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 Calroitech™ 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

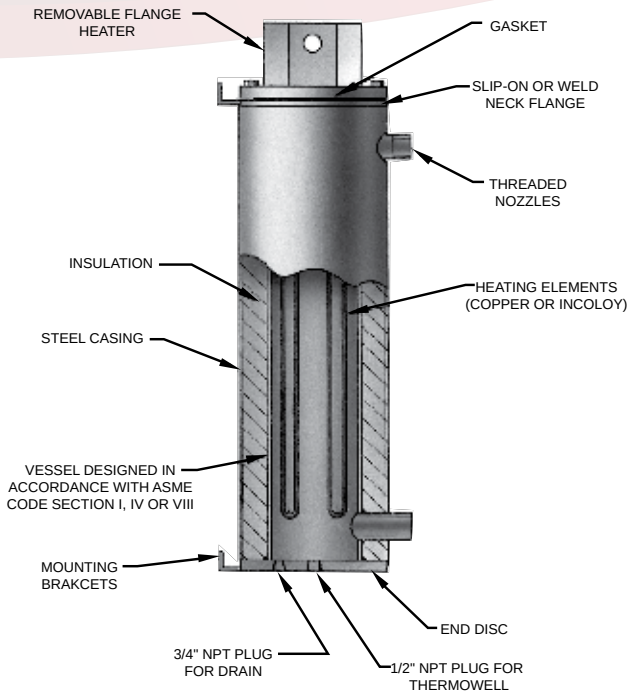


Figure 2 - Construction Details

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.

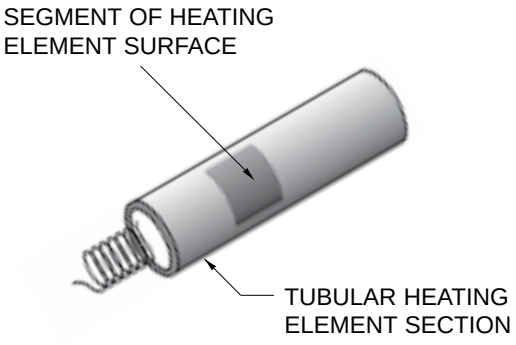
Built-In Limits and Thermostats

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.

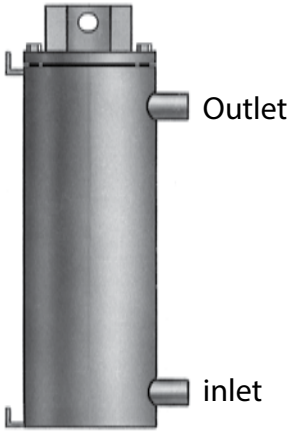


Figure 3 - Liquid Heating or Low Temperature Gas Heating (Vertical Installation)

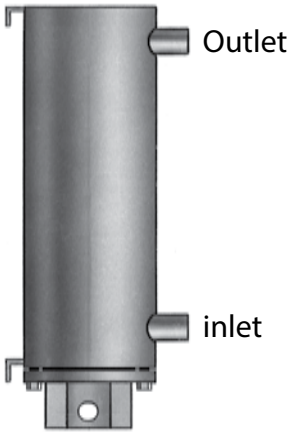


Figure 4 - High Temperature Gas Heating (Vertical Installation)

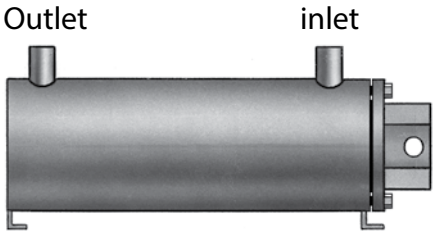
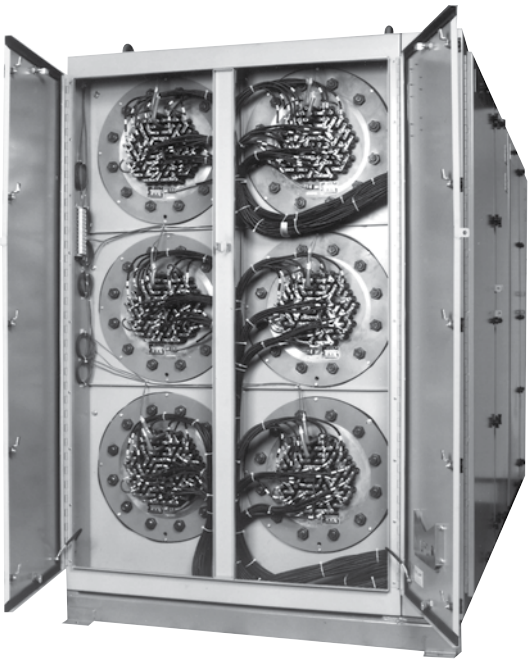


Figure 5 - Gas or Liquid Heating (Horizontal Installation)

Circulation Heaters Custom Designed Assemblies

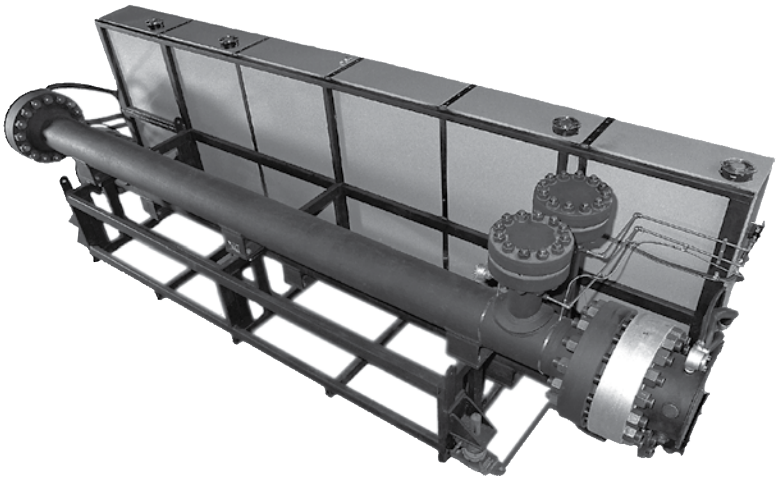
Skidded circulation heater assemblies are available for process heating in chemical processing, mining, refining, etc.



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

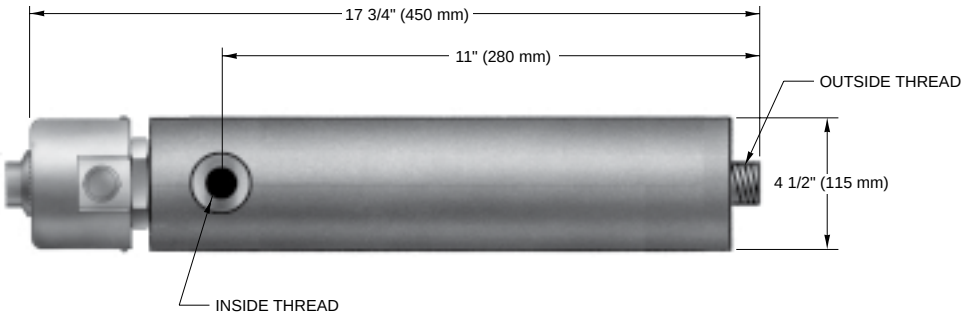
All wetted parts in brass or copper. Used for heating water, glycol water solutions or other liquids of low viscosity which will not corrode the heater materials.

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 W/cm²	Watt Density W/in²	Without Thermostat Catalog Number	With Thermostat 50-250°F (10 - 120°C) Catalog Number	Net Weight lbs	Net Weight kg
Type EXC - Copper Sheath (Brass Plug & Vessel With 1" NPT Connections)							
1.0	120, 280, 240	80	12.4	EXC110P1	EXCT110P1	13.2	6
1.5	-			EXC115P1	EXCT115P1		
2.0	-			EXC120P1	EXCT120P1		
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		

3” Circulation Heaters

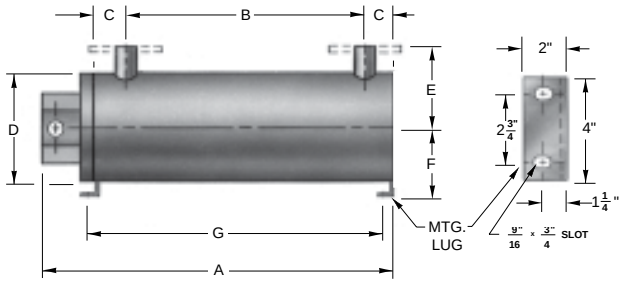
Type EXC
Used primarily for heating water or aqueous solutions which are not corrosive to the steel vessel or the copper sheathed elements.

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		Standard Voltages 208V, 240V		Standard Voltages 480V, 600V		Watt Density		Without Thermostat		With Thermostat 50°F to 250°F (10°C to 120°C)		Net Weight	
	in	mm	1Ø	3Ø	1Ø	3Ø	W/in²	W/cm²	Catalog Number	Part Number	Catalog Number	Part Number	lbs	kg
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

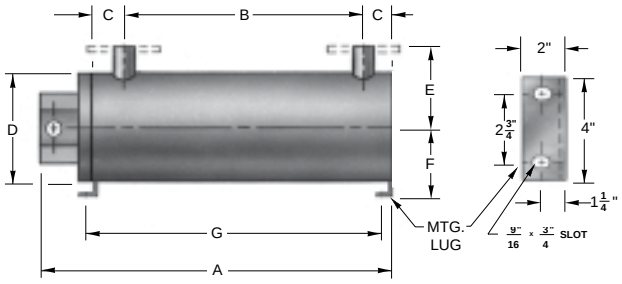
Type EXC
Used primarily for heating water or aqueous solutions which are not corrosive to the steel vessel or the copper sheathed elements.

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 208V, 240V		Standard Voltages 480V, 600V		Watt Density		Without Thermostat		With Thermostat 50°F to 250°F (10°C to 120°C)		Net Weight	
	in	mm	1Ø	3Ø	1Ø	3Ø	W/in²	W/cm²	Catalog Number	Part Number	Catalog Number	Part Number	lbs	kg
4" - 150 lb Flanged Steel Vessel With 1 1/2" (38 mm) Inlet And Outlet														
High Density - Copper Sheath														
12.0	30.7	780	✓	✓	✓	✓	60	8.4	EXC612F4	—	EXCT612F4	—	138.9	63.0
15.0							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	30.7	780	✓	✓	✓	✓	60	9.3	EXC918F4	—	EXCT918F4	—	147.7	67.0
27.0							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	30.7	780	✓	✓	✓	✓	60	8.4	EXI612F4	—	EXIT612F4	—	138.9	63.0
15.0							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	30.7	780	✓	✓	✓	✓	60	9.3	EXI918F4	—	EXIT918F4	—	147.7	67.0
27.0							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	30.7	780	✓	✓	✓	✓	30	4.6	EXF606F4	—	EXFT606F4	—	138.9	63.0
9.0							27	4.2	EXF609F4		EXFT609F4		143.3	65.0
12.0							27	4.2	EXF612F4		EXFT612F4		143.3	65.0
9.0	30.7	780	✓	✓	✓	✓	30	4.6	EXF909F4	—	EXFT909F4	—	149.9	68.0
13.5							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	30.7	780	✓	✓	✓	✓	14	2.1	EXF606F432	—	EXFT606F432	—	143.3	65.0
9.0									EXF909F432		EXFT909F432		152.1	69.0

5” Circulation Heaters

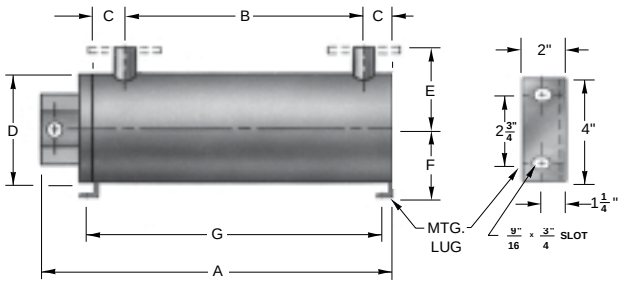
Type EXC
Used primarily for heating water or aqueous solutions which are not corrosive to the steel vessel or the copper sheathed elements.

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 50°F to 250°F (10°C to 120°C)		Net Weight	
			208V, 240V		480V, 600V									
	in	mm	1Ø	3Ø	1Ø	3Ø	W/in²	W/cm²	Catalog Number	Part Number	Catalog Number	Part Number	lbs	kg
5" - 150 lb Flanged Steel Vessel With 2" (51 mm) Inlet And Outlet														
High Density - Copper Sheath														
12.0	30.7	780	✓	✓	✓	✓	60	8.4	EXC612F5	—	EXCT612F5	—	138.9	63.0
15.0							57	8.8	EXC615F5	—	EXCT615F5		141.1	64.0
18.0							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	30.7	780	✓	✓	✓	✓	60	9.3	EXC918F5	—	EXCT918F5	—	147.7	67.0
27.0							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	30.7	780	✓	✓	✓	✓	60	8.4	EXI612F5	—	EXIT612F5	—	138.9	63.0
15.0							57	8.8	EXI615F5		EXIT615F5		141.1	64.0
18.0							55	8.5	EXI618F5		EXIT618F5		141.1	64.0
24.0							54	8.4	EXI624F5		EXIT624F5		141.1	64.0
18.0	30.7	780	✓	✓	✓	✓	60	9.3	EXI918F5	—	EXIT918F5	—	147.7	67.0
27.0							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	30.7	780	✓	✓	✓	✓	30	4.6	EXF606F5	—	EXFT606F5	—	138.9	63.0
9.0							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	30.7	780	✓	✓	✓	✓	30	4.6	EXF909F5	—	EXFT909F5	—	149.9	68.0
13.5							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	30.7	780	✓	✓	✓	✓	14	2.1	EXF606F532	—	EXFT606F532	—	143.3	65.0
9.0									EXF909F532		EXFT909F532		152.1	69.0

6” Circulation Heaters

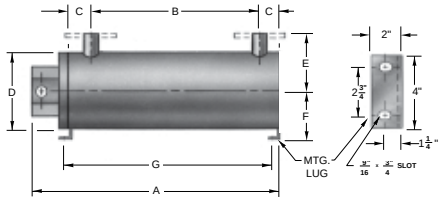
Type EXC
Used primarily for heating water or aqueous solutions which are not corrosive to the steel vessel or the copper sheathed elements.

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 (1220)	30.7 (780)	5.7 (145)	11.0 (280)	11.4 (290)	7.1 (180)	41.9 (1065)
	60.6 (1540)	43.3 (1100)	5.7 (145)	11.0 (280)	11.4 (290)	7.1 (180)	54.5 (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		Standard Voltages 208V, 240V		Standard Voltages 480V, 600V		Watt Density		Without Thermostat		With Thermostat 50°F to 250°F (10°C to 120°C)		Net Weight	
	in	mm	1Ø	3Ø	1Ø	3Ø	W/in²	W/cm²	Catalog Number	Part Number	Catalog Number	Part Number	lbs	kg
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					✓		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					—		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

8” Circulation Heaters

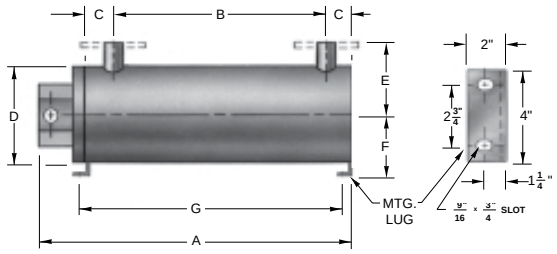
Type EXC
Used primarily for heating water or aqueous solutions which are not corrosive to the steel vessel or the copper sheathed elements.

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
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		Standard Voltages 208V, 240V		Standard Voltages 480V, 600V		Watt Density		Without Thermostat		With Thermostat 50°F to 250°F (10°C to 120°C)		Net Weight	
	in	mm	1Ø	3Ø	1Ø	3Ø	W/in²	W/cm²	Catalog Number	Part Number	Catalog Number	Part Number	lbs	kg
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	43.3	1100	—	—	✓	✓	26	4.1	EXF2472F8	—	EXFT2472F8	—	335.1	152.0
81.0							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

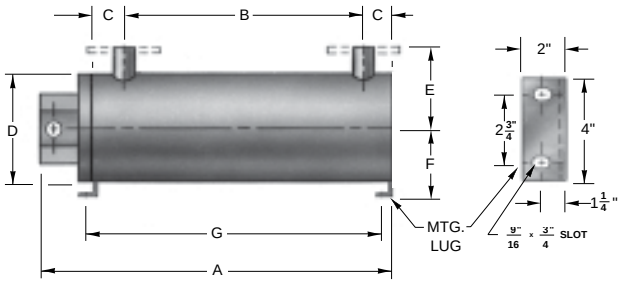
Type EXC
Used primarily for heating water or aqueous solutions which are not corrosive to the steel vessel or the copper sheathed elements.

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 208V, 240V		Standard Voltages 480V, 600V		Watt Density		Without Thermostat		With Thermostat 50°F to 250°F (10°C to 120°C)		Net Weight	
	in	mm	1Ø	3Ø	1Ø	3Ø	W/in²	W/cm²	Catalog Number	Part Number	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			✓				EXF36108F10		EXFT36108F10		498.2	226.0
126.0	43.3	1100	—	—	—	✓	30	4.6	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							EXF3672F10		EXFT3672F10		498.2	226.0
84.0	43.3	1100	—	✓	✓	✓	20	3.1	EXF4284F10	—	EXFT4284F10	—	520.3	236.0
96.0	43.3	1100							EXF4896F10		EXFT4896F10		537.9	244.0

12” Circulation Heaters

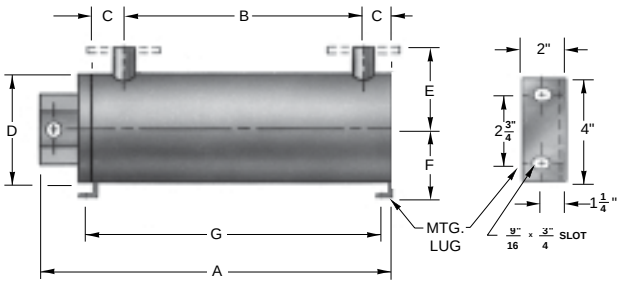
Type EXC
Used primarily for heating water or aqueous solutions which are not corrosive to the steel vessel or the copper sheathed elements.

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 50°F to 250°F (10°C to 120°C)		Net Weight	
			208V, 240V		480V, 600V									
	in	mm	1Ø	3Ø	1Ø	3Ø	W/in²	W/cm²	Catalog Number	Part Number	Catalog Number	Part Number	lbs	kg
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							EXF48144F12		EXFT48144F12		709.9	322.0
162.0	43.3	1100	—	—	—	✓	30	4.6	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

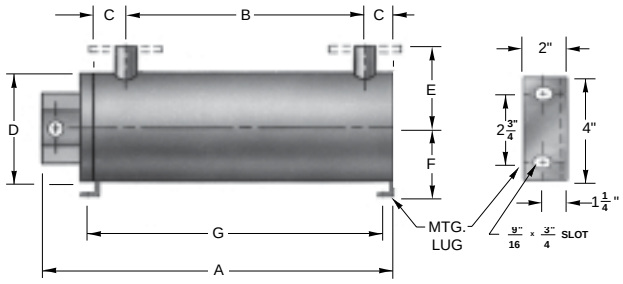
Type EXC
Used primarily for heating water or aqueous solutions which are not corrosive to the steel vessel or the copper sheathed elements.

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 208V, 240V		Standard Voltages 480V, 600V		Watt Density		Without Thermostat		With Thermostat 50°F to 250°F (10°C to 120°C)		Net Weight	
	in	mm	1Ø	3Ø	1Ø	3Ø	W/in²	W/cm²	Catalog Number	Part Number	Catalog Number	Part Number	lbs	kg
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	—	—	—	✓	30	4.6	EXF60180F14	—	EXFT60180F14	—	903.9	410.0
216.0	43.3	1100							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	—	✓	✓	✓	20	3.1	EXF60120F14	—	EXFT60120F14	—	903.9	410.0
144.0	43.3	1100							EXF72144F14		EXFT72144F14		934.8	424.0
168.0	43.3	1100							EXF84168F14		EXFT84168F14		967.8	439.0

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

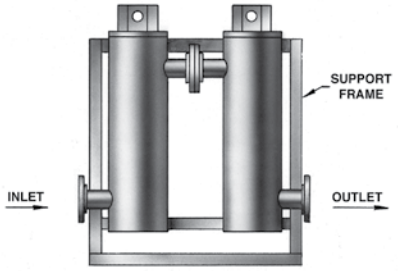
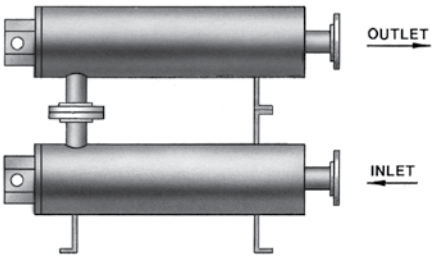


Figure 2



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.