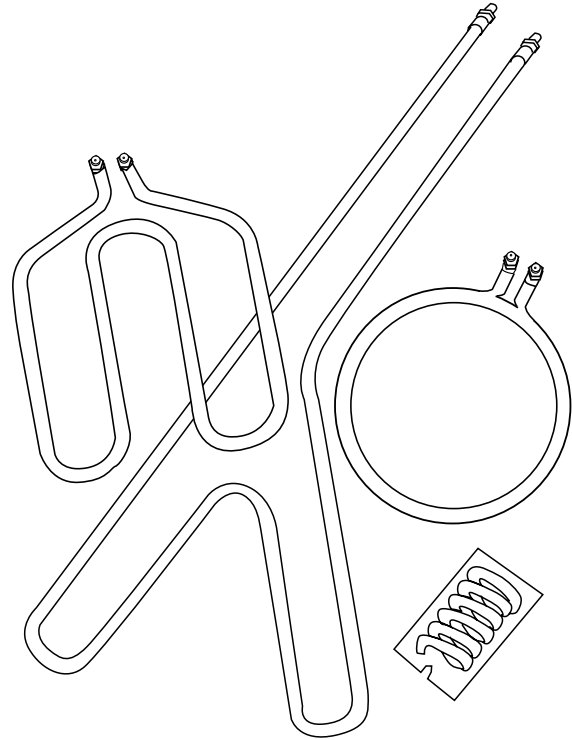


## Fits Virtually Entire Range of Immersion and Air Heating Applications



### Features

- Precision wound nickel-chromium resistance wire
- Silicone resin seals
- MgO insulation filled sheath
- Wide variety of sheath materials to match specific applications
- 36 standard bend formations
- Resistance wire fusion welded to the terminal pin
- Nickel-plated steel studs
- Ceramic insulators

### Benefits

- Distributes heat evenly to the sheath for optimum heater performance
- Protect against moisture contamination and are rated to 390°F (200°C)
- Maximizes dielectric strength, heat transfer and life
- Copper, steel, 316 stainless steel and Incoloy®. Optional materials, available on Made-to-Order (MtO), include 304 stainless steel, Inconel®, Monel® and titanium
- Allow forming the heating element to the application. Spirals, compound bends and multi-axis and multi-plane configurations
- Stronger, positive electrical connection
- Fusion welded to terminal pins for mechanical strength
- Isolate terminations from grounded metal sheaths

Available in single- or double-ended termination styles, the versatile and economical WATROD tubular heating element lends itself to virtually the entire range of immersion and air heating applications.

The single-ended WATROD tubular design has both terminals at one end. The opposite end is sealed. Standard 12-inch (305 mm) flexible leadwires are crimp connected to the terminal pin and have silicone-impregnated fiberglass oversleeves.

The double-ended WATROD, with its round cross-sectional geometry, is highly adaptable for bending—especially when bending is performed in the field.

Both single- and double-ended WATRODs share many construction features that deliver long life—the resistance wire is centered in the heater sheath and electrically insulated with compacted, high-grade magnesium oxide (MgO) for superior heating performance.

WATROD heating elements have a variety of mounting and termination options that make them highly popular among industrial customers.



A subsidiary of Watlow, Designer and Manufacturer of Industrial Heaters, Sensors and Controls  
 6 Industrial Loop Road  
 Hannibal, Missouri 63401 USA  
 Phone: 573-221-2816  
 Fax: 573-221-3723  
 Internet: [www.watlow.com](http://www.watlow.com)

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# W A T R O D

## Performance Capabilities

### Single-Ended WATROD

- Watt densities to 45 W/in<sup>2</sup> (6.9 W/cm<sup>2</sup>)
- UL® and CSA component recognition to 240VAC
- Incoloy and stainless steel sheath temperatures to 1200°F (650°C)

### Double-Ended WATROD

- Watt densities up to 120 W/in<sup>2</sup> (18.6 W/cm<sup>2</sup>)
- UL and CSA component recognition to 480 and 600VAC respectively
- Incoloy sheath temperatures to 1600°F (870°C)
- 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)

## Options

### Moisture Resistant Seals

WATROD's MgO insulating material is hygroscopic. To prevent moisture contamination from entering the heater, a standard silicone resin or optional RTV, epoxy resin or ceramic-to-metal seal is used.

### RTV (Silicone Rubber) Seal

The RTV seal is a 1/8 inch (3 mm) moisture barrier surrounding the terminal pin at the end of the sheath. This seal is effective to 400°F (205°C) continuous, or 500°F (260°C) intermittent.

### Epoxy Resin Seal

Recommended primarily for water applications, an epoxy resin seal is a 1/8 inch (3 mm) moisture barrier surrounding the terminal pin at the end of the sheath. This seal is effective to 250°F (120°C).

### Ceramic Base Seal

For high-temperature applications, a "durapot type" ceramic base seal offers moisture resistance up to 2800°F (1535°C).

### Ceramic-to-Metal End Seal

Ceramic-to-metal end seals with threaded stud terminations provide an air-tight seal for continuous terminal temperatures up to 500°F (260°C). Watlow does not recommend this seal if terminations are exposed to temperatures exceeding 500°F (260°C).

## External Finishes

### Belt Polishing

Belt polishing sands the oxidized sheath to a bright finish. This finish is available only on alloy sheath materials.

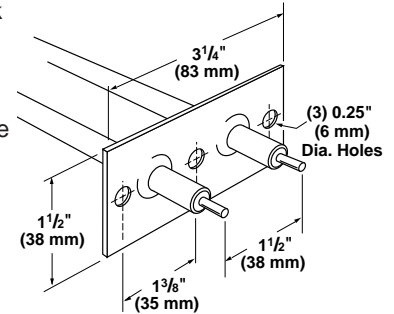
### Passivation

During the manufacturing process, particles of iron or tool steel may become embedded in the stainless steel or alloy sheath. If not removed, these particles may corrode, produce rust spots and/or contaminate the process. For critical sheath applications, passivation will remove free iron from the sheath.

## Mounting Methods

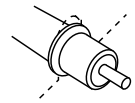
### Brackets

A 0.065 inch (1.7 mm) thick stainless steel bracket provides element mounting in non-pressurized applications. Attached to the heater sheath, these brackets are not suited for liquid-tight mountings. The bracket is located 1/2 inch (13 mm) from the sheath's end, unless otherwise specified.



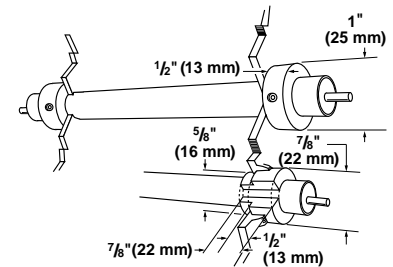
### Locator Washers

Stainless steel locator washers retain the heated area of the sheath in the work zone, while allowing for expansion and contraction during cycling.

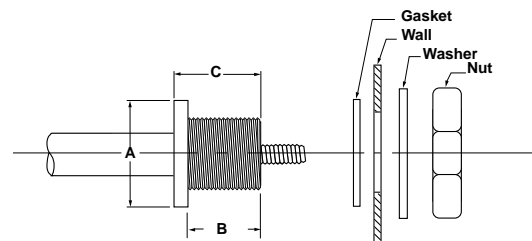


### Mounting Collars

Plated steel mounting collars secure the heater sheath with set screws to serve as adjustable stops for through-the-wall mounting. Collars are shipped in bulk.



### Water-Tight Bulkheads



A threaded bushing with flange on the heater sheath provides rigid, leak-proof mounting through the walls of tanks. A gasket, plated steel washer and hex nut are included. The threaded end of the bushing is flush with the sheath's end unless otherwise specified. Water-tight bulkheads are available in brass, steel or stainless steel.

# W A T R O D

## Single-Ended WATROD Application Hints

The single-ended WATROD heater's construction limits its usefulness in some applications. The following are some guides to follow when considering a single-ended WATROD.

- When single-ended termination simplifies application wiring.
- Your application requires lower wattage or a smaller package.
- Do not locate the end of the heated length within a bend, unless the radius is 3 inches (75 mm) or more. Field bending is not recommended.
- Ensure termination temperatures do not exceed 390°F (200°C) or the seal's maximum rating.
- Keep terminations clean, dry and tight.

## Ordering Information

### How to Order

Single- or Double-Ended WATROD

To order a stock, standard or assembly stock WATROD element, specify:

- Watlow code number (from Watlow Heater's Catalog)
- Volts/watts
- Termination options
- Options
- Quantity

If stock WATROD heaters do not meet your application needs, Watlow can provide a Made-to-Order unit. Please specify:

- Description of application, including heated material, operating temperature and flow rate, etc.
- Volts/watts
- Sheath material / diameter
- Sheath length
- Single- or double-ended
- Heated length
- No-heat length at each end
- Terminal pin length or termination options
- Moisture seal type
- Bend configuration, dimensions and critical tolerances (send drawing, if available)
- Options, including external finish and mounting method
- Quantity

## Availability

### Double-Ended WATROD

Straight Length Element

**Stock:** Same day shipment

**Modified Stock** (Stock units with catalog options):  
3-5 working days

**Standard:** 10 working days

**Made-to-Order:** 3 weeks

Formed Element

**Modified Stock** (Stock units with catalog options):  
5-7 working days

**Standard:** 3 weeks

**Made-to-Order:** 4-5 weeks

### Single-Ended WATROD

Straight Length Element

**Modified Stock** (Stock units with catalog options): 3 weeks

**Standard:** 3 weeks

**Made-to-Order:** 3 weeks

Formed Element

**Modified Stock** (Stock units with catalog options): 3 weeks

**Standard:** 3 weeks

**Made-to-Order:** 4-5 weeks

Options, complexity and quantity may affect availability and leadtimes. Consult factory.