

Immersion Heaters

WATROD and FIREBAR Flange Immersion Heaters

Plate Flange Immersion Heaters

Watlow plate flange heaters are easy to install and maintain. These products are designed for heating heat transfer fluids, medium and lightweight oils and water in tanks and pressure vessels. Plate flange heaters are ideal for applications requiring low to medium wattage requirements.

Watlow plate flange heaters are made with WATROD tubular elements that are brazed or welded to the flange. Stock plate flange heaters are supplied with general purpose or moisture-resistant terminal enclosures.

Performance Capabilities

- Watt densities up to 100 W/in² (15.5 W/cm²)
- Wattages up to 18 kilowatts
- Alloy 800/840 sheath temperatures up to 1600°F (870°C)
- 304 stainless steel sheath temperatures up to 1200°F (650°C)
- Steel sheath temperatures up to 750°F (400°C)

Features and Benefits

Rapid ship program

- Minimizes downtime

Direct replacement for many OEM mold temperature control units

- Provides a single source supplier for many OEM applications

ANSI compatible 2 and 2½ inch flanges

- Provides appropriate heater size-to-application fit

Standard general purpose or moisture resistant terminal enclosures

- Offers easy access to wiring
- Limits accidental contact with termination
- Denies access to wiring connection in local environment



Immersion Heaters

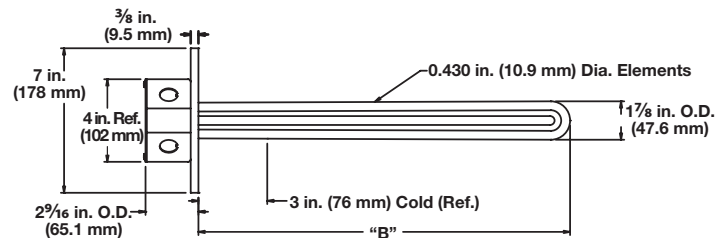
WATROD and FIREBAR Flange Immersion Heaters

Plate Flange Immersion Heaters

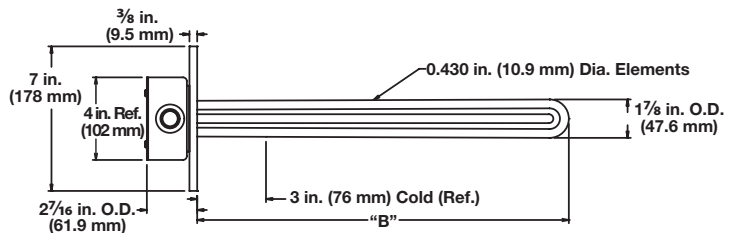
Application: Clean Water

- 2 1/2 inch plate flange (bolt pattern matches 2 1/2 inch - 150 lb ANSI flange)
- WATROD elements
- Not available with thermowell or thermostat
- General purpose or moisture-resistant enclosures

General Purpose



Moisture Resistant



Description	Volts	kW	Ph	# Circ.	"B" Dim. in. (mm)	Ship Wt. lbs (kg)	Part Number	Del.	Part Number	Del.	
							General Purpose Enclosure		Moisture-Resistant Enclosure		
100 W/in ² Steel Flange 3-304 SS Elements (15.5 W/cm ²)	240	12.0	1	3	18 (457)	22 (10)	FLN18A10S	M	FLN18A10W	M	
	240	12.0	3	1	18 (457)	22 (10)	FLN18A3S	M	FLN18A3W	M	
	480	12.0	1	1	18 (457)	22 (10)	FLN18A11S	M	FLN18A11W	M	
	480	12.0	3	1	18 (457)	22 (10)	FLN18A5S	M	FLN18A5W	M	
80 W/in ² Steel Flange 3-304 SS Elements (12.4 W/cm ²)	240	9.0	1	1	17 ³ / ₄ (451)	22 (10)	FLN17N10S	M	FLN17N10W	M	
	240	9.0	3	1	17 ³ / ₄ (451)	22 (10)	FLN17N3S	RS	FLN17N3W	RS	
	480	9.0	1	1	17 ³ / ₄ (451)	22 (10)	FLN17N11S	M	FLN17N11W	M	
	480	9.0	3	1	17 ³ / ₄ (451)	22 (10)	FLN17N5S	M	FLN17N5W	M	
	240	18.0	1	3	30 (762)	27 (13)	FLN30A10S	M	FLN30A10W	M	
	240	18.0	3	1	30 (762)	27 (13)	FLN30A3S	RS	FLN30A3W	RS	
	480	18.0	1	1	30 (762)	27 (13)	FLN30A11S	M	FLN30A11W	M	
	480	18.0	3	1	30 (762)	27 (13)	FLN30A5S	M	FLN30A5W	M	
60 W/in ² Steel Flange 3-Alloy 800 Elements (9.3 W/cm ²)	240	4.5	1	1	12 ¹ / ₂ (318)	21 (10)	FLN12J10S	M	FLN12J10W	M	
	240	4.5	3	1	12 ¹ / ₂ (318)	21 (10)	FLN12J3S	RS	FLN12J3W	RS	
	480	4.5	1	1	12 ¹ / ₂ (318)	21 (10)	FLN12J11S	M	FLN12J11W	M	
	480	4.5	3	1	12 ¹ / ₂ (318)	21 (10)	FLN12J5S	M	FLN12J5W	M	

Note: All flange bundles are designed to fit the inside diameter of the equivalent standard schedule pipe

RAPID SHIP

- RS - Next day shipment up to 5 pieces
- M - Manufacturing lead times

Immersion Heaters

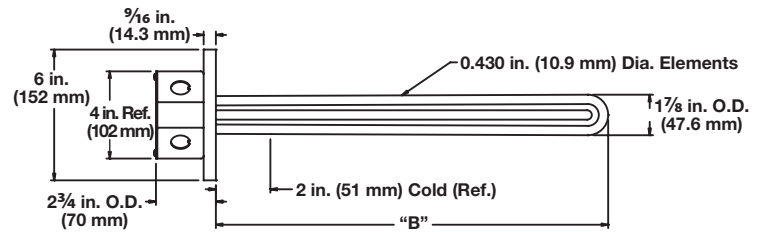
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Plate Flange Immersion Heaters

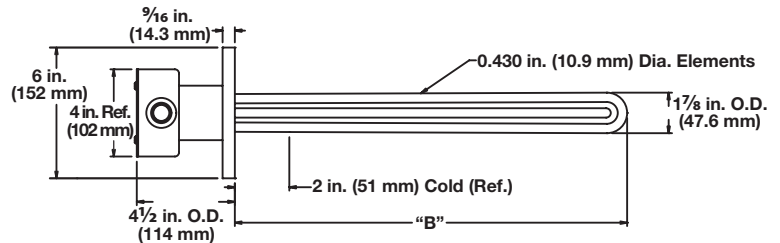
Application: Process Water

- 2 inch flange (bolt pattern matches 2 inch - 150 lb ANSI flange)
- WATROD elements
- Not available with thermowell or thermostat
- General purpose or moisture-resistant enclosures

General Purpose



Moisture Resistant



Description	Volts	kW	PH	# Circ.	"B" Dim. in. (mm)	Ship Wt. lbs (kg)	Part Number		Del.	
							General Purpose Enclosure	Moisture-Resistant Enclosure	Del.	Del.
45 W/in ² Steel Flange 3-Alloy 800 Elements (7 W/cm ²)	240	4.5	1	1	16 (406)	22 (10)	FKN16A10S	M	FKN16A10W	M
	240	4.5	3	1	16 (406)	22 (10)	FKN16A3S	M	FKN16A3W	M
	480	4.5	1	1	16 (406)	22 (10)	FKN16A11S	M	FKN16A11W	M
	480	4.5	3	1	16 (406)	22 (10)	FKN16A5S	RS	FKN16A5W	RS
	240	9.0	1	1	29 (737)	27 (13)	FKN29A10S	M	FKN29A10W	M
	240	9.0	3	1	29 (737)	27 (13)	FKN29A3S	RS	FKN29A3W	RS
	480	9.0	1	1	29 (737)	27 (13)	FKN29A11S	M	FKN29A11W	M
	480	9.0	3	1	29 (737)	27 (13)	FKN29A5S	RS	FKN29A5W	RS
45 W/in ² Steel Flange 3-Alloy 800 Elements (7 W/cm ²)	240	9.0	1	1	28 (711)	27 (13)	FKN28A10S	M	FKN28A10W	M
	240	9.0	3	1	28 (711)	27 (13)	FKN28A3S	M	FKN28A3W	M
	480	9.0	1	1	28 (711)	27 (13)	FKN28A11S	M	FKN28A11W	M
	480	9.0	3	1	28 (711)	27 (13)	FKN28A5S	RS	FKN28A5W	RS

RAPID SHIP

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Note: All flange bundles are designed to fit the inside diameter of the equivalent standard schedule pipe

Immersion Heaters

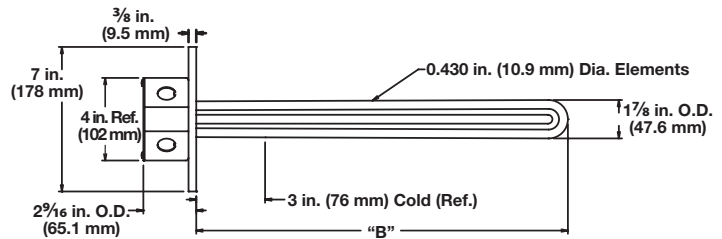
WATROD and FIREBAR Flange Immersion Heaters

Plate Flange Immersion Heaters

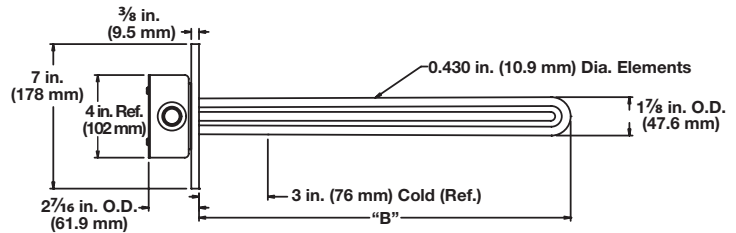
Application: Forced Air and Caustic Solutions

- 2½ inch flange (bolt pattern matches 2½ inch - 150 lb ANSI flange)
- WATROD elements
- Not available with thermowell or thermostat
- General purpose or moisture-resistant enclosures

General Purpose



Moisture Resistant



Description	Volts	kW	Ph	# Circ.	"B" Dim.		Ship Wt.		General Purpose Enclosure		Moisture-Resistant Enclosure	
					in.	(mm)	lbs	(kg)	Part Number	Del.	Part Number	Del.
30 W/in ² Steel Flange 3-Alloy 800 Elements (4.7 W/cm ²)	240	3.0	3	1	17 ³ / ₄	(451)	22	(10)	FLN17N12S	RS	FLN17N12W	RS
	480	3.0	3	1	17 ³ / ₄	(451)	22	(10)	FLN17N13S	RS	FLN17N13W	RS
	240	4.0	3	1	18	(457)	22	(10)	FLN18A12S	RS	FLN18A12W	RS
	480	4.0	3	1	18	(457)	22	(10)	FLN18A13S	M	FLN18A13W	M
	240	6.0	3	1	30	(762)	27	(13)	FLN30A12S	M	FLN30A12W	M
	480	6.0	3	1	30	(762)	27	(13)	FLN30A13S	M	FLN30A13W	M

RAPID SHIP

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Note: All flange bundles are designed to fit the inside diameter of the equivalent standard schedule pipe

Immersion Heaters

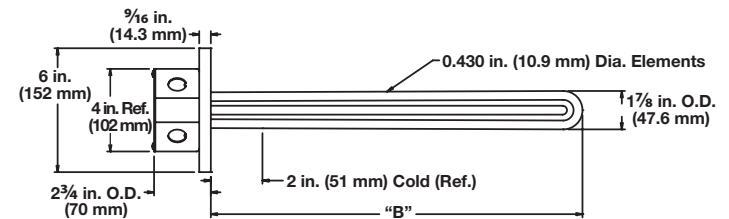
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Plate Flange Immersion Heaters

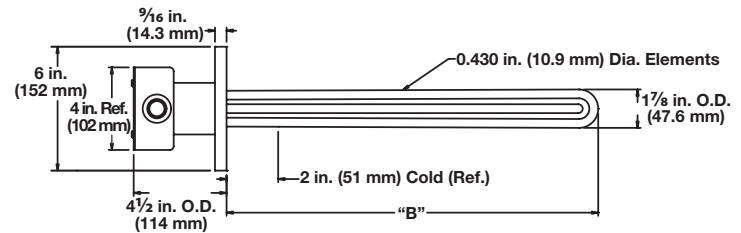
Application: Lightweight Oils and Ethylene Glycol (100%)

- 2 inch flange (bolt pattern matches 2 inch - 150 lb ANSI flange)
- WATROD elements
- Not available with thermowell or thermostat
- General purpose or moisture-resistant enclosures

General Purpose



Moisture Resistant



Description	Volts	kW	Ph	# Circ.	"B" Dim. in.	(mm)	Ship Wt. lbs	(kg)	Part Number		Del.	
									General Purpose Enclosure	Moisture-Resistant Enclosure		
30 W/in ² Steel Flange 3-Steel Elements (4.7 W/cm ²)	240	6.0	1	1	29	(737)	27	(13)	FKS29A10S	RS	FKS29A10W	RS
	240	6.0	3	1	29	(737)	27	(13)	FKS29A3S	RS	FKS29A3W	RS
	480	6.0	1	1	29	(737)	27	(13)	FKS29A11S	RS	FKS29A11W	RS
	480	6.0	3	1	29	(737)	27	(13)	FKS29A5S	M	FKS29A5W	M

RAPID SHIP

- **RS** - Next day shipment up to 5 pieces
- **M** - Manufacturing lead times

Note: All flange bundles are designed to fit the inside diameter of the equivalent standard schedule pipe

Immersion Heaters

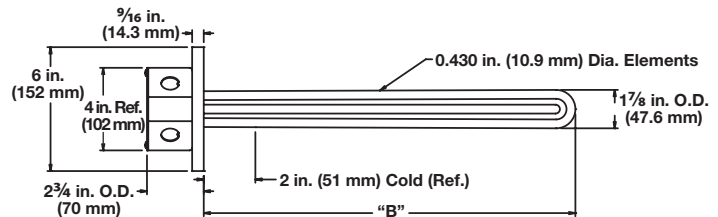
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Plate Flange Immersion Heaters

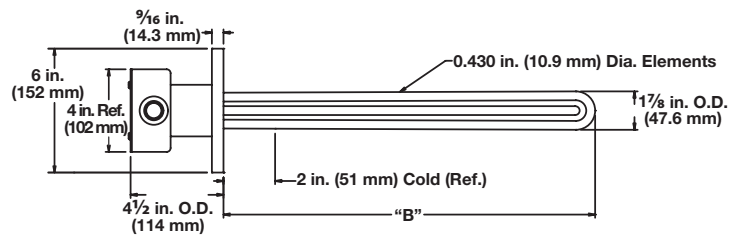
Application: Medium Weight Oils and Heat Transfer Oils

- 2 inch flange (bolt pattern matches 2 inch - 150 lb ANSI flange)
- WATROD elements
- Not available with thermowell or thermostat
- General purpose or moisture-resistant enclosures

General Purpose



Moisture Resistant



Description	Volts	kW	Ph	# Circ.	"B" Dim. in.	(mm)	Ship Wt. lbs	(kg)	Part Number	Del.	Part Number	Del.
									General Purpose Enclosure		Moisture-Resistant Enclosure	
15 W/in ² Steel Flange 3-Alloy 800 Elements (2.3 W/cm ²)	240	3.0	3	1	28	(711)	27	(13)	FKN28A12S	M	FKN28A12W	M
	480	3.0	3	1	28	(711)	27	(13)	FKN28A13S	M	FKN28A13W	M
10 W/in ² Steel Flange 3-Steel Elements (1.6 W/cm ²)	240	2.0	3	1	29	(737)	27	(13)	FKS29A12S	M	FKS29A12W	M
	480	2.0	3	1	29	(737)	27	(13)	FKS29A13S	M	FKS29A13W	M

- M - Manufacturing lead times

Note: All flange bundles are designed to fit the inside diameter of the equivalent standard schedule pipe

Immersion Heaters

WATROD and FIREBAR Flange Immersion Heaters

Square Flange Immersion Heaters

Designed for use in boilers and industrial storage tanks, the square flange immersion heater from Watlow offers an energy efficient solution to heating water, oils and degreasing solutions.

Consisting of WATROD or FIREBAR elements brazed, staked or welded to a four- or six-bolt flange, these heaters mount directly to a mating flange that is welded to a tank wall or nozzle.

Installation and maintenance is easy. Heater change-out is also simple-unbolt the flange and replace it with another-without extensive equipment downtime.

Performance Capabilities

- Watt densities up to 100 W/in² (15.5 W/cm²)
- Wattages up to 24 kilowatts
- Voltages up to 480VAC
- Alloy 800/840 sheath temperatures up to 1600°F (870°C)

Features and Benefits

2¹/₂, 3¹/₈ and 4¹/₂ inch square flanges

- Adapts easily to application needs

Asbestos-free gaskets

- Come wire-tied to each flange. Spare gaskets also available

Epoxy or silicone resin seals rated to 250°F (120°C) or 390°F (200°C)

- Protects elements against moisture and other contaminants

WATROD hairpins are repressed (recompacted)

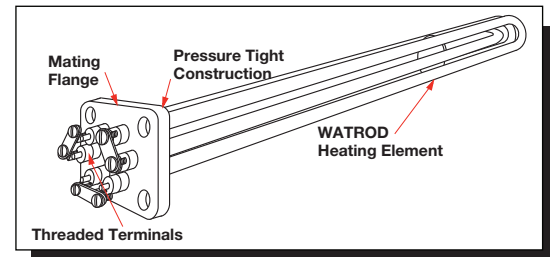
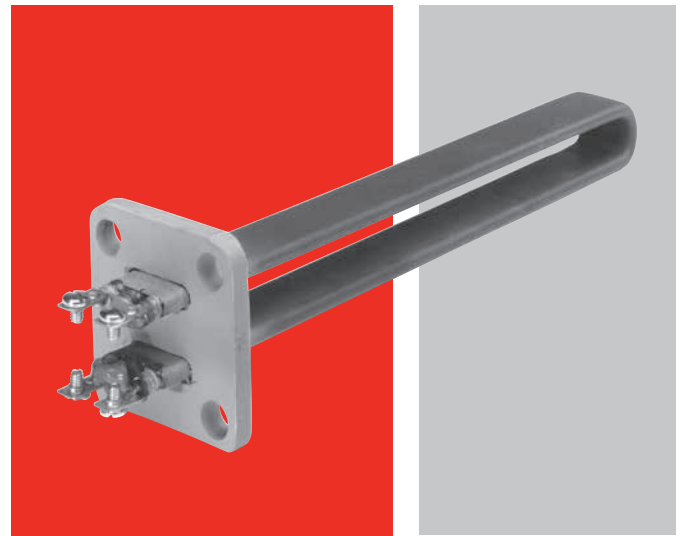
- Helps maintain MgO density, dielectric strength, heat transfer and life

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

- Meets industry safety standards

Typical Applications

- Water
- Boiler equipment
- Vapor degreasers
- Fuel oils
- Heat transfer fluids
- Caustic solutions



Flange Materials

WATROD	Steel 304 SS
FIREBAR	Steel Brass

Available on Request

- **Sheath materials** in steel, 304 and 316 stainless steel and titanium
- **Flange materials** in titanium and 316 stainless steel
- **Flange sizes** to meet specific application needs
- **External finishes** such as passivation, belt polishing and glass beading
- **Other voltage and wattage ratings**
Contact your Watlow representative for details

Immersion Heaters

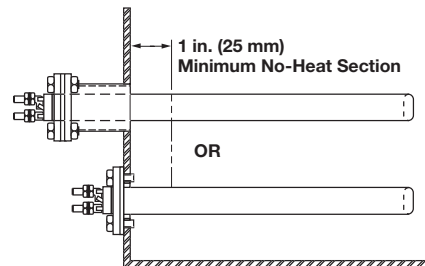
WATROD and FIREBAR Flange Immersion Heaters

Square Flange Immersion Heaters

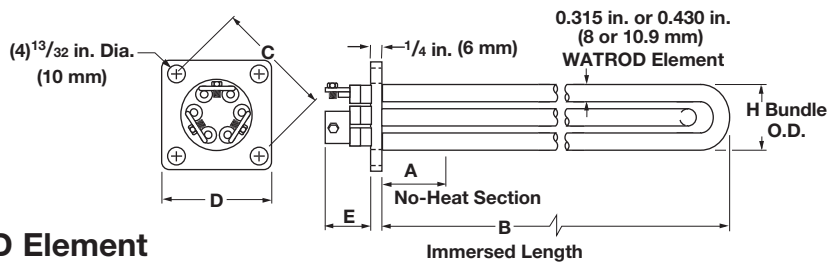
Application Hints

- Determine recommended sheath materials and watt densities by using the *Element and Assembly Selection Guide* on pages 554 to 555. If wattage is not known, contact your Watlow representative.
- Extend the element's no-heat section completely in the fluid at all times to prevent premature heater failure. See the accompanying illustration for proper placement of the no-heat section.

- Mount WATROD and FIREBAR square flange heaters horizontally and low in the tank, but above sludge level.
- Periodically remove heaters to inspect and clean the elements.
- Keep terminations clean, dry and tight.
- Minimize problems associated with low liquid level conditions by using a low liquid level sensor.



Heater Dimension	in.	(mm)
A	1 1/2	(38)
C	2 1/2	(64)
D	2 1/2	(64)
E	1	(25)
H	1 1/2	(38)



2 1/2 inch Square Flange – WATROD Element

WATROD Description	kW	Immersed B Dimension in. (mm)	Part Number				Est. Ship. Wt. lbs (kg)
			240VAC 1-Phase	240VAC 3-Phase	480VAC 1-Phase	480VAC 3-Phase	

Applications: Clean and Potable Water

100 W/in ² Steel Flange 3-Alloy 800 (15.5 W/cm ²)	8.0	11 3/4 (298.0)	FHN11N10 ^②	FHN11N3 ^②	FHN11N11 ^②	FHN11N5 ^①	18 (9)
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Applications: Forced Air and Gases, Caustic Solutions, Degreasing Solutions

30 W/in ² 304 SS Flange 3-Alloy 800 (4.7 W/cm ²)	3.0	18 1/2 (470.0)	FHN18J10 ^①	FHN18J3 ^①	FHN18J11 ^②	FHN18J5 ^②	19 (9)
	3.75	23 1/16 (585.8)	FHN23B10 ^①	FHN23B3 ^①	FHN23B11 ^②	FHN23B5 ^②	20 (9)
25 W/in ² 304 SS Flange 3-Alloy 800 (3.9 W/cm ²)	1.5	12 (305.0)	FHN12A10 ^①	FHN12A3 ^①	FHN12A11 ^②	FHN12A5 ^②	18 (8)

Applications: Bunker C and #6 Fuel Oils

10 W/in ² 304 SS Flange 3-Alloy 800 (1.6 W/cm ²)	1.0	18 1/2 (470.0)		FHN18J12 ^①		FHN18J13 ^②	19 (9)
	1.25	23 1/16 (585.8)		FHN23B12 ^①		FHN23B13 ^②	20 (9)
8 W/in ² 304 SS Flange 3-Alloy 800 (1.3 W/cm ²)	0.5	12 (305.0)		FHN12A12 ^①		FHN12A13 ^②	18 (8)

RAPID SHIP

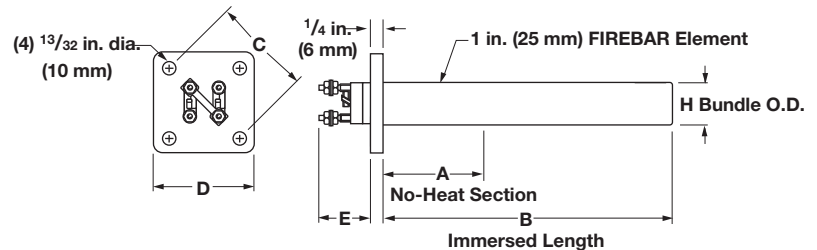
- ① Next day shipment up to 5 pieces
- ② Manufacturing lead times

Immersion Heaters

WATROD and FIREBAR Flange Immersion Heaters

Square Flange Immersion Heaters

Heater Dimension	in.	(mm)
A	1 1/2	(38)
C	2 1/2	(64)
D	2 1/2	(64)
E	1 3/4	(44)
H	1 5/16	(33)



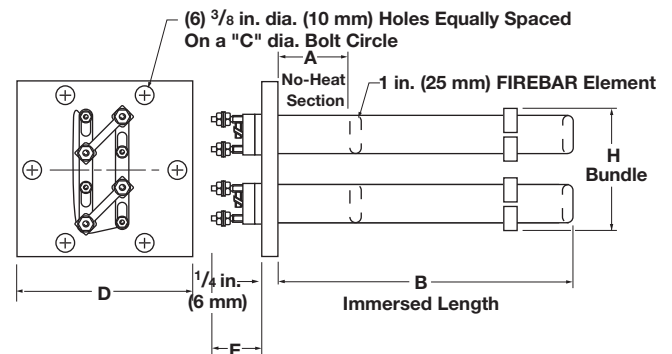
2 1/2 inch Square Flange—FIREBAR Element

FIREBAR Description	kW	Immersed B Dimension in. (mm)	Part Number					Est. Ship.	
			208VAC 3-Phase	240VAC 1-Phase	240VAC 3-Phase	480VAC 1-Phase	480VAC 3-Phase	Wt. lbs	(kg)

Applications: Clean and Potable Water

100 W/in ² Steel Flange	5	11 1/2 (292)	FHNFA11J26N ^②	FHNFA11J10N ^①	FHNFA11J3N ^①	FHNFA11J11N ^②	FHNFA11J5N ^②	5	(3)
1-Alloy 800 (15.5 W/cm ²)	8	20 3/4 (527)	FHNFA20N26N ^②	FHNFA20N10N ^①	FHNFA20N3N ^①	FHNFA20N11N ^②	FHNFA20N5N ^①	7	(4)
	10	24 3/8 (619)	FHNFA24G26N ^②	FHNFA24G10N ^①	FHNFA24G3N ^②	FHNFA24G11N ^②	FHNFA24G5N ^①	8	(4)
	15	33 15/16 (862)	FHNFA33S26N ^②		FHNFA33S3N ^②	FHNFA33S11N ^②	FHNFA33S5N ^①	9	(5)
80 W/in ² Steel Flange	16	22 5/8 (575)	FHNFB22L26J ^②	FHNFB22L10J ^②	FHNFB22L3J ^②	FHNFB22L11J ^②	FHNFB22L5J ^②	10	(5)
1-Alloy 800 (12.4 W/cm ²)									

Heater Dimension	in.	(mm)
A	1	(25.0)
C	3 13/16	(96.8)
D	4 1/2	(114.0)
E	2 1/4	(57.0)
H	3 7/32	(81.8)



4 1/2 inch Square Flange—FIREBAR Element

FIREBAR Description	kW	Immersed B Dimension in. (mm)	Part Number			Est. Ship.	
			208VAC 3-Phase	240VAC 3-Phase	480VAC 3-Phase	Wt. lbs	(kg)

Applications: Clean and Potable Water

100 W/in ² Steel Flange	18	10 1/2 (267)	FGNFB10J26N ^②	FGNFB10J3N ^②	FGNFB10J5N ^①	16	(8)
2-Alloy 800 (15.5 W/cm ²)							
70 W/in ² Steel Flange	12	10 1/2 (267)	FGNFB10J26P ^①	FGNFB10J3P ^②	FGNFB10J5P ^①	16	(8)
2-Alloy 800 (10.9 W/cm ²)							

RAPID SHIP

- ① Next day shipment up to 5 pieces
- ② Manufacturing lead times

Immersion Heaters

**EXTENDED
CAPABILITY**

WATROD and FIREBAR Flange Immersion Heaters

Extended Capabilities For Bayonet/Pipe Insert Immersion Heaters

Bayonet/Pipe insert immersion heaters permit removing and servicing the heater bundle without draining the liquid being heated.

Heating is accomplished by mounting a flange or screw plug immersion heater inside a pressure-tight bayonet pipe vessel then mates to a flange connection on a storage tank's side. Heat transfer between element(s) and tank contents is accomplished by heating the air or heat transfer fluid inside the bayonet pipe for conduction to the tank's contents.

Performance Capabilities

- Wattages up to 100 kilowatts
- Voltages up to 600VAC
- Ratings up to 600 lb pressure class
- Alloy 800 sheath temperatures up to 1400°F (760°C)
- Stainless steel sheath temperatures up to 1200°F (650°C)
- Steel sheath temperatures up to 750°F (400°C)

Features and Benefits

Low watt density screw plug or flange heaters mounted in the bayonet vessel

- Provides long life

Carbon steel, 304 and 316 stainless steel bayonet vessels

- Offers compatibility with a wide range of liquids

Welded flange on pipe vessel

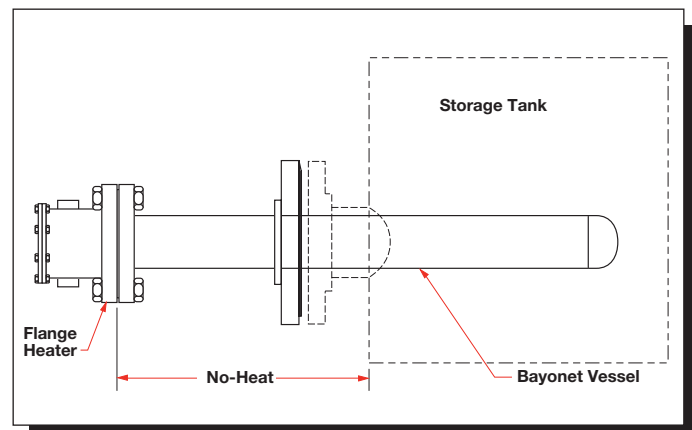
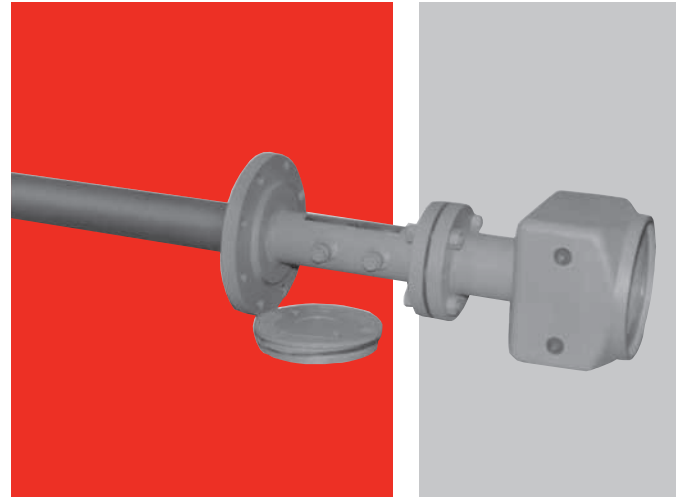
- Ensures pressure seal

Heating elements support(s)

- Ensures proper element spacing and maximum heater performance

Typical Applications

- Indirect heating of viscous fluids:
 - Asphalt
 - Tar
 - Molasses
 - Syrup
 - Glue
- Corrosive liquids
- Degreasing fluids



WATROD and FIREBAR Flange Immersion Heaters

Extended Capabilities For Bayonet/Pipe Insert Immersion Heaters

Options

Pipe insert heaters can be supplied with a variety of options, including:

- Appropriate gasket materials
- Passivation cleaning on pipe insert
- European screw plug to flange adapters
- CSA certified terminal enclosures
- Stand-off terminal enclosures
- Thermocouple temperature sensors
- Thermostats
- Customer specified materials, sizes and pressure class ratings

For descriptions and ordering information about these options, please refer to *Flange Immersion Heaters*, pages 237 to 306, or *Screw Plug Immersion Heaters*, pages 165 to 234.

Flanges

Flanges to 24 in. (610 mm) nominal pipe size are available in materials compatible with specific application needs. For information on flange materials and ratings, consult your Watlow representative.

Bayonet Vessels

Bayonet vessels are available up to 14 in. (356 mm) nominal pipe size and 20 feet long. Vessel size is dependent upon the kilowatt requirement and element watt density. For more information, contact your Watlow representative.

Application Hints

- Mount pipe insert heater horizontally
- Locate pipe insert heaters low in the tank, but above the sludge level
- Consider a low liquid level sensor to protect against low liquid level conditions
- Select a watt density that is compatible with the heat transfer media being used
- Insulate the pipe insert heater's exterior to minimize heat loss



Caution:

Do not insulate the terminal enclosure.