.1	313.0
288.0	43.3	1100	—	—	—	✓	60	9.3	EXC48288F12	—	EXCT48288F12	—	709.9	322.0
324.0	43.3	1100				✓	60	9.3	EXC54324F12		EXCT54324F12		727.5	330.0
360.0	43.3	1100				✓	60	9.3	EXC60360F12		EXCT60360F12		718.7	326.0
High Density - Incoloy® Sheath														
240.0	43.3	1100	—	—	—	✓	63	9.8	EXI48240F12		EXIT48240F12		690.1	313.0
288.0	43.3	1100	—	—	—	✓	60	9.3	EXI48288F12	—	EXIT48288F12	—	709.9	322.0
324.0	43.3	1100				✓	60	9.3	EXI54324F12		EXIT54324F12		727.5	330.0
360.0	43.3	1100				✓	60	9.3	EXI60360F12		EXIT60360F12		718.7	326.0
432.0	43.3	1100	—	—	—	✓	80	12.3	EXI54324F12	—	EXIT54324F12	—	727.5	330.0
480.0	43.3	1100				✓	80	12.3	EXI60480F12		EXIT60480F12		743.0	337.0
Medium Density - Incoloy® Sheath														
144.0	43.3	1100	—	—	—	✓	30	4.6	EXF48144F12		EXFT48144F12		709.9	322.0
162.0	43.3	1100				✓			EXF54162F12	—	EXFT54162F12	—	727.5	330.0
180.0	43.3	1100				✓			EXF60180F12		EXFT60180F12		743.0	337.0
Low Density - Incoloy® Sheath														
96.0	43.3	1100		✓	✓				EXF4896F12		EXFT4896F12		709.9	322.0
108.0	43.3	1100	—	—	✓	✓	20	3.1	EXF54108F12	—	EXFT54108F12	—	727.5	330.0
120.0	43.3	1100		—	—				EXF60120F12		EXFT60120F12		743.0	337.0

14" Circulation Heaters

Type EXC

Used primarily for heating water or aqueous solutions which are not corrosive to the steel vessel or the copper sheathed elements.

Type EXI

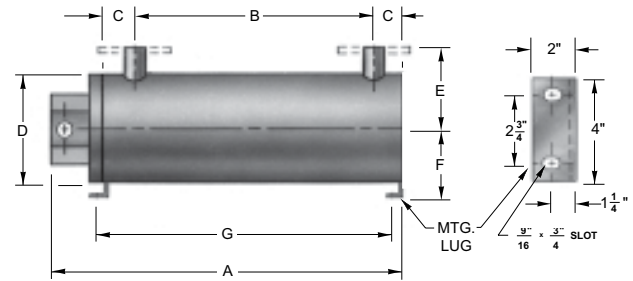
May also be used to heat water, especially in rinse tanks and spray washing systems where the chemical additives would be corrosive to copper.

Type EXF

To heat circulated oils or process liquids which are not corrosive to steel and Incoloy®. To heat compressed air or other gases. Lower density heaters should be specified for high viscosity liquids or high temperature, low flow steam or gas heating systems. Consult factory for technical assistance.

Dimensions - in (mm)

Vessel Size	A	B	C	D	E	F	G
14"	66.2 (1680)	43.3 (1100)	7.8 (200)	21.0 (535)	17.5 (445)	12.6 (320)	58.6 (1490)



To Order Specify

Quantity, catalog number, voltage, phase, wattage, special features, fluid to be heated, operating temperature and pressure, ultimate owner's name and address, installation location name and address.



kW	B' Dimensions Inlet/Outlet		Standard Voltages				Watt Density		Without Thermostat		With Thermostat 50°F to 250°F (10°C to 120°C)		Net Weight	
			208V, 240V		480V, 600V				Catalog Number	Part Number	Catalog Number	Part Number		
			1Ø	3Ø	1Ø	3Ø								
14" - 150 lb Flanged Steel Vessel With 3" (76 mm) Inlet And Outlet														
High Density - Copper Sheath														
300.0	43.3	1100					63	9.8	EXC60300F14		EXCT60300F14		877.4	398.0
360.0	43.3	1100	—	—	—	✓	60	9.3	EXC60360F14	—	EXCT60360F14	—	903.9	410.0
432.0	43.3	1100					60	9.3	EXC72432F14		EXCT72432F14		934.8	424.0
504.0	43.3	1100					60	9.3	EXC84504F14		EXCT84504F14		967.8	439.0
High Density - Incoloy® Sheath														
300.0	43.3	1100				✓	63	9.8	EXI60300F14		EXIT60300F14		877.4	398.0
360.0	43.3	1100	—	—	—	✓	60	9.3	EXI60360F14	—	EXIT60360F14	—	903.9	410.0
432.0	43.3	1100					60	9.3	EXI72432F14		EXIT72432F14		934.8	424.0
504.0	43.3	1100					60	9.3	EXI84504F14		EXIT84504F14		967.8	439.0
576.0	43.3	1100	—	—	—	✓	80	12.3	EXI72576F14	—	EXIT72576F14	—	934.8	424.0
672.0	43.3	1100					80	12.3	EXI84672F14		EXIT84672F14		967.8	439.0
Medium Density - Incoloy® Sheath														
180.0	43.3	1100				✓			EXF60180F14		EXFT60180F14		903.9	410.0
216.0	43.3	1100	—	—	—	✓	30	4.6	EXF72216F14	—	EXFT72216F14	—	934.8	424.0
252.0	43.3	1100							EXF84252F14		EXFT84252F14		967.8	439.0
Low Density - Incoloy® Sheath														
120.0	43.3	1100				✓			EXF60120F14		EXFT60120F14		903.9	410.0
144.0	43.3	1100	—	✓	✓	✓	20	3.1	EXF72144F14	—	EXFT72144F14	—	934.8	424.0
168.0	43.3	1100							EXF84168F14		EXFT84168F14		967.8	439.0

EX

Special Features

Flange Heaters

See Section B of the Caloritech™ catalog for special flange heater features for use in circulation heater vessels.

Special Materials

Stainless steel or special alloy construction available for corrosive liquids of high temperature gas heating when outlet temperatures are in excess of 887°F (475°C).

Flanged Inlet and Outlet



Free Standing Frame

Circulation heaters may be mounted on factory supplied frame as shown.

Factory Mounted Control Panel

Custom designed, fully prewired control panels are available. See pages D27 to D33 for details.

Inlet and Outlet 180° Apart

To facilitate piping inlet and outlet piping may be positioned 180° apart or as required. Specify desired location of mounting lugs in relation to inlet and outlet. (Forward sketch to the factory to avoid mistakes)

Multistage Units

Circulation heaters can be supplied as multistage assemblies with either vertical or horizontal vessel orientation. See Figures 1 and 2.

Figure 1

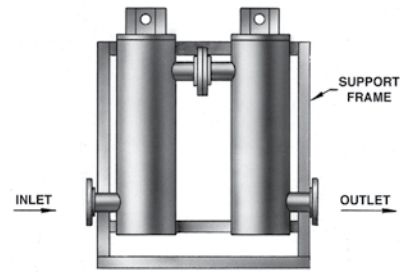
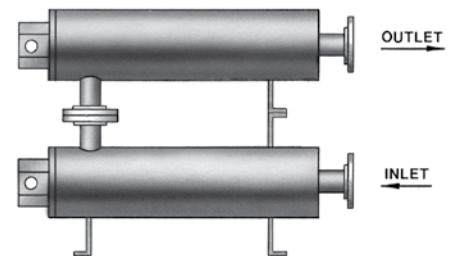


Figure 2



Higher Ratings

Units are available for operation at higher pressures or kilowatt ratings.

Cross Flow Baffles

Cross flow baffles improve heat transfer when heating viscous fluids and high temperature gases.

Valves

Pressure relief valves, bleed and drain valves are available.

Flow Switch

Differential Pressure Switch

Thermocouple

A built-in type J or K thermocouple mounted in the outlet pipe.

Built-In Controls

Mechanical or electronic high limit controls and temperature controls are available.

Larger Sizes

Vessel sizes to 36" (914 mm) diameter or larger are available with flanged inlets and outlets up to 16" (406 mm) diameter.