Strip/Clamp-On Heaters

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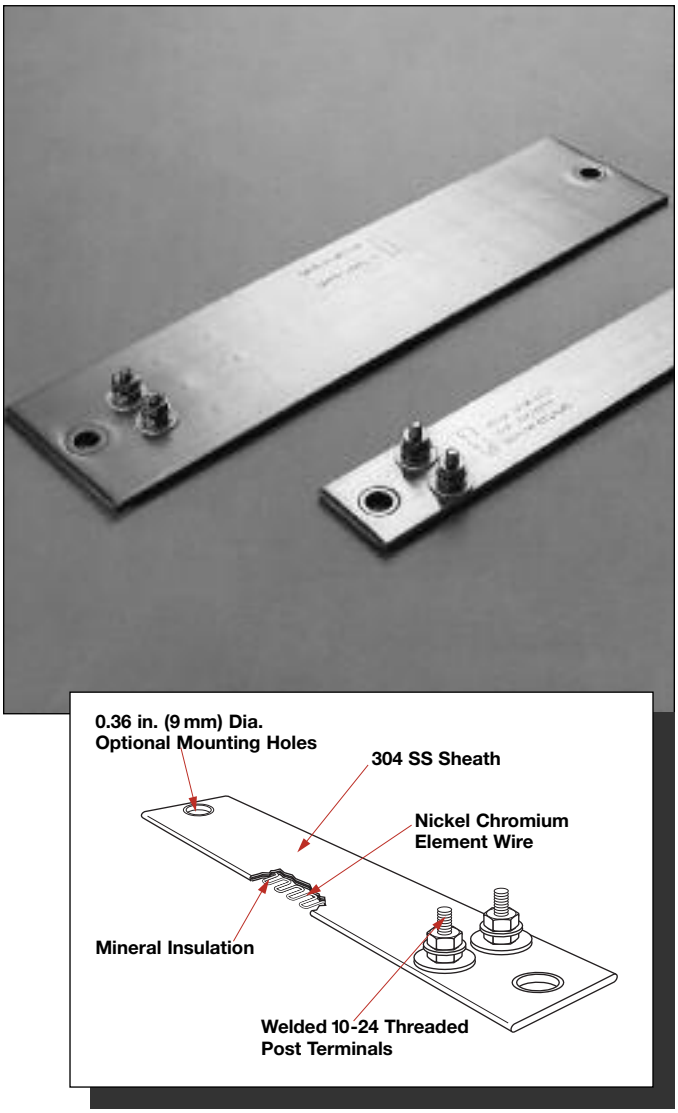
Mineral Insulated Strip Heaters

The Mineral Insulated (MI) strip is a thin, responsive heater setting unmatched standards for performance and durability. It makes use of the most advanced heater construction techniques, including embedding a nickel-chromium element wire in an exclusive mineral insulation from Watlow®. This thin layer of insulation brings the element wire closer to the heater sheath, resulting in easy heat flow from the element wire to the sheath. This allows the wire to run cooler than conventional heaters.



Performance Capabilities

- Sheath temperatures to 1400°F (760°C)
- Watt densities to 100 W/in² (15.5 W/cm²)
- Max. voltage 480V~(ac)

Features and Benefits

Higher watt densities more than any other strip heater

- Provides faster heat up

Exclusive mineral insulation

- Combines dielectric strength and superior thermal conductivity
- Transfers heat rapidly to the sheath

304 stainless steel sheath

- Maintains the high compaction of mineral insulation
- Produces a rigid heater

UL® component recognition

- Available for most 250V~(ac) or less designs
- UL® File #E52951

Applications

- Solder pots
- Zinc die-casting equipment
- Die and mold heating
- High-temperature resins
- Tank and platen heating
- Ovens
- Packaging equipment

Quick Ship

- *Same day shipment on all stock units.*

Mineral Insulated Strip Heaters

Applications and Technical Data

Calculating Watt Density

Watt density is the amount of wattage per square inch of heated area. To determine watt density, divide the total wattage by the heated area.

$$\text{Watt Density} = \frac{\text{Total Watts}}{\text{Heated Area}}$$

To apply this equation, we must define the term "heated area." Heated area is the total contact surface of the heater less areas of no-heat found around terminals, mounting holes, etc.

Heated Area = Total Contact Area - No-Heat Area

To calculate the heated area:

1. Locate the **no-heat factor** from the chart below that corresponds to the type of heater being considered.
2. To use the formula below, insert the no-heat factors, length and width (in inches).

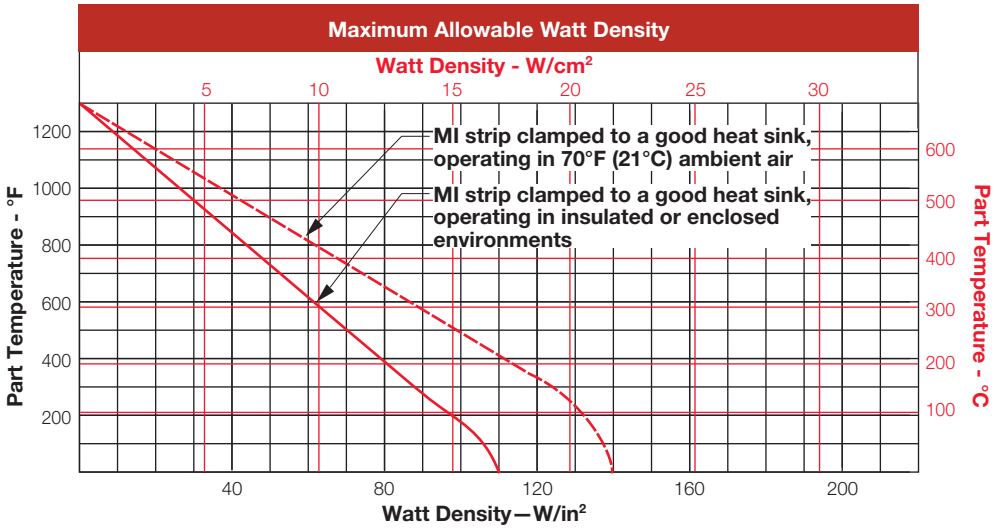
Heated Area = (Heated Length - No-Heat Factor) x Width

Type	Factor (in.)
1 in. Wide	
1 in. wide post terminal 1 on 1	1.75
1 in. wide post terminal 1 on 1 with mounting holes	3.00
1 in. wide post terminal 2 on 1	1.93
1 in. wide post terminal 2 on 1 with mounting holes	3.93
For all other widths	
2 on 1 post terminal	1.18
2 on 1 with mounting holes	3.18

Calculating Watt Density

The drawings on the next page and the graph on this page will help select the correct watt density for a particular application. First, refer to the drawings to determine the heated area of the heater. Then, use the watt density formula and graph to make sure the maximum watt density of the heater will not be exceeded in the specific application.

$$\text{Watt Density} = \frac{\text{Wattage}}{\text{Heated Area}}$$



Mineral Insulated Strip Heaters

Applications and Technical Data *(Continued)*

Specifications

Width

- 1, 1½ and 2 in. (25, 38, 51 mm), Tolerance ±1/32

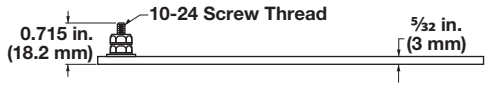
Length

- 8 to 30 in. (203 to 762 mm), Tolerance ±⅛

Terminations

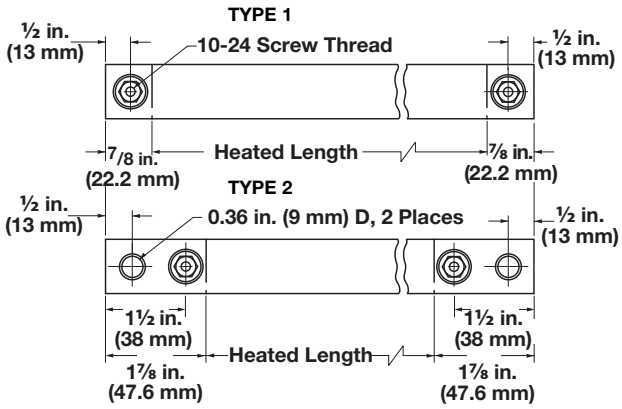
- 1 in. (25 mm) wide—post terminals one-on-one
  1½ to 2 in. (38 to 51 mm)—post terminals two-on-one

All Widths

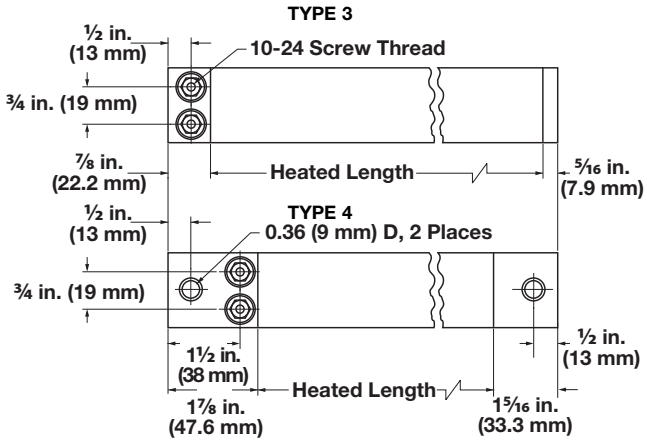


Note: In most applications mounting holes alone will not provide adequate clamping. A clamp bar should be used for each 4 in. (102 mm) of heater length.

1 in. (25 mm) Wide



1½ in.–2 in. (38 – 51 mm) Wide



Stock Heater Code Numbers (Parallel Terminals) Type 3 and 4

Width in.	Width (mm)	Length in.	Length (mm)	Volts	Power (Watts)	Watt Density W/in²	Watt Density (W/cm²)	Approx. Net Wt. lbs.	Approx. Net Wt. (kg)	Type	Code Number
1½	(38)	8	(203)	120	500	48	(7.4)	0.3	(0.15)	3	**MS1J8AS1**
1½	(38)	8	(203)	240	500	50	(7.8)	0.3	(0.15)	3	**MS1J8AS3**
1½	(38)	12	(305)	120	350	26	(4.0)	0.5	(0.2)	4	**MS1J12AV2**①
1½	(38)	12	(305)	240	350	26	(4.0)	0.5	(0.2)	4	**MS1J12AV3**①
1½	(38)	12	(305)	120	800	49	(7.6)	0.5	(0.2)	3	**MS1J12AS1**
1½	(38)	12	(305)	240	800	49	(7.6)	0.5	(0.2)	3	**MS1J12AS2**
1½	(38)	18	(457)	120	1000	40	(6.2)	0.8	(0.3)	3	**MS1J18AS1**
1½	(38)	18	(457)	240	1000	40	(6.2)	0.8	(0.3)	3	**MS1J18AS2**

① Denotes units with mounting holes. Mounting holes are 0.36 in. (9 mm) in diameter, and are intended for use with ¼ in. (6 mm) bolts. Centers of mounting holes are located ½ in. (13 mm) from the ends of the heater.
Note: Type 1 and 2 are made-to-order only.

Mineral Insulated Strip Heaters

Ordering Information

How to Order

Please specify:

- Watlow code number
- Overall dimensions: length and width
- Wattage: see *Maximum Allowable Watt Density* graph
- Termination type: parallel or one-on-one
- Mounting holes, if desired
- Quantity

If stock units do not meet specific application needs, Watlow can manufacture MI strip heaters to meet special requirements.

Availability

Stock: Same day shipment

Made-to-Order: Contact your Watlow representative

Mica Strip Heaters

The Watlow® mica strip heater is an economical and reliable source of heat for industrial equipment. A mica insulator on both sides of the resistance element provides complete electrical insulation and offers little resistance to efficient heat flow. Plus, mica withstands high voltage spikes, resists moisture and is inert to most chemicals.

Performance Capabilities

- Sheath temperatures of 900°F (480°C) on stainless steel units
- Watt densities to 45 W/in² (6.9 W/cm²)
- Maximum voltage 480V~(ac)

Features and Benefits

Low mass construction
- Heats up faster to provide quick response to control output

Flat resistance ribbon
- Generates heat over a broad area
- Puts the heat source closer to the work

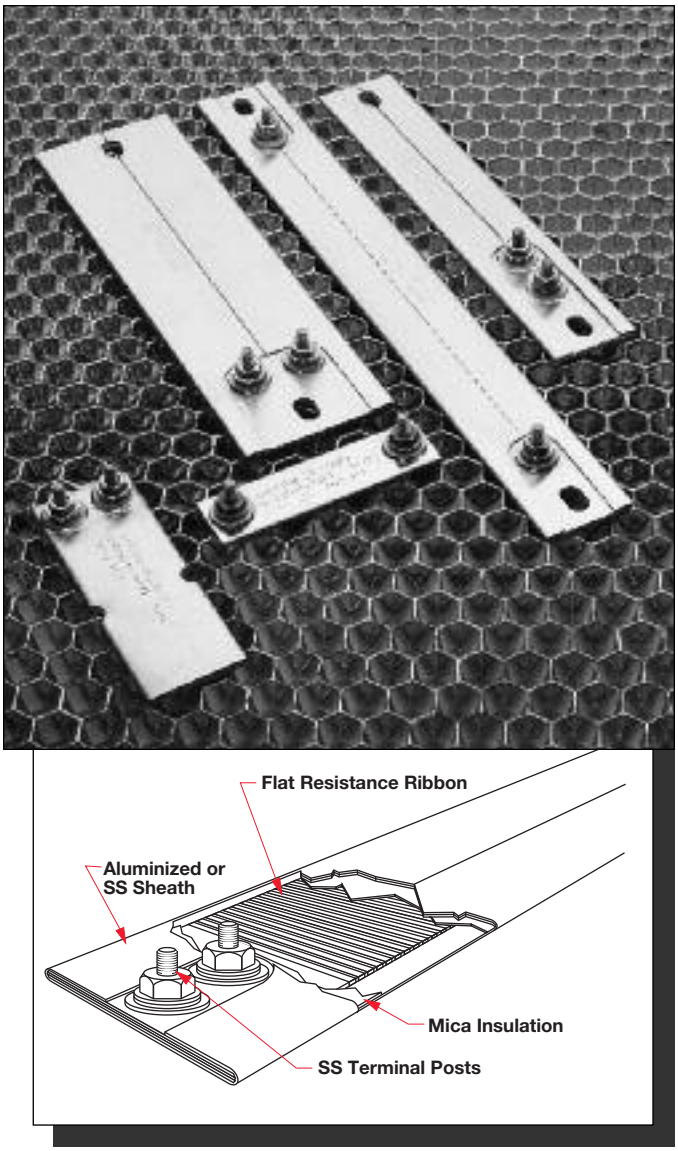
Aluminized steel or stainless steel sheath material
- Resists corrosion at high temperatures

Stainless steel terminal posts are securely riveted
- Ensures a positive, trouble-free connection to the resistance circuit

Computer-aided design engineering
- Ensures the best combination of ribbon gauge, total wattage and winding spacing
- Maximizes heat transfer and life of heater

Quality control inspection for all incoming mica
- Guarantees excellent dielectric strength

UL® component recognition
- Available for applications to 900°F (480°C) sheath temperature
- UL® File #E52951



Applications

- Vulcanizing presses
- Sealing equipment
- Hot plates
- Hot stamping
- Die and mold heating
- Thermoforming
- Tin melting
- Packaging equipment

Quick Ship

- *Same day shipment on all stock units*

Mica Strip Heaters

Applications and Technical Data

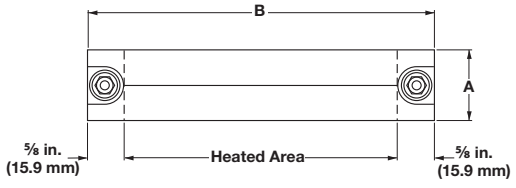
Physical Limitations of Lead Variations

Heater Type	Width				Length			
	Min.		Max.		Min.		Max.	
	in.	(mm)	in.	(mm)	in.	(mm)	in.	(mm)
Post Terminal								
Type 1 - Opposite ends	⅝	(15.9)	15	(381)	2	(51)	96①	(2438)
Type 2 - Tandem	⅝	(15.9)	15	(381)	2	(51)	96①	(2438)
Type 3 - Parallel	1½	(38)	15	(381)	2	(51)	96①	(2438)
Type 4 - Opposite ends with holes	⅝	(15.9)	15	(381)	5½	(140)	96①	(2438)
Type 5 - Tandem with holes	⅝	(15.9)	15	(381)	5½	(140)	96①	(2438)
Type 6 - Parallel with holes	1½	(38)	15	(381)	5½	(140)	96①	(2438)
Leads								
Type C, E. F, H	1	(25)	15	(381)	5½	(140)	96①	(2438)
Type K								
without mounting holes	1	(25)	15	(381)	5½	(140)	96①	(2438)
with mounting holes	1½	(38)	15	(381)	5½	(140)	96①	(2438)
European Plug								
Vertical	1	(25)	15	(381)	5½	(140)	96①	(2438)
Horizontal	2½	(64)	15	(381)	6¼	(159)	96①	(2438)
Three-Phase	3	(76)	15	(381)	5½	(140)	96①	(2438)
Dual Voltage	3	(76)	15	(381)	5½	(140)	96①	(2438)
Terminal Box②								
Type 2 - Tandem	1½	(38)	15	(381)	4¼	(108)	96①	(2438)
Type 3 - Parallel	2½	(64)	15	(381)	4¼	(108)	96①	(2438)
Type 5 - Tandem with holes	1½	(38)	15	(381)	6¼	(159)	96①	(2438)
Type 6 - Parallel with holes	2½	(64)	15	(381)	6¼	(159)	96①	(2438)

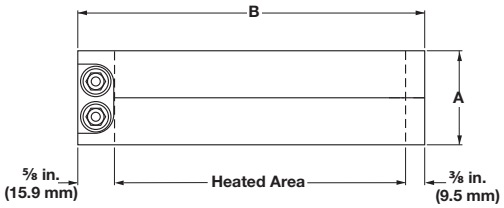
① Contact your Watlow representative if you need to exceed 96 in. (2438 mm).
② Not available on stock heaters.

Note: Some combinations of maximum and minimums cannot occur on the same heater.

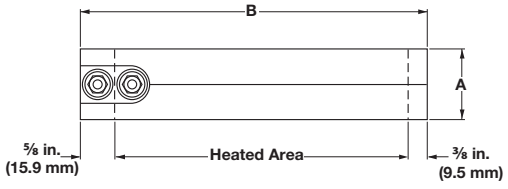
Type 1—Opposite Ends



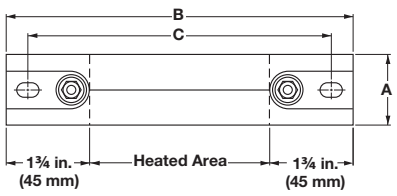
Type 3—Parallel



Type 2—Tandem



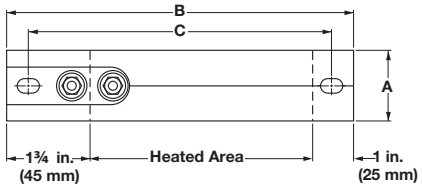
Type 4—Opposite Ends with Holes



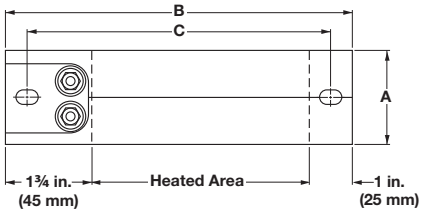
Mica Strip Heaters

Applications and Technical Data *(Continued)*

Type 5—Tandem with Holes



Type 6—Parallel with Holes



Terminations

Types 1 through 6, as illustrated, show the placement of terminals for Watlow mica strip heaters. Placement is specified in terms of length, width and center-to-center dimensions. These dimensions are as follows:

Length: tolerance ±1/16 in. (1.6 mm)
Width: tolerance ±1/16 in. (1.6 mm)
Thickness: nominal 3/16 in. (4.8 mm)

Types 4, 5 and 6 have 3/8 in. x 1/4 in. (9.5 mm x 6 mm) mounting slots. Letters A, B and C called out in the illustrations, denote the following:

A = width, B = overall length and
C = center-to-center dimensions on mounting slots

Calculating Watt Density

Watt density is the amount of wattage per square inch of heated area. To determine watt density, divide the total wattage by the heated area.

$$\text{Watt Density} = \frac{\text{Total Watts}}{\text{Heated Area}}$$

To apply this equation, we must define the term “heated area.” Heated area is the total contact surface of the heater less areas of no-heat found around terminals, mounting holes, etc.

Heated Area = Total Contact Area - No-Heat Area

To calculate the heated area:

Heated Area = (Length - No-Heat Area) x Width

Mica Strip Heaters

Applications and Technical Data *(Continued)*

Maximum Allowable Watt Density

The following derating factors are applicable to the *Maximum Allowable Watt Density* graph. Please review these factors and the graph to determine the maximum watt density for the application.

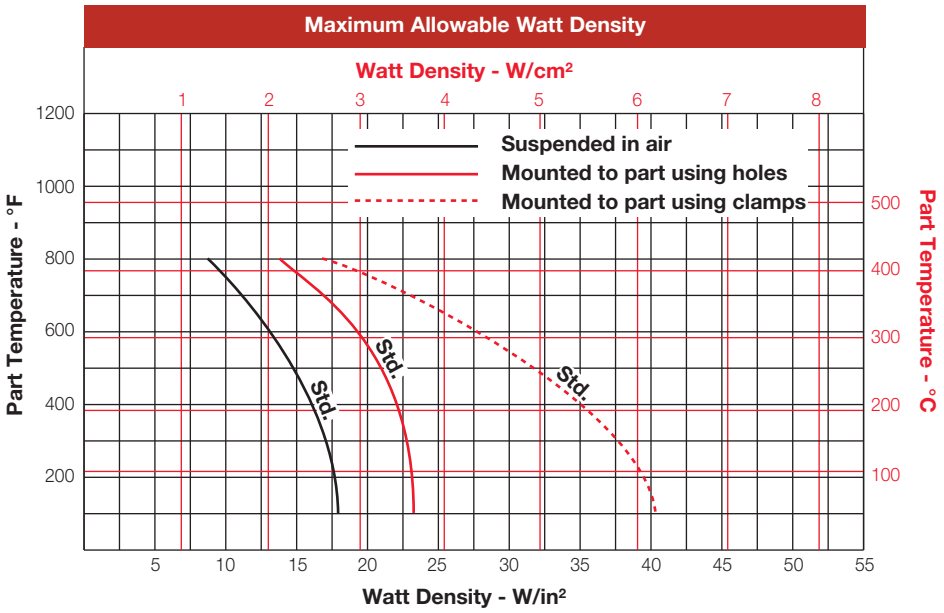
Derating Factors:

- For heaters mounted less than 1 in. (25 mm) apart on a metal part, derate by 5 percent.
- For heaters mounted within 3 in. (76 mm) of a reflective surface, derate by 10 percent.
- For heaters mounted 2 to 6 in. (51 to 152 mm) apart and radiating toward each other, derate by 10 percent.
- For heaters mounted within 1 in. (25 mm) of a reflective surface, derate by 20 percent.
- For heaters mounted less than 2 in. (51 mm) apart and radiating toward each other, derate by 20 percent.
- For termination Types 2 and 5 as well as lead Types C, E, H and K vertical (see illustrations on pages 558 to 562) that are less than 2 in. (51 mm) wide, derate as follows: aluminized steel units by 10 percent and stainless steel units by 20 percent.

Application Hints

To maximize the performance of a mica strip heater, ensure:

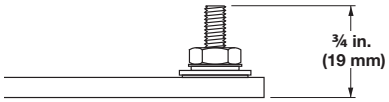
- Small heaters with 5 in² (32.3 cm²) or less of heated area are 120V~(ac). These heaters can be wired in series for a 240V~(ac) power supply.
- The surface to be heated is clean and smooth, so that heat is transferred efficiently. Even small air gaps can cause hot spotting.
- Terminal post nuts are not overly tightened. Although the posts are securely riveted to the elements, excessive torque could break the connection.



Mica Strip Heaters

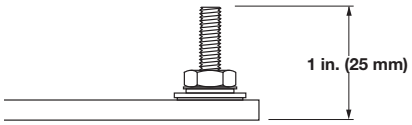
Termination Options

Post Terminals (Standard)



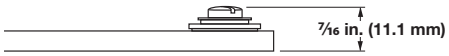
Post terminals have a threaded length of 7⁄16 in. (11.1 mm) and require approximately ¾ in. (19 mm) clearance. Specify **standard terminals** when ordering.

Long Terminals



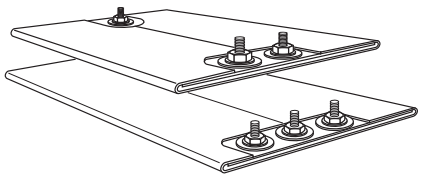
Longer terminals with 11⁄16 in. (17.5 mm) threaded lengths are available and require approximately 1 in. (25 mm) clearance. Specify **long terminals** when ordering.

Button Terminals



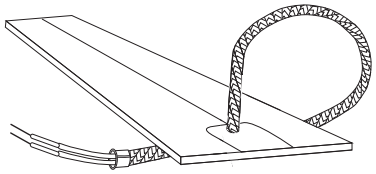
The slotted screw head terminals require only 7⁄16 in. (11.1 mm) clearance. Specify **button terminals** when ordering.

Three Terminal Construction



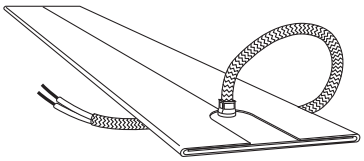
A third terminal can be added to provide dual voltage or three-heat operation. Or, it can be connected to the sheath for easy grounding. Specify **dual voltage** or **three-heat operation** when ordering.

Type E—Loose Metal Braided Leads



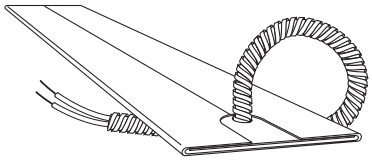
Loose metal braid encloses two fiberglass leads for good abrasion protection, lead flexibility and wiring convenience. Leads are 2 in. (51 mm) longer than the braid. To order, specify **Type E** and **length**.

Type C—Metal Overbraid Leads



Each fiberglass-insulated lead wire exits in a single metal braid from the back of the heater. This arrangement offers abrasion protection, lead flexibility and convenient wiring for a neat installation. Minimum heater length is 5½ in. (140 mm). Specify **Type C** and **length** when ordering. Leads are 2 in. (51 mm) longer than braid.

Type H—Flexible Steel Hose Leads (Vertical)



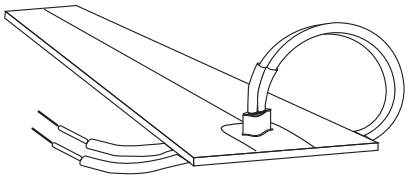
Galvanized, flexible steel hose leads give superior mechanical protection where lead abrasion is a particular problem. Minimum heater length is 5½ in. (140 mm). Specify **Type H** and **lead length** when ordering. Leads are typically 2 in. (51 mm) longer than hose.

Mica Strip Heaters

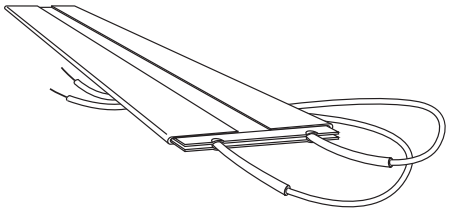
Termination Options *(Continued)*

Type K—Flexible Leads

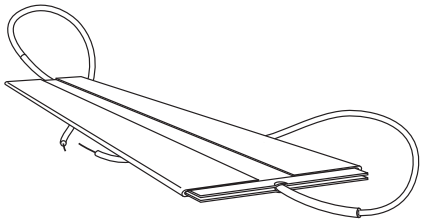
Type K has two fiberglass-insulated leads. These leads can exit one at each end or both at the same end, so please specify end termination when ordering. Type K is suitable for applications where lead abrasion is not a problem. Specify **Type K orientation** and **length** when ordering.



Two-on-One (Vertical)



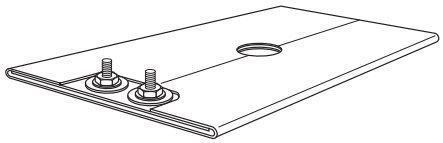
Two-on-One (Horizontal)



One-on-One (Horizontal)

Options

Holes or Slots

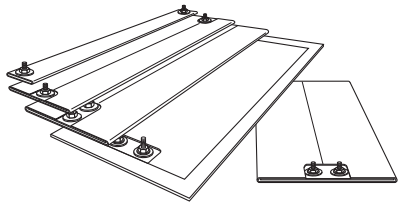


When required for instrumentation or mounting, holes or slots may be provided as a manufactured variation in nearly any location as long as there is at least 1 in. (25 mm) between the edge of the hole and one side of the heater. Dimensional drawing is required when ordering.

Distributed Wattage

A mica strip heater can be designed with varying heat profile along the length for uneven heat distribution.

Widths



The 1½ in. (38 mm) wide heater is the most efficient size due to its maximum clamping effect. Heaters are available in widths from ⅝ in. (15.9 mm) to 24 in. (610 mm).

Heaters 5 in. (127 mm) wide and greater are constructed with end folds and a reinforcement shim rather than full folds. Units less than 1⅜ in. (34.9 mm) wide have the sheath seam on the side opposite the terminals.

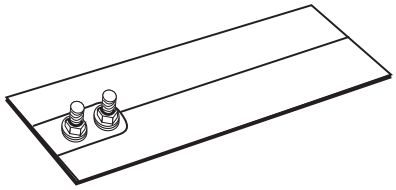
Open Element

This economical heater design without the metal case is commonly used in laminating machines. The heater assembly is sandwiched between machine parts, eliminating the need for additional and expensive metal cases.

Mica Strip Heaters

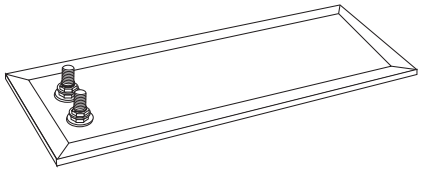
Options *(Continued)*

Butt Case



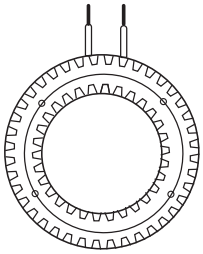
Recommended for heating applications where a strip heater will be placed in a milled slot between two steel plates. Specify **butt case** construction when ordering.

Four Sides Closed



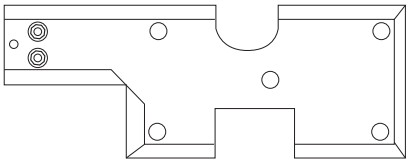
Mica strip heaters can be closed on all four sides to prevent contamination. Standard on strip heaters 5 in. (127 mm) wide and greater.

Ring Heaters



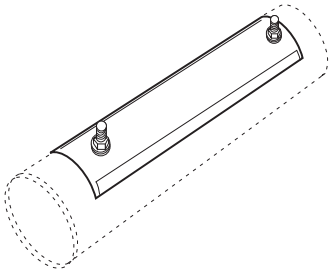
When ordering ring heaters, specify **inside** and **outside diameters**. If mounting holes are required, specify location and hole size.

Irregular Shapes



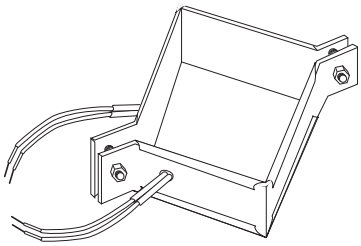
Mica strip heaters can be made into any practical shape and electrical rating. Examples include: cone, flat circular, square, rectangular and hexagon.

Cross Section Formed



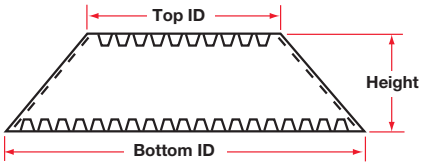
Strip heaters can be formed on a cross section for piping applications. Specify diameter of pipe on which heaters are to be mounted.

Square, Rectangular Bands



Square or rectangular heaters are normally used for heating dies on plastic extruders or the barrels of twin screw extruders. These can be made in either one- or two-piece construction (see illustration).

Cone Shapes



Cone shaped heaters are normally used for special heating applications when heat is required for hoppers or funnels. They are made strictly to customer specifications. The preferred method of attachment is with bent-up flange clamping.

Mica Strip Heaters

Options *(Continued)*

Clamping Styles

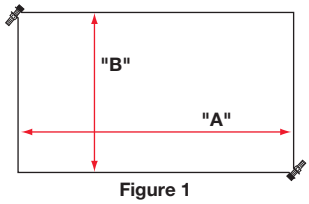


Figure 1

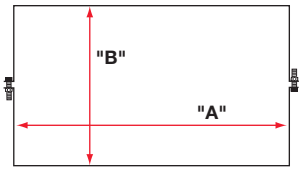


Figure 2

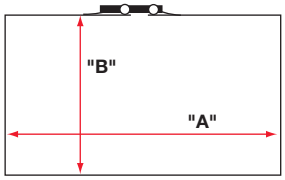
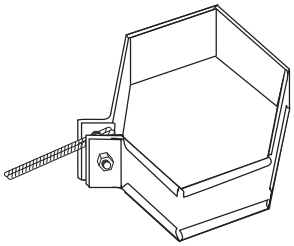


Figure 3

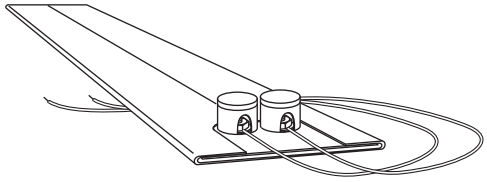
Referring to the illustrations, the preferred design is Figure 1, with bent-up flange clamping, due to the uniform applied clamping force at the corners. Next is Figure 2, with bent-up flanges or built-in strapping brackets at the sides. The least preferred design is Figure 3, one-piece heater, due to the lack of uniform applied clamping force.

Hex Bands



Hex shaped heaters are used on the hex shaped portion of the nozzle on injection molding machines. A drawing is required when ordering.

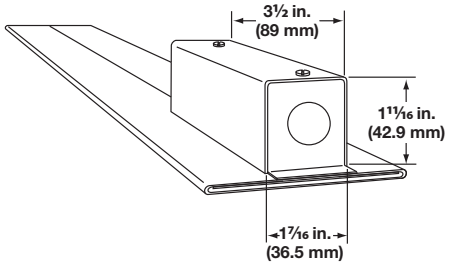
Ceramic Terminal Covers



Ceramic terminal covers are a convenient, economical way to provide safety. Covers are sized for standard 7⁄16 in. (11.1 mm) long post terminals requiring approximately ¾ in. (19 mm) clearance.

The clearance, with ceramic cover cap, is 0.91 in. (23.1 mm). Excluding the thickness of the heater, the clearance is 0.75 in. (19 mm). Screw thread size is 10-24. To order, specify Watlow code number **Z-4918** and quantity.

Metallic Terminal Box



A high quality metallic terminal box is welded to the heater sheath. Units with tandem terminals must be at least 1½ in. (38 mm) wide. Units with parallel terminals must be at least 4¼ in. (108 mm) wide. Minimum length is 4¼ in. (108 mm) without mounting holes or 6¼ in. (159 mm) with holes. When ordering specify, **terminal box.**

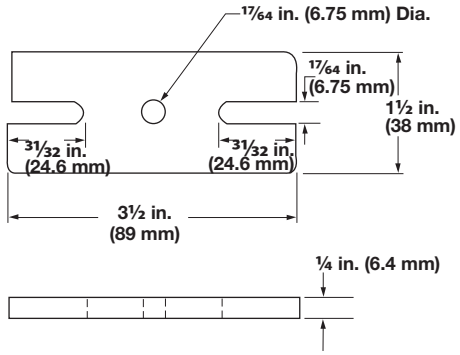
Note: Complex configurations may require design charges or minimum quantities. Use stock or standard products if possible.

Mica Strip Heaters

Accessories

Clamping Bars

For maximum life and efficient operation, strip heaters must be firmly clamped to the part being heated. Clamping bars 3½ in. (89 mm) wide can be used to clamp strips with a maximum width of 3 in. (76 mm). Watlow recommends clamping every 6 in. (152 mm). Specify code number **MB101-1** and quantity when ordering clamping bars.



Stock Heater Code Numbers

Width in. (mm)	Overall Length in. (mm)	Type	Center-to-Center Mtg Holes in. (mm)	Volts	Power (Watts)	Watt Density W/in.² (W/cm²)	Approx. Net Wt. lbs (kg)	Avail.	Code Number
1 (25)	3½ (89)	1	— —	120	50	22 (3.4)	0.09 (0.04)	Stock	**S1A3JP1**
	6 (152)	1	— —	120	100	21 (3.3)	0.17 (0.08)	Stock	**S1A6AP1**
	6 (152)	1	— —	240	100	21 (3.3)	0.17 (0.08)	Stock	**S1A6AP2**
	12 (305)	4	11 (279)	120	175	21 (3.3)	0.33 (0.15)	Stock	**S1A12AT1**
	12 (305)	4	11 (279)	240	175	21 (3.3)	0.33 (0.15)	Stock	**S1A12AT2**
	6 (152)	5	5¼ (133)	120	100	20 (3.1)	0.17 (0.08)	Stock	**S1A6AU1②**
1½ (38)	18 (457)	1	— —	120	750	30 (4.6)	0.75 (0.34)	Stock	**S1J18AP1**
	6 (152)	2	— —	120	250	33 (5.1)	0.25 (0.11)	Stock	**S1J6AR1**
	8 (203)	2	— —	120	400	37 (5.7)	0.33 (0.15)	Stock	**S1J8AR1**
	8 (203)	2	— —	240	400	37 (5.7)	0.33 (0.15)	Stock	**S1J8AR2**
	12 (305)	2	— —	120	500	30 (4.6)	0.50 (0.23)	Stock	**S1J12AR1**
	12 (305)	2	— —	240	500	30 (4.6)	0.50 (0.23)	Stock	**S1J12AR2**
	14 (356)	2	— —	120	500	25 (3.9)	0.58 (0.26)	Stock	**S1J14AR1**
	14 (356)	2	— —	240	500	25 (3.9)	0.58 (0.26)	Stock	**S1J14AR2**
	18 (457)	2	— —	120	800	31 (4.8)	0.75 (0.34)	Stock	**S1J18AR1**
	18 (457)	2	— —	240	800	31 (4.8)	0.75 (0.34)	Stock	**S1J18AR2**
	24 (610)	2	— —	120	1000	29 (4.5)	1.00 (0.45)	Stock	**S1J24AR1**
	24 (610)	2	— —	240	1000	29 (4.5)	1.00 (0.45)	Stock	**S1J24AR2**
	8 (203)	4	7 (178)	120	150	22 (3.4)	0.33 (0.15)	Stock	**S1J8AT1**
	12 (305)	4	11 (279)	120	250	20 (3.1)	0.50 (0.23)	Stock	**S1J12AT1**
	12 (305)	4	11 (279)	240	250	20 (3.1)	0.50 (0.23)	Stock	**S1J12AT2**
	18 (457)	4	17 (432)	240	500	23 (3.6)	0.75 (0.34)	Stock	**S1J18AT1**
	5½ (140)	5	4½ (114)	120	125	30 (4.6)	0.23 (0.11)	Stock	**S1J5JU1**
	7½ (191)	5	6½ (165)	120	150	21 (3.3)	0.32 (0.15)	Stock	**S1J7JU1**
	8 (203)	5	7 (178)	120	150	19 (2.9)	0.33 (0.15)	Stock	**S1J8AU1**
	8 (203)	5	7 (178)	240	150	19 (2.9)	0.33 (0.15)	Stock	**S1J8AU2**
	8 (203)	5	7 (178)	120	175	22 (3.4)	0.33 (0.15)	Stock	**S1J8AU3**
	8 (203)	5	7 (178)	240	175	22 (3.4)	0.33 (0.15)	Stock	**S1J8AU4**
	8 (203)	5	7 (178)	120	250	32 (5.0)	0.33 (0.15)	Stock	**S1J8AU5**
	8 (203)	5	7 (178)	240	250	32 (5.0)	0.33 (0.15)	Stock	**S1J8AU6**

CONTINUED

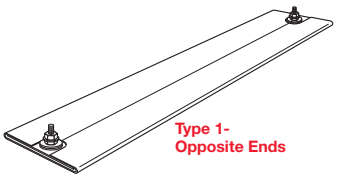
① Mounting slots on stock heaters are ½ x 5⁄16 in. (13 x 7.9 mm). On made-to-order units, mounting slots are ⅜ x ¼ in. (9.5 x 6 mm).
② This unit has ⅜ x ¼ in. (9.5 x 6 mm) mounting holes.

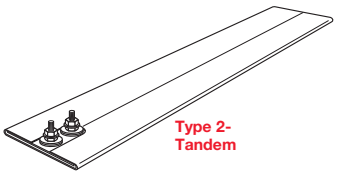
Mica Strip Heaters

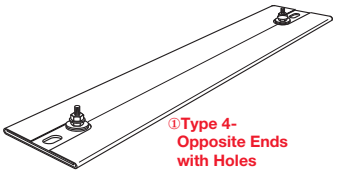
Stock Heater Code Numbers *(Continued)*

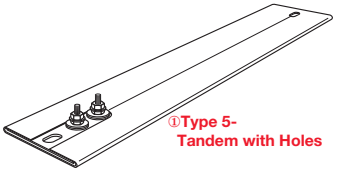
Width in.	(mm)	Overall Length in.	(mm)	Type	Center-to-Center Mtg Holes in.	(mm)	Volts	Power (Watts)	Watt Density W/in.²	(W/cm²)	Approx. Net Wt. lbs	(kg)	Avail.	Code Number
1	(25)	10½	(267)	5	9½	(241.0)	120	250	22	(3.4)	0.42	(0.19)	Stock	**S1J10JU1**
		10½	(267)	5	9½	(241.0)	240	250	22	(3.4)	0.42	(0.19)	Stock	**S1J10JU2**
		12	(305)	5	11	(279.0)	120	250	18	(2.8)	0.50	(0.23)	Stock	**S1J12AU1**
		12	(305)	5	11	(279.0)	240	250	18	(2.8)	0.50	(0.23)	Stock	**S1J12AU2**
		12	(305)	5	—	—	120	150	11	(1.7)	0.50	(0.23)	Stock	**S1J12AU10**
		12	(305)	5	—	—	240	150	11	(1.7)	0.50	(0.23)	Stock	**S1J12AU11**
		15¼	(387)	5	14¼	(362.0)	240	500	27	(4.2)	0.63	(0.29)	Stock	**S1J15EU1**
		17⅞	(454)	5	16⅞	(428.6)	120	375	17	(2.6)	0.75	(0.34)	Stock	**S1J17RU1**
		17⅞	(454)	5	16⅞	(428.6)	120	500	22	(3.4)	0.75	(0.34)	Stock	**S1J17RU2**
		17⅞	(454)	5	16⅞	(428.6)	240	500	22	(3.4)	0.75	(0.34)	Stock	**S1J17RU3**
		21	(533)	5	20	(508.0)	240	650	24	(3.7)	0.87	(0.39)	Stock	**S1J21AU1**
		23¾	(603)	5	22¾	(578.0)	120	500	16	(2.5)	0.99	(0.45)	Stock	**S1J23NU1**
		23¾	(603)	5	22¾	(578.0)	240	500	16	(2.5)	0.99	(0.45)	Stock	**S1J23NU2**
		23¾	(603)	5	22¾	(578.0)	120	750	24	(3.7)	0.99	(0.45)	Stock	**S1J23NU3**
		23¾	(603)	5	22¾	(578.0)	240	750	24	(3.7)	0.99	(0.45)	Stock	**S1J23NU4**
		25½	(648)	5	24½	(622.0)	240	650	19	(2.9)	1.10	(0.50)	Stock	**S1J25JU1**
		30½	(775)	5	29½	(749.0)	240	800	19	(2.9)	1.30	(0.59)	Stock	**S1J30JU1**
2½	(64)	6½	(165)	6	5½	(140.0)	120	225	24	(3.7)	0.45	(0.20)	Stock	**S2J6JV1**
		6½	(165)	6	5½	(140.0)	240	225	24	(3.7)	0.45	(0.20)	Stock	**S2J6JV2**
		8½	(216)	6	7½	(191.0)	120	350	24	(3.7)	0.59	(0.27)	Stock	**S2J8JV1**
		8½	(216)	6	7½	(191.0)	240	350	24	(3.7)	0.59	(0.27)	Stock	**S2J8JV2**
		25½	(648)	6	24½	(622.0)	120	1000	18	(2.8)	1.78	(0.81)	Stock	**S2J25JV1**
		25½	(648)	6	24½	(622.0)	240	1000	18	(2.8)	1.78	(0.81)	Stock	**S2J25JV2**

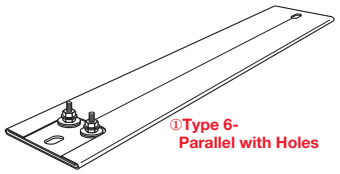
① Mounting slots on stock heaters are ½ x 5⁄16 in. (13 x 7.9 mm). On made-to-order units, mounting slots are ⅜ x ¼ in. (9.5 x 6 mm).
② This unit has ⅜ x ¼ in. (9.5 x 6 mm) mounting holes.


Type 1-
Opposite Ends


Type 2-
Tandem


①Type 4-
Opposite Ends
with Holes


①Type 5-
Tandem with Holes


①Type 6-
Parallel with Holes

How to Order

To order stock mica strip heater, specify:

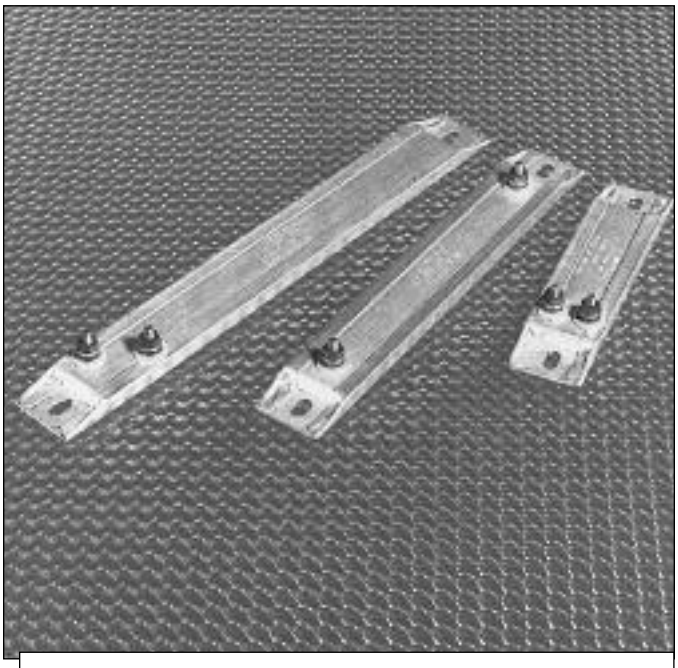
- Quantity
- Watlow code number

Availability

Stock: Same day shipment

Made-to-Order: If stock units do not meet application needs, Watlow can manufacture mica strip heaters to special requirements. Please contact your Watlow representative.

375 High-Temperature Strip Heaters



Named for its 0.375 in. (9.5 mm) thickness, the Watlow® 375 strip is a rugged heater capable of both high temperatures and high watt densities.

Its ruggedness comes from the design and use of choice materials. Watlow begins construction by accurately placing a coiled, nickel-chromium element wire in the center of the heater. The element wire is then embedded in MgO-based insulation compacted into a solid mass resulting in excellent heat conductivity and high dielectric strength. Finally, the heater is enclosed in aluminized steel sheathing.

Performance Capabilities

- Aluminized steel sheath temperatures to 1100°F (595°C)
- Stainless steel sheath temperatures to 1200°F (650°C)
- Watt densities to 120 W/in^2 (20.1 W/cm^2)
- UL® approved to 240V~(ac) (File No. E52951)
- CSA approved to 600V~(ac) (File No. LR7392)

Features and Benefits

Nickel-chromium element wire is centered in the heater
- Assures uniform heat

Aluminized steel sheath
- Operates at higher temperatures
- Resists corrosion better than iron-sheathed heaters

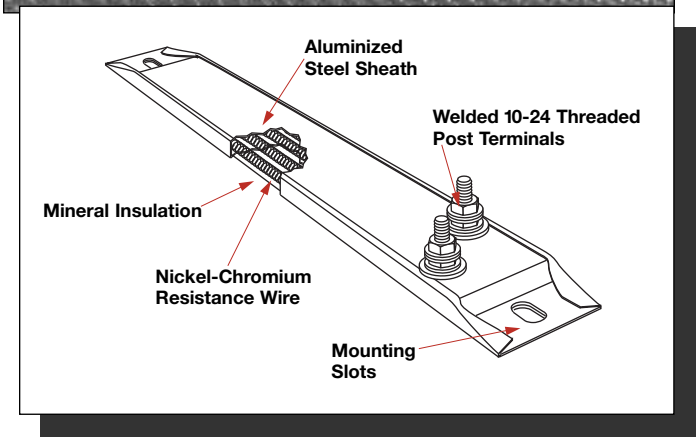
Optional 430 stainless steel sheath
- Available for applications where temperatures reach 1200°F (650°C)

Post terminals, welded to the element wire
- Produces strong, trouble-free connections

Rigid ⅜ in. (9.5 mm) thick design
- Enables the heater to fit into many existing applications

Over 100 in-stock models in popular sizes and ratings
- Allows next day shipment

Available dimensions are 1½ in. (38 mm) wide and 5½ to 48 in. (140 to 1219 mm) long
- Fits a variety of application needs



Applications

- Food warming
- Freeze and moisture protection
- Tank and platen heating
- Packaging
- Dies and mold heating
- Autoclaves
- Ovens
- Telecom

Quick Ship

• Next day shipment on all stock units.

375 High-Temperature Strip Heaters

Applications and Technical Data

Calculating Watt Density

Use the *Maximum Allowable Watt Density* graphs and formulas to ensure the allowable watt density for the heater will not be exceeded in your application. **Watt density is calculated for one side of the heater only.**

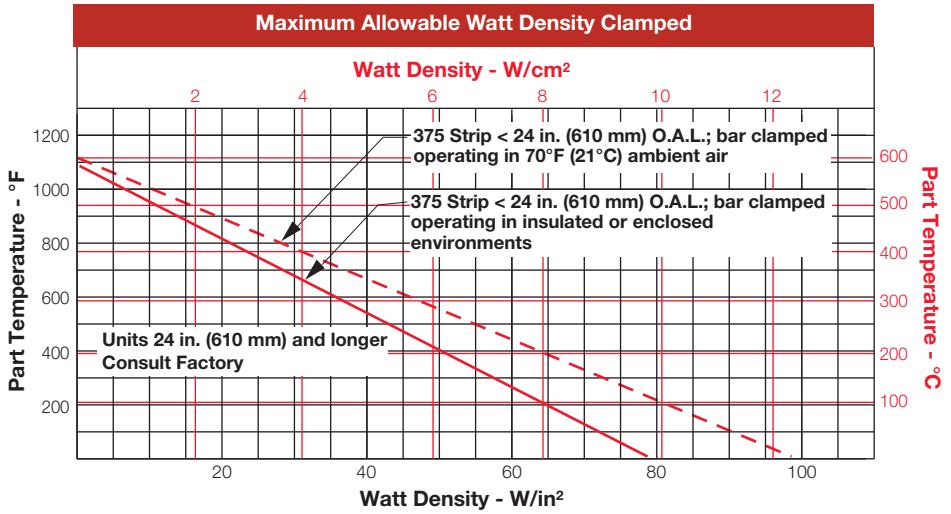
Formulas

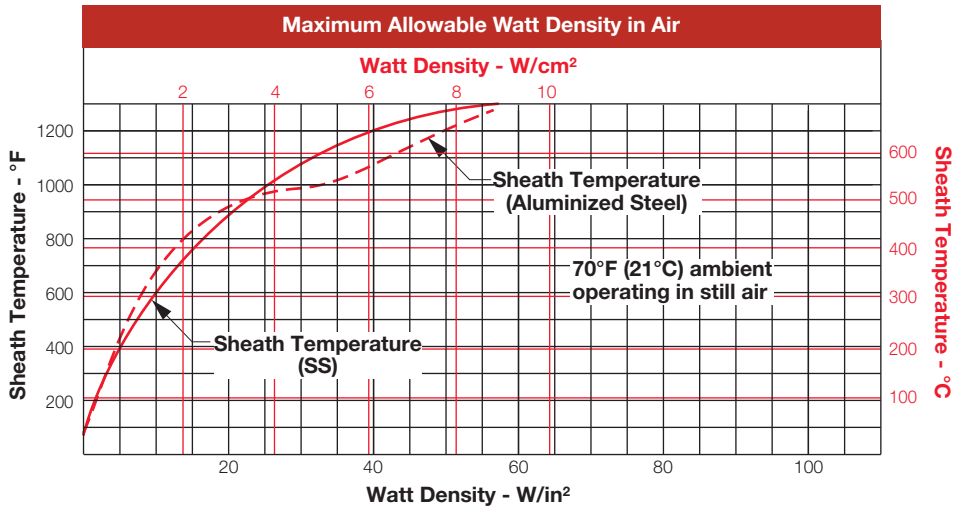
$$\text{Watt Density} = \frac{\text{Wattage}}{\text{Heated Area}}$$

Heated Area
(Offset Terminals) = [Overall Length (A) x 1.5 in] - 6 in^2
= [Overall Length (A) x 38 mm] - 38.7 cm^2

Heated Area
(Parallel Terminals) = [Overall Length (A) x 1.5 in] - 4.7 in^2
= [Overall Length (A) x 38 mm] - 30.3 cm^2

Heated Area
(One-on-One Terminals) = [Overall Length (A) x 1.5 in] - 6 in^2
= [Overall Length (A) x 38 mm] - 38.7 cm^2

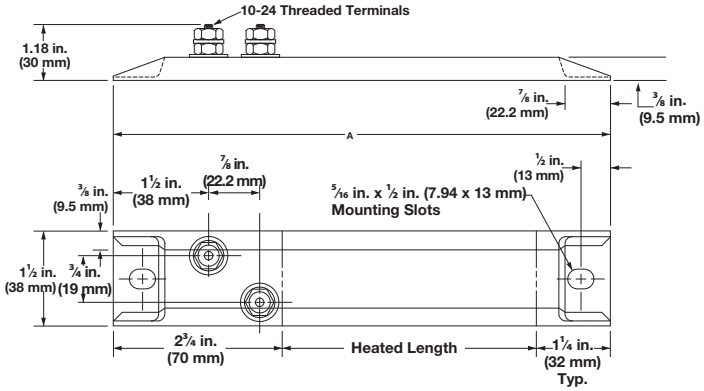




375 High-Temperature Strip Heaters

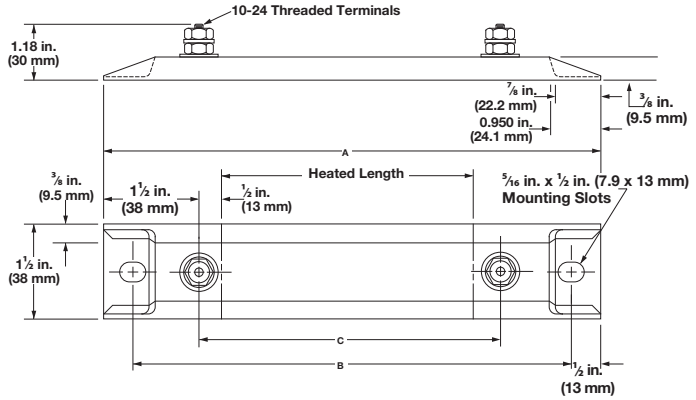
Termination Options

Offset Terminals*



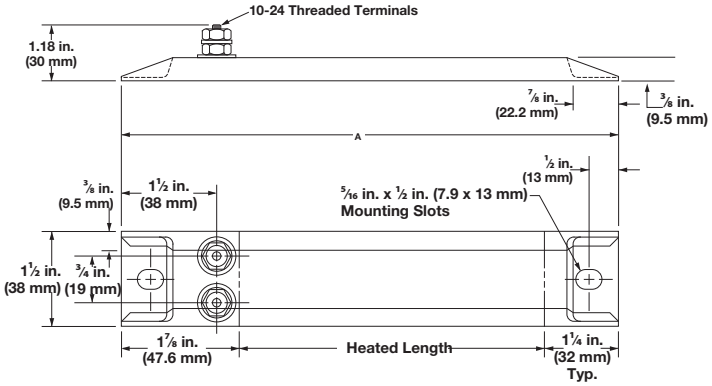
Two 10-24 threaded post terminals are offset from each other on the same end.

One-on-One Terminals*



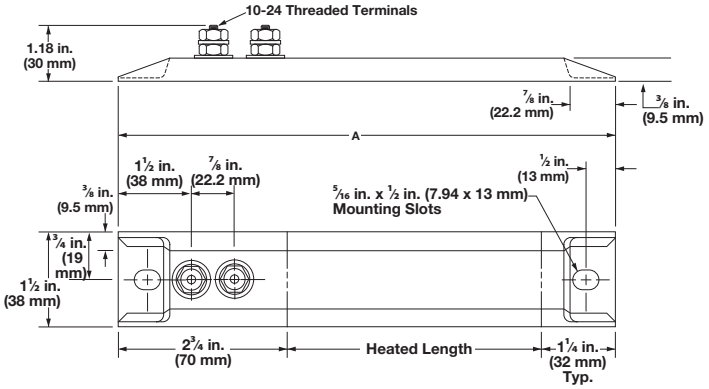
Two 10-24 threaded post terminals are placed one on each end.

Parallel Terminals*



Two 10-24 threaded post terminals are used; both terminals on one end.

In-Line Terminals*



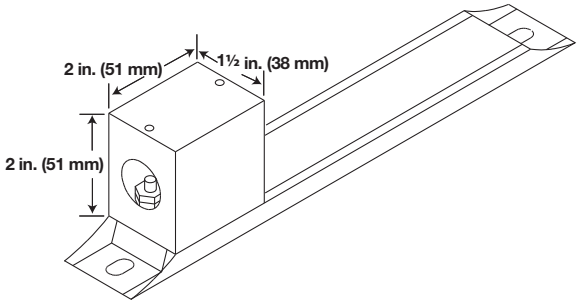
Two 10-24 threaded post terminals are in-line with each other on the same end.

* Tab removal available from stock or manufactured.
Length without tabs = Length with tabs minus 1.5 in. (38 mm)

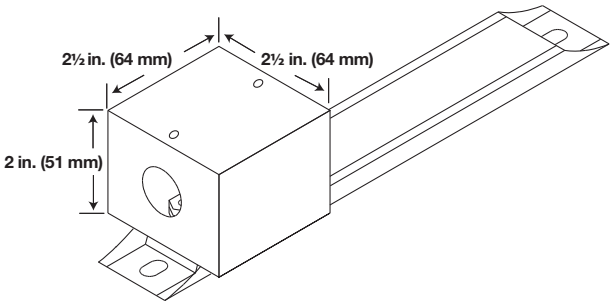
375 High-Temperature Strip Heaters

Termination Options *(Continued)*

Metallic Terminal Boxes - Variations



Available on in-line terminals only.

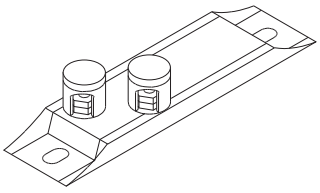


Available on offset terminals from stock and manufactured.

Metallic terminal boxes are available on offset terminals from stock. Terminal boxes act as a safety feature by covering the terminals. Conduit may be attached to the box through ⅞ in. (22.2 mm) diameter holes in the ends of the box. To order, specify **terminal box**.

Accessories

Ceramic Terminal Covers



A convenient and economic way to insulate post terminals. Sized for standard length posts. 10-24 screw thread size. These are supplied as an accessory item and shipped separately. Specify **Z-4918** and quantity.

How to Order

To order your **stock** 375 strip heater, specify:

- Quantity
- Watlow code number
- Removal of mounting tabs if desired

If stock units do not meet application needs, Watlow can manufacture 375 strip heaters to special requirements. For **made-to-order** units, please specify in addition to above information:

- Width
- Heater length, including mounting tabs
- Terminal type (offset, parallel or one-on-one)

Availability

Stock: Next day shipment

Made-to-Order: Please contact your Watlow representative.

375 High-Temperature Strip Heaters

Stock and Standard Heater Code Numbers

Width in. (mm)	Length in. (mm)	Term.	Volts	Power (Watts)	Watt Density W/in² (W/cm²)	Approx. Net Wt. lbs (kg)	Avail.	Code Number	Chromalox® Code No. ①		Wellman® Code No. ①	
									Rust Resist. Iron Sheath	Chrome Stl. Sheath	Aluminized Steel Sheath	Chrome Stl. Sheath
1½ (38)	5½ (140)	Parallel	120	125	35 (5.4)	0.4 (0.18)	Stock	**SGA1J5JP1**	PT-512	—	—	—
	5½ (140)	Parallel	120	250	70 (10.8)	0.4 (0.18)	Stock	**SGA1J5JP2**	—	PT-502	—	—
	6 (152)	Parallel	120	150	35 (5.4)	0.4 (0.18)	Stock	**SGA1J6AP2**	PT-615	—	—	—
	6 (152)	Parallel	240	150	35 (5.4)	0.4 (0.18)	Stock	**SGA1J6AP3**	PT-615	—	—	—
	6 (152)	Parallel	120	300	70 (10.8)	0.4 (0.18)	Stock	**SGA1J6AP4**	—	PT-603	—	—
	6 (152)	Parallel	240	300	70 (10.8)	0.4 (0.18)	Stock	**SGA1J6AP5**	—	PT-603	—	—
	7½ (191)	Offset	120	150	29 (4.5)	0.5 (0.23)	Stock	**SGA1J7JO1**	OT-715	—	SS1041	—
	7½ (191)	Offset	240	150	29 (4.5)	0.5 (0.23)	Standard	**SGA1J7JO2**	OT-715	—	SS1052	—
	7½ (191)	Offset	240	200	38 (5.9)	0.5 (0.23)	Stock	**SGA1J7JO3**	—	OT-702	—	SS2052
	8 (203)	Offset	120	150	25 (3.9)	0.5 (0.23)	Stock	**SGA1J8AO1**	OT-815	—	SS1061	—
	8 (203)	Offset	240	150	25 (3.9)	0.5 (0.23)	Stock	**SGA1J8AO5**	OT-815	—	SS1072	—
	8 (203)	Offset	120	175	29 (4.5)	0.5 (0.23)	Stock	**SGA1J8AO6**	OT-817	—	SS1081	—
	8 (203)	Offset	240	175	29 (4.5)	0.5 (0.23)	Standard	**SGA1J8AO7**	OT-817	—	SS1092	—
	8 (203)	Offset	120	250	42 (6.5)	0.5 (0.23)	Stock	**SGA1J8AO2**	—	OT-802	—	SS2061
	8 (203)	Offset	240	250	42 (6.5)	0.5 (0.23)	Stock	**SGA1J8AO8**	—	OT-802	—	SS2072
	8 (203)	Offset	120	400	67 (10.4)	0.5 (0.23)	Stock	**SGA1J8AO9**	—	OT-804	—	SS2081
	8 (203)	Offset	240	400	67 (10.4)	0.5 (0.23)	Stock	**SGA1J8AO10**	—	OT-804	—	SS2092
	8 (203)	Offset	120	500	83 (12.9)	0.5 (0.23)	Stock	**SGA1J8AO3**	—	—	—	—
	8 (203)	Offset	240	500	83 (12.9)	0.5 (0.23)	Stock	**SGA1J8AO4**	—	—	—	—
	8 (203)	1-on-1	120	150	24 (3.7)	0.5 (0.23)	Stock	**SGA1J8AT1**	S-815	—	SD1021	—
	8 (203)	1-on-1	240	150	24 (3.7)	0.5 (0.23)	Standard	**SGA1J8AT2**	S-815	—	SD1032	—
	9½ (241)	1-on-1	120	200	23 (3.6)	0.6 (0.27)	Standard	**SGA1J9JT1**	S-920	—	SD1041	—
	10½ (267)	Offset	120	250	26 (4.0)	0.7 (0.32)	Stock	**SGA1J10JO1**	OT-1025	—	SS1101	—
	10½ (267)	Offset	240	250	26 (4.0)	0.7 (0.32)	Stock	**SGA1J10JO2**	OT-1025	—	SS1102	—
	10½ (267)	Offset	120	350	36 (5.6)	0.7 (0.32)	Stock	**SGA1J10JO8**	—	OT-1003	—	SS2101
	10½ (267)	Offset	240	350	36 (5.6)	0.7 (0.32)	Stock	**SGA1J10JO5**	—	OT-1003	—	SS2112
	10½ (267)	Offset	120	400	41 (6.4)	0.7 (0.32)	Stock	**SGA1J10JO6**	—	OT-1004	—	SS2131
	10½ (267)	Offset	240	400	41 (6.4)	0.7 (0.32)	Stock	**SGA1J10JO7**	—	OT-1004	—	SS2132
	12 (305)	Offset	120	250	21 (3.3)	0.8 (0.32)	Stock	**SGA1J12AO1**	OT-1225	OT-1202	SS1141	—
	12 (305)	Offset	240	250	21 (3.3)	0.8 (0.32)	Stock	**SGA1J12AO2**	OT-1225	OT-1202	SS1152	—
	12 (305)	Offset	120	350	29 (4.5)	0.8 (0.36)	Stock	**SGA1J12AO5**	—	OT-1203	—	SS2141
	12 (305)	Offset	240	350	29 (4.5)	0.8 (0.36)	Stock	**SGA1J12AO6**	—	OT-1203	—	SS2152
	12 (305)	Offset	120	500	42 (6.5)	0.8 (0.36)	Stock	**SGA1J12AO3**	—	OT-1205	—	SS2161
	12 (305)	Offset	240	500	42 (6.5)	0.8 (0.36)	Stock	**SGA1J12AO4**	—	OT-1205	—	SS2172
	12 (305)	1-on-1	120	250	20 (3.1)	0.8 (0.36)	Standard	**SGA1J12AT1**	S-1225	S-1202	SD1061	SD2071
	12 (305)	1-on-1	240	250	20 (3.1)	0.8 (0.36)	Stock	**SGA1J12AT2**	S-1225	S-1202	SD1072	SD2082
	12 (305)	1-on-1	240	500	40 (6.2)	0.8 (0.36)	Stock	**SGA1J12AT3**	—	S-1205	—	SD2122
	14 (356)	Offset	120	300	20 (3.1)	0.9 (0.41)	Stock	**SGA1J14AO2**	OT-1430	—	SS1181	—
	14 (356)	Offset	240	300	20 (3.1)	0.9 (0.41)	Stock	**SGA1J14AO1**	OT-1430	—	SS1192	—
	14 (356)	Offset	120	500	33 (5.1)	0.9 (0.41)	Stock	**SGA1J14AO3**	—	OT-1405	—	SS2181
	14 (356)	Offset	240	500	33 (5.1)	0.9 (0.41)	Stock	**SGA1J14AO4**	—	OT-1405	—	SS2192
	14 (356)	1-on-1	120	300	20 (3.1)	0.9 (0.41)	Standard	**SGA1J14AT1**	S-1430	—	SD1131	—
	15¼ (387)	Offset	120	325	19 (2.9)	1.0 (0.45)	Stock	**SGA1J15EO2**	OT-1532	—	SS1201	—
	15¼ (387)	Offset	240	325	19 (2.9)	1.0 (0.45)	Stock	**SGA1J15EO3**	OT-1532	—	SS1212	—
	15¼ (387)	Offset	240	500	30 (4.6)	1.0 (0.45)	Stock	**SGA1J15EO4**	—	OT-1505	—	SS2212
	17⅞ (454)	Offset	120	350	17 (2.6)	1.2 (0.54)	Stock	**SGA1J17RO4**	OT-1835	—	SS1221	SS2221
	17⅞ (454)	Offset	240	350	17 (2.6)	1.2 (0.54)	Standard	**SGA1J17RO5**	OT-1835	—	SS1232	SS2232
	17⅞ (454)	Offset	120	375	18 (2.8)	1.2 (0.54)	Standard	**SGA1J17RO6**	OT-1837	—SS1261	SS2241	—

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① Chromalox® and Wellman® code numbers are used as a cross reference to help you select the equivalent Watlow code number. Chromalox® sizes 27 in. (686 mm) and longer, and all Wellman® sizes, will have mounting slot center to center distances ⅛ in. (3.2 mm) less than Watlow spacing.

375 High-Temperature Strip Heaters

Stock and Standard Heater Code Numbers *(Continued)*

Width in. (mm)	Length in. (mm)	Term.	Volts	Power (Watts)	Watt Density W/in² (W/cm²)	Approx. Net Wt. lbs (kg)	Avail.	Code Number	Chromalox® Code No. ①		Wellman® Code No. ①	
									Rust Resist. Iron Sheath	Chrome Stl. Sheath	Aluminized Steel Sheath	Chrome Stl. Sheath
1½ (38)	17⅞ (454)	Offset	240	375	18 (2.8)	1.2 (0.54)	Stock	**SGA1J17RO7**	OT-1837	—	SS1252	—
	17⅞ (454)	Offset	120	500	24 (3.7)	1.2 (0.54)	Stock	**SGA1J17RO1**	OT-1850	—	SS1261	SS2241
	17⅞ (454)	Offset	240	500	24 (3.7)	1.2 (0.54)	Stock	**SGA1J17RO2**	OT-1850	—	SS1272	SS2252
	17⅞ (454)	Offset	120	750	36 (5.6)	1.2 (0.54)	Stock	**SGA1J17RO9**	—	OT-1807	—	SS2261
	17⅞ (454)	Offset	240	750	36 (5.6)	1.2 (0.54)	Stock	**SGA1J17RO8**	—	OT-1807	—	SS2272
	17⅞ (454)	Offset	120	1000	48 (7.4)	1.2 (0.54)	Stock	**SGA1J17RO10**	—	OT-1801	—	SS2281
	17⅞ (454)	Offset	240	1000	48 (7.4)	1.2 (0.54)	Stock	**SGA1J17RO3**	—	OT-1801	—	SS2292
	17⅞ (454)	1-on-1	120	500	24 (3.7)	1.2 (0.54)	Standard	**SGA1J17RT1**	S-1850	S-1805	SD1211	SD2171
	17⅞ (454)	1-on-1	240	500	24 (3.7)	1.2 (0.54)	Stock	**SGA1J17RT2**	S-1850	S-1805	SD1222	SD2182
	17⅞ (454)	1-on-1	240	750	35 (5.4)	1.2 (0.54)	Standard	**SGA1J17RT3**	—	S-1807	—	SD2202
	17⅞ (454)	1-on-1	120	1000	47 (7.3)	1.2 (0.54)	Standard	**SGA1J17RT4**	—	S-1801	—	SD2211
	17⅞ (454)	1-on-1	240	1000	47 (7.3)	1.2 (0.54)	Standard	**SGA1J17RT5**	—	S-1801	—	SD2222
	19½ (496)	Offset	240	350	15 (2.3)	1.3 (0.59)	Stock	**SGA1J19JO6**	OT-1935	—	SS1301	—
	19½ (496)	Offset	120	500	22 (3.4)	1.3 (0.59)	Standard	**SGA1J19JO7**	OT-1950	OT-1905	—	SS2301
	19½ (496)	Offset	240	500	22 (3.4)	1.3 (0.59)	Stock	**SGA1J19JO4**	OT-1950	OT-1905	—	SS2312
	19½ (496)	Offset	240	750	32 (5.0)	1.3 (0.59)	Stock	**SGA1J19JO8**	—	OT-1907	—	—
	19½ (496)	Offset	240	1000	43 (6.7)	1.3 (0.59)	Stock	**SGA1J19JO1**	—	OT-1901	—	SS2332
	19½ (496)	1-on-1	240	750	32 (5.0)	1.3 (0.59)	Standard	**SGA1J19JT1**	—	S-1907	—	SD2262
	21 (533)	Offset	120	500	20 (3.1)	1.4 (0.64)	Standard	**SGA1J21AO1**	OT-2150	—	SS1341	—
	21 (533)	Offset	240	500	20 (3.1)	1.4 (0.64)	Stock	**SGA1J21AO2**	OT-2150	—	SS1352	—
	21 (533)	Offset	120	750	29 (4.5)	1.4 (0.64)	Stock	**SGA1J21AO3**	—	OT-2107	—	SS2341
	21 (533)	Offset	240	750	29 (4.5)	1.4 (0.64)	Stock	**SGA1J21AO4**	—	OT-2107	—	SS2352
	21 (533)	1-on-1	120	500	19 (2.9)	1.4 (0.64)	Standard	**SGA1J21AT1**	S-2050	S-2005	SD1291	SD2291
	23¾ (603)	Offset	120	500	17 (2.6)	1.5 (0.68)	Stock	**SGA1J23NO5**	OT-2450	OT-2405	SS1361	SS2361
	23¾ (603)	Offset	240	500	17 (2.6)	1.5 (0.68)	Stock	**SGA1J23NO6**	OT-2450	OT-2405	SS1372	SS2372
	23¾ (603)	Offset	120	750	25 (3.9)	1.5 (0.68)	Standard	**SGA1J23NO1**	OT-2475	OT-2407	SS1391	SS2381
	23¾ (603)	Offset	240	750	25 (3.9)	1.5 (0.68)	Stock	**SGA1J23NO2**	OT-2475	OT-2407	SS1402	SS2392
	23¾ (603)	Offset	120	1000	34 (5.3)	1.5 (0.68)	Stock	**SGA1J23NO7**	—	OT-2401	—	SS2401
	23¾ (603)	Offset	240	1000	34 (5.3)	1.5 (0.68)	Stock	**SGA1J23NO3**	—	OT-2401	—	SS2412
	23¾ (603)	Offset	240	1500	51 (7.9)	1.5 (0.68)	Stock	**SGA1J23NO4**	—	OT-2415	—	—
	23¾ (603)	1-on-1	240	250	8 (1.2)	1.5 (0.68)	Standard	**SGA1J23NT1**	S-2425	—	SD1322	—
	23¾ (603)	1-on-1	240	500	17 (2.6)	1.5 (0.68)	Stock	**SGA1J23NT3**	S-2450	S-2404	SD1342	SD2322
	23¾ (603)	1-on-1	240	750	25 (3.9)	1.5 (0.68)	Stock	**SGA1J23NT5**	—	S-2407	—	SD2352
	23¾ (603)	1-on-1	120	1000	33 (5.1)	1.5 (0.68)	Stock	**SGA1J23NT6**	—	S-2401	—	SD2361
	23¾ (603)	1-on-1	240	1000	33 (5.1)	1.5 (0.68)	Standard	**SGA1J23NT7**	—	S-2401	—	SD2372
	23¾ (603)	1-on-1	240	1500	50 (7.8)	1.5 (0.68)	Standard	**SGA1J23NT8**	—	S-2415	—	—
	25½ (648)	Offset	120	500	16 (2.5)	1.7 (0.77)	Stock	**SGA1J25JO1**	OT-2550	—	SS1421	—
	25½ (648)	Offset	240	500	16 (2.5)	1.7 (0.77)	Stock	**SGA1J25JO2**	OT-2550	—	SS1432	—
	25½ (648)	Offset	120	750	23 (3.6)	1.7 (0.77)	Standard	**SGA1J25JO3**	OT-2575	OT2507	SS1441	SS2421
	25½ (648)	Offset	240	750	23 (3.6)	1.7 (0.77)	Stock	**SGA1J25JO4**	OT-2575	OT-2507	SS1452	SS2432
	25½ (648)	Offset	240	1000	31 (4.8)	1.7 (0.77)	Stock	**SGA1J25JO5**	—	OT-2501	—	SS2452
	26¾ (680)	Offset	240	700	21 (3.3)	1.7 (0.77)	Stock	**SGA1J26NO1**	OT-2670	—	SS1472	—
	26¾ (680)	Offset	240	1000	29 (4.5)	1.7 (0.77)	Stock	**SGA1J26NO2**	—	OT-2601	—	SS2472
	30½ (775)	Offset	120	750	19 (2.9)	2.0 (0.91)	Standard	**SGA1J30JO2**	OT-3075	OT-3007	SS1481	—
	30½ (775)	Offset	240	750	19 (2.9)	2.0 (0.91)	Stock	**SGA1J30JO3**	OT-3075	OT-3007	SS1492	SS2482
	30½ (775)	1-on-1	240	750	19 (2.9)	2.0 (0.91)	Stock	**SGA1J30JT1**	S-3075	S-3007	SD1452	—

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① Chromalox® and Wellman® code numbers are used as a cross reference to help you select the equivalent Watlow code number. Chromalox® sizes 27 in. (686 mm) and longer, and all Wellman® sizes, will have mounting slot center to center distances ⅛ in. (3.2 mm) less than Watlow spacing.

375 High-Temperature Strip Heaters

Stock and Standard Heater Code Numbers *(Continued)*

Width in. (mm)	Length in. (mm)	Term.	Volts	Power (Watts)	Watt Density W/in² (W/cm²)	Approx. Net Wt. lbs (kg)	Avail.	Code Number	Chromalox® Code No. ①		Wellman® Code No. ①	
									Rust Resist. Iron Sheath	Chrome Stl. Sheath	Aluminized Steel Sheath	Chrome Stl. Sheath
1½ (38)	33½ (851)	Offset	240	750	17 (2.6)	2.2 (1.0)	Stock	**SGA1J33J01**	OT-3375	OT-3307	SS1522	SS2522
	33½ (851)	1-on-1	240	1000	22 (3.4)	2.2 (1.0)	Standard	**SGA1J33JT1**	—	S-3301	—	SD2472
	35⅞ (911)	Offset	120	1000	21 (3.3)	2.3 (1.0)	Standard	**SGA1J35R04**	OT-3610	—	SS1531	—
	35⅞ (911)	Offset	240	1000	21 (3.3)	2.3 (1.0)	Stock	**SGA1J35R03**	OT-3610	—	SS1542	SS2532
	35⅞ (911)	Offset	240	1500	31 (4.8)	2.3 (1.0)	Stock	**SGA1J35R01**	—	OT-3601	SS2552	—
	35⅞ (911)	1-on-1	240	1000	21 (3.3)	2.3 (1.0)	Stock	**SGA1J35RT1**	S-3610	S-3601	SD1492	SD2492
	38½ (978)	Offset	120	1000	19 (2.9)	2.5 (1.1)	Standard	**SGA1J38J02**	OT-3810	OT-3801	SS1581	SS2561
	38½ (978)	Offset	240	1500	29 (4.5)	2.5 (1.1)	Stock	**SGA1J38J03**	—	OT-3815	—	—
	42½ (1080)	Offset	240	1500	26 (4.0)	2.8 (1.3)	Stock	**SGA1J42J01**	—	OT-4315	SS1632	SS2632
	47⅞ (1216)	Offset	240	2250	34 (5.3)	3.1 (1.4)	Stock	**SGA1J47R01**	—	OT-4822	—	—

Note: 5⁄16 in. x ½ in. (7.9 mm x 13 mm) mounting slots are supplied on all 375 strip heaters. Tabs can be removed upon request. Also, note Watlow code number specifies the 375 strip heater comes with an aluminized steel sheath. If you require a special sheath material, such as stainless steel, please contact your Watlow representative for material availability.

① Chromalox® and Wellman® code numbers are used as a cross reference to help you select the equivalent Watlow code number. Chromalox® sizes 27 in. (686 mm) and longer, and all Wellman® sizes, will have mounting slot center to center distances ⅛ in. (3.2 mm) less than Watlow spacing.

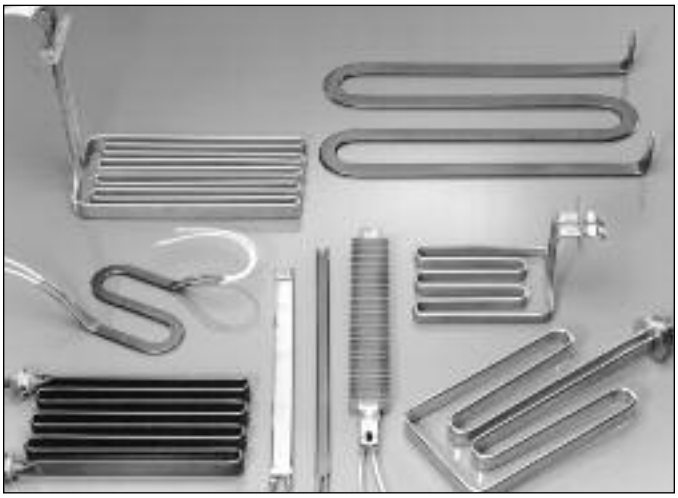
FIREBAR® Clamp-On Heaters

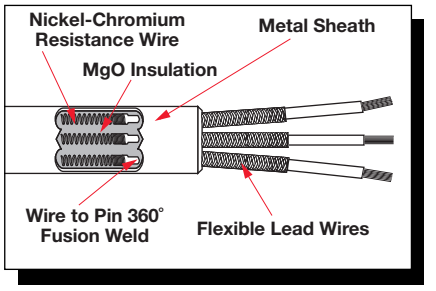
FIREBAR® heating elements provide added heating performance over standard round tubular heating elements—especially for immersion applications in petroleum based liquids that require high kilowatts. The FIREBAR's unique flat surface geometry packs more power in shorter elements and assemblies, along with a host of other performance improvements. These include:

- Minimizing coking and fluid degrading
- Enhancing the flow of fluid past the element's surface to carry heat from the sheath
- Improving heat transfer with a significantly larger boundary layer that allows much more liquid to flow up and across the sheath's surface

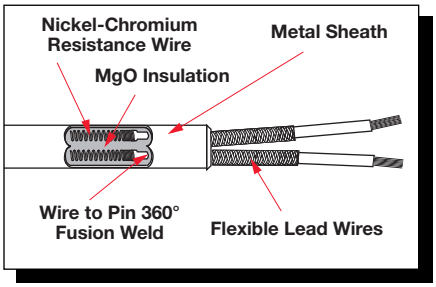
FIREBAR elements are available in single- and double-ended constructions with one inch or ⅝ inch heights. These two configuration variables make it possible to use FIREBAR elements instead of round tubular elements in virtually all applications.

FINBAR is a special version of the one inch, single-ended FIREBAR. FINBAR is specially modified with fins to further increase surface area for air and gas heating applications. Details are contained in the *FINBAR* section, starting on page 119.





One Inch Double-Ended FIREBAR Element and Lead Configurations



⅝ Inch Double-Ended FIREBAR Element and Lead Configurations

For detailed product and ordering information see the full FIREBAR product section located on pages 99 through 118.

Thick Film Conduction Heaters

The 14 gauge, 430 stainless steel thick film conduction heaters from Watlow® are ideal for use in many applications where fast response and uniformity are essential. These high performance heaters use thick film technology to provide maximum temperature response in a compact package.

A clamp-on thick film heater provides the best possible combination of heat transfer, thermal efficiency and temperature uniformity. For example, clamping the thick film conduction heater on to a 316 stainless steel pan or aluminum griddle in foodservice applications results in uniform cooking and heating.

This technology can be applied in areas where space is at a premium or where conventional heaters cannot be used because of limited voltage and wattage combinations.

Thick film conduction heaters provide a low-profile heater in a variety of shapes. These shapes include two-dimensional circular, rectangular and square forms. Due to the direct surface contact, thick film heaters ensure greater heat transfer through thermally stable substrates and precise heater patterns.

Features and Benefits

1025°F (550°C) maximum substrate temperature (dependent upon application demands and substrate material)

- Allows for higher process temperatures than most conduction heater technologies

UR® File #E52951 CSA available

- Conforms with applicable CE directives
- Contact your Watlow representative for current status of agency recognitions

High watt densities for clamp-on applications

- Allows for precise, repeatable wattage distribution and uniform temperature distribution

Threaded stud termination

- Produces strong, trouble-free connections, see Termination drawing on the next page.

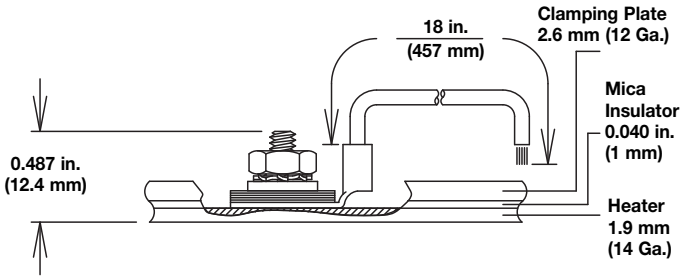
Applications

- Foodservice
- Industrial machines
- Life sciences
- Plastics
- Semiconductor

Thick Film Conduction Heaters

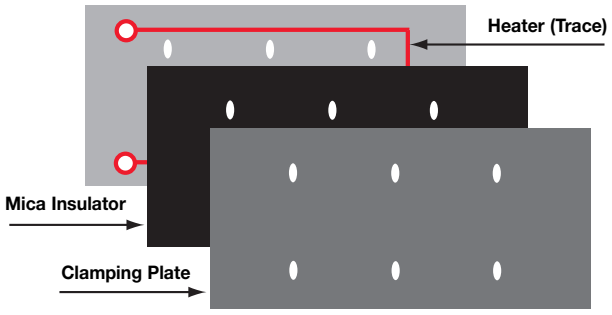
Technical Information

Termination Assembly



To install, mount the heater to the surface being heated and assemble mounting hardware. Standard measurements of assembly hardware are illustrated in the *Termination Assembly* drawing above. Please refer to the *Installation and Maintenance Manual (316-42-32-1)* that is supplied with the heater for proper mounting instructions.

Construction



Thick film conduction heaters, designed for clamp-on applications, are supplied as a multi-part assembly: heater, mica insulator, clamping plate and mounting hardware.

The mica insulator acts as a thermal barrier to more effectively force the heat into the part being heated, as well as an additional protective layer for the heater.

The clamping plate distributes the pressure loading evenly across the entire surface of the heater to promote intimate contact between the thick film heater and the part being heated.

The mounting hardware has been designed to provide the most effective means to clamp the heater to the part being heated, based on the size of the heater.

Stock Heater Code Numbers

Heater Size in.	(mm)	Voltage	Wattage①	W/in²	W/cm²	Approximate Assembly Wt. lbs	(kg)	Watlow Code Number
Round								
4.5 dia.	(114)	120	325	20.4	(3.2)	1.10	(0.50)	**TFA004JA03EL18B**
6.0 dia.	(152)	120	850	30.1	(4.7)	2.74	(1.24)	**TFA006AA08KL18C**
6.0 dia.	(152)	240	1125	39.8	(6.2)	2.74	(1.24)	**TFA006AE11EL18C**
8.0 dia.	(203)	240	2000	39.8	(6.2)	4.91	(2.23)	**TFA008AE200L18C**
10.0 dia.	(254)	240	3000	38.2	(5.9)	7.24	(3.28)	**TFA010AE300L18C**
Square								
2.25 x 2.25	(57 x 57)	120	100	19.8	(3.1)	0.27	(0.12)	**TFA2E2EA010L18B**
3.00 x 3.00	(76 x 76)	120	225	25.0	(3.9)	0.50	(0.23)	**TFA3A3AA02EL18B**
4.00 x 4.00	(102 x 102)	120	400	25.0	(3.8)	1.61	(0.73)	**TFA4A4AA040L18C**
6.00 x 6.00	(152 x 152)	120	1250	34.7	(5.4)	3.74	(1.70)	**TFA6A6AA12KL18C**
6.00 x 6.00	(152 x152)	240	1450	40.3	(6.3)	3.74	(1.70)	**TFA6A6AE14KL18C**
8.00 x 8.00	(203 x 203)	240	2500	39.1	(6.1)	6.36	(2.88)	**TFA8A8AE250L18C**
Rectangle								
2.0 X 4.0	(51 x 102)	120	240	30.0	(4.6)	0.47	(0.21)	**TFA2A4AA02HL18B**
4.0 X 6.0	(102 x 152)	120	725	30.2	(4.7)	2.46	(1.12)	**TFA4A6AA07EL18C**
6.0 X 8.0	(152 x 203)	240	1920	40.0	(6.2)	5.01	(2.27)	**TFA6A8AE19DL18C**

①Wattage output at 77°F (25°C).

Note: Size and wattage may vary with future design enhancements. Please contact your Watlow representative for current wattage information.