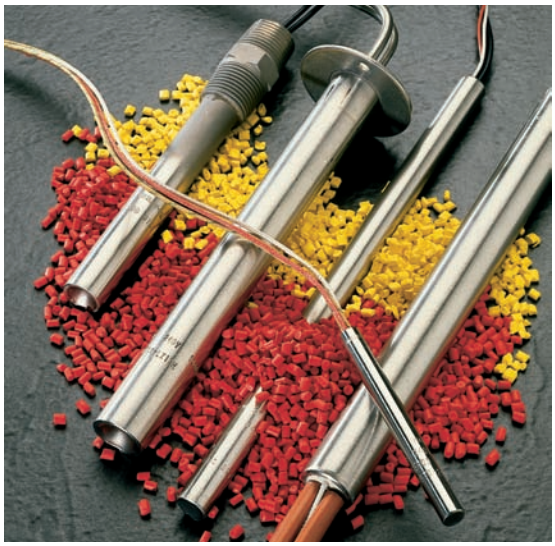
METRIC FIREROD® CARTRIDGE



Cartridge Heater Built to Meet The Specifications Of The Global Market

The Watlow FIREROD® not only sets the industry standard for cartridge heaters, it continues making improvements in construction and design. One improvement is the metric FIREROD. It is a variation of the FIREROD cartridge heater which was built to meet the exacting specifications of the global market.

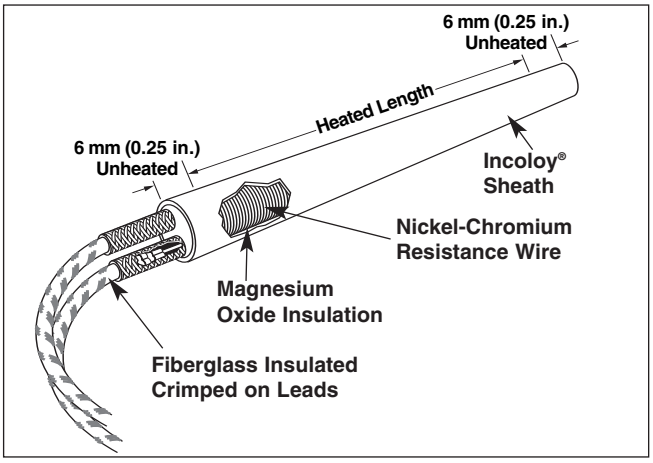
Like its counterpart, the metric FIREROD consistently outperforms other cartridge heaters because of its design solutions such as exclusive resistance wire winding process. Plus details, like bringing the resistance wire closer to the sheath and compacting the MgO insulation, maximize heat transfer. The end result is longer service life and better efficiency.

Performance Capabilities

- Part temperatures to 760°C (1400°F) on Incoloy® sheath
- Watt densities to 60 W/cm² (400 W/in²)

Applications

- Molds
- Dies
- Platens
- Hot plates
- Sealings



Features and Benefits

Nickel-chromium resistance wire precisely wound and centered in the unit

- Assures even, efficient distribution of heat to the sheath

Conductor pins metallurgically bonded to the resistance wire

- Ensures trouble-free electrical continuity

Magnesium oxide insulation of specific grain and purity swaged to the proper density

- Results in high dielectric strength and contributes to faster heat-up

Incoloy® sheath

- Resists oxidation and corrosion from chemicals, heat and atmospheres
- Able to withstand very high temperatures

Minimal spacing between element wire and sheath

- Results in lower internal temperature, providing the ability to design with fewer or smaller heaters that operate at higher watt densities
- Faster startup and longer life

Incoloy is a registered trademark of Special Metals Corporation.

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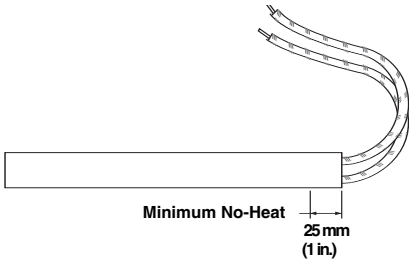
Termination Options

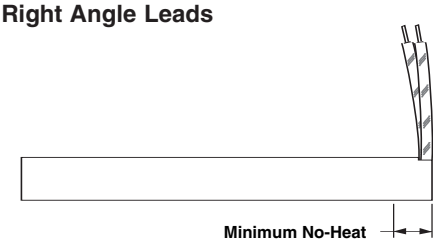
Swaged-In Flexible Leads



Swaged-in flexible leads, with a silicone-fiberglass insulation, are recommended for applications in which the leads must be bent at the exit point from the heater. Unless longer length is specified, 250 mm (10 inch) leads are supplied.

Heaters 150 mm (six inches) or shorter generally have a six mm (0.25 inch) no-heat section. Heaters to 250 mm (10 inches) require a 25 mm (one inch) no-heat section. Heaters greater than 250 mm (10 inch) will require more than a 25 mm (one inch) no-heat section.

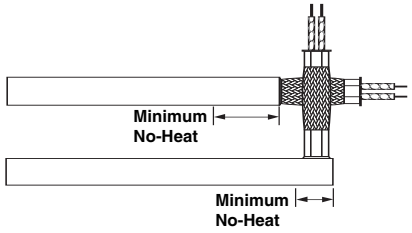
Right Angle Leads



Right angle leads are used in applications with space limitations. Lead wires exit at a 90 degree angle through the side of the heater sheath.

Metric FIREROD Diameter mm	Minimum No-Heat Length mm (inches)
6.5	11 (0.4375)
8.0	11 (0.4375)
10.0	13 (0.5)
12.5	16 (0.625)
16.0	19 (0.75)
20.0	22 (0.875)

Stainless Steel Braid



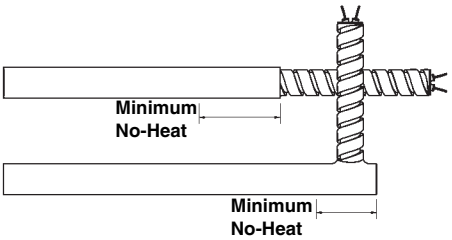
Stainless steel braid is designed to protect leads from abrasion against sharp edges. It is the most flexible of Watlow's protective lead arrangements.

When the leads exit straight out, the braid is swaged into the no-heat section of the heater. When the leads exit at a right angle, a crimp connector is used to attach the braids.

Unless otherwise specified, leads are 350 mm (14 inches) and the braid is 300 mm (12 inches) long.

Metric FIREROD Dia. mm	Min. No-Heat Length	
	Straight mm (inches)	Right Angle mm (inches)
6.5	29 (1.125)	14 (0.5)
8.0	29 (1.125)	14 (0.5)
10.0	38 (1.5)	16 (0.625)
12.5	38 (1.5)	17 (0.66)
16.0	38 (1.5)	22 (0.875)
20.0	38 (1.5)	30 (1.1875)

Stainless Steel Hose

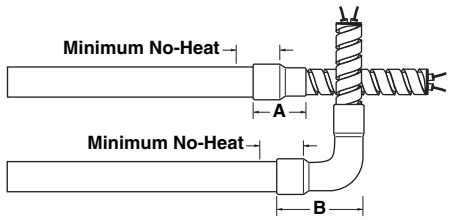


Stainless steel hose provides the best protection against abrasion from sharp edges or abrasive equipment. It's also easy to handle and can be wired in abrasive environments.

When the leads exit at a right angle to the heater, the hose is silver-soldered to the sheath. Unless otherwise specified, leads are 350 mm (14 inches) long and the hose is 305 mm (12 inches) long.

Metric FIREROD Diameter mm	Min. No-Heat Length		Stainless Steel Hose O.D. mm (inches)
	Straight mm (inches)	Right Angle mm (inches)	
6.5	29 (1.125)	14 (0.5)	5.6 (0.1875)
8.0	29 (1.125)	14 (0.5)	6.5 (0.25)
10.0	38 (1.5)	16 (0.625)	7.2 (0.3125)
12.5	38 (1.5)	17 (0.66)	9.5 (0.375)
16.0	38 (1.5)	22 (0.875)	12.7 (0.5)
20.0	38 (1.5)	30 (1.1875)	15.9 (0.625)

Galvanized Conduit



Metric FIREROD Diameter mm	Minimum No-Heat Length mm (inches)	Dimension A mm (inches)	Dimension B mm (inches)	Galvanized Conduit O.D. mm (inches)
6.5	12 (0.4375)	22 (0.875)	29 (1.125)	10 (0.375)
8.0	12 (0.4375	22 (0.875)	29 (1.125)	10 (0.375)
10.0	14 (0.5)	22 (0.875)	29 (1.125)	10 (0.375)
12.5	16 (0.625)	28 (1.125)	30 (1.1875)	14 (0.5)
16.0	19 (0.75)	28 (1.125)	34 (1.3125)	14 (0.5)
20.0	22 (0.875)	29 (1.125)	36 (1.4375)	16 (0.625)

Galvanized conduit equals stainless steel hose in its abrasion protection. The conduit is attached with 90 degree elbow copper coupler that overlaps the heater sheath.

Unless otherwise specified, 250 mm (10 inch) leads are supplied.

Teflon® Seal and Leads

Teflon® seal and leads protect the heater against moisture/contamination from lubricating oil, cleaning solvents, plastic material or fumes and organic tapes. This seal is effective to 200°C (400°F) under continuous operation.

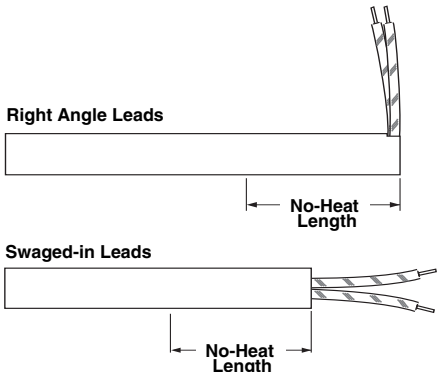
Please note, when ordering this option, that a 25 mm (one inch) minimum no-heat section is required to allow for construction. Additional no-heat may be required to keep the seal below effective temperatures.

Silicone Rubber Seals and Leads

Silicone rubber seal and leads protect the heater against moisture/contamination from lubricating oil, cleaning solvents, plastic material or fumes and organic tapes. This seal is effective to 150°C (302°F) under continuous operation.

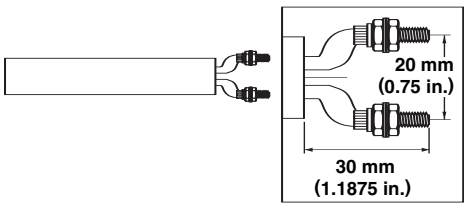
Please note, when ordering this option, that a 25 mm (one inch) minimum no-heat section is required to allow for construction. Additional no-heat may be required to keep the seal below effective temperatures.

No-Heat Section



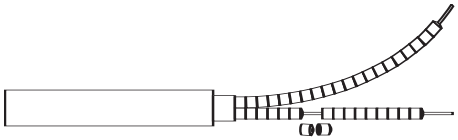
No-heat sections are recommended in applications where leads may be exposed to excessive heat, thus requiring a cooler lead end. Also use when heat is not required along the entire length of the metric FIREROD. Unheated extensions are available on all diameters with both pin style and swaged-in leads.

Post Terminals



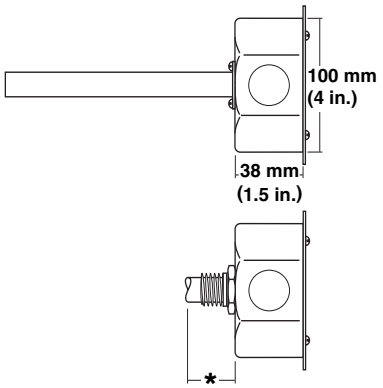
Post terminals provide a quick, secure connection with ring or fork connectors or bus bars. Threaded M4 x 12 mm (0.157 x 0.47 inch)studs are soldered to the solid power pins. Nuts and washers are provided. This termination is available on 16 mm (0.63 inch) and 20 mm (0.787 inch) diameter units.

Ceramic Bead Insulation



Ceramic bead insulation protects the leads from high ambient temperature above 450°C (840°F). The beads fit over solid conductors that are extended long enough to reach a cooler area where flexible wires can be attached.

Terminal Box



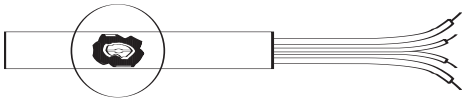
NEMA 1, NEMA 4 (moisture-proof) and NEMA 7 (explosion-proof) octagonal terminal boxes can be mounted to a flange or threaded fitting on the 12.5, 16 and 20 mm (0.49, 0.63 and 0.78 inch)diameter units. These 100 mm (four inch) terminal boxes have conduit knockouts to protect electrical connections.

Aluminum and macrolon plastic terminal boxes are also available in the following sizes:

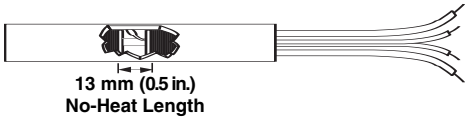
- 50 x 50 x 30 mm (1.96 x 1.96 x 1.18 inch) nominal size for heaters to 10 mm (0.39 inch) in diameter
- 80 x 80 x 55 mm (3.15 x 3.15 x 2.17 inch) nominal size for heaters 12.5 mm (0.49 inch) or larger in diameter

Internal Thermocouple

Style A

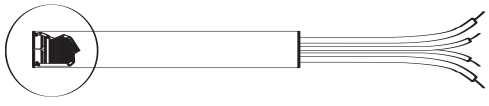


The Style A internal thermocouple can be used to evaluate heat transfer efficiency of an application ... a measure that enables you to cut energy costs and increase heater life. Measures heater part temperature.



Style B

The Style B internal thermocouple gives a good approximation of part temperature, thermocouple styles are all available in all diameters. The thermocouple junction may be in contact with the inside of the heater sheath, located in the 13 mm (0.5 inch) no-heat section anywhere along the heater length.



Style C

A Style C internal thermocouple is useful in applications where material flows past the end of the heater, as in plastic molding. This junction is embedded in a special end disc. Style C is not available on 20 mm (0.787 inch) diameter units.

How to Order

Metric FIREROD cartridge heaters are available as **made-to-order** units only. To order, please specify:

- Diameter
- Overall length
- Volts
- Watts
- Lead type and length or terminal configuration
- Options

Availability

Made-to-Order: Shipment within three weeks