

## Compact Heater Enables Versatile Heating System Design

FIREROD® cartridge immersion heaters are ideal for replacing large screw-plug immersion heaters. The heater packages up to 300 W/in<sup>2</sup> (46.5 W/cm<sup>2</sup>) in a compact unit, enabling a versatile heating system design.

These heaters include a brass or stainless steel 3/4 inch National Pipe Thread Taper (NPT) double threaded fitting, which allows conduit boxes to be added. Also, FIREROD immersion heaters are sealed at the lead end with silicone rubber potting.

Solid copper leads with silicone rubber sleeves are provided for heavy-duty wiring. These units are recommended for immersion in water or 90+ percent water soluble solutions.

### Performance Capabilities

- Maximum operating temperature in water to 212°F (100°C) at atmospheric pressure
- Maximum watt density to 300 W/in<sup>2</sup> (46.5 W/cm<sup>2</sup>)
- Maximum voltage to 480VAC

### Features and Benefits

#### Nickel-chromium resistance wire precisely centered in the unit

- Ensures even, efficient distribution of heat to the sheath

#### MgO 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

- Overlaps the resistance wire inside the core, ensuring trouble-free electrical continuity

#### Lead end with silicone rubber seal

- Protects the heater from moisture contamination

#### Optional stainless steel fittings

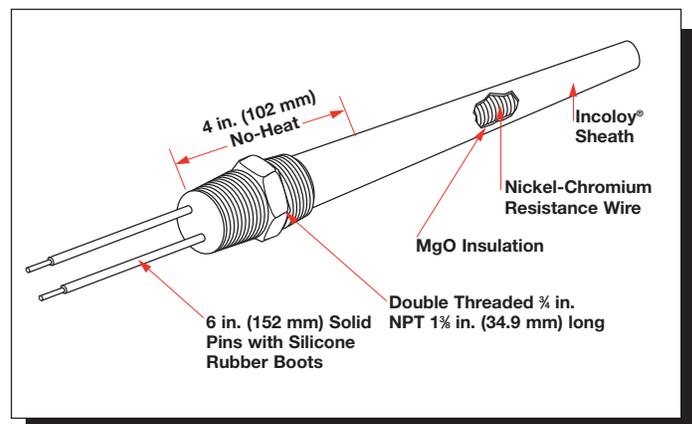
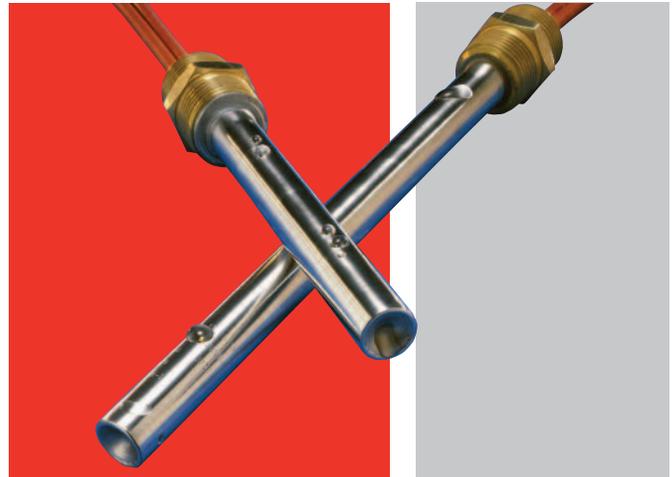
- Offers availability for use in corrosive applications

#### Horizontal through the wall tank mounting

- Provides faster set-up

#### 240 and 480VAC

- Allows flexibility in wiring the heater for use in your specific applications



### Typical Applications

- Plastic reclamation
- Food preparation
- Lab equipment

## Applications and Technical Data

The small size and large capacity of FIREROD cartridge heating units make them ideal immersion heaters for cramped spaces. 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<sup>2</sup> is recommended. (Laboratory tests indicate that under certain conditions ratings as high as 700 W/in<sup>2</sup> are safe.)

For longer life at high watt densities:

- The FIREROD unit should be positioned 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 on the FIREROD heater

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 when long life and high quality outweigh economic considerations. As with all immersion applications, scale build-up on the sheath and sludge on the bottom of the tank must be carefully controlled to ensure long heater life.

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

Moisture resistant seals are available to protect damp atmospheres outside the tank.

Threaded fittings are furnished in stainless steel or brass. FIRERODs are designed with Incoloy® sheaths, but other sheath materials can be provided on made-to-order FIRERODs.

Fittings and sheath material should be appropriate for the specific liquid material being heated.

## Sheath Material Compositions

Sheath Material	Chemical Composition															
	Al	C	Co	Cr	Cu	Fe	Mn	Mo	Ni	P	S	Si	Ta	Ti	V	W
<b>Stainless Steels</b>																
304		0.08 <sup>①</sup>		18-20		Bal	2 <sup>①</sup>		8-12			1 <sup>①</sup>				
316		0.08 <sup>①</sup>		16-18		Bal	2 <sup>①</sup>	2-3	10-14			1 <sup>①</sup>				
<b>Nickel Alloys</b>																
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.

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Incoloy® is a registered trademark of Special Metals Corporation.

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