Quick Ship • *Same day shipment on all stock units.*

Cartridge Heaters

FIREROD® Immersion

FIREROD® immersion heaters package to 300 W/in² (46.5 W/cm²) in a compact unit, giving you greater versatility in designing your heating system. This design solution is ideal for replacing large screw-plug immersion heaters.

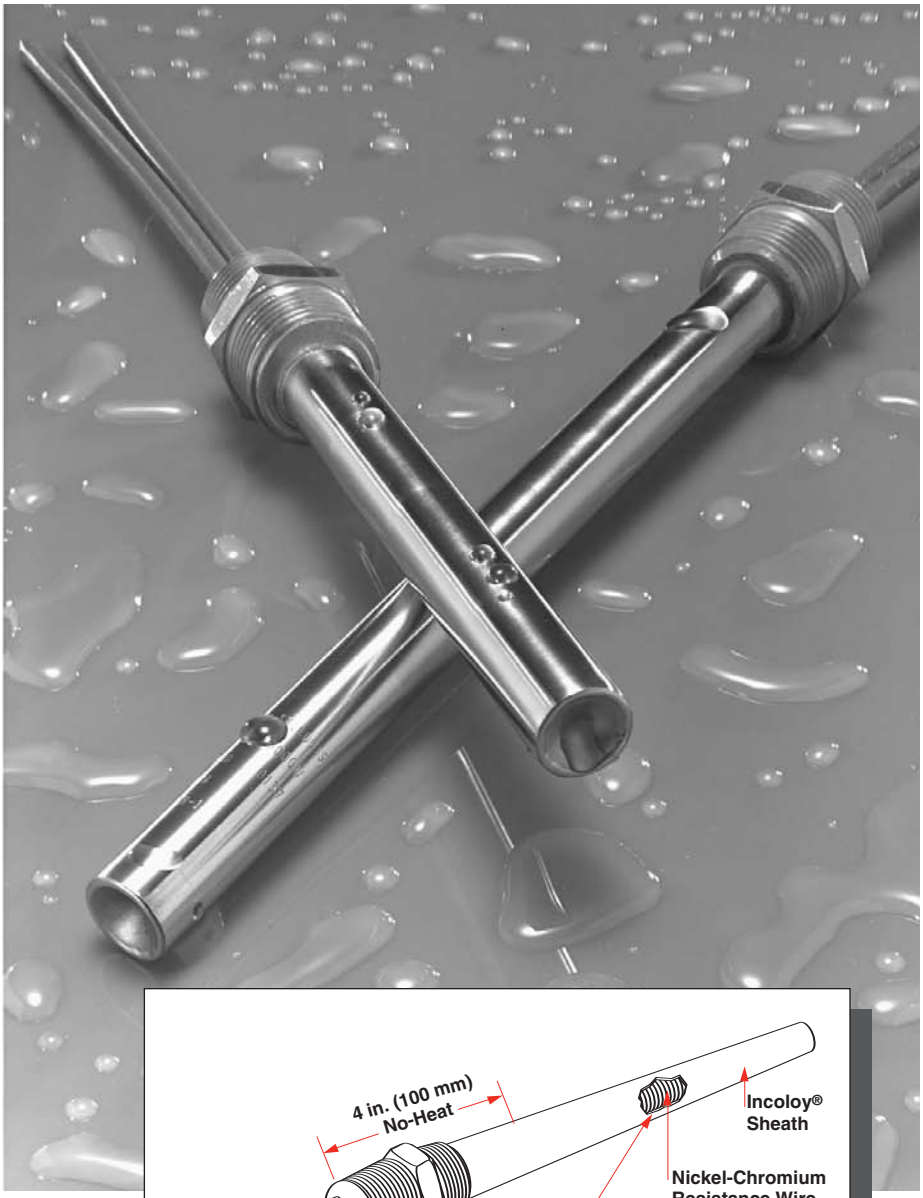
Aside from its versatile design, these heaters come complete with a brass ¾ inch NPT double threaded screw plug, which allows you to add conduit boxes. Also, FIREROD immersion heaters are sealed at the lead end with a silicone rubber seal. Solid copper leads, with silicone rubber sleeve, are provided for unconfined wiring. These units are recommended for immersion in water or 90+ percent water soluble solutions.

Performance Capabilities

- Maximum operating temperature in water to 100°C (212°F) at atmospheric pressure
- Maximum watt density to 300 W/in² (46.5 W/cm²)
- Maximum voltage to 480V~(ac)

Features and Benefits

- **Nickel-chromium resistance wire,** precisely centered in the unit, assures even, efficient distribution of heat to the sheath.
- **Magnesium oxide insulation,** compacted to the proper density, results in high dielectric strength and contributes to faster heat-up.
- **Incoloy® sheath** resists corrosion from water.
- **Metallurgically-bonded conductor pins** overlap the resistance wire inside the core, ensuring trouble-free electrical continuity.
- **Lead end with silicone rubber seal** protects the heater against moisture contamination.
- **Optional stainless steel fittings** are available for use in corrosive applications.



- **Horizontal through the wall tank mounting** makes set-up faster.
- **240 and 480V~(ac)** give flexibility in wiring the heater for use in your particular application.

Applications

- Plastic reclamation
- Food preparation
- Lab equipment

Incoloy® is a registered trademark of Special Metals Corporation.

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Applications and Technical Data

The small size and big capacity of FIREROD cartridge heating units make them ideal immersion heaters in cramped quarters. When heating liquids of low viscosity, FIRERODs have the high watt density to pack more heat into tight spots. For water heating applications a rating of 150 to 300 W/in^2 is recommended. (Laboratory tests show that under certain conditions ratings as high as 700 W/in^2 are safe.) For longer life at high watt densities:

- The FIREROD unit should be in the main body of the liquid and not in a restricted space.
- The FIREROD heater should be covered with liquid at all times.
- The heater should not be allowed to cycle on and off too frequently.
- Scale should not form.

When heating viscous liquids, such as oils, watt densities must be kept low to prevent carbonization at the heater sheath. FIREROD cartridges offer advantages for heating viscous materials where long life and high quality outweigh the usual economic considerations. As in all immersion applications, scale build-up on the sheath and sludge on the bottom of the tank must be carefully controlled to assure long heater life.

Equipped with smaller threaded fittings than conventional immersion heaters, FIRERODs leave room for more units in the same space. Replacement of single FIREROD units in multiheater assemblies is fast and easy, and avoids discarding the complete assembly.

Moisture proof seals are available to give protection from damp atmospheres outside the tank.

Built for sustained operation at high temperatures, the FIREROD is especially valuable in heat-transfer applications with liquid metals. This factor alone has made the FIREROD heater a widely used component in the development of nuclear power systems.

Threaded fittings are furnished in either stainless steel or brass. FIRERODs with Incoloy® or 304 stainless steel sheaths are standard, but other sheath materials can be provided. Headers and sheath material should be suited to the material being heated.

Consult FIREROD section, pages 75 to 76 for more information.

Sheath Material Compositions

Sheath Material	Chemical Composition															
	Al	C	Co	Cr	Cu	Fe	Mn	Mo	Ni	P	S	Si	Ta	Ti	V	W
Stainless Steels																
304		0.08 ①		18/20		Bal	2 ①		8/12			1 ①				
316		0.08 ①		16/18		Bal	2 ①	2/3	10/14			1 ①				
Nickel Alloys																
Incoloy® 800	0.15/0.6	0.1		19/23	0.75	Bal	1.5		30/35		0.015	1.0		0.15/0.6		

① Maximum

See application guide for additional sheath material composition.

Cartridge Heaters

FIREROD Immersion

Applications and Technical Data

Continued

How to Order:

To order stock FIREROD immersion heaters, specify Watlow code number and quantity.

For **made-to-order** units, please specify:

- Diameter
- Overall length
- Immersed length
- Heated length
- Watts
- Volts
- Threaded fitting material

Ordering Example: Specify FIREROD immersion heater ⅝ inch diameter, six inches overall length, immersed length of four inches, and two inches heated length. The heater is to be supplied with 1200 watts, 240 volts, ¾ inch NPT double threaded brass fitting, silicone seal and six inch pins, no leads.

Availability

Stock: Same day shipment

Made-to-Order: Consult Watlow

F.O.B.: St. Louis, Missouri

Diameter in.	Overall length in.	(mm)	Volts	Watts	Watt Density W/in²	(W/cm²)	Approx Fittings Type	Net Wt. lbs	(kg)	Availability	Code No.
⅝	6 ¼	(159)	120	500	127	(19.7)	Brass	0.58	(0.26)	Stock	**L6EX12A**
	6 ¼	(159)	120	500	127	(19.7)	SS	0.58	(0.26)	Stock	**L6EX12B**
	6 ¼	(159)	240	500	127	(19.7)	Brass	0.58	(0.26)	Stock	**L6EX13A**
	6 ¼	(159)	240	500	127	(19.7)	SS	0.58	(0.26)	Stock	**L6EX13B***
	6 ¼	(159)	120	750	191	(29.6)	Brass	0.58	(0.26)	Stock	**L6EX14A**
	6 ¼	(159)	120	750	191	(29.6)	SS	0.58	(0.26)	Stock	**L6EX14B**
	6 ¼	(159)	240	750	191	(29.6)	Brass	0.58	(0.26)	Stock	**L6EX15A**
	6 ¼	(159)	240	750	191	(29.6)	SS	0.58	(0.26)	Stock	**L6EX15B**
	6 ¼	(159)	120	1000	254	(39.4)	Brass	0.58	(0.26)	Stock	**L6EX16A**
	6 ¼	(159)	120	1000	254	(39.4)	SS	0.58	(0.26)	Stock	**L6EX16B**
	6 ¼	(159)	240	1000	254	(39.4)	Brass	0.58	(0.26)	Stock	**L6EX17A**
	6 ¼	(159)	240	1000	254	(39.4)	SS	0.58	(0.26)	Stock	**L6EX17B**
	6 ¾	(159)	240	1500	300	(46.5)	Brass	0.60	(0.27)	Stock	**L6NX7A**
	6 ¾	(171)	240	1500	300	(46.5)	SS	0.60	(0.27)	Stock	**L6NX7B**
	6 ¾	(171)	480	1500	300	(46.5)	Brass	0.60	(0.27)	Stock	**L6NX8A**
	6 ¾	(171)	480	1500	300	(46.5)	SS	0.60	(0.27)	Stock	**L6NX8B**
	7 ¾	(197)	240	2000	291	(45.1)	Brass	0.66	(0.30)	Stock	**L7NX5A**
	7 ¾	(197)	240	2000	291	(45.1)	SS	0.66	(0.30)	Stock	**L7NX5B**
	7 ¾	(197)	480	2000	291	(45.1)	Brass	0.66	(0.30)	Stock	**L7NX6A**
	7 ¾	(197)	480	2000	291	(45.1)	SS	0.66	(0.30)	Stock	**L7NX6B**
	8 ½	(216)	240	2500	300	(46.5)	Brass	0.68	(0.31)	Stock	**L8JX16A**
	8 ½	(216)	240	2500	300	(46.5)	SS	0.68	(0.31)	Stock	**L8JX16B**
	8 ½	(216)	480	2500	300	(46.5)	Brass	0.68	(0.31)	Stock	**L8JX17A**
	8 ½	(216)	480	2500	300	(46.5)	SS	0.68	(0.31)	Stock	**L8JX17B***
	9 ¼	(235)	240	3000	300	(46.5)	Brass	0.72	(0.33)	Stock	**L9EX11A**
	9 ¼	(235)	240	3000	300	(46.5)	SS	0.72	(0.33)	Stock	**L9EX11B**
	9 ¼	(235)	480	3000	300	(46.5)	Brass	0.72	(0.33)	Stock	**L9EX12A**
	9 ¼	(235)	480	3000	300	(46.5)	SS	0.72	(0.33)	Stock	**L9EX12B**
	11	(279)	240	4000	300	(46.5)	Brass	0.80	(0.36)	Stock	**L11AX59A**
	11	(279)	240	4000	300	(46.5)	SS	0.80	(0.36)	Stock	**L11AX59B**
	11	(279)	480	4000	300	(46.5)	Brass	0.80	(0.36)	Stock	**L11AX60A**
	11	(279)	480	4000	300	(46.5)	SS	0.80	(0.36)	Stock	**L11AX60B**

CONTINUED

* Limited quantities available, consult factory for delivery.

Cartridge Heaters

F.O.B.: St. Louis, Missouri

FIREROD Immersion

Diameter in.	Overall length in.	(mm)	Volts	Watts	Watt Density W/in²	(W/cm²)	Approx Fittings Type	Net Wt. lbs	(kg)	Availability	Code No.
⅝	12 ¾	(324)	240	5000	300	(46.5)	Brass	0.89	(0.41)	Stock	**L12NX4A**
	12 ¾	(324)	240	5000	300	(46.5)	SS	0.89	(0.41)	Stock	**L12NX4B**
	12 ¾	(324)	480	5000	300	(46.5)	Brass	0.89	(0.41)	Stock	**L12NX5A**
	12 ¾	(324)	480	5000	300	(46.5)	SS	0.89	(0.41)	Stock	**L12NX5B**
	14 ½	(368)	240	6000	300	(46.5)	Brass	0.95	(0.43)	Stock	**L14JX8A**
	14 ½	(368)	240	6000	300	(46.5)	SS	0.95	(0.43)	Stock	**L14JX8B**
	14 ½	(368)	480	6000	300	(46.5)	Brass	0.95	(0.43)	Stock	**L14JX9A**
	14 ½	(368)	480	6000	300	(46.5)	SS	0.95	(0.43)	Stock	**L14JX9B**
	18	(457)	240	8000	295	(45.7)	Brass	1.14	(0.52)	Stock	**L18AX43A**
	18	(457)	240	8000	295	(45.7)	SS	1.14	(0.52)	Stock	**L18AX43B**
	18	(457)	480	8000	295	(45.7)	Brass	1.14	(0.52)	Stock	**L18AX44A**
	18	(457)	480	8000	295	(45.7)	SS	1.14	(0.52)	Stock	**L18AX44B**
	21 ¼	(540)	240	10000	300	(46.5)	Brass	1.3	(0.59)	Stock	**L21EX1A**
	21 ¼	(540)	240	10000	300	(46.5)	SS	1.3	(0.59)	Stock	**L21EX1B**
	21 ¼	(540)	480	10000	300	(46.5)	Brass	1.3	(0.59)	Stock	**L21EX2A**
	21 ¼	(540)	480	10000	300	(46.5)	SS	1.3	(0.59)	Stock	**L21EX2B**
	24 ¾	(629)	480	12000	300	(46.5)	Brass	1.5	(0.68)	Stock	**L24NX1A**
	24 ¾	(629)	480	12000	300	(46.5)	SS	1.5	(0.68)	Stock	**L24NX1B***
	29 ¾	(756)	480	15000	300	(46.5)	Brass	1.8	(0.82)	Stock	**L29NX5A**
	29 ¾	(756)	480	15000	300	(46.5)	SS	1.8	(0.82)	Stock	**L29NX5B***
	35	(889)	480	18000	300	(46.5)	Brass	2.0	(0.91)	Stock	**L35AX5A**
	35	(889)	480	18000	300	(46.5)	SS	2.0	(0.91)	Stock	**L35AX5B**

* Limited quantities available, consult factory for delivery.