

# Circulation Heaters

Circulation Heaters	Sheath Materials	Max. Operating Temperatures		Typical Max. Watt Densities		Page
		°F	°C	W/in <sup>2</sup>	W/cm <sup>2</sup>	
<b>Ultra-Pure Thick Film Quartz Modules</b>	Quartz	302	150	100	15.4	<b>359</b>
<b>STARFLOW™</b>	316L stainless steel	1000	537	30	4.6	<b>365</b>
<b>WATROD™ and FIREBAR®</b>	Incoloy®	1600	870	120	18.6	<b>367</b>
	Stainless steel	1200	650	120	18.6	
	Steel	750	400	120	18.6	
	Copper	350	175	120	18.6	
<b>Booster</b>	Copper	350	175	60	9.3	<b>413</b>
	Steel	750	400	23	3.6	
<b>Engine Preheaters</b>	Alloy 800	1600	870	90	13.9	<b>415</b>

Circulation Heaters





# Circulation Heaters

## Ultra-Pure Thick Film Quartz Heater Modules

Watlow® thick film quartz heater modules are intended for use in deionized (DI) water and aggressive chemical heating applications. The quartz heater modules employ Watlow's patented thick film on quartz technology.

These superior thick film heaters can be applied in areas where space is at a premium or where conventional heaters cannot be used because the voltage and wattage combination precludes using other types of resistive heaters. The heater's optimum watt density assures high reliability and long life. Due to the unique nature of a thick film circuit, these heaters can be designed to vary heat output across the entire surface. This quartz module provides superior performance under variable and low flow conditions.

The primary benefits of thick film heating include:

- Reduction in size of the heater modules over other heating technologies, therefore saving space in expensive tools, cleanrooms and wafer fabricators
- Elimination of the need for clean-dry-air (CDA) purge required in most infrared (IR) heating systems
- Reduction of the possibility of quartz devitrification that can occur in high-temperature IR heating systems
- Elimination of potential metal contamination associated with Teflon® (PFA) heating systems
- Reduction of preventative maintenance and increased tool uptime
- Reduced cost of ownership

### Performance Capabilities

- Application temperatures up to 302°F (150°C), or 90% of the boiling point, whichever is lower
- Watt densities up to 100 W/in<sup>2</sup> (15.5 W/cm<sup>2</sup>) on the substrate
- Single- and multi-phase power forms 120 to 480VAC

### Features and Benefits

#### Up to 100W/in<sup>2</sup> substrate

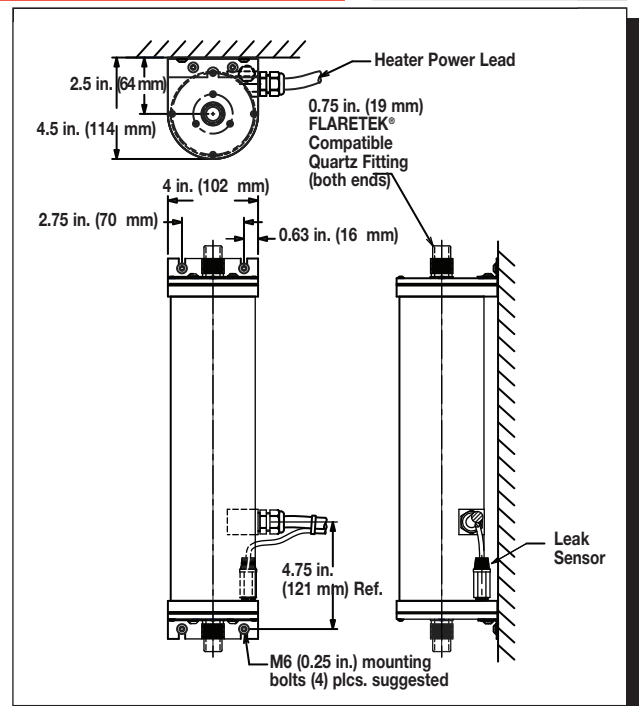
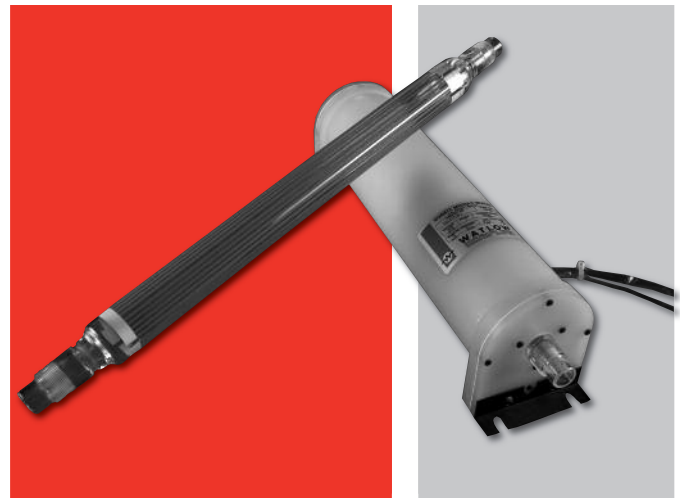
- Extends product life
- Provides higher product reliability
- Reduces cost of ownership

#### High purity semiconductor grade GE 214 quartz

- Minimizes risk of metal contamination

#### Primary element over-temperature sensor available as an RTD or thermocouple

- Provides standard sensor product offering



#### Power ratings up to 11kW

- Assures fast recovery due to direct heater contact
- Enables fast response

#### Low element temperature up to 842°F (450°C)

- Assures no CDA purge required at 8 gallons (30 liters) per minute, maximum flow rate and 0.25 gallons (0.95 liters) per minute, minimum flow rate
- Assures maximum efficiency in differing flow conditions
- Reduces preventative maintenance cycles

#### Redundant mechanical over-temperature snap switch

- Assures product safety

# Circulation Heaters

## Ultra-Pure Thick Film Quartz Heater Modules

### Features and Benefits *(Continued)*

#### Single- and multi-phase power forms 120 to 480VAC

- Works with the power available for heaters that do not require transformers

#### Options including enclosure materials

- Provides extra chemical resistance

**\*Note:** Refer to Flaretek® or Flarelock® II for manufacturer's pressure versus temperature rating charts on external fittings. Use a surge suppressor and/or pressure regulator in applications exceeding manufacturer's ratings.

### Typical Applications

- Ammonium chloride
- Deionized water (DI)
- Hydrobromic acid
- Hydrochloric acid
- Hydrogen peroxide
- Nitric acid
- Phosphoric acid
- Piranha etch (sulfuric acid + hydrogen peroxide)
- RCA standard clean 1 (SC1) (DI + ammonium hydroxide + hydrogen peroxide)
- RCA standard clean 2 (SC2) (DI + hydrochloric acid + hydrogen peroxide)
- Sulfuric acid
- TMAH (Tetra Methyl Ammonium Hydroxide)

### Optional Features

Quartz heater modules can be stand-alone units or interconnected to form systems for DI water or acid applications.

Depending upon the process need, the design of the quartz module allows application requirements to drive not only the electrical and thermal solution, but also the physical size of the equipment.

- Single-phase voltage
- Quartz end fittings compatible with standard 0.75 in. (19 mm) Flaretek® and Flarelock® II fittings
- 6 ft (1828 mm long Teflon® lead wires within flexible Teflon® sleeve
- Redundant safety high limit — Pilot duty (dry contact mechanical switch)
- High-limit sensor — Type J or K thermocouple (set limit control for 482°F (250°C))

### Options

- Quartz end fitting compatible with standard 19 mm pillar-style fitting available
- Three-phase voltage
- Leak detector — non-contact electro-optical switch (open collector)
- Teflon® (PFA) interconnects for arrays
- Kynar® 740 (PVDF) rated 266°F (130°C), recommended for acid applications other than hot phosphoric
- Semiconductor grade cleaning
- Downstream process sensor assembly
- Fitting assembly also available
- High-limit sensor — 100 RTD for dry-fire condition (set limit control for 482°F (250°C))

# Circulation Heaters

## Ultra-Pure Thick Film Quartz Heater Modules

### Technical Information

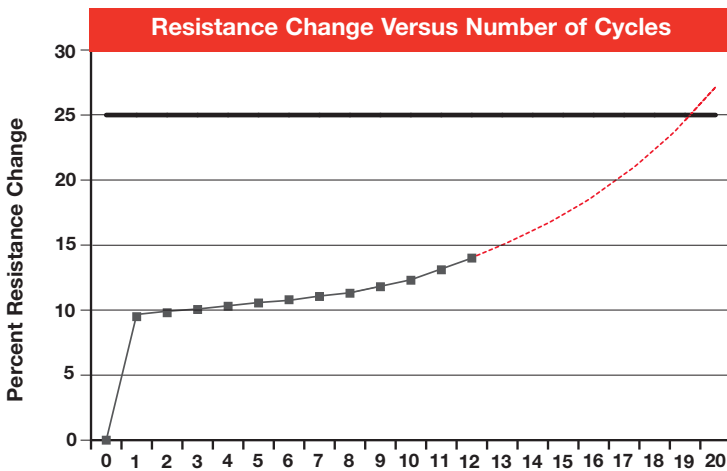
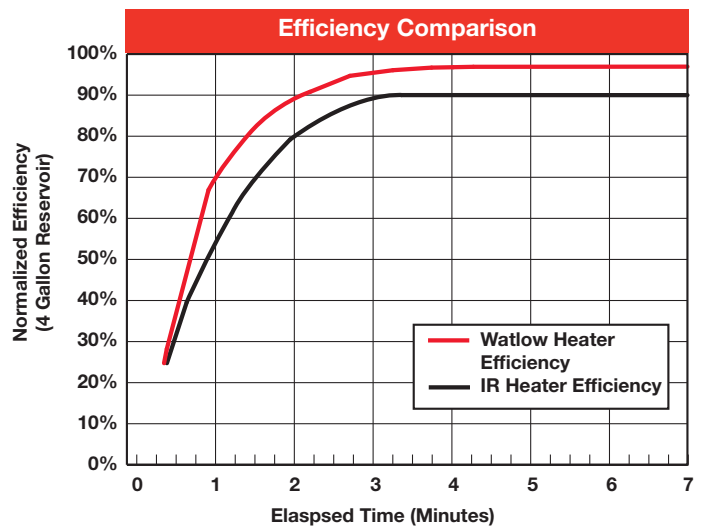
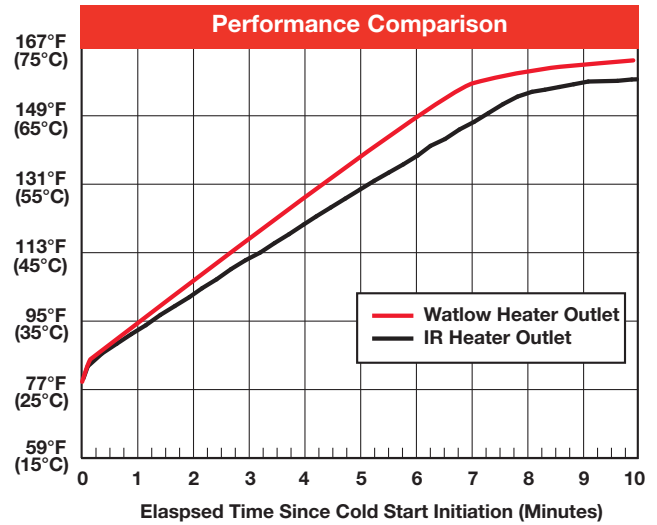
#### Performance Testing

Watlow's quartz heater module was tested in direct comparison to an IR heater to provide evidence of the performance and efficiency advantages of thick film technology.

Testing was performed on a wet bench heating DI water. The normalized performance comparison graph illustrates the thermal response of the system using each heater. The thermal load consisted of 4 gallons (15.1 liters) of water circulating through a diaphragm pump, the in-line heater, a diverter valve and back to a holding tank (reservoir). Temperatures were sensed at the outlet of the in-line heater and the bulk tank. The Watlow heater provided a faster heat up time. It outperformed the IR heater by achieving the process set point of 149°F (65°C) in 6.5 minutes; whereas, the IR heater required 7.25 minutes.

This efficiency comparison was created by normalizing the nominal power outputs of the respective heaters and calculating the efficiency based upon the work performed at the reservoir. Elapsed time for the efficiency test was equal for both systems at which both were at 100 percent power.

As shown in the efficiency comparison graph the Watlow heater demonstrated a five to ten percent improvement in efficiency.



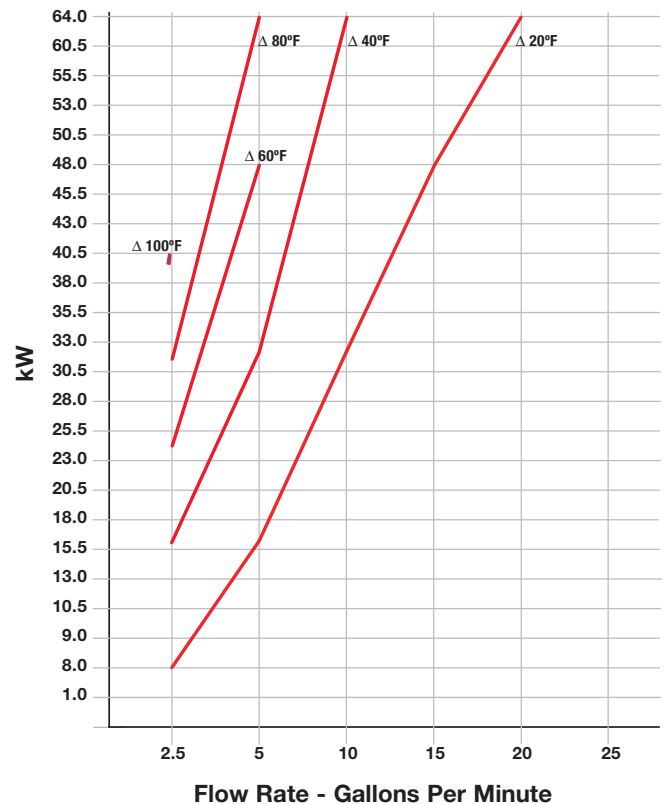
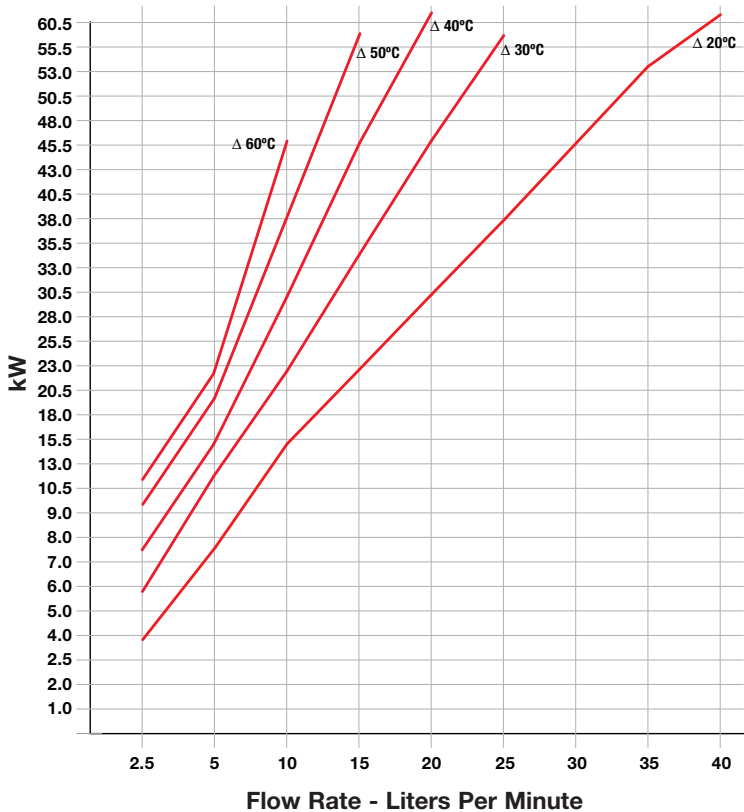
**Note:** Thermal cycling test conducted by Watlow using water at outlet temperature of 176°F (80°C), 10 seconds ON and 10 seconds OFF per cycle. Water back pressure at 50psi with flow rate at around 0.5 GPM failure predicted at 25 percent resistance change or approximately 1.9 million cycles.

# Circulation Heaters

## Ultra-Pure Thick Film Quartz Heater Modules

### Technical Information

#### Quick Estimates of Wattage Requirements (for Deionized Water)



**Note:** Locate the application flow rate on x-axis of the appropriate chart and follow the vertical line upward until it intersects the target temperature rise. At that point move left, horizontally, to the y-axis to capture the approximated wattage requirement.

#### Quick Estimates of Wattage Requirements

For heating flowing water, simply calculate:

$$\text{kW} = \text{GPM} \times \text{temperature rise (}^\circ\text{F)} \times 0.16$$

or

$$\text{kW} = \text{Liters/minute} \times \text{temperature rise (}^\circ\text{C)} \times 0.076$$

For heating recirculation applications in baths, simply calculate:

$$\text{kW} = \frac{\text{Gallons} \times \text{temperature rise (}^\circ\text{F)}}{375 \times \text{heat up time (hours)}}$$

or

$$\text{kW} = \frac{\text{Liters} \times \text{temperature rise (}^\circ\text{C)}}{790 \times \text{heat up time (hours)}}$$

# Circulation Heaters

**EXTENDED  
CAPABILITY**

## Extended Capabilities For Ultra-Pure Thick Film Quartz Heater Modules

### Technical Information

#### Maximum Available Power (kW)

Minimum Overall Fluid Path Length		Power (kW)	A	
Flaretek®			in.	(mm)
Lf in.	Lf (mm)			
12	(305)	2.4	10	(254)
15	(381)	3.8	13	(330)
18	(457)	5.2	16	(406)
21	(533)	6.6	19	(483)
24	(610)	8.0	22	(559)
27	(686)	9.4	25	(635)
30	(762)	10.8	28	(711)

**Notes:** ①Fluid path length includes a 0.75 in. (19 mm) Flaretek® — compatible all-PFA tube union.  
Minimum flow rate: 0.25 GPM (0.95 LPM). Contact your Watlow representative for available voltage forms.

# Circulation Heaters

## Ultra-Pure Thick Film Quartz Heater Modules

### Technical Information

#### Thick Film Quartz In-Line Heater Modules

Code Number	Module Size	Wattage	Voltage	Fitting Style	Lead Length
TQ-117-8-1	18 in.	5.2kW	208, 1-ph	¾ in. Flaretek®	72 in.
TQ-117-13-1	24 in.	6.8kW	480, 3-ph wye	¾ in. Flaretek®	72 in.
TQ-117-10-1	30 in.	9.2kW	480, 3-ph wye	¾ in. Flaretek®	72 in.

Includes leak detector

# Circulation Heaters

## STARFLOW™ Heaters

The STARFLOW™ circulation heater is engineered to heat a flowing gas stream to 1000°F (537°C). The 316L stainless steel chamber houses a small diameter sheathed element, which allows for quick response to both heat-up and cool down cycles.

Watlow's starwound, coiled cable heater provides extremely efficient and reliable heating by maximizing the contact area of the gas or fluid with the element. Because the element is sheathed, the unit can operate in gas streams requiring a clean environment as well as atmospheres containing contaminants and moisture. This provides superior performance compared to units with internally exposed or open element wires.

### Performance Capabilities

- Temperatures up to 1000°F (537°C), 316L stainless steel sheath
- Maximum watt densities to 30 W/in<sup>2</sup> (4.7 W/cm<sup>2</sup>)
- Maximum voltage to 240V

### Features and Benefits

#### Small diameter heater

- Allows for quick response time

#### Internal starwound element

- Provides fast, efficient heating

#### Sheathed element

- Provides the ability to heat in clean or impure streams

#### Flexibility in configurations

- Allows for adaptability to any process

#### 316L stainless steel

- Provides a rugged and corrosion resistant construction

#### Electropolishing available on all wetted surface

- Reduces particulate contamination

**Note:** contact factory for ultra-high purity applications

#### Low pressure loss

- Minimal flow restriction

**Note:** not suitable for use as a pressure vessel

#### Type J or K thermocouples

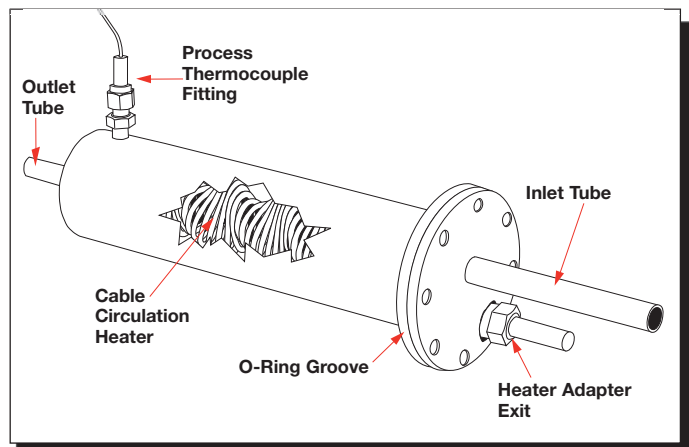
- Provides precise control and high-limit safety

#### Replaceable heater and thermocouple

- Reduces replacement cost

#### Shipment from stock

- Reduces downtime



### Typical Applications

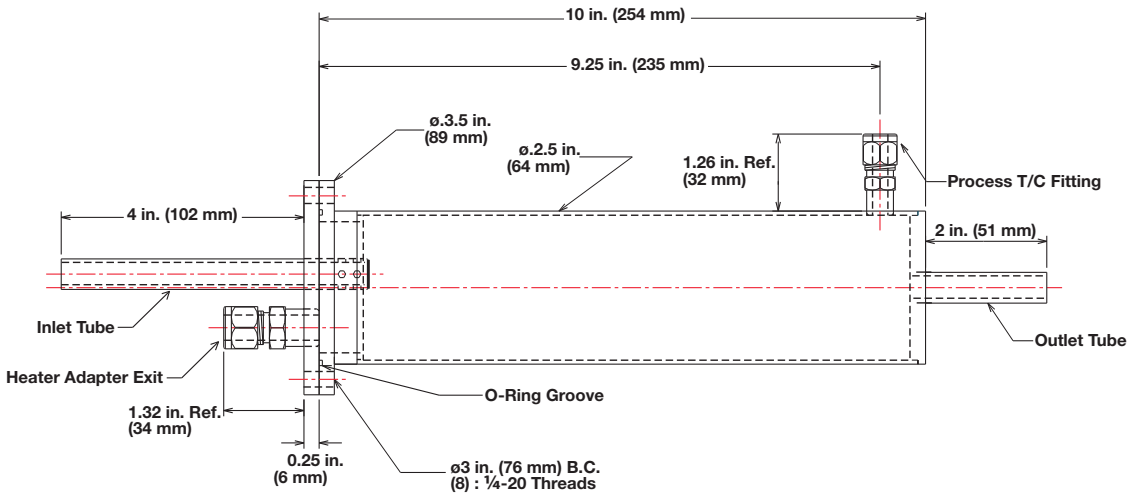
- Semiconductor processing
- Curing and drying
- Electronics
- Heat shrinking
- Thermal forming/sealing

### RAPID SHIP

- 1 to 3 day shipment

# Circulation Heaters

## STARFLOW Heaters



## Ordering Information

To order, complete the code number to the right with the information below:

1 2 3 4 5 6 7 8 9 10 11 12 13 14  
C H

### 3-4. Type of Inlet

ET = 1/4 in. (6 mm) O.D. tube  
JT = 1/2 in. (13 mm) O.D. tube

### 5-6. Type of Outlet

ET = 1/4 in. (6 mm) O.D. tube  
JT = 1/2 in. (13 mm) O.D. tube

### 7-10. Heater Wattage

0375 = 120V, 375 W  
0500 = 120V, 500 W  
0750 = 120V, 750 W  
1500 = 240V, 1500 W  
2000 = 240V, 2000 W  
3000 = 240V, 3000 W

### 11. Internal Thermocouple Calibration (Heater)

J = Type J  
K = Type K

### 12. Surface Finish of Assembly and Heater

X = Unfinished  
E = Electropolished

### 13. Process Thermocouple Calibration (Assembly)

J = Type J  
K = Type K

### 14. O-Ring Material

A = Viton® 500°F (260°C)  
M = Alloy X750® 1300°F (704°C)  
T = Teflon® encapsulated Viton® 392°F (200°C)

# Circulation Heaters

## WATROD™ and FIREBAR® Circulation Heaters

Circulation heaters provide a ready-made means to install electric heating with a minimal amount of time and labor. This is accomplished by combining heating elements, vessel, insulation, terminal enclosure, mounting brackets and inlet and outlet connections into a complete assembly.

Made from NPT screw plug or ANSI flange heater assemblies mated with a pressure vessel (tank), circulation heaters are designed to heat forced-circulation air, gases or liquids. Ideal for either in-line or side-arm operations, these assemblies direct fluids past FIREBAR® or WATROD™ heating elements, to deliver fast response and even heat distribution.

Watlow® meets virtually all your circulation heater assembly needs with made-to-order units. These units can be made from a wide range of heating element sheath materials, wattages, vessel sizes and materials, pressure ratings, terminal enclosures and controls.

### Performance Capabilities

- Watt densities to 120 W/in<sup>2</sup> (18.6 W/cm<sup>2</sup>)
- Wattages to three megawatts
- UL® and CSA component recognition to 600VAC
- Ratings to ANSI Class 600 pressure class
- Incoloy® sheath temperatures to 1600°F (870°C)
- Passivated 316 stainless steel sheath temperatures to 1200°F (650°C)
- Steel sheath temperatures to 750°F (400°C)
- Copper sheath temperatures to 350°F (175°C)

### Features and Benefits

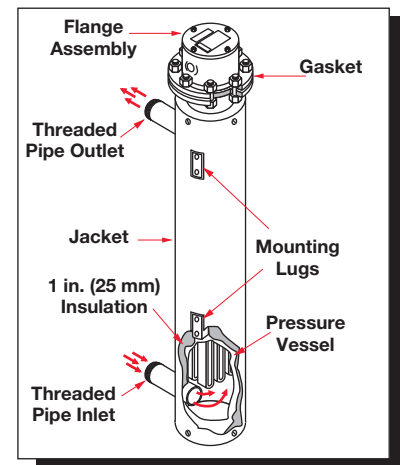
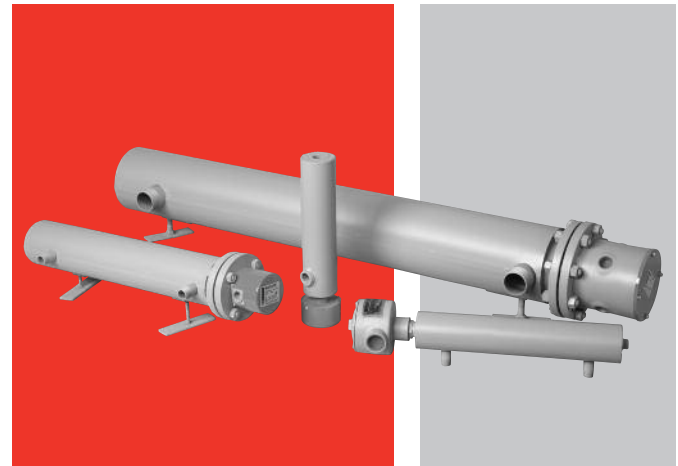
#### Catalog screw plug and flange part numbers

- Provides a wide selection of WATROD and FIREBAR elements to meet specific application requirements

Type	Sizes (in.)
NPT Screw Plugs	1¼, 2½
ANSI flanges	3, 4, 5, 6, 8, 10, 12, 14

#### ANSI B16.5 Class 150 on 4 or 6 inch FIREBAR element flanges and 3 to 14 inch WATROD element flanges

- Meets recognized agency standards



#### FIREBAR assemblies pack more wattage in a smaller heater bundle

- Replaces larger flanges with round tubular elements, with a smaller package

#### Compacted MgO insulation filled elements

- Maximizes dielectric strength, heat transfer and life

#### 1 inch (25 mm) thermal insulation rated to 750°F (400°C)

- Reduces heat loss from the vessel

#### Heavy-gauge steel jacket (shroud)

- Protects thermal insulation and heating vessel and comes with protective primer coating

## RAPID SHIP

- 1¼ to 5 in. NPS assemblies will ship same day up to 5 pieces
- 4 in. NPS, 316 SS assemblies will ship next day up to 5 pieces
- 6 in. NPS assemblies will ship same day up to 2 pieces
- 6 in. NPS, 316 SS assemblies will ship next day up to 2 pieces
- 8 to 14 in. NPS assemblies will ship next day up to 2 pieces

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

### Features and Benefits *(Continued)*

#### All catalog units rated to ANSI pressure Class 150

- Provides pressure vessels (tanks) that are either carbon or 316 stainless steel

#### Standard offering includes units rated for up to and including ANSI pressure class 600 (application review required)

- Provides pressure vessels (tanks) available in carbon steel, 304 or 316 stainless steel materials
- Includes schedule 40, standard and 80 pipe used in the pressure vessel construction

#### Catalog units provided with NPT or ANSI Class 150 nozzle connection

- Makes installation easy. Inlet and outlet nozzle connections are threaded MNPT on 8 in. (203 mm) and smaller tanks. Class 150 flanged connections on 10 in. (254 mm) and larger tanks

#### Mounting lugs are welded onto the tank wall of all 2½ in. (64 mm) NPT and larger units

- Provides mounting support

#### General purpose (NEMA 1), moisture resistant (NEMA 4), moisture/explosion resistant (NEMA 4/7) enclosures available

- Offers easy access to terminal wiring

#### Flange mounting holes

- Straddles centerline to comply with industry standards

#### UL® and CSA component recognition under file numbers E52951 and 31388 respectively

- Meets industry safety standards

### Typical Applications

#### Water:

- Deionized
- Demineralized
- Clean
- Potable
- Process
- Industrial water rinse tanks
- Hydraulic oil, crude, asphalt
- Lubricating oils at API specified watt densities
- Heat transfer oil
- Paraffin
- Caustic cleaners
- Nitrogen, hydrogen and other air/gas systems
- Superheating steam

## Options

### Terminal Enclosures

General purpose (NEMA 1) terminal enclosures, without thermostats, are supplied on all Watlow circulation heaters. Moisture and explosion resistant ratings are available to meet specific application needs. For screw plug terminal enclosures, refer to page 193.

For flange terminal enclosures, refer to page 265.

### Stand-off Terminal Enclosures

Stand-off terminal enclosures help protect terminal enclosures against excessive temperatures. For details, refer to page 261.

### ASME Pressure Vessel Code Welding

Flange or screw plug assemblies can be provided with an ASME Section VIII, Div. I pressure vessel stamp upon request.

### Branch Circuits

Branch circuits are designed for 48 amperes per circuit maximum. Contact your Watlow representative for circuit requirements other than those listed in the stock charts.

### Certified Enclosures

CSA, ATEX or IECEx certified moisture and/or explosion resistant terminal enclosures protect wiring in hazardous gas environments. These terminal enclosures, covered under CSA file number 61707, ATEX certificate # KEMA 07ATEX0172X or IECEx certificate # IECEx CSA 09.0010 are available on WATROD flange heaters. For additional information, see page 611 and 612 or contact your Watlow representative.

To order, specify **CSA or ATEX or IECEx certified enclosure**, **process temperature** (°F), maximum ambient temperature, maximum **working pressure** of application (psig), **media** being heated and heater **mounting orientation** (horizontal or vertical) and **flange size**.

### Thermostats

To provide process temperature control, Watlow offers optional single- and double-pole thermostats. Thermostats are typically mounted in the terminal enclosure. Optional side mounting on vessel also available.

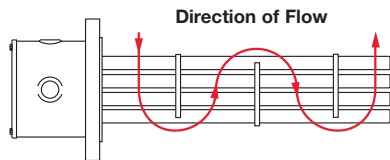
See *Screw Plug Immersion Heaters*, page 189 and *Flange Immersion Heaters*, on page 261 for details.

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

Options (Continued)

### Baffles



Baffles mounted on the heating element bundle enhance and/or modify liquid or gas flow for better heat transfer.

For critical sheath temperature and low flow conditions, baffles may be required.

Contact your Watlow representative for details.

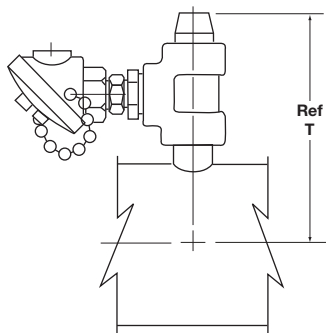
### Thermocouples

To sense process or element sheath temperature, ASTM Type J or K thermocouples are available.

See *Screw Plug Immersion Heaters*, page 190 and *Flange Immersion Heaters*, on page 261 for details.

### Process Thermocouple in Nozzle

(Must specify which nozzle)



Ref. Tank Size	Ref. Nozzle Size	Dimension "A"
1¼	¾ NPT	8 <sup>3</sup> / <sub>16</sub>
2½	1 NPT	8 <sup>3</sup> / <sub>16</sub>
3	1 NPT	8 <sup>3</sup> / <sub>16</sub>
4	1½ NPT	10 <sup>3</sup> / <sub>16</sub>
5	2 NPT	11 <sup>1</sup> / <sub>16</sub>
6	2½ NPT	13 <sup>3</sup> / <sub>16</sub>
8	2½ NPT	14 <sup>3</sup> / <sub>16</sub>

For 10 in. (254 mm) and larger tanks contact your Watlow representative for dimension.

### Sheath Materials

The following sheath materials are available on WATROD and FIREBAR heating elements:

#### Standard Sheath Materials

<b>WATROD</b>	Incoloy® 316 SS Steel Copper
<b>FIREBAR</b>	Incoloy®

#### Made-to-Order Sheath Materials

<b>WATROD</b>	304 SS Monel®
<b>FIREBAR</b>	304 stainless steel

### Wattages and Voltages

Watlow routinely supplies circulation heaters with 120 to 480VAC as well as wattages from 500 watts to one megawatt. If required, Watlow will configure circulation heaters with voltages and wattages outside these parameters.

For more information on special voltage and wattage configurations, contact your Watlow representative.

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

### Options (Continued)

#### Pressure Vessels

All catalog pressure vessel (tank) materials consist of schedule 40 pipe and 150# class forged fittings and are made from one of the following materials:

- Carbon steel
- 316 stainless steel

All catalog pressure vessels (tanks) are steel unless otherwise noted.

316 stainless steel pressure vessels (tanks) are passivated on all wetted surfaces. Available from Assembly Stock on 2½ inch NPT and 4 or 6 inch ANSI flange circulation heaters.

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#### Passivated Finish

For critical applications, passivation will remove free iron from all wetted surfaces.

Contact your Watlow representative for details.

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#### Gaskets

Rubber, asbestos-free and spiral wound gaskets are available for all heater flange, and inlet and outlet flange sizes.

Watlow recommends ordering spares in case replacement becomes necessary.

To order, specify **gasket type, flange size/rating** and **process operating temperature**.

For details on gasket materials and temperature ratings, see page 262.

#### Inlet and Outlet Nozzle Connections

All inlet and outlet materials are compatible with the pressure vessel material and pressure class rating.

Vessel sizes from 1¼ to 8 inches are typically configured with MNPT (Male National Pipe Thread) nozzles. Optional NPT and flange sizes can be supplied to mate with existing piping.

10 inch and larger vessels are supplied with Class 150 inlet and outlet flanges. Optional Class 300 or Class 600 can be provided to mate with existing piping.

To order, specify **type, size** and **pressure class** rating for both inlet and outlet nozzle/flange connections.

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#### Protective Steel Jacket (Shroud)

To protect circulation heaters from weather or wash-down conditions, fully welded (weatherproof) or partially welded (standard) outer protective steel jackets are available. Standard steel, or made-to-order 304 or 316 stainless steel can be supplied. Jacket diameter is dependent upon thermal insulation thickness.

To order, specify **protective steel jacket, material type** and **weatherproof**, if desired.

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

### Technical Data

#### Maximum Velocities

The rate at which a gas or liquid flows through inlet and outlet pipes is critical to maintaining the desired output temperature. Pressure drop through the circulation heater must be considered to properly size blowers or pumps. The *Maximum Velocity to Avoid Excessive Pressure Drop* chart gives recommended maximum velocities, in feet per second and meters per second of gas or liquid being heated and nominal pipe size.

#### Maximum Velocity to Avoid Excessive Pressure Drop

Fluid	Nominal Pipe Size in.	Maximum Velocity	
		ft/sec	(m/sec)
Gases	All	200	(61.0)
Liquid	4 and smaller	10	(3.0)
Liquid	6-8	15	(5.0)
Liquid	10-12	19	(6.0)
Liquid	14-16	21	(6.4)
Liquid	18-20	23	(7.0)
Liquid	24	24	(7.3)

#### Vessel Orientation Guidelines

Correctly orienting the heating vessel assures lower terminal enclosure temperatures and element immersion. Detailed instructions on vessel orientation are contained in the *Installation and Maintenance Instructions* that accompanies all circulation heaters.

The following are guidelines for vessel orientation in liquid and gas heating applications.

##### Liquids

Orient circulation heater:

- Horizontally with inlet and outlet pipes pointing up
- Vertically with the terminal enclosure up and the inlet pipe on the bottom

These orientations ensure the heating elements will be immersed at all times and help prevent premature failure.

##### Air or Gases

Orient circulation heater:

- Horizontally with the inlet nozzle closest to the terminal enclosure
- Vertically with terminal enclosure at the bottom of the tank. Use the nozzle nearest the bottom as the inlet connection

If installation constraints do not allow mounting in accordance with these guidelines, contact your Watlow representative.

#### Application Hints

- Select the recommended heating element sheath material and watt density for the substance being heated. Use the *Supplemental Applications Chart* on pages 599 to 604. If unable to determine the correct heating element type and material, contact your Watlow representative.
- Assure selecting proper vessel by considering the pressure or flow rate, process temperature and corrosiveness of the media being heated. If assistance with vessel selection is required, contact your Watlow representative.
- For maintenance/replacement procedures, retain an area twice the circulation heater's overall length to permit easy removal and inspection of screw plug or flange heater assemblies.
- Choose a FIREBAR assembly when you require:
  - A smaller package
  - More kilowatts or lower watt density in an equally sized WATROD circulation tank.
- Minimize problems associated with low flow or low liquid level conditions with a low liquid level sensor and/or sheath high-limit control.
- Ensure wiring integrity by making sure terminal enclosure temperature does not exceed 400°F (205°C).
- Size power feeder wires in accordance with national electrical code guidelines and other applicable codes
- Protect against electrical shock by properly grounding the unit per NEC requirements.
- One or more circulation heaters may be connected in series to achieve the desired total kilowatt or temperature output.

## WATROD and FIREBAR Circulation Heaters

### Performance Capabilities

- Up to 3000psi design pressure

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### Features and Benefits

Offering includes units rated above ANSI pressure class 600

- Pressure vessel tanks are available in “H” series stainless steel, Titanium, Incoloy®, Alloy 600, Chrome Moly, Monel, Duplex and 321 stainless steel

### Options

#### Exotic Sheath Materials

Contact your Watlow representative for details and availability.

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#### Pressure Vessels

Made-to-order units can be made in a variety of materials, flange sizes and pressure classes.

To order, specify **pressure vessel (tank) size, material and pressure class.**

Ratings to ANSI class 2500 pressure class are available for high-pressure applications.

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#### High-Temperature Thermal Insulation

To further minimize heat loss, the pressure vessel's standard one inch thermal insulation wrap may be replaced with thicker or higher temperature insulation. For more information, contact your Watlow representative.

To order, specify **insulation thickness, standard or high temperature insulation and temperature rating.**

Vessels may be supplied with a primer coating without insulation.

To order, specify **no insulation.**

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#### Support Saddles

To mate with an existing installation, customized support saddle(s) and/or mounting lugs are available.

To order, specify **mounting lugs or support saddles** and supply a dimensional drawing.

# Circulation Heaters

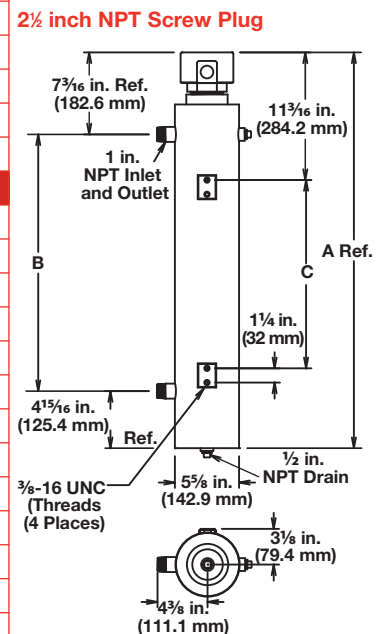
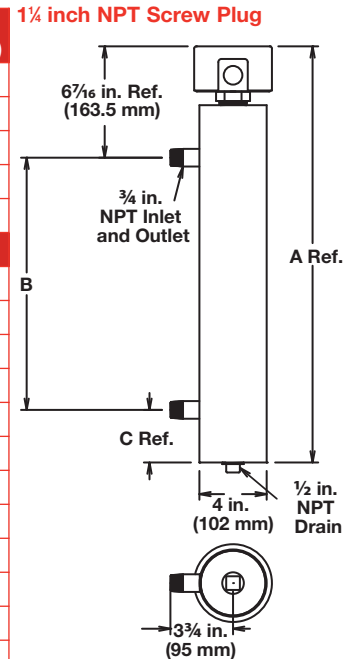
## WATROD and FIREBAR Circulation Heaters



### Application: Clean Water ⑤

- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>1 1/4 inch NPT Screw Plug (WATROD)</b>										
<b>60 W/in<sup>2</sup> ④ Steel Tank 2-Copper Elements (9.3 W/cm<sup>2</sup>)</b>	120/240	3.0	1	1	CBEC15A6S	RS	23 (11)	24 3/8 (625.5)	15 (381)	3 3/8 (79.4)
	240	4.0	1	1	CBEC19A10S	RS	29 (14)	24 3/8 (625.5)	15 (381)	3 3/8 (79.4)
	240	5.0	1	1	CBEC23J10S	RS	29 (14)	32 3/8 (828.7)	23 (584)	3 3/8 (79.4)
	240	6.0	1	1	CBEC27J10S	RS	31 (14)	32 3/8 (828.7)	23 (584)	3 3/8 (79.4)
<b>1 1/4 inch NPT Screw Plug (FIREBAR)</b>										
<b>90 W/in<sup>2</sup> Steel Tank 1-Incoloy® Elements (14 W/cm<sup>2</sup>)</b>	240	1.5	1	1	CBDNF7R10S	RS	26 (12)	24 3/8 (625.5)	15 (381)	3 3/8 (79.4)
	480	1.5	1	1	CBDNF7R11S	RS	26 (12)	24 3/8 (625.5)	15 (381)	3 3/8 (79.4)
	240	3.0	1	1	CBDNF11G10S	RS	26 (12)	24 3/8 (625.5)	15 (381)	3 3/8 (79.4)
	480	3.0	1	1	CBDNF11G11S	RS	26 (12)	24 3/8 (625.5)	15 (381)	3 3/8 (79.4)
	240	5.0	3	1	CBDNF16G3S	RS	26 (12)	24 3/8 (625.5)	15 (381)	3 3/8 (79.4)
	480	5.0	3	1	CBDNF16G5S	RS	26 (12)	24 3/8 (625.5)	15 (381)	3 3/8 (79.4)
	240	6.5	3	1	CBDNF19G3S	RS	30 (14)	32 3/8 (828.7)	23 (584)	3 3/8 (79.4)
	480	6.5	3	1	CBDNF19G5S	RS	30 (14)	32 3/8 (828.7)	23 (584)	3 3/8 (79.4)
	240	8.5	3	1	CBDNF24L3S	RS	31 (14)	32 3/8 (828.7)	23 (584)	3 3/8 (79.4)
	480	8.5	3	1	CBDNF24L5S	RS	31 (14)	32 3/8 (828.7)	23 (584)	3 3/8 (79.4)
	240	10.5	3	1	CBDNF29R3S	RS	43 (20)	42 3/8 (1082.7)	32 (813)	4 3/8 (111.1)
	480	10.5	3	1	CBDNF29R5S	RS	43 (20)	42 3/8 (1082.7)	32 (813)	4 3/8 (111.1)
	240	12.7	3	1	CBDNF34R3S	RS	44 (20)	42 3/8 (1082.7)	32 (813)	4 3/8 (111.1)
	480	12.7	3	1	CBDNF34R5S	RS	44 (20)	42 3/8 (1082.7)	32 (813)	4 3/8 (111.1)
	240	17.0	3	1	CBDNF45G3S	RS	69 (32)	63 3/8 (1616.1)	53 (1346)	4 3/8 (111.1)
	480	17.0	3	1	CBDNF45G5S	RS	69 (32)	63 3/8 (1616.1)	53 (1346)	4 3/8 (111.1)
480	21.5	3	1	CBDNF55R5S	RS	71 (33)	63 3/8 (1616.1)	53 (1346)	4 3/8 (111.1)	
<b>2 1/2 inch NPT Screw Plug (WATROD)</b>										
<b>60 W/in<sup>2</sup> Steel Tank 3-Copper Elements (9.3 W/cm<sup>2</sup>)</b>	240	6.0	3	1	CBLC714L3S	RS	24 (11)	34 3/8 (881)	22 1/2 (572)	16 1/2 (419)
	480	6.0	3	1	CBLC714L5S	RS	24 (11)	34 3/8 (881)	22 1/2 (572)	16 1/2 (419)
	240	7.5	3	1	CBLC717L3S	RS	24 (11)	34 3/8 (881)	22 1/2 (572)	16 1/2 (419)
	480	7.5	3	1	CBLC717L5S	RS	24 (11)	34 3/8 (881)	22 1/2 (572)	16 1/2 (419)
	240	9.0	3	1	CBLC720L3S	RS	26 (12)	34 3/8 (881)	22 1/2 (572)	16 1/2 (419)
	480	9.0	3	1	CBLC720L5S	RS	26 (12)	34 3/8 (881)	22 1/2 (572)	16 1/2 (419)
	240	12.0	3	1	CBLC726C3S	RS	27 (13)	44 (1135)	32 1/2 (1129)	26 1/2 (673)
	480	12.0	3	1	CBLC726C5S	RS	27 (13)	44 (1135)	32 1/2 (1129)	26 1/2 (673)
	240	15.0	3	1	CBLC731L3S	RS	29 (14)	44 (1135)	32 1/2 (1129)	26 1/2 (673)
	480	15.0	3	1	CBLC731L5S	RS	29 (14)	44 (1135)	32 1/2 (1129)	26 1/2 (673)
	240	18.0	3	1	CBLC737C3S	RS	30 (14)	57 1/8 (1453)	45 (1143)	39 (991)
	480	18.0	3	1	CBLC737C5S	RS	30 (14)	57 1/8 (1453)	45 (1143)	39 (991)



### RAPID SHIP

- RS - Same day shipment up to 5 pieces

④ Wired for higher voltage

⑤ When steel vessel materials are used in this application, some rust may be present in the process media

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters



### Application: Clean Water ⑤

- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>2½ inch NPT Screw Plug (FIREBAR)</b>										
<b>90 W/in<sup>2</sup> ⑧ Steel Tank 3-Incoloy® Elements (14 W/cm<sup>2</sup>)</b>	240	15.0	3	1	CBLNF15C3S	RS	22 (10)	34¾ (881)	22½ (572)	16½ (419)
	480	15.0	3	1	CBLNF15C5S	RS	22 (10)	34¾ (881)	22½ (572)	16½ (419)
	240	20.0	3	1	CBLNF18C3S	RS	23 (11)	34¾ (881)	22½ (572)	16½ (419)
	480	20.0	3	1	CBLNF18C5S ③	RS	23 (11)	34¾ (881)	22½ (572)	16½ (419)
	480	25.0	3	1	CBLNF23C5S	RS	31 (14)	34¾ (881)	22½ (572)	16½ (419)
	480	32.0	3	1	CBLNF28L5S	RS	34 (16)	44¾ (1135)	32½ (1129)	26½ (673)
480	38.0	3	1	CBLNF33L5S	RS	35 (16)	44¾ (1135)	32½ (1129)	26½ (673)	
<b>3 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>60 W/in<sup>2</sup> Steel Tank 3-Copper Elements (9.3 W/cm<sup>2</sup>)</b>	120	6.0	1	1	CFMC715J10S	RS	66 (30)	35¾ (894)	22½ (573)	16½ (419)
	240	6.0	3	1	CFMC715J3S	RS	66 (30)	35¾ (894)	22½ (573)	16½ (419)
	480	6.0	1	1	CFMC715J11S	RS	66 (30)	35¾ (894)	22½ (573)	16½ (419)
	480	6.0	3	1	CFMC715J5S	RS	66 (30)	35¾ (894)	22½ (573)	16½ (419)
	120	9.0	1	1	CFMC721J10S	RS	70 (32)	35¾ (894)	22½ (573)	16½ (419)
	240	9.0	3	1	CFMC721J3S	RS	70 (32)	35¾ (894)	22½ (573)	16½ (419)
	480	9.0	1	1	CFMC721J11S	RS	70 (32)	35¾ (894)	22½ (573)	16½ (419)
	480	9.0	3	1	CFMC721J5S	RS	70 (32)	35¾ (894)	22½ (573)	16½ (419)
	240	12.0	3	1	CFMC727A3S	RS	80 (37)	45¾ (1148)	32½ (826)	26½ (673)
	480	12.0	1	1	CFMC727A11S	RS	80 (37)	45¾ (1148)	32½ (826)	26½ (673)
	480	12.0	3	1	CFMC727A5S	RS	80 (37)	45¾ (1148)	32½ (826)	26½ (673)
	240	15.0	3	1	CFMC732J3S	RS	96 (44)	45¾ (1148)	32½ (826)	26½ (673)
	480	15.0	1	1	CFMC732J11S	RS	96 (44)	45¾ (1148)	32½ (826)	26½ (673)
	480	15.0	3	1	CFMC732J5S	RS	96 (44)	45¾ (1148)	32½ (826)	26½ (673)
	240	18.0	3	1	CFMC738A3S	RS	98 (45)	57¾ (1465)	45 (1143)	39 (991)
	480	18.0	1	1	CFMC738A11S	RS	98 (45)	57¾ (1465)	45 (1143)	39 (991)
	480	18.0	3	1	CFMC738A5S	RS	98 (45)	57¾ (1465)	45 (1143)	39 (991)

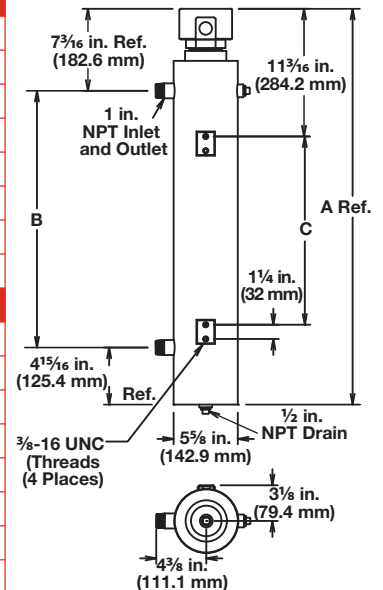
### RAPID SHIP

- RS - Same day shipment up to 5 pieces

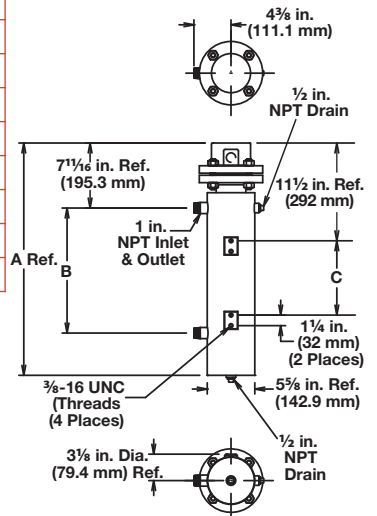
- ③ Wired for 3-phase operation only
- ⑤ When steel vessel materials are used in this application, some rust may be present in the process media
- ⑧ Can be wired for 1-phase operation

Truck Shipment only

### 2½ inch NPT Screw Plug



### 3 inch - 150 lb ANSI Flange



# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

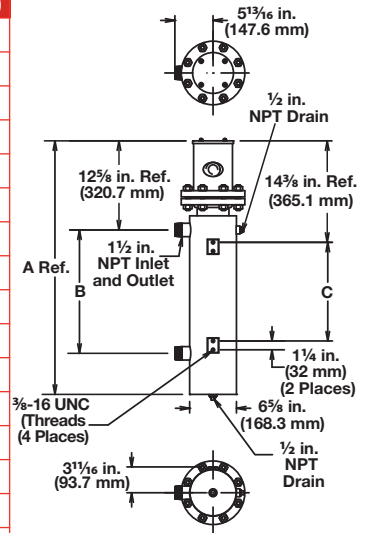


### Application: Clean Water ⑤

- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>4 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>60 W/in<sup>2</sup> Steel Tank 6-Copper Elements (9.3 W/cm<sup>2</sup>)</b>	240	12.0	1	2	<b>CFOC715J10S</b>	RS	124 (57)	39 (989)	20½ (521)	17 (432)
	240	12.0	3	1	<b>CFOC715J3S</b>	RS	124 (57)	39 (989)	20½ (521)	17 (432)
	480	12.0	1	1	<b>CFOC715J11S</b>	RS	124 (57)	39 (989)	20½ (521)	17 (432)
	480	12.0	3	1	<b>CFOC715J5S</b>	RS	124 (57)	39 (989)	20½ (521)	17 (432)
	240	18.0	1	2	<b>CFOC721J10S</b>	RS	127 (58)	39 (989)	20½ (521)	17 (432)
	240	18.0	3	1	<b>CFOC721J3S</b>	RS	127 (58)	39 (989)	20½ (521)	17 (432)
	480	18.0	1	1	<b>CFOC721J11S</b>	RS	127 (58)	39 (989)	20½ (521)	17 (432)
	480	18.0	3	1	<b>CFOC721J5S</b>	RS	127 (58)	39 (989)	20½ (521)	17 (432)
	240	24.0	1	2	<b>CFOC727A10S</b>	RS	160 (73)	49½ (1256)	31 (787)	27½ (699)
	240	24.0	3	2	<b>CFOC727A3S</b>	RS	160 (73)	49½ (1256)	31 (787)	27½ (699)
	480	24.0	1	1	<b>CFOC727A11S</b>	RS	160 (73)	49½ (1256)	31 (787)	27½ (699)
	480	24.0	3	1	<b>CFOC727A5S</b>	RS	160 (73)	49½ (1256)	31 (787)	27½ (699)
	240	30.0	3	2	<b>CFOC732J3S</b>	RS	163 (74)	49½ (1256)	31 (787)	27½ (699)
	480	30.0	1	2	<b>CFOC732J11S</b>	RS	163 (74)	49½ (1256)	31 (787)	27½ (699)
	480	30.0	3	1	<b>CFOC732J5S</b>	RS	163 (74)	49½ (1256)	31 (787)	27½ (699)
	240	36.0	3	2	<b>CFOC738A3S</b>	RS	229 (104)	70½ (1789)	52 (1321)	48½ (1232)
	480	36.0	1	2	<b>CFOC738A11S</b>	RS	229 (104)	70½ (1789)	52 (1321)	48½ (1232)
	480	36.0	3	1	<b>CFOC738A5S</b>	RS	229 (104)	70½ (1789)	52 (1321)	48½ (1232)
	480	50.0	3	2	<b>CFOC751A5S</b>	RS	234 (107)	70½ (1789)	52 (1321)	48½ (1232)
	480	60.0	3	2	<b>CFOC760J5S</b>	S	297 (135)	91½ (2326)	73 (1854)	66 (1676)

4 inch - 150 lb ANSI Flange



### RAPID SHIP

- **RS** - Same day shipment up to 5 pieces
- **S** - 10 day lead time

⑤ When steel vessel materials are used in this application, some rust may be present in the process media

■ Truck Shipment only

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

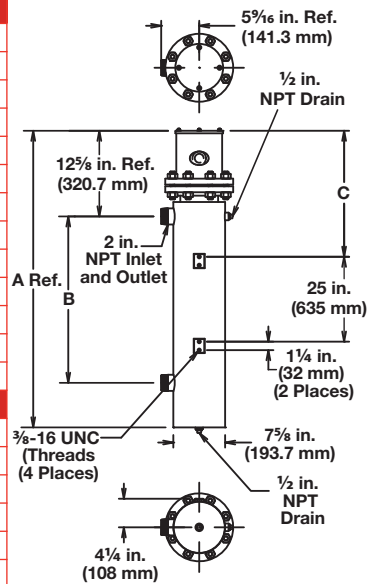


### Application: Clean Water <sup>⑤</sup>

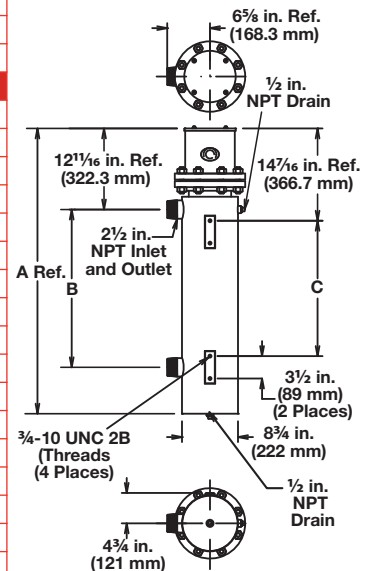
- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>5 inch - 150 lb ANSI Flange (WATROD)</b>										
60 W/in <sup>2</sup> Steel Tank 6-Copper Elements (9.3 W/cm <sup>2</sup> )	240	24.0	1	3	CFNC727A10S	RS	140 (64)	49 $\frac{1}{4}$ (1249.0)	30 (762)	14 $\frac{1}{8}$ (378.8)
	240	24.0	3	2	CFNC727A3S	RS	140 (64)	49 $\frac{1}{4}$ (1249.0)	30 (762)	14 $\frac{1}{8}$ (378.8)
	480	24.0	1	3	CFNC727A11S	RS	140 (64)	49 $\frac{1}{4}$ (1249.0)	30 (762)	14 $\frac{1}{8}$ (378.8)
	480	24.0	3	1	CFNC727A5S	RS	140 (64)	49 $\frac{1}{4}$ (1249.0)	30 (762)	14 $\frac{1}{8}$ (378.8)
	240	30.0	3	2	CFNC732J3S	RS	142 (65)	49 $\frac{1}{4}$ (1249.0)	30 (762)	14 $\frac{1}{8}$ (378.8)
	480	30.0	1	2	CFNC732J11S	RS	142 (65)	49 $\frac{1}{4}$ (1249.0)	30 (762)	14 $\frac{1}{8}$ (378.8)
	480	30.0	3	1	CFNC732J5S	RS	142 (65)	49 $\frac{1}{4}$ (1249.0)	30 (762)	14 $\frac{1}{8}$ (378.8)
	240	36.0	3	2	CFNC738A3S	RS	160 (73)	56 $\frac{1}{4}$ (1427.0)	37 (940)	18 $\frac{1}{8}$ (473.1)
	480	36.0	1	2	CFNC738A11S	RS	160 (73)	56 $\frac{1}{4}$ (1427.0)	37 (940)	18 $\frac{1}{8}$ (473.1)
	480	36.0	3	1	CFNC738A5S	RS	160 (73)	56 $\frac{1}{4}$ (1427.0)	37 (940)	18 $\frac{1}{8}$ (473.1)
480	50.0	3	2	CFNC751A5S	RS	180 (82)	67 $\frac{1}{4}$ (1719.0)	48 $\frac{1}{2}$ (1232)	25 (633.0)	
480	60.0	3	2	CFNC760J5S	S	190 (87)	81 $\frac{1}{2}$ (2060.6)	61 $\frac{1}{2}$ (1572)	30 $\frac{1}{2}$ (784.2)	
<b>5 inch - 150 lb ANSI Flange (WATROD)</b>										
60 W/in <sup>2</sup> Steel Tank 9-Copper Elements (9.3 W/cm <sup>2</sup> )	240	36.0	3	3	CFNC727A3XS	RS	145 (66)	49 $\frac{1}{4}$ (1249.0)	30 (762)	14 $\frac{1}{8}$ (378.8)
	480	36.0	1	3	CFNC727A11XS	RS	145 (66)	49 $\frac{1}{4}$ (1249.0)	30 (762)	14 $\frac{1}{8}$ (378.8)
	480	36.0	3	1	CFNC727A5XS	RS	145 (66)	49 $\frac{1}{4}$ (1249.0)	30 (762)	14 $\frac{1}{8}$ (378.8)
	240	45.0	3	3	CFNC732J3XS	RS	147 (67)	49 $\frac{1}{4}$ (1249.0)	30 (762)	14 $\frac{1}{8}$ (378.8)
	480	45.0	1	3	CFNC732J11XS	RS	147 (67)	49 $\frac{1}{4}$ (1249.0)	30 (762)	14 $\frac{1}{8}$ (378.8)
	480	45.0	3	3	CFNC732J5XS	RS	147 (67)	49 $\frac{1}{4}$ (1249.0)	30 (762)	14 $\frac{1}{8}$ (378.8)
	240	54.0	3	3	CFNC738A3XS	RS	166 (76)	56 $\frac{1}{4}$ (1427.0)	37 (940)	18 $\frac{1}{8}$ (473.1)
	480	54.0	1	3	CFNC738A11XS	RS	166 (76)	56 $\frac{1}{4}$ (1427.0)	37 (940)	18 $\frac{1}{8}$ (473.1)
	480	54.0	3	3	CFNC738A5XS	RS	166 (76)	56 $\frac{1}{4}$ (1427.0)	37 (940)	18 $\frac{1}{8}$ (473.1)
	480	75.0	3	3	CFNC751A5XS	RS	188 (86)	67 $\frac{1}{4}$ (1719.0)	48 $\frac{1}{2}$ (1232)	25 (633.0)
480	90.0	3	3	CFNC760J5XS	S	200 (91)	81 $\frac{1}{2}$ (2060.6)	61 $\frac{1}{2}$ (1572)	30 $\frac{1}{2}$ (784.2)	
<b>6 inch - 150 lb ANSI Flange (WATROD)</b>										
60 W/in <sup>2</sup> Steel Tank 12-Copper Elements (9.3 W/cm <sup>2</sup> )	240	24.0	1	3	CFPC715G10S	RS	212 (97)	40 $\frac{1}{2}$ (1027)	20 $\frac{1}{2}$ (521)	17 (432)
	240	24.0	3	2	CFPC715G3S	RS	212 (97)	40 $\frac{1}{2}$ (1027)	20 $\frac{1}{2}$ (521)	17 (432)
	480	24.0	1	2	CFPC715G11S	RS	212 (97)	40 $\frac{1}{2}$ (1027)	20 $\frac{1}{2}$ (521)	17 (432)
	480	24.0	3	1	CFPC715G5S	RS	212 (97)	40 $\frac{1}{2}$ (1027)	20 $\frac{1}{2}$ (521)	17 (432)
	240	36.0	1	4	CFPC721G10S	RS	217 (99)	40 $\frac{1}{2}$ (1027)	20 $\frac{1}{2}$ (521)	17 (432)
	240	36.0	3	2	CFPC721G3S	RS	217 (99)	40 $\frac{1}{2}$ (1027)	20 $\frac{1}{2}$ (521)	17 (432)
	480	36.0	1	2	CFPC721G11S	RS	217 (99)	40 $\frac{1}{2}$ (1027)	20 $\frac{1}{2}$ (521)	17 (432)
	480	36.0	3	1	CFPC721G5S	RS	217 (99)	40 $\frac{1}{2}$ (1027)	20 $\frac{1}{2}$ (521)	17 (432)
	240	48.0	3	4	CFPC726R3S	RS	222 (101)	51 (1294)	31 (787)	27 $\frac{1}{2}$ (699)
	480	48.0	1	3	CFPC726R11S	RS	222 (101)	51 (1294)	31 (787)	27 $\frac{1}{2}$ (699)
	480	48.0	3	2	CFPC726R5S	RS	222 (101)	51 (1294)	31 (787)	27 $\frac{1}{2}$ (699)
	240	60.0	3	4	CFPC732G3S	RS	288 (131)	51 (1294)	31 (787)	27 $\frac{1}{2}$ (699)
	480	60.0	1	3	CFPC732G11S	RS	288 (131)	51 (1294)	31 (787)	27 $\frac{1}{2}$ (699)
	480	60.0	3	2	CFPC732G5S	RS	288 (131)	51 (1294)	31 (787)	27 $\frac{1}{2}$ (699)
	240	72.0	3	4	CFPC737R3S	RS	290 (132)	72 (1827)	52 (1321)	48 $\frac{1}{2}$ (1232)
	480	72.0	3	2	CFPC737R5S	RS	290 (132)	72 (1827)	52 (1321)	48 $\frac{1}{2}$ (1232)
	480	100.0	3	4	CFPC750R5S	RS	298 (136)	72 (1827)	52 (1321)	48 $\frac{1}{2}$ (1232)
	480	120.0	3	4	CFPC760G5S	S	360 (164)	93 (2361)	73 (1854)	66 (1676)

### 5 inch - 150 lb ANSI Flange



### 6 inch - 150 lb ANSI Flange



## RAPID SHIP

- RS - Same day shipment up to 5 pieces
- S - 10 day lead time

⑤ When steel vessel materials are used in this application, some rust may be present in the process media

Truck Shipment only

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

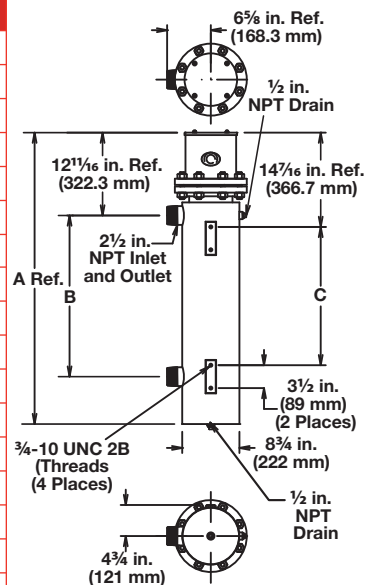


### Application: Clean Water ⑤

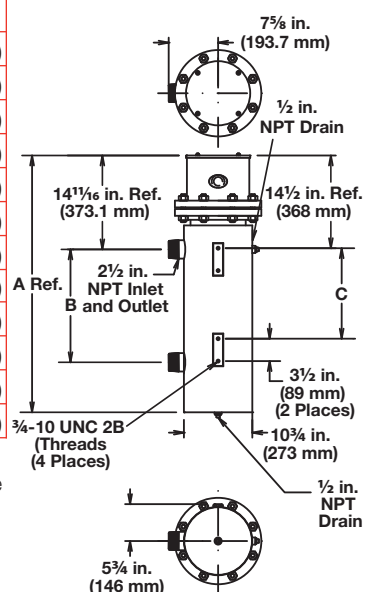
- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>6 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>60 W/in<sup>2</sup> Steel Tank 15-Copper Elements (9.3 W/cm<sup>2</sup>)</b>	240	30.0	1	3	CFPC715G10XS	RS	215 (98)	40½ (1027)	20½ (521)	17 (432)
	240	30.0	3	5	CFPC715G3XS	RS	215 (98)	40½ (1027)	20½ (521)	17 (432)
	480	30.0	1	3	CFPC715G11XS	RS	215 (98)	40½ (1027)	20½ (521)	17 (432)
	480	30.0	3	1	CFPC715G5XS	RS	215 (98)	40½ (1027)	20½ (521)	17 (432)
	240	45.0	1	5	CFPC721G10XS	RS	223 (102)	40½ (1027)	20½ (521)	17 (432)
	240	45.0	3	5	CFPC721G3XS	RS	223 (102)	40½ (1027)	20½ (521)	17 (432)
	480	45.0	1	3	CFPC721G11XS	RS	223 (102)	40½ (1027)	20½ (521)	17 (432)
	480	45.0	3	5	CFPC721G5XS	RS	223 (102)	40½ (1027)	20½ (521)	17 (432)
	240	60.0	3	5	CFPC726R3XS	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	480	60.0	1	3	CFPC726R11XS	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	480	60.0	3	5	CFPC726R5XS	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	240	75.0	3	5	CFPC732G3XS	RS	288 (131)	51 (1294)	31 (787)	27½ (699)
	480	75.0	1	5	CFPC732G11XS	RS	288 (131)	51 (1294)	31 (787)	27½ (699)
	480	75.0	3	5	CFPC732G5XS	RS	288 (131)	51 (1294)	31 (787)	27½ (699)
	240	90.0	3	5	CFPC737R3XS	RS	296 (134)	72 (1827)	52 (1321)	48½ (1232)
	480	90.0	3	5	CFPC737R5XS	RS	296 (134)	72 (1827)	52 (1321)	48½ (1232)
	480	125.0	3	5	CFPC750R5XS	RS	306 (139)	72 (1827)	52 (1321)	48½ (1232)
	480	150.0	3	5	CFPC760G5XS	S	370 (168)	93 (2361)	73 (1854)	66 (1676)
<b>8 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>60 W/in<sup>2</sup> Steel Tank 18-Copper Elements (7.5 W/cm<sup>2</sup>)</b>	240	50.0	3	3	CFRC721N3S	RS	340 (155)	47¼ (1199.0)	24¾ (627.0)	21¼ (538.0)
	480	50.0	1	3	CFRC721N11S	RS	340 (155)	47¼ (1199.0)	24¾ (627.0)	21¼ (538.0)
	480	50.0	3	2	CFRC721N5S	RS	340 (155)	47¼ (1199.0)	24¾ (627.0)	21¼ (538.0)
	240	75.0	3	6	CFRC729N3S	RS	360 (164)	55¼ (1402.0)	32¾ (830.0)	29¾ (741.0)
	480	75.0	3	2	CFRC729N5S	RS	360 (164)	55¼ (1402.0)	32¾ (830.0)	29¾ (741.0)
	240	100.0	3	6	CFRC737E3S	RS	385 (175)	62¼ (1580.0)	39¾ (1008.0)	36¾ (919.0)
	480	100.0	3	3	CFRC737E5S	RS	385 (175)	62¼ (1580.0)	39¾ (1008.0)	36¾ (919.0)
	240	125.0	3	6	CFRC745E3S	RS	410 (186)	69¾ (1774.8)	47¾ (1203.3)	43¾ (1114.4)
	480	125.0	3	6	CFRC745E5S	RS	410 (186)	69¾ (1774.8)	47¾ (1203.3)	43¾ (1114.4)
	480	150.0	3	6	CFRC752N5S	RS	440 (200)	79¾ (2016.1)	56¾ (1444.6)	53¾ (1355.7)
	480	175.0	3	6	CFRC760N5S	RS	465 (211)	88¾ (2244.7)	65¾ (1673.2)	62¾ (1584.3)
	480	200.0	3	6	CFRC768E5S	RS	510 (232)	98¾ (2498.7)	75¾ (1927.2)	72¾ (1838.3)

6 inch - 150 lb ANSI Flange



8 inch - 150 lb ANSI Flange



### RAPID SHIP

- RS - Next day shipment up to 2 pieces
- S - 10 day lead time

⑤ When steel vessel materials are used in this application, some rust may be present in the process media

■ Truck Shipment only

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

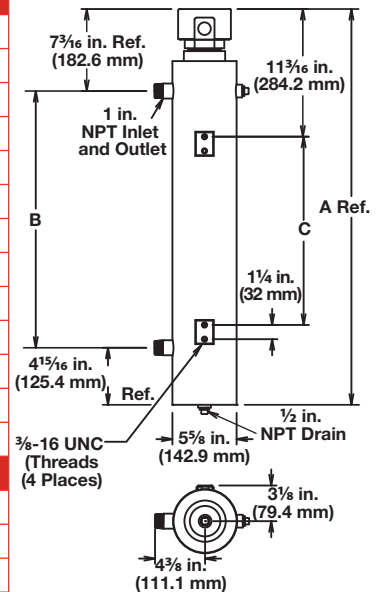


### Application: Deionized or Demineralized Water

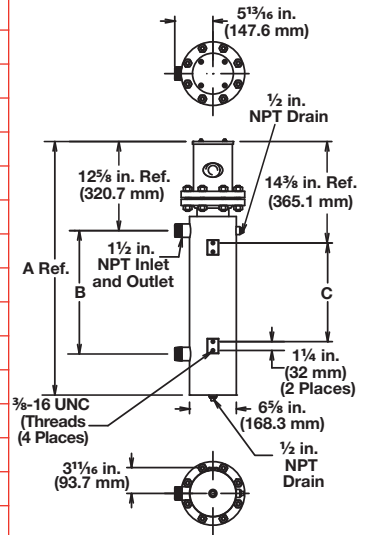
- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>2½ inch NPT Screw Plug (WATROD)</b>										
60 W/in <sup>2</sup> 316 SS Tank	240	6.0	3	1	CBLR714L3S	RS	24 (11)	34¾ (881)	22½ (572)	16½ (419)
	480	6.0	3	1	CBLR714L5S	RS	24 (11)	34¾ (881)	22½ (572)	16½ (419)
3-316 SS Elements (9.3 W/cm <sup>2</sup> ) Passivated	240	7.5	3	1	CBLR717L3S	RS	24 (11)	34¾ (881)	22½ (572)	16½ (419)
	480	7.5	3	1	CBLR717L5S	RS	24 (11)	34¾ (881)	22½ (572)	16½ (419)
	240	9.0	3	1	CBLR720L3S	RS	26 (12)	34¾ (881)	22½ (572)	16½ (419)
	480	9.0	3	1	CBLR720L5S	RS	26 (12)	34¾ (881)	22½ (572)	16½ (419)
	240	12.0	3	1	CBLR726C3S	RS	27 (13)	44¾ (1135)	32½ (1129)	26½ (673)
	480	12.0	3	1	CBLR726C5S	RS	27 (13)	44¾ (1135)	32½ (1129)	26½ (673)
	240	15.0	3	1	CBLR731L3S	RS	29 (14)	44¾ (1135)	32½ (1129)	26½ (673)
	480	15.0	3	1	CBLR731L5S	RS	29 (14)	44¾ (1135)	32½ (1129)	26½ (673)
	240	18.0	3	1	CBLR737C3S	RS	30 (14)	57¼ (1453)	45 (1143)	39 (991)
	480	18.0	3	1	CBLR737C5S	RS	30 (14)	57¼ (1453)	45 (1143)	39 (991)
<b>4 inch - 150 lb ANSI Flange (WATROD)</b>										
60 W/in <sup>2</sup> 316 SS Tank	240	12.0	1	2	CFOR716A10S	RS	124 (57)	39 (989)	20½ (521)	17 (432)
	240	12.0	3	1	CFOR716A3S	RS	124 (57)	39 (989)	20½ (521)	17 (432)
6-316 SS Elements (9.3 W/cm <sup>2</sup> ) Passivated	480	12.0	1	1	CFOR716A11S	RS	124 (57)	39 (989)	20½ (521)	17 (432)
	480	12.0	3	1	CFOR716A5S	RS	124 (57)	39 (989)	20½ (521)	17 (432)
	240	18.0	1	2	CFOR722A10S	RS	127 (58)	39 (989)	20½ (521)	17 (432)
	240	18.0	3	1	CFOR722A3S	RS	127 (58)	39 (989)	20½ (521)	17 (432)
	480	18.0	1	1	CFOR722A11S	RS	127 (58)	39 (989)	20½ (521)	17 (432)
	480	18.0	3	1	CFOR722A5S	RS	127 (58)	39 (989)	20½ (521)	17 (432)
	240	24.0	1	2	CFOR727J10S	RS	160 (73)	49½ (1256)	31 (787)	27½ (699)
	240	24.0	3	2	CFOR727J3S	RS	160 (73)	49½ (1256)	31 (787)	27½ (699)
	480	24.0	1	1	CFOR727J11S	RS	160 (73)	49½ (1256)	31 (787)	27½ (699)
	480	24.0	3	1	CFOR727J5S	RS	160 (73)	49½ (1256)	31 (787)	27½ (699)
	240	30.0	3	2	CFOR733A3S	RS	163 (74)	49½ (1256)	31 (787)	27½ (699)
	480	30.0	1	2	CFOR733A11S	RS	163 (74)	49½ (1256)	31 (787)	27½ (699)
	480	30.0	3	1	CFOR733A5S	RS	163 (74)	49½ (1256)	31 (787)	27½ (699)
	240	36.0	3	2	CFOR738J3S	RS	229 (104)	70½ (1789)	52 (1321)	48½ (1232)
	480	36.0	1	2	CFOR738J11S	RS	229 (104)	70½ (1789)	52 (1321)	48½ (1232)
	480	36.0	3	1	CFOR738J5S	RS	229 (104)	70½ (1789)	52 (1321)	48½ (1232)
	480	50.0	3	2	CFOR751J5S	RS	234 (107)	70½ (1789)	52 (1321)	48½ (1232)
	480	60.0	3	2	CFOR761A5S	RS	297 (135)	91½ (2326)	73 (1854)	66 (1676)

2½ inch NPT Screw Plug



4 inch - 150 lb ANSI Flange



**RAPID SHIP**

- RS - Next day shipment up to 5 pieces

Truck Shipment only

# Circulation Heaters

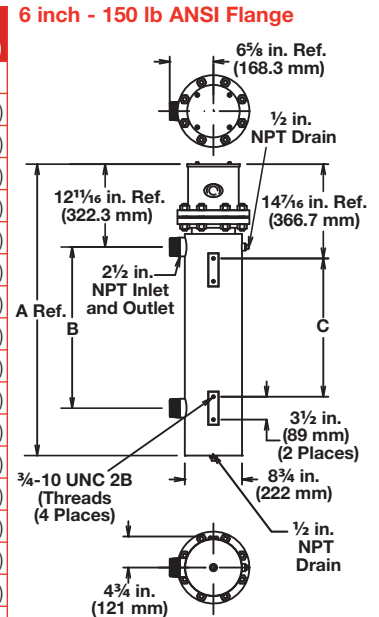
## WATROD and FIREBAR Circulation Heaters



### Application: Deionized or Demineralized Water

- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>6 inch - 150 lb ANSI Flange (WATROD)</b>										
60 W/in <sup>2</sup>	240	24.0	1	3	CFPR715N10S	RS	212 (97)	40½ (1027)	20½ (521)	17 (432)
316 SS Tank	240	24.0	3	2	CFPR715N3S	RS	212 (97)	40½ (1027)	20½ (521)	17 (432)
12-316 SS Elements (9.3 W/cm <sup>2</sup> )	480	24.0	1	2	CFPR715N11S	RS	212 (97)	40½ (1027)	20½ (521)	17 (432)
Passivated	480	24.0	3	1	CFPR715N5S	RS	212 (97)	40½ (1027)	20½ (521)	17 (432)
	240	36.0	1	4	CFPR721N10S	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)
	240	36.0	3	2	CFPR721N3S	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)
	480	36.0	1	2	CFPR721N11S	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)
	480	36.0	3	1	CFPR721N5S	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)
	240	48.0	3	4	CFPR727E3S	RS	222 (101)	51 (1294)	31 (787)	27½ (699)
	480	48.0	1	3	CFPR727E11S	RS	222 (101)	51 (1294)	31 (787)	27½ (699)
	480	48.0	3	2	CFPR727E5S	RS	222 (101)	51 (1294)	31 (787)	27½ (699)
	240	60.0	3	4	CFPR732N3S	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	480	60.0	1	3	CFPR732N11S	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	480	60.0	3	2	CFPR732N5S	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	240	72.0	3	4	CFPR738E3S	RS	290 (132)	72 (1827)	52 (1321)	48½ (1232)
	480	72.0	3	2	CFPR738E5S	RS	290 (132)	72 (1827)	52 (1321)	48½ (1232)
	480	100.0	3	4	CFPR751E5S	RS	298 (136)	72 (1827)	52 (1321)	48½ (1232)
	480	120.0	3	4	CFPR760N5S	RS	360 (164)	93 (2361)	73 (1854)	66 (1676)
<b>6 inch - 150 lb ANSI Flange (WATROD)</b>										
60 W/in <sup>2</sup>	240	30.0	1	3	CFPR715N10XS	RS	215 (98)	40½ (1027)	20½ (521)	17 (432)
316 SS Tank	240	30.0	3	5	CFPR715N3XS	RS	215 (98)	40½ (1027)	20½ (521)	17 (432)
15-316 SS Elements (9.3 W/cm <sup>2</sup> )	480	30.0	1	3	CFPR715N11XS	RS	215 (98)	40½ (1027)	20½ (521)	17 (432)
Passivated	480	30.0	3	1	CFPR715N5XS	RS	215 (98)	40½ (1027)	20½ (521)	17 (432)
	240	45.0	1	5	CFPR721N10XS	RS	223 (102)	40½ (1027)	20½ (521)	17 (432)
	240	45.0	3	5	CFPR721N3XS	RS	223 (102)	40½ (1027)	20½ (521)	17 (432)
	480	45.0	1	3	CFPR721N11XS	RS	223 (102)	40½ (1027)	20½ (521)	17 (432)
	480	45.0	3	5	CFPR721N5XS	RS	223 (102)	40½ (1027)	20½ (521)	17 (432)
	240	60.0	3	5	CFPR727E3XS	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	480	60.0	1	3	CFPR727E11XS	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	480	60.0	3	5	CFPR727E5XS	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	240	75.0	3	5	CFPR732N3XS	RS	288 (131)	51 (1294)	31 (787)	27½ (699)
	480	75.0	1	5	CFPR732N11XS	RS	288 (131)	51 (1294)	31 (787)	27½ (699)
	480	75.0	3	5	CFPR732N5XS	RS	288 (131)	51 (1294)	31 (787)	27½ (699)
	240	90.0	3	5	CFPR738E3XS	RS	296 (135)	72 (1827)	52 (1321)	48½ (1232)
	480	90.0	3	5	CFPR738E5XS	RS	296 (135)	72 (1827)	52 (1321)	48½ (1232)
	480	125.0	3	5	CFPR751E5XS	RS	306 (139)	72 (1827)	52 (1321)	48½ (1232)
	480	150.0	3	5	CFPR760N5XS	RS	370 (168)	93 (2361)	73 (1854)	66 (1676)



### RAPID SHIP

- RS - Next day shipment up to 2 pieces

Truck Shipment only

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

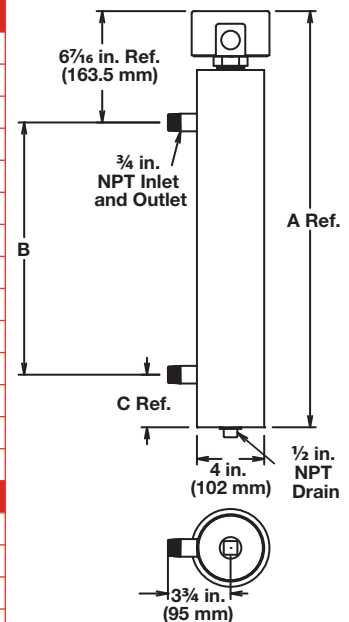


### Application: Process Water ⑤

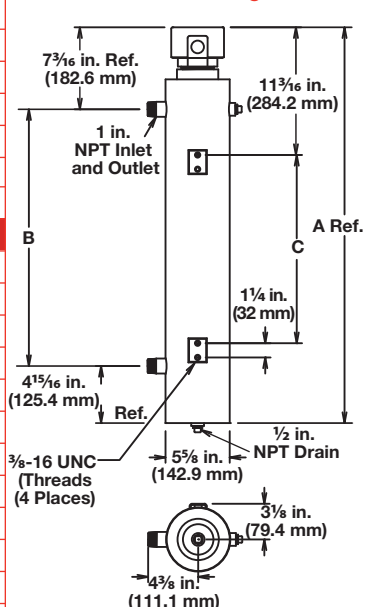
- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>1½ inch NPT Screw Plug (FIREBAR)</b>										
45 W/in <sup>2</sup> ⑥ Steel Tank 1-Incoloy® Element (7 W/cm <sup>2</sup> )	240	2.0	3	1	CBDNF13A27S	RS	25 (12)	24% (625.5)	15 (381)	3½ (79.4)
	240	2.5	3	1	CBDNF15J27S	RS	26 (12)	24% (625.5)	15 (381)	3½ (79.4)
	240	3.0	3	1	CBDNF18A27S	RS	30 (14)	32% (828.7)	23 (584)	3½ (79.4)
	240	4.0	3	1	CBDNF22J27S	RS	31 (14)	32% (828.7)	23 (584)	3½ (79.4)
	480	4.0	3	1	CBDNF22J28S	RS	31 (14)	32% (828.7)	23 (584)	3½ (79.4)
	240	5.0	3	1	CBDNF27J27S	RS	43 (20)	42% (1082.7)	32 (813)	4% (111.1)
	480	5.0	3	1	CBDNF27J28S	RS	43 (20)	42% (1082.7)	32 (813)	4% (111.1)
	240	6.0	3	1	CBDNF32J27S	RS	44 (20)	42% (1082.7)	32 (813)	4% (111.1)
	480	6.0	3	1	CBDNF32J28S	RS	44 (20)	42% (1082.7)	32 (813)	4% (111.1)
	240	8.0	3	1	CBDNF42A27S	RS	69 (32)	63% (1616.1)	53 (1346)	4% (111.1)
	480	8.0	3	1	CBDNF42A28S	RS	69 (32)	63% (1616.1)	53 (1346)	4% (111.1)
	240	10.0	3	1	CBDNF51J27S	RS	71 (33)	63% (1616.1)	53 (1346)	4% (111.1)
480	10.0	3	1	CBDNF51J28S	RS	71 (33)	63% (1616.1)	53 (1346)	4% (111.1)	
<b>2½ inch NPT Screw Plug (WATROD)</b>										
48 W/in <sup>2</sup> ⑥ Steel Tank 3-Incoloy® Elements (7.5 W/cm <sup>2</sup> )	240	6.0	3	1	CBLN717G3S	RS	24 (11)	34% (881)	22½ (572)	16½ (419)
	480	6.0	3	1	CBLN717G5S	RS	24 (11)	34% (881)	22½ (572)	16½ (419)
	240	7.5	3	1	CBLN719R3S	RS	26 (12)	34% (881)	22½ (572)	16½ (419)
	480	7.5	3	1	CBLN719R5S	RS	26 (12)	34% (881)	22½ (572)	16½ (419)
	240	9.0	3	1	CBLN724R3S	RS	27 (13)	34% (881)	22½ (572)	16½ (419)
	480	9.0	3	1	CBLN724R5S	RS	27 (13)	34% (881)	22½ (572)	16½ (419)
	240	12.0	3	1	CBLN732G3S	RS	29 (14)	44% (1135)	32½ (1129)	26½ (673)
	480	12.0	3	1	CBLN732G5S	RS	29 (14)	44% (1135)	32½ (1129)	26½ (673)
	240	15.0	3	1	CBLN739R3S	RS	31 (14)	57% (1453)	45 (1143)	39 (991)
	480	15.0	3	1	CBLN739R5S	RS	31 (14)	57% (1453)	45 (1143)	39 (991)
	240	18.0	3	1	CBLN747G3S	RS	32 (15)	57% (1453)	45 (1143)	39 (991)
	480	18.0	3	1	CBLN747G5S	RS	32 (15)	57% (1453)	45 (1143)	39 (991)
<b>2½ inch NPT Screw Plug (FIREBAR)</b>										
45 W/in <sup>2</sup> ⑥ Steel Tank 3-Incoloy (7 W/cm <sup>2</sup> )	240	6.0	3	1	CBLNF12A27S	RS	21 (10)	34% (881)	22½ (572)	16½ (419)
	240	7.5	3	1	CBLNF14J27S	RS	22 (10)	34% (881)	22½ (572)	16½ (419)
	240	9.0	3	1	CBLNF17A27S	RS	23 (11)	34% (881)	22½ (572)	16½ (419)
	240	12.0	3	1	CBLNF21J27S	RS	31 (14)	34% (881)	22½ (572)	16½ (419)
	480	12.0	3	1	CBLNF21J28S	RS	31 (14)	34% (881)	22½ (572)	16½ (419)
	240	15.0	3	1	CBLNF26J27S	RS	34 (16)	44% (1135)	32½ (1129)	26½ (673)
	480	15.0	3	1	CBLNF26J28S	RS	34 (16)	44% (1135)	32½ (1129)	26½ (673)
	240	18.0	3	1	CBLNF31J27S	RS	35 (16)	44% (1135)	32½ (1129)	26½ (673)
	480	18.0	3	1	CBLNF31J28S	RS	35 (16)	44% (1135)	32½ (1129)	26½ (673)
	480	24.0	3	1	CBLNF41A28S	RS	44 (20)	57% (1453)	45 (1143)	39 (991)
	480	30.0	3	1	CBLNF50J28S	RS	52 (24)	63% (1618)	51½ (1308)	46½ (1181)

1½ inch NPT Screw Plug



2½ inch NPT Screw Plug



### RAPID SHIP

- RS - Same day shipment up to 5 pieces

- ⑥ Can be wired for 1-phase operation
- ⑤ When steel vessel materials are used in this application, some rust may be present in the process media

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

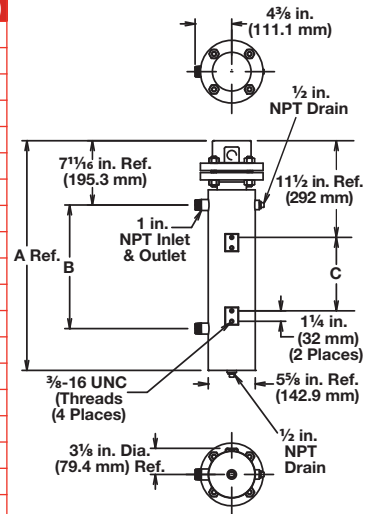


### Application: Process Water<sup>®</sup>

- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

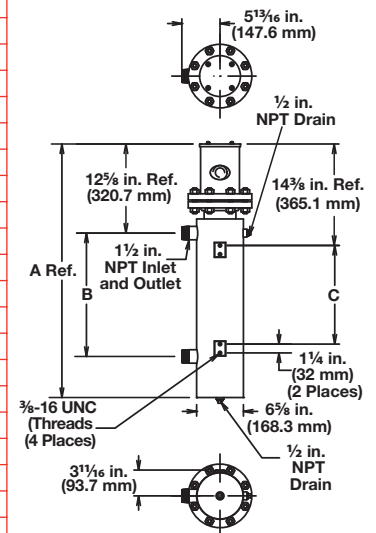
Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>3 inch - 150 lb ANSI Flange (WATROD)</b>										
48 W/in <sup>2</sup> Steel Tank	240	6.0	1	1	CFMN718A10S	RS	68 (31)	35¼ (894)	22½ (573)	16½ (419)
3-Incoloy <sup>®</sup> Elements (7.5 W/cm <sup>2</sup> )	240	6.0	3	1	CFMN718A3S	RS	68 (31)	35¼ (894)	22½ (573)	16½ (419)
	480	6.0	1	1	CFMN718A11S	RS	68 (31)	35¼ (894)	22½ (573)	16½ (419)
	480	6.0	3	1	CFMN718A5S	RS	68 (31)	35¼ (894)	22½ (573)	16½ (419)
	240	7.5	1	1	CFMN720J10S	RS	70 (32)	35¼ (894)	22½ (573)	16½ (419)
	240	7.5	3	1	CFMN720J3S	RS	70 (32)	35¼ (894)	22½ (573)	16½ (419)
	480	7.5	1	1	CFMN720J11S	RS	70 (32)	35¼ (894)	22½ (573)	16½ (419)
	480	7.5	3	1	CFMN720J5S	RS	70 (32)	35¼ (894)	22½ (573)	16½ (419)
	240	9.0	1	1	CFMN725J10S	RS	78 (36)	45¼ (1148)	32½ (826)	26½ (673)
	240	9.0	3	1	CFMN725J3S	RS	78 (36)	45¼ (1148)	32½ (826)	26½ (673)
	480	9.0	1	1	CFMN725J11S	RS	78 (36)	45¼ (1148)	32½ (826)	26½ (673)
	480	9.0	3	1	CFMN725J5S	RS	78 (36)	45¼ (1148)	32½ (826)	26½ (673)
	240	12.0	3	1	CFMN733A3S	RS	96 (44)	45¼ (1148)	32½ (826)	26½ (673)
	480	12.0	1	1	CFMN733A11S	RS	96 (44)	45¼ (1148)	32½ (826)	26½ (673)
	480	12.0	3	1	CFMN733A5S	RS	96 (44)	45¼ (1148)	32½ (826)	26½ (673)
	240	15.0	3	1	CFMN740J3S	RS	100 (46)	57¼ (1465)	45 (1143)	39 (991)
	480	15.0	1	1	CFMN740J11S	RS	100 (46)	57¼ (1465)	45 (1143)	39 (991)
	480	15.0	3	1	CFMN740J5S	RS	100 (46)	57¼ (1465)	45 (1143)	39 (991)
	240	18.0	3	1	CFMN748A3S	RS	107 (49)	57¼ (1465)	45 (1143)	39 (991)
	480	18.0	1	1	CFMN748A11S	RS	107 (49)	57¼ (1465)	45 (1143)	39 (991)
	480	18.0	3	1	CFMN748A5S	RS	107 (49)	57¼ (1465)	45 (1143)	39 (991)

3 inch - 150 lb ANSI Flange



Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>4 inch - 150 lb ANSI Flange (WATROD)</b>										
48 W/in <sup>2</sup> Steel Tank	240	9.0	1	1	CFON713J10S	RS	122 (56)	39 (989)	20½ (521)	17 (432)
6-Incoloy <sup>®</sup> Elements (7.5 W/cm <sup>2</sup> )	240	9.0	3	1	CFON713J3S	RS	122 (56)	39 (989)	20½ (521)	17 (432)
	480	9.0	1	1	CFON713J11S	RS	122 (56)	39 (989)	20½ (521)	17 (432)
	480	9.0	3	1	CFON713J5S	RS	122 (56)	39 (989)	20½ (521)	17 (432)
	240	12.0	1	2	CFON718A10S	RS	125 (57)	39 (989)	20½ (521)	17 (432)
	240	12.0	3	1	CFON718A3S	RS	125 (57)	39 (989)	20½ (521)	17 (432)
	480	12.0	1	1	CFON718A11S	RS	125 (57)	39 (989)	20½ (521)	17 (432)
	480	12.0	3	1	CFON718A5S	RS	125 (57)	39 (989)	20½ (521)	17 (432)
	240	15.0	1	2	CFON720J10S	RS	127 (58)	39 (989)	20½ (521)	17 (432)
	240	15.0	3	1	CFON720J3S	RS	127 (58)	39 (989)	20½ (521)	17 (432)
	480	15.0	1	1	CFON720J11S	RS	127 (58)	39 (989)	20½ (521)	17 (432)
	480	15.0	3	1	CFON720J5S	RS	127 (58)	39 (989)	20½ (521)	17 (432)
	240	18.0	1	2	CFON725J10S	RS	160 (73)	39 (989)	20½ (521)	17 (432)
	240	18.0	3	1	CFON725J3S	RS	160 (73)	39 (989)	20½ (521)	17 (432)
	480	18.0	1	1	CFON725J11S	RS	160 (73)	39 (989)	20½ (521)	17 (432)
	480	18.0	3	1	CFON725J5S	RS	160 (73)	39 (989)	20½ (521)	17 (432)
	240	24.0	1	2	CFON733A10S	RS	163 (74)	49½ (1256)	31 (787)	27½ (699)
	240	24.0	3	2	CFON733A3S	RS	163 (74)	49½ (1256)	31 (787)	27½ (699)
	480	24.0	1	1	CFON733A11S	RS	163 (74)	49½ (1256)	31 (787)	27½ (699)
	480	24.0	3	1	CFON733A5S	RS	163 (74)	49½ (1256)	31 (787)	27½ (699)
	240	30.0	3	2	CFON740J3S	RS	229 (104)	70½ (1789)	52 (1321)	48½ (1232)
	480	30.0	1	2	CFON740J11S	RS	229 (104)	70½ (1789)	52 (1321)	48½ (1232)
	480	30.0	3	1	CFON740J5S	RS	229 (104)	70½ (1789)	52 (1321)	48½ (1232)
	240	36.0	3	2	CFON748A3S	RS	234 (107)	70½ (1789)	52 (1321)	48½ (1232)
	480	36.0	1	2	CFON748A11S	RS	234 (107)	70½ (1789)	52 (1321)	48½ (1232)
	480	36.0	3	1	CFON748A5S	RS	234 (107)	70½ (1789)	52 (1321)	48½ (1232)

4 inch - 150 lb ANSI Flange



### RAPID SHIP

- RS - Next day shipment up to 2 pieces

<sup>®</sup> When steel vessel materials are used in this application, some rust may be present in the process media

Truck Shipment only

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

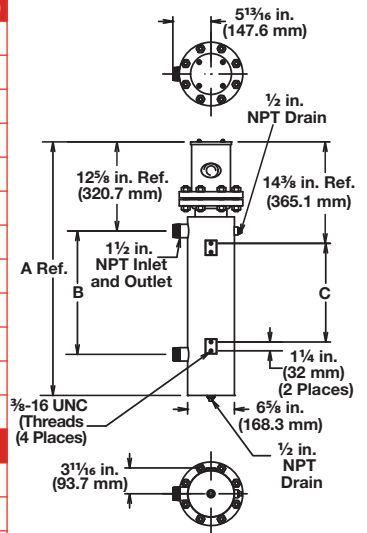


### Application: Process Water ⑤

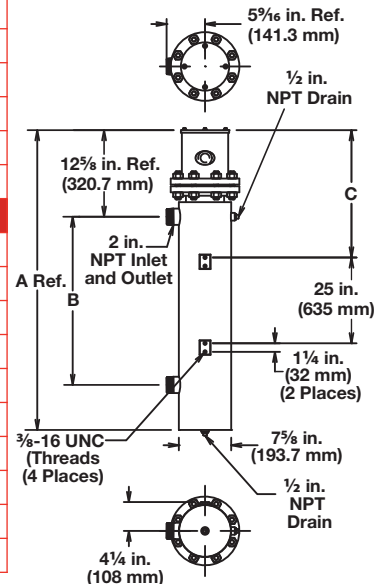
- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>4 inch - 150 lb ANSI Flange (FIREBAR)</b>										
45 W/in <sup>2</sup> Steel Tank 6-Incoloy® Elements (7 W/cm <sup>2</sup> )	240	12.0	3	1	CFONF13G27S	RS	125 (57)	39 (989)	20½ (521)	17 (432)
	240	15.0	3	1	CFONF16A27S	RS	128 (58)	39 (989)	20½ (521)	17 (432)
	240	18.0	3	1	CFONF18G27S	RS	130 (59)	39 (989)	20½ (521)	17 (432)
	240	24.0	3	2	CFONF22R27S	RS	133 (61)	39 (989)	20½ (521)	17 (432)
	480	24.0	3	1	CFONF22R28S	RS	133 (61)	39 (989)	20½ (521)	17 (432)
	240	30.0	3	2	CFONF27R27S	RS	168 (77)	49½ (1256)	31 (787)	27½ (699)
	480	30.0	3	1	CFONF27R28S	RS	168 (77)	49½ (1256)	31 (787)	27½ (699)
	240	36.0	3	2	CFONF32R27S	RS	170 (78)	49½ (1256)	31 (787)	27½ (699)
	480	36.0	3	1	CFONF32R28S	RS	170 (78)	49½ (1256)	31 (787)	27½ (699)
	480	48.0	3	2	CFONF42G28S	RS	236 (107)	70½ (1789)	52 (1321)	48½ (1232)
480	60.0	3	2	CFONF51R28S	RS	240 (109)	70½ (1789)	52 (1321)	48½ (1232)	
<b>5 inch - 150 lb ANSI Flange (WATROD)</b>										
48 W/in <sup>2</sup> Steel Tank 6-Incoloy® Elements (7.5 W/cm <sup>2</sup> )	240	24.0	1	3	CFNN733A10S	RS	145 (66)	49¼ (1249)	30 (762)	14¼ (377.8)
	240	24.0	3	2	CFNN733A3S	RS	145 (66)	49¼ (1249)	30 (762)	14¼ (377.8)
	480	24.0	1	2	CFNN733A11S	RS	145 (66)	49¼ (1249)	30 (762)	14¼ (377.8)
	480	24.0	3	1	CFNN733A5S	RS	145 (66)	49¼ (1249)	30 (762)	14¼ (377.8)
	240	30.0	3	2	CFNN740J3S	RS	167 (76)	56¼ (1427)	37 (940)	18 (473.1)
	480	30.0	1	2	CFNN740J11S	RS	167 (76)	56¼ (1427)	37 (940)	18 (473.1)
	480	30.0	3	1	CFNN740J5S	RS	167 (76)	56¼ (1427)	37 (940)	18 (473.1)
	240	36.0	3	2	CFNN748A3S	RS	180 (82)	67¼ (1719)	48½ (1232)	25 (633.0)
	480	36.0	1	2	CFNN748A11S	RS	180 (82)	67¼ (1719)	48½ (1232)	25 (633.0)
	480	36.0	3	1	CFNN748A5S	RS	180 (82)	67¼ (1719)	48½ (1232)	25 (633.0)
<b>5 inch - 150 lb ANSI Flange (WATROD)</b>										
48 W/in <sup>2</sup> Steel Tank 9-Incoloy® Elements (7.5 W/cm <sup>2</sup> )	240	36.0	3	3	CFNN733A3XS	RS	150 (68)	49¼ (1249)	30 (762)	14¼ (377.8)
	480	36.0	1	3	CFNN733A11XS	RS	150 (68)	49¼ (1249)	30 (762)	14¼ (377.8)
	480	36.0	3	1	CFNN733A5XS	RS	150 (68)	49¼ (1249)	30 (762)	14¼ (377.8)
	240	45.0	3	3	CFNN740J3XS	RS	173 (79)	56¼ (1427)	37 (940)	18 (473.1)
	480	45.0	1	3	CFNN740J11XS	RS	173 (79)	56¼ (1427)	37 (940)	18 (473.1)
	480	45.0	3	3	CFNN740J5XS	RS	173 (79)	56¼ (1427)	37 (940)	18 (473.1)
	240	54.0	3	3	CFNN748A3XS	RS	188 (86)	67¼ (1719)	48½ (1232)	25 (633.0)
	480	54.0	1	3	CFNN748A11XS	RS	188 (86)	67¼ (1719)	48½ (1232)	25 (633.0)
	480	54.0	3	3	CFNN748A5XS	RS	188 (86)	67¼ (1719)	48½ (1232)	25 (633.0)

### 4 inch - 150 lb ANSI Flange



### 5 inch - 150 lb ANSI Flange



## RAPID SHIP

- RS - Same day shipment up to 5 pieces

⑤ When steel vessel materials are used in this application, some rust may be present in the process media

■ Truck Shipment only

# Circulation Heaters

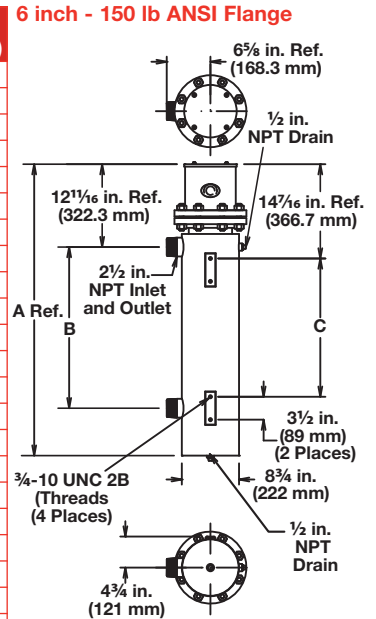
## WATROD and FIREBAR Circulation Heaters



### Application: Process Water ⑤

- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>6 inch - 150 lb ANSI Flange (WATROD)</b>										
48 W/in <sup>2</sup> Steel Tank	240	18.0	1	2	CFPN713G10S	RS	212 (97)	40½ (1027)	20½ (521)	17 (432)
	240	18.0	3	1	CFPN713G3S	RS	212 (97)	40½ (1027)	20½ (521)	17 (432)
12-Incoloy® Elements (7.5 W/cm <sup>2</sup> )	480	18.0	1	1	CFPN713G11S	RS	212 (97)	40½ (1027)	20½ (521)	17 (432)
	480	18.0	3	1	CFPN713G5S	RS	212 (97)	40½ (1027)	20½ (521)	17 (432)
	240	24.0	1	3	CFPN717R10S	RS	214 (97)	40½ (1027)	20½ (521)	17 (432)
	240	24.0	3	2	CFPN717R3S	RS	214 (97)	40½ (1027)	20½ (521)	17 (432)
	480	24.0	1	2	CFPN717R11S	RS	214 (97)	40½ (1027)	20½ (521)	17 (432)
	480	24.0	3	1	CFPN717R5S	RS	214 (97)	40½ (1027)	20½ (521)	17 (432)
	240	30.0	1	3	CFPN720G10S	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)
	240	30.0	3	2	CFPN720G3S	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)
	480	30.0	1	2	CFPN720G11S	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)
	480	30.0	3	1	CFPN720G5S	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)
	240	36.0	1	4	CFPN725G10S	RS	222 (101)	40½ (1027)	20½ (521)	17 (432)
	240	36.0	3	2	CFPN725G3S	RS	222 (101)	40½ (1027)	20½ (521)	17 (432)
	480	36.0	1	2	CFPN725G11S	RS	222 (101)	40½ (1027)	20½ (521)	17 (432)
	480	36.0	3	1	CFPN725G5S	RS	222 (101)	40½ (1027)	20½ (521)	17 (432)
	240	48.0	3	4	CFPN732R3S	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	480	48.0	1	3	CFPN732R11S	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	480	48.0	3	2	CFPN732R5S	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	240	60.0	3	4	CFPN740G3S	RS	290 (132)	72 (1827)	52 (1321)	48½ (1232)
	480	60.0	1	3	CFPN740G11S	RS	290 (132)	72 (1827)	52 (1321)	48½ (1232)
	480	60.0	3	2	CFPN740G5S	RS	290 (132)	72 (1827)	52 (1321)	48½ (1232)
	240	72.0	3	4	CFPN747R3S	RS	298 (136)	72 (1827)	52 (1321)	48½ (1232)
	480	72.0	3	2	CFPN747R5S	RS	298 (136)	72 (1827)	52 (1321)	48½ (1232)
<b>6 inch - 150 lb ANSI Flange (WATROD)</b>										
48 W/in <sup>2</sup> Steel Tank	240	23.0	1	3	CFPN713G10XS	RS	215 (98)	40½ (1027)	20½ (521)	17 (432)
	240	23.0	3	5	CFPN713G3XS	RS	215 (98)	40½ (1027)	20½ (521)	17 (432)
15-Incoloy® Elements (7.5 W/cm <sup>2</sup> )	480	23.0	1	1	CFPN713G11XS	RS	215 (98)	40½ (1027)	20½ (521)	17 (432)
	480	23.0	3	1	CFPN713G5XS	RS	215 (98)	40½ (1027)	20½ (521)	17 (432)
	240	30.0	1	3	CFPN717R10XS	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)
	240	30.0	3	5	CFPN717R3XS	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)
	480	30.0	1	3	CFPN717R11XS	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)
	480	30.0	3	1	CFPN717R5XS	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)
	240	38.0	1	5	CFPN720G10XS	RS	223 (102)	40½ (1027)	20½ (521)	17 (432)
	240	38.0	3	5	CFPN720G3XS	RS	223 (102)	40½ (1027)	20½ (521)	17 (432)
	480	38.0	1	3	CFPN720G11XS	RS	223 (102)	40½ (1027)	20½ (521)	17 (432)
	480	38.0	3	1	CFPN720G5XS	RS	223 (102)	40½ (1027)	20½ (521)	17 (432)
	240	45.0	1	5	CFPN725G10XS	RS	226 (103)	40½ (1027)	20½ (521)	17 (432)
	240	45.0	3	5	CFPN725G3XS	RS	226 (103)	40½ (1027)	20½ (521)	17 (432)
	480	45.0	1	3	CFPN725G11XS	RS	226 (103)	40½ (1027)	20½ (521)	17 (432)
	480	45.0	3	5	CFPN725G5XS	RS	226 (103)	40½ (1027)	20½ (521)	17 (432)
	240	60.0	3	5	CFPN732R3XS	RS	288 (131)	51 (1294)	31 (787)	27½ (699)
	480	60.0	1	3	CFPN732R11XS	RS	288 (131)	51 (1294)	31 (787)	27½ (699)
	480	60.0	3	5	CFPN732R5XS	RS	288 (131)	51 (1294)	31 (787)	27½ (699)
	240	75.0	3	5	CFPN740G3XS	RS	296 (135)	72 (1827)	52 (1321)	48½ (1232)
	480	75.0	1	5	CFPN740G11XS	RS	296 (135)	72 (1827)	52 (1321)	48½ (1232)
	480	75.0	3	5	CFPN740G5XS	RS	296 (135)	72 (1827)	52 (1321)	48½ (1232)
	240	90.0	3	5	CFPN747R3XS	RS	306 (139)	72 (1827)	52 (1321)	48½ (1232)
	480	90.0	3	5	CFPN747R5XS	RS	306 (139)	72 (1827)	52 (1321)	48½ (1232)



**RAPID SHIP**

• RS - Same day shipment up to 2 pieces  
 Truck Shipment only

⑤ When steel vessel materials are used in this application, some rust may be present in the process media

**WATLOW®**

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

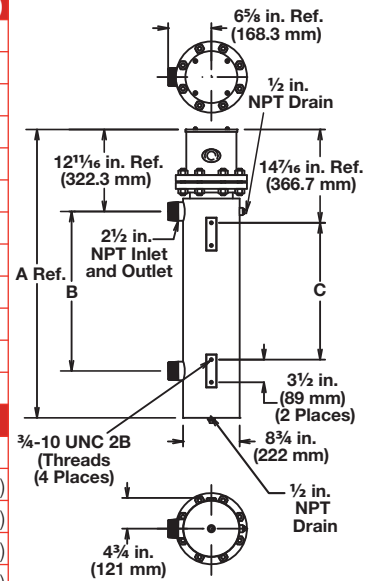


### Application: Process Water ⑤

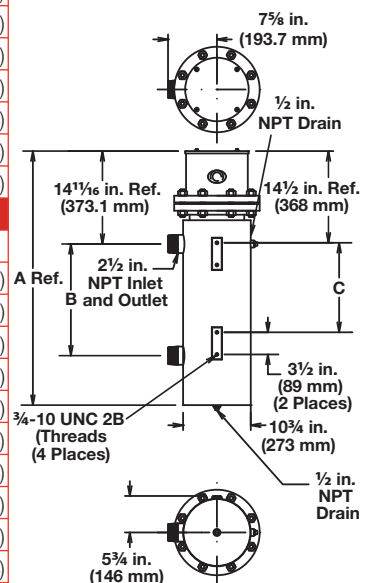
- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>6 inch - 150 lb ANSI Flange (FIREBAR)</b>										
45 W/in <sup>2</sup> Steel Tank 15-Incoloy® Elements (7 W/cm <sup>2</sup> )	240	30.0	3	5	CFPNF13G27S	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)
	240	37.5	3	5	CFPNF16A27S	RS	220 (100)	40½ (1027)	20½ (521)	17 (432)
	240	45.0	3	5	CFPNF18G27S	RS	223 (102)	40½ (1027)	20½ (521)	17 (432)
	240	60.0	3	5	CFPNF22R27S	RS	226 (103)	40½ (1027)	20½ (521)	17 (432)
	480	60.0	3	5	CFPNF22R28S	RS	226 (103)	40½ (1027)	20½ (521)	17 (432)
	240	75.0	3	5	CFPNF27R27S	RS	232 (106)	51 (1294)	31 (787)	27½ (699)
	480	75.0	3	5	CFPNF27R28S	RS	232 (106)	51 (1294)	31 (787)	27½ (699)
	240	90.0	3	5	CFPNF32R27S	RS	236 (107)	51 (1294)	31 (787)	27½ (699)
	480	90.0	3	5	CFPNF32R28S	RS	236 (107)	51 (1294)	31 (787)	27½ (699)
	480	120.0	3	5	CFPNF42G28S	RS	304 (138)	72 (1827)	52 (1321)	48½ (1232)
480	150.0	3	5	CFPNF51R28S	RS	314 (143)	72 (1827)	52 (1321)	48½ (1232)	
<b>8 inch - 150 lb ANSI Flange (WATROD)</b>										
48 W/in <sup>2</sup> Steel Tank 18-Incoloy® Elements (7.5 W/cm <sup>2</sup> )	240	50.0	3	3	CFRN725N3S	RS	350 (159)	55¼ (1402.0)	32¼ (830.0)	29¼ (741.0)
	480	50.0	1	3	CFRN725N11S	RS	350 (159)	55¼ (1402.0)	32¼ (830.0)	29¼ (741.0)
	480	50.0	3	2	CFRN725N5S	RS	350 (159)	55¼ (1402.0)	32¼ (830.0)	29¼ (741.0)
	240	75.0	3	6	CFRN735N3S	RS	380 (173)	62¼ (1580.0)	39¼ (1008.0)	36¼ (919.0)
	480	75.0	3	2	CFRN735N5S	RS	380 (173)	62¼ (1580.0)	39¼ (1008.0)	36¼ (919.0)
	240	100.0	3	6	CFRN744E3S	RS	410 (186)	69¼ (1774.8)	47¼ (1203.3)	43¼ (1114.4)
	480	100.0	3	3	CFRN744E5S	RS	410 (186)	69¼ (1774.8)	47¼ (1203.3)	43¼ (1114.4)
	240	125.0	3	6	CFRN754M3S	RS	445 (202)	79¼ (2016.1)	56¼ (1444.6)	53¼ (1355.7)
	480	125.0	3	6	CFRN754M5S	RS	445 (202)	79¼ (2016.1)	56¼ (1444.6)	53¼ (1355.7)
	480	150.0	3	6	CFRN763M5S	RS	490 (223)	88¼ (2244.7)	65¼ (1673.2)	62¼ (1584.3)
480	175.0	3	6	CFRN773D5S	RS	530 (241)	98¼ (2498.7)	75¼ (1927.2)	72¼ (1838.3)	
480	200.0	3	6	CFRN782M5S	RS	560 (254)	98¼ (2498.7)	75¼ (1927.2)	72¼ (1838.3)	
<b>8 inch - 150 lb ANSI Flange (WATROD)</b>										
48 W/in <sup>2</sup> Steel Tank 24-Incoloy® Elements (7.5 W/cm <sup>2</sup> )	240	67.0	3	4	CFRN726D3XS	RS	358 (163)	55¼ (1402.0)	32¼ (830.0)	29¼ (741.0)
	480	67.0	1	3	CFRN726D11XS	RS	358 (163)	55¼ (1402.0)	32¼ (830.0)	29¼ (741.0)
	480	67.0	3	2	CFRN726D5XS	RS	358 (163)	55¼ (1402.0)	32¼ (830.0)	29¼ (741.0)
	240	100.0	3	8	CFRN736D3XS	RS	392 (178)	62¼ (1580.0)	39¼ (1008.0)	36¼ (919.0)
	480	100.0	3	4	CFRN736D5XS	RS	392 (178)	62¼ (1580.0)	39¼ (1008.0)	36¼ (919.0)
	240	133.0	3	8	CFRN744M3XS	RS	425 (193)	69¼ (1774.8)	47¼ (1203.3)	43¼ (1114.4)
	480	133.0	3	4	CFRN744M5XS	RS	425 (193)	69¼ (1774.8)	47¼ (1203.3)	43¼ (1114.4)
	240	167.0	3	8	CFRN754M3XS	RS	463 (210)	79¼ (2016.1)	56¼ (1444.6)	53¼ (1355.7)
	480	167.0	3	8	CFRN754M5XS	RS	463 (210)	79¼ (2016.1)	56¼ (1444.6)	53¼ (1355.7)
	480	200.0	3	8	CFRN763M5XS	RS	511 (232)	88¼ (2244.7)	65¼ (1673.2)	62¼ (1584.3)
480	233.0	3	8	CFRN773D5XS	RS	554 (252)	98¼ (2498.7)	75¼ (1927.2)	72¼ (1838.3)	
480	267.0	3	8	CFRN782M5XS	RS	587 (267)	98¼ (2498.7)	75¼ (1927.2)	72¼ (1838.3)	

6 inch - 150 lb ANSI Flange



8 inch - 150 lb ANSI Flange



### RAPID SHIP

- RS - Next day shipment up to 2 pieces

⑤ When steel vessel materials are used in this application, some rust may be present in the process media

■ Truck Shipment only

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters



### Application: Process Water ⑤

- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

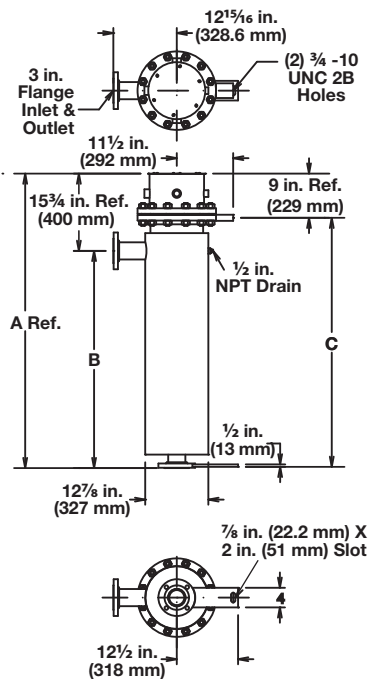
Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>10 inch - 150 lb ANSI Flange (WATROD)</b>										
48 W/in <sup>2</sup> ⑥ Steel Tank 27-Incoloy® Elements (7.5 W/cm <sup>2</sup> )	480	262.0	3	9	CFSN773E5S	S	600 (273)	106 $\frac{1}{2}$ (2708.3)	90 $\frac{1}{2}$ (2308.2)	97 $\frac{1}{16}$ (2471.7)
<b>12 inch, 150 lb ANSI Flange (WATROD)</b>										
48 W/in <sup>2</sup> Steel Tank 36-Incoloy® Elements (7.5 W/cm <sup>2</sup> )	480	350.0	3	12	CFWN773C5S	S	650 (295)	106 $\frac{1}{2}$ (2705)	90 $\frac{1}{2}$ (2295.5)	97 $\frac{1}{16}$ (2467.0)
<b>14 inch - 150 lb ANSI Flange (WATROD)</b>										
48 W/in <sup>2</sup> Steel Tank 45-Incoloy® Elements (7.5 W/cm <sup>2</sup> )	480	315.0	3	15	CFWN754J5S	S	600 (273)	83 $\frac{3}{4}$ (2115)	67 (1700)	73 $\frac{11}{16}$ (1871.7)
	480	375.0	3	15	CFWN763J5S	S	650 (295)	90 $\frac{1}{4}$ (2305)	74 $\frac{1}{2}$ (1891)	81 $\frac{3}{16}$ (2062.2)

- S - 10 day lead time
- Truck Shipment only

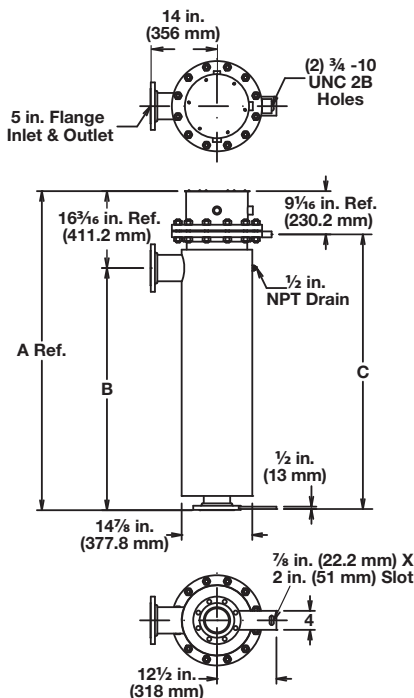
⑥ When steel vessel materials are used in this application, some rust may be present in the process media

⑦ Can be wired for 1-phase operation

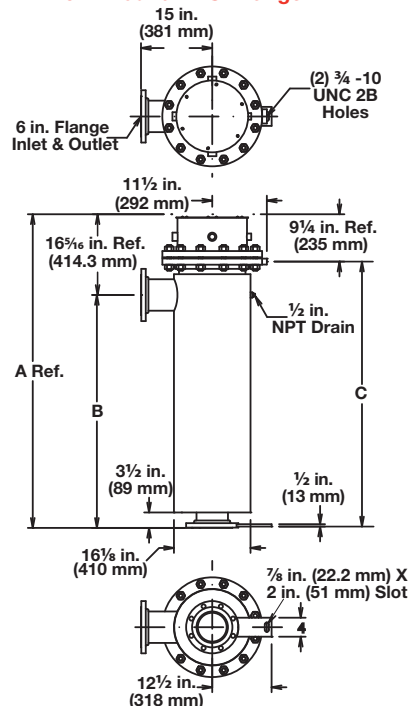
### 10 inch - 150 lb ANSI Flange



### 12 inch - 150 lb ANSI Flange



### 14 inch - 150 lb ANSI Flange



# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

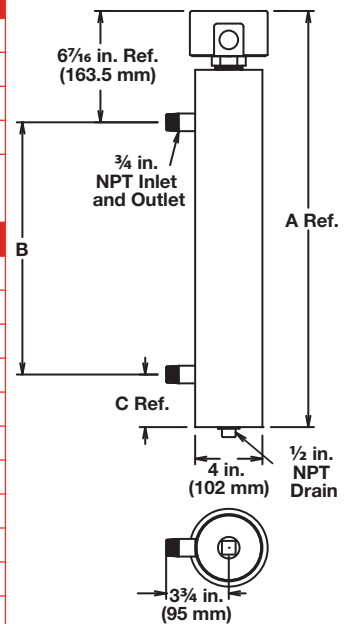


### Application: Forced Air and Caustic Solutions

- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

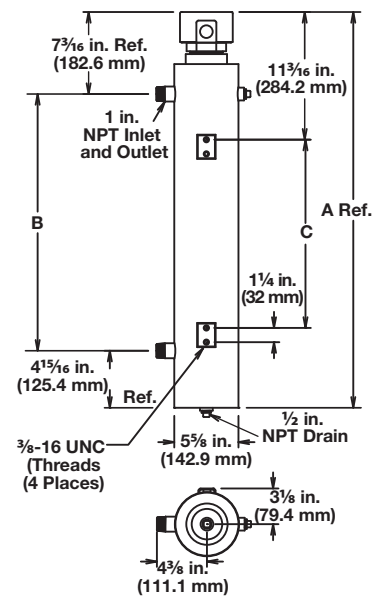
Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>1½ inch NPT Screw Plug (WATROD)</b>										
23 W/in <sup>2</sup> ④ Steel Tank	120/240	1.0	1	1	CBEN13G6S	RS	21 (10)	24¾ (625.5)	15 (381)	3½ (79.4)
2-Incoloy® Elements (3.6 W/cm <sup>2</sup> )	120/240	1.5	1	1	CBEN19A6S	RS	29 (14)	24¾ (625.5)	15 (381)	3½ (79.4)
	120/240	2.0	1	1	CBEN24G6S	RS	29 (14)	32¾ (828.7)	23 (584)	3½ (79.4)
<b>2½ inch NPT Screw Plug (WATROD)</b>										
23 W/in <sup>2</sup> Steel Tank 3-Incoloy® Elements (3.6 W/cm <sup>2</sup> )	240	3.0	3	1	CBLNA17G3S	RS	24 (11)	34¾ (881)	22½ (572)	16½ (419)
	480	3.0	3	1	CBLNA17G5S	RS	24 (11)	34¾ (881)	22½ (572)	16½ (419)
	240	4.5	3	1	CBLNA24R3S	RS	27 (13)	44¾ (1135)	32½ (1129)	26½ (673)
	480	4.5	3	1	CBLNA24R5S	RS	27 (13)	44¾ (1135)	32½ (1129)	26½ (673)
	240	6.0	3	1	CBLNA32G3S	RS	29 (14)	44¾ (1135)	32½ (1129)	26½ (673)
	480	6.0	3	1	CBLNA32G5S	RS	29 (14)	44¾ (1135)	32½ (1129)	26½ (673)
	240	7.5	3	1	CBLNA39R3S	RS	31 (14)	57¾ (1453)	45 (1143)	39 (991)
	480	7.5	3	1	CBLNA39R5S	RS	31 (14)	57¾ (1453)	45 (1143)	39 (991)
	240	9.0	3	1	CBLNA47G3S	RS	32 (15)	57¾ (1453)	45 (1143)	39 (991)
	480	9.0	3	1	CBLNA47G5S	RS	32 (15)	57¾ (1453)	45 (1143)	39 (991)

1½ inch NPT Screw Plug



④ Wired for higher voltage

2½ inch NPT Screw Plug



## RAPID SHIP

- RS - Same day shipment up to 5 pieces

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

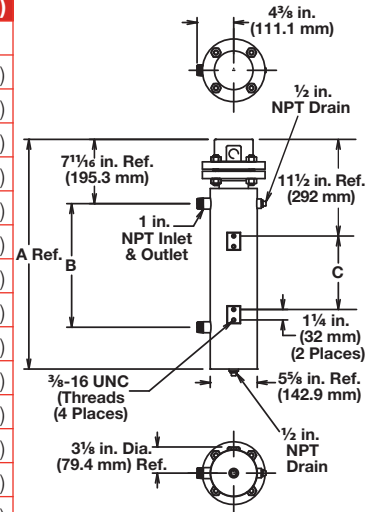


### Application: Forced Air and Caustic Solutions

- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>3 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>23 W/in<sup>2</sup> Steel Tank 3-Incoloy<sup>®</sup> Elements (3.6 W/cm<sup>2</sup>)</b>	240	3.0	1	1	CFMNA18A10S	RS	68 (31)	35 $\frac{1}{4}$ (894)	22 $\frac{1}{2}$ (573)	16 $\frac{1}{2}$ (419)
	240	3.0	3	1	CFMNA18A3S	RS	68 (31)	35 $\frac{1}{4}$ (894)	22 $\frac{1}{2}$ (573)	16 $\frac{1}{2}$ (419)
	480	3.0	1	1	CFMNA18A11S	RS	68 (31)	35 $\frac{1}{4}$ (894)	22 $\frac{1}{2}$ (573)	16 $\frac{1}{2}$ (419)
	480	3.0	3	1	CFMNA18A5S	RS	68 (31)	35 $\frac{1}{4}$ (894)	22 $\frac{1}{2}$ (573)	16 $\frac{1}{2}$ (419)
	240	4.5	1	1	CFMNA25J10S	RS	78 (36)	45 $\frac{1}{4}$ (1148)	32 $\frac{1}{2}$ (826)	26 $\frac{1}{2}$ (673)
	240	4.5	3	1	CFMNA25J3S	RS	78 (36)	45 $\frac{1}{4}$ (1148)	32 $\frac{1}{2}$ (826)	26 $\frac{1}{2}$ (673)
	480	4.5	1	1	CFMNA25J11S	RS	78 (36)	45 $\frac{1}{4}$ (1148)	32 $\frac{1}{2}$ (826)	26 $\frac{1}{2}$ (673)
	480	4.5	3	1	CFMNA25J5S	RS	78 (36)	45 $\frac{1}{4}$ (1148)	32 $\frac{1}{2}$ (826)	26 $\frac{1}{2}$ (673)
	240	6.0	1	1	CFMNA33A10S	RS	96 (44)	45 $\frac{1}{4}$ (1148)	32 $\frac{1}{2}$ (826)	26 $\frac{1}{2}$ (673)
	240	6.0	3	1	CFMNA33A3S	RS	96 (44)	45 $\frac{1}{4}$ (1148)	32 $\frac{1}{2}$ (826)	26 $\frac{1}{2}$ (673)
	480	6.0	1	1	CFMNA33A11S	RS	96 (44)	45 $\frac{1}{4}$ (1148)	32 $\frac{1}{2}$ (826)	26 $\frac{1}{2}$ (673)
	480	6.0	3	1	CFMNA33A5S	RS	96 (44)	45 $\frac{1}{4}$ (1148)	32 $\frac{1}{2}$ (826)	26 $\frac{1}{2}$ (673)
	240	7.5	1	1	CFMNA40J10S	RS	100 (46)	57 $\frac{3}{4}$ (1465)	45 (1143)	39 (991)
	240	7.5	3	1	CFMNA40J3S	RS	100 (46)	57 $\frac{3}{4}$ (1465)	45 (1143)	39 (991)
	480	7.5	1	1	CFMNA40J11S	RS	100 (46)	57 $\frac{3}{4}$ (1465)	45 (1143)	39 (991)
	480	7.5	3	1	CFMNA40J5S	RS	100 (46)	57 $\frac{3}{4}$ (1465)	45 (1143)	39 (991)
	240	9.0	1	1	CFMNA48A10S	RS	107 (49)	57 $\frac{3}{4}$ (1465)	45 (1143)	39 (991)
	240	9.0	3	1	CFMNA48A3S	RS	107 (49)	57 $\frac{3}{4}$ (1465)	45 (1143)	39 (991)
480	9.0	1	1	CFMNA48A11S	RS	107 (49)	57 $\frac{3}{4}$ (1465)	45 (1143)	39 (991)	
480	9.0	3	1	CFMNA48A5S	RS	107 (49)	57 $\frac{3}{4}$ (1465)	45 (1143)	39 (991)	

3 inch - 150 lb ANSI Flange



### RAPID SHIP

- RS - Same day shipment up to 5 pieces

Truck Shipment only

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

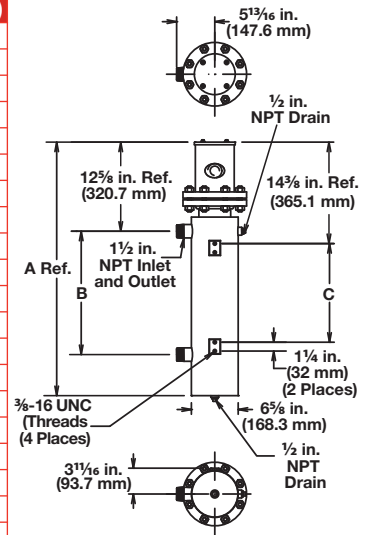


### Application: Forced Air and Caustic Solutions

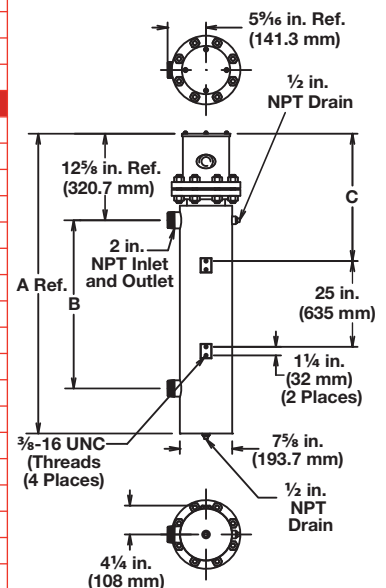
- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>4 inch - 150 lb ANSI Flange (WATROD)</b>										
23 W/in <sup>2</sup> ⑥	240	6.0	1	1	CFONA18A10S	RS	125 (57)	39 (989)	20½ (521)	17 (432)
Steel Tank	240	6.0	3	1	CFONA18A3S	RS	125 (57)	39 (989)	20½ (521)	17 (432)
6-Incoloy®	480	6.0	1	1	CFONA18A11S	RS	125 (57)	39 (989)	20½ (521)	17 (432)
Elements	480	6.0	3	1	CFONA18A5S	RS	125 (57)	39 (989)	20½ (521)	17 (432)
(3.6 W/cm <sup>2</sup> )	240	9.0	1	1	CFONA25J10S	RS	160 (73)	39 (989)	20½ (521)	17 (432)
	240	9.0	3	1	CFONA25J3S	RS	160 (73)	39 (989)	20½ (521)	17 (432)
	480	9.0	1	1	CFONA25J11S	RS	160 (73)	39 (989)	20½ (521)	17 (432)
	480	9.0	3	1	CFONA25J5S	RS	160 (73)	39 (989)	20½ (521)	17 (432)
	240	12.0	1	2	CFONA33A10S	RS	163 (74)	49½ (1256)	31 (787)	27½ (699)
	240	12.0	3	1	CFONA33A3S	RS	163 (74)	49½ (1256)	31 (787)	27½ (699)
	480	12.0	1	1	CFONA33A11S	RS	163 (74)	49½ (1256)	31 (787)	27½ (699)
	480	12.0	3	1	CFONA33A5S	RS	163 (74)	49½ (1256)	31 (787)	27½ (699)
	240	15.0	1	2	CFONA40J10S	RS	229 (104)	70½ (1789)	52 (1321)	48½ (1232)
	240	15.0	3	1	CFONA40J3S	RS	229 (104)	70½ (1789)	52 (1321)	48½ (1232)
	480	15.0	1	1	CFONA40J11S	RS	229 (104)	70½ (1789)	52 (1321)	48½ (1232)
	480	15.0	3	1	CFONA40J5S	RS	229 (104)	70½ (1789)	52 (1321)	48½ (1232)
	240	18.0	1	2	CFONA48A10S	RS	234 (107)	70½ (1789)	52 (1321)	48½ (1232)
	240	18.0	3	1	CFONA48A3S	RS	234 (107)	70½ (1789)	52 (1321)	48½ (1232)
	480	18.0	1	1	CFONA48A11S	RS	234 (107)	70½ (1789)	52 (1321)	48½ (1232)
	480	18.0	3	1	CFONA48A5S	RS	234 (107)	70½ (1789)	52 (1321)	48½ (1232)
	240	25.0	3	2	CFONA64J3S	RS	298 (136)	91½ (2326)	73 (1854)	66 (1676)
	480	25.0	1	2	CFONA64J11S	RS	298 (136)	91½ (2326)	73 (1854)	66 (1676)
	480	25.0	3	1	CFONA64J5S	RS	298 (136)	91½ (2326)	73 (1854)	66 (1676)
	240	30.0	3	2	CFONA77A3S	RS	306 (139)	91½ (2326)	73 (1854)	66 (1676)
	480	30.0	1	2	CFONA77A11S	RS	306 (139)	91½ (2326)	73 (1854)	66 (1676)
	480	30.0	3	1	CFONA77A5S	RS	306 (139)	91½ (2326)	73 (1854)	66 (1676)
<b>5 inch - 150 lb ANSI Flange (WATROD)</b>										
23 W/in <sup>2</sup> ⑥	240	9.0	1	1	CFNNA25J10S	RS	140 (64)	49¼ (1249.0)	30 (762.0)	14¼ (377.8)
Steel Tank	240	9.0	3	1	CFNNA25J3S	RS	140 (64)	49¼ (1249.0)	30 (762.0)	14¼ (377.8)
6-Incoloy®	480	9.0	1	1	CFNNA25J11S	RS	140 (64)	49¼ (1249.0)	30 (762.0)	14¼ (377.8)
Elements	480	9.0	3	1	CFNNA25J5S	RS	140 (64)	49¼ (1249.0)	30 (762.0)	14¼ (377.8)
(3.6 W/cm <sup>2</sup> )	240	12.0	1	2	CFNNA33A10S	RS	145 (66)	56¼ (1427.0)	37 (940.0)	18% (473.1)
	240	12.0	3	1	CFNNA33A3S	RS	145 (66)	56¼ (1427.0)	37 (940.0)	18% (473.1)
	480	12.0	1	1	CFNNA33A11S	RS	145 (66)	56¼ (1427.0)	37 (940.0)	18% (473.1)
	480	12.0	3	1	CFNNA33A5S	RS	145 (66)	56¼ (1427.0)	37 (940.0)	18% (473.1)
	240	15.0	1	2	CFNNA40J10S	RS	167 (76)	56¼ (1427.0)	37 (940.0)	18% (473.1)
	240	15.0	3	1	CFNNA40J3S	RS	167 (76)	56¼ (1427.0)	37 (940.0)	18% (473.1)
	480	15.0	1	1	CFNNA40J11S	RS	167 (76)	56¼ (1427.0)	37 (940.0)	18% (473.1)
	480	15.0	3	1	CFNNA40J5S	RS	167 (76)	56¼ (1427.0)	37 (940.0)	18% (473.1)
	240	18.0	1	2	CFNNA48A10S	RS	180 (82)	67% (1719.0)	48½ (1232.0)	25 (633.0)
	240	18.0	3	1	CFNNA48A3S	RS	180 (82)	67% (1719.0)	48½ (1232.0)	25 (633.0)
	480	18.0	1	1	CFNNA48A11S	RS	180 (82)	67% (1719.0)	48½ (1232.0)	25 (633.0)
	480	18.0	3	1	CFNNA48A5S	RS	180 (82)	67% (1719.0)	48½ (1232.0)	25 (633.0)
	240	25.0	3	2	CFNNA64J3S	RS	195 (89)	81% (2060.6)	61% (1571.6)	25 (633.0)
	480	25.0	1	2	CFNNA64J11S	RS	195 (89)	81% (2060.6)	61% (1571.6)	25 (633.0)
	480	25.0	3	1	CFNNA64J5S	RS	195 (89)	81% (2060.6)	61% (1571.6)	25 (633.0)
	240	30.0	3	2	CFNNA77A3S	RS	220 (100)	94% (2390.8)	75 (1902.0)	25 (633.0)
	480	30.0	1	2	CFNNA77A11S	RS	220 (100)	94% (2390.8)	75 (1902.0)	25 (633.0)
	480	30.0	3	1	CFNNA77A5S	RS	220 (100)	94% (2390.8)	75 (1902.0)	25 (633.0)

### 4 inch - 150 lb ANSI Flange



### 5 inch - 150 lb ANSI Flange



## RAPID SHIP

- RS - Same day shipment up to 5 pieces

⑥ Can be wired 3-phase wye to produce ½ of the rated kW and watt density  
 Truck Shipment only

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

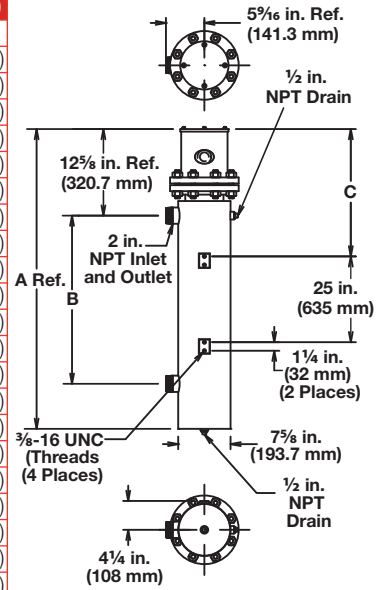


### Application: Forced Air and Caustic Solutions

- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

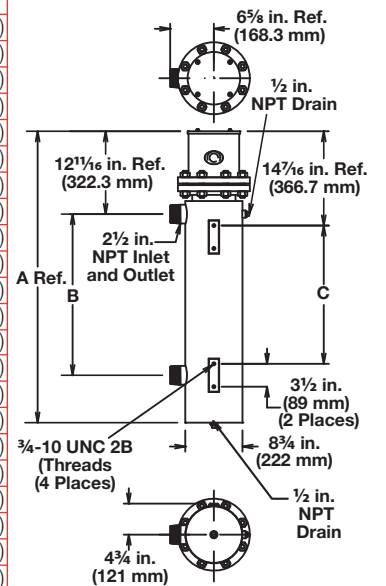
Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>5 inch - 150 lb ANSI Flange (WATROD)</b>										
23 W/in <sup>2</sup> ⑥	240	14.0	1	3	CFNNA25J10XS	RS	145 (66)	49¼ (1249.0)	30 (762.0)	14¼ (377.8)
Steel Tank	240	14.0	3	1	CFNNA25J3XS	RS	145 (66)	49¼ (1249.0)	30 (762.0)	14¼ (377.8)
9-Incoloy®	480	14.0	1	1	CFNNA25J11XS	RS	145 (66)	49¼ (1249.0)	30 (762.0)	14¼ (377.8)
Elements	480	14.0	3	1	CFNNA25J5XS	RS	145 (66)	49¼ (1249.0)	30 (762.0)	14¼ (377.8)
(3.6 W/cm <sup>2</sup> )	240	18.0	1	3	CFNNA33A10XS	RS	150 (68)	56¼ (1427.0)	37 (940.0)	18¼ (473.1)
	240	18.0	3	1	CFNNA33A3XS	RS	150 (68)	56¼ (1427.0)	37 (940.0)	18¼ (473.1)
	480	18.0	1	1	CFNNA33A11XS	RS	150 (68)	56¼ (1427.0)	37 (940.0)	18¼ (473.1)
	480	18.0	3	1	CFNNA33A5XS	RS	150 (68)	56¼ (1427.0)	37 (940.0)	18¼ (473.1)
	240	23.0	1	3	CFNNA40J10XS	RS	174 (79)	56¼ (1427.0)	37 (940.0)	18¼ (473.1)
	240	23.0	3	3	CFNNA40J3XS	RS	174 (79)	56¼ (1427.0)	37 (940.0)	18¼ (473.1)
	480	23.0	1	1	CFNNA40J11XS	RS	174 (79)	56¼ (1427.0)	37 (940.0)	18¼ (473.1)
	480	23.0	3	1	CFNNA40J5XS	RS	174 (79)	56¼ (1427.0)	37 (940.0)	18¼ (473.1)
	240	27.0	1	3	CFNNA48A10XS	RS	189 (86)	67¼ (1719.0)	48½ (1232.0)	25 (633.0)
	240	27.0	3	3	CFNNA48A3XS	RS	189 (86)	67¼ (1719.0)	48½ (1232.0)	25 (633.0)
	480	27.0	1	3	CFNNA48A11XS	RS	189 (86)	67¼ (1719.0)	48½ (1232.0)	25 (633.0)
	480	27.0	3	1	CFNNA48A5XS	RS	189 (86)	67¼ (1719.0)	48½ (1232.0)	25 (633.0)
	240	38.0	3	3	CFNNA64J3XS	RS	207 (94)	81¼ (2060.6)	61¼ (1571.6)	25 (633.0)
	480	38.0	1	3	CFNNA64J11XS	RS	207 (94)	81¼ (2059.0)	61¼ (1571.6)	25 (633.0)
	480	38.0	3	1	CFNNA64J5XS	RS	207 (94)	81¼ (2059.0)	61¼ (1571.6)	25 (633.0)
	240	45.0	3	3	CFNNA77A3XS	RS	233 (106)	94¼ (2389.0)	75 (1902.0)	25 (633.0)
	480	45.0	1	3	CFNNA77A11XS	RS	233 (106)	94¼ (2389.0)	75 (1902.0)	25 (633.0)
	480	45.0	3	3	CFNNA77A5XS	RS	233 (106)	94¼ (2389.0)	75 (1902.0)	25 (633.0)

5 inch - 150 lb ANSI Flange



<b>6 inch - 150 lb ANSI Flange (WATROD)</b>										
23 W/in <sup>2</sup> ⑥	240	12.0	1	2	CFPNA17R10S	RS	214 (97)	40¼ (1027)	20½ (521)	17 (432)
Steel Tank	240	12.0	3	1	CFPNA17R3S	RS	214 (97)	40¼ (1027)	20½ (521)	17 (432)
12-Incoloy®	480	12.0	1	1	CFPNA17R11S	RS	214 (97)	40¼ (1027)	20½ (521)	17 (432)
Elements	480	12.0	3	1	CFPNA17R5S	RS	214 (97)	40¼ (1027)	20½ (521)	17 (432)
(3.6 W/cm <sup>2</sup> )	240	18.0	1	2	CFPNA25G10S	RS	222 (101)	40¼ (1027)	20½ (521)	17 (432)
	240	18.0	3	1	CFPNA25G3S	RS	222 (101)	40¼ (1027)	20½ (521)	17 (432)
	480	18.0	1	1	CFPNA25G11S	RS	222 (101)	40¼ (1027)	20½ (521)	17 (432)
	480	18.0	3	1	CFPNA25G5S	RS	222 (101)	40¼ (1027)	20½ (521)	17 (432)
	240	24.0	1	3	CFPNA32R10S	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	240	24.0	3	2	CFPNA32R3S	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	480	24.0	1	2	CFPNA32R11S	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	480	24.0	3	1	CFPNA32R5S	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	240	30.0	1	3	CFPNA40G10S	RS	290 (132)	72 (1827)	52 (1321)	48½ (1232)
	240	30.0	3	2	CFPNA40G3S	RS	290 (132)	72 (1827)	52 (1321)	48½ (1232)
	480	30.0	1	2	CFPNA40G11S	RS	290 (132)	72 (1827)	52 (1321)	48½ (1232)
	480	30.0	3	1	CFPNA40G5S	RS	290 (132)	72 (1827)	52 (1321)	48½ (1232)
	240	36.0	1	4	CFPNA47R10S	RS	298 (136)	72 (1827)	52 (1321)	48½ (1232)
	240	36.0	3	2	CFPNA47R3S	RS	298 (136)	72 (1827)	52 (1321)	48½ (1232)
	480	36.0	1	2	CFPNA47R11S	RS	298 (136)	72 (1827)	52 (1321)	48½ (1232)
	480	36.0	3	1	CFPNA47R5S	RS	298 (136)	72 (1827)	52 (1321)	48½ (1232)
	240	50.0	3	4	CFPNA64G3S	RS	360 (164)	93 (2361)	73 (1854)	66 (1676)
	480	50.0	1	3	CFPNA64G11S	RS	360 (164)	93 (2361)	73 (1854)	66 (1676)
	480	50.0	3	2	CFPNA64G5S	RS	360 (164)	93 (2361)	73 (1854)	66 (1676)
	240	60.0	3	4	CFPNA76R3S	RS	368 (167)	93 (2361)	73 (1854)	66 (1676)
	480	60.0	1	3	CFPNA76R11S	RS	368 (167)	93 (2361)	73 (1854)	66 (1676)
	480	60.0	3	2	CFPNA76R5S	RS	368 (167)	93 (2361)	73 (1854)	66 (1676)

6 inch - 150 lb ANSI Flange



### RAPID SHIP

- RS - Same day shipment up to 5 pieces

⑥ Can be wired 3-phase wye to produce ½ of the rated kW and watt density

Truck Shipment only

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

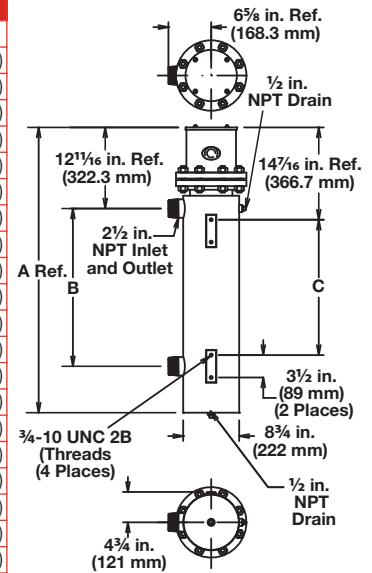


### Application: Forced Air and Caustic Solutions

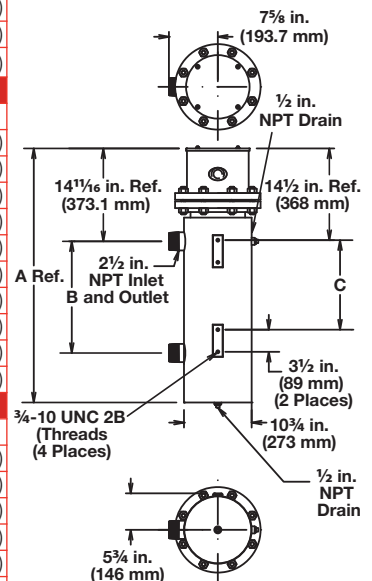
- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>6 inch - 150 lb ANSI Flange (WATROD)</b>										
23 W/in <sup>2</sup> Steel Tank	240	15.0	1	3	CFPNA17R10XS	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)
15-Incoloy® Elements (3.6 W/cm <sup>2</sup> )	480	15.0	1	1	CFPNA17R11XS	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)
	480	15.0	3	1	CFPNA17R5XS	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)
240	23.0	1	3	CFPNA25G10XS	RS	226 (103)	40½ (1027)	20½ (521)	17 (432)	
	23.0	3	5	CFPNA25G3XS	RS	226 (103)	40½ (1027)	20½ (521)	17 (432)	
480	23.0	1	1	CFPNA25G11XS	RS	226 (103)	40½ (1027)	20½ (521)	17 (432)	
	23.0	3	1	CFPNA25G5XS	RS	226 (103)	40½ (1027)	20½ (521)	17 (432)	
240	30.0	1	3	CFPNA32R10XS	RS	288 (131)	51 (1294)	31 (787)	27½ (699)	
	30.0	3	5	CFPNA32R3XS	RS	288 (131)	51 (1294)	31 (787)	27½ (699)	
480	30.0	1	3	CFPNA32R11XS	RS	288 (131)	51 (1294)	31 (787)	27½ (699)	
	30.0	3	1	CFPNA32R5XS	RS	288 (131)	51 (1294)	31 (787)	27½ (699)	
240	38.0	1	5	CFPNA40G10XS	RS	296 (135)	72 (1827)	52 (1321)	48½ (1232)	
	38.0	3	5	CFPNA40G3XS	RS	296 (135)	72 (1827)	52 (1321)	48½ (1232)	
480	38.0	1	3	CFPNA40G11XS	RS	296 (135)	72 (1827)	52 (1321)	48½ (1232)	
	38.0	3	1	CFPNA40G5XS	RS	296 (135)	72 (1827)	52 (1321)	48½ (1232)	
240	45.0	1	5	CFPNA47R10XS	RS	306 (139)	72 (1827)	52 (1321)	48½ (1232)	
	45.0	3	5	CFPNA47R3XS	RS	306 (139)	72 (1827)	52 (1321)	48½ (1232)	
480	45.0	1	3	CFPNA47R11XS	RS	306 (139)	72 (1827)	52 (1321)	48½ (1232)	
	45.0	3	5	CFPNA47R5XS	RS	306 (139)	72 (1827)	52 (1321)	48½ (1232)	
240	63.0	3	5	CFPNA64G3XS	RS	370 (168)	93 (2361)	73 (1854)	66 (1676)	
	63.0	1	3	CFPNA64G11XS	RS	370 (168)	93 (2361)	73 (1854)	66 (1676)	
480	63.0	3	5	CFPNA64G5XS	RS	370 (168)	93 (2361)	73 (1854)	66 (1676)	
	75.0	3	5	CFPNA76R3XS	RS	381 (173)	93 (2361)	73 (1854)	66 (1676)	
480	75.0	1	5	CFPNA76R11XS	RS	381 (173)	93 (2361)	73 (1854)	66 (1676)	
	75.0	3	5	CFPNA76R5XS	RS	381 (173)	93 (2361)	73 (1854)	66 (1676)	
<b>8 inch - 150 lb ANSI Flange (WATROD)</b>										
23 W/in <sup>2</sup> Steel Tank	240	30.0	1	3	CFRNA32N10S	RS	370 (168)	55½ (1402.0)	32¾ (830.0)	29¾ (741.0)
18-Incoloy® Elements (3.6 W/cm <sup>2</sup> )	480	30.0	1	2	CFRNA32N11S	RS	370 (168)	55½ (1402.0)	32¾ (830.0)	29¾ (741.0)
	480	30.0	3	1	CFRNA32N5S	RS	370 (168)	55½ (1402.0)	32¾ (830.0)	29¾ (741.0)
240	40.0	3	3	CFRNA43E3S	RS	410 (186)	62½ (1580.0)	39¾ (1008.0)	36¾ (919.0)	
	40.0	1	2	CFRNA43E11S	RS	410 (186)	62½ (1580.0)	39¾ (1008.0)	36¾ (919.0)	
480	40.0	3	3	CFRNA43E5S	RS	410 (186)	62½ (1580.0)	39¾ (1008.0)	36¾ (919.0)	
	50.0	3	3	CFRNA51M3S	RS	440 (200)	69¾ (1774.8)	47¾ (1203.3)	43¾ (1114.4)	
480	50.0	1	3	CFRNA51M11S	RS	440 (200)	69¾ (1774.8)	47¾ (1203.3)	43¾ (1114.4)	
	50.0	3	2	CFRNA51M5S	RS	440 (200)	69¾ (1774.8)	47¾ (1203.3)	43¾ (1114.4)	
<b>8 inch - 150 lb ANSI Flange (WATROD)</b>										
23 W/in <sup>2</sup> Steel Tank	240	40.0	1	4	CFRNA33D10XS	RS	382 (174)	55½ (1402.0)	32¾ (830.0)	29¾ (741.0)
24-Incoloy® Elements (3.6 W/cm <sup>2</sup> )	480	40.0	1	2	CFRNA33D11XS	RS	382 (174)	55½ (1402.0)	32¾ (830.0)	29¾ (741.0)
	480	40.0	3	2	CFRNA33D5XS	RS	382 (174)	55½ (1402.0)	32¾ (830.0)	29¾ (741.0)
240	53.0	3	4	CFRNA43M3XS	RS	425 (193)	62½ (1580.0)	39¾ (1008.0)	36¾ (919.0)	
	53.0	1	3	CFRNA43M11XS	RS	425 (193)	62½ (1580.0)	39¾ (1008.0)	36¾ (919.0)	
480	53.0	3	2	CFRNA43M5XS	RS	425 (193)	62½ (1580.0)	39¾ (1008.0)	36¾ (919.0)	
	67.0	3	4	CFRNA51M3XS	RS	457 (207)	69¾ (1774.8)	47¾ (1203.3)	43¾ (1114.4)	
480	67.0	1	3	CFRNA51M11XS	RS	457 (207)	69¾ (1774.8)	47¾ (1203.3)	43¾ (1114.4)	
	67.0	3	2	CFRNA51M5XS	RS	457 (207)	69¾ (1774.8)	47¾ (1203.3)	43¾ (1114.4)	

6 inch - 150 lb ANSI Flange



8 inch - 150 lb ANSI Flange



**RAPID SHIP**

• RS - Next day shipment up to 2 pieces

Truck Shipment only

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters



### Application: Forced Air and Caustic Solutions

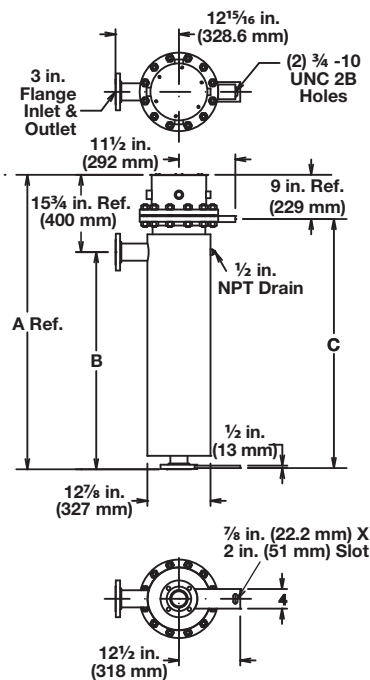
- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>10 inch - 150 lb ANSI Flange (WATROD)</b>										
23 W/in <sup>2</sup> Steel Tank 27-Incoloy® Elements (3.6 W/cm <sup>2</sup> )	240	60.0	3	3	CFSNA43N3S	S	515 (234)	76 <sup>5</sup> / <sub>16</sub> (1946.3)	60 <sup>7</sup> / <sub>16</sub> (1546.2)	67 <sup>7</sup> / <sub>16</sub> (1709.7)
	480	60.0	3	3	CFSNA43N5S	S	515 (234)	76 <sup>5</sup> / <sub>16</sub> (1946.3)	60 <sup>7</sup> / <sub>16</sub> (1546.2)	67 <sup>7</sup> / <sub>16</sub> (1709.7)
	240	75.0	3	9	CFSNA51N3S	S	530 (241)	84 <sup>1</sup> / <sub>2</sub> (2136.8)	68 <sup>3</sup> / <sub>16</sub> (1736.2)	74 <sup>13</sup> / <sub>16</sub> (1900.2)
	480	75.0	3	3	CFSNA51N5S	S	530 (241)	84 <sup>1</sup> / <sub>2</sub> (2136.8)	68 <sup>3</sup> / <sub>16</sub> (1736.2)	74 <sup>13</sup> / <sub>16</sub> (1900.2)
<b>12 inch - 150 lb ANSI Flange (WATROD)</b>										
23 W/in <sup>2</sup> Steel Tank 36-Incoloy® Elements (3.6 W/cm <sup>2</sup> )	480	80.0	3	3	CFTNA43L5S	S	565 (257)	76 <sup>5</sup> / <sub>16</sub> (1952.6)	60 <sup>7</sup> / <sub>16</sub> (1541)	67 <sup>7</sup> / <sub>16</sub> (1714.0)
	480	100.0	3	3	CFTNA51L5S	S	585 (266)	84 <sup>1</sup> / <sub>2</sub> (2143.1)	68 <sup>1</sup> / <sub>4</sub> (1732)	75 (1905.0)
<b>14 inch - 150 lb ANSI Flange (WATROD)</b>										
23 W/in <sup>2</sup> Steel Tank 45-Incoloy® Elements (3.6 W/cm <sup>2</sup> )	480	100.0	3	3	CFWNA43J5S	S	570 (259)	75 <sup>3</sup> / <sub>4</sub> (1924)	59 <sup>1</sup> / <sub>2</sub> (1510)	66 <sup>3</sup> / <sub>16</sub> (1681.2)
	480	125.0	3	5	CFWNA51J5S	S	590 (268)	83 <sup>1</sup> / <sub>4</sub> (2115)	67 (1700)	73 <sup>1</sup> / <sub>16</sub> (1871.7)

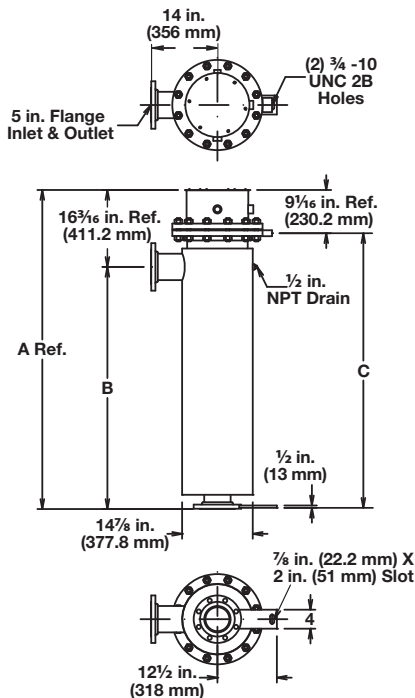
• S - 10 day lead time

■ Truck Shipment only

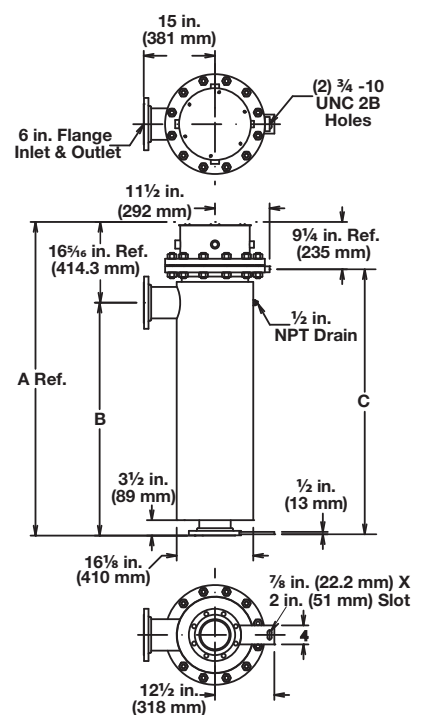
#### 10 inch - 150 lb ANSI Flange



#### 12 inch - 150 lb ANSI Flange



#### 14 inch - 150 lb ANSI Flange



# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

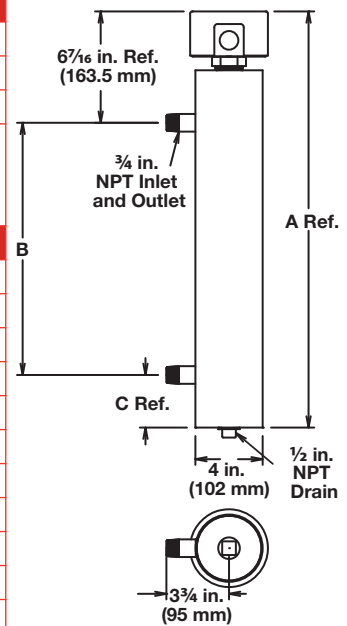


### Application: Lightweight Oils and Heat Transfer Oils

- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>1½ inch NPT Screw Plug (WATROD)</b>										
<b>23 W/in<sup>2</sup> ④ Steel Tank 2-Steel Element (3.6 W/cm<sup>2</sup>)</b>	120/240	1.5	1	1	<b>CBES19G6S</b>	RS	29 (14)	24% (625.5)	15 (381)	3% (79.4)
	120/240	2.0	1	1	<b>CBES25G6S</b>	RS	29 (14)	32% (828.7)	23 (584)	3 (76.0)
<b>1½ inch NPT Screw Plug (FIREBAR)</b>										
<b>30 W/in<sup>2</sup> Steel Tank 1-Incoloy® Elements (4.7 W/cm<sup>2</sup>)</b>	240	1.7	3	1	<b>CBDNF16G12S</b>	RS	26 (12)	24% (625.5)	15 (381)	3% (79.4)
	480	1.7	3	1	<b>CBDNF16G13S</b>	RS	26 (12)	24% (625.5)	15 (381)	3% (79.4)
	240	2.2	3	1	<b>CBDNF19G12S</b>	RS	30 (14)	32% (828.7)	23 (584)	3% (79.4)
	480	2.2	3	1	<b>CBDNF19G13S</b>	RS	30 (14)	32% (828.7)	23 (584)	3% (79.4)
	240	2.8	3	1	<b>CBDNF24L12S</b>	RS	31 (14)	32% (828.7)	23 (584)	3% (79.4)
	480	2.8	3	1	<b>CBDNF24L13S</b>	RS	31 (14)	32% (828.7)	23 (584)	3% (79.4)
	240	3.5	3	1	<b>CBDNF29R12S</b>	RS	43 (20)	42% (1082.7)	32 (813)	4% (111.1)
	480	3.5	3	1	<b>CBDNF29R13S</b>	RS	43 (20)	42% (1082.7)	32 (813)	4% (111.1)
	240	4.3	3	1	<b>CBDNF34R12S</b>	RS	44 (20)	42% (1082.7)	32 (813)	4% (111.1)
	480	4.3	3	1	<b>CBDNF34R13S</b>	RS	44 (20)	42% (1082.7)	32 (813)	4% (111.1)
	240	5.7	3	1	<b>CBDNF45G12S</b>	RS	69 (32)	63% (1616.1)	53 (1346)	4% (111.1)
	480	5.7	3	1	<b>CBDNF45G13S</b>	RS	69 (32)	63% (1616.1)	53 (1346)	4% (111.1)
	240	7.2	3	1	<b>CBDNF55R12S</b>	RS	71 (33)	63% (1616.1)	53 (1346)	4% (111.1)
	480	7.2	3	1	<b>CBDNF55R13S</b>	RS	71 (33)	63% (1616.1)	53 (1346)	4% (111.1)
	<b>1½ inch NPT Screw Plug (FIREBAR)</b>									
<b>23 W/in<sup>2</sup> Steel Tank 1-Incoloy® (3.6 W/cm<sup>2</sup>)</b>	240	1.25	3	1	<b>CBDNF16G20S</b>	RS	26 (12)	24% (625.5)	15 (381)	3% (79.4)
	240	1.65	3	1	<b>CBDNF19G20S</b>	RS	30 (14)	32% (828.7)	23 (584)	3% (79.4)
	240	2.15	3	1	<b>CBDNF24L20S</b>	RS	31 (14)	32% (828.7)	23 (584)	3% (79.4)
	480	2.15	3	1	<b>CBDNF24L19S</b>	RS	31 (14)	32% (828.7)	23 (584)	3% (79.4)
	240	2.65	3	1	<b>CBDNF29R20S</b>	RS	43 (20)	42% (1082.7)	32 (813)	4% (111.1)
	480	2.65	3	1	<b>CBDNF29R19S</b>	RS	43 (20)	42% (1082.7)	32 (813)	4% (111.1)
	240	3.20	3	1	<b>CBDNF34R20S</b>	RS	44 (20)	42% (1082.7)	32 (813)	4% (111.1)
	480	3.20	3	1	<b>CBDNF34R19S</b>	RS	44 (20)	42% (1082.7)	32 (813)	4% (111.1)
	240	4.25	3	1	<b>CBDNF45G20S</b>	RS	69 (32)	63% (1616.1)	53 (1346)	4% (111.1)
	480	4.25	3	1	<b>CBDNF45G19S</b>	RS	69 (32)	63% (1616.1)	53 (1346)	4% (111.1)
	240	5.40	3	1	<b>CBDNF55R20S</b>	RS	71 (33)	63% (1616.1)	53 (1346)	4% (111.1)
	480	5.40	3	1	<b>CBDNF55R19S</b>	RS	71 (33)	63% (1616.1)	53 (1346)	4% (111.1)

1½ inch NPT Screw Plug



### RAPID SHIP

- RS - Same day shipment up to 5 pieces

④ Wired for higher voltage

# Circulation Heaters

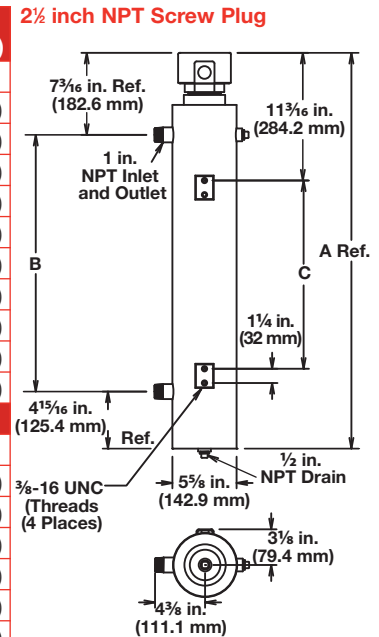
## WATROD and FIREBAR Circulation Heaters



### Application: Lightweight Oils and Heat Transfer Oils

- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)		
<b>2½ inch NPT Screw Plug (WATROD)</b>												
<b>23 W/in<sup>2</sup> Steel Tank 3-Steel (3.6 W/cm<sup>2</sup>)</b>	240	3.0	3	1	<b>CBL5717E3S</b>	RS	24 (11)	34¾ (881)	22½ (572)	16½ (419)		
	480	3.0	3	1	<b>CBL5717E5S</b>	RS	24 (11)	34¾ (881)	22½ (572)	16½ (419)		
	240	4.5	3	1	<b>CBL5724N3S</b>	RS	27 (13)	34¾ (881)	22½ (572)	16½ (419)		
	480	4.5	3	1	<b>CBL5724N5S</b>	RS	27 (13)	34¾ (881)	22½ (572)	16½ (419)		
	240	6.0	3	1	<b>CBL5732E3S</b>	RS	29 (14)	44¾ (1135)	32½ (1129)	26½ (673)		
	480	6.0	3	1	<b>CBL5732E5S</b>	RS	29 (14)	44¾ (1135)	32½ (1129)	26½ (673)		
	240	7.5	3	1	<b>CBL5739N3S</b>	RS	31 (14)	57¼ (1453)	45 (1143)	39 (991)		
	480	7.5	3	1	<b>CBL5739N5S</b>	RS	31 (14)	57¼ (1453)	45 (1143)	39 (991)		
	240	9.0	3	1	<b>CBL5747E3S</b>	RS	32 (15)	57¼ (1453)	45 (1143)	39 (991)		
480	9.0	3	1	<b>CBL5747E5S</b>	RS	32 (15)	57¼ (1453)	45 (1143)	39 (991)			
<b>2½ inch NPT Screw Plug (FIREBAR)</b>												
<b>30 W/in<sup>2</sup> ③ Steel Tank 3-Incoloy® Elements (4.7 W/cm<sup>2</sup>)</b>	240	5.0	3	1	<b>CBLNF15C12S</b>	RS	22 (10)	34¾ (881)	22½ (572)	16½ (419)		
	480	5.0	3	1	<b>CBLNF15C13S</b>	RS	22 (10)	34¾ (881)	22½ (572)	16½ (419)		
	240	6.5	3	1	<b>CBLNF18C12S</b>	RS	23 (11)	34¾ (881)	22½ (572)	16½ (419)		
	480	6.5	3	1	<b>CBLNF18C13S</b>	RS	23 (11)	34¾ (881)	22½ (572)	16½ (419)		
	240	8.5	3	1	<b>CBLNF23C12S</b>	RS	31 (14)	34¾ (881)	22½ (572)	16½ (419)		
	480	8.5	3	1	<b>CBLNF23C13S</b>	RS	31 (14)	34¾ (881)	22½ (572)	16½ (419)		
	240	10.5	3	1	<b>CBLNF28L12S</b>	RS	34 (16)	44¾ (1135)	32½ (1129)	26½ (673)		
	480	10.5	3	1	<b>CBLNF28L13S</b>	RS	34 (16)	44¾ (1135)	32½ (1129)	26½ (673)		
	240	12.8	3	1	<b>CBLNF33L12S</b>	RS	35 (16)	44¾ (1135)	32½ (1129)	26½ (673)		
	480	12.8	3	1	<b>CBLNF33L13S</b>	RS	35 (16)	44¾ (1135)	32½ (1129)	26½ (673)		
	240	17.0	3	1	<b>CBLNF44C12S</b>	RS	44 (20)	57¼ (1453)	45 (1143)	39 (991)		
	480	17.0	3	1	<b>CBLNF44C13S</b>	RS	44 (20)	57¼ (1453)	45 (1143)	39 (991)		
	480	21.5	3	1	<b>CBLNF54L13S</b>	RS	52 (24)	63¾ (1618)	51½ (1308)	46½ (1181)		
	<b>2½ inch NPT Screw Plug (FIREBAR)</b>											
	<b>23 W/in<sup>2</sup> ⑧ Steel Tank 3-Incoloy® (3.6 W/cm<sup>2</sup>)</b>	240	3.80	3	1	<b>CBLNF15C20S</b>	RS	22 (10)	34¾ (881)	22½ (572)	16½ (419)	
240		4.90	3	1	<b>CBLNF18C20S</b>	RS	23 (11)	34¾ (881)	22½ (572)	16½ (419)		
240		6.40	3	1	<b>CBLNF23C20S</b>	RS	31 (14)	34¾ (881)	22½ (572)	16½ (419)		
480		6.40	3	1	<b>CBLNF23C19S</b>	RS	31 (14)	34¾ (881)	22½ (572)	16½ (419)		
240		7.90	3	1	<b>CBLNF28L20S</b>	RS	34 (16)	44¾ (1135)	32½ (1129)	26½ (673)		
480		7.90	3	1	<b>CBLNF28L19S</b>	RS	34 (16)	44¾ (1135)	32½ (1129)	26½ (673)		
240		9.60	3	1	<b>CBLNF33L20S</b>	RS	35 (16)	44¾ (1135)	32½ (1129)	26½ (673)		
480		9.60	3	1	<b>CBLNF33L19S</b>	RS	35 (16)	44¾ (1135)	32½ (1129)	26½ (673)		
240		12.80	3	1	<b>CBLNF44C20S</b>	RS	44 (20)	57¼ (1453)	45 (1143)	39 (991)		
480		12.80	3	1	<b>CBLNF44C19S</b>	RS	44 (20)	57¼ (1453)	45 (1143)	39 (991)		
240		16.10	3	1	<b>CBLNF54L20S</b>	RS	52 (24)	63¾ (1618)	51½ (1308)	46½ (1181)		
480		16.10	3	1	<b>CBLNF54L19S</b>	RS	52 (24)	63¾ (1618)	51½ (1308)	46½ (1181)		



### RAPID SHIP

- RS - Same day shipment up to 5 pieces

- ③ Wired for 3-phase operation only
- ⑧ Can be wired for 1-phase operation

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

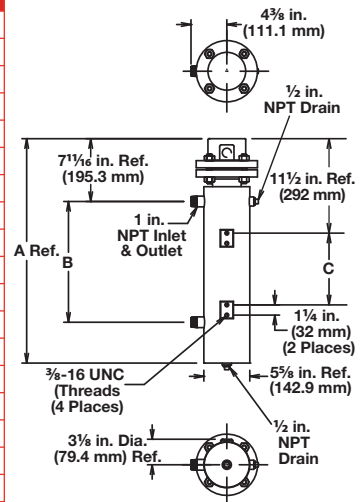


### Application: Lightweight Oils and Heat Transfer Oils

- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

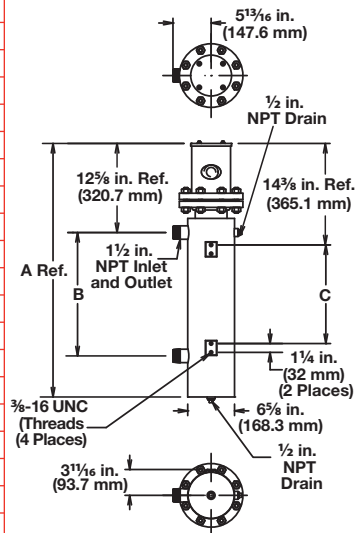
Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>3 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>23 W/in<sup>2</sup> Steel Tank 3-Steel Elements (3.6 W/cm<sup>2</sup>)</b>	240	3.0	1	1	CFMS718A10S	RS	68 (31)	35 1/4 (894)	22 1/2 (573)	16 1/2 (419)
	240	3.0	3	1	CFMS718A3S	RS	68 (31)	35 1/4 (894)	22 1/2 (573)	16 1/2 (419)
	480	3.0	1	1	CFMS718A11S	RS	68 (31)	35 1/4 (894)	22 1/2 (573)	16 1/2 (419)
	480	3.0	3	1	CFMS718A5S	RS	68 (31)	35 1/4 (894)	22 1/2 (573)	16 1/2 (419)
	240	4.5	1	1	CFMS725J10S	RS	78 (36)	35 1/4 (894)	22 1/2 (573)	16 1/2 (419)
	240	4.5	3	1	CFMS725J3S	RS	78 (36)	35 1/4 (894)	22 1/2 (573)	16 1/2 (419)
	480	4.5	1	1	CFMS725J11S	RS	78 (36)	35 1/4 (894)	22 1/2 (573)	16 1/2 (419)
	480	4.5	3	1	CFMS725J5S	RS	78 (36)	35 1/4 (894)	22 1/2 (573)	16 1/2 (419)
	240	6.0	1	2	CFMS733A10S	RS	96 (44)	45 1/4 (1148)	32 1/2 (826)	26 1/2 (673)
	240	6.0	3	1	CFMS733A3S	RS	96 (44)	45 1/4 (1148)	32 1/2 (826)	26 1/2 (673)
	480	6.0	1	1	CFMS733A11S	RS	96 (44)	45 1/4 (1148)	32 1/2 (826)	26 1/2 (673)
	480	6.0	3	1	CFMS733A5S	RS	96 (44)	45 1/4 (1148)	32 1/2 (826)	26 1/2 (673)
	240	7.5	1	2	CFMS740J10S	RS	100 (46)	57 1/4 (1465)	45 (1143)	39 (991)
	240	7.5	3	1	CFMS740J3S	RS	100 (46)	57 1/4 (1465)	45 (1143)	39 (991)
	480	7.5	1	1	CFMS740J11S	RS	100 (46)	57 1/4 (1465)	45 (1143)	39 (991)
	480	7.5	3	1	CFMS740J5S	RS	100 (46)	57 1/4 (1465)	45 (1143)	39 (991)
	240	9.0	1	2	CFMS748A10S	RS	107 (49)	57 1/4 (1465)	45 (1143)	39 (991)
	240	9.0	3	1	CFMS748A3S	RS	107 (49)	57 1/4 (1465)	45 (1143)	39 (991)
	480	9.0	1	1	CFMS748A11S	RS	107 (49)	57 1/4 (1465)	45 (1143)	39 (991)
	480	9.0	3	1	CFMS748A5S	RS	107 (49)	57 1/4 (1465)	45 (1143)	39 (991)

3 inch - 150 lb ANSI Flange



<b>4 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>23 W/in<sup>2</sup> Steel Tank 6-Steel Elements (3.6 W/cm<sup>2</sup>)</b>	240	6.0	1	1	CFOS718A10S	RS	125 (57)	39 (989)	20 1/2 (521)	17 (432)
	240	6.0	3	1	CFOS718A3S	RS	125 (57)	39 (989)	20 1/2 (521)	17 (432)
	480	6.0	1	1	CFOS718A11S	RS	125 (57)	39 (989)	20 1/2 (521)	17 (432)
	480	6.0	3	1	CFOS718A5S	RS	125 (57)	39 (989)	20 1/2 (521)	17 (432)
	240	9.0	1	1	CFOS725J10S	RS	160 (73)	39 (989)	20 1/2 (521)	17 (432)
	240	9.0	3	1	CFOS725J3S	RS	160 (73)	39 (989)	20 1/2 (521)	17 (432)
	480	9.0	1	1	CFOS725J11S	RS	160 (73)	39 (989)	20 1/2 (521)	17 (432)
	480	9.0	3	1	CFOS725J5S	RS	160 (73)	39 (989)	20 1/2 (521)	17 (432)
	240	12.0	1	2	CFOS733A10S	RS	163 (74)	49 1/2 (1256)	31 (787)	27 1/2 (699)
	240	12.0	3	1	CFOS733A3S	RS	163 (74)	49 1/2 (1256)	31 (787)	27 1/2 (699)
	480	12.0	1	1	CFOS733A11S	RS	163 (74)	49 1/2 (1256)	31 (787)	27 1/2 (699)
	480	12.0	3	1	CFOS733A5S	RS	163 (74)	49 1/2 (1256)	31 (787)	27 1/2 (699)
	240	15.0	1	2	CFOS740J10S	RS	229 (104)	70 1/2 (1789)	52 (1321)	48 1/2 (1232)
	240	15.0	3	1	CFOS740J3S	RS	229 (104)	70 1/2 (1789)	52 (1321)	48 1/2 (1232)
	480	15.0	1	1	CFOS740J11S	RS	229 (104)	70 1/2 (1789)	52 (1321)	48 1/2 (1232)
	480	15.0	3	1	CFOS740J5S	RS	229 (104)	70 1/2 (1789)	52 (1321)	48 1/2 (1232)
	240	18.0	1	2	CFOS748A10S	RS	234 (107)	70 1/2 (1789)	52 (1321)	48 1/2 (1232)
	240	18.0	3	1	CFOS748A3S	RS	234 (107)	70 1/2 (1789)	52 (1321)	48 1/2 (1232)
	480	18.0	1	1	CFOS748A11S	RS	234 (107)	70 1/2 (1789)	52 (1321)	48 1/2 (1232)
	480	18.0	3	1	CFOS748A5S	RS	234 (107)	70 1/2 (1789)	52 (1321)	48 1/2 (1232)
240	25.0	3	2	CFOS764J3S	RS	298 (136)	91 1/2 (2326)	73 (1854)	66 (1676)	
480	25.0	1	2	CFOS764J11S	RS	298 (136)	91 1/2 (2326)	73 (1854)	66 (1676)	
480	25.0	3	1	CFOS764J5S	RS	298 (136)	91 1/2 (2326)	73 (1854)	66 (1676)	
240	30.0	3	2	CFOS777A3S	RS	306 (139)	91 1/2 (2326)	73 (1854)	66 (1676)	
480	30.0	1	2	CFOS777A11S	RS	306 (139)	91 1/2 (2326)	73 (1854)	66 (1676)	
480	30.0	3	1	CFOS777A5S	RS	306 (139)	91 1/2 (2326)	73 (1854)	66 (1676)	

4 inch - 150 lb ANSI Flange



**RAPID SHIP**

• RS - Same day shipment up to 5 pieces

Truck Shipment only

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

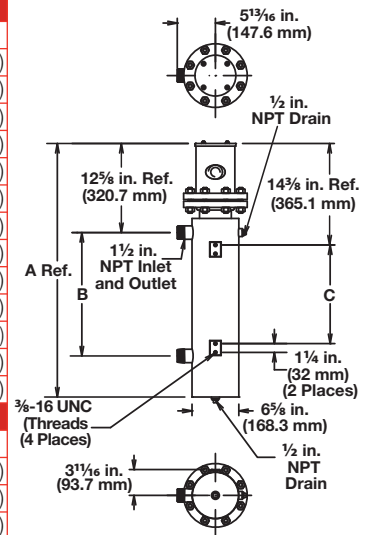


### Application: Lightweight Oils and Heat Transfer Oils

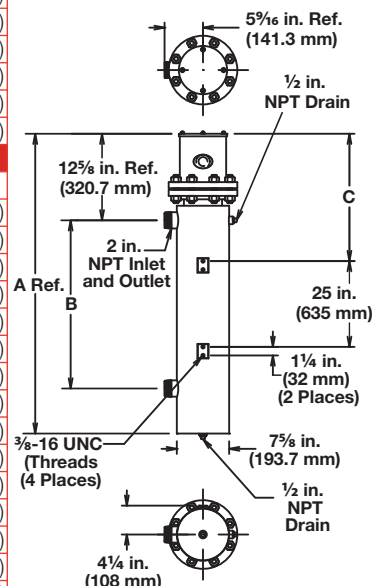
- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>4 inch - 150 lb ANSI Flange (FIREBAR)</b>										
<b>30 W/in<sup>2</sup> Steel Tank</b>	240	10.0	3	1	CFONF16J12S	RS	128 (58)	39 (989)	20½ (521)	17 (432)
	480	10.0	3	1	CFONF16J13S	RS	128 (58)	39 (989)	20½ (521)	17 (432)
<b>6-Incoloy® (4.7 W/cm<sup>2</sup>)</b>	240	13.0	3	1	CFONF19J12S	RS	130 (59)	39 (989)	20½ (521)	17 (432)
	480	13.0	3	1	CFONF19J13S	RS	130 (59)	39 (989)	20½ (521)	17 (432)
	240	17.0	3	1	CFONF24J12S	RS	133 (61)	39 (989)	20½ (521)	17 (432)
	480	17.0	3	1	CFONF24J13S	RS	133 (61)	39 (989)	20½ (521)	17 (432)
	240	21.0	3	2	CFONF30A12S	RS	168 (77)	49½ (1256)	31 (787)	27½ (699)
	480	21.0	3	1	CFONF30A13S	RS	168 (77)	49½ (1256)	31 (787)	27½ (699)
	240	25.5	3	2	CFONF35A12S	RS	170 (78)	49½ (1256)	31 (787)	27½ (699)
	480	25.5	3	1	CFONF35A13S	RS	170 (78)	49½ (1256)	31 (787)	27½ (699)
	240	34.0	3	2	CFONF45J12S	RS	236 (107)	70½ (1789)	52 (1321)	48½ (1232)
	480	34.0	3	1	CFONF45J13S	RS	236 (107)	70½ (1789)	52 (1321)	48½ (1232)
	480	43.0	3	2	CFONF56A13S	RS	240 (109)	70½ (1789)	52 (1321)	48½ (1232)
<b>4 inch - 150 lb ANSI Flange (FIREBAR)</b>										
<b>23 W/in<sup>2</sup> Steel Tank</b>	240	7.5	3	1	CFONF16J20S	RS	128 (58)	39 (989)	20½ (521)	17 (432)
	240	10.0	3	1	CFONF19J20S	RS	130 (59)	39 (989)	20½ (521)	17 (432)
<b>6-Incoloy® Elements (3.6 W/cm<sup>2</sup>)</b>	240	12.8	3	1	CFONF24J20S	RS	133 (61)	39 (989)	20½ (521)	17 (432)
	480	12.8	3	1	CFONF24J19S	RS	133 (61)	39 (989)	20½ (521)	17 (432)
	240	15.8	3	1	CFONF30A20S	RS	168 (77)	49½ (1256)	31 (787)	27½ (699)
	480	15.8	3	1	CFONF30A19S	RS	168 (77)	49½ (1256)	31 (787)	27½ (699)
	240	19.0	3	1	CFONF35A20S	RS	170 (78)	49½ (1256)	31 (787)	27½ (699)
	480	19.0	3	1	CFONF35A19S	RS	170 (78)	49½ (1256)	31 (787)	27½ (699)
	240	25.0	3	2	CFONF45J20S	RS	236 (107)	70½ (1789)	52 (1321)	48½ (1232)
	480	25.0	3	1	CFONF45J19S	RS	236 (107)	70½ (1789)	52 (1321)	48½ (1232)
	240	32.3	3	2	CFONF56A20S	RS	240 (109)	70½ (1789)	52 (1321)	48½ (1232)
	480	32.3	3	1	CFONF56A19S	RS	240 (109)	70½ (1789)	52 (1321)	48½ (1232)
<b>5 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>23 W/in<sup>2</sup> Steel Tank</b>	240	12.00	1	2	CFNS733A10S	RS	145 (66)	56¼ (1427.0)	37 (940.0)	18½ (473.1)
	240	12.00	3	1	CFNS733A3S	RS	145 (66)	56¼ (1427.0)	37 (940.0)	18½ (473.1)
<b>6-Steel (3.6 W/cm<sup>2</sup>)</b>	480	12.00	1	1	CFNS733A11S	RS	145 (66)	56¼ (1427.0)	37 (940.0)	18½ (473.1)
	480	12.00	3	1	CFNS733A5S	RS	145 (66)	56¼ (1427.0)	37 (940.0)	18½ (473.1)
	240	15.00	1	2	CFNS740J10S	RS	167 (76)	56¼ (1427.0)	37 (940.0)	18½ (473.1)
	240	15.00	3	1	CFNS740J3S	RS	167 (76)	56¼ (1427.0)	37 (940.0)	18½ (473.1)
	480	15.00	1	1	CFNS740J11S	RS	167 (76)	56¼ (1427.0)	37 (940.0)	18½ (473.1)
	480	15.00	3	1	CFNS740J5S	RS	167 (76)	56¼ (1427.0)	37 (940.0)	18½ (473.1)
	240	18.00	1	2	CFNS748A10S	RS	180 (82)	67¼ (1719.0)	48½ (1232.0)	18½ (473.1)
	240	18.00	3	1	CFNS748A3S	RS	180 (82)	67¼ (1719.0)	48½ (1232.0)	18½ (473.1)
	480	18.00	1	1	CFNS748A11S	RS	180 (82)	67¼ (1719.0)	48½ (1232.0)	18½ (473.1)
	480	18.00	3	1	CFNS748A5S	RS	180 (82)	67¼ (1719.0)	48½ (1232.0)	18½ (473.1)
	240	25.00	3	2	CFNS764J3S	RS	195 (89)	81¼ (2060.6)	61¼ (1571.6)	25 (633.0)
	480	25.00	1	2	CFNS764J11S	RS	195 (89)	81¼ (2060.6)	61¼ (1571.6)	25 (633.0)
	480	25.00	3	1	CFNS764J5S	RS	195 (89)	81¼ (2060.6)	61¼ (1571.6)	25 (633.0)
	240	30.00	3	2	CFNS777A3S	RS	220 (100)	94¼ (2390.8)	75 (1902.0)	25 (633.0)
	480	30.00	1	2	CFNS777A11S	RS	220 (100)	94¼ (2390.8)	75 (1902.0)	25 (633.0)
	480	30.00	3	1	CFNS777A5S	RS	220 (100)	94¼ (2390.8)	75 (1902.0)	25 (633.0)

### 4 inch - 150 lb ANSI Flange



### 5 inch - 150 lb ANSI Flange



## RAPID SHIP

- RS - Same day shipment up to 5 pieces

Truck Shipment only

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

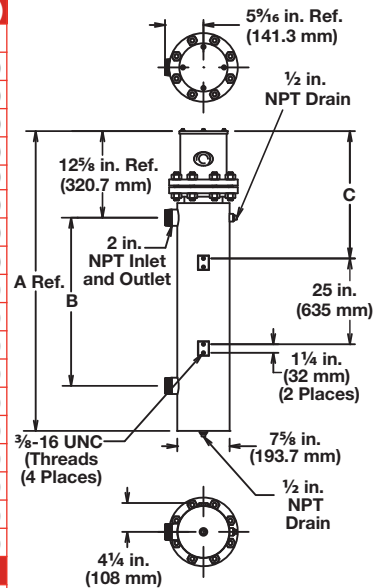


### Application: Lightweight Oils and Heat Transfer Oils

- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

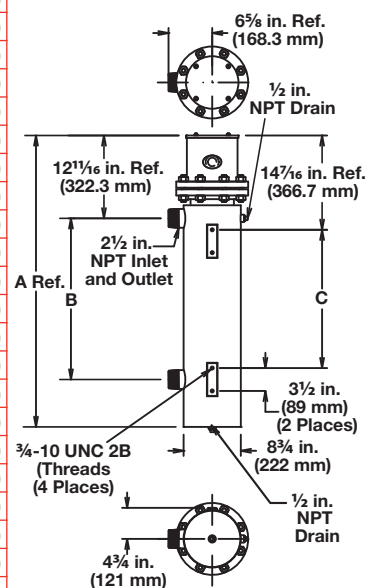
Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>5 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>23 W/in<sup>2</sup> Steel Tank 9-Steel Elements (3.6 W/cm<sup>2</sup>)</b>	240	18.0	1	3	CFNS733A10XS	RS	150 (68)	56¼ (1427.0)	37 (940.0)	18¾ (471.1)
	240	18.0	3	1	CFNS733A3XS	RS	150 (68)	56¼ (1427.0)	37 (940.0)	18¾ (471.1)
	480	18.0	1	1	CFNS733A11XS	RS	150 (68)	56¼ (1427.0)	37 (940.0)	18¾ (471.1)
	480	18.0	3	1	CFNS733A5XS	RS	150 (68)	56¼ (1427.0)	37 (940.0)	18¾ (471.1)
	240	23.0	1	3	CFNS740J10XS	RS	173 (79)	56¼ (1427.0)	37 (940.0)	18¾ (471.1)
	240	23.0	3	3	CFNS740J3XS	RS	173 (79)	56¼ (1427.0)	37 (940.0)	18¾ (471.1)
	480	23.0	1	1	CFNS740J11XS	RS	173 (79)	56¼ (1427.0)	37 (940.0)	18¾ (471.1)
	480	23.0	3	1	CFNS740J5XS	RS	173 (79)	56¼ (1427.0)	37 (940.0)	18¾ (471.1)
	240	27.0	1	3	CFNS748A10XS	RS	188 (86)	67¼ (1719.0)	48½ (1232.0)	25 (633.0)
	240	27.0	3	3	CFNS748A3XS	RS	188 (86)	67¼ (1719.0)	48½ (1232.0)	25 (633.0)
	480	27.0	1	3	CFNS748A11XS	RS	188 (86)	67¼ (1719.0)	48½ (1232.0)	25 (633.0)
	480	27.0	3	1	CFNS748A5XS	RS	188 (86)	67¼ (1719.0)	48½ (1232.0)	25 (633.0)
	240	38.0	3	3	CFNS764J3XS	RS	206 (94)	81¼ (2060.6)	61¼ (1571.6)	25 (633.0)
	480	38.0	1	3	CFNS764J11XS	RS	206 (94)	81¼ (2060.6)	61¼ (1571.6)	25 (633.0)
	480	38.0	3	1	CFNS764J5XS	RS	206 (94)	81¼ (2060.6)	61¼ (1571.6)	25 (633.0)
	240	45.0	3	3	CFNS777A3XS	RS	233 (106)	94¼ (2390.8)	75 (1902.0)	25 (633.0)
480	45.0	1	3	CFNS777A11XS	RS	233 (106)	94¼ (2390.8)	75 (1902.0)	25 (633.0)	
480	45.0	3	3	CFNS777A5XS	RS	233 (106)	94¼ (2390.8)	75 (1902.0)	25 (633.0)	

5 inch - 150 lb ANSI Flange



<b>6 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>23 W/in<sup>2</sup> Steel Tank 12-Steel Elements (3.6 W/cm<sup>2</sup>)</b>	240	12.0	1	2	CFPS717R10S	RS	214 (97)	40¼ (1027)	20½ (521)	17 (432)
	240	12.0	3	1	CFPS717R3S	RS	214 (97)	40¼ (1027)	20½ (521)	17 (432)
	480	12.0	1	1	CFPS717R11S	RS	214 (97)	40¼ (1027)	20½ (521)	17 (432)
	480	12.0	3	1	CFPS717R5S	RS	214 (97)	40¼ (1027)	20½ (521)	17 (432)
	240	18.0	1	2	CFPS725G10S	RS	222 (101)	40¼ (1027)	20½ (521)	17 (432)
	240	18.0	3	1	CFPS725G3S	RS	222 (101)	40¼ (1027)	20½ (521)	17 (432)
	480	18.0	1	1	CFPS725G11S	RS	222 (101)	40¼ (1027)	20½ (521)	17 (432)
	480	18.0	3	1	CFPS725G5S	RS	222 (101)	40¼ (1027)	20½ (521)	17 (432)
	240	24.0	1	3	CFPS732R10S	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	240	24.0	3	2	CFPS732R3S	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	480	24.0	1	2	CFPS732R11S	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	480	24.0	3	1	CFPS732R5S	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	240	30.0	1	3	CFPS740G10S	RS	290 (132)	72 (1827)	52 (1321)	48½ (1232)
	240	30.0	3	2	CFPS740G3S	RS	290 (132)	72 (1827)	52 (1321)	48½ (1232)
	480	30.0	1	2	CFPS740G11S	RS	290 (132)	72 (1827)	52 (1321)	48½ (1232)
	480	30.0	3	1	CFPS740G5S	RS	290 (132)	72 (1827)	52 (1321)	48½ (1232)
	240	36.0	1	4	CFPS747R10S	RS	298 (136)	72 (1827)	52 (1321)	48½ (1232)
	240	36.0	3	2	CFPS747R3S	RS	298 (136)	72 (1827)	52 (1321)	48½ (1232)
	480	36.0	1	2	CFPS747R11S	RS	298 (136)	72 (1827)	52 (1321)	48½ (1232)
	480	36.0	3	1	CFPS747R5S	RS	298 (136)	72 (1827)	52 (1321)	48½ (1232)
	240	50.0	3	4	CFPS764G3S	RS	360 (164)	93 (2361)	73 (1854)	66 (1676)
	480	50.0	1	3	CFPS764G11S	RS	360 (164)	93 (2361)	73 (1854)	66 (1676)
	480	50.0	3	2	CFPS764G5S	RS	360 (164)	93 (2361)	73 (1854)	66 (1676)
	240	60.0	3	4	CFPS776R3S	RS	368 (167)	93 (2361)	73 (1854)	66 (1676)
480	60.0	1	3	CFPS776R11S	RS	368 (167)	93 (2361)	73 (1854)	66 (1676)	
480	60.0	3	2	CFPS776R5S	RS	368 (167)	93 (2361)	73 (1854)	66 (1676)	

6 inch - 150 lb ANSI Flange



**RAPID SHIP**

- RS - Same day shipment up to 5 pieces

Truck Shipment only

# Circulation Heaters

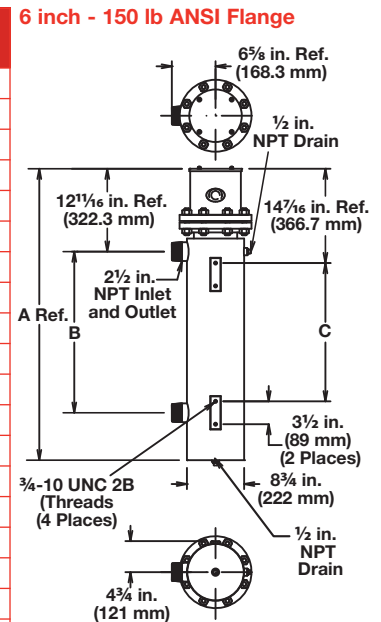
## WATROD and FIREBAR Circulation Heaters



### Application: Lightweight Oils and Heat Transfer Oils

- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)	
<b>6 inch - 150 lb ANSI Flange (WATROD)</b>											
<b>23 W/in<sup>2</sup> Steel Tank 15-Steel Elements (3.6 W/cm<sup>2</sup>)</b>	240	15.0	1	3	CFPS717R10XS	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)	
	240	15.0	3	1	CFPS717R3XS	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)	
	480	15.0	1	1	CFPS717R11XS	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)	
	480	15.0	3	1	CFPS717R5XS	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)	
	240	23.0	1	3	CFPS725G10XS	RS	222 (101)	40½ (1027)	20½ (521)	17 (432)	
	240	23.0	3	5	CFPS725G3XS	RS	222 (101)	40½ (1027)	20½ (521)	17 (432)	
	480	23.0	1	1	CFPS725G11XS	RS	222 (101)	40½ (1027)	20½ (521)	17 (432)	
	480	23.0	3	1	CFPS725G5XS	RS	222 (101)	40½ (1027)	20½ (521)	17 (432)	
	240	30.0	1	3	CFPS732R10XS	RS	226 (103)	51 (1294)	31 (787)	27½ (699)	
	240	30.0	3	5	CFPS732R3XS	RS	226 (103)	51 (1294)	31 (787)	27½ (699)	
	480	30.0	1	3	CFPS732R11XS	RS	226 (103)	51 (1294)	31 (787)	27½ (699)	
	480	30.0	3	1	CFPS732R5XS	RS	226 (103)	51 (1294)	31 (787)	27½ (699)	
	240	38.0	1	5	CFPS740G10XS	RS	290 (132)	72 (1827)	52 (1321)	48½ (1232)	
	240	38.0	3	5	CFPS740G3XS	RS	290 (132)	72 (1827)	52 (1321)	48½ (1232)	
	480	38.0	1	3	CFPS740G11XS	RS	290 (132)	72 (1827)	52 (1321)	48½ (1232)	
	480	38.0	3	1	CFPS740G5XS	RS	290 (132)	72 (1827)	52 (1321)	48½ (1232)	
	240	45.0	1	5	CFPS747R10XS	RS	298 (136)	72 (1827)	52 (1321)	48½ (1232)	
	240	45.0	3	5	CFPS747R3XS	RS	298 (136)	72 (1827)	52 (1321)	48½ (1232)	
	480	45.0	1	3	CFPS747R11XS	RS	298 (136)	72 (1827)	52 (1321)	48½ (1232)	
	480	45.0	3	5	CFPS747R5XS	RS	298 (136)	72 (1827)	52 (1321)	48½ (1232)	
	240	63.0	3	5	CFPS764G3XS	RS	360 (164)	93 (2361)	73 (1854)	66 (1676)	
	480	63.0	1	3	CFPS764G11XS	RS	360 (164)	93 (2361)	73 (1854)	66 (1676)	
	480	63.0	3	5	CFPS764G5XS	RS	360 (164)	93 (2361)	73 (1854)	66 (1676)	
	240	75.0	3	5	CFPS776R3XS	RS	368 (167)	93 (2361)	73 (1854)	66 (1676)	
	480	75.0	1	5	CFPS776R11XS	RS	368 (167)	93 (2361)	73 (1854)	66 (1676)	
	480	75.0	3	5	CFPS776R5XS	RS	368 (167)	93 (2361)	73 (1854)	66 (1676)	
	<b>6 inch - 150 lb ANSI Flange (FIREBAR)</b>										
	<b>30 W/in<sup>2</sup> ③ Steel Tank 15-Incoloy® Elements (4.7 W/cm<sup>2</sup>)</b>	240	25.0	3	5	CFPNF16J12S	RS	220 (100)	40½ (1027)	20½ (521)	17 (432)
480		25.0	3	5	CFPNF16J13S	RS	220 (100)	40½ (1027)	20½ (521)	17 (432)	
240		32.0	3	5	CFPNF19J12S	RS	223 (102)	40½ (1027)	20½ (521)	17 (432)	
480		32.0	3	5	CFPNF19J13S	RS	223 (102)	40½ (1027)	20½ (521)	17 (432)	
240		42.0	3	5	CFPNF24J12S	RS	226 (103)	40½ (1027)	20½ (521)	17 (432)	
480		42.0	3	5	CFPNF24J13S	RS	226 (103)	40½ (1027)	20½ (521)	17 (432)	
240		52.0	3	5	CFPNF30A12S	RS	232 (106)	51 (1294)	31 (787)	27½ (699)	
480		52.0	3	5	CFPNF30A13S	RS	232 (106)	51 (1294)	31 (787)	27½ (699)	
240		64.0	3	5	CFPNF35A12S	RS	236 (107)	51 (1294)	31 (787)	27½ (699)	
480		64.0	3	5	CFPNF35A13S	RS	236 (107)	51 (1294)	31 (787)	27½ (699)	
240		85.0	3	5	CFPNF45J12S	RS	304 (138)	72 (1827)	52 (1321)	48½ (1232)	
480		85.0	3	5	CFPNF45J13S	RS	304 (138)	72 (1827)	52 (1321)	48½ (1232)	
480		110.0	3	5	CFPNF56A13S	RS	314 (143)	72 (1827)	52 (1321)	48½ (1232)	



### RAPID SHIP

- RS - Same day shipment up to 2 pieces

③ Wired for 3-phase operation only

■ Truck Shipment only

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

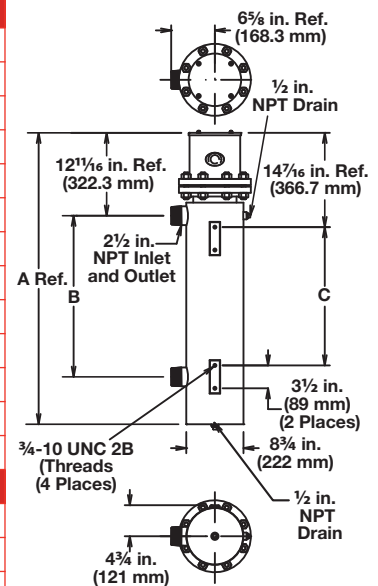


### Application: Lightweight Oils and Heat Transfer Oils

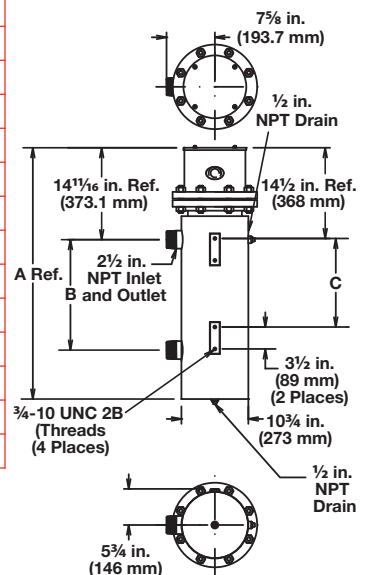
- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>6 inch - 150 lb ANSI Flange (FIREBAR)</b>										
<b>23 W/in<sup>2</sup> Steel Tank 15-Incoloy® (3.6 W/cm<sup>2</sup>)</b>	240	19.0	3	5	CFPNF16J20S	RS	220 (100)	40½ (1027)	20½ (521)	17 (432)
	240	24.0	3	5	CFPNF19J20S	RS	223 (102)	40½ (1027)	20½ (521)	17 (432)
	240	32.0	3	5	CFPNF24J20S	RS	226 (103)	40½ (1027)	20½ (521)	17 (432)
	480	32.0	3	5	CFPNF24J19S	RS	226 (103)	40½ (1027)	20½ (521)	17 (432)
	240	40.0	3	5	CFPNF30A20S	RS	232 (106)	51 (1294)	31 (787)	27½ (699)
	480	40.0	3	5	CFPNF30A19S	RS	232 (106)	51 (1294)	31 (787)	27½ (699)
	240	48.0	3	5	CFPNF35A20S	RS	236 (107)	51 (1294)	31 (787)	27½ (699)
	480	48.0	3	5	CFPNF35A19S	RS	236 (107)	51 (1294)	31 (787)	27½ (699)
	240	64.0	3	5	CFPNF45J20S	RS	304 (138)	72 (1827)	52 (1321)	48½ (1232)
	480	64.0	3	5	CFPNF45J19S	RS	304 (138)	72 (1827)	52 (1321)	48½ (1232)
	240	80.0	3	5	CFPNF56A20S	RS	314 (143)	72 (1827)	52 (1321)	48½ (1232)
	480	80.0	3	5	CFPNF56A19S	RS	314 (143)	72 (1827)	52 (1321)	48½ (1232)
<b>8 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>23 W/in<sup>2</sup> Steel Tank 18-Steel Elements (3.6 W/cm<sup>2</sup>)</b>	240	30.0	1	3	CFRS732N10S	RS	370 (168)	55¼ (1402.0)	32¾ (830.0)	29¼ (741.0)
	240	30.0	3	2	CFRS732N3S	RS	370 (168)	55¼ (1402.0)	32¾ (830.0)	29¼ (741.0)
	480	30.0	1	2	CFRS732N11S	RS	370 (168)	55¼ (1402.0)	32¾ (830.0)	29¼ (741.0)
	480	30.0	3	1	CFRS732N5S	RS	370 (168)	55¼ (1402.0)	32¾ (830.0)	29¼ (741.0)
	240	40.0	3	3	CFRS743E3S	RS	410 (186)	62¼ (1580.0)	39¼ (1008.0)	36¼ (919.0)
	480	40.0	1	2	CFRS743E11S	RS	410 (186)	62¼ (1580.0)	39¼ (1008.0)	36¼ (919.0)
	480	40.0	3	2	CFRS743E5S	RS	410 (186)	62¼ (1580.0)	39¼ (1008.0)	36¼ (919.0)
	240	50.0	3	3	CFRS751M3S	RS	440 (200)	69¾ (1774.8)	47¾ (1203.3)	43¾ (1114.4)
	480	50.0	1	3	CFRS751M11S	RS	440 (200)	69¾ (1774.8)	47¾ (1203.3)	43¾ (1114.4)
	480	50.0	3	2	CFRS751M5S	RS	440 (200)	69¾ (1774.8)	47¾ (1203.3)	43¾ (1114.4)
	240	60.0	3	6	CFRS762D3S	RS	480 (218)	79¾ (2016.1)	56¾ (1444.6)	53¾ (1355.7)
	480	60.0	1	3	CFRS762D11S	RS	480 (218)	79¾ (2016.1)	56¾ (1444.6)	53¾ (1355.7)
	480	60.0	3	2	CFRS762D5S	RS	480 (218)	79¾ (2016.1)	56¾ (1444.6)	53¾ (1355.7)
	240	70.0	3	6	CFRS770M3S	RS	530 (241)	88¾ (2244.7)	65¾ (1673.2)	62¾ (1584.3)
	480	70.0	1	6	CFRS770M11S	RS	530 (241)	88¾ (2244.7)	65¾ (1673.2)	62¾ (1584.3)
	480	70.0	3	2	CFRS770M5S	RS	530 (241)	88¾ (2244.7)	65¾ (1673.2)	62¾ (1584.3)
	240	80.0	3	6	CFRS779M3S	RS	610 (277)	98¾ (2498.7)	75¾ (1927.2)	72¾ (1838.3)
	480	80.0	3	3	CFRS779M5S	RS	610 (277)	98¾ (2498.7)	75¾ (1927.2)	72¾ (1838.3)

### 6 inch - 150 lb ANSI Flange



### 8 inch - 150 lb ANSI Flange



## RAPID SHIP

- RS - Next day shipment up to 2 pieces

Truck Shipment only

# Circulation Heaters

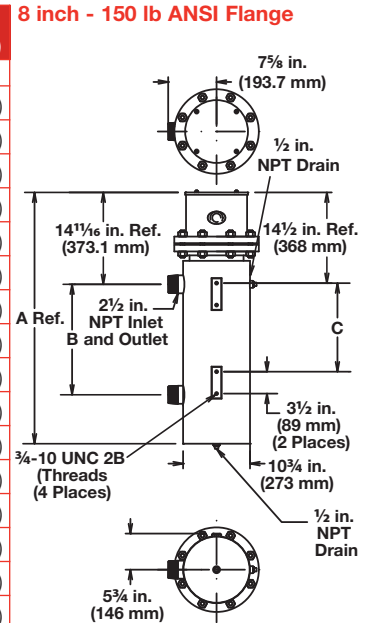
## WATROD and FIREBAR Circulation Heaters



### Application: Lightweight Oils and Heat Transfer Oils

- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>8 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>23 W/in<sup>2</sup> Steel Tank 24-Steel (3.6 W/cm<sup>2</sup>)</b>	240	40.0	1	4	CFRS733D10XS	RS	382 (174)	55 $\frac{1}{4}$ (1402.0)	32 $\frac{3}{4}$ (830.0)	29 $\frac{1}{4}$ (741.0)
	240	40.0	3	4	CFRS733D3XS	RS	382 (174)	55 $\frac{1}{4}$ (1402.0)	32 $\frac{3}{4}$ (830.0)	29 $\frac{1}{4}$ (741.0)
	480	40.0	1	2	CFRS733D11XS	RS	382 (174)	55 $\frac{1}{4}$ (1402.0)	32 $\frac{3}{4}$ (830.0)	29 $\frac{1}{4}$ (741.0)
	480	40.0	3	2	CFRS733D5XS	RS	382 (174)	55 $\frac{1}{4}$ (1402.0)	32 $\frac{3}{4}$ (830.0)	29 $\frac{1}{4}$ (741.0)
	240	53.0	3	4	CFRS743M3XS	RS	425 (193)	62 $\frac{1}{4}$ (1580.0)	39 $\frac{3}{4}$ (1008.0)	36 $\frac{1}{4}$ (919.0)
	480	53.0	1	3	CFRS743M11XS	RS	425 (193)	62 $\frac{1}{4}$ (1580.0)	39 $\frac{3}{4}$ (1008.0)	36 $\frac{1}{4}$ (919.0)
	480	53.0	3	2	CFRS743M5XS	RS	425 (193)	62 $\frac{1}{4}$ (1580.0)	39 $\frac{3}{4}$ (1008.0)	36 $\frac{1}{4}$ (919.0)
	240	67.0	3	4	CFRS751M3XS	RS	457 (208)	69 $\frac{1}{4}$ (1774.8)	47 $\frac{3}{4}$ (1203.3)	43 $\frac{3}{4}$ (1114.4)
	480	67.0	1	3	CFRS751M11XS	RS	457 (208)	69 $\frac{1}{4}$ (1774.8)	47 $\frac{3}{4}$ (1203.3)	43 $\frac{3}{4}$ (1114.4)
	480	67.0	3	2	CFRS751M5XS	RS	457 (208)	69 $\frac{1}{4}$ (1774.8)	47 $\frac{3}{4}$ (1203.3)	43 $\frac{3}{4}$ (1114.4)
	240	80.0	3	8	CFRS762D3XS	RS	461 (209)	79 $\frac{1}{4}$ (2016.1)	56 $\frac{1}{4}$ (1444.6)	53 $\frac{3}{4}$ (1355.7)
	480	80.0	1	4	CFRS762D11XS	RS	461 (209)	79 $\frac{1}{4}$ (2016.1)	56 $\frac{1}{4}$ (1444.6)	53 $\frac{3}{4}$ (1355.7)
	480	80.0	3	4	CFRS762D5XS	RS	461 (209)	79 $\frac{1}{4}$ (2016.1)	56 $\frac{1}{4}$ (1444.6)	53 $\frac{3}{4}$ (1355.7)
	240	93.0	3	8	CFRS770M3XS	RS	554 (252)	88 $\frac{3}{4}$ (2244.7)	65 $\frac{1}{4}$ (1673.2)	62 $\frac{1}{4}$ (1584.3)
	480	93.0	1	6	CFRS770M11XS	RS	554 (252)	88 $\frac{3}{4}$ (2244.7)	65 $\frac{1}{4}$ (1673.2)	62 $\frac{1}{4}$ (1584.3)
	480	93.0	3	4	CFRS770M5XS	RS	554 (252)	88 $\frac{3}{4}$ (2244.7)	65 $\frac{1}{4}$ (1673.2)	62 $\frac{1}{4}$ (1584.3)
240	107.0	3	8	CFRS779M3XS	RS	636 (289)	98 $\frac{3}{4}$ (2498.7)	75 $\frac{1}{4}$ (1927.2)	72 $\frac{1}{4}$ (1838.3)	
480	107.0	3	4	CFRS779M5XS	RS	636 (289)	98 $\frac{3}{4}$ (2498.7)	75 $\frac{1}{4}$ (1927.2)	72 $\frac{1}{4}$ (1838.3)	



### RAPID SHIP

- RS - Next day shipment up to 2 pieces

Truck Shipment only

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters



### Application: Lightweight Oils and Heat Transfer Oils

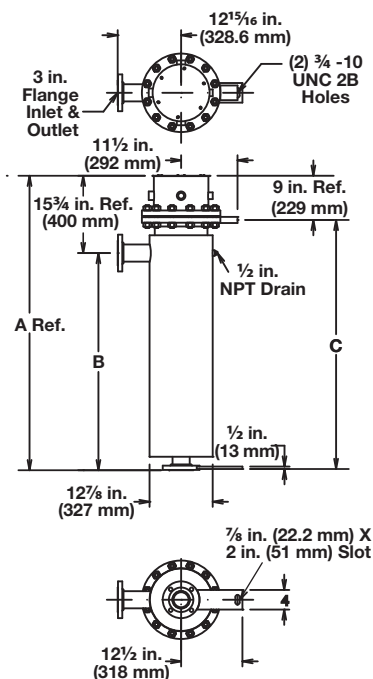
- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>10 inch - 150 lb ANSI Flange (WATROD)</b>										
23 W/in <sup>2</sup> Steel Tank 27-Steel Elements (3.6 W/cm <sup>2</sup> )	480	90.0	3	3	CFSS762E5S	S	540 (245)	91¼ (2316.0)	75½ (1916.0)	81 <sup>15</sup> / <sub>16</sub> (2081.2)
	480	105.0	3	3	CFSS770N5S	S	600 (645)	99¾ (2517.8)	83¾ (2117.7)	89 <sup>13</sup> / <sub>16</sub> (2281.2)
	480	120.0	3	3	CFSS778N5S	S	645 (293)	106¾ (2708.3)	90¾ (2308.2)	97 <sup>7</sup> / <sub>16</sub> (2471.7)
<b>12 inch - 150 lb ANSI Flange (WATROD)</b>										
23 W/in <sup>2</sup> Steel Tank 36-Steel Elements (3.6 W/cm <sup>2</sup> )	480	140.0	3	4	CFTS770L5S	S	650 (295)	99 (2515)	82¾ (2105.0)	89¾ (2276.5)
	480	160.0	3	4	CFTS778L5S	S	700 (318)	106½ (2705)	90¾ (2295.5)	97¾ (2467.0)
<b>14 inch - 150 lb ANSI Flange (WATROD)</b>										
23 W/in <sup>2</sup> Steel Tank 45-Steel Elements (3.6 W/cm <sup>2</sup> )	480	150.0	3	5	CFWS762A5S	S	650 (295)	90¾ (2305)	74½ (1891)	81 <sup>15</sup> / <sub>16</sub> (2062.2)
	480	175.0	3	5	CFWS770J5S	S	700 (318)	98¾ (2496)	82 (2081)	88 <sup>1</sup> / <sub>16</sub> (2252.7)
	480	200.0	3	5	CFWS778J5S	S	780 (354)	105¾ (2686)	89¾ (2272)	96 <sup>15</sup> / <sub>16</sub> (2443.2)

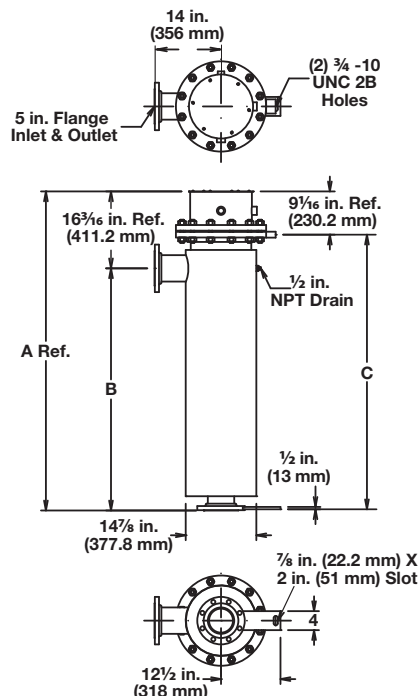
• S - 10 day lead time

■ Truck Shipment only

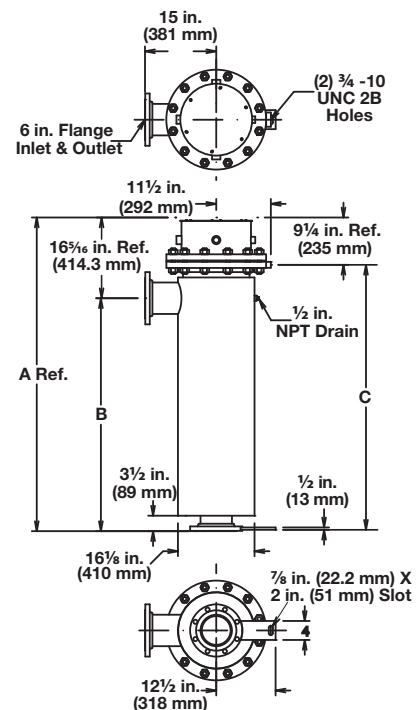
### 10 inch - 150 lb ANSI Flange



### 12 inch - 150 lb ANSI Flange



### 14 inch - 150 lb ANSI Flange



# Circulation Heaters

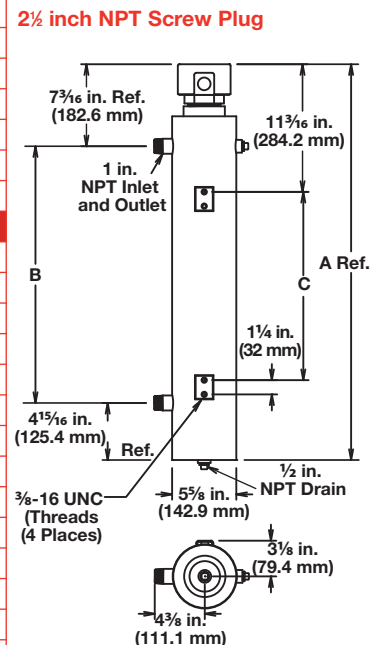
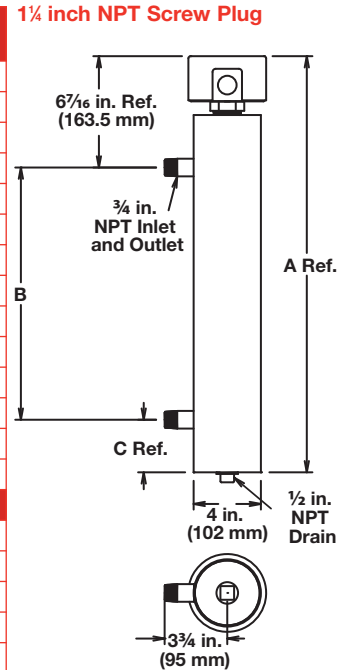
## WATROD and FIREBAR Circulation Heaters



### Application: Medium Weight Oils and Heat Transfer Oils

- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>1½ inch NPT Screw Plug (FIREBAR)</b>										
15 W/in <sup>2</sup> ③ Steel Tank 1-Incoloy® Element (2.3 W/cm <sup>2</sup> )	240	0.67	3	1	CBDNF13A29S	RS	25 (12)	24% (625.5)	15 (381)	3½ (79.4)
	240	0.83	3	1	CBDNF15J29S	RS	26 (12)	24% (625.5)	15 (381)	3½ (79.4)
	240	1.00	3	1	CBDNF18A29S	RS	30 (14)	32% (828.7)	23 (584)	3½ (79.4)
	240	1.33	3	1	CBDNF22J29S	RS	31 (14)	32% (828.7)	23 (584)	3½ (79.4)
	480	1.33	3	1	CBDNF22J30S	RS	31 (14)	32% (828.7)	23 (584)	3½ (79.4)
	240	1.67	3	1	CBDNF27J29S	RS	43 (20)	42% (1082.7)	32 (813)	4% (111.1)
	480	1.67	3	1	CBDNF27J30S	RS	43 (20)	42% (1082.7)	32 (813)	4% (111.1)
	240	2.00	3	1	CBDNF32J29S	RS	44 (20)	42% (1082.7)	32 (813)	4% (111.1)
	480	2.00	3	1	CBDNF32J30S	RS	44 (20)	42% (1082.7)	32 (813)	4% (111.1)
	240	2.67	3	1	CBDNF42A29S	RS	69 (32)	63% (1616.1)	53 (1346)	4% (111.1)
	480	2.67	3	1	CBDNF42A30S	RS	69 (32)	63% (1616.1)	53 (1346)	4% (111.1)
	240	3.33	3	1	CBDNF51J29S	RS	71 (33)	63% (1616.1)	53 (1346)	4% (111.1)
	480	3.33	3	1	CBDNF51J30S	RS	71 (33)	63% (1616.1)	53 (1346)	4% (111.1)
<b>2½ inch NPT Screw Plug (WATROD)</b>										
16 W/in <sup>2</sup> ③ Steel Tank 3-Incoloy® Elements (2.5 W/cm <sup>2</sup> )	240	2.0	3	1	CBLN717G12S	RS	24 (11)	34¾ (881)	22½ (572)	16½ (419)
	480	2.0	3	1	CBLN717G13S	RS	24 (11)	34¾ (881)	22½ (572)	16½ (419)
	240	2.5	3	1	CBLN719R12S	RS	26 (12)	34¾ (881)	22½ (572)	16½ (419)
	480	2.5	3	1	CBLN719R13S	RS	26 (12)	34¾ (881)	22½ (572)	16½ (419)
	240	3.0	3	1	CBLN724R12S	RS	27 (13)	34¾ (881)	22½ (572)	16½ (419)
	480	3.0	3	1	CBLN724R13S	RS	27 (13)	34¾ (881)	22½ (572)	16½ (419)
	240	4.0	3	1	CBLN732G12S	RS	29 (14)	44% (1135)	32½ (1129)	26½ (673)
	480	4.0	3	1	CBLN732G13S	RS	29 (14)	44% (1135)	32½ (1129)	26½ (673)
	240	5.0	3	1	CBLN739R12S	RS	31 (14)	57% (1453)	45 (1143)	39 (991)
	480	5.0	3	1	CBLN739R13S	RS	31 (14)	57% (1453)	45 (1143)	39 (991)
	240	6.0	3	1	CBLN747G12S	RS	32 (15)	57% (1453)	45 (1143)	39 (991)
	480	6.0	3	1	CBLN747G13S	RS	32 (15)	57% (1453)	45 (1143)	39 (991)
<b>2½ inch NPT Screw Plug (FIREBAR)</b>										
15 W/in <sup>2</sup> ③ Steel Tank 3-Incoloy® (2.3 W/cm <sup>2</sup> )	240	2.00	3	1	CBLNF12A29S	RS	21 (10)	34¾ (881)	22½ (572)	16½ (419)
	240	2.50	3	1	CBLNF14J29S	RS	22 (10)	34¾ (881)	22½ (572)	16½ (419)
	240	3.00	3	1	CBLNF17A29S	RS	23 (11)	34¾ (881)	22½ (572)	16½ (419)
	240	4.00	3	1	CBLNF21J29S	RS	31 (14)	34¾ (881)	22½ (572)	16½ (419)
	480	4.00	3	1	CBLNF21J30S	RS	31 (14)	34¾ (881)	22½ (572)	16½ (419)
	240	5.00	3	1	CBLNF26J29S	RS	34 (16)	44% (1135)	32½ (1129)	26½ (673)
	480	5.00	3	1	CBLNF26J30S	RS	34 (16)	44% (1135)	32½ (1129)	26½ (673)
	240	6.00	3	1	CBLNF31J29S	RS	35 (16)	44% (1135)	32½ (1129)	26½ (673)
	480	6.00	3	1	CBLNF31J30S	RS	35 (16)	44% (1135)	32½ (1129)	26½ (673)
	240	8.00	3	1	CBLNF41A29S	RS	44 (20)	57% (1453)	45 (1143)	39 (991)
	480	8.00	3	1	CBLNF41A30S	RS	44 (20)	57% (1453)	45 (1143)	39 (991)
	240	10.00	3	1	CBLNF50J29S	RS	52 (24)	63% (1618)	51½ (1308)	46½ (1181)
	480	10.00	3	1	CBLNF50J30S	RS	52 (24)	63% (1618)	51½ (1308)	46½ (1181)



### RAPID SHIP

- RS - Same day shipment up to 5 pieces

③ Wired for 3-phase operation only

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

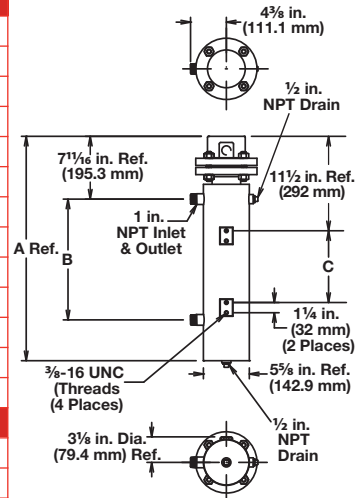


### Application: Medium Weight Oils and Heat Transfer Oils

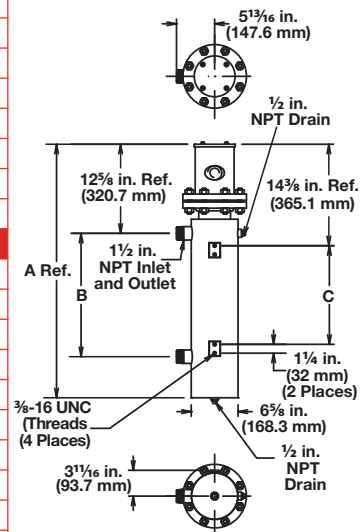
- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>3 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>16 W/in<sup>2</sup> ③ Steel Tank 3-Incoloy® Element (2.6 W/cm<sup>2</sup>)</b>	240	2.00	3	1	CFMN718A12S	RS	68 (31)	35 1/4 (894)	22 1/2 (573)	16 1/2 (419)
	480	2.00	3	1	CFMN718A13S	RS	68 (31)	35 1/4 (894)	22 1/2 (573)	16 1/2 (419)
	240	2.50	3	1	CFMN720J12S	RS	70 (32)	35 1/4 (894)	22 1/2 (573)	16 1/2 (419)
	480	2.50	3	1	CFMN720J13S	RS	70 (32)	35 1/4 (894)	22 1/2 (573)	16 1/2 (419)
	240	3.00	3	1	CFMN725J12S	RS	78 (36)	45 1/4 (1148)	32 1/2 (826)	26 1/2 (673)
	480	3.00	3	1	CFMN725J13S	RS	78 (36)	45 1/4 (1148)	32 1/2 (826)	26 1/2 (673)
	240	4.00	3	1	CFMN733A12S	RS	96 (44)	45 1/4 (1148)	32 1/2 (826)	26 1/2 (673)
	480	4.00	3	1	CFMN733A13S	RS	96 (44)	45 1/4 (1148)	32 1/2 (826)	26 1/2 (673)
	240	5.00	3	1	CFMN740J12S	RS	100 (46)	57 1/4 (1465)	45 (1143)	39 (991)
	480	5.00	3	1	CFMN740J13S	RS	100 (46)	57 1/4 (1465)	45 (1143)	39 (991)
	240	6.00	3	1	CFMN748A12S	RS	107 (49)	57 1/4 (1465)	45 (1143)	39 (991)
480	6.00	3	1	CFMN748A13S	RS	107 (49)	57 1/4 (1465)	45 (1143)	39 (991)	
<b>4 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>16 W/in<sup>2</sup> ③ Steel Tank 6-Incoloy® Elements (2.5 W/cm<sup>2</sup>)</b>	240	3.0	3	1	CFON713J12S	RS	122 (56)	39 (989)	20 1/2 (521)	17 (432)
	480	3.0	3	1	CFON713J13S	RS	122 (56)	39 (989)	20 1/2 (521)	17 (432)
	240	4.0	3	1	CFON718A12S	RS	125 (57)	39 (989)	20 1/2 (521)	17 (432)
	480	4.0	3	1	CFON718A13S	RS	125 (57)	39 (989)	20 1/2 (521)	17 (432)
	240	5.0	3	1	CFON720J12S	RS	127 (58)	39 (989)	20 1/2 (521)	17 (432)
	480	5.0	3	1	CFON720J13S	RS	127 (58)	39 (989)	20 1/2 (521)	17 (432)
	240	6.0	3	1	CFON725J12S	RS	160 (73)	39 (989)	20 1/2 (521)	17 (432)
	480	6.0	3	1	CFON725J13S	RS	160 (73)	39 (989)	20 1/2 (521)	17 (432)
	240	8.0	3	1	CFON733A12S	RS	163 (74)	49 1/2 (1256)	31 (787)	27 1/2 (699)
	480	8.0	3	1	CFON733A13S	RS	163 (74)	49 1/2 (1256)	31 (787)	27 1/2 (699)
	240	10.0	3	1	CFON740J12S	RS	229 (104)	70 1/2 (1789)	52 (1321)	48 1/2 (1232)
	480	10.0	3	1	CFON740J13S	RS	229 (104)	70 1/2 (1789)	52 (1321)	48 1/2 (1232)
	240	12.0	3	1	CFON748A12S	RS	234 (107)	70 1/2 (1789)	52 (1321)	48 1/2 (1232)
	480	12.0	3	1	CFON748A13S	RS	234 (107)	70 1/2 (1789)	52 (1321)	48 1/2 (1232)
	<b>4 inch - 150 lb ANSI Flange (FIREBAR)</b>									
<b>15 W/in<sup>2</sup> ③ Steel Tank 6-Incoloy® (2.3 W/cm<sup>2</sup>)</b>	240	4.00	3	1	CFONF13G29S	RS	125 (57)	39 (989)	20 1/2 (521)	17 (432)
	240	5.00	3	1	CFONF16A29S	RS	128 (58)	39 (989)	20 1/2 (521)	17 (432)
	240	6.00	3	1	CFONF18G29S	RS	130 (59)	39 (989)	20 1/2 (521)	17 (432)
	240	8.00	3	1	CFONF22R29S	RS	133 (61)	39 (989)	20 1/2 (521)	17 (432)
	480	8.00	3	1	CFONF22R30S	RS	133 (61)	39 (989)	20 1/2 (521)	17 (432)
	240	10.00	3	1	CFONF27R29S	RS	168 (77)	49 1/2 (1256)	31 (787)	27 1/2 (699)
	480	10.00	3	1	CFONF27R30S	RS	168 (77)	49 1/2 (1256)	31 (787)	27 1/2 (699)
	240	12.00	3	1	CFONF32R29S	RS	170 (77)	49 1/2 (1256)	31 (787)	27 1/2 (699)
	480	12.00	3	1	CFONF32R30S	RS	170 (77)	49 1/2 (1256)	31 (787)	27 1/2 (699)
	240	16.00	3	1	CFONF42G29S	RS	236 (107)	70 1/2 (1789)	52 (1321)	48 1/2 (1232)
	480	16.00	3	1	CFONF42G30S	RS	236 (107)	70 1/2 (1789)	52 (1321)	48 1/2 (1232)
	240	20.00	3	1	CFONF51R29S	RS	240 (109)	70 1/2 (1789)	52 (1321)	48 1/2 (1232)
	480	20.00	3	1	CFONF51R30S	RS	240 (109)	70 1/2 (1789)	52 (1321)	48 1/2 (1232)

### 3 inch - 150 lb ANSI Flange



### 4 inch - 150 lb ANSI Flange



**RAPID SHIP**

• RS - Same day shipment up to 5 pieces

③ Wired for 3-phase operation only

■ Truck Shipment only

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

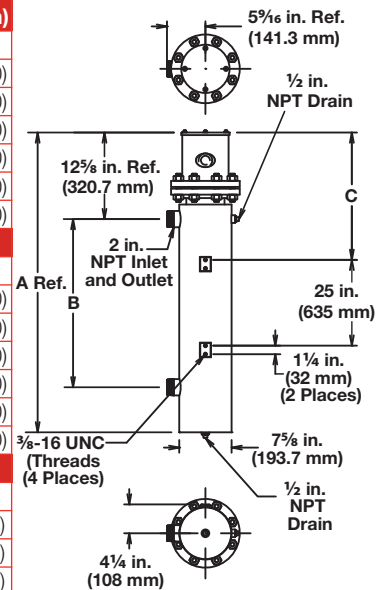


### Application: Medium Weight Oils and Heat Transfer Oils

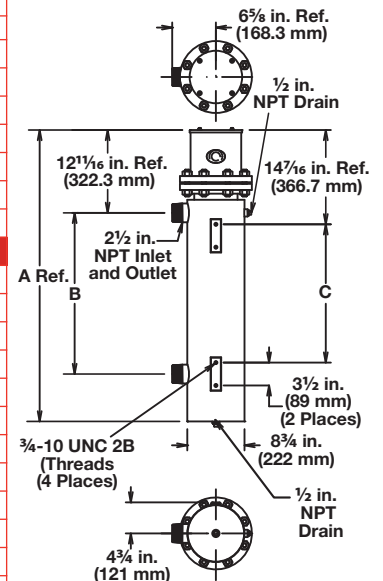
- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)	
<b>5 inch - 150 lb ANSI Flange (WATROD)</b>											
16 W/in <sup>2</sup> ③	240	8.0	3	1	CFNN733A12S	RS	145 (66)	49¼ (1249)	30 (762)	25 (633.0)	
Steel Tank	480	8.0	3	1	CFNN733A13S	RS	145 (66)	49¼ (1249)	30 (762)	25 (633.0)	
6-Incoloy Element (2.6 W/cm <sup>2</sup> )	240	10.0	3	1	CFNN740J12S	RS	167 (76)	56¼ (1427)	37 (940)	25 (633.0)	
	480	10.0	3	1	CFNN740J13S	RS	167 (76)	56¼ (1427)	37 (940)	25 (633.0)	
	240	12.0	3	1	CFNN748A12S	RS	180 (82)	67¼ (1719)	48½ (1232)	25 (633.0)	
	480	12.0	3	1	CFNN748A13S	RS	180 (82)	67¼ (1719)	48½ (1232)	25 (633.0)	
<b>5 inch - 150 lb ANSI Flange (WATROD)</b>											
16 W/in <sup>2</sup> ③	240	12.0	3	1	CFNN733A12XS	RS	150 (68)	49¼ (1249)	30 (762)	25 (633.0)	
Steel Tank	480	12.0	3	1	CFNN733A13XS	RS	150 (68)	49¼ (1249)	30 (762)	25 (633.0)	
9-Incoloy® Element (2.6 W/cm <sup>2</sup> )	240	15.0	3	1	CFNN740J12XS	RS	173 (79)	56¼ (1427)	37 (940)	25 (633.0)	
	480	15.0	3	1	CFNN740J13XS	RS	173 (79)	56¼ (1427)	37 (940)	25 (633.0)	
	240	18.0	3	1	CFNN748A12XS	RS	188 (86)	67¼ (1719)	48½ (1232)	25 (633.0)	
	480	18.0	3	1	CFNN748A13XS	RS	188 (86)	67¼ (1719)	48½ (1232)	25 (633.0)	
<b>6 inch - 150 lb ANSI Flange (WATROD)</b>											
16 W/in <sup>2</sup> ③	240	6.0	3	1	CFPN713G12S	RS	212 (97)	40½ (1027)	20½ (521)	17 (432)	
Steel Tank	480	6.0	3	1	CFPN713G13S	RS	212 (97)	40½ (1027)	20½ (521)	17 (432)	
12-Incoloy® Elements (2.6 W/cm <sup>2</sup> )	240	8.0	3	1	CFPN717R12S	RS	214 (97)	40½ (1027)	20½ (521)	17 (432)	
	480	8.0	3	1	CFPN717R13S	RS	214 (97)	40½ (1027)	20½ (521)	17 (432)	
	240	10.0	3	1	CFPN720G12S	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)	
	480	10.0	3	1	CFPN720G13S	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)	
	240	12.0	3	1	CFPN725G12S	RS	222 (101)	40½ (1027)	20½ (521)	17 (432)	
	480	12.0	3	1	CFPN725G13S	RS	222 (101)	40½ (1027)	20½ (521)	17 (432)	
	240	16.0	3	1	CFPN732R12S	RS	226 (103)	51 (1294)	31 (787)	27½ (699)	
	480	16.0	3	1	CFPN732R13S	RS	226 (103)	51 (1294)	31 (787)	27½ (699)	
	240	20.0	3	2	CFPN740G12S	RS	290 (132)	72 (1827)	52 (1321)	48½ (1232)	
	480	20.0	3	1	CFPN740G13S	RS	290 (132)	72 (1827)	52 (1321)	48½ (1232)	
	240	24.0	3	2	CFPN747R12S	RS	298 (136)	72 (1827)	52 (1321)	48½ (1232)	
	480	24.0	3	1	CFPN747R13S	RS	298 (136)	72 (1827)	52 (1321)	48½ (1232)	
	<b>6 inch - 150 lb ANSI Flange (WATROD)</b>										
	16 W/in <sup>2</sup> ③	240	7.50	3	1	CFPN713G12XS	RS	215 (98)	40½ (1027)	20½ (521)	17 (432)
	Steel Tank	480	7.50	3	1	CFPN713G13XS	RS	215 (98)	40½ (1027)	20½ (521)	17 (432)
	15-Incoloy® (2.6 W/cm <sup>2</sup> )	240	10.0	3	1	CFPN717R12XS	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)
480		10.0	3	1	CFPN717R13XS	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)	
240		12.5	3	1	CFPN720G12XS	RS	223 (102)	40½ (1027)	20½ (521)	17 (432)	
480		12.5	3	1	CFPN720G13XS	RS	223 (102)	40½ (1027)	20½ (521)	17 (432)	
240		15.0	3	1	CFPN725G12XS	RS	226 (103)	40½ (1027)	20½ (521)	17 (432)	
480		15.0	3	1	CFPN725G13XS	RS	226 (103)	40½ (1027)	20½ (521)	17 (432)	
240		20.0	3	5	CFPN732R12XS	RS	288 (131)	51 (1294)	31 (787)	27½ (699)	
480		20.0	3	1	CFPN732R13XS	RS	288 (131)	51 (1294)	31 (787)	27½ (699)	
240		25.0	3	5	CFPN740G12XS	RS	296 (135)	72 (1827)	52 (1321)	48½ (1232)	
480		25.0	3	1	CFPN740G13XS	RS	296 (135)	72 (1827)	52 (1321)	48½ (1232)	
240		30.0	3	5	CFPN747R12XS	RS	306 (139)	72 (1827)	52 (1321)	48½ (1232)	
480		30.0	3	1	CFPN747R13XS	RS	306 (139)	72 (1827)	52 (1321)	48½ (1232)	

### 5 inch - 150 lb ANSI Flange



### 6 inch - 150 lb ANSI Flange



**RAPID SHIP**

• RS - Same day shipment up to 5 pieces

③ Wired for 3-phase operation only

■ Truck Shipment only

**WATLOW®**

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

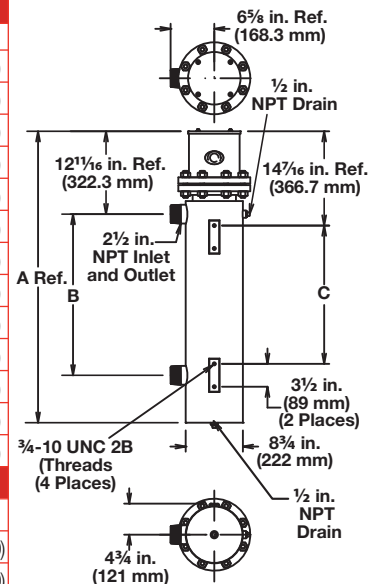


### Application: Medium Weight Oils and Heat Transfer Oils

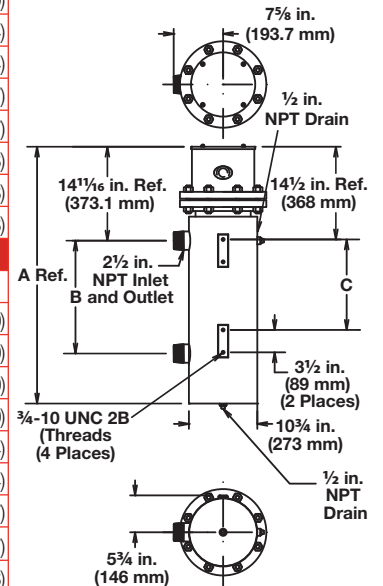
- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>6 inch - 150 lb ANSI Flange (FIREBAR)</b>										
15 W/in <sup>2</sup> <sup>③</sup>	240	10.00	3	5	CFPNF13G29S	RS	217 (99)	40½ (1027)	20½ (521)	17 (432)
Steel Tank	240	12.50	3	5	CFPNF16A29S	RS	220 (100)	40½ (1027)	20½ (521)	17 (432)
15-Incoloy®	240	15.00	3	5	CFPNF18G29S	RS	223 (102)	40½ (1027)	20½ (521)	17 (432)
Element	240	20.00	3	5	CFPNF22R29S	RS	226 (103)	40½ (1027)	20½ (521)	17 (432)
(2.3 W/cm <sup>2</sup> )	480	20.00	3	5	CFPNF22R30S	RS	226 (103)	40½ (1027)	20½ (521)	17 (432)
	240	25.00	3	5	CFPNF27R29S	RS	232 (106)	51 (1294)	31 (787)	27½ (699)
	480	25.00	3	5	CFPNF27R30S	RS	232 (106)	51 (1294)	31 (787)	27½ (699)
	240	30.00	3	5	CFPNF32R29S	RS	236 (107)	51 (1294)	31 (787)	27½ (699)
	480	30.00	3	5	CFPNF32R30S	RS	236 (107)	51 (1294)	31 (787)	27½ (699)
	240	40.00	3	5	CFPNF42G29S	RS	304 (138)	72 (1827)	52 (1321)	48½ (1232)
	480	40.00	3	5	CFPNF42G30S	RS	304 (138)	72 (1827)	52 (1321)	48½ (1232)
	240	50.00	3	5	CFPNF51R29S	RS	314 (143)	72 (1827)	52 (1321)	48½ (1232)
	480	50.00	3	5	CFPNF51R30S	RS	314 (143)	72 (1827)	52 (1321)	48½ (1232)
<b>8 inch - 150 lb ANSI Flange (WATROD)</b>										
16 W/in <sup>2</sup> <sup>③</sup>	240	17.00	3	1	CFRN725N12S	RS	350 (159)	55¼ (1402.0)	32¾ (830.0)	29¼ (741.0)
Steel Tank	480	17.00	3	1	CFRN725N13S	RS	350 (159)	55¼ (1402.0)	32¾ (830.0)	29¼ (741.0)
18-Incoloy®	240	25.00	3	2	CFRN735N12S	RS	380 (173)	62¼ (1580.0)	39¼ (1008.0)	36¼ (919.0)
Element	480	25.00	3	1	CFRN735N13S	RS	380 (173)	62¼ (1580.0)	39¼ (1008.0)	36¼ (919.0)
(2.6 W/cm <sup>2</sup> )	240	33.00	3	2	CFRN744E12S	RS	410 (186)	69¾ (1774.8)	47¾ (1203.3)	43¾ (1114.4)
	480	33.00	3	1	CFRN744E13S	RS	410 (186)	69¾ (1774.8)	47¾ (1203.3)	43¾ (1114.4)
	240	42.00	3	3	CFRN754M12S	RS	445 (202)	79¾ (2016.1)	56¾ (1444.6)	53¾ (1355.7)
	480	42.00	3	2	CFRN754M13S	RS	445 (202)	79¾ (2016.1)	56¾ (1444.6)	53¾ (1355.7)
	480	50.00	3	2	CFRN763M13S	RS	490 (223)	88¾ (2244.7)	65¾ (1673.2)	62¾ (1584.3)
	480	58.00	3	2	CFRN773D13S	RS	530 (241)	98¾ (2498.7)	75¾ (1927.2)	72¾ (1838.3)
	480	67.00	3	2	CFRN782M13S	RS	560 (254)	98¾ (2498.7)	75¾ (1927.2)	72¾ (1838.3)
<b>8 inch - 150 lb ANSI Flange (WATROD)</b>										
16 W/in <sup>2</sup> <sup>③</sup>	240	23.0	3	2	CFRN726D12XS	RS	358 (163)	55¼ (1402.0)	32¾ (830.0)	29¼ (741.0)
Steel Tank	480	23.0	3	1	CFRN726D13XS	RS	358 (163)	55¼ (1402.0)	32¾ (830.0)	29¼ (741.0)
24-Incoloy®	240	33.0	3	2	CFRN736D12XS	RS	392 (178)	62¼ (1580.0)	39¼ (1008.0)	36¼ (919.0)
Elements	480	33.0	3	1	CFRN736D13XS	RS	392 (178)	62¼ (1580.0)	39¼ (1008.0)	36¼ (919.0)
(2.6 W/cm <sup>2</sup> )	240	44.0	3	4	CFRN744M12XS	RS	425 (193)	69¾ (1774.8)	47¾ (1203.3)	43¾ (1114.4)
	480	44.0	3	2	CFRN744M13XS	RS	425 (193)	69¾ (1774.8)	47¾ (1203.3)	43¾ (1114.4)
	240	56.0	3	4	CFRN754M12XS	RS	463 (210)	79¾ (2016.1)	56¾ (1444.6)	53¾ (1355.7)
	480	56.0	3	2	CFRN754M13XS	RS	463 (210)	79¾ (2016.1)	56¾ (1444.6)	53¾ (1355.7)
	480	67.0	3	2	CFRN763M13XS	RS	511 (232)	88¾ (2244.7)	65¾ (1673.2)	62¾ (1584.3)
	480	77.0	3	2	CFRN773D13XS	RS	554 (252)	98¾ (2498.7)	75¾ (1927.2)	72¾ (1838.3)
	480	89.0	3	4	CFRN782M13XS	RS	587 (267)	98¾ (2498.7)	75¾ (1927.2)	72¾ (1838.3)

### 6 inch - 150 lb ANSI Flange



### 8 inch - 150 lb ANSI Flange



③ Wired for 3-phase operation only

■ Truck Shipment only

**RAPID SHIP**

• RS - Next day shipment up to 2 pieces

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters



### Application: Medium Weight Oils and Heat Transfer Oils

- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

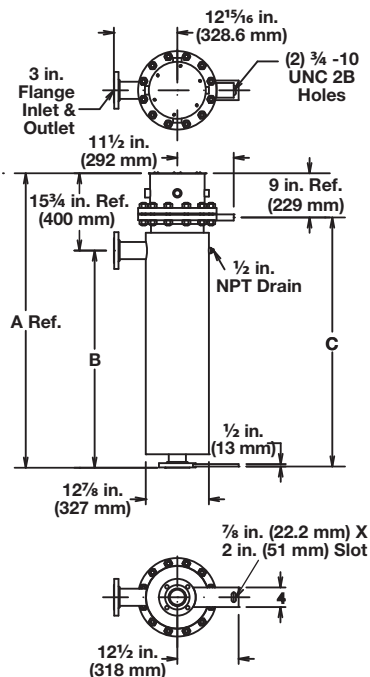
Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>10 inch - 150 lb ANSI Flange (WATROD)</b>										
16 W/in <sup>2</sup> ③ Steel Tank	480	75.0	3	3	CFSN763N13S	S	540 (245)	91 <sup>5</sup> / <sub>16</sub> (2316)	75 <sup>7</sup> / <sub>16</sub> (1916)	81 <sup>15</sup> / <sub>16</sub> (2081)
27-Incoloy® Elements (2.6 W/cm <sup>2</sup> )	480	87.0	3	3	CFSN773E13S	S	600 (273)	106 <sup>9</sup> / <sub>16</sub> (2707)	90 <sup>13</sup> / <sub>16</sub> (1037)	97 <sup>5</sup> / <sub>16</sub> (2471)
<b>12 inch - 150 lb ANSI Flange (WATROD)</b>										
16 W/in <sup>2</sup> ③ Steel Tank	480	117.0	3	3	CFTN773C13S	S	650 (295)	106 <sup>1</sup> / <sub>2</sub> (2705)	90 <sup>5</sup> / <sub>16</sub> (2295.5)	97 <sup>5</sup> / <sub>16</sub> (2468.6)
36-Incoloy® Elements (2.6 W/cm <sup>2</sup> )										
<b>14 inch - 150 lb ANSI Flange (WATROD)</b>										
16 W/in <sup>2</sup> ③ Steel Tank	480	105.0	3	3	CFWN754J13S	S	600 (273)	83 <sup>3</sup> / <sub>4</sub> (2115)	67 (1700)	73 <sup>11</sup> / <sub>16</sub> (1872)
45-Incoloy® Elements (2.6 W/cm <sup>2</sup> )	480	125.0	3	5	CFWN763J13S	S	650 (295)	90 <sup>3</sup> / <sub>4</sub> (2305)	74 <sup>1</sup> / <sub>2</sub> (1891)	81 <sup>5</sup> / <sub>16</sub> (2062)

• S - 10 day lead time

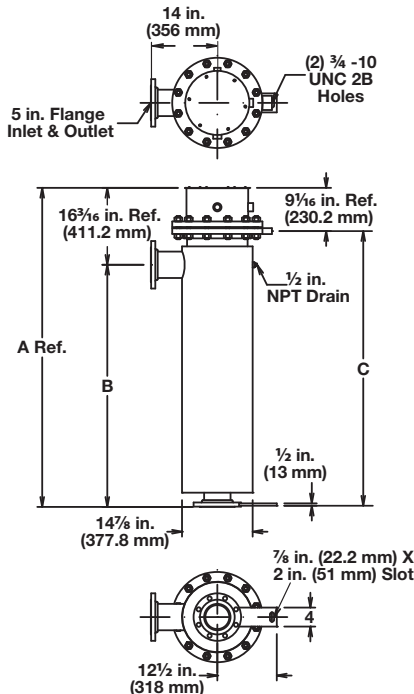
③ Wired for 3-phase operation only

■ Truck Shipment only

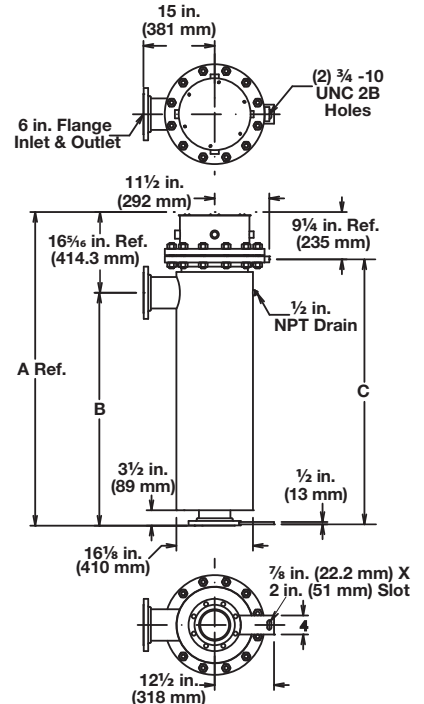
#### 10 inch - 150 lb ANSI Flange



#### 12 inch - 150 lb ANSI Flange



#### 14 inch - 150 lb ANSI Flange



# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

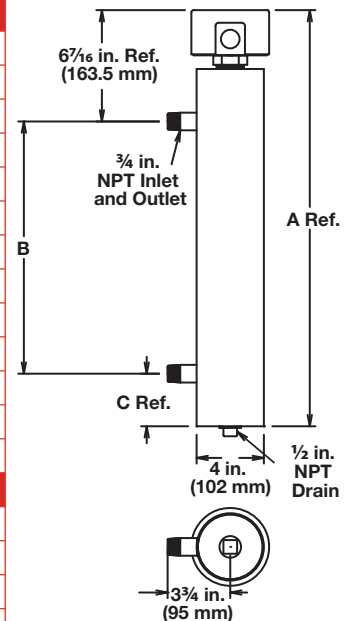


### Application: Bunker C, Asphalt and #6 Fuel Oil

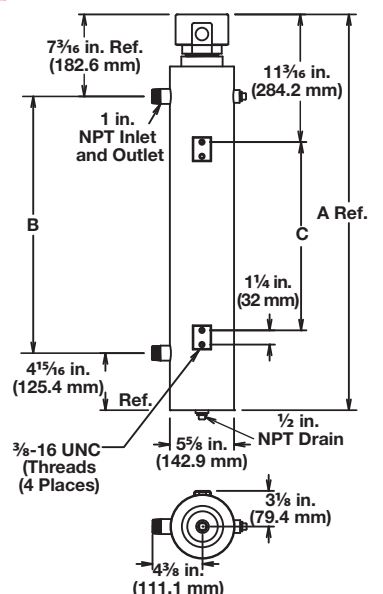
- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)	
<b>1 1/4 inch NPT Screw Plug (FIREBAR)</b>											
<b>8 W/in<sup>2</sup> ③ Steel Tank 1-Incoloy® Elements (1.3 W/cm<sup>2</sup>)</b>	240	0.43	3	1	<b>CBDNF16G22S</b>	RS	26 (12)	24 3/4 (625.5)	15 (381)	3 3/8 (79.4)	
	240	0.55	3	1	<b>CBDNF19G22S</b>	RS	30 (14)	32 1/4 (828.7)	23 (584)	3 3/8 (79.4)	
	240	0.70	3	1	<b>CBDNF24L22S</b>	RS	31 (14)	32 1/4 (828.7)	23 (584)	3 3/8 (79.4)	
	480	0.70	3	1	<b>CBDNF24L21S</b>	RS	31 (14)	32 1/4 (828.7)	23 (584)	3 3/8 (79.4)	
	240	0.88	3	1	<b>CBDNF29R22S</b>	RS	43 (20)	42 1/4 (1082.7)	32 (813)	4 3/8 (111.1)	
	480	0.88	3	1	<b>CBDNF29R21S</b>	RS	43 (20)	42 1/4 (1082.7)	32 (813)	4 3/8 (111.1)	
	240	1.08	3	1	<b>CBDNF34R22S</b>	RS	44 (20)	42 1/4 (1082.7)	32 (813)	4 3/8 (111.1)	
	480	1.08	3	1	<b>CBDNF34R21S</b>	RS	44 (20)	42 1/4 (1082.7)	32 (813)	4 3/8 (111.1)	
	240	1.40	3	1	<b>CBDNF45G22S</b>	RS	69 (31)	63 1/4 (1616.1)	53 (1346)	4 3/8 (111.1)	
	480	1.40	3	1	<b>CBDNF45G21S</b>	RS	69 (31)	63 1/4 (1616.1)	53 (1346)	4 3/8 (111.1)	
	240	1.80	3	1	<b>CBDNF55R22S</b>	RS	71 (32)	63 1/4 (1616.1)	53 (1346)	4 3/8 (111.1)	
	480	1.80	3	1	<b>CBDNF55R21S</b>	RS	71 (32)	63 1/4 (1616.1)	53 (1346)	4 3/8 (111.1)	
<b>2 1/2 inch NPT Screw Plug (WATROD)</b>											
<b>8 W/in<sup>2</sup> ③ Steel Tank 3-Steel Elements (1.3 W/cm<sup>2</sup>)</b>	240	2.0	3	1	<b>CBLS732E12S</b>	RS	29 (14)	44 3/4 (1135)	32 1/2 (1129)	26 1/2 (673)	
	480	2.0	3	1	<b>CBLS732E13S</b>	RS	29 (14)	44 3/4 (1135)	32 1/2 (1129)	26 1/2 (673)	
	240	3.0	3	1	<b>CBLS747E12S</b>	RS	32 (15)	57 1/4 (1453)	45 (1143)	39 (991)	
	480	3.0	3	1	<b>CBLS747E13S</b>	RS	32 (15)	57 1/4 (1453)	45 (1143)	39 (991)	

1 1/4 inch NPT Screw Plug



2 1/2 inch NPT Screw Plug



③ Wired for 3-phase operation only

## RAPID SHIP

- RS - Same day shipment up to 5 pieces

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

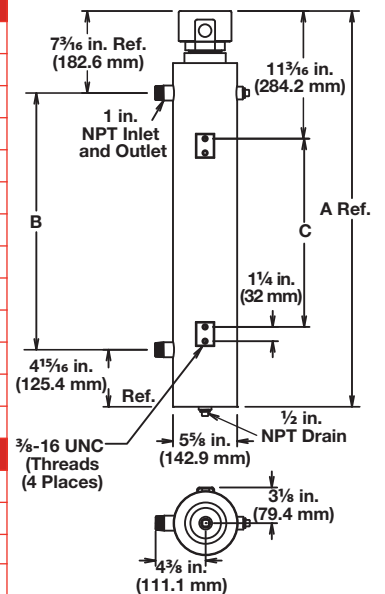


### Application: Bunker C, Asphalt and #6 Fuel Oil

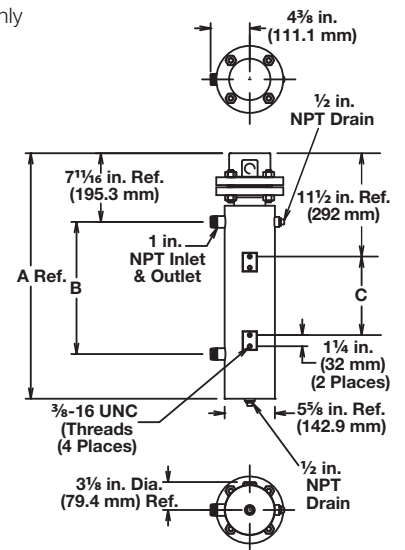
- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)	
<b>2½ inch NPT Screw Plug (FIREBAR)</b>											
8 W/in <sup>2</sup> ③ Steel Tank	240	1.25	3	1	CBLNF15C22S	RS	22 (10)	34¾ (881)	22½ (572)	16½ (419)	
3-Incoloy® Elements (1.3 W/cm <sup>2</sup> )	240	1.63	3	1	CBLNF18C22S	RS	23 (10)	34¾ (881)	22½ (572)	16½ (419)	
	240	2.13	3	1	CBLNF23C22S	RS	31 (14)	34¾ (881)	22½ (572)	16½ (419)	
	480	2.13	3	1	CBLNF23C21S	RS	31 (14)	34¾ (881)	22½ (572)	16½ (419)	
	240	2.63	3	1	CBLNF28L22S	RS	34 (15)	44¾ (1135)	32½ (1129)	26½ (673)	
	480	2.63	3	1	CBLNF28L21S	RS	34 (15)	44¾ (1135)	32½ (1129)	26½ (673)	
	240	3.19	3	1	CBLNF33L22S	RS	35 (16)	44¾ (1135)	32½ (1129)	26½ (673)	
	480	3.19	3	1	CBLNF33L21S	RS	35 (16)	44¾ (1135)	32½ (1129)	26½ (673)	
	240	4.25	3	1	CBLNF44C22S	RS	44 (20)	57¾ (1453)	45 (1143)	39 (991)	
	480	4.25	3	1	CBLNF44C21S	RS	44 (20)	57¾ (1453)	45 (1143)	39 (991)	
	240	5.38	3	1	CBLNF54L22S	RS	52 (24)	63¾ (1453)	51½ (1308)	46½ (1181)	
	480	5.38	3	1	CBLNF54L21S	RS	52 (24)	63¾ (1453)	51½ (1308)	46½ (1181)	
<b>3 inch - 150 lb ANSI Flange (WATROD)</b>											
8 W/in <sup>2</sup> ③ Steel Tank	240	2.0	3	1	CFMS733A12S	RS	96 (44)	45¾ (1148)	32½ (826)	26½ (673)	
3-Steel Elements (1.3 W/cm <sup>2</sup> )	480	2.0	3	1	CFMS733A13S	RS	96 (44)	45¾ (1148)	32½ (826)	26½ (673)	
	240	3.0	3	1	CFMS748A12S	RS	107 (49)	57¾ (1465)	45 (1143)	39 (991)	
	480	3.0	3	1	CFMS748A13S	RS	107 (49)	57¾ (1465)	45 (1143)	39 (991)	

2½ inch NPT Screw Plug



3 inch - 150 lb ANSI Flange



### RAPID SHIP

- RS - Same day shipment up to 5 pieces

③ Wired for 3-phase operation only

■ Truck Shipment only

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

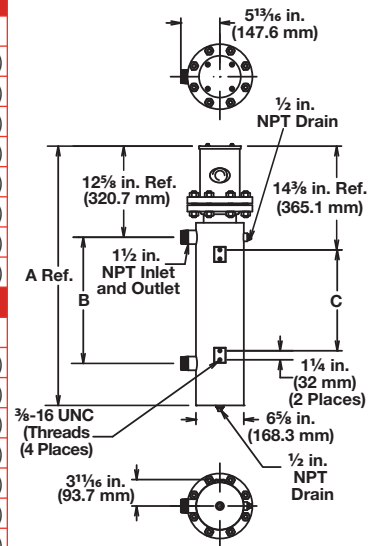


### Application: Bunker C, Asphalt and #6 Fuel Oil

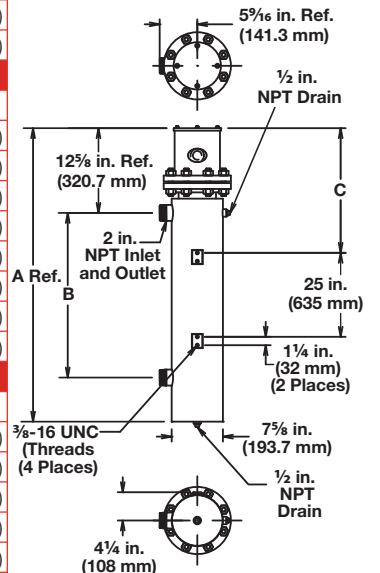
- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>4 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>8 W/in<sup>2</sup> ③ Steel Tank 6-Steel Elements (1.3 W/cm<sup>2</sup>)</b>	240	5.00	3	1	CFOS740J12S	RS	229 (104)	70½ (1789)	52 (1321)	48½ (1232)
	480	5.00	3	1	CFOS740J13S	RS	229 (104)	70½ (1789)	52 (1321)	48½ (1232)
	240	6.00	3	1	CFOS748A12S	RS	234 (106)	70½ (1789)	52 (1321)	48½ (1232)
	480	6.00	3	1	CFOS748A13S	RS	234 (106)	70½ (1789)	52 (1321)	48½ (1232)
	240	8.00	3	1	CFOS764J12S	RS	298 (135)	91½ (2326)	73 (1854)	66 (1676)
	480	8.00	3	1	CFOS764J13S	RS	298 (135)	91½ (2326)	73 (1854)	66 (1676)
	240	10.00	3	1	CFOS777A12S	RS	306 (139)	91½ (2326)	73 (1854)	66 (1676)
480	10.00	3	1	CFOS777A13S	RS	306 (139)	91½ (2326)	73 (1854)	66 (1676)	
<b>4 inch - 150 lb ANSI Flange (FIREBAR)</b>										
<b>8 W/in<sup>2</sup> ③ Steel Tank 6-Incoloy® Elements (1.3 W/cm<sup>2</sup>)</b>	240	2.50	3	1	CFONF16J22S	RS	128 (58)	39 (989)	20½ (521)	17 (432)
	240	3.25	3	1	CFONF19J22S	RS	130 (59)	39 (989)	20½ (521)	17 (432)
	240	4.25	3	1	CFONF24J22S	RS	133 (61)	39 (989)	20½ (521)	17 (432)
	480	4.25	3	1	CFONF24J21S	RS	133 (61)	39 (989)	20½ (521)	17 (432)
	240	5.25	3	1	CFONF30A22S	RS	168 (77)	49½ (1256)	31 (787)	27½ (699)
	480	5.25	3	1	CFONF30A21S	RS	168 (77)	49½ (1256)	31 (787)	27½ (699)
	240	6.38	3	1	CFONF35A22S	RS	170 (77)	49½ (1256)	31 (787)	27½ (699)
	480	6.38	3	1	CFONF35A21S	RS	170 (77)	49½ (1256)	31 (787)	27½ (699)
	240	8.50	3	1	CFONF45J22S	RS	236 (107)	70½ (1789)	52 (1321)	48½ (1232)
	480	8.50	3	1	CFONF45J21S	RS	236 (107)	70½ (1789)	52 (1321)	48½ (1232)
	240	10.75	3	1	CFONF56A22S	RS	240 (109)	70½ (1789)	52 (1321)	48½ (1232)
480	10.75	3	1	CFONF56A21S	RS	240 (109)	70½ (1789)	52 (1321)	48½ (1232)	
<b>5 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>8 W/in<sup>2</sup> ③ Steel Tank 6-Steel Elements (1.3 W/cm<sup>2</sup>)</b>	240	5.00	3	1	CFNS740J12S	RS	167 (76)	56¼ (1427.0)	37 (940.0)	25 (633.0)
	480	5.00	3	1	CFNS740J13S	RS	167 (76)	56¼ (1427.0)	37 (940.0)	25 (633.0)
	240	6.00	3	1	CFNS748A12S	RS	180 (82)	67¼ (1719.0)	48½ (1232.0)	25 (633.0)
	480	6.00	3	1	CFNS748A13S	RS	180 (82)	67¼ (1719.0)	48½ (1232.0)	25 (633.0)
	240	8.00	3	1	CFNS764J12S	RS	195 (89)	81½ (2060.6)	61½ (1571.6)	25 (633.0)
	480	8.00	3	1	CFNS764J13S	RS	195 (89)	81½ (2060.6)	61½ (1571.6)	25 (633.0)
	240	10.00	3	1	CFNS777A12S	RS	220 (100)	94¼ (2390.8)	75 (1902.0)	25 (633.0)
480	10.00	3	1	CFNS777A13S	RS	220 (100)	94¼ (2390.8)	75 (1902.0)	25 (633.0)	
<b>5 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>8 W/in<sup>2</sup> ③ Steel Tank 9-Steel Elements (1.3 W/cm<sup>2</sup>)</b>	240	7.5	3	1	CFNS740J12XS	RS	173 (79)	56¼ (1427.0)	37 (940.0)	25 (633.0)
	480	7.5	3	1	CFNS740J13XS	RS	173 (79)	56¼ (1427.0)	37 (940.0)	25 (633.0)
	240	9.0	3	1	CFNS748A12XS	RS	188 (86)	67¼ (1719.0)	48½ (1232.0)	25 (633.0)
	480	9.0	3	1	CFNS748A13XS	RS	188 (86)	67¼ (1719.0)	48½ (1232.0)	25 (633.0)
	240	12.0	3	1	CFNS764J12XS	RS	206 (94)	81½ (2060.6)	61½ (1571.6)	25 (633.0)
	480	12.0	3	1	CFNS764J13XS	RS	206 (94)	81½ (2060.6)	61½ (1571.6)	25 (633.0)
	240	15.0	3	1	CFNS777A12XS	RS	233 (106)	94¼ (2390.8)	75 (1902.0)	25 (633.0)
480	15.0	3	1	CFNS777A13XS	RS	233 (106)	94¼ (2390.8)	75 (1902.0)	25 (633.0)	

### 4 inch - 150 lb ANSI Flange



### 5 inch - 150 lb ANSI Flange



**RAPID SHIP**

- RS - Same day shipment up to 5 pieces

- ③ Wired for 3-phase operation only
- Truck Shipment only

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

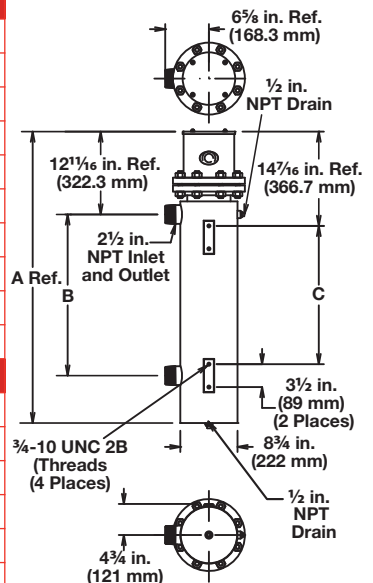


### Application: Bunker C, Asphalt and #6 Fuel Oil

- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>6 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>8 W/in<sup>2</sup> ③ Steel Tank 12-Steel Element (1.3 W/cm<sup>2</sup>)</b>	240	8.00	3	1	CFPS732R12S	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	480	8.00	3	1	CFPS732R13S	RS	226 (103)	51 (1294)	31 (787)	27½ (699)
	240	10.00	3	1	CFPS740G12S	RS	290 (132)	72 (1827)	52 (1321)	48½ (1232)
	480	10.00	3	1	CFPS740G13S	RS	290 (132)	72 (1827)	52 (1321)	48½ (1232)
	240	12.00	3	1	CFPS747R12S	RS	298 (136)	72 (1827)	52 (1321)	48½ (1232)
	480	12.00	3	1	CFPS747R13S	RS	298 (136)	72 (1827)	52 (1321)	48½ (1232)
	240	16.50	3	1	CFPS764G12S	RS	360 (164)	93 (2361)	73 (1854)	66 (1676)
	480	16.50	3	1	CFPS764G13S	RS	360 (164)	93 (2361)	73 (1854)	66 (1676)
	480	20.00	3	1	CFPS776R13S	RS	368 (167)	93 (2361)	73 (1854)	66 (1676)
<b>6 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>8 W/in<sup>2</sup> ③ Steel Tank 15-Steel Element (1.3 W/cm<sup>2</sup>)</b>	240	10.00	3	1	CFPS732R12XS	RS	288 (131)	51 (1294)	31 (787)	27½ (699)
	480	10.00	3	1	CFPS732R13XS	RS	288 (131)	51 (1294)	31 (787)	27½ (699)
	240	12.50	3	1	CFPS740G12XS	RS	296 (135)	72 (1827)	52 (1321)	48½ (1232)
	480	12.50	3	1	CFPS740G13XS	RS	296 (135)	72 (1827)	52 (1321)	48½ (1232)
	240	15.00	3	1	CFPS747R12XS	RS	306 (139)	72 (1827)	52 (1321)	48½ (1232)
	480	15.00	3	1	CFPS747R13XS	RS	306 (139)	72 (1827)	52 (1321)	48½ (1232)
	240	21.00	3	5	CFPS764G12XS	RS	370 (168)	93 (2361)	73 (1854)	66 (1676)
	480	21.00	3	1	CFPS764G13XS	RS	370 (168)	93 (2361)	73 (1854)	66 (1676)
	240	25.00	3	5	CFPS776R12XS	RS	381 (173)	93 (2361)	73 (1854)	66 (1676)
480	25.00	3	1	CFPS776R13XS	RS	381 (173)	93 (2361)	73 (1854)	66 (1676)	
<b>6 inch - 150 lb ANSI Flange (FIREBAR)</b>										
<b>8 W/in<sup>2</sup> ③ Steel Tank 15-Incoloy® Elements (1.3 W/cm<sup>2</sup>)</b>	240	6.3	3	5	CFPNF16J22S	RS	220 (100)	40½ (1027)	20½ (521)	17 (432)
	240	8.1	3	5	CFPNF19J22S	RS	223 (102)	40½ (1027)	20½ (521)	17 (432)
	240	10.6	3	5	CFPNF24J22S	RS	226 (103)	40½ (1027)	20½ (521)	17 (432)
	480	10.6	3	5	CFPNF24J21S	RS	226 (103)	40½ (1027)	20½ (521)	17 (432)
	240	13.1	3	5	CFPNF30A22S	RS	232 (106)	51 (1294)	31 (787)	27½ (699)
	480	13.1	3	5	CFPNF30A21S	RS	232 (106)	51 (1294)	31 (787)	27½ (699)
	240	16.0	3	5	CFPNF35A22S	RS	236 (107)	51 (1294)	31 (787)	27½ (699)
	480	16.0	3	5	CFPNF35A21S	RS	236 (107)	51 (1294)	31 (787)	27½ (699)
	240	21.3	3	5	CFPNF45J22S	RS	304 (138)	72 (1827)	52 (1321)	48½ (1232)
	480	21.3	3	5	CFPNF45J21S	RS	304 (138)	72 (1827)	52 (1321)	48½ (1232)
	240	26.0	3	5	CFPNF56A22S	RS	314 (143)	72 (1827)	52 (1321)	48½ (1232)
	480	26.0	3	5	CFPNF56A21S	RS	314 (143)	72 (1827)	52 (1321)	48½ (1232)

6 inch - 150 lb ANSI Flange



**RAPID SHIP**

• RS - Same day shipment up to 2 pieces

③ Wired for 3-phase operation only

■ Truck Shipment only

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

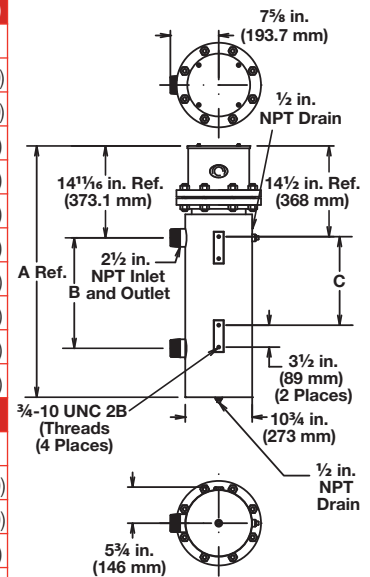


### Application: Bunker C, Asphalt and #6 Fuel Oil

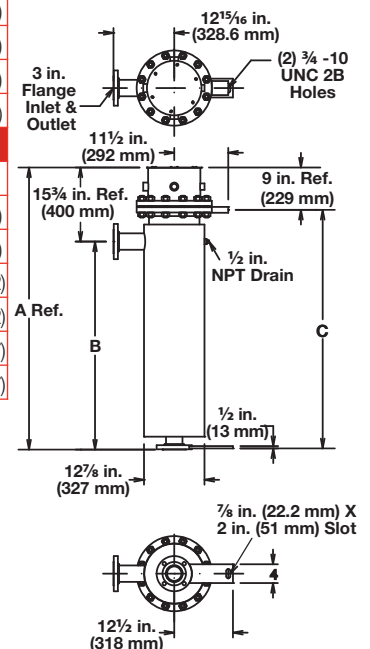
- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>8 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>8 W/in<sup>2</sup> ③ Steel Tank 18-Steel Elements (1.3 W/cm<sup>2</sup>)</b>	240	12.5	3	1	CFRS743E12S	RS	410 (186)	62¼ (1580.0)	39¼ (1008.0)	36¼ (919.0)
	480	12.5	3	1	CFRS743E13S	RS	410 (186)	62¼ (1580.0)	39¼ (1008.0)	36¼ (919.0)
	240	16.5	3	1	CFRS751M12S	RS	440 (200)	69¾ (1774.8)	47¾ (1203.3)	43¾ (1114.4)
	480	16.5	3	1	CFRS751M13S	RS	440 (200)	69¾ (1774.8)	47¾ (1203.3)	43¾ (1114.4)
	240	20.0	3	2	CFRS762D12S	RS	480 (218)	79¾ (2016.1)	56¾ (1444.6)	53¾ (1355.7)
	480	20.0	3	1	CFRS762D13S	RS	480 (218)	79¾ (2016.1)	56¾ (1444.6)	53¾ (1355.7)
	240	24.0	3	2	CFRS770M12S	RS	530 (241)	88¾ (2244.7)	65¾ (1673.2)	62¾ (1584.3)
	480	24.0	3	1	CFRS770M13S	RS	530 (241)	88¾ (2244.7)	65¾ (1673.2)	62¾ (1584.3)
	240	27.0	3	2	CFRS779M12S	RS	610 (277)	98¾ (2498.7)	75¾ (1927.2)	72¾ (1838.3)
480	27.0	3	1	CFRS779M13S	RS	610 (277)	98¾ (2498.7)	75¾ (1927.2)	72¾ (1838.3)	
<b>8 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>8 W/in<sup>2</sup> ③ Steel Tank 24-Steel Elements (1.3 W/cm<sup>2</sup>)</b>	240	17.0	3	1	CFRS743M12XS	RS	425 (193)	62¼ (1580.0)	39¼ (1008.0)	36¼ (919.0)
	480	17.0	3	1	CFRS743M13XS	RS	425 (193)	62¼ (1580.0)	39¼ (1008.0)	36¼ (919.0)
	240	22.0	3	2	CFRS751M12XS	RS	457 (208)	69¾ (1774.8)	47¾ (1203.3)	43¾ (1114.4)
	480	22.0	3	1	CFRS751M13XS	RS	457 (208)	69¾ (1774.8)	47¾ (1203.3)	43¾ (1114.4)
	240	27.0	3	2	CFRS762D12XS	RS	461 (209)	79¾ (2016.1)	56¾ (1444.6)	53¾ (1355.7)
	480	27.0	3	1	CFRS762D13XS	RS	461 (209)	79¾ (2016.1)	56¾ (1444.6)	53¾ (1355.7)
	240	32.0	3	2	CFRS770M12XS	RS	554 (252)	88¾ (2244.7)	65¾ (1673.2)	62¾ (1584.3)
	480	32.0	3	1	CFRS770M13XS	RS	554 (252)	88¾ (2244.7)	65¾ (1673.2)	62¾ (1584.3)
	240	36.0	3	2	CFRS779M12XS	RS	636 (289)	98¾ (2498.7)	75¾ (1927.2)	72¾ (1838.3)
480	36.0	3	1	CFRS779M13XS	RS	636 (289)	98¾ (2498.7)	75¾ (1927.2)	72¾ (1838.3)	
<b>10 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>8 W/in<sup>2</sup> ③ Steel Tank 27-Steel Elements (1.3 W/cm<sup>2</sup>)</b>	240	30.0	3	3	CFSS762E12S	S	540 (245)	91¼ (2316.0)	75½ (1916.0)	82¼ (2088.0)
	480	30.0	3	1	CFSS762E13S	S	540 (245)	91¼ (2316.0)	75½ (1916.0)	82¼ (2088.0)
	240	35.0	3	3	CFSS770N12S	S	600 (273)	99¾ (2517.8)	83¾ (2117.7)	89¾ (2281.2)
	480	35.0	3	1	CFSS770N13S	S	600 (273)	99¾ (2517.8)	83¾ (2117.7)	89¾ (2281.2)
	240	40.0	3	3	CFSS778N12S	S	645 (293)	106¾ (2708.3)	90¾ (2308.2)	97¾ (2471.7)
	480	40.0	3	1	CFSS778N13S	S	645 (293)	106¾ (2708.3)	90¾ (2308.2)	97¾ (2471.7)

### 8 inch - 150 lb ANSI Flange



### 10 inch - 150 lb ANSI Flange



## RAPID SHIP

- RS - Next day shipment up to 2 pieces
- S - 10 day lead time

③ Wired for 3-phase operation only

Truck Shipment only

# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters



### Application: Bunker C, Asphalt and #6 Fuel Oil

- WATROD or FIREBAR elements
- Without thermostat
- General purpose enclosure

Description	Volts	kW	Ph	# Circ.	Code Number	Del.	Ship Wt. lbs (kg)	"A" Dim. in. (mm)	"B" Dim. in. (mm)	"C" Dim. in. (mm)
<b>12 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>8 W/in<sup>2</sup> ③ Steel Tank 36-Steel Elements (1.3 W/cm<sup>2</sup>)</b>	240	47.0	3	3	CFTS770L12S	S	700 (318)	99 (2515)	82 <sup>7</sup> / <sub>16</sub> (2105.0)	89 <sup>7</sup> / <sub>16</sub> (2277)
	480	47.0	3	2	CFTS770L13S	S	700 (318)	99 (2515)	82 <sup>7</sup> / <sub>16</sub> (2105.0)	89 <sup>7</sup> / <sub>16</sub> (2277)
	240	54.0	3	3	CFTS778L12S	S	750 (341)	106 <sup>1</sup> / <sub>2</sub> (2705)	90 <sup>7</sup> / <sub>16</sub> (2295.5)	97 <sup>7</sup> / <sub>16</sub> (2467)
	480	54.0	3	2	CFTS778L13S	S	750 (341)	106 <sup>1</sup> / <sub>2</sub> (2705)	90 <sup>7</sup> / <sub>16</sub> (2295.5)	97 <sup>7</sup> / <sub>16</sub> (2467)
<b>14 inch - 150 lb ANSI Flange (WATROD)</b>										
<b>8 W/in<sup>2</sup> ③ Steel Tank 45-Steel Elements (1.3 W/cm<sup>2</sup>)</b>	240	60.0	3	3	CFWS770J12S	S	700 (318)	98 <sup>3</sup> / <sub>4</sub> (2496)	82 (2081)	88 <sup>1</sup> / <sub>16</sub> (2253)
	480	60.0	3	3	CFWS770J13S	S	700 (318)	98 <sup>3</sup> / <sub>4</sub> (2496)	82 (2081)	88 <sup>1</sup> / <sub>16</sub> (2253)
	240	67.0	3	5	CFWS778J12S	S	780 (354)	105 <sup>3</sup> / <sub>4</sub> (2686)	89 <sup>1</sup> / <sub>2</sub> (2272)	96 <sup>7</sup> / <sub>16</sub> (2443)
	480	67.0	3	3	CFWS778J13S	S	780 (354)	105 <sup>3</sup> / <sub>4</sub> (2686)	89 <sup>1</sup> / <sub>2</sub> (2272)	96 <sup>7</sup> / <sub>16</sub> (2443)

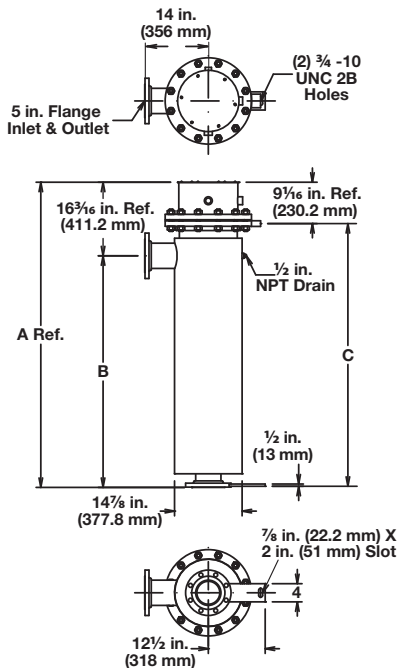
### RAPID SHIP

- S - 10 day lead time

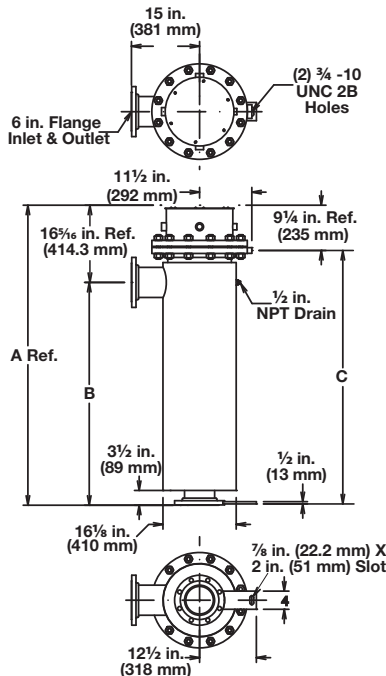
③ Wired for 3-phase operation only

■ Truck Shipment only

#### 12 inch - 150 lb ANSI Flange



#### 14 inch - 150 lb ANSI Flange



# Circulation Heaters

## WATROD and FIREBAR Circulation Heaters

### Build-a-Code

### Ordering Information

To order, complete the code number  
to the right with the information below:

Example: CFONA18A10 S 5 HJ

Stock Plug or ANSI Flange Code Number ①

Optional Terminal Enclosures ②

- S = General purpose enclosure
- W = Moisture resistant enclosure
- E = Explosion resistant enclosure
- C = Moisture/explosion resistant enclosure

Optional Process Sensor ④

- 1 = 30 to 110°F (-1 to 43°C), SPST
- 2 = 30 to 250°F (-1 to 121°C), SPST
- 3 = 175 to 550°F (79 to 288°C), SPST
- 4 = 40 to 110°F (-1 to 43°C), DPST
- 5A = 60 to 250°F (16 to 121°C), DPST (FIREBAR)
- 7A = 100 to 550°F (38 to 288°C), DPST (FIREBAR)
- J = Type J process thermocouple in thermowell
- K = Type K process thermocouple in thermowell

Sheath Limit Sensor ③

- HJ = Type J high-limit thermocouple, horizontal mount
- TJ = Type J high-limit thermocouple, vertical/housing at top
- BJ = Type J high-limit thermocouple, vertical/housing at bottom
- HK = Type K high-limit thermocouple, horizontal mount
- TK = Type K high-limit thermocouple, vertical/housing at top
- BK = Type K high-limit thermocouple, vertical/housing at bottom

① Catalog part numbers include optional enclosures and process sensors. To order optional enclosures or sensors, substitute the appropriate suffix.

② Catalog listings include either a general purpose enclosure or moisture/explosion resistant enclosure. Substitute enclosure options are noted.

③ Heater orientation is critical to accurate sensing of limit conditioners. Use the appropriate code to indicate heater mounting orientation.

④ Thermostat part numbers are shown in the *Thermostat Chart* on page 581.

# Circulation Heaters

## WATROD and FIREBAR Heaters

### Booster Heaters

Booster heaters are ideal for circulating applications requiring less kilowatts, including engine preheating.

Booster heaters are made from a steel or brass 1¼ in. (32 mm) NPT screw plug heater and insulated pressure vessel with 1 in. (25 mm) FNPT inlet and outlet. This assembly also contains an integral thermostat.

### Performance Capabilities

- Watt densities to 60 W/in<sup>2</sup> (9.3 W/cm<sup>2</sup>)
- Wattages to 3 kilowatts
- Voltages to 480VAC
- Steel sheath temperatures to 750°F (400°C)
- Copper sheath temperatures to 350°F (175°C)

### Features and Benefits

#### Dual voltages

- Simplifies stocking and wiring

#### Carbon steel, standard pipe wall vessel

- Assures compatibility with many applications

#### One inch thick (25 mm) fiberglass thermal insulation rated to 750°F (400°C)

- Reduces heat loss

#### Steel jacket (shroud)

- Provides a fully welded and painted shroud to protect thermal insulation

#### Inlet and outlet nozzle connections

- Includes threaded FNPT connections to meet OEM standards

#### General purpose (NEMA 1) terminal enclosures

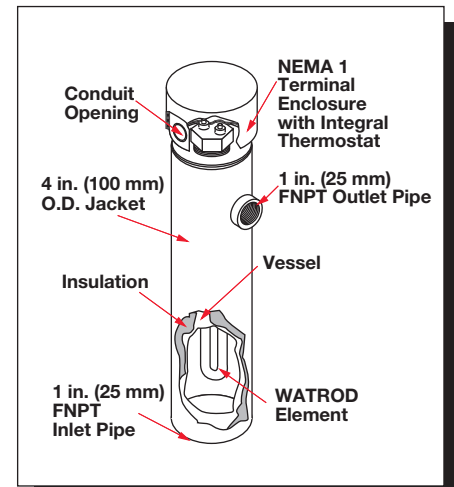
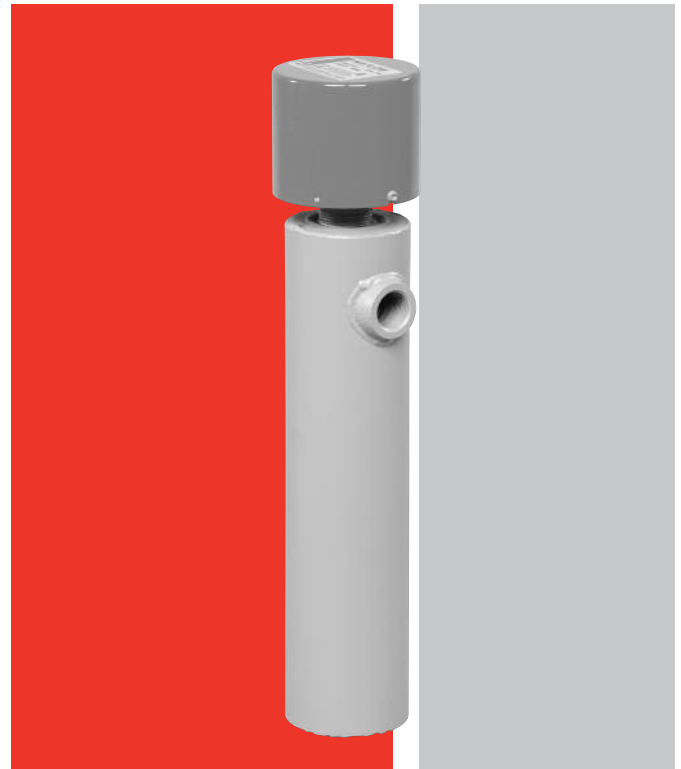
- Protects terminals and thermostat

#### Integral thermostat controls process temperatures from: 60 to 160°F (15 to 70°C) on copper sheath elements and 175 to 550°F (80 to 290°C) on steel sheath elements

- Minimizes the amount of time that the heater operates while the engine is running

### Typical Applications

- Stand by generators
- Peak power trimming generators
- Mobile generator sets
- Earth moving equipment
- Water heaters
- Lightweight oils



# Circulation Heaters

## WATROD and FIREBAR Heaters

### Booster Heaters

#### Options

##### Terminal Enclosure

General purpose (NEMA 1) terminal enclosures with integral thermostats are supplied on all Watlow booster heaters. Optional moisture resistant (NEMA 4) terminal enclosures protect wiring and thermostat from liquid contaminants. To order, request the **moisture resistant enclosure option**.

For explosion resistant (NEMA 7) and explosion/moisture resistant (NEMA 7/4) terminal enclosures, request the **explosion/moisture resistant option**.

Description	kW	Phase	Code Number 120/240VAC	Est. Ship. Wt. lbs (kg)
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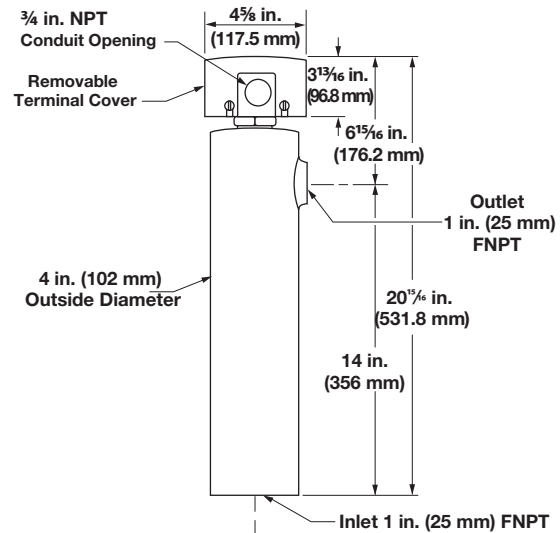
#### Application: Aqueous Solutions

60 W/in <sup>2</sup>	1.50	1	CBEC8G6	18 (8.2)
Brass Plug	2.00	1	CBEC10F6	18 (8.2)
2-Copper	2.50	1	CBEC12F6	18 (8.2)
(9.3 W/cm <sup>2</sup> )	3.00	1	CBEC15A6X	18 (8.2)

#### Application: Lightweight Oils

23 W/in <sup>2</sup>	0.50	1	CBES7G6	18 (8.2)
Steel Plug	0.75	1	CBES10B6	18 (8.2)
2- Steel	1.00	1	CBES12P6	18 (8.2)
(3.6 W/cm <sup>2</sup> )				

For optional housing adders, use circulation heater adders.



# Circulation Heaters

## WATROD and FIREBAR Heaters

### Engine Preheaters

Watlow engine preheaters help maintain a desired minimum engine temperature to make starting fast and easy. They also reduce engine wear caused by cold engine starting.

Engine preheaters mount conveniently on an engine or rail. The internal thermostat constantly adjusts to ambient temperature changes to keep engine coolant warm at all times.

An internal tank temperature sensor protects Watlow engine preheaters from dry fire conditions caused by low coolant levels or blocked flow.

Installation is easy with just two mounting bolts and inlet and outlet hose connections.

### Performance Capabilities

- Watt densities from 45 to 90 W/in<sup>2</sup> (7 to 14 W/cm<sup>2</sup>)
- Wattages to 6 kilowatts
- UL<sup>®</sup> and CSA component recognition to 480VAC and 600VAC respectively.
- Thermostatically controlled from 60 to 160°F (15 to 70°C)
- Incoloy<sup>®</sup> sheath temperatures to 1600°F (870°C)

### Features and Benefits

#### Incoloy<sup>®</sup> sheath

- Minimizes the risk of premature failure in the event of a dry-fire condition

#### Integral, prewired adjustable thermostat mounted in a general purpose (NEMA 1) terminal enclosure

- Provides a ready to install unit

#### Easy installation with standard 1 in. (25 mm) diameter beaded inlet and outlet nozzles

- Provides rubber hose connections eliminating the need for threaded fittings and adapters

#### 120/240VAC or 240/480VAC dual voltages

- Makes field wiring flexible
- Minimizes stocking multiple voltages

#### Mounting bracket

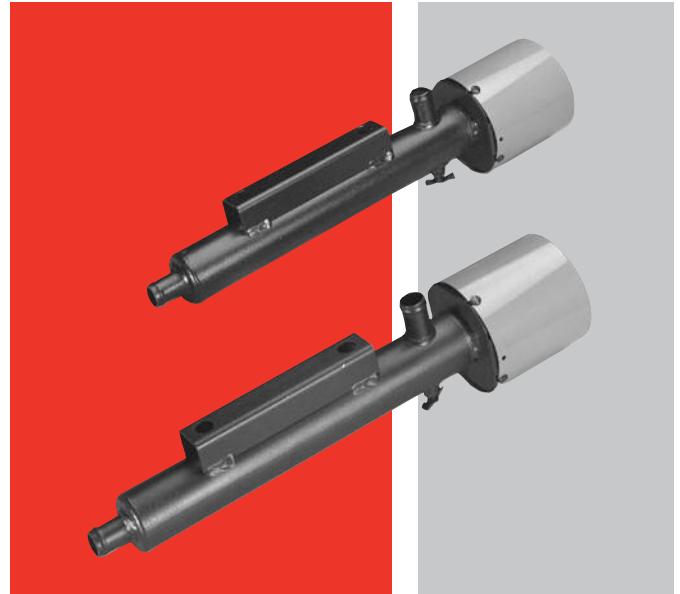
- Isolates harmful engine vibration

#### Heavy-duty welded carbon steel tank

- Resists corrosion and extends life

#### Optional oil pressure interconnect switch

- Disrupts power during engine operation



#### Integral check valve

- Assures proper coolant flow and correct thermostat operation. Check valve will not interfere with adequate thermo-siphoning
- **UL<sup>®</sup> and CSA component**  
Recognition under file numbers E52951 and 31388 respectively.

### Typical Applications

- Stand by generators
- Primary power generators
- Firepump engines

### Options

#### Terminal Enclosure

The following terminal enclosures are available:

- Standard, general purpose (NEMA 1)
- Moisture resistant (NEMA 4)
- Explosion resistant (NEMA 7) Class 1, groups B, C and D.

# Circulation Heaters

## WATROD and FIREBAR Heaters

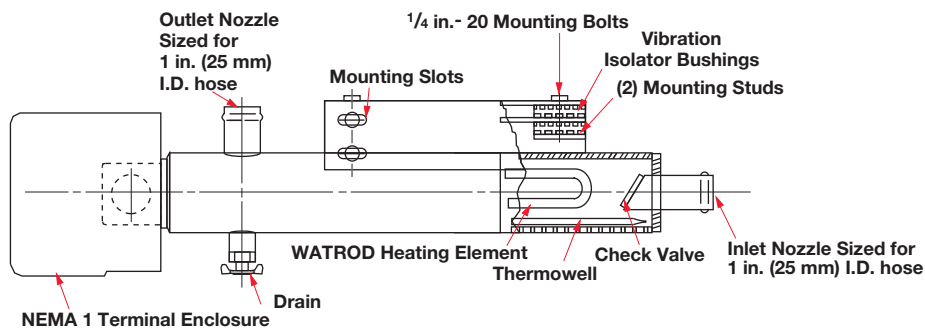
### Engine Preheaters

#### Application Hints

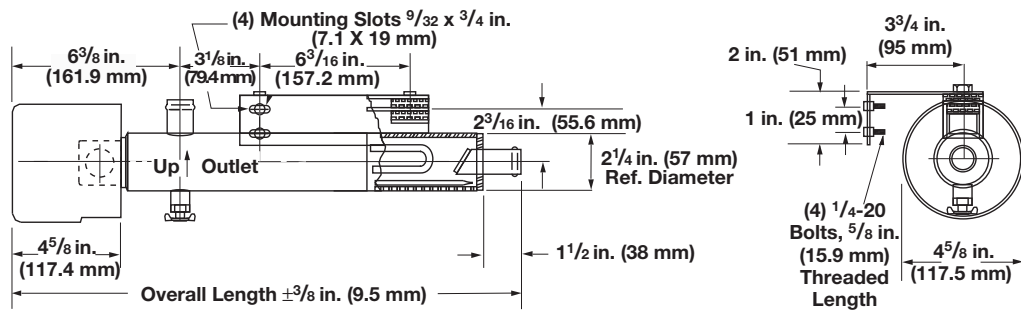
- Mount engine preheaters in horizontal position only (as shown in Figures 1, 2 and 3). Contact your Watlow representative if vertical mounting is unavoidable.
- Mount the heater near or below the lowest point on the engine block. Keep outlet nozzle pointed up, as indicated on the tank.

- Estimate kilowatt requirements with the following formula. First determine the engine displacement, then multiply:

<b>English</b>
Cubic inches X 3 = estimated wattage
<b>Metric</b>
Liters X 183 = estimated wattage



**Figure 1**



kW	Overall Length in. (mm)	Code Number			Est. Ship.	
		120/240VAC 1-Phase	208VAC 1-Phase	240/480VAC 1-Phase	lbs	Wt. (kg)

#### Application: Ethylene Glycol/Engine Coolant

1.13	20% (530.2)	CPBPB6S12	CPBPL2S12①		12	(6)
1.50	20% (530.2)		CPBPB2S12①		12	(6)
1.69	20% (530.2)		CPBPM2S12①		12	(6)
1.88	20% (530.2)		CPBPN2S12①		12	(6)
2.00	20% (530.2)	CPBPC6S12			12	(6)
2.25	20% (530.2)	CPBPD6S12			12	(6)
2.25	26 1/16 (677.9)		CPBPD2S12①		15	(7)
2.50	20% (530.2)	CPBPE6S12			12	(6)
3.00	26 1/16 (677.9)		CPBPF2S12①	CPBPF7S12	15	(7)
3.75	26 1/16 (677.9)		CPBPG2S12①		15	(7)
4.00	26 1/16 (677.9)			CPBPH7S12	15	(7)
5.00	26 1/16 (677.9)			CPBPJ7S12①	15	(7)

**RAPID SHIP**

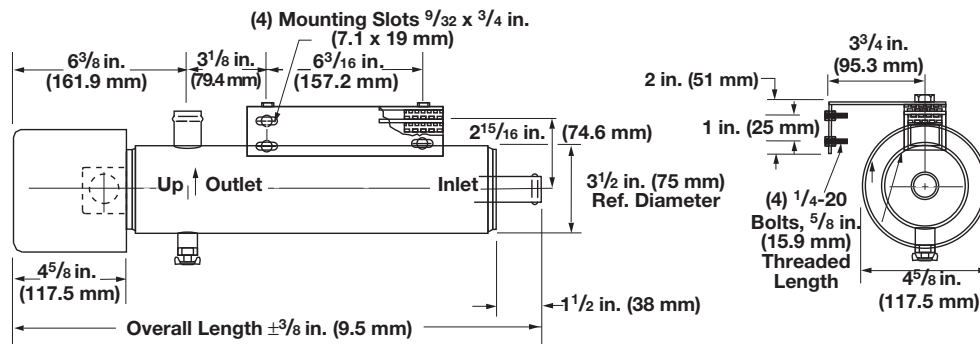
- Available on all elements unless otherwise noted
- Same day shipment
- ① Delivery 4 weeks

# Circulation Heaters

## WATROD and FIREBAR Heaters

### Engine Preheaters

Figure 2



kW	Overall Length in. (mm)	Code Number		Est. Ship. Wt. lbs (kg)
		277VAC 1-Phase	480VAC 3-Phase	

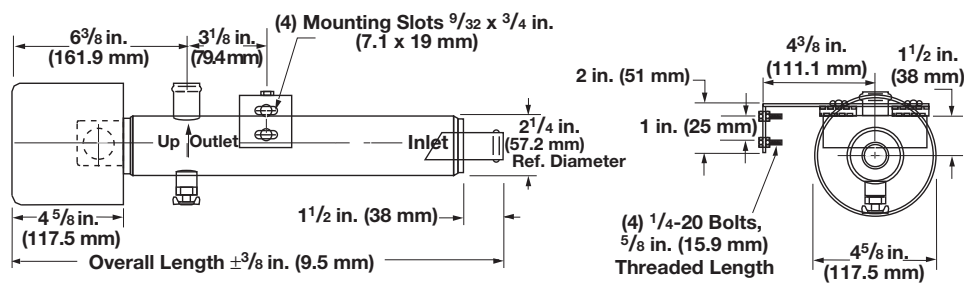
Application: Ethylene Glycol/Engine Coolant

1.50	20% (530.2)	CPCPB4S12 <sup>①</sup>	CPCPB13S12 <sup>①</sup>	12 (6)
2.00	20% (530.2)	CPCPC4S12 <sup>①</sup>	CPCPC13S12 <sup>①</sup>	12 (6)
2.50	20% (530.2)	CPCPE4S12 <sup>①</sup>	CPCPE13S12 <sup>①</sup>	12 (6)
3.75	20% (530.2)	CPCPG4S12 <sup>①</sup>	CPCPG13S12 <sup>①</sup>	12 (6)
4.00	20% (530.2)	CPCPH4S12 <sup>①</sup>	CPCPH13S12	12 (6)
5.00	20% (530.2)	CPCPJ4S12 <sup>①</sup>	CPCPJ13S12	12 (6)

**RAPID SHIP**

- Available on all elements unless otherwise noted
- Same day shipment
- ① Delivery 4 weeks

Figure 3



kW	Overall Length in. (mm)	Code Number		Est. Ship. Wt. lbs (kg)
		120/240VAC 1-Phase	208VAC 1-Phase	

Application: Ethylene Glycol/Engine Coolant

0.75	15% (396.9)	CPBPA6S12 <sup>①</sup>	CPBPK2S12 <sup>①</sup>	9 (4)
1.00	15% (396.9)		9 (4)	

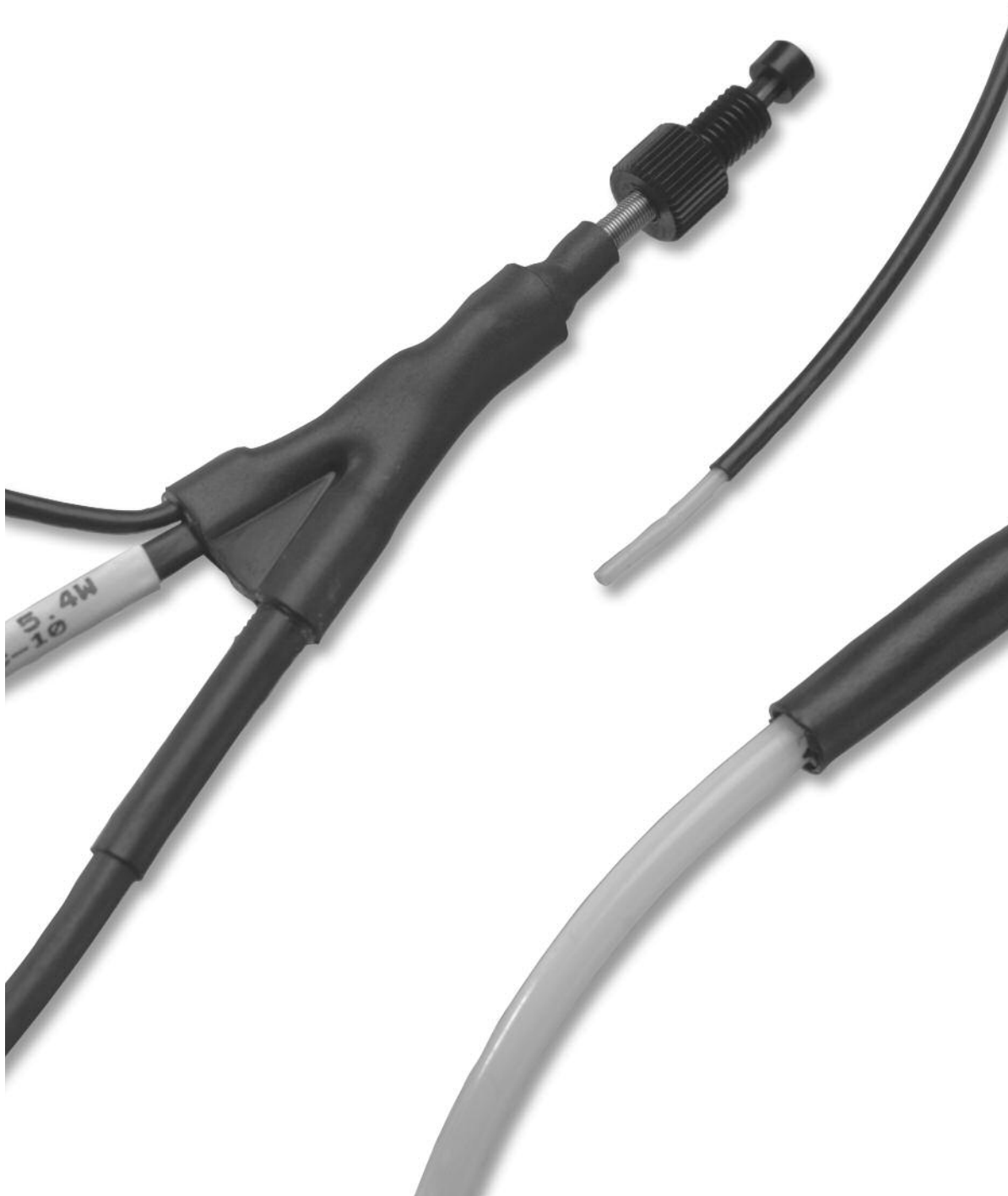
**RAPID SHIP**

- Available on all elements unless otherwise noted
- Same day shipment
- ① Delivery 4 weeks



# Fluid Delivery Heaters

Fluid Delivery Heaters	Sheath Materials	Max. Operating Temperatures		Typical Max. Watt Densities		Page
		°F	°C	W/in <sup>2</sup>	W/cm <sup>2</sup>	
<b>FREEFLEX®</b>	Polymeric	212	100	10	1.5	<b>421</b>
<b>Syringe</b>	Polycarbonate laminate	185	85	2	0.3	<b>424</b>



Fluid Delivery Heaters



# Fluid Delivery Heaters

EXTENDED  
CAPABILITY

## Extended Capabilities For FREEFLEX® Heaters

The miniature heated polymeric tubing assemblies from Watlow® provide a flexible heat-up and transport system for moving fluids in tubing as small as 1/32 in. (0.8 mm) inside diameter. FREEFLEX® heats fluids up to 212°F (100°C) and maintains temperature during transfer from a reservoir to a point of use. In some applications, the tubing can actually serve as the reservoir for limited volumes of fluid, helping to reduce start-up times. For higher temperatures contact your Watlow representative.

Watlow's innovative design places the heating element and sensor directly in contact with the perimeter of the tubing to produce efficient, responsive heating and temperature control of the tube contents. The element is evenly wound to ensure reliable, close contact for uniform heating along a portion or the entire length of the line. A flexible, durable jacket covers the wound element and lets the tubing flex and move in a dynamic system. This allows for fluid delivery to multiple locations from a single supply source. In stationary applications, the FREEFLEX heated tubing is conveniently routed through available space or around other system components. This saves space and provides for an uncomplicated retrofit in existing systems.

The superior construction employs an efficient heating element design with the ability to incorporate optional thermocouple, thermistor or RTD temperature sensors into the thermal package. Users can select leads to exit one or both ends of the assembly. Typical standard Teflon® tubing comes in 1/32, 1/16, 1/8 or 3/16 in. (0.8, 1.6, 3.2, 4.8 mm) inside diameters, although other sizes and materials are available.

### Features and Benefits

#### Flexible heat-up and transport system

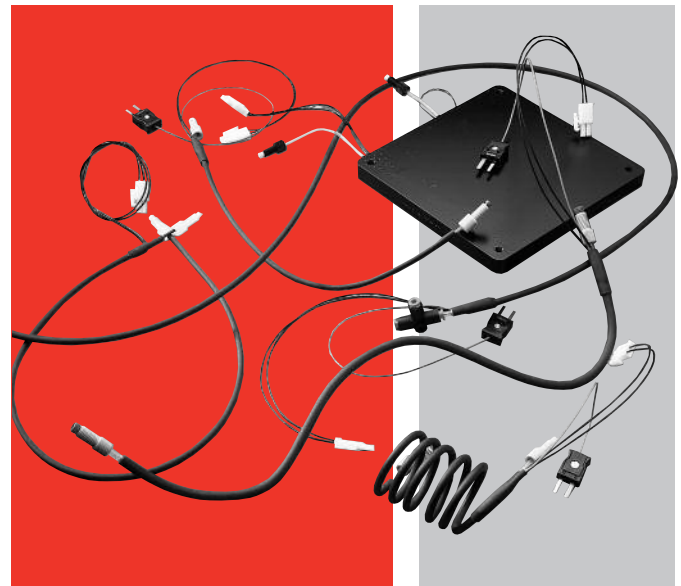
- Eliminates the need for heated reservoir systems in many applications

#### Heating element directly contacts tubing

- Provides fast, efficient more responsive heating

#### Available in three configurations

- FREEFLEX design - allows tubing to flex, coil or bend around system components
- Pre-formed design - allows longer tube length in smaller volume
- Molded design - provides a compact heating assembly for easy installation



#### Integral sensors

- Maintains close control of heater and fluid temperatures

#### Low voltage design

- Promotes safety

#### Miniature sizes as small as 1/32 in. (0.8 mm) inside diameter

- Transports and heats fluids in even the smallest spaces

#### Convenient retrofit

- Allows for routing flexible tubing around system components and using existing control system

#### UL® recognition

- Available on qualified designs by request

### Typical Applications

- **Medical:** automated clinical analyzers, tissue processing equipment
- **Analytical:** sample preheating for LC and HPLC systems, breathalyzers
- **Semiconductor processing:** wafer drying equipment, DI water heating
- **Printing:** Ink jet printers, rapid prototyping systems, photo lithography
- **General process:** wax/paraffin processing and non-combustible gas heating
- **Water purification systems**
- **Precision cleaning equipment**
- **Aerospace**
- **Military**

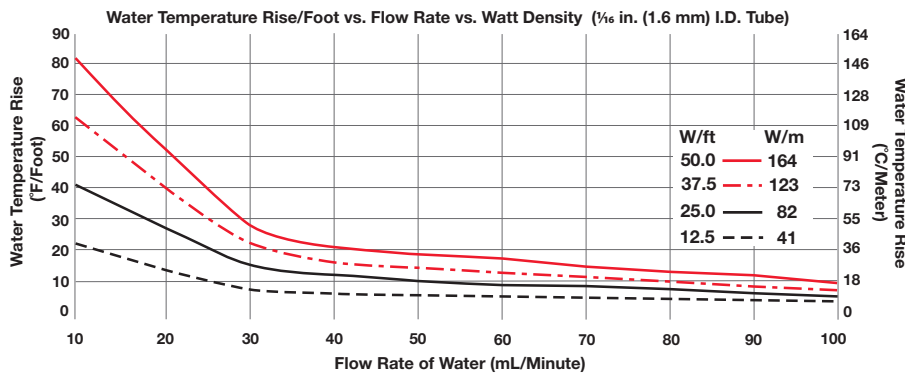
# Fluid Delivery Heaters

**EXTENDED  
CAPABILITY**

## Extended Capabilities For FREEFLEX® Heaters

### Technical Data

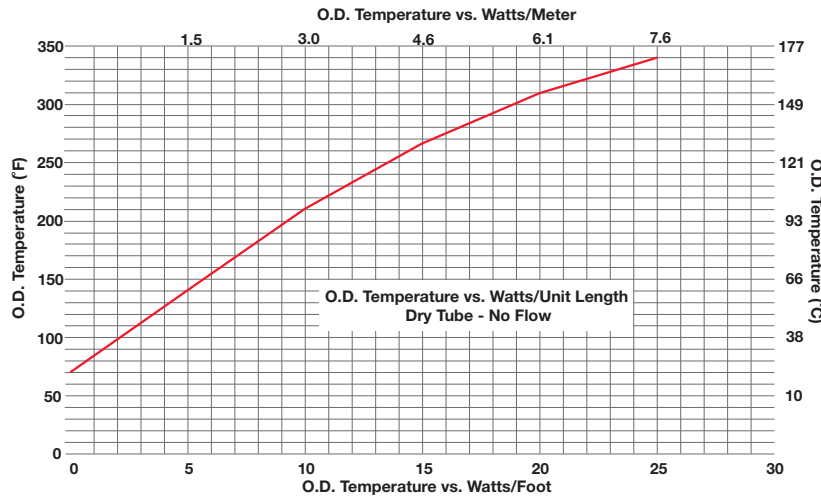
### Water Temperature Rise/Length Versus Flow Rate Versus Watt Density



Water Temperature Rise °F/Foot				
W/ft	Flow Rate (mL/minute)			
	10	30	50	100
50.0	82	29	19	10
37.5	64	22	14	7
25.0	41	16	10	5
12.5	22	8	5	3

Water Temperature Rise °C/Meter				
W/m	Flow Rate (mL/minute)			
	10	30	50	100
164	149	52	35	18
123	116	40	26	13
82	75	29	18	9
41	40	15	9	5

### FREEFLEX Outside Diameter Temperature Versus Watts/Length



W/ft	W/m	O.D. Temperature °C	(°F) (Ambient)
0	0	70	(21)
5	1.5	140	(60)
10	3.0	210	(99)
15	4.6	265	(129)
20	6.1	310	(154)
25	7.6	340	(171)

# Fluid Delivery Heaters

## Extended Capabilities For FREEFLEX® Heaters

### Typical Application Requirements

When requesting a quote please specify:

- **Fluid Type**
  - **Inlet Temperature**
  - **Outlet Temperature**
  - **Flow Rate**
  - **Voltage** - Typically less than 36V
  - **Watts/ft** - See chart on previous page for typical values
  - **Maximum Allowable Outside Surface Temperature**
  - **Tube Size**
    - 1/32 in. (0.8 mm) I.D. x 1/16 in. (1.6 mm) O.D.
    - 1/16 in. (1.6 mm) I.D. x 1/8 in. (3.2 mm) O.D.
    - 1/8 in. (3.2 mm) I.D. x 3/16 in. (4.8 mm) O.D.
    - 3/16 in. (4.8 mm) I.D. x 1/4 in. (6 mm) O.D.
    - Other (specify size)
  - **Tube Material**
    - Teflon® (PTFE standard)
    - Silicone rubber
    - Others upon request
  - **Tube Length** - 12 to 120 in. (305 to 3048 mm) typical
    - Total
    - Heated
    - Unheated (specify)
  - **Tube Fittings**
    - No fittings (1 in. [25 mm] bare tubing each end)
    - Other (specify)
  - **Tube Flexing**
    - Static (to route around components in system)
    - Dynamic (subject to more continuous flexing)
    - Occasional, frequent or continuous
- Note:** Min. recommended flexing radius
- 1/32 in. (0.8 mm) I.D. x 1/16 in. (1.6 mm) O.D. Teflon® 1 in. (25 mm)
  - 1/16 in. (1.6 mm) I.D. x 1/8 in. (3.2 mm) O.D. Teflon® 1 1/2 in. (38 mm)
  - 1/8 in. (3.2 mm) I.D. x 3/16 in. (4.8 mm) O.D. Teflon® 2 in. (51 mm)
  - 3/16 in. (4.8 mm) I.D. x 1/4 in. (6 mm) O.D. Teflon® 3 in. (76 mm)
- **Heater Leads**
    - One at each end
    - Both at one end
    - Standard lead insulation (UL® Style 1180 CSA white Teflon®)
    - Other insulation (specify)

### Heater Lead Length

- Standard 12 in. (305 mm) w/customer end stripped/tinned 1/2 in. (13 mm)
- Other (specify)

### Heater Lead Exit Direction

- Inboard/outboard

### Temperature Sensor

- Thermocouple (#30 AWG Teflon® - Type J)
- Thermistor (specify) 10KΩ at 72°F (25°C) standard
- Other temperature sensors size/types (specify)
- Sense heater element or tube temperature

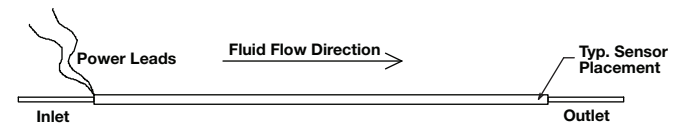
### Sensor Lead Exit Direction

- Inboard/outboard

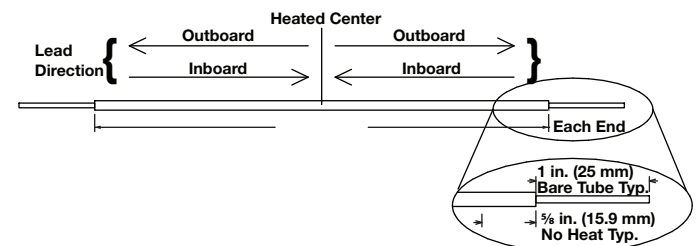
### Temperature Sensor Lead Length

- 12 in. (305 mm)
- Other (specify)

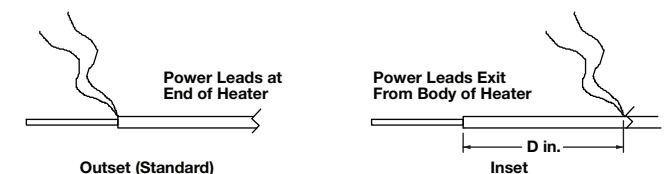
### Typical FREEFLEX Layout



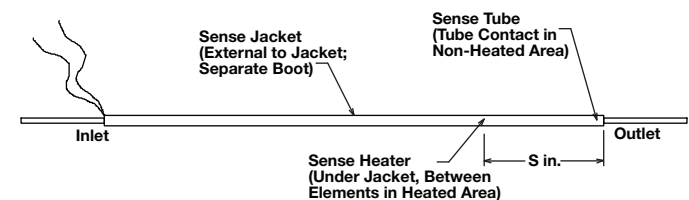
### Lead Orientation



### Lead Location



### Sensor Location/Mounting Description



## Extended Capabilities for Syringe Heaters

The syringe heater from Watlow produces consistent results by reducing temperature and viscosity variations. These heaters provide a heated fluid and drug delivery solution that maximizes patient comfort while reducing risk.

The versatile Watlow heater system was developed for the unique needs of medical injection applications. Heater configurations include silicone/wire or polycarbonate/foil configurations to deliver flexibility and convenience. Both heater forms are designed to “snap” on to the syringe with one hand and hold firmly during the procedure.

Constructed utilizing a clear polycarbonate laminate, this design allows technicians to view fluid levels and monitor for air bubbles. Smooth outer surfaces and a radius on all inside corners facilitate cleaning. The syringe heaters also house an overmold containing an electronic controller and/or sensor to deliver years of accurate, trouble free service and warm solutions to precise specifications. Redundant controller may also be incorporated if required.

Precise fluid temperatures greatly increase patients' comfort levels. Body temperature injections are more easily introduced to patients and have reduced viscosity. Heated contrast media minimizes patient risk and is particularly beneficial for patients in a frail or distressed condition.

### Features and Benefits

#### Long operational life

- Improves system reliability
- Reduces equipment down time—minimizes the need to reschedule procedures

#### Two heater configurations provide flexibility and adaptability

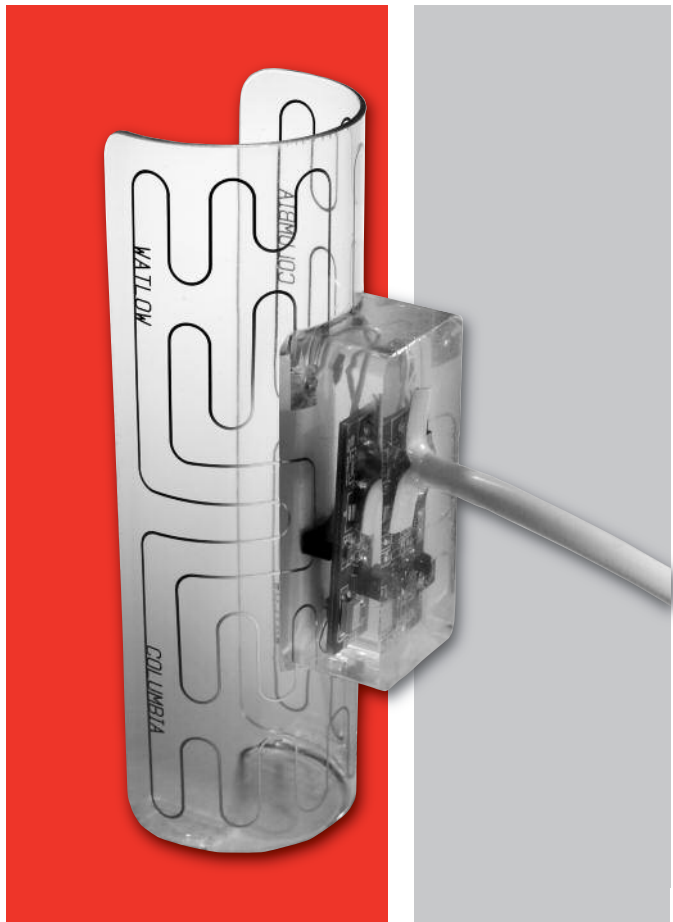
- Provides maximum flexibility to accommodate various syringe sizes (silicon wire)
- Provides high tech look and functionality (polycarbonate/foil)

#### Customizable to most OEM requirements

- Allows over-mold to be modified and color matched for a seamless, integrated appearance

#### Optional precise, repeatable temperature sensing control

- Maximizes patient comfort
- Minimizes patient risk
- Increases the consistency of test results by eliminating temperature and viscosity variations
- Improves product life versus bimetal thermostats



### Specifications

#### Silicone/Wire and Polycarbonate/Foil

- Length: 5 in. (127 mm) max.
- Formed heater diameter: formed to fit syringe. Typical diameter is 2 in. (50 mm) to 6 in. (150 mm)\*
- Voltage: dependent on application, over 48V may impact agency approvals
- Control accuracy: 5.4°F (±3°C)
- Max. operating surface temperature: 185°F (85°C)
- Approximate control pod dimensions: 1 x 1 x 2.75 in. (25 x 25 x 70 mm)\*
- Cord pull strength: Up to 20 lbs\*

\* Dependent on design requirements.