FROM THE **CEO**

THANK YOU

On behalf of everyone at Fast Heat, Inc., I would like to thank you for choosing our Heating Elements & Sensors Catalog. You will be impressed with our new approach. We have provided you with the latest technical information on a wide variety of applications, as well as insightful tips on optimizing the performance of our products. I am confident the catalog will be a very useful tool for you.

Fast Heat has continually provided the kind of innovation you expect from a leader. Our customer-centered philosophy, along with a dedication to providing products and services which support our customers' success, has been our continual driving force. You will find our people to be genuine, sincere and dedicated to meeting your needs. Inside Fast Heat we call it customer focus, and I am confident you will see the difference.

So please take a few minutes to browse through our catalog. I know that you will like what you see. And if you have any questions, please feel free to contact our customer service team...they will be happy to help you.

Sincerely,

Tim Stojka

CEO

ORDERING **INFORMATION**

Ordering Options

1. Call (toll-free)1-877-HEATERS (877-432-8377) to place an order.
2. Fax (toll-free) 1-877-FAXHEAT (877-329-4328) for instant ordering.
3. Email your order to info@fastheat.com
4. Order on-line at www.fastheat.com.

Ordering Information

Please have the following information ready to place your order:

1. Account number or company name
2. Purchase order number
3. Shipping instructions
4. Part number (depending on lead configuration and length, you may receive an updated catalog number).
5. Product Description
6. Quantity

Custom Stocking

If we don't have the item you're looking for in stock, ask about our Custom Stocking Program. Depending on how many you order and the frequency of orders, we may be able to stock it for you!

Competitive Pledge

Can't find what you need? If we don't stock a particular item that you can find in stock in a competitor's catalog, we'll make it for you through our Fast Track program and waive the premium charge. That's our commitment to customer satisfaction!

Warranty

All QuickShip products have a minimum of one year warranty from date of shipment from factory.

Returns

All returns must have an authorized RA (Return Authorization) number assigned to the product prior to returning to Fast Heat. This RA number can be obtained by calling or faxing Fast Heat customer service or any regional sales office. At this time the specific details (i.e. model number, order number, and reason for return) are requested. All RA numbers are valid for 30 days.

Terms and Conditions

For terms and conditions of sale, consult our full General Product Catalog, or call Customer Service at **1-630-833-5400.**

DELIVERY EXPRESS **PROGRAMS**

QuickShip®

Same Day!
Stocking Program

If you place your order of a QuickShip stock item before 3:00 p.m. CST, we will ship it that same day or we will provide FREE next day delivery, and that's a promise! Our goal at Fast Heat is to keep our commitment to exceptional service and have the best delivery in the business.

Fast Track®

2 to 5 Day
"Rush" Made-to-Order

Fast Track is a short lead-time program, providing special variations of Hi-Temp & Standard Cartridges, Mica Bands, Mica and Ceramic Strip heaters for customers in immediate need of parts shipped within 2 to 5 days. Special premium charges apply, based on a percentage of the net price of items ordered. If we miss the quoted ship date, the Fast Track charges do not apply.

Rapid Delivery

10 Day
Made-to-Order

Our Rapid Delivery program provides many custom products, manufactured in 10 days, including a wide variety of Hi-Temp & Standard Cartridges, Mica Bands, Mica and Ceramic Strips.

Call Fast Heat customer service for more information on specific products.

TABLE OF **CONTENTS**

QUICK-REFERENCE ICONS

In order to make your tour through this catalog as easy as possible, we've incorporated quick-reference product icons on the upper corners of the pages.

CARTRIDGE HEATERS

Hi-Temp Cartridge heaters are designed for optimum performance above and beyond the norm.

fast heat®

HI-TEMP
CARTRIDGE HEATERS

HI-TEMP® CARTRIDGES

Fast Heat's ruggedly constructed, high watt density Hi-Temp Cartridge heaters provide excellent heat transfer efficiency, high operating temperature (typically 90 to 95 watts per square inch, depending on the application) and long life. Hi-Temps can meet U.L./C.S.A. approval, use the chart on page 151 for reference and consult factory.

The Hi-Temp Cartridge is made to withstand internal temperatures of up to 1600º F (871º C). Its swaged construction allows for minimal air gaps, providing superior heat transfer and resistance to impact and vibration. Dual voltage and three phase are available on selected diameters of the Hi-Temp.

If you're in a hurry, Hi-Temps are available through QuickShip and Fast Track. Refer to page 2 for a complete description of these rapid delivery programs.

APPLICATIONS

The Hi-Temp's ability to withstand high heat and excessive vibration makes it ideally suited for many diverse applications, including heating platens, sealing bars, heating fluids, hot stamping and forming.

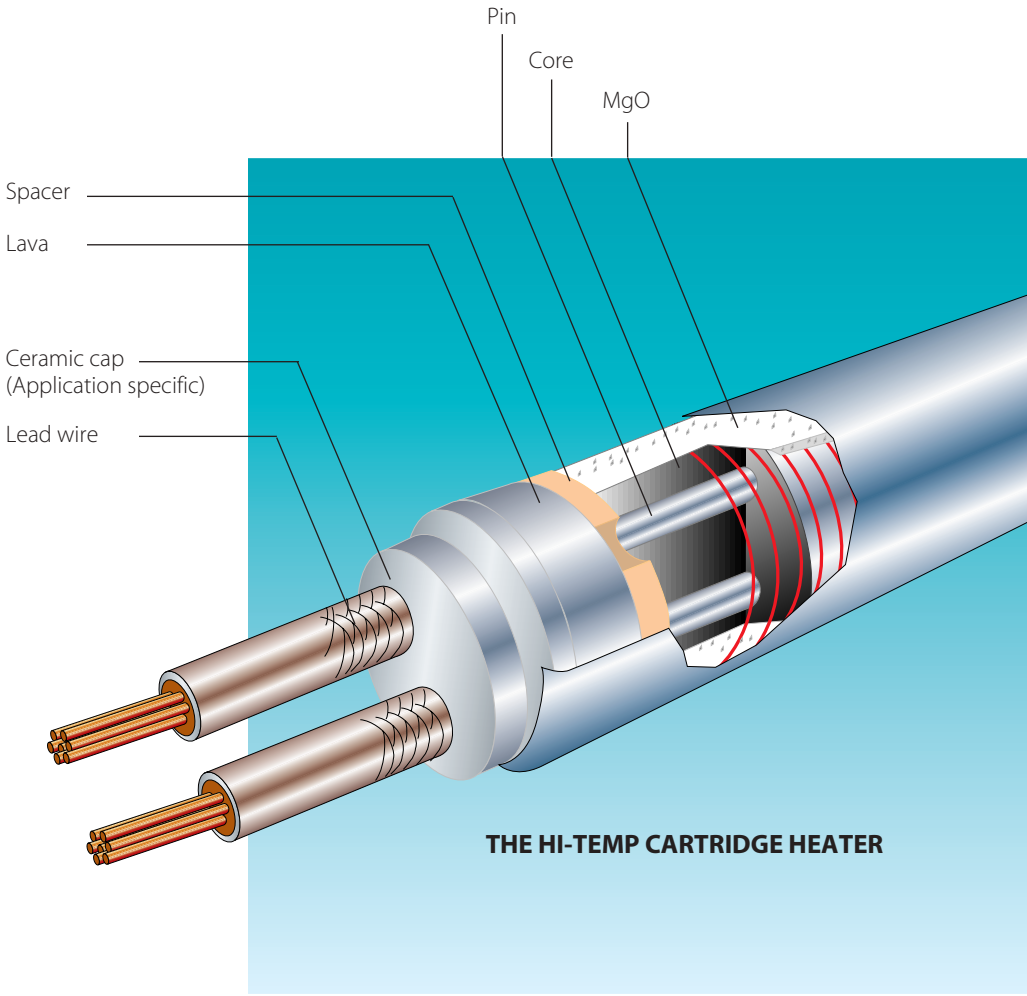
In addition, Hi-Temps can be modified to meet the demands of virtually any special application. Our engineers can utilize a variety of alternative features and options to customize the heater to your specific needs.

FEATURES AND BENEFITS

- High watt density required.
- Efficient dissipation of heat.
- Where space limitations apply.
- Resistant to impact and vibration.
- Dual voltage, selected diameters.
- Three phase, selected diameters.
- Distributed wattage.

MATERIAL AND CONSTRUCTION

- Computer designed specifications.
- High quality resistor wire precisely wound on magnesium oxide cores.
- Resistor core assembly accurately and consistently spaced close to the outer sheath for efficient heat transfer.
- High purity magnesium oxide (MgO) surrounds the resistor core assembly.
- Initial heater diameter is reduced, thus increasing density of the assembly, resulting in a heating source which exhibits exceptional dielectric strength and heat transfer characteristics.
- End disc is always welded in place, preventing contaminants from entering the heater.
- U.L. approved, C.S.A. certified flexible nickel leads attached to nickel pins from within the heater 482º F (250º C), standard. Mica tape insulated 842º F (450º C), available when requested as dictated by the application.
- Incoloy® 800 sheath material.
- Cement is standard; epoxy or RTV seal also available.
- Cold sections vary depending upon heater length and diameter.



THE HI-TEMP CARTRIDGE HEATER

HI-TEMP
CARTRIDGE HEATERS

SPECIFICATIONS

Wattage Tolerances: +5% – 10% based on Nema Standards.

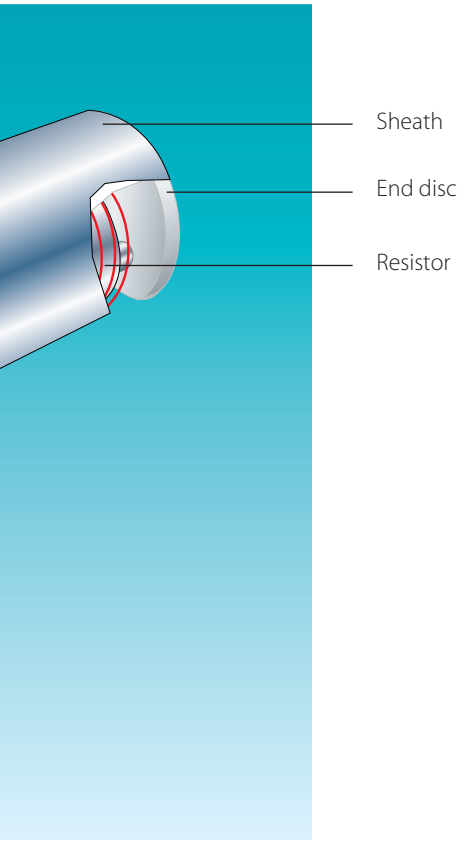
Resistance Tolerances: +10% – 5% to give above power tolerances. Note that above tolerances are based on internal operating temperature, since the room temperature resistance of an element wire is normally 3.3% lower than when operating.

Choice of voltage: 120V or 240V - other voltages on request.

See page 21 to calculate watt density on Hi-Temp heaters.

SPECIAL NOTE ON WARRANTY

Heaters with an operating voltage higher than 250 Volts must be larger than or equal to 5/8" diameter to be eligible for a warranty.



DIAMETER TOLERANCE*

ENGLISH SIZES

1/4" (0.250) = .247 ± .002
5/16" (0.312) = .310 ± .002
3/8" (0.375) = .370 ± .002
7/16" (0.437) = .432 ± .002
1/2" (0.500) = .495 ± .002
9/16" (0.562 - Sleeved) = .560 ± .002
5/8" (0.625) = .620 ± .002
11/16" (0.687) = .682 ± .002
3/4" (0.750) = .745 ± .002
13/16" (0.812 - Sleeved) = .812 ± .003
7/8" (0.875 - Sleeved) = .869 ± .002
15/16" (0.937 - Sleeved) = .932 ± .002
1" (1.000) = .995 ± .003

METRIC SIZES	ENGLISH EQUIVALENT
6.5 mm = 6.4 ± .05	.256" = .253" ± .002
8 mm = 7.9 ± .05	.315" = .312" ± .002
10 mm = 9.9 ± .05	.394" = .391" ± .002
11.9 mm =11.8 ± .05	.468" = .465" ± .002
12 mm = 11.9 ± .05	.472" = .469" ± .002
12 .5 mm = 12.4 ± .05	.492" = .489" ± .002
12.7 mm = 12.6 ± .05	.500" = .497" ± .002
14 mm = 13.9 ± .05 (Sleeved)	.551" = .546" ± .002
15 mm = 14.9 ± .05	.591" = .587" ± .002
16 mm = 15.9 ± .05	.630" = .627" ± .002
17.5 mm = 17.4 ± .05	.689" = .687" ± .002
19.5 mm = 19.4 ± .05	.768" = .768" ± .002
20 mm = 19.9 ± .05	.787" = .784" ± .002

* Diameter at each end may vary +.002" -.004" (+ .05 mm - .1 mm).

Length Tolerances: ± 2% with ± 1/8" (3.2 mm) min. tolerance, whichever is greater. For closer tolerances contact Fast Heat.

Camber Tolerances: .020" (.05 mm) per foot (1.7 mm per meter) length.

RECOMMENDED MAXIMUM AMPERAGES

ENGLISH SIZES

1/4" = 3.2 Amps
5/16" = 5.8 Amps
3/8" = 7.5 Amps
7/16" = 7.5 Amps
1/2" = 12.5 Amps
9/16" = 12.5 Amps
5/8" = 24 Amps
11/16" = 24 Amps
3/4" = 24 Amps
13/16" = 24 Amps
7/8" = 24 Amps
15/16" = 24 Amps
1" = 24 Amps

METRIC SIZES

6.5 mm = 3.2 Amps
8 mm = 5.8 Amps
10 mm = 7.5 Amps
11.9 mm = 12.5 Amps
12 mm = 12.5 Amps
12.5 mm = 12.5 Amps
12.7 mm = 12.5 Amps
14 mm = 12.5 Amps
15 mm = 12.5 Amps
16 mm = 24 Amps
17.5 mm = 24 Amps
19.5 mm = 24 Amps
20 mm = 24 Amps

Contact Fast Heat for higher voltage and amperage ratings, and special diameters or tolerances.

AVOIDING COMMON HEATER FAILURE MODES

Use recommended maximum watt density range to avoid excessive watt densities which result in the internal overheating of the heater.

When heater requirements demand excessive watt densities, contact Fast Heat for recommendations. Special heaters can be designed for these applications.

Contamination of heater, both on leads and internally, is serious and results in rapid failure. Care should be taken to keep possible carbonizing agents such as oil and low temperature tapes away from heater. In cases where this is not possible, use catalog recommended seals or contact Fast Heat for assistance.

Lead failure due to excessive flexing can be decreased or halted by utilizing special lead arrangements shown in catalog. For further assistance contact Fast Heat.

Thermal expansion and contraction due to cycling shortens heater life. We recommend reducing watt densities by 20% for those heaters subject to frequent cycling.

Also be sure the full heated length is in contact with metal to avoid burn-out by operating in air.

STANDARD
CARTRIDGE HEATERS

STANDARD CARTRIDGES

Our Standard Cartridge heaters are designed as an economical, quality heater for lower temperature use (typically 40 watts per square inch, depending on the application). Standard Cartridges can meet U.L./C.S.A. approval, use the chart on page 151 for reference and consult factory.

The Standard Cartridge Heater is made to withstand internal temperatures of up to 1000º F (538º C) and features a stainless steel sheath for resistance to oxidation. High-purity magnesium oxide (MgO) fills any space around the resistor wire in order to optimize heat transfer and increase the life of the heater.

For faster shipment, Standard Cartridges are available through our Fast Track delivery program. Refer to page 2 for a complete description of these rapid delivery programs.

APPLICATIONS

Standard Cartridge heaters can be used in virtually any application involving lower temperatures and relatively little vibration or impact. Some examples include sealing bars, heating platens, heating fluids and forming.

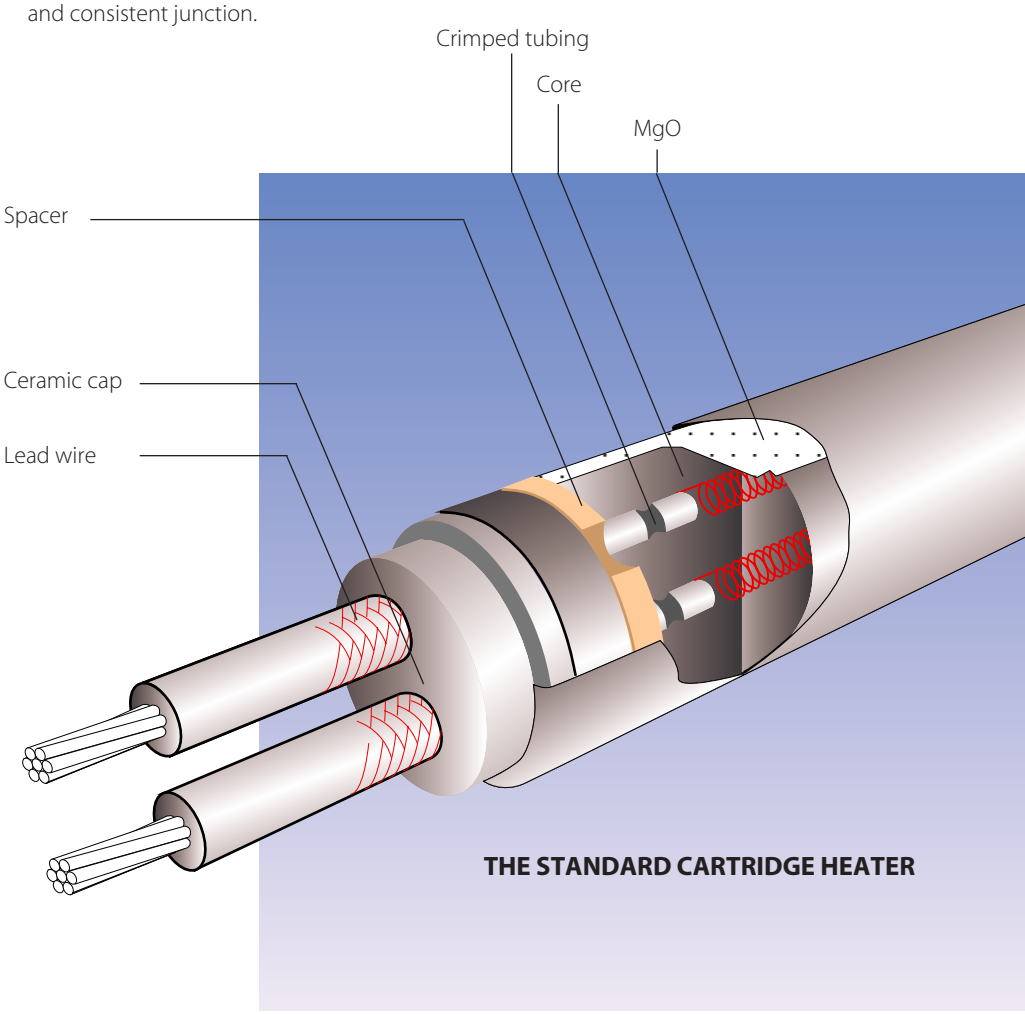
Standard Cartridges can also be modified to meet the demands of special applications. Our engineers can utilize a variety of alternative features and options to customize the heater to your specific needs.

FEATURES AND BENEFITS

- Wide range of diameters.
- Many termination styles.
- Voltage variations.
- U.L. approved and C.S.A. recognized.
- Top quality ceramic element support.
- Unique winding design allows faster heating and longer life.
- High purity MgO packing for even heat distribution.
- Fiberglass insulated lead wire is standard. Other lead wire insulation available upon request.

MATERIAL AND CONSTRUCTION

- Computer designed specifications.
- 304 stainless steel sheath for oxidation resistance.
- Ceramic insulator spaces helically wound resistor inside the sheath.
- Helically wound nickel chromium resistor is of a conservative design for each application and evenly stretched through the ceramic insulators.
- Fine grain high purity magnesium oxide (MgO) fills any voids around the resistor wire to optimize heat transfer, dielectric strength and life of the heater.
- Resistor wire is joined to the leads by placing each end into nickel chromium which, upon crimping, affords a positive and consistent junction.
- U.L. approved and C.S.A. certified flexible nickel conductor with fiberglass insulated lead wire 482º F, (250º C) is standard. Mica tape/fiberglass insulated 842º F, (450º C) available when requested as dictated by the application.
- Disc end of the heater rests on a mica insulator and is held in position when the sheath is rolled over onto it. This is a standard assembly procedure unless the application requires moisture or water-proof sealing, at which time the end cap can be sealed by brazing or welding.
- Ceramic cap standard; cement, epoxy or RTV seal also available.



THE STANDARD CARTRIDGE HEATER

STANDARD
CARTRIDGE HEATERS

SPECIFICATIONS

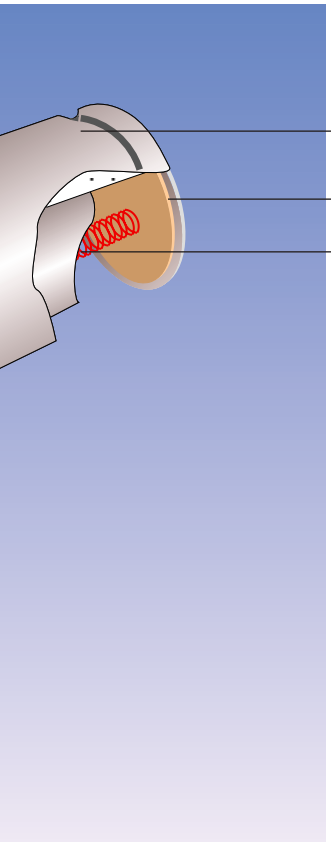
Wattage Tolerances: +5% – 10% based on Nema standards.

Resistance Tolerances: +10% – 5% to give above power tolerances. Note that above tolerances are based on internal operating temperature since the room temperature resistance of an element wire is normally 8.5% lower than when operating.

Standard voltages are 120V or 240V. 120V max. for short length units 3/16", 1/4", and 5/16" dia. (4.7, 6.3, 7.9 mm).

SPECIAL NOTE ON WARRANTY

Heaters with an operating voltage higher than 250 Volts must be larger than or equal to 5/8" diameter to be eligible for a warranty.



DIAMETER TOLERANCE

ENGLISH SIZES	METRIC EQUIVALENT
3/16" (0.1875) = .183 ± .001	4.6 mm ± .02
1/4" (0.250) = .245 ± .002	6.3 mm ± .05
5/16" (0.312) = .308 ± .002	7.8 mm ± .05
3/8" (0.375) = .370 ± .002	9.4 mm ± .05
7/16" (0.437) = .432 ± .002	11.0 mm ± .05
1/2" (0.500) = .494 ± .003	12.6 mm ± .07
9/16" (0.562) = .562 ± .003	14.3 mm ± .07
5/8" (0.625) = .620 ± .003	14.3 mm ± .07
11/16" (0.687) = .681 ± .003	15.8 mm ± .07
3/4" (0.750) = .744 ± .003	17.3 mm ± .07
13/16" (0.812) = .812 ± .003	20.6 mm ± .07
7/8" (0.875) = .869 ± .003	22.2 mm ± .07
15/16" (0.937) = .932 ± .002	23.7 mm ± .07
1" (1.000) = .992 ± .005	25.2 mm ± .12
1 1/4" (1.250) = 1.244 ± .003	31.6 mm ± .12

METRIC SIZES	ENGLISH EQUIVALENT
10 mm = 9.8 ± .05	.394" = .389" ± .003

Length Tolerances: ± .062" (1.6 mm). For closer tolerances contact Fast Heat.

The Fast Heat Standard Cartridge heater is computer designed and specified to include components that are equal to the wide variety of applications to which this style of heater will be subjected.

As with the Hi-Temp Cartridge heater, a variety of termination styles can be adapted to this style of heater. When there are termination requirements other than the ones illustrated, please contact Fast Heat.

There may be applications where, due to the wattage requirement, it would be appropriate to specify a Standard Cartridge heater but the application dictates that a Hi-Temp be considered. Such applications are where distributed wattage is required or the heater would be subjected to extreme vibration or impact in operation.

Contact Fast Heat for higher voltage and amperage ratings, and special diameters or tolerances.

AVOIDING COMMON HEATER FAILURE MODES

Use recommended maximum watt density range to avoid excessive watt densities which result in the internal overheating of the heater.

A clean and properly bored hole in relation to heater diameter is required for good heat transfer.

Be aware that moisture/contamination will reduce the life expectancy of a heater. Consider specifying that either the disc or lead end or both be sealed, depending upon the specific conditions to which the heater is being subjected.

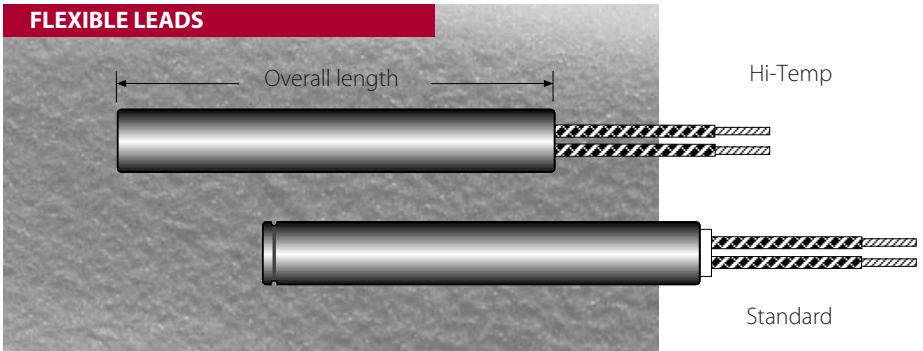
Review lead exit variations and select the style that best suits your particular application. Consider such conditions as contamination, abrasion, flexing and sharp bending of the leads as they exit the heater.

It is recommended that watt density be reduced by 20% for those heaters subjected to frequent cycling.

To avoid burn-out by operating in open air, heated length must always be fully inserted. In addition, an exposed heated section of the heater may cause a hazardous condition.

HI-TEMP/STANDARD
CARTRIDGE HEATERS

FLEXIBLE LEADS

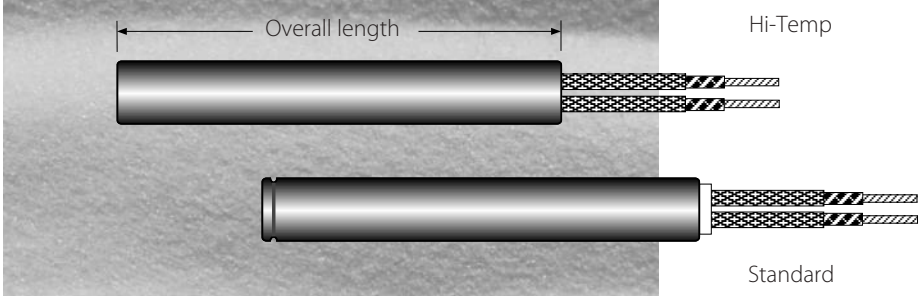


Internally connected leads.

For applications requiring maximum flexibility at lead exit.

10" (25.4 cm) leads standard, other lengths are available.

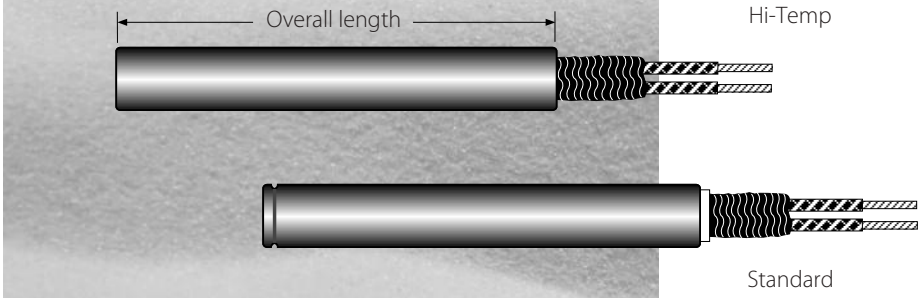
EXTERNALLY CONNECTED LEADS



Hi-Temp Cartridges are provided with approx. 1" (25.4 mm) sleeving over lead junction as standard.

10" (25.4 cm) leads standard, other lengths are available.

STRAIGHT LEADS W/SILK AND PAINT



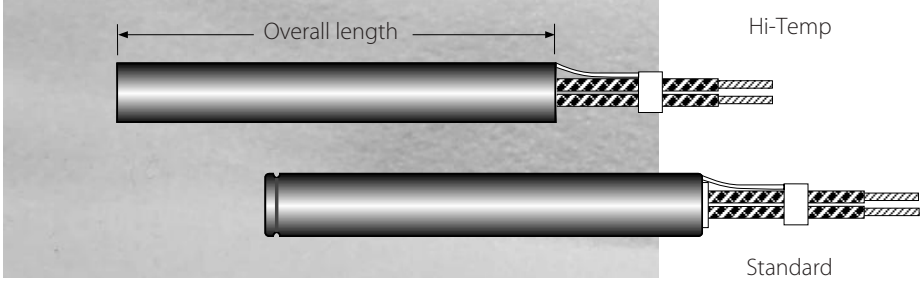
Repairable silk and paint leads for Standard Cartridges.

Hi-Temp Cartridges are provided with approx. 1" (25.4 mm) sleeving as standard.

Silk and paint leads are optional on Hi-Temps.

10" (25.4 cm) leads standard, other lengths are available.

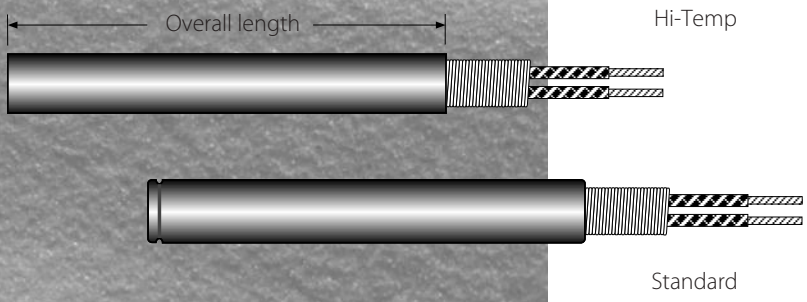
STRAIGHT LEADS W/CLIP SUPPORT



Clip support helps to minimize lead breakage where leads exit heater.

10" (25.4 cm) leads standard, other lengths are available.

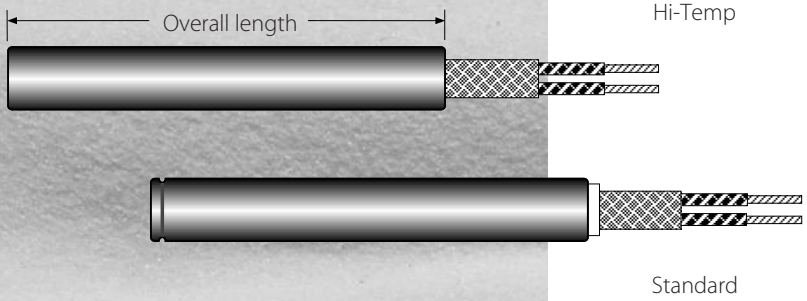
STRAIGHT STRAIN RELIEF SPRING



Straight strain relief spring minimizes bending strain on lead wires.

Spring extends approximately 3" (76.2 mm) beyond end of sheath.

BRAID OVER PAIR OF LEADS

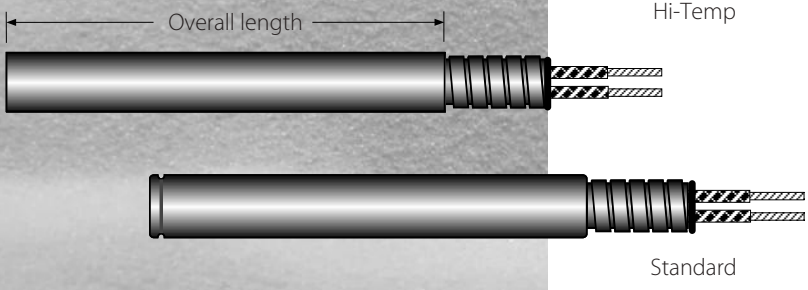


Stainless steel braid over lead wires.

For applications requiring small radius bending and lead wire abrasion protection.

10" (25.4 cm) braid standard, other lengths are available.

SQUARE-LOCK ARMOR STRAIN RELIEF



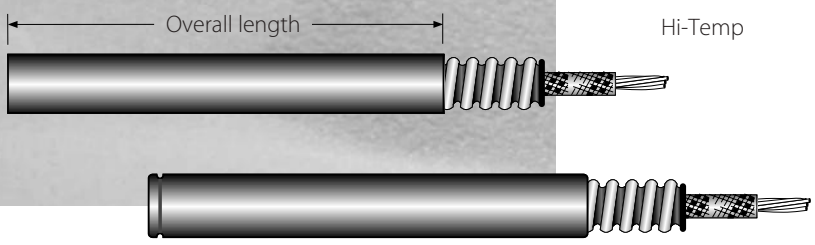
Straight stainless steel armor cable protects leads from abrasion.

Armor sizes include:
Square-lock - 1/4", 5/16", 1/2", and 5/8".

Convoluted - 3/8", and 5/8" only. (Moisture-resistant)

10" (25.4 cm) standard, other lengths are available.

CONVOLUTED ARMOR STRAIN RELIEF



CONVOLUTED ARMOR

- Used in situations that require moisture resistant armor.
- Available in most instances in which armor is utilized.
- Some size restrictions apply.

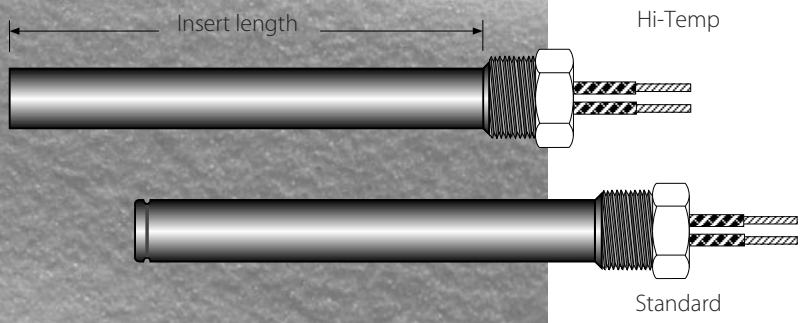
POTTING SYSTEMS AVAILABLE

1. Cement 1000º F (538º C)
2. Epoxy 300º F (149º C)
3. RTV® 500º F (260º C)
4. Teflon® Cap 500º F (260º C)

- Cement seal can be wiped with a Silicon® varnish to inhibit moisture penetration.
- Teflon® Cap requires an extended lead time.

HI-TEMP/STANDARD
CARTRIDGE HEATERS

N.P.T. BUSHING



Hex head N.P.T. bushing attached.

Must specify insert length and bushing material.

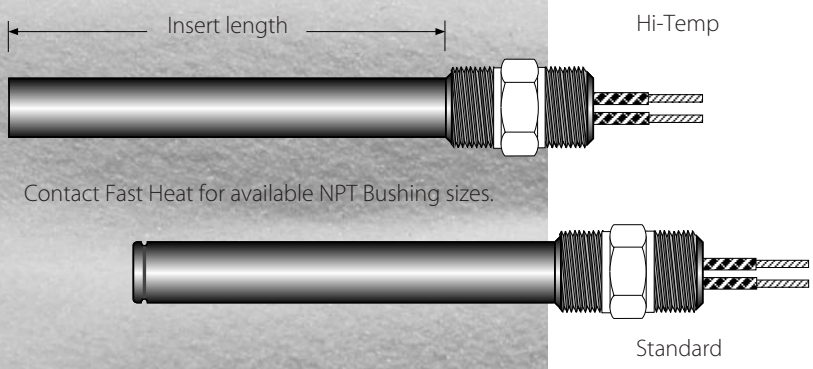
Sheath material types: stainless steel, cold rolled or galvanized.

Bushing material types: brass, stainless steel or steel.

10″ (25.4 cm) leads standard, other lengths are available.

For immersion applications, specify sealed end. Up to 3/4″ (19 mm) dia. Octagonal box available.

HEX CENTER BUSHING



Hex head N.P.T. bushing attached.

Must specify insert length and bushing material.

Sheath material types: stainless steel, steel or brass.

Bushing material types: brass, stainless steel or steel.

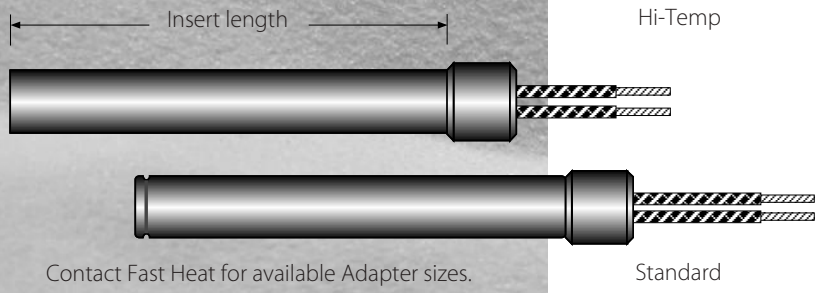
10″ (25.4 cm) leads standard, other lengths are available.

For immersion applications, specify sealed end.

Octagonal or explosion-proof boxes can be adapted to both Standard and Hi-Temp Cartridge heaters.

Consult Fast Heat for details.

ADAPTERS



Must specify insert length and bushing material.

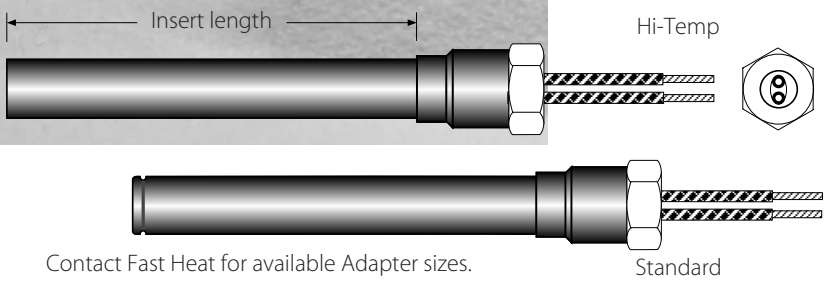
Sheath material types: stainless steel, cold rolled or galvanized.

Bushing material types: brass, stainless steel or steel.

10″ (25.4 cm) leads standard, other lengths are available.

For immersion applications, specify sealed end. 5/8″ to 1″ (15.8 mm to 25.4 mm) dia.

ADAPTERS WITH HEX HEAD



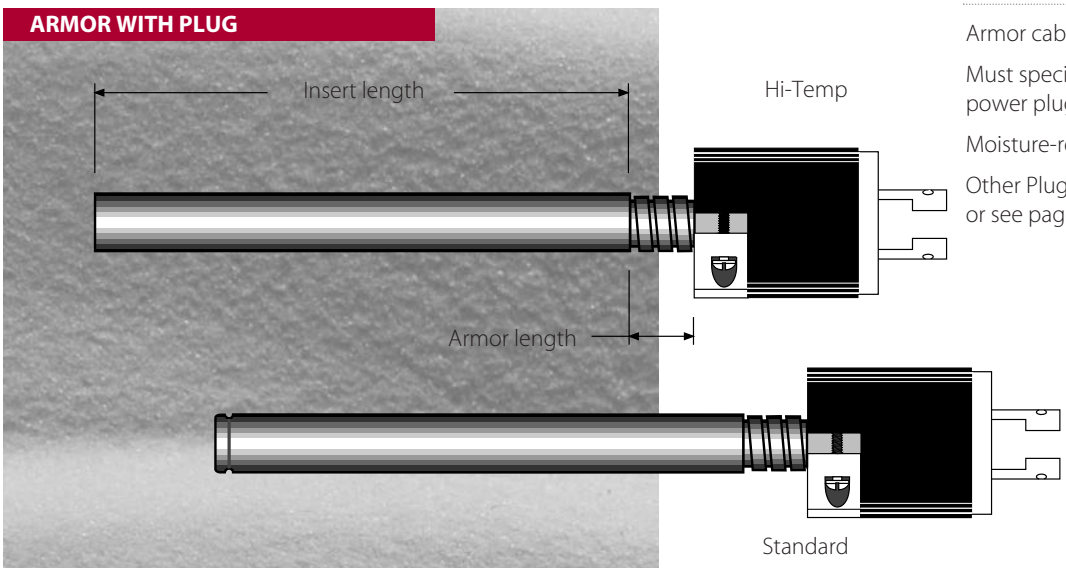
Must specify insert length.

Bushing material is copper.

10″ (25.4 cm) leads standard, other lengths are available.

For immersion applications, specify sealed end. Up to 3/4″ (19 mm) dia.

ARMOR WITH PLUG



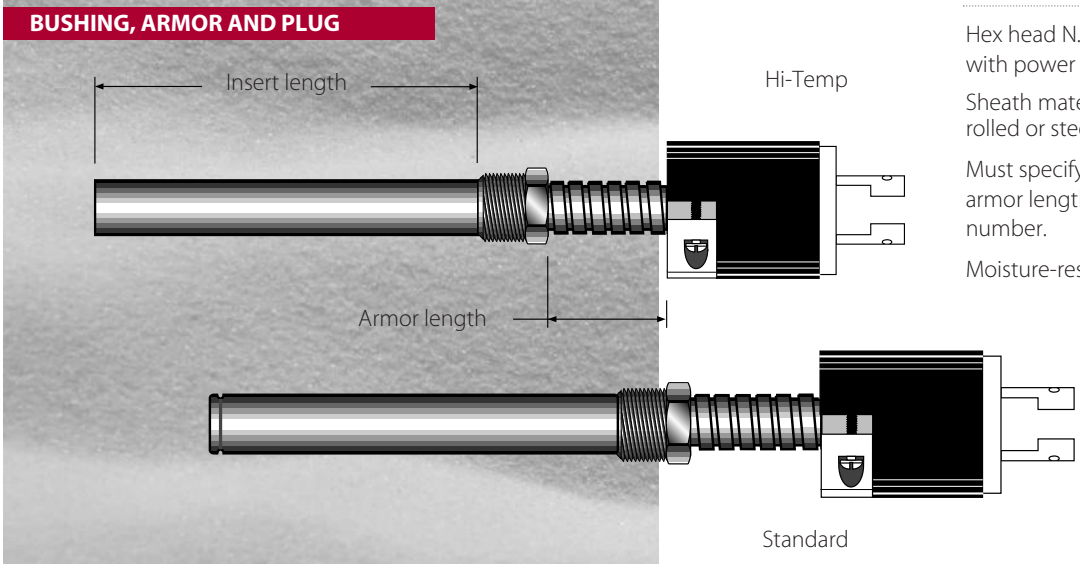
Armor cable with power plug attached.

Must specify armor length and Hubbell® power plug number.

Moisture-resistant armor available.

Other Plugs are available, contact Fast Heat or see page 26 of our QuickShip catalog.

BUSHING, ARMOR AND PLUG



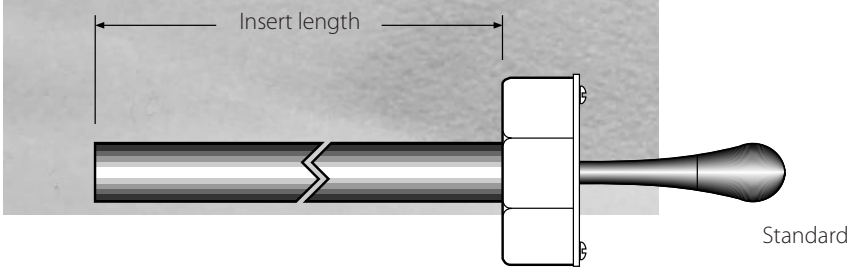
Hex head N.P.T. bushing and armor cable with power plug attached.

Sheath material types: stainless steel, cold rolled or steel.

Must specify insert length, bushing material, armor length and Hubbell® power plug number.

Moisture-resistant armor available.

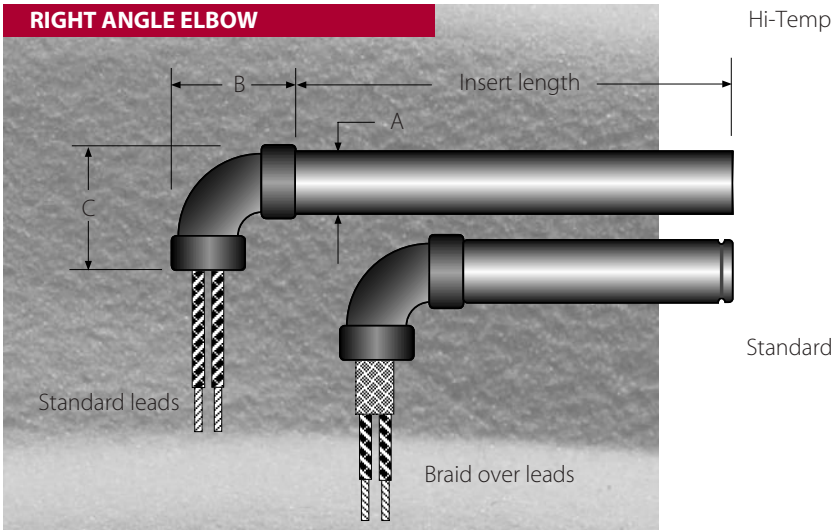
BOLT HEATER



Fast Heat bolt heaters are designed to heat drilled metal surfaces quickly while minimizing heat loss to surrounding areas. Each is designed to expand drilled bolts or studs while maintaining a uniform heat throughout its heated length. Typically, after a bolt is heated (expanded) the holding nut is tightened. The shrink tightness is obtained when the heater is removed and the bolt cools. This process is frequently used in the assembly and/or servicing of heavy duty equipment such as compressors, steam turbines, pressure vessels, etc.

HI-TEMP/STANDARD
CARTRIDGE HEATERS

RIGHT ANGLE ELBOW



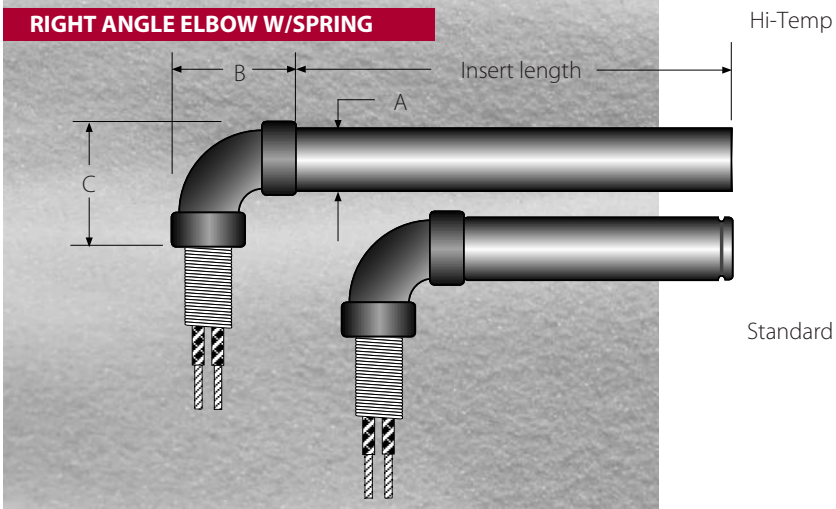
Right angle copper elbow for applications requiring right angle lead exit.

Moisture-resistant seal is optional.

10" (25.4 cm) leads standard, other lengths are available.

Both Hi-Temp and Standard Cartridges are also available with stainless steel braid over the leads (See Standard at left).

RIGHT ANGLE ELBOW W/SPRING



Right angle copper elbow with spring for applications requiring right angle lead exit and reduced bending strain on lead wire.

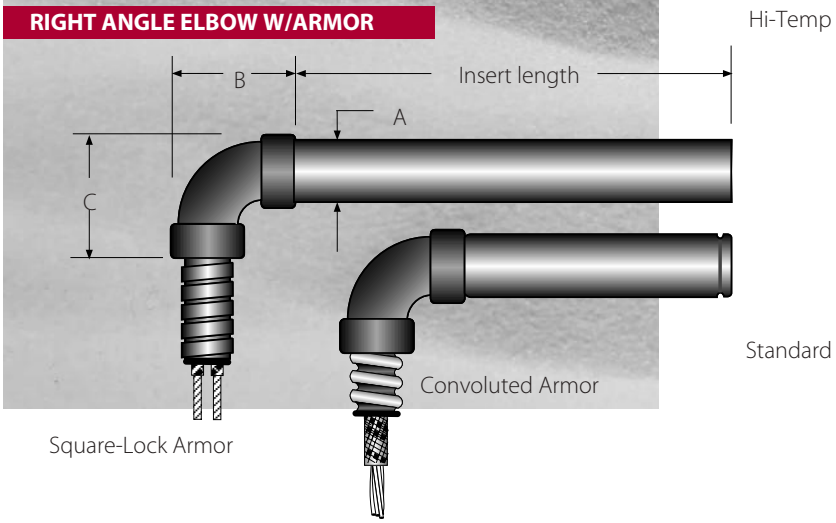
Spring approximately 3" (76.2 mm) long.

10" (25.4 cm) leads standard, other lengths are available.

ELBOW DIMENSIONS

A		B		C	
IN	MM	IN	MM	IN	MM
3/8	9.5	1	25.4	1	25.4
1/2	12.8	1 1/4	31.8	1 1/4	31.8
5/8	15.9	1 1/4	31.8	1 1/2	38.1
3/4	19.1	1 5/8	41.3	1 1/2	38.1

RIGHT ANGLE ELBOW W/ARMOR



Right angle copper elbow with armor cable for applications requiring right angle lead exit and lead wire abrasion protection.

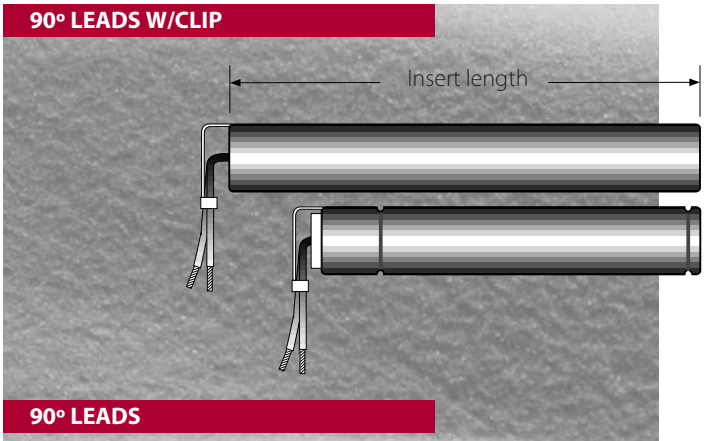
Moisture-resistant armor and seal are optional.

10" (25.4 cm) armor standard, other lengths are available.

Both Hi-Temp and Standard Cartridges are available with either Convoluted or Square-Lock Armor over the leads.

NOTE: Convoluted armor is available in 3/8" and 5/8" diameters.

90° LEADS W/CLIP



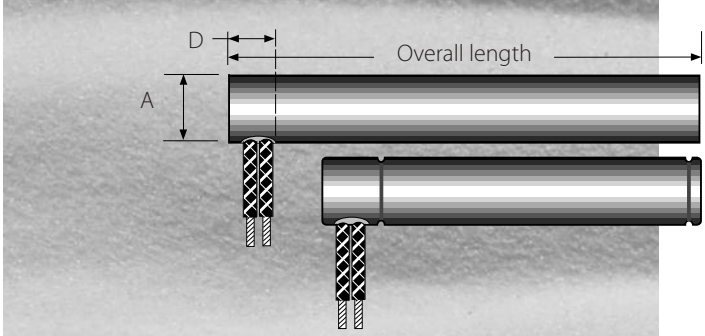
Hi-Temp

Standard

Clip support helps to minimize lead breakage where leads exit heater.

10" (25.4 cm) leads standard, other lengths are available.

90° LEADS



Hi-Temp

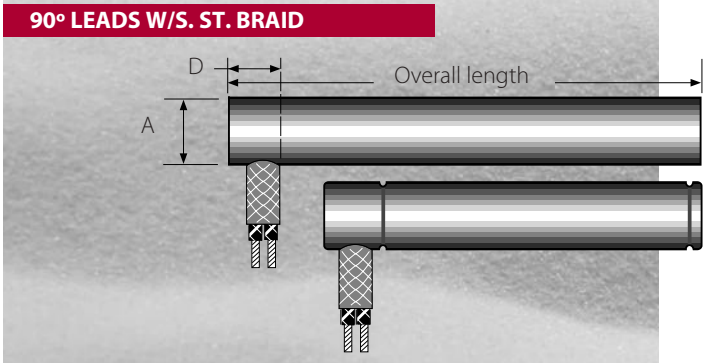
Standard

Leads exit at 90° angle for applications requiring small radius bends, lead wire protection and where space is limited.

10" (25.4 cm) braid standard, other lengths are available.

Order by overall length.

90° LEADS W/S. ST. BRAID



Hi-Temp

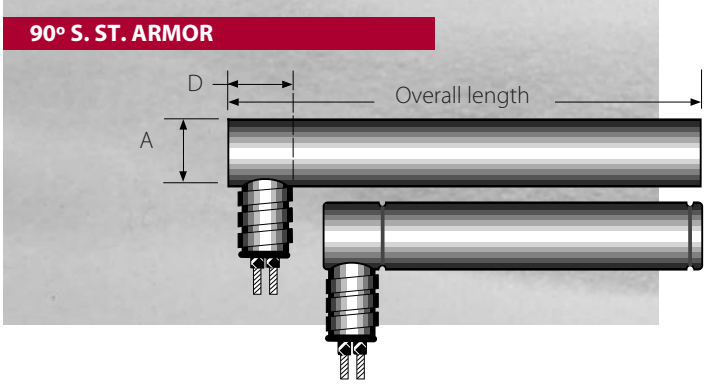
Standard

Braided leads exit at 90° angle for applications requiring small radius bends, lead wire protection and where space is limited.

10" (25.4 cm) braid standard, other lengths are available.

Order by overall length.

90° S. ST. ARMOR



Hi-Temp

Standard

Armor cable exit at 90° angle for applications where space is limited and lead wire abrasion protection is required.

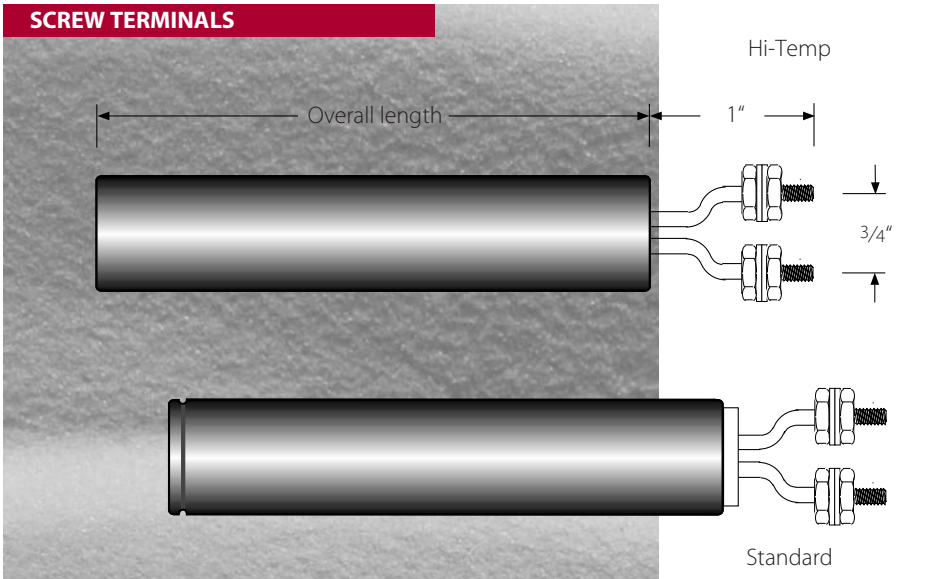
10" (25.4 cm) armor standard, other lengths are available.

Order by overall length.

A		D (min.)	
IN	MM	IN	MM
3/8	9.5	3/8	9.5
1/2	12.7	1/2	12.8
5/8	15.9	5/8	15.9
3/4	19.0	3/4	19.0

HI-TEMP/STANDARD
CARTRIDGE HEATERS

SCREW TERMINALS



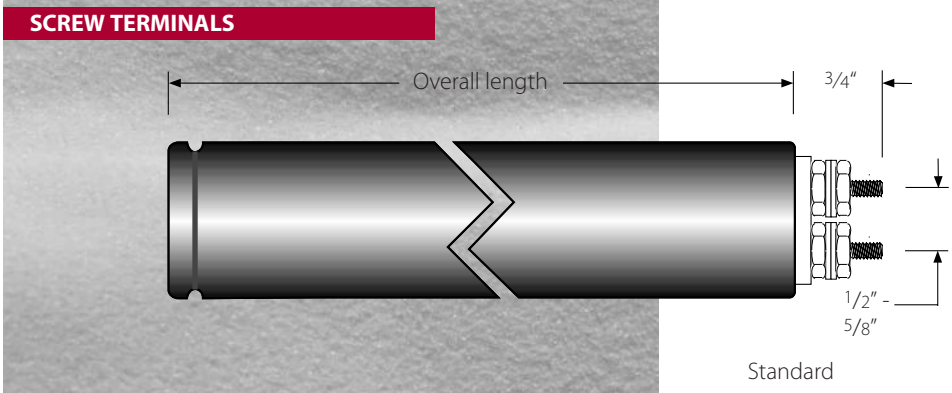
Screw terminals for applications with high amps and requiring universal connection capability. Screw terminals are attached to external pins.

Standard Cartridge 10-32 screw terminal on 3/8″ to 15/16″ (9.5 mm - 23.8 mm) dia.

Hi-Temp 1/2″ to 3/4″ (12.7 mm - 19 mm) dia.

NOTE: The Terminal dimensions shown are approximate size.

SCREW TERMINALS

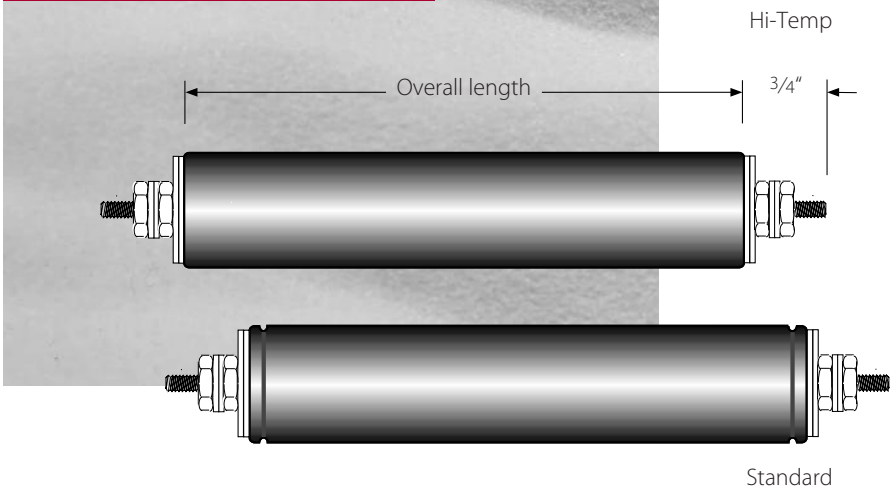


Screw terminals are flush with cap.

Standard Cartridge 10-24 screw terminal 1″ to 1 1/4″ (25.4 mm - 31.8 mm) dia.

NOTE: The Terminal dimensions shown are approximate size.

SCREW TERMINALS



Screw terminals for applications with high amps and requiring universal connection capability.

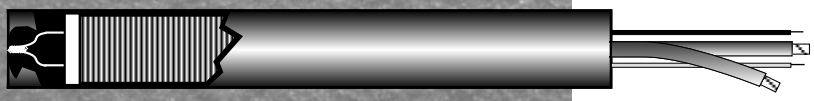
Standard Cartridge 10-32 screw terminal 1/2″ to 1 1/4″ (12.7 mm - 31.7 mm) dia.

Hi-Temp 10-32 screw terminal 1/2″ to 3/4″ (12.7 mm - 19 mm) dia.

NOTE: The Terminal dimensions shown are approximate size.

THERMOCOUPLE LOCATION
CARTRIDGE HEATERS

T/C AT BOTTOM



Hi-Temp

Hi-Temp

BOTTOM GROUNDED

For fast response, heater is positioned in a blind hole or where material flows past or encompasses the heater.

The end disk is always welded in place.

Machined flat up to 1/2" (12.7 mm) dia.

BOTTOM UNGROUNDED

Where circumstances are such that an ungrounded thermocouple is required.

T/C AT CENTER

Hi-Temp

Hi-Temp

CENTER GROUNDED

Selected when a fast response is required.

The thermocouple can be located in any position along the length of the heater. Standard location is midway along the length with approximately 1/4" (6.4 mm) cold section on either side of the junction.

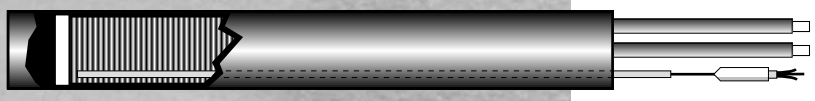
Not available on 1/4" diameter heaters.

CENTER UNGROUNDED

The thermocouple is positioned internally and ungrounded to monitor the heater temperature.

Generally used in research and development applications.

REMOVEABLE THERMOCOUPLE



Hi-Temp

REMOVEABLE THERMOCOUPLE

The thermocouple is inserted down a hypotube for easy removal.

T/C AVAILABILITY
All heaters shown are Hi-Temp 10" leads, type "J" T/C standard, type "K" T/C is available.

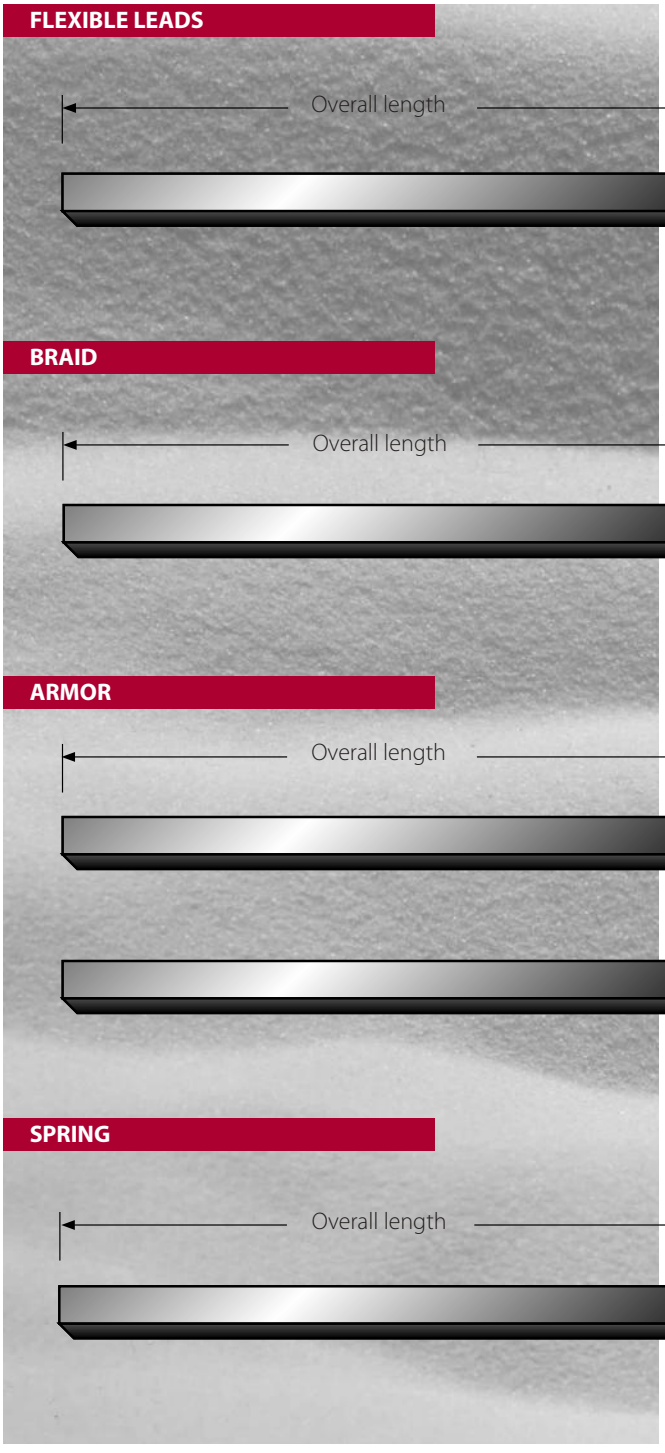
T/C available in all Standard Cartridge heaters. Located at bottom ungrounded and center ungrounded.

HI-TEMP T/C LOCATION AVAILABILITY

HTR DIA.	GROUNDED		UNGROUNDED	
	BOTTOM	CENTER	BOTTOM	CENTER
1/4" (6.4 mm)	Y	N	Y	Y
5/16" (7.9 mm)	Y	N	Y	Y
3/8" (9.5 mm)	Y	Y	Y	Y
1/2" (12.7 mm)	Y	Y	Y	Y
5/8" (15.9 mm)	Y	Y	Y	Y

SQUARE
CARTRIDGE HEATERS

FLEXIBLE LEADS



Internally connected leads.

For applications requiring maximum flexibility at lead exit.

10" (25.4 cm) leads standard, other lengths are available.

BRAID

Stainless steel braid over lead wires.

For applications requiring small radius bending and lead wire abrasion protection.

10" (25.4 cm) braid standard, other lengths are available.

ARMOR

Straight stainless steel armor cable protects leads from abrasion.

Moisture-resistant armor available.

10" (25.4 cm) armor standard, other lengths are available.

NOTE: Convoluted armor is available in 3/8" and 5/8" diameters.

SPRING

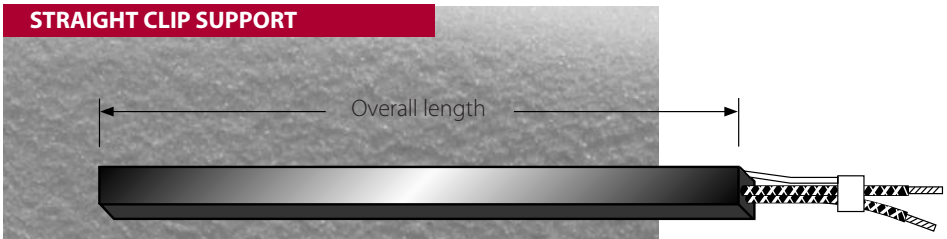
Straight strain relief spring minimizes bending strain on lead wires.

Spring extends approx. 3" (76.2 mm) beyond end of sheath.

10" (25.4 cm) leads standard, other lengths are available.

NOTE: All of the Square Cartridge heaters are available in either Hi-Temp (85 to 90 watts per square inch, depending on the application) or Standard (35 to 40 watts per square inch, depending on the application).

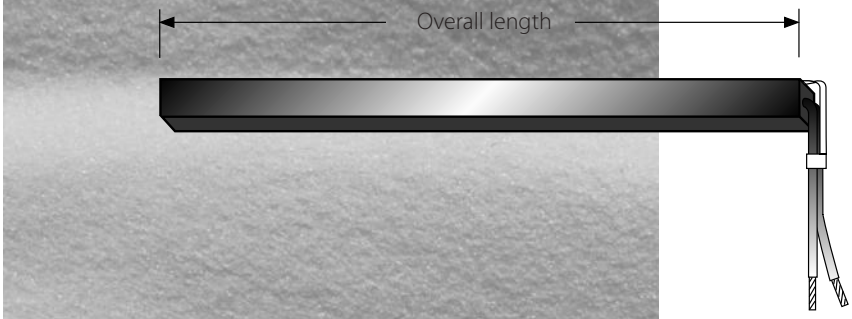
STRAIGHT CLIP SUPPORT



Clip support helps to minimize lead breakage where leads exit heater.

10" (25.4 cm) leads standard, other lengths are available.

90° CLIP SUPPORT

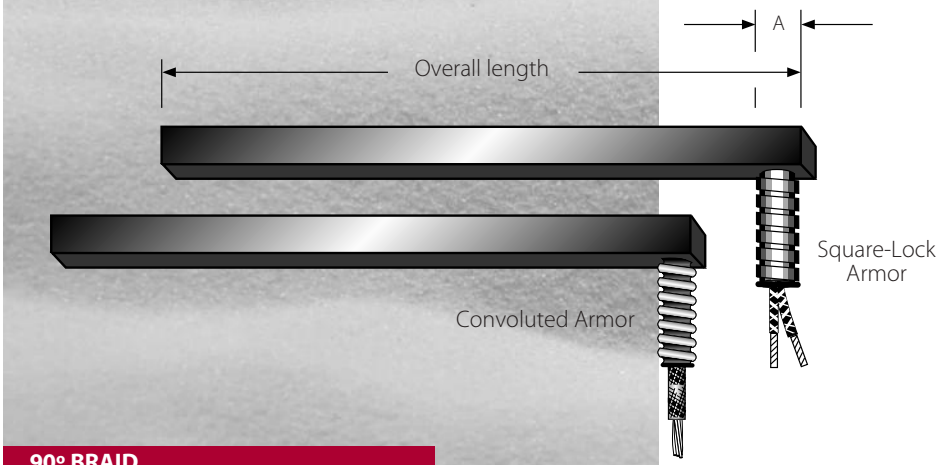


Clip support helps to minimize lead breakage where leads exit heater.

10" (25.4 cm) leads standard, other lengths are available.

SIZE	WIDTH TOLERANCE	DIM. A MAX.
3/8" x 3/8" (9.5 mm x 9.5 mm)	.370" ± .002" (9.4 mm ± .05 mm)	7/16" (11.1 mm)
1/2" x 1/2" (12.7 mm x 12.7 mm)	.495" ± .002" (12.6 mm ± .05 mm)	9/16" (14.3 mm)
5/8" x 5/8" (15.9 mm x 15.9 mm)	.620" ± .002" (15.7 mm ± .05 mm)	11/16" (17.5 mm)

90° ARMOR



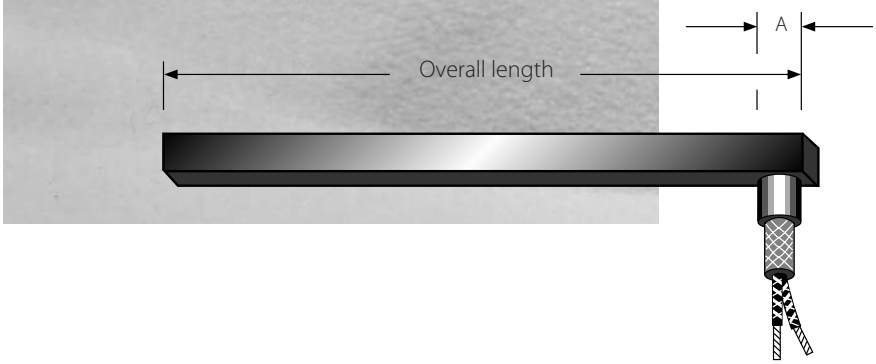
Armor cable exit at 90° angle for applications where space is limited and lead wire abrasion protection is required.

10" (25.4 cm) armor standard, other lengths are available.

Order by overall length.

NOTE: Convoluted armor is available in 3/8" and 5/8" diameters.

90° BRAID



Braided leads exit at 90° angle for applications requiring small radius bends, lead wire protection and where space is limited.

10" (25.4 cm) braid standard, other lengths are available.

Order by overall length.

CARTRIDGE **HEATERS**

PRECISION STANDARD SQUARE CARTRIDGE HEATERS

Our Square Cartridge heaters, 3/8" (9.5 mm), 1/2" (12.7 mm), and 5/8" (15.9 mm) square, provide more surface area contact than cylindrical types. Square Cartridge heaters are normally inserted in a milled slot, therefore permitting greater lengths than would be practically feasible with a drilled or reamed hole.

As with our Standard Cartridge, Fast Heat's Square Cartridge heater features a stainless steel sheath for resistance to oxidation and can withstand internal temperatures of up to 1000º F (538º C). In order to optimize heat transfer and lengthen the life of the heater, high-purity magnesium oxide (MgO) insulation fills any space around the resistor wire.

APPLICATIONS

Square Cartridge heaters can be used in virtually any application involving average temperatures and vibration. Some examples include sealing bars, heating platens, heating fluids and forming.

Square Cartridges can also be modified to meet the demands of virtually any special application. Our engineers can utilize a variety of alternative features and options to customize the heater to your specific needs.

APPLICATION FOR SELECTION OF CARTRIDGE HEATERS IN PLATENS

Whether round or square cartridges are used, close contact of the heater to the component being heated is important.

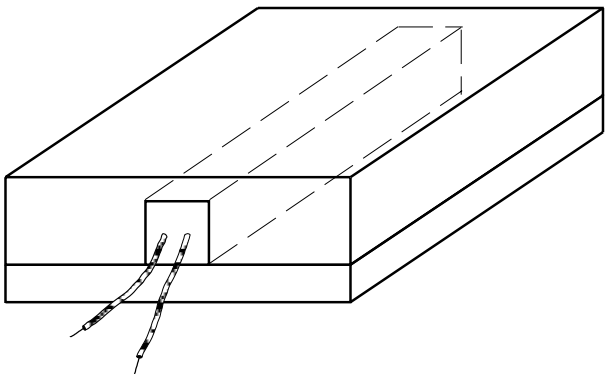
When the application is such that the hole into which a round heater is to be inserted is too long for practical drilling and reaming, a Square Cartridge can be selected.

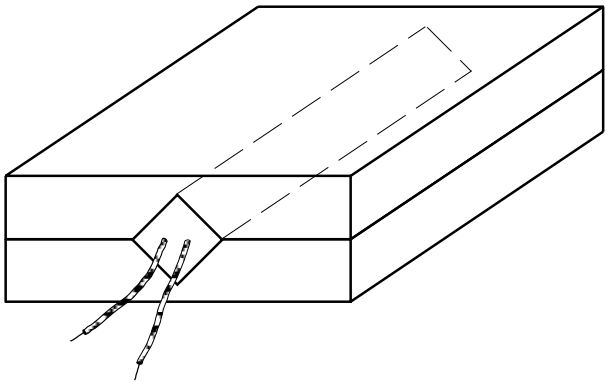
By considering a split plate design, platen recesses for the Square heater can be milled for greater lengths or to keep the machine in-house.

For even heating along the length of the heaters, consider distributed wattage.

If terminations are protected by a wire enclosure box and the platen is operating in excess of 450º F (232º C), consider specifying high temperature mica tape leads.

To leads that are flexing, add clip supports; where there is abrasion, cover the leads with stainless steel braid. For possible contamination, request armor.





HI-TEMP OPEN AIR TEST

This test was conducted using a 5/8" dia. x 6" (15.8 mm x 152 mm) long, 750 watt 240 volt Hi-Temp Cartridge heater. The test was conducted in ambient air 70° F (21° C). A type 'J' thermocouple was attached to the heater at the center of the sheath. The voltage was varied through a variac to obtain proper power input for corresponding watt density.

WATT DENSITY CALCULATIONS:

Watt density of a Hi-Temp Cartridge is simply the total heater wattage divided by the heated area of the cartridge in square inches.

$$\text{Watt Density} = \frac{\text{Total Heater Wattage}}{\text{(Heated Length) x Cartridge Dia. x 3.14}}$$

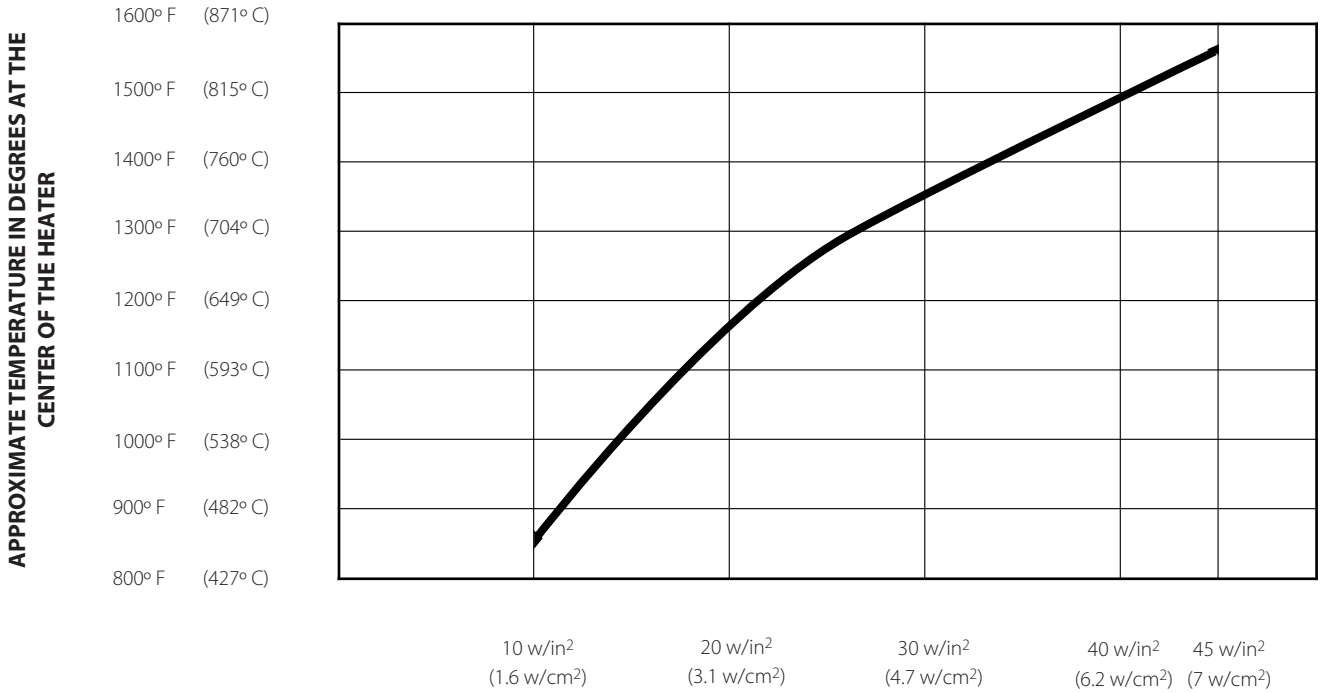
Heated Length = OAL – Unheated Sections

(OAL - Overall Length)

The subtraction of 3/4" from the overall length in the above equations is a general allowance for the watt density calculations on Standard Cartridge heaters only.

Hi-Temp Cartridge heaters, heated length varies depending upon heater diameter and length.

For specific unheated sections contact Fast Heat.



WATTS PER SQUARE INCH / WATTS PER SQUARE CM SHEATH; HI-TEMP CARTRIDGE HEATER (THIS GRAPH FOR REFERENCE ONLY)

HI-TEMP
CARTRIDGE HEATERS

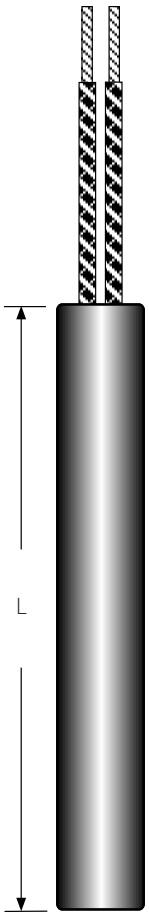
1/4" (6.4 MM) DIA. HI-TEMP – INTERNALLY CONNECTED, 10" FLEXIBLE LEADS

10" (25.4 cm) fiberglass leads, 300 volt rating, leads connected under cap.

L				
IN	MM	WATTS	120V	240V
1	25.4	100	◆	
1 1/4	31.8	100	◆	
1 1/4	31.8	150	◆	
1 1/4	31.8	225		◆
1 1/2	38.1	100	◆	
1 1/2	38.1	175	◆	
1 1/2	38.1	200	◆	
1 1/2	38.1	200		◆
1 1/2	38.1	250		◆
2	50.8	100	◆	
2	50.8	125		◆
2	50.8	200	◆	
2	50.8	200		◆
2	50.8	250		◆
2	50.8	300		◆
2 1/2	63.5	250	◆	
2 1/2	63.5	250		◆
3	76.2	100	◆	
3	76.2	200	◆	
3	76.2	200		◆
3	76.2	300	◆	
3	76.2	300		◆
4	101.6	200		◆
4	101.6	300	◆	
4	101.6	300		◆
4 1/2	114.3	200	◆	
5	127.0	350		◆
6	152.4	400		◆

TERMINATION

- Internally connected leads.
- For applications requiring maximum flexibility at lead exit.
- 10" (25.4 cm) leads standard, other lengths are available.



OTHER SIZES AVAILABLE

- Other sizes and variations are available as made to order items.
- Please consult Fast Heat for the current lead times.

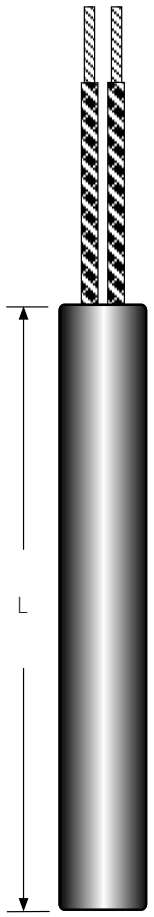
3/8" (9.5 MM) DIA. HI-TEMP – INTERNALLY CONNECTED, 10" FLEXIBLE LEADS

10" (25.4 cm) fiberglass leads, 300 volt rating, leads connected under cap.

L				
IN	MM	WATTS	120V	240V
1	25.4	100	◆	
1	25.4	150	◆	
1	25.4	200		◆
1 1/4	31.8	200	◆	
1 1/4	31.8	200		◆
1 1/2	38.1	75	◆	
1 1/2	38.1	100	◆	
1 1/2	38.1	100		◆
1 1/2	38.1	150	◆	
1 1/2	38.1	200	◆	
1 1/2	38.1	200		◆
1 1/2	38.1	250	◆	
1 1/2	38.1	250	◆	
1 3/4	44.5	175	◆	
1 3/4	44.5	250	◆	
1 3/4	44.5	250		◆
2	50.8	100	◆	
2	50.8	100		◆
2	50.8	150	◆	
2	50.8	150		◆
2	50.8	200	◆	
2	50.8	200		◆
2	50.8	250	◆	
2	50.8	250		◆
2	50.8	300	◆	
2	50.8	300		◆
2	50.8	400	◆	
2	50.8	400		◆
2 1/4	57.2	125	◆	
2 1/4	57.2	125		◆
2 1/4	57.2	175	◆	
2 1/4	57.2	250	◆	
2 1/4	57.2	250		◆
2 1/4	57.2	300	◆	
2 1/4	57.2	300		◆
2 1/4	57.2	350	◆	
2 1/4	57.2	350		◆
2 1/2	63.5	200	◆	
2 1/2	63.5	250	◆	
2 1/2	63.5	250		◆
2 1/2	63.5	400	◆	
2 1/2	63.5	400		◆
2 1/2	63.5	500	◆	
2 1/2	63.5	500		◆

TERMINATION

- Internally connected leads.
- For applications requiring maximum flexibility at lead exit.
- 10" (25.4 cm) leads standard, other lengths are available.



- Optional 15/16" O.D. fins available on 3/8" diameter heaters only.
(See page 25 for diagram)

HI-TEMP
CARTRIDGE HEATERS

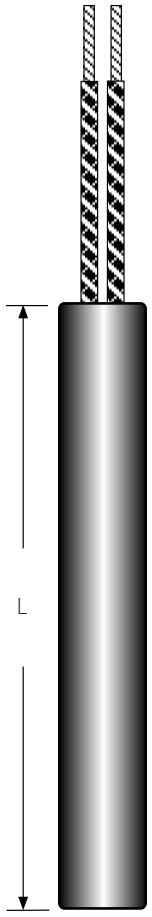
3/8" (9.5 MM) DIA. HI-TEMP – INTERNALLY CONNECTED, 10" FLEXIBLE LEADS

10" (25.4 cm) fiberglass leads, 300 volt rating, leads connected under cap.

L				
IN	MM	WATTS	120V	240V
3	76.2	100	◆	
3	76.2	150	◆	
3	76.2	200	◆	
3	76.2	200		◆
3	76.2	250	◆	
3	76.2	250		◆
3	76.2	300	◆	
3	76.2	300		◆
3	76.2	400	◆	
3	76.2	400		◆
3	76.2	500	◆	
3	76.2	500		◆
3	76.2	600		◆
3 1/2	88.9	250	◆	
3 1/2	88.9	250		◆
3 1/2	88.9	300	◆	
3 1/2	88.9	300		◆
3 1/2	88.9	500	◆	
3 1/2	88.9	500		◆
4	101.6	125	◆	
4	101.6	125		◆
4	101.6	150	◆	
4	101.6	250	◆	
4	101.6	250		◆
4	101.6	350		◆
4	101.6	400	◆	
4	101.6	400		◆
4	101.6	425		◆
4	101.6	500	◆	
4	101.6	500		◆
4 1/2	114.3	300	◆	
4 1/2	114.3	300		◆
4 1/2	114.3	500	◆	
4 1/2	114.3	500		◆
5	127.0	150	◆	
5	127.0	150		◆
5	127.0	300	◆	
5	127.0	300		◆
5	127.0	500	◆	
5	127.0	500		◆
5	127.0	550		◆
5	127.0	750		◆
5	127.0	1000		◆
5 1/2	139.7	600		◆
5 1/2	139.7	1000		◆

TERMINATION

- Internally connected leads.
- For applications requiring maximum flexibility at lead exit.
- 10" (25.4 cm) leads standard, other lengths are available.



- Optional 15/16" O.D. fins available on 3/8" diameter heaters only. (See page 25 for diagram)

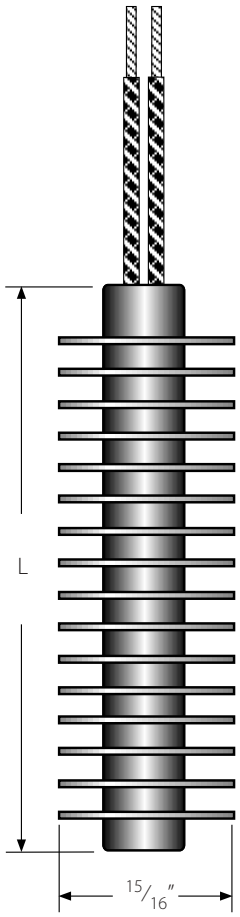
3/8" (9.5 MM) DIA. HI-TEMP – INTERNALLY CONNECTED, 10" FLEXIBLE LEADS

10" (25.4 cm) fiberglass leads, 300 volt rating, leads connected under cap.

L				
IN	MM	WATTS	120V	240V
6	152.4	200	◆	
6	152.4	250	◆	
6	152.4	250		◆
6	152.4	400	◆	
6	152.4	400		◆
6	152.4	500		◆
6	152.4	600	◆	
6	152.4	600		◆
6	152.4	675		◆
6	152.4	750		◆
6	152.4	1000		◆
6 1/2	165.1	600		◆
6 1/2	165.1	1000		◆
7	177.8	250		◆
7	177.8	500		◆
7	177.8	600	◆	
7	177.8	600		◆
7	177.8	675		◆
7	177.8	775		◆
7 1/2	190.5	600		◆
7 1/2	190.5	850		◆
7 1/2	190.5	1000		◆
8	203.2	300	◆	
8	203.2	300		◆
8	203.2	400	◆	
8	203.2	500	◆	
8	203.2	500		◆
8	203.2	900		◆
8	203.2	1000		◆
10	254.0	400	◆	
10	254.0	600	◆	
10	254.0	700		◆
10	254.0	1125		◆

TERMINATION

- Internally connected leads.
- For applications requiring maximum flexibility at lead exit.
- 10" (25.4 cm) leads standard, other lengths are available.



- Optional 15/16" O.D. fins available on 3/8" diameter heaters only. (See diagram above)

OTHER SIZES AVAILABLE

- Other sizes and variations are available as made to order items.
- Please consult Fast Heat for the current lead times.

HI-TEMP
CARTRIDGE HEATERS

1/2" (12.7 MM) DIA. HI-TEMP – INTERNALLY CONNECTED, 10" FLEXIBLE LEADS

10" (25.4 cm) fiberglass leads, 300 volt rating, leads connected under cap.

L				
IN	MM	WATTS	120V	240V
2 1/2	63.5	100	◆	
2 1/2	63.5	100		◆
2 1/2	63.5	250	◆	
2 1/2	63.5	250		◆
2 1/2	63.5	400	◆	
2 1/2	63.5	400		◆
2 1/2	63.5	500	◆	
2 1/2	63.5	500		◆
3	76.2	125	◆	
3	76.2	125		◆
3	76.2	250	◆	
3	76.2	300	◆	
3	76.2	300		◆
3	76.2	400		◆
3	76.2	500	◆	
3	76.2	500		◆
3	76.2	600	◆	
3	76.2	600		◆
3	76.2	750	◆	
3	76.2	750		◆
3 1/2	88.9	250	◆	
3 1/2	88.9	250		◆
3 1/2	88.9	350		◆
3 1/2	88.9	500	◆	

5/8" (15.9 MM) DIA. HI-TEMP – INTERNALLY CONNECTED, 10" FLEXIBLE LEADS

10" (25.4 cm) fiberglass leads, 300 volt rating, leads connected under cap.

L				
IN	MM	WATTS	120V	240V
3	76.2	150	◆	
3	76.2	250	◆	
3	76.2	250		◆
3	76.2	500	◆	
3	76.2	500		◆
3	76.2	750		◆

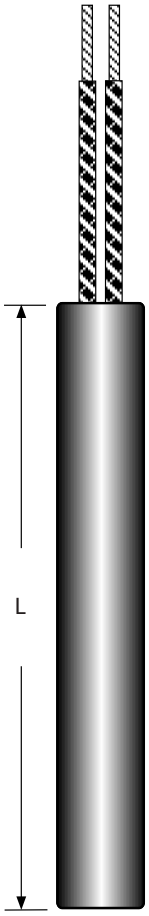
1" (25.4 MM) DIA. HI-TEMP – INTERNALLY CONNECTED, 10" FLEXIBLE LEADS

10" (25.4 cm) fiberglass leads, 300 volt rating, leads connected under cap.

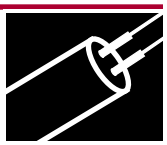
L					
IN	MM	WATTS	120V	240V	480V
2	50.8	285	◆	◆	◆
3	76.2	500	◆	◆	◆
4	101.6	750	◆	◆	◆
6	152.4	1000	◆	◆	◆
8	203.2	1250	◆	◆	◆
10	254.0	1750	◆	◆	◆
12	304.8	2000		◆	◆

TERMINATION

- Internally connected leads.
- For applications requiring maximum flexibility at lead exit.
- 10" (25.4 cm) leads standard, other lengths are available.



METRIC HI-TEMP
CARTRIDGE HEATERS



METRIC HI-TEMP – INTERNALLY CONNECTED, 10" FLEXIBLE LEADS

DIA.		L				
MM	IN	MM	IN	WATTS	120V	240V
6.5	0.255	40	1.574	75	◆	◆
6.5	0.255	50	1.968	100	◆	◆
6.5	0.255	60	2.362	150	◆	◆
6.5	0.255	80	3.149	200	◆	◆
6.5	0.255	100	3.937	250	◆	◆
6.5	0.255	130	5.118	300	◆	◆
6.5	0.255	150	5.905	350	◆	◆
8.0	0.314	40	1.574	100	◆	◆
8.0	0.314	50	1.968	150	◆	◆
8.0	0.314	60	2.362	175	◆	◆
8.0	0.314	80	3.149	250	◆	◆
8.0	0.314	100	3.937	300	◆	◆
8.0	0.314	130	5.118	350	◆	◆
8.0	0.314	150	5.905	400	◆	◆
8.0	0.314	180	7.086	500	◆	◆
8.0	0.314	200	7.874	550	◆	◆
10.0	0.393	40	1.574	150	◆	◆
10.0	0.393	50	1.968	175	◆	◆
10.0	0.393	60	2.362	250	◆	◆
10.0	0.393	80	3.149	300	◆	◆
10.0	0.393	100	3.937	350	◆	◆
10.0	0.393	130	5.118	450	◆	◆
10.0	0.393	150	5.905	550	◆	◆
10.0	0.393	180	7.086	650	◆	◆
10.0	0.393	200	7.874	750	◆	◆
10.0	0.393	230	9.055	850	◆	◆
10.0	0.393	250	9.842	1000	◆	◆
10.0	0.393	280	11.023	1100	◆	◆
10.0	0.393	300	11.811	1200	◆	◆

TERMINATION

- Standard fiberglass flexible leads.
- Standard lead length: 25.4 cm (10")

OTHER SIZES AVAILABLE

- Other sizes and variations are available as made to order items.
- Please consult Fast Heat for the current lead times.

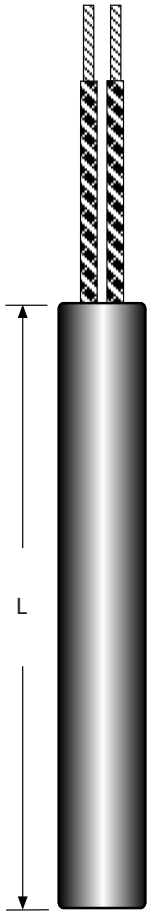
METRIC HI-TEMP
CARTRIDGE HEATERS

METRIC HI-TEMP – INTERNALLY CONNECTED, 10" FLEXIBLE LEADS

DIA.		L				
MM	IN	MM	IN	WATTS	120V	240V
12.5	0.492	40	1.574	175	◆	◆
12.5	0.492	50	1.968	250	◆	◆
12.5	0.492	60	2.362	300	◆	◆
12.5	0.492	80	3.149	400	◆	◆
12.5	0.492	100	3.937	500	◆	◆
12.5	0.492	130	5.118	550	◆	◆
12.5	0.492	150	5.905	650	◆	◆
12.5	0.492	180	7.086	800	◆	◆
12.5	0.492	200	7.874	900	◆	◆
12.5	0.492	230	9.055	1100	◆	◆
12.5	0.492	250	9.842	1200	◆	◆
12.5	0.492	280	11.023	1350	◆	◆
12.5	0.492	300	11.811	1500	◆	◆
15.0	0.590	50	1.968	300	◆	◆
15.0	0.590	60	2.362	350	◆	◆
15.0	0.590	80	3.149	450	◆	◆
15.0	0.590	100	3.937	600	◆	◆
15.0	0.590	130	5.118	700	◆	◆
15.0	0.590	150	5.905	850	◆	◆
15.0	0.590	180	7.086	1000	◆	◆
15.0	0.590	200	7.874	1250	◆	◆
15.0	0.590	230	9.055	1450	◆	◆
15.0	0.590	250	9.842	1550	◆	◆
15.0	0.590	280	11.023	1750	◆	◆
15.0	0.590	300	11.811	2000	◆	◆
16.0	0.629	50	1.968	300	◆	◆
16.0	0.629	60	2.362	350	◆	◆
16.0	0.629	80	3.149	450	◆	◆
16.0	0.629	100	3.937	600	◆	◆
16.0	0.629	130	5.118	700	◆	◆
16.0	0.629	150	5.905	850	◆	◆
16.0	0.629	180	7.086	1000	◆	◆
16.0	0.629	200	7.874	1250	◆	◆
16.0	0.629	230	9.055	1450	◆	◆
16.0	0.629	250	9.842	1550	◆	◆
16.0	0.629	280	11.023	1750	◆	◆
16.0	0.629	300	11.811	2000	◆	◆

TERMINATION

- Standard fiberglass flexible leads.
- Standard lead length: 25.4 cm (10")



OTHER SIZES AVAILABLE

- Other sizes and variations are available as made to order items: 12 mm, 12.7, 14, 17.5, 19.5, 20.
- Please consult Fast Heat for the current lead times.

THERMOCOUPLES AND THEIR PLACEMENT

DIA.	DISC END GROUNDED	CENTER GROUNDED
6.5	YES	NO
8	YES	NO
10	YES	YES
12.5	YES	YES
15	YES	YES
16	YES	YES

16 mm dia. available in 480 volts.

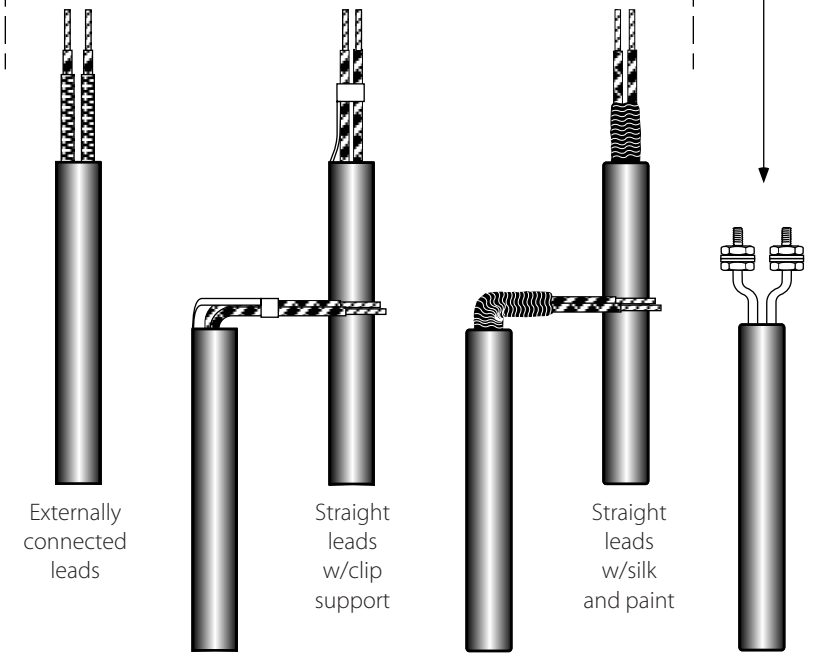
These heaters are available in a variety of terminations. To order, follow the chart below.

CARTRIDGE HEATER
Externally connected with pins

Choose termination type

Leads

Screw terminals



Externally connected leads

Straight leads w/clip support

Straight leads w/silk and paint

Right angle leads 90º clip support

Right angle leads w/silk and paint

Screw terminals

Choose lead length

Customer Service will give you the updated catalog number.

OTHER SIZES AVAILABLE

- Other sizes and variations are available as made to order items.
- Please consult Fast Heat for the current lead times.

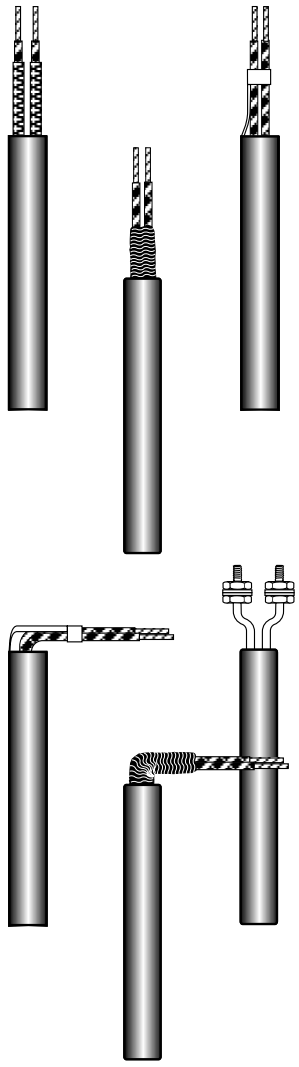
HI-TEMP
CARTRIDGE HEATERS

1/4" (6.4 MM) DIA. HI-TEMP – EXTERNALLY CONNECTED, PINS

L				
IN	MM	WATTS	120V	240V
1	25.4	100	◆	
1	25.4	150	◆	
1 1/4	31.8	100	◆	
1 1/4	31.8	150	◆	
1 1/4	31.8	225		◆
1 1/4	31.8	100	◆	
1 1/4	31.8	150	◆	
1 1/4	31.8	175		◆
1 1/4	31.8	200	◆	
1 1/4	31.8	200		◆
1 1/4	31.8	250		◆
2	50.8	100	◆	
2	50.8	125		◆
2	50.8	200	◆	
2	50.8	200		◆
2	50.8	250	◆	
2	50.8	250		◆
2	50.8	300		◆
3	76.2	125		◆
4	101.6	175	◆	
4	101.6	175		◆

TERMINATION

- These heaters are available in a variety of terminations.
- To order, follow the chart on page 29.

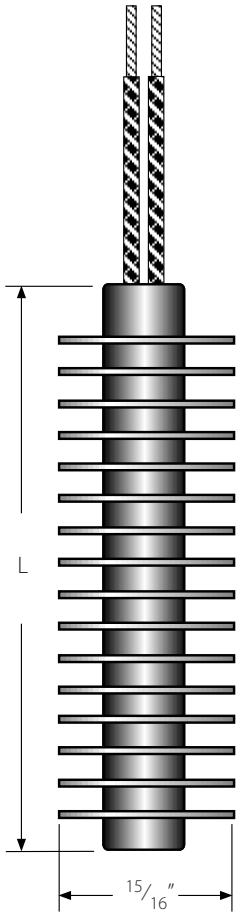


3/8" (9.5 MM) DIA. HI-TEMP – EXTERNALLY CONNECTED, PINS

L				
IN	MM	WATTS	120V	240V
1	25.4	100	◆	
1	25.4	150	◆	
1	25.4	200		◆
1 1/4	31.8	125	◆	
1 1/4	31.8	200	◆	
1 1/4	31.8	200		◆
1 1/2	38.1	75	◆	
1 1/2	38.1	100	◆	
1 1/2	38.1	100		◆
1 1/2	38.1	150	◆	
1 1/2	38.1	200	◆	
1 1/2	38.1	200		◆
1 1/2	38.1	250	◆	
1 1/2	38.1	250		◆
1 3/4	44.5	175	◆	
1 3/4	44.5	250	◆	
1 3/4	44.5	250		◆
2	50.8	100	◆	
2	50.8	100		◆
2	50.8	150	◆	
2	50.8	150		◆
2	50.8	200	◆	
2	50.8	200		◆
2	50.8	250	◆	
2	50.8	250		◆
2	50.8	300	◆	
2	50.8	300		◆
2	50.8	400	◆	
2	50.8	400		◆
2 1/4	57.5	175	◆	
3	76.2	200	◆	
3	76.2	250	◆	
3	76.2	250		◆
3	76.2	300		◆
3	76.2	400		◆
3	76.2	500		◆
4	101.6	250		◆
4	101.6	350	◆	
4	101.6	500		◆
5	127.0	300		◆
5	127.0	500		◆
6	152.4	675		◆
7	177.8	675		◆
8	203.2	1000		◆
10	254.0	1125		◆

TERMINATION

- These heaters are available in a variety of terminations.
- To order, please follow the chart on page 29.



- Optional 15/16" O.D. fins available on 3/8" diameter heaters only. (See diagram above)

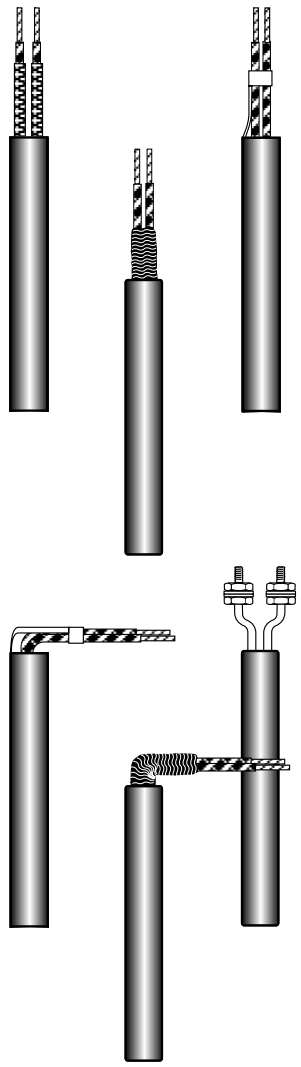
HI-TEMP
CARTRIDGE HEATERS

1/2" (12.7 MM) DIA. HI-TEMP – EXTERNALLY CONNECTED, PINS

L				
IN	MM	WATTS	120V	240V
2 1/2	63.5	250		◆
2 1/2	63.5	400	◆	
2 1/2	63.5	400		◆
2 1/2	63.5	500	◆	
2 1/2	63.5	500		◆
3	76.2	300		◆
3	76.2	500		◆

TERMINATION

- These heaters are available in a variety of terminations.
- To order, please follow the chart on page 29.



OTHER SIZES AVAILABLE

- Other sizes and variations are available as made to order items.
- Please consult Fast Heat for the current lead times.

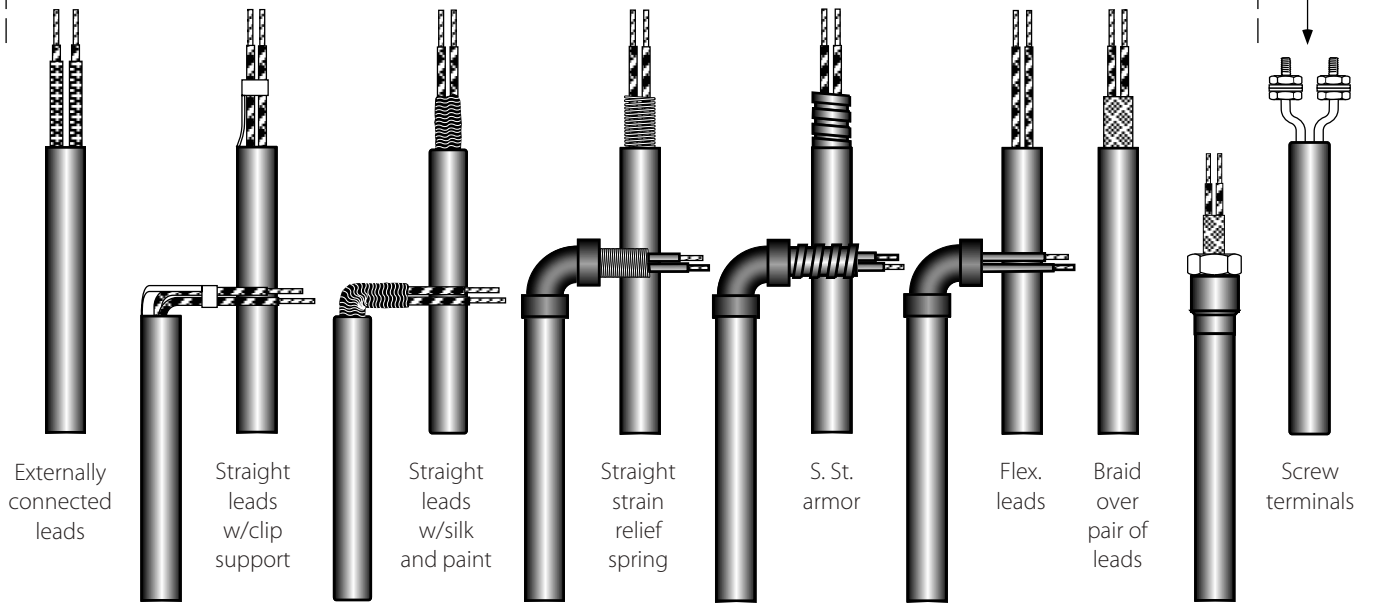
These heaters are available in a variety of terminations. To order, follow the chart below.

CARTRIDGE HEATER
Externally connected with pins

Choose termination type

Leads

Screw terminals



Externally connected leads

Straight leads w/clip support

Straight leads w/silk and paint

Straight strain relief spring

S. St. armor

Flex. leads

Braid over pair of leads

Screw terminals

Right angle leads 90º clip support

Right angle leads w/silk and paint

Right angle copper elbow w/spring

Right angle copper elbow w/armor cable

Right angle copper elbow plain leads

HEX HEAD N.P.T. bushing (Stainless Steel, Cold rolled, or Brass)

Choose lead length

Customer Service will give you the updated catalog number.

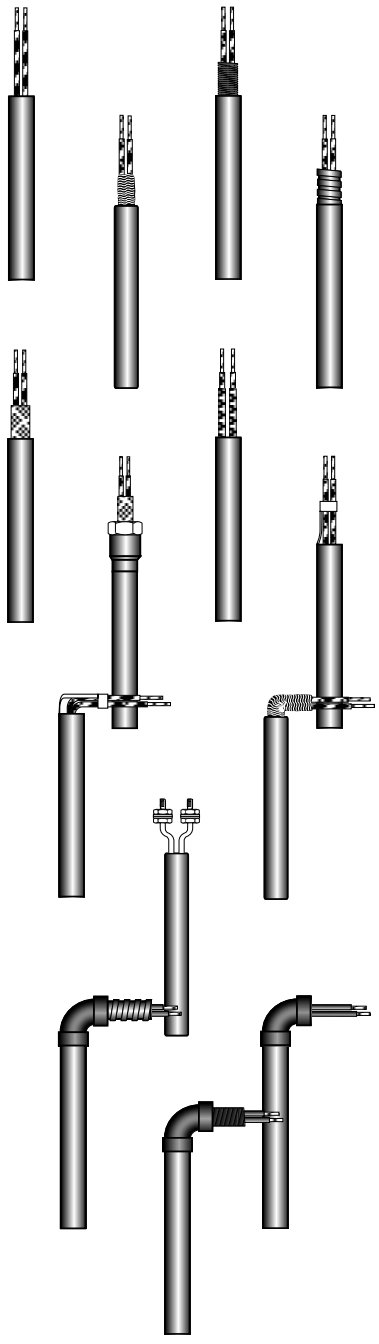
HI-TEMP
CARTRIDGE HEATERS

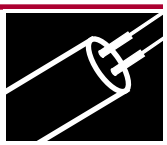
1/2" (12.7 MM) DIA. HI-TEMP – EXTERNALLY CONNECTED, PINS

L				
IN	MM	WATTS	120V	240V
3 1/2	88.9	500		◆
3 1/2	88.9	750		◆
4	101.6	150	◆	
4	101.6	150		◆
4	101.6	250	◆	
4	101.6	250		◆
4	101.6	300	◆	
4	101.6	300		◆
4	101.6	350		◆
4	101.6	400	◆	
4	101.6	400		◆
4	101.6	500	◆	
4	101.6	500		◆
4	101.6	550		◆
4	101.6	750	◆	
4	101.6	750		◆
4	101.6	1000		◆
4 1/2	114.3	500	◆	
4 1/2	114.3	500		◆
4 1/2	114.3	750	◆	
4 1/2	114.3	750		◆
5	127.0	350	◆	
5	127.0	350		◆
5	127.0	500	◆	
5	127.0	500		◆
5	127.0	550		◆
5	127.0	750	◆	
5	127.0	750		◆
5	127.0	1000		◆
5 1/2	139.7	500	◆	
5 1/2	139.7	500		◆
5 1/2	139.7	750	◆	
5 1/2	139.7	750		◆
6	152.4	500	◆	
6	152.4	500		◆
6	152.4	600		◆
6	152.4	750		◆
6	152.4	875		◆
6	152.4	1000	◆	
6	152.4	1000		◆
6 1/2	165.1	500	◆	
6 1/2	165.1	500		◆
6 1/2	165.1	1000		◆

TERMINATION

- These heaters are available in a variety of terminations.
- To order, follow the chart on page 33.





1/2" (12.7 MM) DIA. HI-TEMP – EXTERNALLY CONNECTED, PINS

L				
IN	MM	WATTS	120V	240V
7	177.8	250	◆	
7	177.8	500	◆	
7	177.8	500		◆
7	177.8	600	◆	
7	177.8	600		◆
7	177.8	1000		◆
7 1/2	190.5	500		◆
7 1/2	190.5	1000		◆
8	203.2	500	◆	
8	203.2	500		◆
8	203.2	800		◆
8	203.2	1000	◆	
8	203.2	1000		◆
8	203.2	1175		◆
8	203.2	1500		◆
8	203.2	2000		◆
8 1/2	215.9	500		◆
8 1/2	215.9	1000		◆
9	228.6	500		◆
9	228.6	1000		◆
9	228.6	1325		◆
9 1/2	241.3	500		◆
9 1/2	241.3	1000		◆
10	254.0	1000	◆	
10	254.0	1000		◆
10	254.0	1100		◆
10	254.0	1500		◆
10	254.0	2000		◆
11	279.4	1000		◆
12	304.8	1000	◆	
12	304.8	1000		◆
12	304.8	1100		◆
12	304.8	1500		◆
12	304.8	2000		◆
14	355.6	1000		◆
14	355.6	2300		◆
15	381.0	1500		◆
16	406.4	1000		◆
17	431.8	1000		◆
18	457.2	1500		◆
18	457.2	1700		◆
18	457.2	1000		◆

TERMINATION

- These heaters are available in a variety of terminations.
- To order, follow the chart on page 33.

OTHER SIZES AVAILABLE

- Other sizes and variations are available as made to order items.
- Please consult Fast Heat for the current lead times.

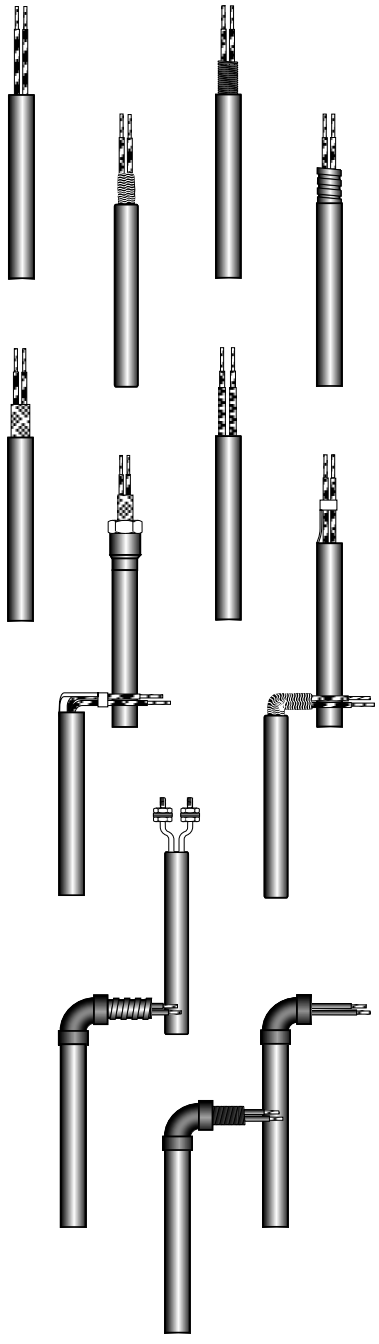
HI-TEMP
CARTRIDGE HEATERS

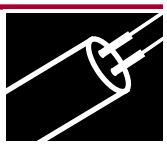
5/8" (15.9 MM) DIA. HI-TEMP – EXTERNALLY CONNECTED, PINS

L				
IN	MM	WATTS	120V	240V
3 3/4	95.3	525	◆	
3 3/4	95.3	525		◆
4	101.6	250	◆	
4	101.6	250		◆
4	101.6	400		◆
4	101.6	500		◆
4	101.6	600		◆
4	101.6	750		◆
4	101.6	1000		◆
5	127.0	250	◆	
5	127.0	250		◆
5	127.0	500		◆
5	127.0	750		◆
5	127.0	875		◆
5	127.0	1000		◆
5 1/2	139.7	800	◆	
5 1/2	139.7	800		◆
6	152.4	300	◆	
6	152.4	300		◆
6	152.4	500		◆
6	152.4	750		◆
6	152.4	1000		◆
6	152.4	1500		◆
6 1/2	165.1	500	◆	
6 1/2	165.1	500		◆
7	177.8	500	◆	
7	177.8	500		◆
7	177.8	1000		◆
7	177.8	1500		◆

TERMINATION

- These heaters are available in a variety of terminations.
- To order, follow the chart on page 33.





5/8" (15.9 MM) DIA. HI-TEMP – EXTERNALLY CONNECTED, PINS

L				
IN	MM	WATTS	120V	240V
8	203.2	500	◆	
8	203.2	500		◆
8	203.2	850		◆
8	203.2	1000		◆
8	203.2	1500		◆
8	203.2	2000		◆
8 1/2	215.9	875		◆
8 1/2	215.9	975		◆
10	254.0	500	◆	
10	254.0	500		◆
10	254.0	750		◆
10	254.0	1000		◆
10	254.0	1500		◆
10	254.0	2000		◆
12	304.8	500	◆	
12	304.8	500		◆
12	304.8	900		◆
12	304.8	1000	◆	
12	304.8	1000		◆
12	304.8	1500		◆
12	304.8	2000		◆
13	330.2	1000		◆
14	355.6	1000		◆
14	355.6	3700		◆
15	381.0	1000		◆
15	381.0	2400		◆
16	406.4	1000		◆
16	406.4	4500		◆
17	431.8	1000		◆
18	457.2	1000		◆
18	457.2	3000		◆
19	482.6	1000		◆
20	508.0	1000		◆
20	508.0	3500		◆
24	609.6	1000		◆
24	609.6	2000		◆

TERMINATION

- These heaters are available in a variety of terminations.
- To order, follow the chart on page 33.

OTHER SIZES AVAILABLE

- Other sizes and variations are available as made to order items.
- Please consult Fast Heat for the current lead times.

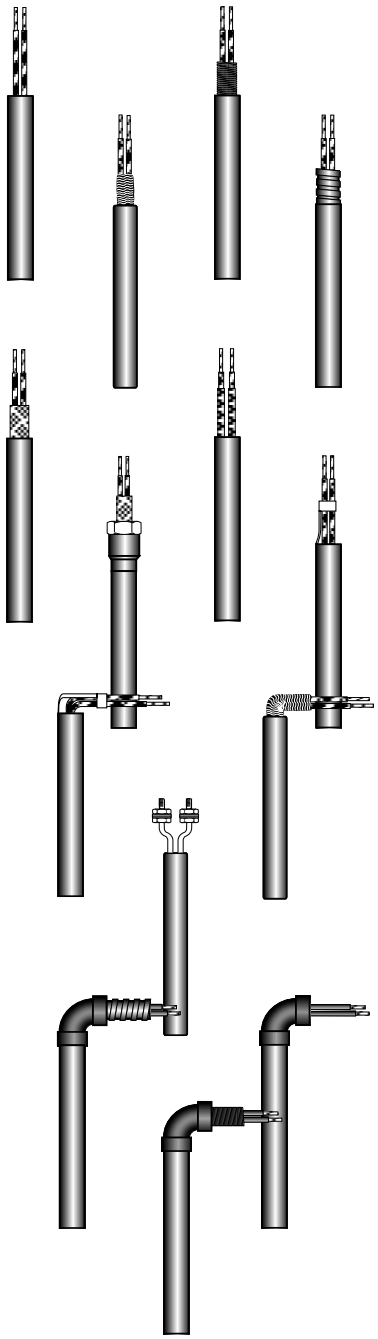
HI-TEMP
CARTRIDGE HEATERS

3/4" (19.0 MM) DIA. HI-TEMP – EXTERNALLY CONNECTED, PINS

L				
IN	MM	WATTS	120V	240V
3 1/2	88.9	250	◆	
3 1/2	88.9	250		◆
3 1/2	88.9	350		◆
3 1/2	88.9	500	◆	
4	101.6	250	◆	
4	101.6	500		◆
4	101.6	1000		◆
5	127.0	300	◆	
5	127.0	500		◆
5	127.0	1000		◆
6	152.4	500	◆	
6	152.4	500		◆
6	152.4	1000		◆
7	177.8	500	◆	
7	177.8	500		◆
7	177.8	1000		◆
8	203.2	500	◆	
8	203.2	500		◆
8	203.2	1000		◆
8	203.2	2000		◆
9	228.6	1200		◆
10	254.0	1000		◆
10	254.0	1200		◆
10	254.0	2000		◆
11	279.4	1000		◆
12	304.8	1000		◆
12	304.8	1200		◆
12	304.8	2000		◆
13	330.2	1000		◆
14	355.6	1000		◆
14	355.6	1250		◆
14	355.6	2500		◆
14	355.6	4500		◆
15	381.0	1000		◆
16	406.4	1000		◆
16	406.4	1800		◆
16	406.4	4700		◆
17	431.8	1000		◆
18	457.2	1000		◆
18	457.2	2000		◆
18	457.2	5000		◆
19	482.6	1000		◆
20	508.0	1000		◆
20	508.0	1050		◆
20	508.0	2050		◆
24	609.6	1000		◆
24	609.6	2000		◆

TERMINATION

- These heaters are available in a variety of terminations.
- To order, follow the chart on page 33.



HI-TEMP/STANDARD CARTRIDGE
IMMERSION HEATERS

CARTRIDGE IMMERSION HEATER

Immersion cartridge heaters may be selected when a tubular style heater may be too large for the application.

Heaters are constructed using the Fast Heat Hi-Temp design allowing for higher watt densities, thus making it possible to concentrate more heat into a smaller package.

Standard designs are listed in this section; however, heaters of other diameters, lengths and fitting sizes for similar applications can be designed.

Disc end of heater opposite the lead end is welded. Lead end is sealed against moisture.

APPLICATIONS

This type of immersion heater can be found in applications where hot water for food/beverage vending, hot water for processing applications, etc. is required.

Optimum utilization of heat is experienced when an immersion heater can be adapted to a fluid heating application.

Attention must be given to selecting the proper watts per square inch for the material to be heated. Refer to the watt density chart on page 150.

There are applications, because of the surrounding exterior of the container, in which a terminal box will not be required.

Most standard immersion heater designs can be adapted to fit special applications.

FEATURES AND BENEFITS

- Durable sheath material designed for water or oil immersion.
- Magnesium oxide provides an excellent heat transfer medium.
- Resistance wire is precision wound to provide long heater life.
- N.P.T. fitting provides easy installation.
- BX Box isolates lead wires.

SPECIFICATIONS

TOLERANCES:

Wattage: +5%-10% based on NEMA standards

MAX. VOLTAGES:

1/2" (12.7 mm) diameter & below: . . 240 V AC
5/8" (15.9 mm) diameter: . . . . . 480 V AC
3/4" (19.1 mm) diameter: . . . . . 480 V AC
1" (25.4 mm) diameter: . . . . . 480 V AC

BUSHING MATERIALS:

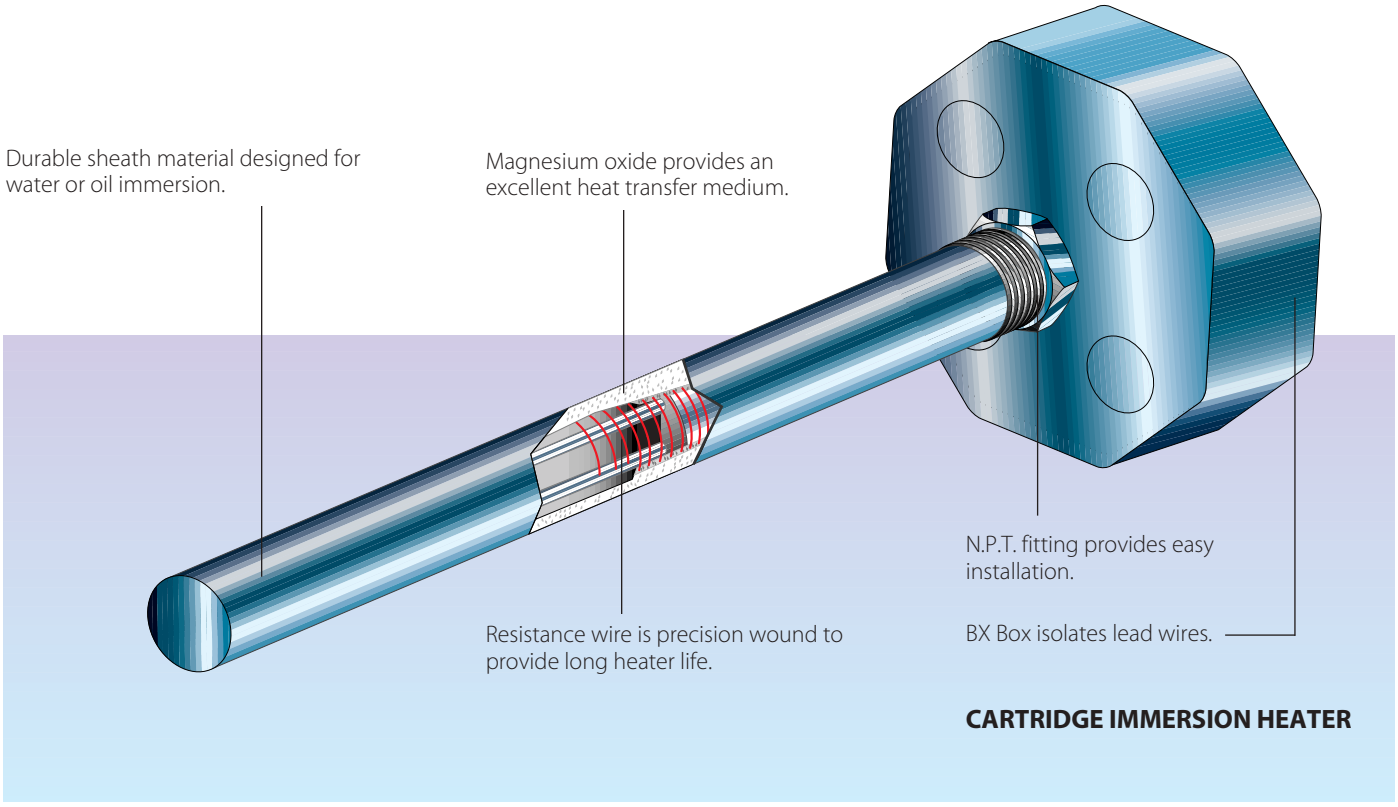
Stainless steel, Brass, and CRS

LEADS:

Conductor and insulation selected with respect to the design and environment exterior to the heater.

SHEATH MATERIALS:

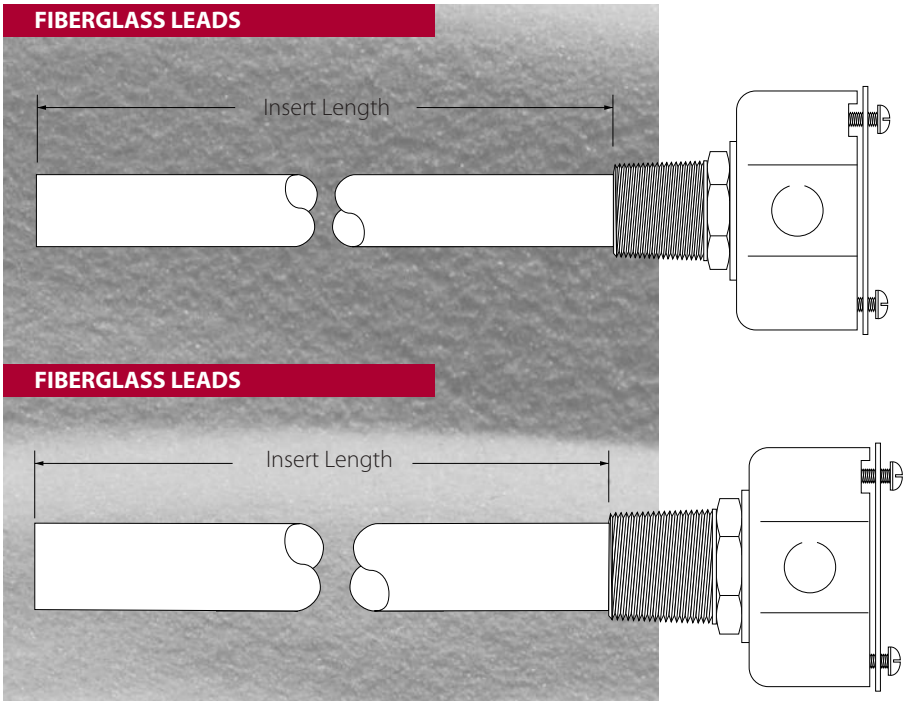
Stainless steel
Incoloy®



CARTRIDGE IMMERSION HEATER

HI-TEMP/STANDARD CARTRIDGE
IMMERSION HEATERS

FIBERGLASS LEADS



5/8" (15.9 MM) DIA. OIL/WATER

5/8" (15.9 mm) dia.

10" (25.4 cm) fiberglass leads inside octagonal terminal box.

1/2" (12.7 mm) N. P. T. brass bushing.

FIBERGLASS LEADS

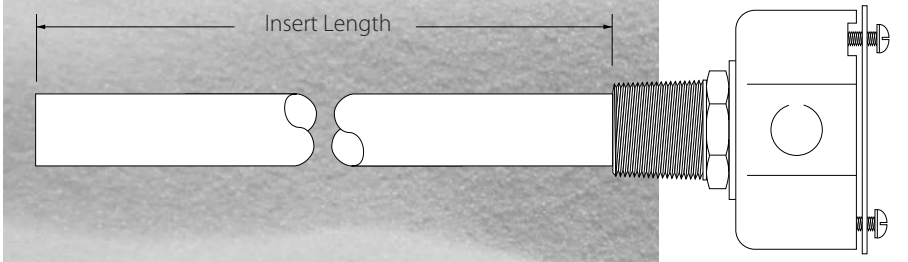
3/4" (19.1 MM) DIA. OIL/WATER

3/4" (19.1 mm) dia.

10" (25.4 cm) fiberglass leads inside octagonal terminal box.

3/4" (19.1 mm) N. P. T. steel bushing.

SCREW TERMINALS



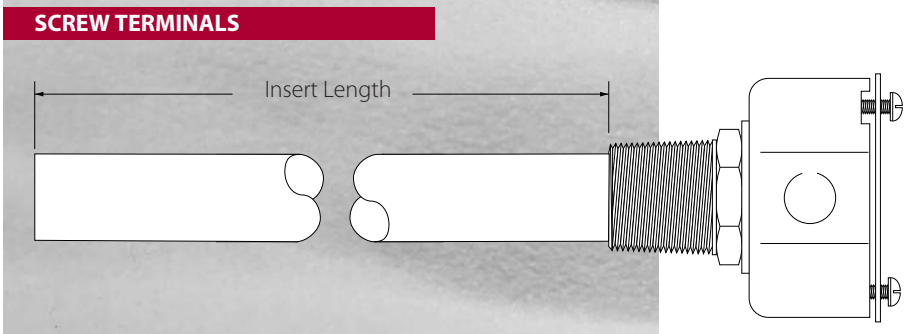
5/8" (15.9 MM) DIA. OIL/WATER

5/8" (15.9 mm) dia.

Screw terminals inside octagonal terminal box.

1/2" (12.7 mm) N. P. T. brass bushing.

SCREW TERMINALS



3/4" (19.1 MM) DIA. OIL/WATER

3/4" (19.1 mm) dia.

Screw terminals inside octagonal terminal box.

3/4" (19.1 mm) N. P. T. brass bushing.

FITTING CHART

MALE PIPE N.P.T. FITTINGS FOR CARTRIDGE HEATERS					
N.P.T. SIZE	1/8" (3.2 mm)	1/4 (6.4)	3/8 (9.5)	1/2 (12.7)	3/4 (19.1)
CART. DIA.	1/4" (6.4 mm)	3/8 (9.5)	1/2 (12.7)	5/8 (15.9)	3/4 (19.1)

Brass, steel or stainless steel fittings are available for liquid immersion applications. Other heater N.P.T. combinations available.

B A N D H E A T E R S

As sophisticated as the advanced resins
they work with–Fast Heat's patented
Better Band® heaters.

fast heat®

BETTER
BAND HEATERS

BETTER BAND®

Fast Heat, recognizing the need for a heater with operating temperature capabilities exceeding that of mica-insulated bands, pioneered the development of the mineral insulated band heater and received a patent on this technology.

In both laboratory and factory conditions, the Better Band has performed without fail in temperatures up to 1400º F (760º C) and watt densities of 100 watts per square inch (15.5 w/sq. cm). Better Bands can meet U.L./C.S.A. approval, use the chart on page 151 for reference and consult factory. If C.S.A. approval is required for lead wire, please notify Customer Service when ordering.

Better Bands are available through QuickShip and Fast Track . Refer to page 2 for a complete description of these rapid delivery programs.

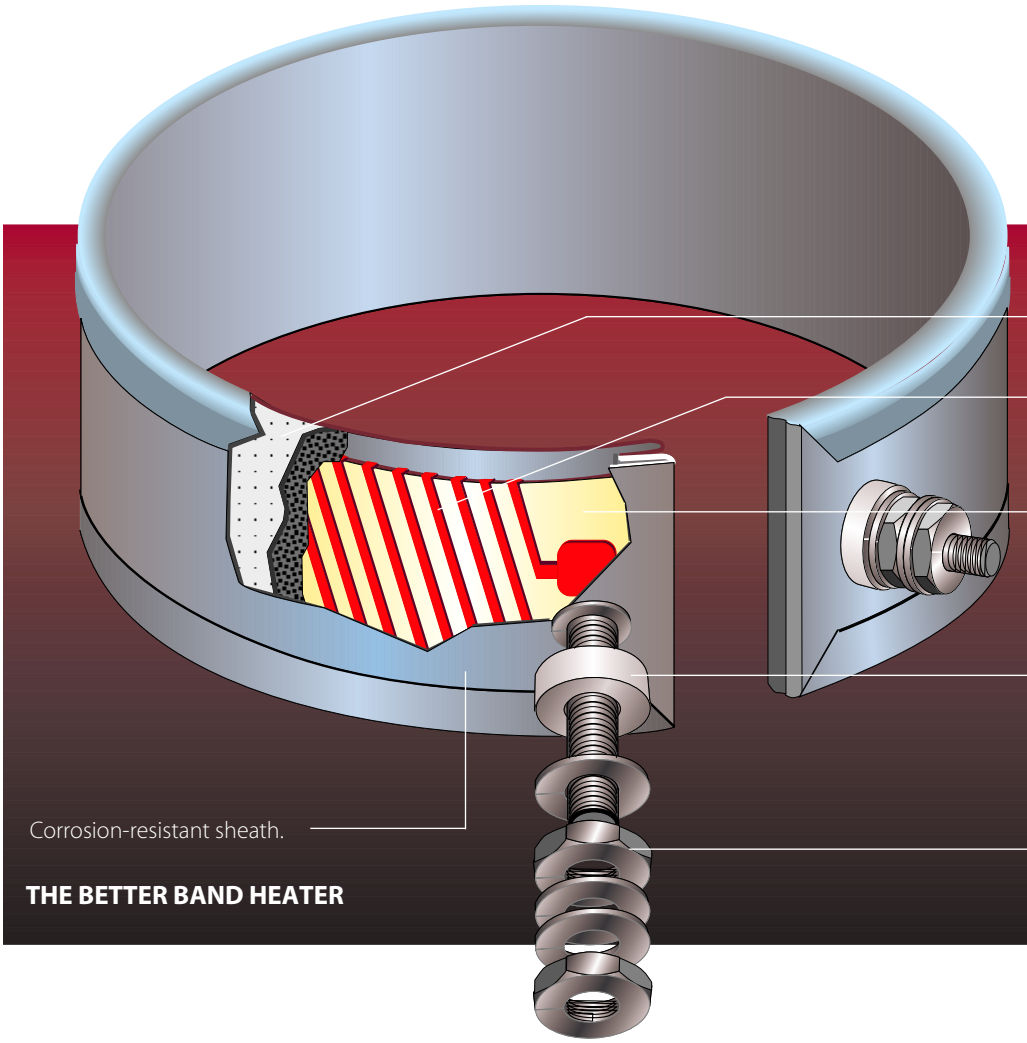
APPLICATIONS

The Better Band will consistently out-perform other bands in virtually any application. Its ability to withstand extremely high heat makes it the best choice for the plastics industry, especially when processing engineering-grade resins. Additional uses include heating pipes, chemical processing and drum heating.

In addition, Better Bands can be modified to meet the demands of virtually any special application. Our engineers can utilize a variety of alternative features and options to customize the heater to your specific needs.

FEATURES AND BENEFITS

- Maximum watt densities; far in excess of any other type of band.
- Highest application temperatures available.
- Best possible clamping and the resulting improved efficiency.
- Longest life available for any application and reduction of equipment downtime.
- High heat transfer rates and the resulting fast response.
- Rapid heat-up capabilities and no fear of heater failure.
- Reduced number and physical size of heaters required per application.
- Cost-effective performance.
- Choose a Better Band when the temperature of the heater will exceed 650º F (343º C).
- Expandable or two-piece construction.



THE BETTER BAND HEATER

BETTER/SEALED BETTER
BAND HEATERS

MATERIAL AND CONSTRUCTION

- Precision engineered with computer-selected wound resistor element.
- Efficient low expansion clamping systems or welded-to-the-sheath clamping ears.
- Optional lead and screw termination styles.
- High temperature patented mineral insulation heat transfer media.
- High temperature oxidation-resistant sheath material commensurate with maximum operating temperature.
- Stainless steel screw terminals welded to an internal stainless steel pad effecting a positive and secure electrical connection. The surrounding area is insulated with a high temperature refractory cement and ceramic insert.
- When lead wires are specified, they are also welded to a stainless steel pad. The U.L./C.S.A. (please specify) high temperature mica tape lead wire, 842º F (450º C), is ideally suited for most applications.

BETTER BAND® SPECIFICATIONS

Optional features include a sealed low-profile cap and tube termination system for low clearance applications. The tube may be lengthened to accommodate radius bends to clear a nozzle hex or other obstructions.

Braid and armor lead wire protection is available. A 10" (25.4 cm) length is standard.

Flexible leads are 10" (25.4 cm) standard. Other leads are available upon request.

Diameters from 3/4" (19 mm) up to 36" (91.4 cm) typical.

Widths from 3/4" (19 mm) up to 6" (152.4 mm) maximum.

Mineral insulation provides excellent insulating and heat transfer properties.

Precision engineered wound resistance element.

High temperature insulation.

Insulating ceramic.

In addition to screw terminations, several lead wire variations are also available.

SEALED BETTER® BAND

The revolutionary Sealed Better Band offers the longest heater life in the most severe band heater applications. The contamination resistant construction, coupled with the high watt density capabilities, make the Sealed Better Band the obvious choice for the plastics industry.

FEATURES AND BENEFITS

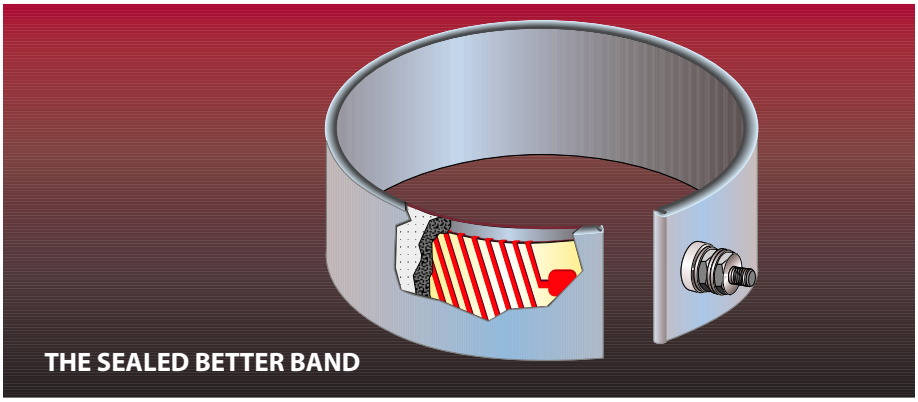
- Sealed for life.
- Compact mineral insulation.
- Sealed power leads.
- Rugged lead protection.

SPECIFICATIONS

The Sealed Better Band, with its stainless steel seamless sheath and welded ends, will not allow contamination to enter the heater from points normally experienced in general band heater construction. To be completely contamination proof, this design may have leak proof convoluted armor attached over leads, which prevents contamination through the lead area. Contact Fast Heat for details.

Diameters from 3/4" (19 mm) up to 36" (91.4 cm) typical.

Widths available in: 3/4", 15/16", 1", 1 1/16", 1 1/4", 1 5/16", 1 3/8", 1 1/2", 1 3/4", 2", and 2 1/2". (19 mm, 23.8 mm, 25.4 mm, 27 mm, 31.7 mm, 33.3 mm, 34.9 mm, 38.1 mm, 44.5 mm, 50.8 mm, and 63.5mm).



THE SEALED BETTER BAND

MICA
BAND HEATERS

MICA BAND

Fast Heat's reliable, inexpensive Mica Band heaters are best suited for uses involving low to moderate temperatures. Mica Bands also offer a wide variety of termination and clamping styles.

Fast Heat's Mica Bands feature thin construction and high quality insulation for effective heat transfer and excellent dielectric qualities. Mica Bands can meet U.L./C.S.A. approval, use the chart on page 151 for reference and consult factory. If C.S.A. approval is required for lead wire, please notify Customer Service when ordering.

Mica Bands are available through QuickShip and Fast Track. Refer to page 2 for a complete description of these rapid delivery programs.

APPLICATIONS

Ideally suited for plastics industry applications, the Mica Band can be used for heating commodity resins in injection molding machines, extruders and blow molding machines. Other applications can be found in the food and pharmaceutical industries or any situation in which efficient band heating is required.

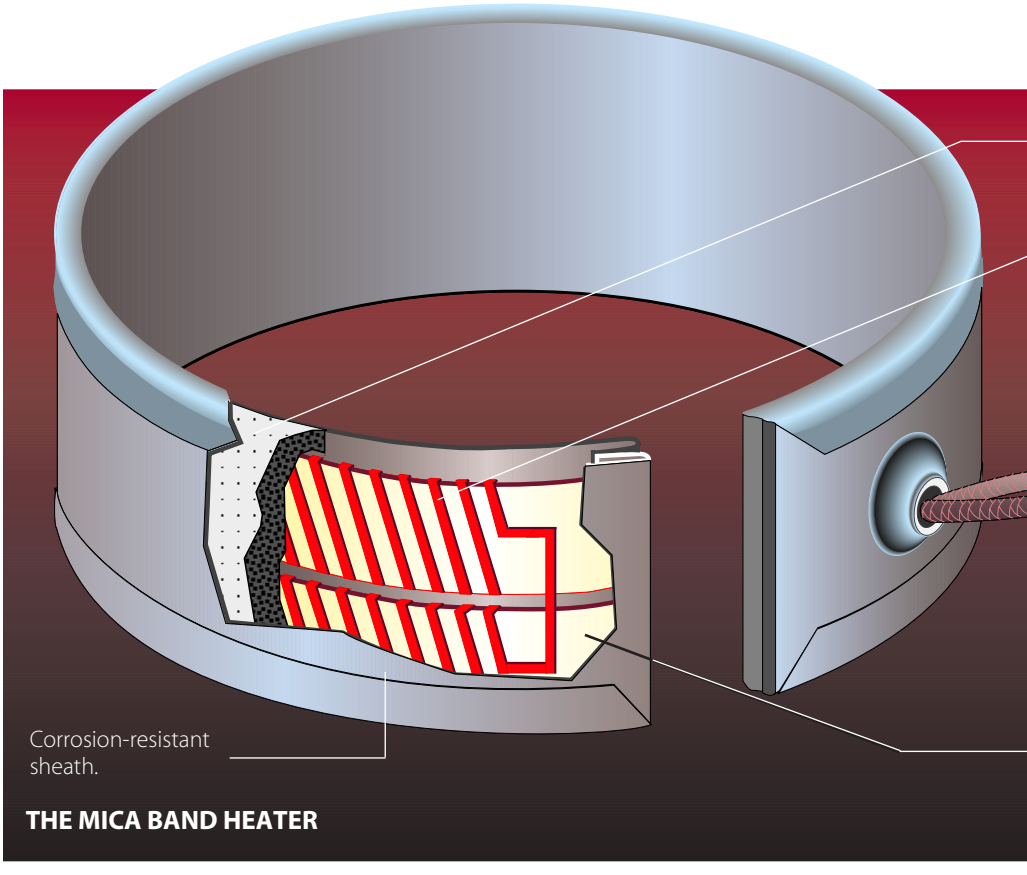
In addition, Mica Bands can be modified to meet the demands of virtually any special application. Our engineers can utilize a variety of alternative features and options to customize the heater to your specific needs.

FEATURES AND BENEFITS

- Make a Fast Heat Mica Band your selection when price and quality is a consideration.
- Thin construction for effective heat transfer.
- Available for partial band applications.
- Reverse bands for application into rolls. Heating from the inside out.
- Expandable or two-piece construction.

MATERIAL AND CONSTRUCTION

- All heaters are computer designed.
- Designs consistently offer maximum resistor coverage.
- Ends of heaters incorporate folded-in lips to resist contamination.
- All bands are accurately rolled to the specified diameter for optimum contact.
- Reliable welded internal termination junction whether screw or lead terminals are specified.
- A variety of lead protection systems are available to protect against flexing, abrasion and contamination.
- High quality mica used in all designs.
- Oxidation-resistant metal enclosures.
- U.L. and C.S.A. (please specify) approved lead wires.



THE MICA BAND HEATER

MICA BAND SPECIFICATIONS

Designs available up to 480 volts AC.

Resistance tolerance +10% -5%. Note that the tolerance is based on the heater in operation. The resistance at room temperature is generally 5% lower than while operating.

Diameters from 1" (25.4 mm) up to 60" (152.4 cm) typical.

Widths from ¾" (19 mm) up to 18" (45.7 cm) typical.

VALUE BAND

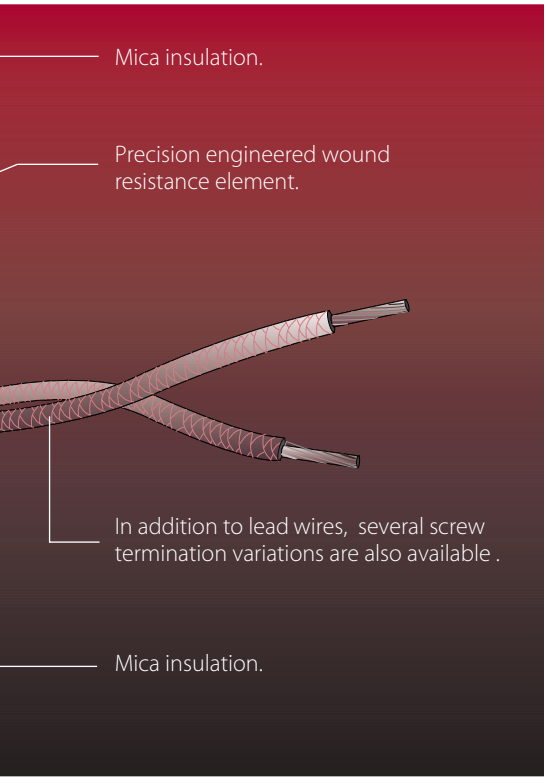
Fast Heat introduced the Value Band in 1993. The goal was to create an extremely low-cost, dependable nozzle band that could be used in many different applications.

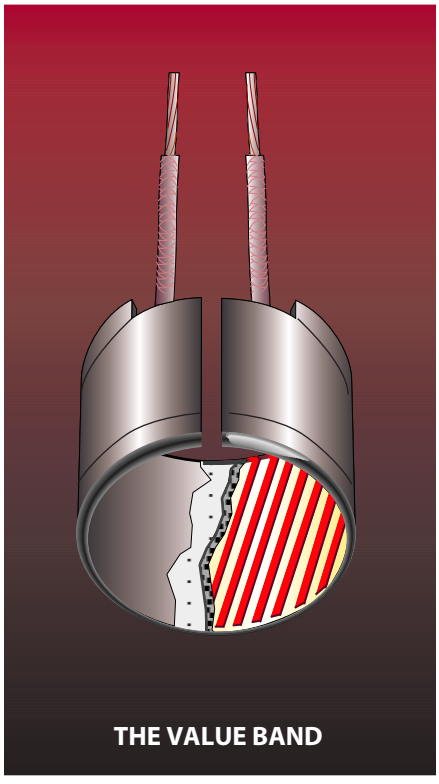
In order to expedite the manufacturing process and keep costs down, the Value Band is offered in a single termination style: 10" (25.4 cm) of fiberglass-insulated, nickel lead wire. The Value Band is C.S.A. approved and is backed by a one year "no problem" warranty.

Value Bands are available through QuickShip. Refer to page 2 for a complete description of this rapid delivery program.

FEATURES AND BENEFITS

- Capable of temperatures up to 900° F (482° C)
- Leads are specially constructed so that they can be bent 90° allowing the heaters to be butted against one another in multiple band applications. The lead areas have also been reinforced to make them more durable and resistant to pull.
- Corrosion-resistant sheath to minimize oxidation.





THE VALUE BAND

BAND HEATERS

BAND HEATER SELECTION

Prior to selecting a band heater style for an application, there are a number of items that must be taken into consideration. These include type of application, operational temperature, controls and heat required to continually satisfy the application. All band heaters have their own physical and operational characteristics and limitations which should be reviewed prior to making a selection. For assistance with calculating the wattage requirement for an application, see the Reference Guide section of this catalog, starting on page 150. Once the total wattage requirement has been established, the number of heaters needed can be determined.

$$\frac{\text{TOTAL WATTAGE}}{\text{NUMBER OF HEATERS}}$$

- Knowing the maximum watts per square inch of the heater is essential when making your selection and can be calculated by:

ONE-PIECE HEATER

$$W/_{IN^2} = \frac{\text{Wattage of Heater}}{[\,(\text{Heater ID X } 3.14\,) - 1/2''\,^{*}\,] \text{ X Heater Width}}$$

ID & WIDTH IN CM.

$$W/_{CM^2} = \frac{\text{Wattage of Heater}}{[\,(\text{Heater ID X } 3.14\,) - 1.3\text{ cm}\,^{*}\,] \text{ X Heater Width}}$$

TWO-PIECE HEATER

$$W/_{IN^2} = \frac{\text{Wattage of Heater (per half)}}{\left[\left(\frac{\text{Heater ID X } 3.14}{2}\right) - 1/2''\,^{*}\right] \text{ X Heater Width}}$$

ID & WIDTH IN CM.

$$W/_{CM^2} = \frac{\text{Wattage of Heater (per half)}}{\left[\left(\frac{\text{Heater ID X } 3.14}{2}\right) - 1.3\,^{*}\right] \text{ X Heater Width}}$$

* average gap size

Example: 1) ID = 4" (10.2 cm), Heater Width = 2" (5.1 cm), One-piece heater, wattage = 400

$$\frac{400 \text{ Watts}}{[\,(4'' \text{ x } 3.14) - 1/2''\,] \text{ X } 2''} = 16.575 \frac{\text{Watts}}{\text{Inch}^2}$$

ID & WIDTH IN CM.

$$\frac{400 \text{ Watts}}{[\,(10.2 \text{ x } 3.14) - 1.3\,] \text{ X } 5.1} = 2.55 \frac{\text{Watts}}{\text{CM}^2}$$

Example: 2) ID = 4" (10.2 cm), Heater Width = 2" (5.1 cm), Two-piece heater, wattage = 400 each half

$$\frac{400 \text{ Watts}}{\left[\frac{(4'' \text{ X } 3.14)}{2} - 1/2''\right] \text{ X } 2''} = 34.583 \frac{\text{Watts}}{\text{Inch}^2}$$

ID & WIDTH IN CM.

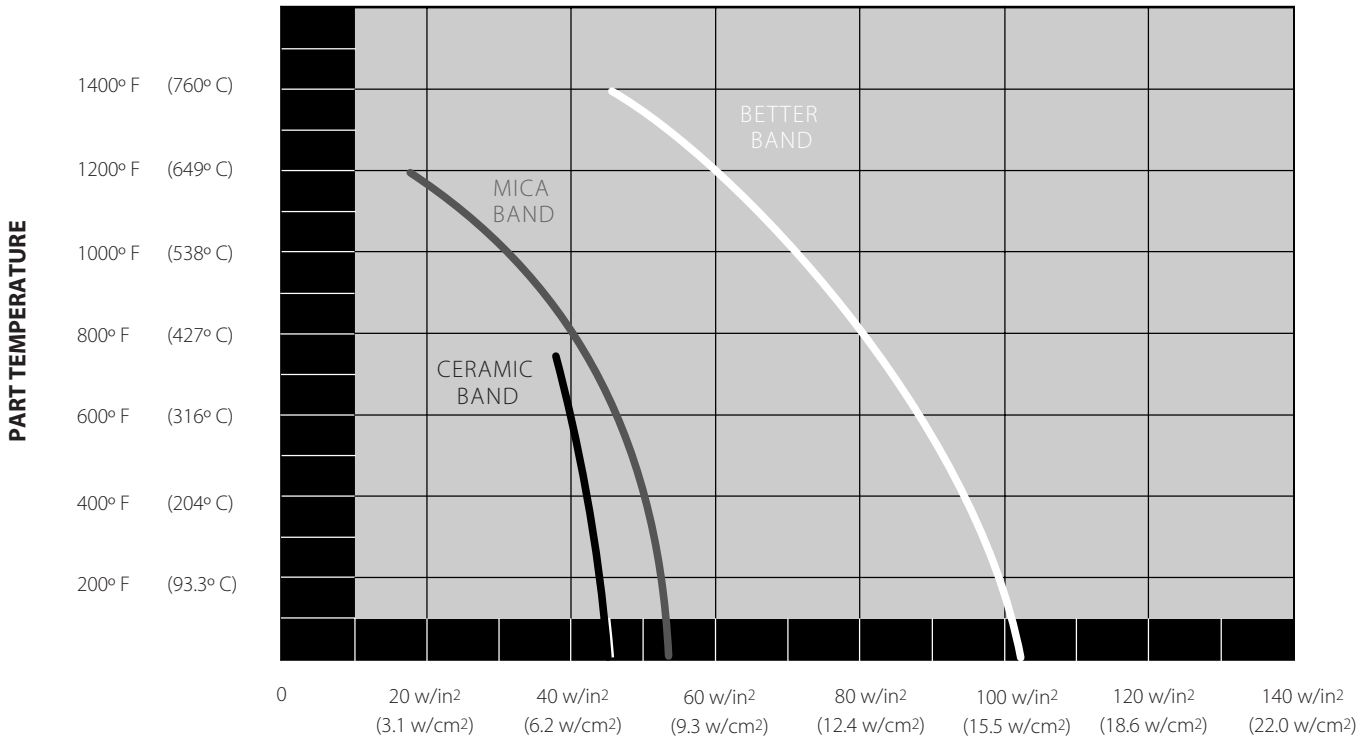
$$\frac{400 \text{ Watts}}{\left[\frac{(10.2 \text{ X } 3.14)}{2} - 1.3\right] \text{ X } 5.1} = 5.33 \frac{\text{Watts}}{\text{CM}^2}$$

- Holes, notches, two-piece heaters and special gaps all reduce the effective heating surface of a heater and must be taken into account when estimating the heated surface used to calculate the watts per square inch of the heater.
- Factors to be considered when calculating heater area:
  - Holes
  - Notches
  - One- or two-piece
  - Special gap
- Use the accompanying graph to make sure that watt density does not exceed the normally recommended maximum.
  - Locate your established maximum cylinder or part temperature on the left side of the graph.
  - Follow the horizontal line to the intersection of the curve relating to the heater style selected and read directly down to the recommended maximum watt density.

ORDERING GUIDE

For better customer service, the following information will be needed when placing an order:

1. Your customer number, if you have been assigned one.
2. Your P.O. number.
3. Shipping instructions.
4. Our catalog number or: product line, inside diameter, width, 1 pc. or 2 pc. construction, total watts, volts (each half if applicable), type of termination and any special features you require.
5. Customer Service will provide you with a configuration number. Please record this for future reference.
6. Specify the quantity you wish to order and whether or not your order is taxable.



OPTIMIZE HEATER PERFORMANCE

- During the first heating cycle, it is advisable to retighten the clamping mechanism of the heater for optimum contact. (De-energize the heater, retighten and repower the heater.)
- Select your heater using the procedure outlined in the ordering guide. Verify that the wattage chosen corresponds to the application requirements. Improperly chosen wattages create temperature over-shoot, excessive cycling and a general decrease in application efficiency.
- Use several narrow band heaters rather than one wide band to obtain the most trouble-free operation. Lab tests have shown the narrow band design to be the most efficient and reliable design.
- Heater I.D. must conform to your cylinder diameter for the best possible fit. Poor fit results in decreased operating efficiency and heater life.
- Tighten heater clamps for the best heat transfer to cylinder. Poor clamping causes decreased heater life and increased heat loss.
- Ensure that your cylinder is smooth and free of foreign material for best clamping and operating results.
- Use one-piece heaters only when they can be slipped over the end of the cylinder. If opening the heater is an installation necessity, use two-piece heaters.
- Avoid possible contamination. Do not allow carbonizing materials such as plastic and oil to collect on heaters. Contamination can lead to internal electrical shorts.
- Use special care in selection of leads and terminals when physical abuse cannot be avoided. If special lead arrangements are required, contact Fast Heat.

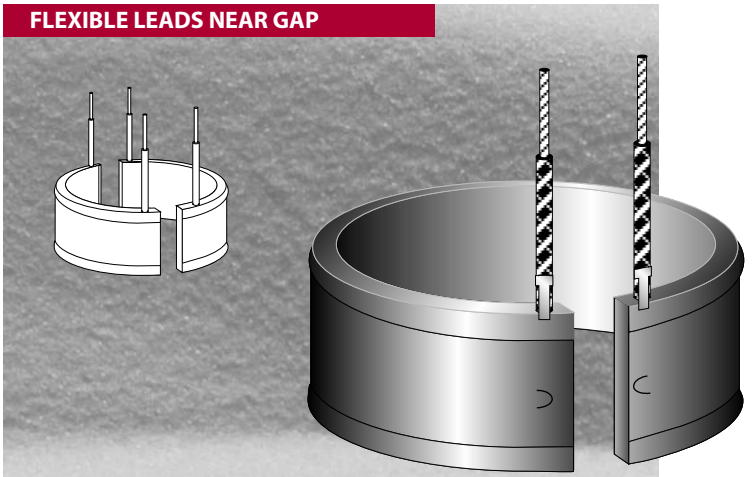
LAB TESTED AND FIELD PROVEN CAPABILITIES

To verify total life characteristics of the Better Band, a multitude of accelerated life tests have been performed. Under severe operating conditions, including the combination of 1400° F (760° C) band temperatures and watt densities in excess of 100 w/in^2 (15.5 w/cm^2), the Better Band has survived thousands of hours of operation without failure.

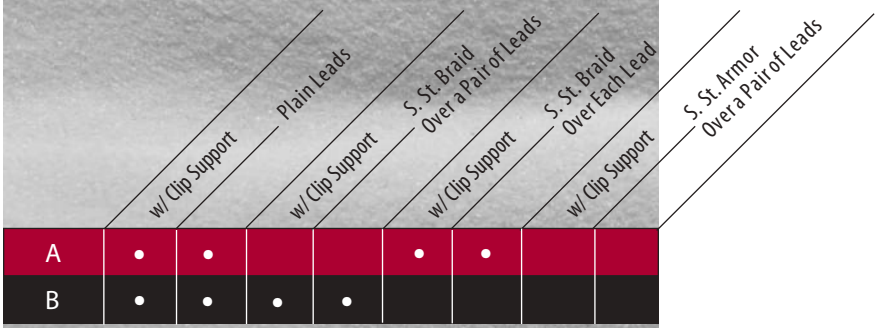
Field testing of the Better Band in typical high temperature plastic molding situations and in applications as extreme as die casting nozzles has further proven the Better Band to be the most advanced band heater available.

BETTER & MICA
BAND HEATERS

FLEXIBLE LEADS NEAR GAP



Better and Mica Band



Bands are available with leads exiting axially on each side of the gap.

Supplied with full contact clamping for longer heater life.

10" (25.4 cm) leads standard, other lengths available.

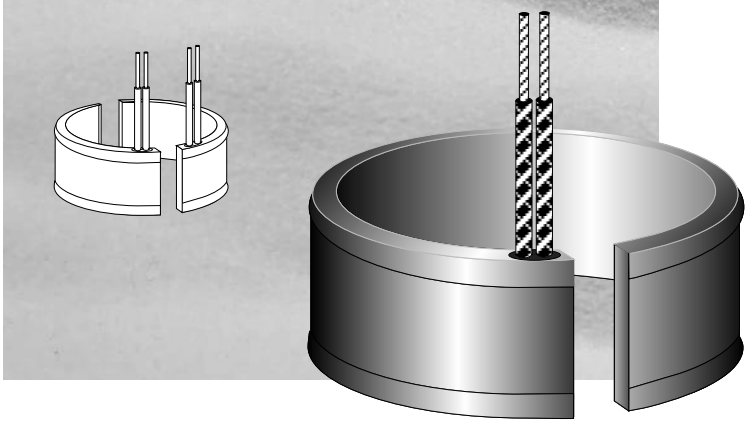
See chart A.

TWO-PIECE HEATERS

- Specify for easy installation/removal where projections or tandem positioned heaters are in use.
- When using two-piece heaters, each half is designed with half of the total wattage requirement. This has the capability of being used on either 120 Volts ($V_1 = V_2 = V$ Total) when connected in parallel or 240 Volts ($V_1 + V_2 = V$ Total) when connected in series.

• This heater termination style available.

FLEXIBLE LEADS NEAR GAP



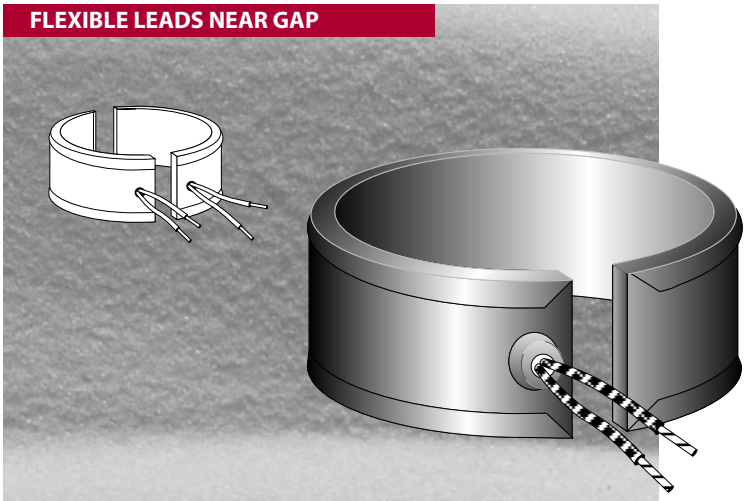
Better and Mica Band

Leads exiting axially on one side of gap supplied with full contact clamping for longer heater life.

10" (25.4 cm) leads standard, other lengths available.

See chart B.

FLEXIBLE LEADS NEAR GAP



Better and Mica Band

Leads exit along the width on one side near the gap.

10" (25.4 cm) leads standard, other lengths available. Standard lead exit.

This style of lead exit can be selected when there is minimum clearance around the heater.

As with all lead type heaters, variations of lead protection and support are available.

See chart A.

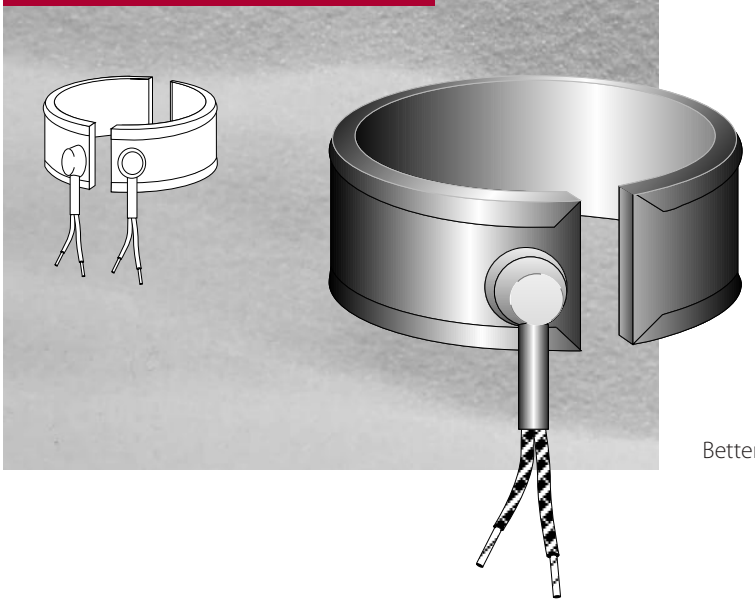
	Plain Leads w/ Clip Support	Plain Leads	S. St. Braid Over a Pair of Leads w/ Clip Support	S. St. Braid Over a Pair of Leads	S. St. Braid Over Each Lead w/ Clip Support	S. St. Braid Over Each Lead	S. St. Armor Over a Pair of Leads w/ Clip Support	S. St. Armor Over a Pair of Leads
A	•	•	•	•			•	•
B		•		•		•		•

GROUND WIRE

- A ground wire is available on most heaters where grounding is required.
- Consult Fast Heat for details.

• This heater termination style available.

FLEXIBLE LEADS W/ CAP NEAR GAP



Better and Mica Band

Low profile cap with leads exiting axially through cap and tube near the gap.

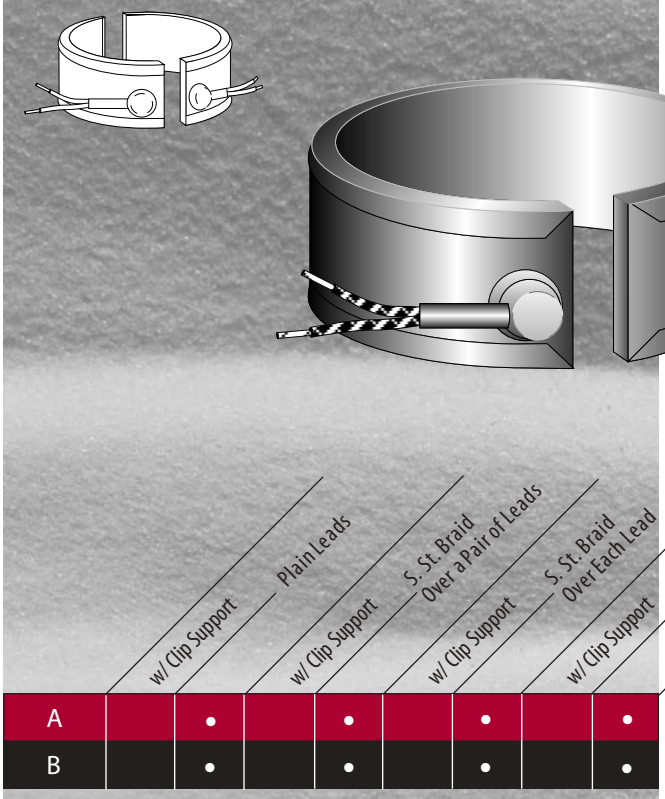
10" (25.4 cm) leads standard, other lengths available.

Leads exit in direction of junction/termination. If heaters are in tandem, they can be positioned next to one another.

See chart B.

BETTER & MICA
BAND HEATERS

FLEXIBLE LEADS W/ 90° CAP NEAR GAP



Better and Mica Band

Low profile cap with leads exiting 90° to axis through cap and tube along length.

Ideal for installations where access is limited.

10" (25.4 cm) leads standard, other lengths available.

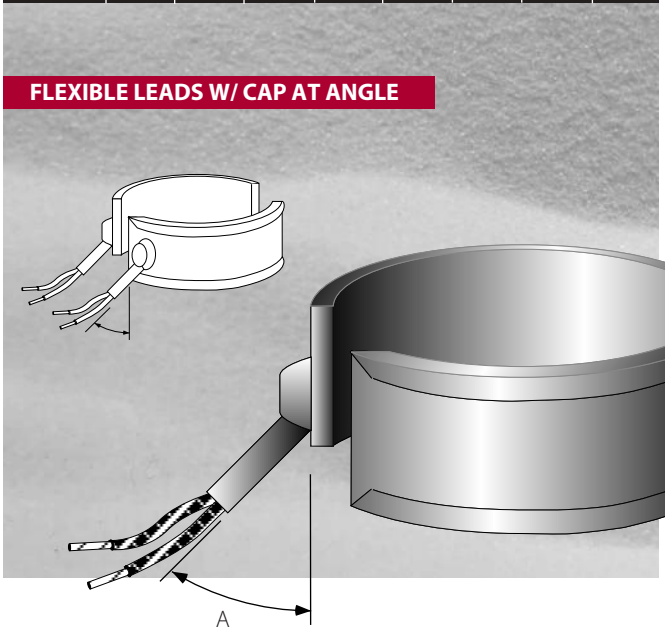
See chart A.

CAP AND TUBE

- Cap and tube exit of leads provides a substantial and contamination resistant exit from the heater.
- In nozzle or similar applications where heaters are close to one another, the upward angle of the tube directs the leads over the adjacent heater, thus preventing the leads from contacting the hot surface.

• This heater termination style available.

FLEXIBLE LEADS W/ CAP AT ANGLE



Better and Mica Band

Leads exiting through cap and tube near gap. Angle of tube may be specified at 15°, 30° or 45°.

10" (25.4 cm) leads standard. Other lengths available.

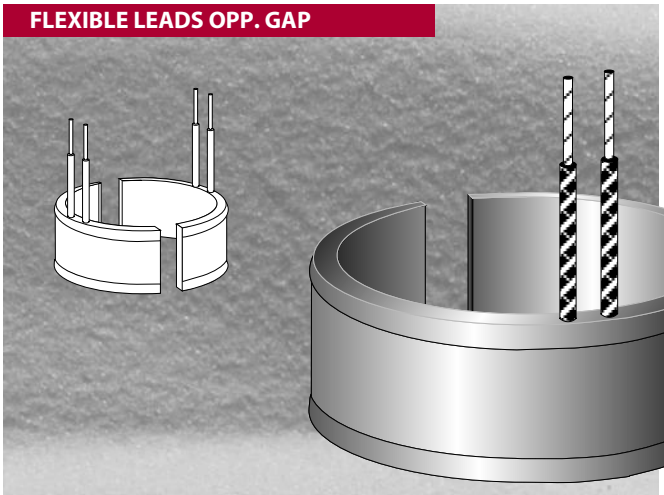
Please specify angle (A) of tube.

See chart B.

LEAD PROTECTION

- Armor and braid are accessories that may be added to protect the leads from abrasion and/or some forms of contamination.

FLEXIBLE LEADS OPP. GAP



Better and Mica Band

Leads exiting axially from thickness opposite the gap.

10" (25.4 cm) leads standard, other lengths available.

These heaters are generally specified when clearance around the heater is not adequate to allow the lead to exit from the heater pressure plate.

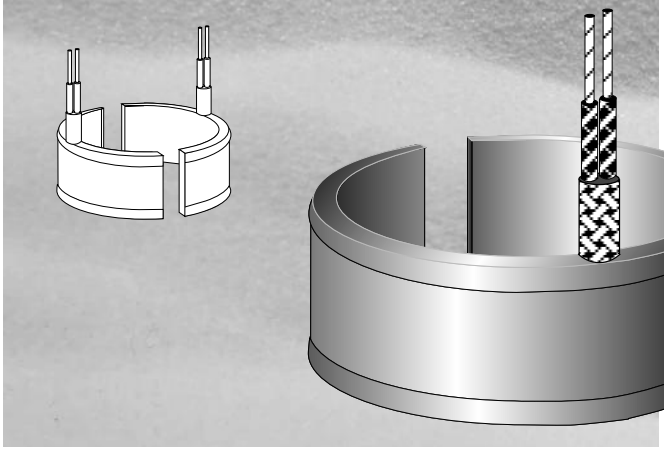
See chart A.

CLIP SUPPORT

- Clip supports may be specified on many lead wire exits to reduce straining of the lead junction.
- Clip supports are standard on all Better Band heaters.
- Consult Fast Heat for details.

• This heater termination style available.

FLEXIBLE LEADS W/ BRAID OPP. GAP



Better and Mica Band

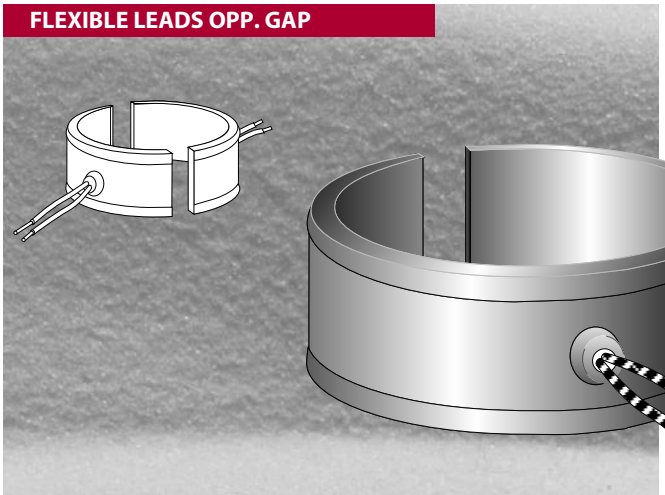
Two leads in one braid exiting axially from thickness opposite the gap.

10" (25.4 cm) leads standard, other lengths available.

See chart B.

BETTER & MICA
BAND HEATERS

FLEXIBLE LEADS OPP. GAP



Better and Mica Band

	Plain Leads w/ Clip Support	Plain Leads	S. St. Braid Over a Pair of Leads w/ Clip Support	S. St. Braid Over a Pair of Leads	S. St. Braid Over Each Lead w/ Clip Support	S. St. Braid Over Each Lead	S. St. Armor Over a Pair of Leads w/ Clip Support	S. St. Armor Over a Pair of Leads
A	•	•	•	•			•	•
B		•		•		•		•

Standard lead exit opposite the gap.

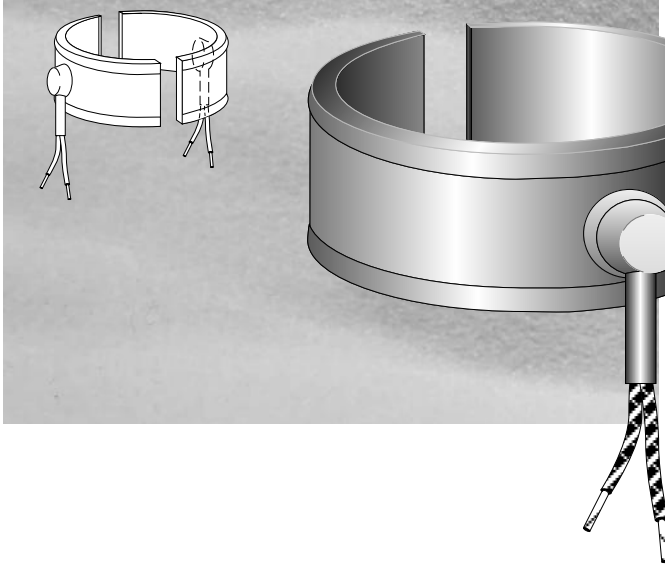
10" (25.4 cm) leads standard, other lengths available.

Cap is welded onto sheath. Various lead protection options are available.

See chart A.

• This heater termination style available.

FLEXIBLE LEADS W/ CAP OPP. GAP



Better and Mica Band

Leads exiting axially through cap and tube opposite the gap.

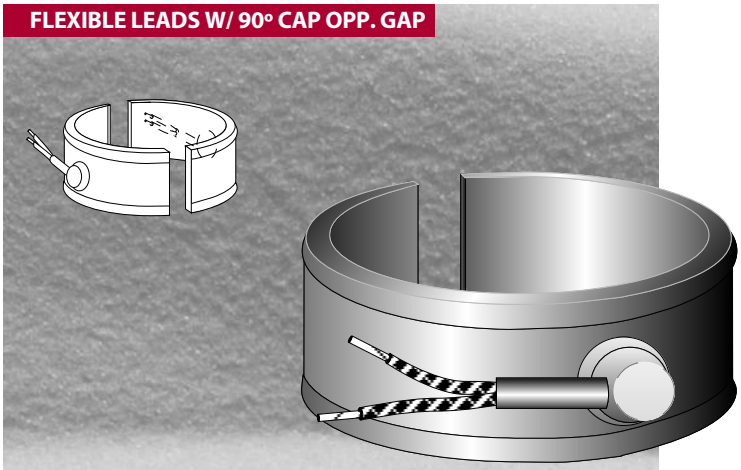
10" (25.4 cm) leads standard, other lengths available.

Cap and tube give protection near the sheath.

Additional protection is available.

See chart B.

FLEXIBLE LEADS W/ 90° CAP OPP. GAP



Better and Mica Band

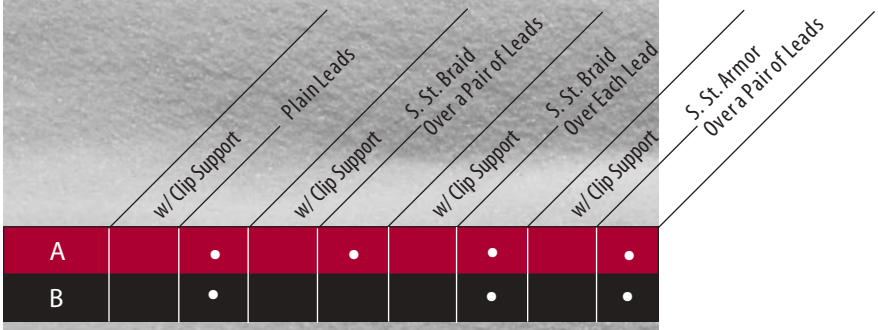
Leads exiting through cap and tube along length opposite the gap.

10" (25.4 cm) leads standard, other lengths are available.

Cap and tube give protection near the sheath.

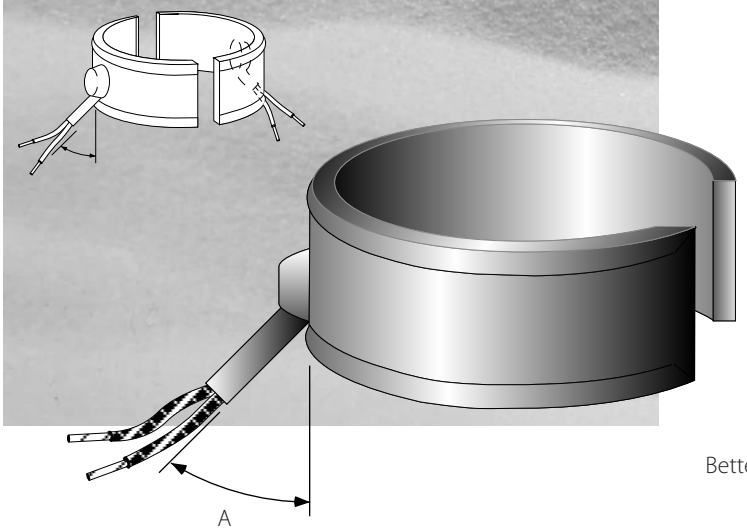
Available in both Mica and Better Band constructions.

See chart A.



• This heater termination style available.

FLEXIBLE LEADS W/CAP OPP. GAP AT ANGLE



Better and Mica Band

Leads exiting through cap and tube opposite gap.

Having the lead exit/tube raised up at an angle allows heaters to be positioned immediately next to one another without having the leads come in contact with the adjacent heater.

The angle of tube may be specified at 15°, 30° or 45°.

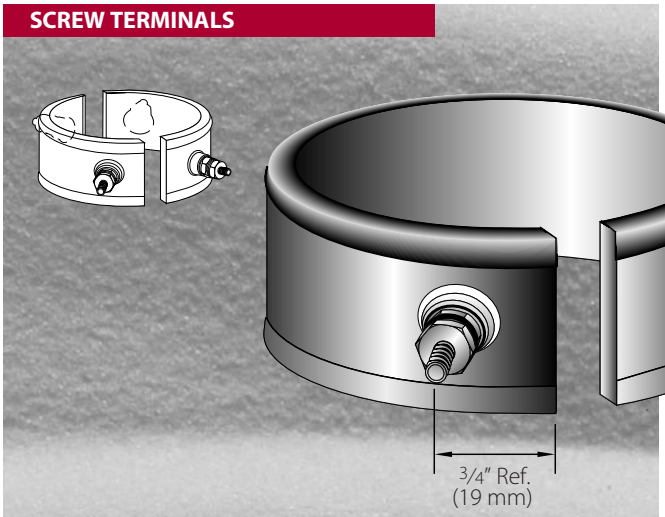
10" (25.4 cm) lead standard. Other lengths available. Please specify angle "A" of tube.

Additional protection is available.

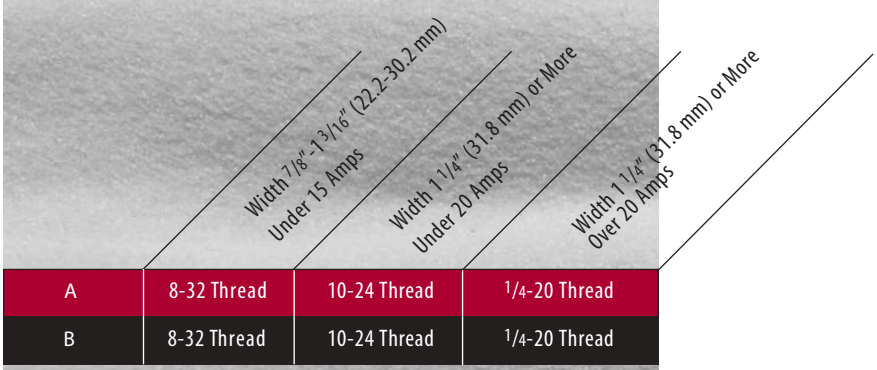
See chart B.

BETTER & MICA
BAND HEATERS

SCREW TERMINALS



Better and Mica Band



A	8-32 Thread	10-24 Thread	1/4-20 Thread
B	8-32 Thread	10-24 Thread	1/4-20 Thread

Band with screw terminals on top; one on each side of gap.

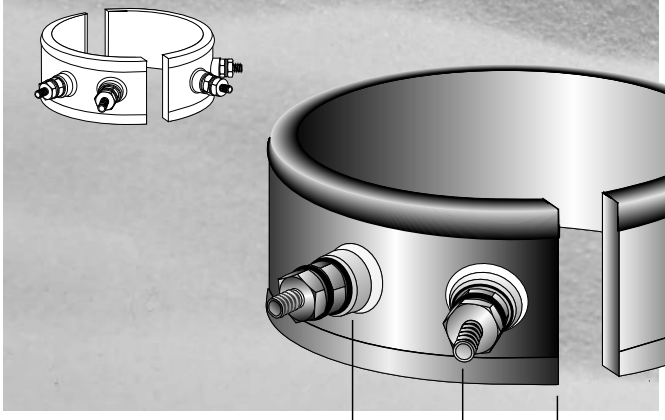
This permits easy connection to power leads w/lugs.

See chart A.

SCREW TERMINALS

- Screw terminals are specified when user wants to provide their own wiring harness.
- Replacement is easier in case of heater failure.
- Junction boxes can be placed over the terminals for protection.

SCREW TERMINALS



Better and Mica Band

Band has two screw terminals on one side, near gap, along the length of the heater.

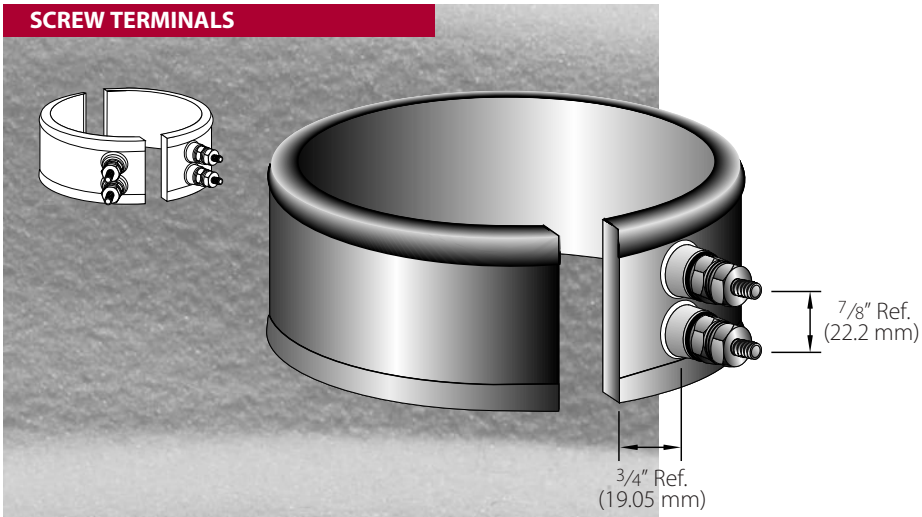
Simplifies lead wire connections.

Available in Better Band and Mica Band construction.

See chart B

European plug is available for bands larger than 4" (101.6mm) I.D.

SCREW TERMINALS



Better and Mica Band

A	10-24 Thread	1/4-20 Thread
B	10-24 Thread	1/4-20 Thread

Band has pair of screw terminals axially on one side, near gap, along the width of the heater.

Available in both Better Band and Mica Band constructions.

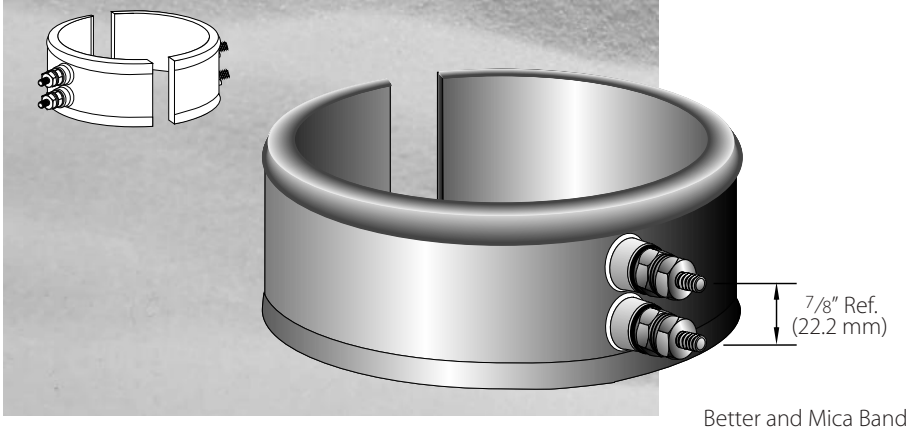
See chart A.

European plug is available on heaters with a minimum width of 2" (50.8mm).

GROUND STUD

- An optional ground stud is available on most bands to permit grounding wire connection.
- Consult Fast Heat for details.

SCREW TERMINALS



Better and Mica Band

Band has pair of screw terminals axially opposite gap, along the width of the heater.

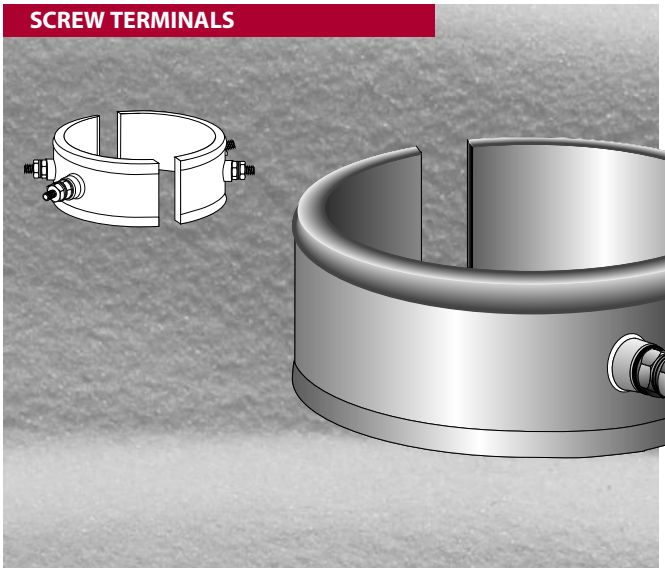
Available in both Better Band and Mica Band construction.

See chart B.

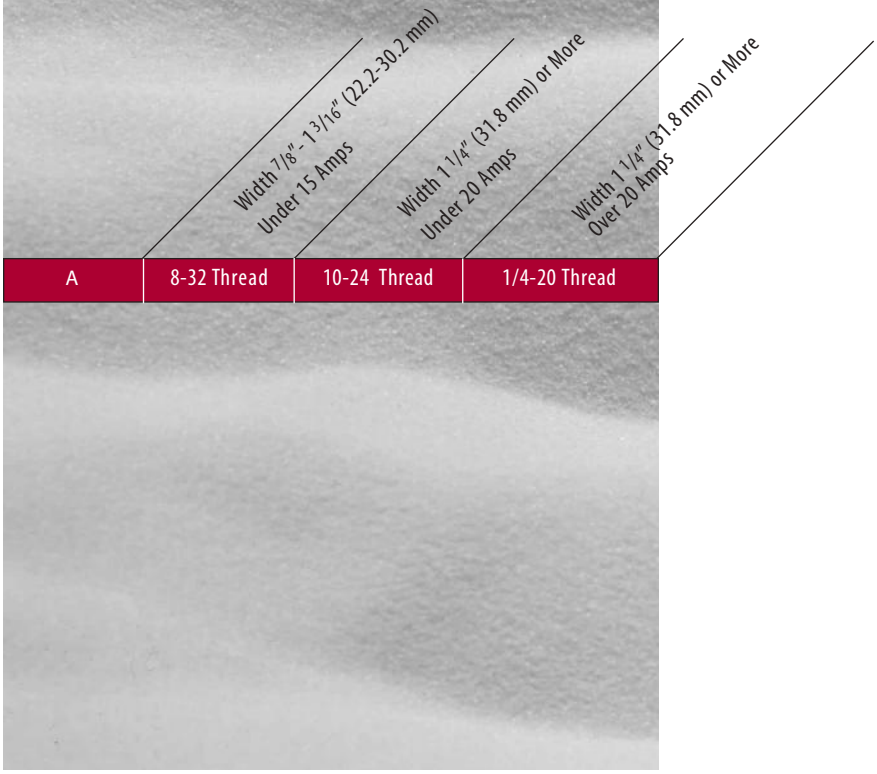
European plug is available on heaters with a minimum width of 2" (50.8mm).

BETTER & MICA
BAND HEATERS

SCREW TERMINALS



Better and Mica Band



Band has pair of screw terminals along length of heater. This permits easier wire connections.

Available in both Better Band and Mica Band construction.

See chart A.

European plug is available for bands larger than 4" (101.6mm) I.D.

THERMOCOUPLE

- Thermocouples are available as options for many of the bands shown.
- Typically type "J" thermocouples are used; however, contact Fast Heat for your special requirement.
- Thermocouples can be positioned on the sheath as required. Depending upon the heater design, the thermo-couple can also be positioned within the heater.
- Contact Fast Heat with your special requirement.

PLAIN LEADS

Plain: Fiberglass and Teflon® or Fiberglass and Mica Tape

Conductor Wire

Jacketed for continuous service up to 482° F (250° C) with nickel standard conductors. It is recommended to use Monel® lugs.

High temperature mica tape lead wire is suitable up to 842° F (450° C) max. with nickel stranded conductors. Outer jacket is glass Teflon® finish. The use of Monel® lugs is recommended.

Better Band comes standard with mica tape. Mica Band comes standard with fiberglass.

SLEEVING

Sleeving

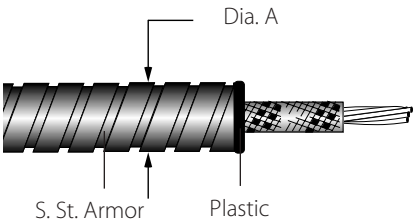
Fiberglass silicone rubber coated sleeving class c -1, 392° F (200° C) service. Provides extra insulation where wire is exposed to heat, molten plastics or abrasion. Rated 1500 volts at 428° F (220° C), except 5/16" (7.9 mm) size which has no voltage rating. This size used primarily to enclose multiple insulation wires in heat and abrasion resistant covering.

S. ST. BRAID

S. St. Braid Shrink Sleeving

Stainless steel over braid is most commonly specified in applications where leads may be subjected to abrasion due to movement of the application. Lead wires may be rubbing together or passing over sharp objects.

S. ST. ARMOR

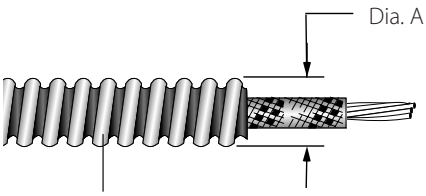


S. St. Armor Plastic Bushing

Used over leads in areas where more protection is necessary. Selected for similar applications as the stainless steel braid, in addition to applications where non-fluid contamination may come in contact with the leads. This lead protection is not as flexible as over the braid.

Stainless steel square lock construction.

CONVOLUTED ARMOR



Convoluted Armor

This is a seamless product and can be attached to the heater so that fluids do not contaminate the leads. This system of lead protection is generally associated with the Fast Heat "Sealed Band" construction. Not recommended where leads are flexed in the application.

300 VOLTS 418° F (250° C) FIBERGLASS LEAD WIRE	
GAGE	MAX. CURRENT @ 392° F (200° C)
16	6.6 amps
18	5.2 amps
20	3.7 amps
22	2.8 amps

600 VOLTS 418° F (250° C) FIBERGLASS LEAD WIRE	
GAGE	MAX. CURRENT @ 392° F (200° C)
8	22.1 amps
10	16.5 amps
12	12.2 amps
14	9.0 amps
16	6.6 amps
18	5.2 amps
20	3.7 amps
22	2.8 amps

600 VOLTS 778° F (450° C) MICA TAPE LEAD WIRE	
GAGE	MAX. CURRENT @ 392° F (200° C)
12	15.2 amps
14	11.3 amps
16	8.3 amps
18	6.4 amps
20	4.6 amps
22	3.4 amps

300 VOLTS 778° F (450° C) MICA TAPE LEAD WIRE	
GAGE	MAX. CURRENT @ 392° F (200° C)
16	8.3 amps
18	6.4 amps
20	4.6 amps
22	3.4 amps

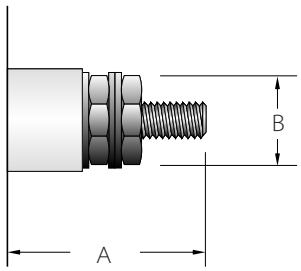
TERMINATIONS

- Lead protection may be required where a problem of lead abrasion arises. This protection may be provided by the use of stainless steel wire braid or armor cable, both of which are firmly anchored to the heater and readily available in most sizes of heater bands.

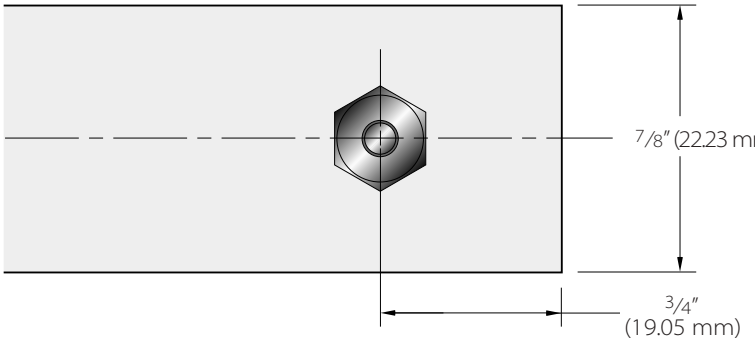
FIBERGLASS SILICONE RUBBER COATED SLEEVING	
SLEEVING SIZES (GA.)	I. D.
12	.085 in / 2.1 mm
10	.106 in / 2.6 mm
8	.133 in / 3.3 mm
6	.166 in / 4.2 mm
5	.190 in / 4.8 mm
3	.234 in / 5.9 mm
5/16	.313 in / 7.9 mm

OPTIONS
BAND HEATERS

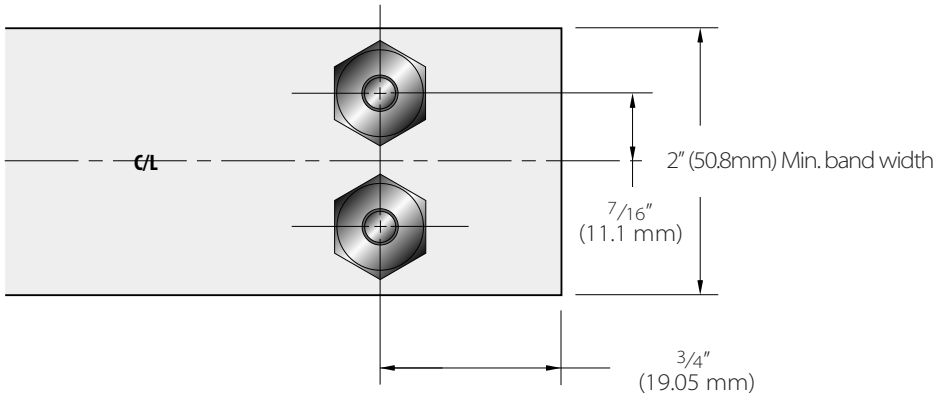
TYPICAL SCREW TERMINAL



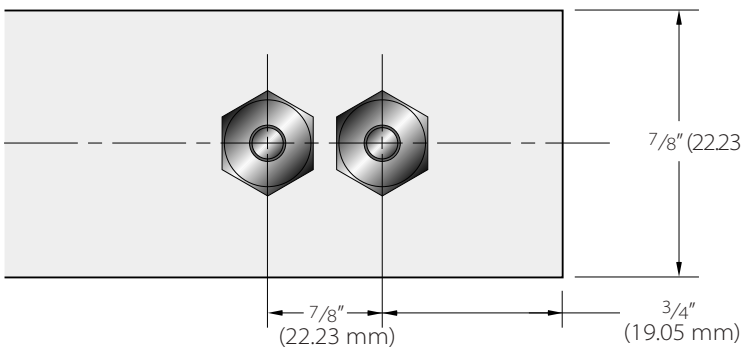
SCREW TERMINAL (ON TOP)



SCREW TERMINALS (ALONG THE WIDTH)



SCREW TERMINALS (ALONG THE LENGTH)



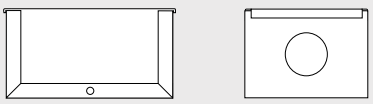
SCREW TERMINALS

Terminals are a very convenient way of connecting our band heaters to power; typically, Monel® lugs are used to secure wiring.

Supplied when heater width is at a minimum or when, in application, a buss bar is used to connect the terminals of adjoining heaters.

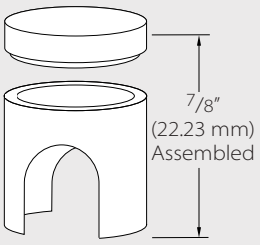
SCREW SIZE	A IN	A MM	B IN	B MM	MAX. AMPS
8-32	3/4	19.0	7/16	11.0	15
8-32	1	25.4	7/16	11.0	15
10-24	3/4	19.0	7/16	12.7	20
10-24	1	25.4	7/16	12.7	20
1/4-20	1	25.4	7/8	22.2	25

TERMINAL BOX



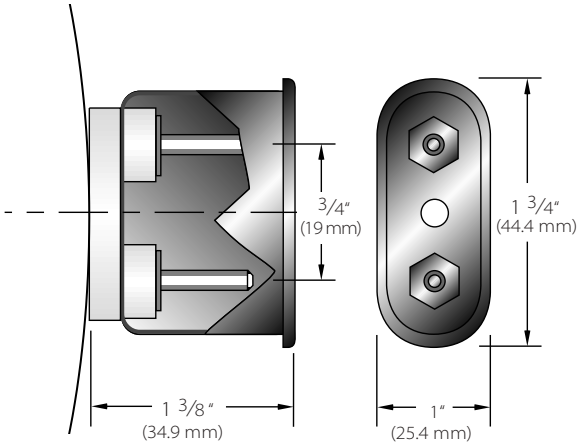
- Used when screw terminals are employed in conjunction with box connector.

CERAMIC COVER



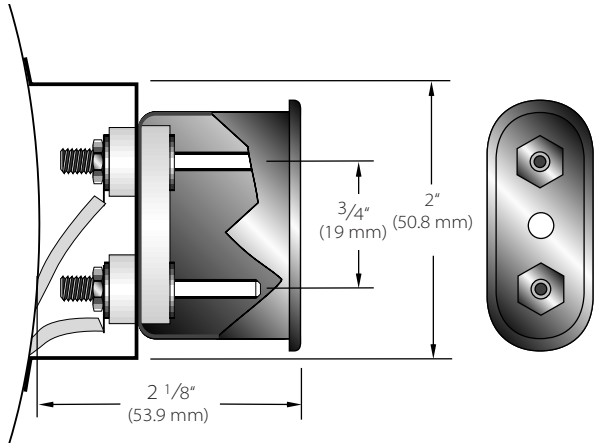
- Ceramic terminal cover fits Fast Heat size 10-24 threaded terminals.
- Requires 1" (25.4 mm) screw.

EUROPEAN PLUG

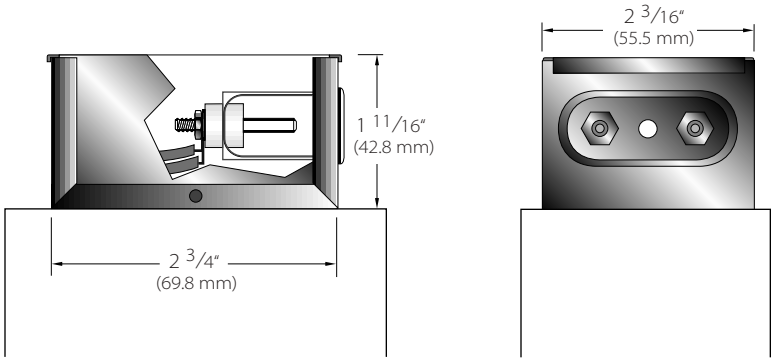


Plug is illustrated in the most common position. There are occasions for special boxes where the plug may be positioned on the top surface of the box.

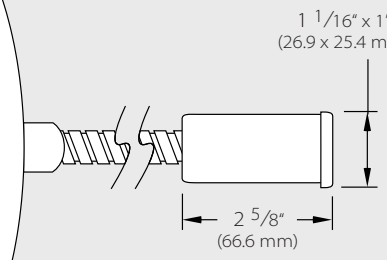
EUROPEAN PLUG W/BRACKET



EUROPEAN PLUG W/BOX

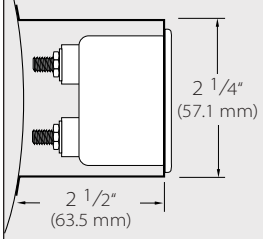


EUROPEAN PLUG IN TUBE



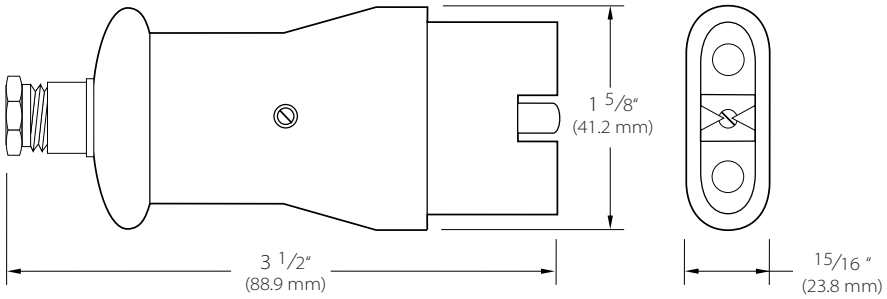
- Shown here with S. St. Armor

EUROPEAN PLUG W/ BRACKET (INTERNAL MOUNT)



OPTIONS
BAND HEATERS

QUICK-DISCONNECT PLUG



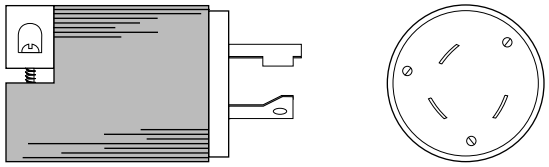
2 pole-25 amp-250V 600º F (315.5º C) service. Ideal for power connection to heaters.

Durable cast aluminum body on female side.

Both sides have ceramic insert insulators.

Ground connection via contact fingers.

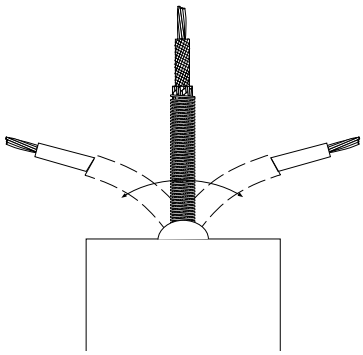
HUBBELL® PLUG (OR EQUIVALENT)



Customer to specify type, part number and amperage required.

There is a wide variety of Hubbell plugs that can be fitted to our heaters. Please specify Hubbell's part number or call us for suggestions.

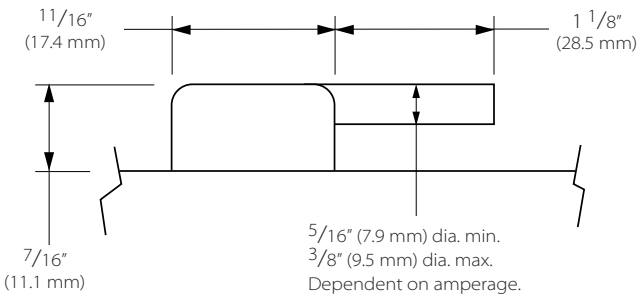
RELIEF SPRING



This optional relief spring is welded to the terminal cap. It adds protection from abrasion while keeping the leads very flexible.

Specify length. Maximum length: 12" (30 cm)

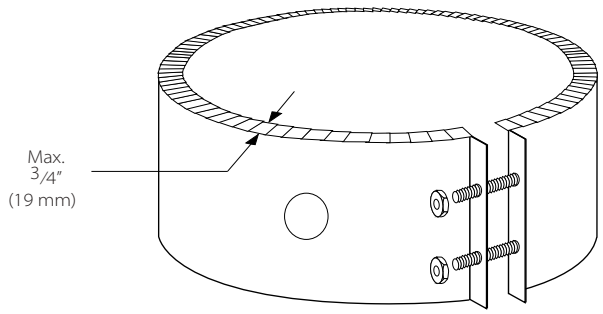
CAP AND TUBE



SILICONE RUBBER QUICK-DISCONNECT PLUG

- This all-silicone rubber disconnect plug is generally selected for applications in which the plug is frequently disconnected, thus submitting the plug to possible damage such as cracking the ceramic.
- When selecting, be aware of the temperature limitation of silicone rubber.
- Available in straight, as in adjoining picture and at right angle exit for low profile.

SHROUD (INSULATED/ NON-INSUL.)



The insulated shroud is available as an accessory or attached to the heater.

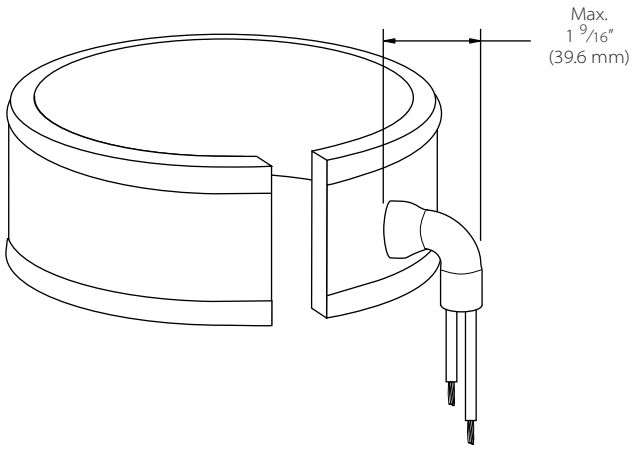
Insulated shroud conserves energy and reduces power consumption.

Available with one- or two-piece Mica Band and Better Band construction.

A wide variety of terminations are available.

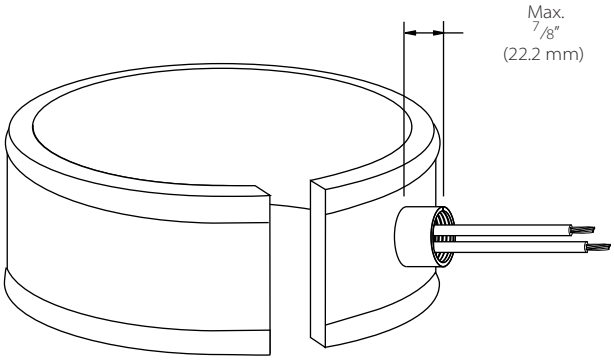
Fiberfrax insulation optional.

COPPER ELBOW



The copper elbow is selected when the leads are required to exit the heater in a definite direction and away from the heater surface.

PIPE COUPLING



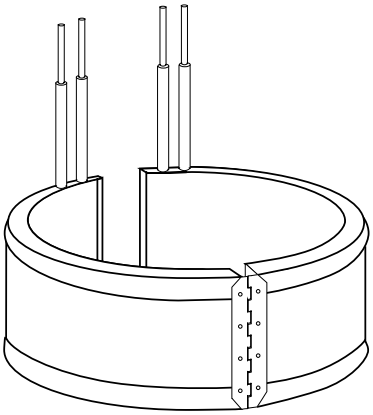
Available in stainless steel or galvanized steel.

These pipe couplings, welded to the band heater sheath, provide a method of fastening conduit or armor to the heater which can be disconnected from the heater as required.

Typical sizes are 3/8" (9.5 mm) and 1/2" (12.7 mm) NPT.

OPTIONS
BAND HEATERS

HINGED BAND

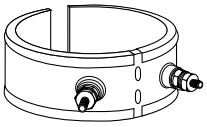


Mica and Better Band

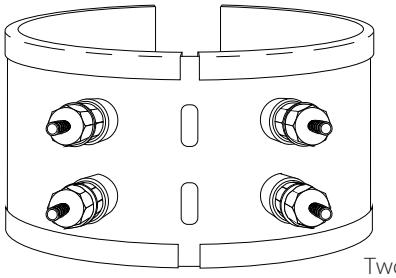
Available in two-piece heaters for applications in which the assembly is frequently required to be opened for easy and registered positioning around the surface.

A variety of termination styles are available.

EXPANDABLE BAND



One Piece Mica Band

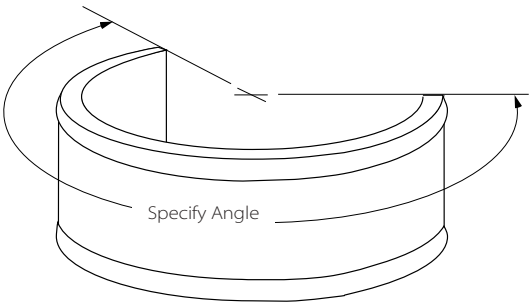


Two Piece Better Band

A heater which can be easily expanded to fit around a surface. Not for applications requiring consistent removal. (2-3 times max.)

Separate full clamping strap provides excellent clamping. Can be expanded 2-3 times without parting.

PARTIAL BAND



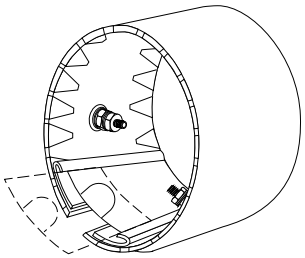
Mica and Better Band

Available in a variety of terminations and clamping styles (please indicate when ordering).

Specially constructed to any angle.

Please specify I.D., width, angle and termination style.

REVERSE BAND



Mica Band only

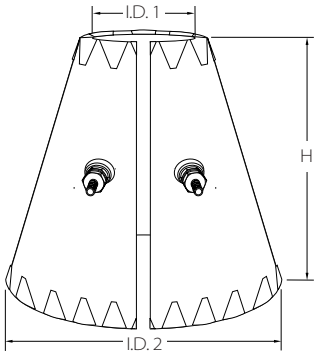
Design allows the heater to be expanded and thus heat from an internal surface.

Available in a variety of clamping styles (please indicate when ordering; shown is the wedge lock low profile clamping).

Available in a variety of termination styles.

Constructed with a fully notched case.

CONE BAND



Mica Band only

Specified where funnels, chutes, etc. are required to be heated.

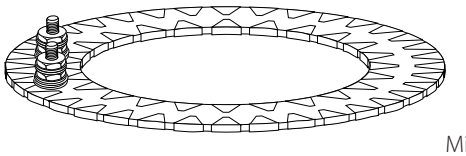
Available in a variety of termination styles.

Constructed with a fully notched case.

Segmented bands may be required for large sizes or for easy application and removal.

I.D. 1 = minimum I.D.
I.D. 2 = maximum I.D.
H = height

RING HEATER



Mica Construction only

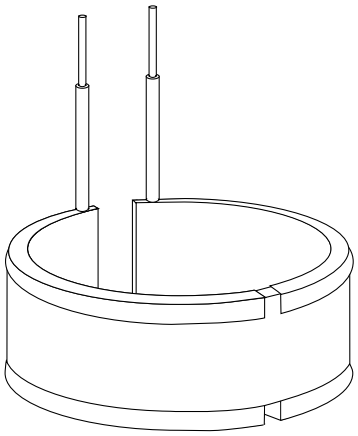
Constructed with a fully notched case.

Available in a variety of terminations.

Please specify I.D. and O.D.

OPTIONS
BAND HEATERS

NOTCHED BAND



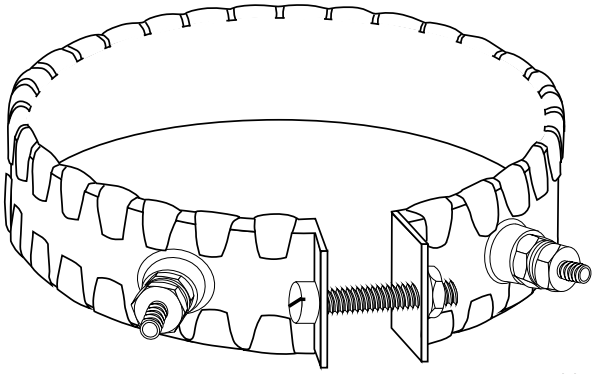
Mica Band only

Available in a wide variety of termination styles.

Standard notch size is 1⁄8" (3.1 mm).

This Mica Band has a notch on the case to facilitate opening.

FULLY NOTCHED BAND

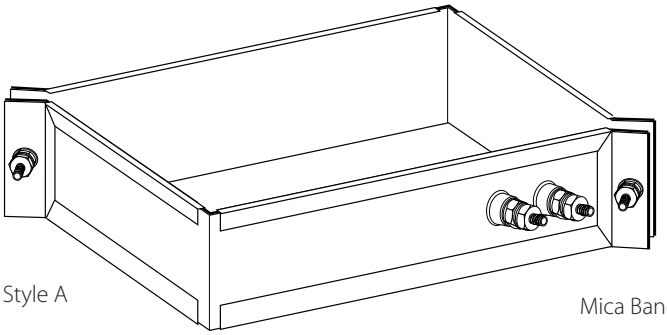


Mica Band only

Used not only in circular applications but can be adapted for irregular surfaces.

Available in a wide variety of termination styles.

RECTANGULAR BAND

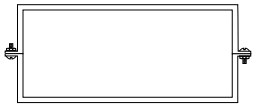


Style A

Mica Band only

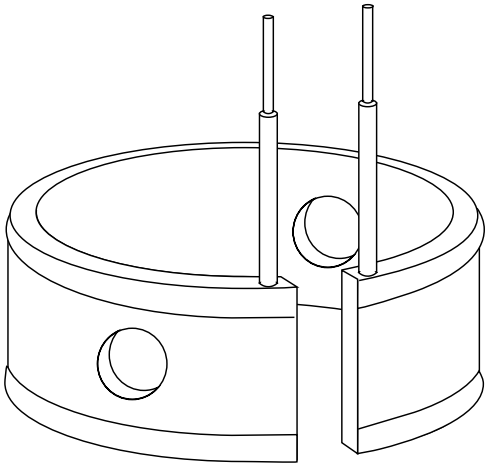
Specify inside dimensions, width dimensions and clamping ears.

Available in a variety of termination styles and two location choices for clamping ears.



Style B

SPECIAL W/HOLES



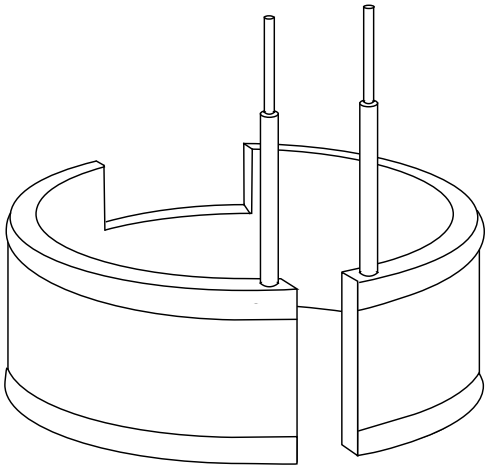
Mica and Better Band

Heaters can be built to satisfy your special requirements. Certain applications require holes for thermocouples to clear tubing, wiring and other obstacles.

These modifications require customer drawings to specify exact diameters and locations of the holes.

Special order only.

SPECIAL W/NOTCH



Mica and Better Band

When clearance is a problem with band heater installation, consider requesting slot cut-outs. This can greatly facilitate installation.

Drawing is required with exact dimensions and locations.

Special order only.

TUBULAR NOZZLE **BAND HEATERS**

TUBULAR NOZZLE BAND

Designed for durability, Fast Heat's Tubular Nozzle Band can withstand almost any type of contamination, vibration and shock while still providing excellent heat transfer. The use of a tubular heating element as opposed to customary heating methods enables the heater to resist plastic drool, moisture and other contaminants.

APPLICATIONS

The Tubular Nozzle Band is most commonly selected to heat nozzles in injection molding or extruding machines, where constant contamination is a problem. The Tubular heater is also an excellent choice for most applications involving higher than normal vibration and shock. Other applications include lead, zinc and aluminum die casting.

In addition, modifications can be made to meet the demands of virtually any special application. Our engineers can utilize a variety of alternative features and options to customize the heater to your specific needs.

MATERIAL AND CONSTRUCTION

- Tubular heating element is brazed for good heat transfer to a stainless steel band.
- Ear type clamping is standard; however, other styles are available depending on the heater size.
- Leads have protective shrink sleeving at transition.
- Contamination-resistant.
- Each Tubular Band is securely attached to a stainless steel strap. The leg section that extends away from the nozzle is ductile and permits a 1/2" (12.7 mm) minimum radius bend to facilitate installation in a limited space.
- Holes can be placed in the bands. However, size of the hole and the heater width must be taken into consideration.

SPECIFICATIONS

Standard Diameters: Minimum 1 1/2" (38.1 mm)

Standard Width: 1" (25.4 mm)

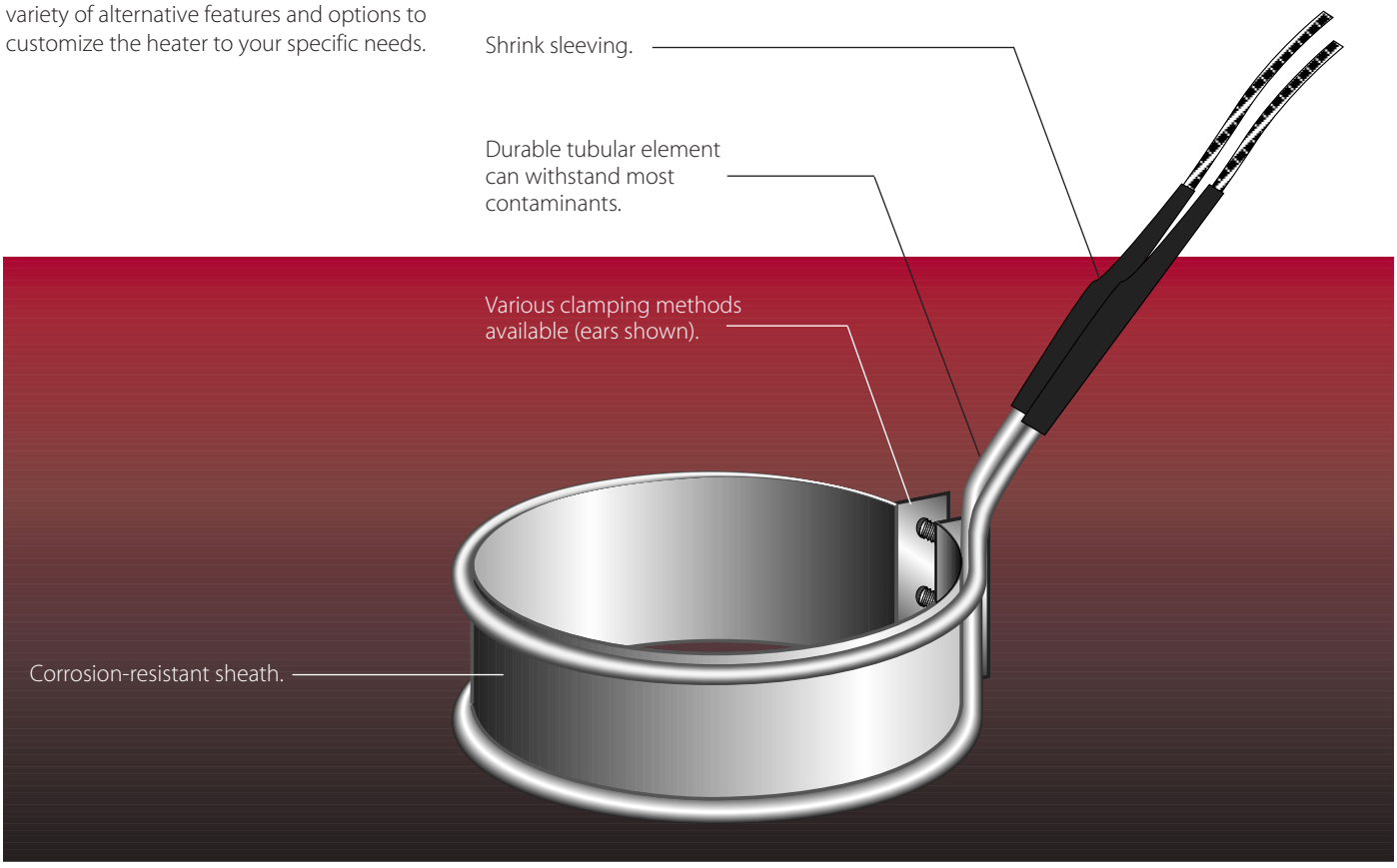
Wattage: 40 watts/in^2 max. (6.2 w/cm^2)

Voltage: 240 vac

Standard lead length: 10" (25.4 cm)

Standard lead type: Fiberglass

Standard leg length is 3" (76.2 mm); other lengths are available upon request.



KNUCKLE BAND HEATERS

KNUCKLE BAND

The Knuckle Band, a segmented ceramic band heater, was designed by Fast Heat to provide evenly-distributed heat on extrusion and injection molding barrels.

Best suited for low to moderate temperatures, the Knuckle Band is constructed of precision-made segmented ceramics in order to add flexibility and allow for easy installation. The ceramics are covered with fiberglass insulation, which directs the heat toward the barrel.

The end results include a decrease in energy waste, a lower wattage requirement and longer heater life.

APPLICATIONS

The Knuckle Band is ideal for use on the barrels of extrusion and injection molding machines when processing commodity resins at low to moderate temperatures. Other applications include pipe and drum heating. Knuckle Bands are also frequently used on injection molding machines made outside the United States.

In addition, Knuckle Bands can be modified to meet the demands of virtually any special application. Our engineers can utilize a variety of alternative features and options to customize the heater to your specific needs.

MATERIAL AND CONSTRUCTION

- Flexible segmented ceramics allow for easy installation on barrel.
- Stainless steel sheath.
- Energy-saving fiberglass insulation.
- Ceramic segments brickworked so that heater remains as one unit.
- Heater can be made with holes and slots.
- Insulation: 1/4" (6.3 mm) thick ceramic fiberglass is standard; 3/8" (9.5 mm), 1/2" (12.7 mm) or no insulation is optional.
- Shroud: Stainless steel.
- Clamping Method: Ears are standard, strap ends and spring bolt clamping is optional. Clamping height of heater with 1/4" (6.3 mm) thick insulation approximately 9/16" (14.2 mm).

SPECIFICATIONS

Standard Diameters: Between 3 1/2" (88.9 mm) and 12" (30 cm).
Also can be made up to 29" (73 cm) diameter in one piece heater. Larger diameters can be made using multiple segments.

- Dimensions of terminal box: 2" long x 2 1/2" wide x 1 7/8" high

Standard Widths: 2 1/2", 3", 4", 4 1/2", 5", 6", 7 1/2", 8", 9", & 10" (63.5 mm, 76.2 mm, 10.1 cm, 11.4 cm, 12.7 cm, 15.2 cm, 19.0 cm, 20.3 cm, 22.8 cm, 25.4 cm).

Metric Sizes: Available on special order basis.

Gap: 1/2" (12.7 mm) unless otherwise specified.

Terminations: Post terminals, opposite gap unless otherwise specified; see below for other optional terminations.

Wattage: 40 watts/in^2 max (6.2 w/cm^2).

Voltage: 120, 240, or 480 vac. 3 phase and dual voltage optional.

TERMINATIONS

Fig. 1: Post Terminals

Fig. 2: Terminal Strip in box
Minimum width - 2 1/2"

Fig. 3: Leads w/Strain Relief (shown)
Leads w/Strain Relief & S. St. Braid
Leads w/Strain Relief & S. St. Armor

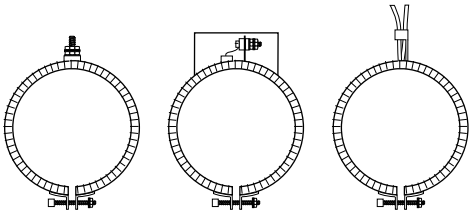
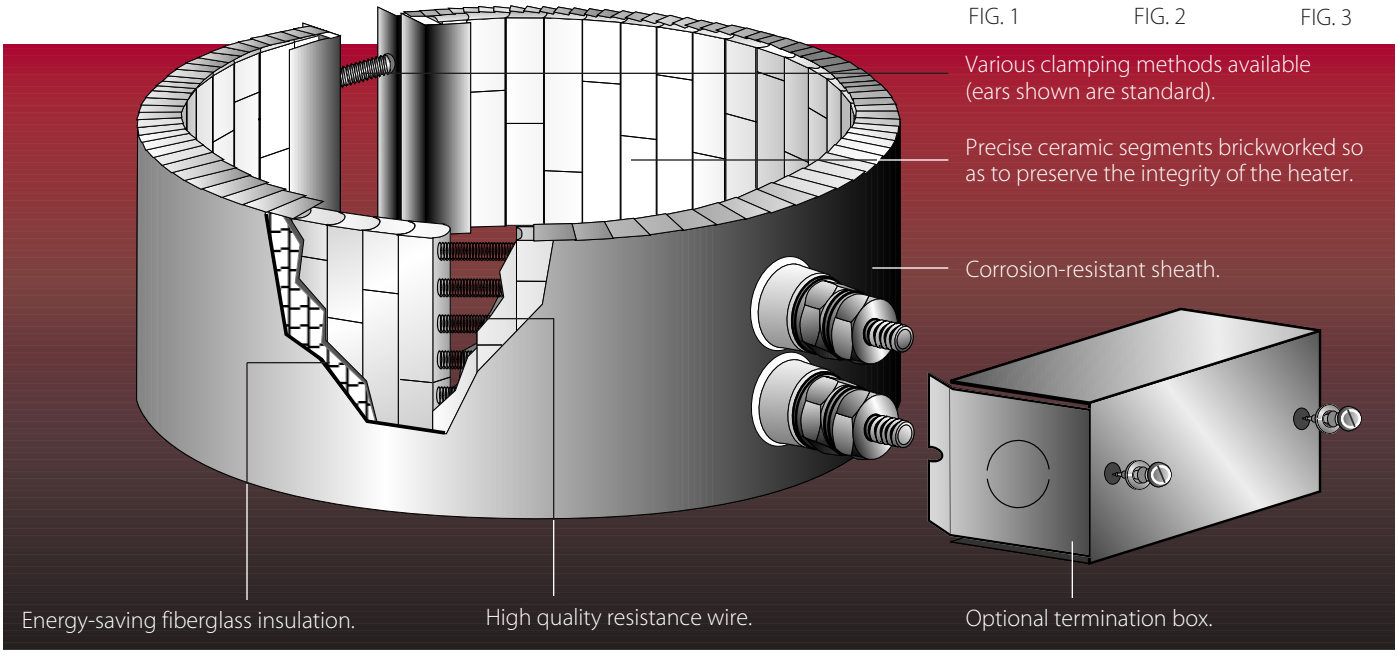


FIG. 1 FIG. 2 FIG. 3



PERMAHEAT
BAND HEATERS

PERMAHEAT

Our durable Permaheat Band heater uses a tubular heating element to provide excellent heat transfer and resistance to contamination. Its aluminum body allows for better conformity to slightly irregular diameters.

The tubular elements are placed in a precisely extruded aluminum base. This aluminum base is normally sectioned to ensure a positive contact with the object being heated. The aluminum body also serves as an excellent transfer medium for rapid heat-up while providing a uniform temperature throughout the entire band.

APPLICATIONS

Permaheats can be used in many different situations, including heating barrels of extrusion and injection molding machines, especially in areas where contamination is possible.

In addition, Permaheats can be modified to meet the demands of special applications. There are a variety of alternative features and options available to customize the heater to your special needs.

MATERIAL AND CONSTRUCTION

- Aluminum extrusion allows for even heat distribution.
- Durable tubular heating element.
- Precision wound resistance wire.
- 20 Ga. St. Steel strap for added clamping strength.
- Standard high strength 1/4 - 20 clamping bar.
- Cooling tubes are available as an option on Permaheat Bands. Permaheat sizes available are 3" (76.2 mm), 4" (10.1 cm) widths and 5" (12.7 cm) to 20" (50.8 cm) I. D. bands.

TERMINATIONS

Straight threaded terminals are normally supplied on all Permaheat heaters.

Fig.1: Terminal box protects employees from possible electric shock. High temperature braid or stainless steel can also be ordered for further protection. (Aluminum terminal box is standard).

Fig. 2: High temperature ceramic insulated quick-disconnect plug mounted in a terminal box allows quick and convenient connection. Female quick-disconnect plugs are also available.

Fig. 3: For applications requiring leads, high temperature mica tape (842° F, 450° C) lead wire is attached.

SPECIFICATIONS

MECHANICAL:
Widths: 1 1/2", 2 1/2", 3", 4"
(38.1mm, 63.5 mm, 76.2 mm, 10.1 cm)
Min. Dia. for 1 1/2" width: 3.5" (8.9 cm)
Min. Dia. for all other widths: 5" (12.7 cm)
Max. Dia.: 106" (269.2 cm)
Standard Gap: 3/8" (9.5 mm)
[on dias. up to 14" (35.5 cm)]
Max. Operating Temperature:
600° F (315.5° C)

- Dimensions of terminal box:
  3 1/4" long x 1 7/8" wide x 2" high

ELECTRICAL:
Max. Volts per half: 240 vac
Standard Watt Density: 30 watts/in^2
(4.65 w/cm^2)
Max. Watt Density: 40 watts/in^2
(6.2 w/cm^2)
Std. Supply Line Voltage: 240 vac

Permaheat Band heaters are constructed as sets. The tubular heaters are rated as one-half total wattage.

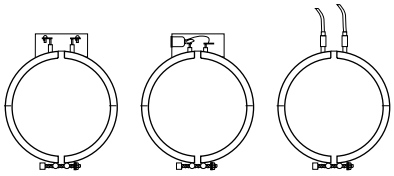
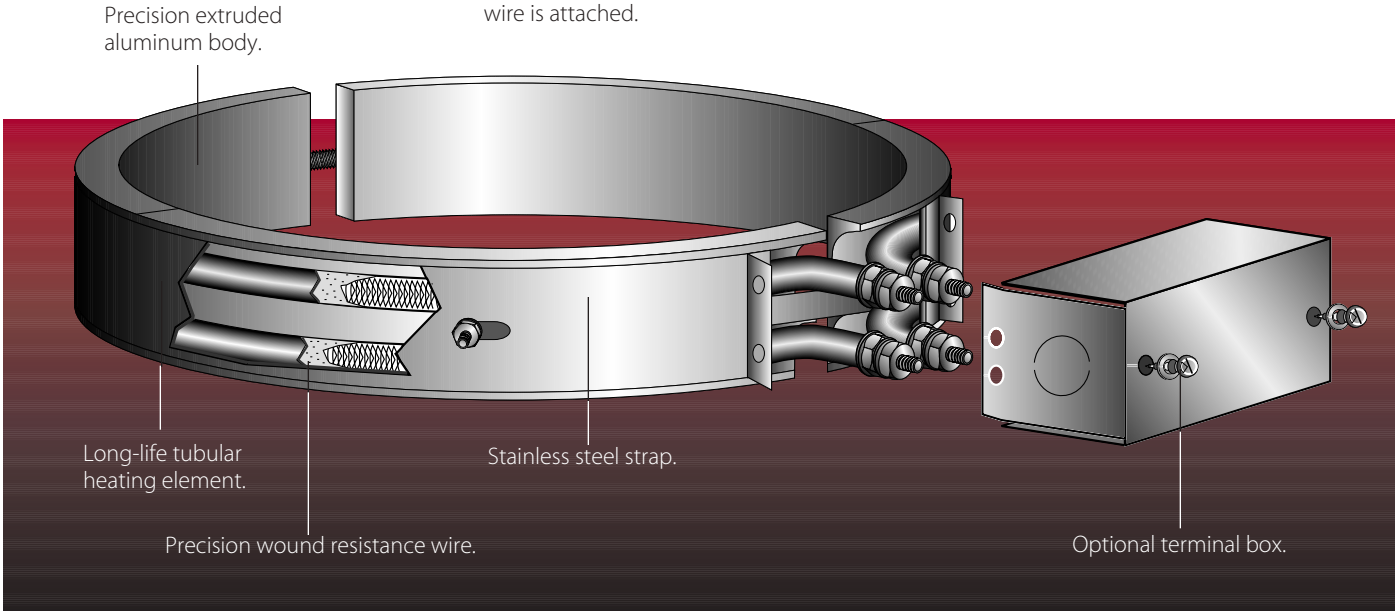
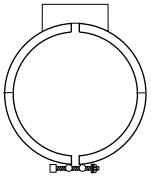
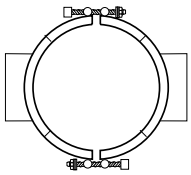


FIG. 1 FIG. 2 FIG. 3

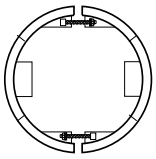




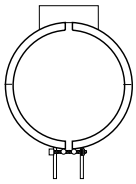
2 PIECE - PERMAHEAT BAND (1 BOX)					
WIDTH	MM	SMALLEST DIA.	MM	LARGEST DIA.	MM
1 1/2″	38.1	3 1/2″	88.9	30″	762
2 1/2	63.5	5″	127.0	20″	508
3	76.2	5″	127.0	20″	508
4	101.6	5″	127.0	20″	508



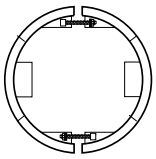
2 PIECE - PERMAHEAT BAND (2 BOXES)					
WIDTH	MM	SMALLEST DIA.	MM	LARGEST DIA.	MM
1 1/2″	38.1	30″	762	55″	1397
2 1/2	63.5	20	508	50	1270
3	76.2	20	508	50	1270
4	101.6	20	508	50	1270



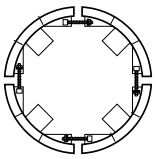
2 PIECE - REVERSE PERMAHEAT BAND					
WIDTH	MM	SMALLEST DIA.	MM	LARGEST DIA.	MM
1 1/2″	38.1	55″	1397	110″	2794
2 1/2	63.5	50	1270	110	2794
3	76.2	50	1270	110	2794
4	101.6	50	1270	100	2794



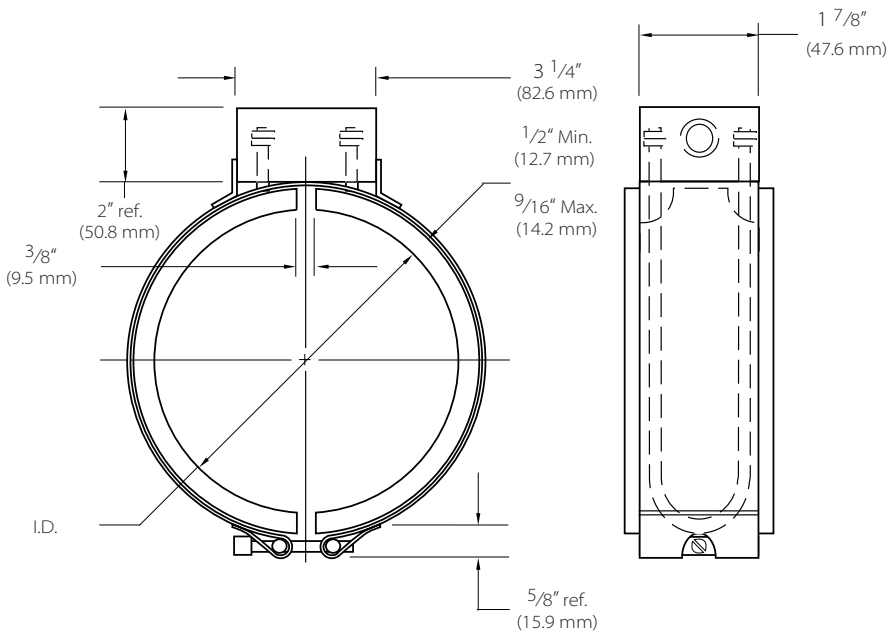
2 PIECE - COOLING TUBE PERMAHEAT BAND					
WIDTH	MM	SMALLEST DIA.	MM	LARGEST DIA.	MM
3″	76.2	5″	127.0	25″	635
4	101.6	5	127.0	25	635



2 PIECE - REVERSE PERMAHEAT BAND					
WIDTH	MM	SMALLEST DIA.	MM	LARGEST DIA.	MM
1 1/2″	38.1	12″	304.8	50″	1270
2 1/2	63.5	15	381	50	1270
3	76.2	15	381	50	1270
4	101.6	15	381	50	1270



4 PIECE - REVERSE PERMAHEAT BAND					
WIDTH	MM	SMALLEST DIA.	MM	LARGEST DIA.	MM
1 1/2″	38.1	50″	1270	110″	2794
2 1/2	63.5	50	1270	110	2794
3	76.2	50	1270	110	2794
4	101.6	50	1270	110	2794



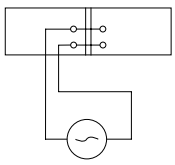
Permaheat Band heaters can be designed for either heating an external or internal surface. In either instance, the segmented aluminum heat sink construction, along with rugged clamping, afford excellent contact to the surface being heated.

Copper cooling tubes 3/8″ (9.5 mm) can be incorporated into the heater when required. The adjoining chart should be referred to for cooling tube and other size parameters.

Note that the number of band sections are in relation to the diameter.

Over 20″ (50 cm) in diameter, spring bolt clamping is standard.

ELECTRICAL DIAGRAM



ULTIMA
BAND HEATERS

ULTIMA BAND

Fast Heat's Ultima Band heater is one of the most rugged products on the market. Its tubular heating element enables the Ultima to provide uniform heat at medium to high temperatures while resisting contamination, corrosion and vibration.

Ultima band heaters are constructed of a heavy-duty stainless steel sheath with welded stainless steel end caps. This stainless steel structure eliminates distortion and deformation problems that may occur with other bands at higher temperatures.

APPLICATIONS

The Ultima's sturdy construction makes it very well-suited for many applications, including heating extrusion dies, barrel heating and chemical processing. Keep the Ultima in mind anytime there is the possibility of vibration, shock or contamination.

If you have a special application, there are a variety of alternative features and options available to customize the Ultima to your specific needs.

MATERIAL AND CONSTRUCTION

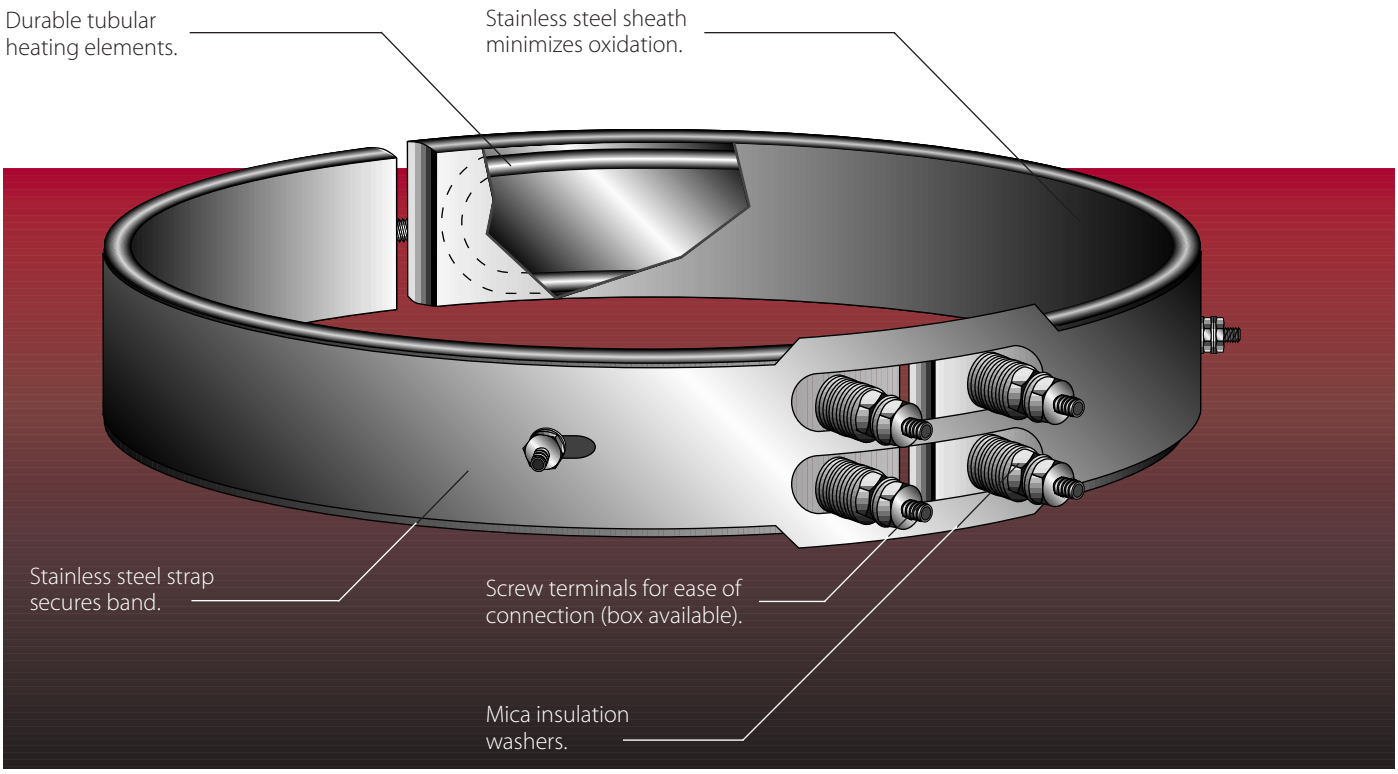
- High temperature tubular construction.
- Outer stainless steel sheath for durability.
- MgO filled for better heat transfer.
- Maximum strength 1/4 - 20 clamping bar.
- 20 Ga. stainless steel strap for added clamping strength.

SPECIFICATIONS

Standard Ultima Band heaters are available from 5" (12 cm) to 30" (76 cm) in diameter, in two-piece construction. Where it is necessary, they can be made in 3, 4 or more pieces. A stainless steel splash-proof terminal box is optional.

Standard Ultima heaters are manufactured to 40 watts/in^2 (6.2 w/cm^2) heat capacity and 240 volt rating. In this manner, tandem Ultima strips or bands can be wired to a 240 volt source. These heaters can operate up to 1200º F (648.8º C) continuously with the highest dielectrical properties attainable in industrial application today.

Cross section of the heater is 1 1/2" x 3/8" (38.1 x 9.5 mm) with fully rounded corners.



FLEXTRACOIL

Our Flextracoil heaters were created to heat flow-through nozzles and sprue bushings in runnerless molding systems. Available in either flat, square or round styles, the Flextracoil can be coiled evenly spaced or with distributed coils. All styles are stocked uncoiled at Fast Heat and are formed to customer specifications before shipping.

If you're in a hurry, Flextracoil heaters are available through QuickShip. For more details on this rapid delivery program, see page 2.

APPLICATIONS

Although the most common application for the Flextracoil is externally heating flow-through nozzles in hot runner systems, this heater is also versatile enough to be used for hot metal forming punches and dies, sealing bars and dies, instrumentation and medical applications.

Flextracoils can also be modified to meet the demands of virtually any special application. Our engineers can utilize a variety of alternative features and options to customize the heater to your specific needs.

Each Flextracoil heater is warranted against burn-out and defects in materials and workmanship for a period of one year after delivery.

MATERIAL AND CONSTRUCTION

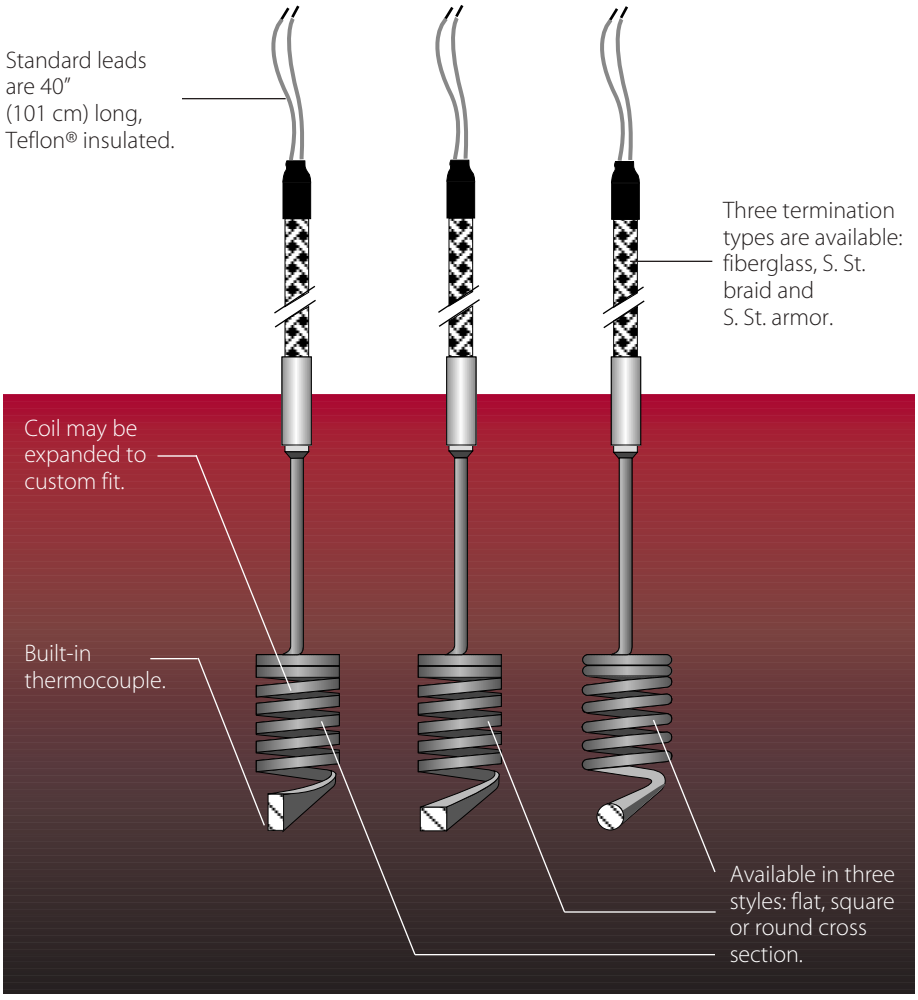
- Corrosion resistant high nickel alloy.
- Annealed element.
- Highly compacted MgO insulation.
- Three cross sections available.
- Standard leads are Teflon® insulated, 40" (101 cm) long.
- Three termination types are available: fiberglass sleeving (standard), stainless steel braid or armor.
- With or without type "J" thermocouple.
- Customization is available.

Following are some things to keep in mind when considering a Flextracoil heater. The square and flat designs have a broader surface contact and are recommended over the round design. For short coil widths, the square element is recommended because of its narrower width, which will allow for more turns per inch.

Because of the many different applications and possible designs, Fast Heat is ready to help with any design questions you may have or further design specifics you may need.

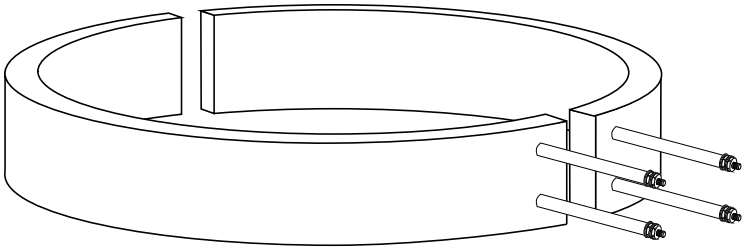
THERMOCOUPLE

As mentioned before, the thermocouple is type "J". The thermocouple has been located 1/4" (6.3 mm) to 3/8" (9.5 mm) in from the tip of the element. This is due to the fact that when the heater is coiled, the tip does not conform to the coiling diameter. By moving it back, a more accurate reading is achieved.

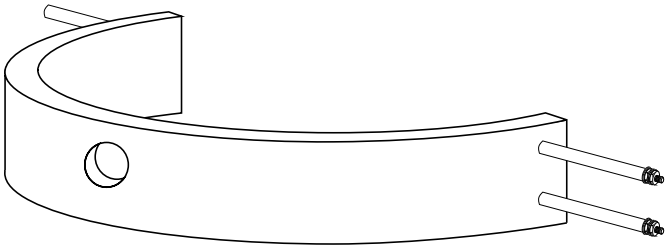


CAST
BAND HEATERS

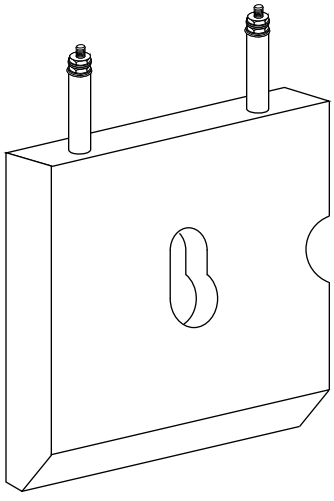
HEATING ONLY



HEATING W/COOLING TUBES



SPECIAL HEATED SHAPE



CAST BANDS

The cast heater is the toughest band available; it can withstand most rough handling, shock and vibration. And the heating element is completely isolated from the outside of the band, so it can withstand almost any type of contamination. Cast heaters are typically constructed of aluminum and can be produced in an almost endless variety of shapes and sizes.

APPLICATIONS

Castings can be used to heat dies, extruders, chemical valves & pipelines, and also to heat & cool oil. These bands will take almost any type of abuse without failure.

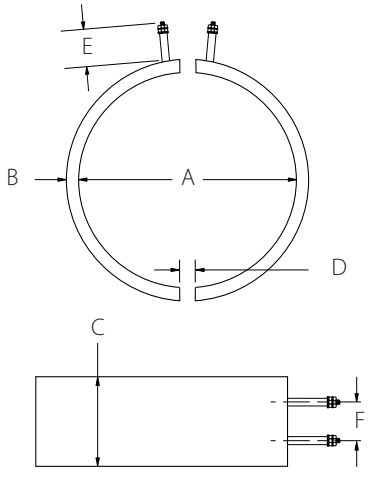
If you have a special application, Cast Bands can also be modified to meet these demands. Our engineers can utilize a variety of alternative features and options to customize the heater to your specific needs.

HOW TO ORDER CAST BAND HEATERS

Specify dimensions as follows:

- "A" = inside diameter
- "B" = wall thickness
  (contact Fast Heat for min. thickness)
- "C" = width
- "D" = gap (top and bottom)
- "E" = stem height
- "F" = centers

Total watts, volts and cooling tubes.



BAND SHAPE VS. AVAILABLE CLAMP TYPE

HOW TO USE

To facilitate choosing a clamping style, use the chart below. Cross reference the heater style on the left to the desired clamping style across the top.

Please note that some styles are only available in the Mica Band. These clamping styles are more fully illustrated and described on the following pages.

HEATER INSTALLATION

The heater should be tightly clamped around the cylinder. To ensure that the units are tightly clamped, they should be re-tightened after the unit has reached operating temperature and the electrical power has been disconnected.

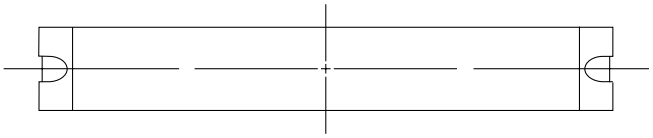
CLAMPING

Straps create uniform pressure over the entire circumference of the band, providing intimate contact of the band with the cylinder. Special material used has a low expansion rate to assure tight fit under most conditions. Where straps cannot be used, we adapt strap ends to heaters.

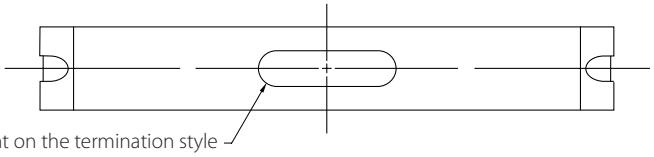
	Strap	Strap End	Ear	Dual Screw Bar Clamp	Wedge Lock	Extension Pad	Full Width Strap	Disc Spring (Belleville)	Spring Bolt	Turn-Buckle
Standard (Round)	•	•	•	•	•		•	•	•	
Sealed	•	•	•	•			•	•	•	
Hinged (Mica)	•	•	•	•			•	•	•	
Expandable	•	•	•	•			•	•	•	
Rectangular (Mica)	•		•			•	•	•	•	
Partial	•	•	•			•	•	•	•	
Reverse					•					•
Square (Mica)	•		•				•	•	•	
Cone Shaped (Mica)		•	•	•	•					
U-Shaped (Mica)	•	•		•		•	•			

STRAPS
BAND HEATERS

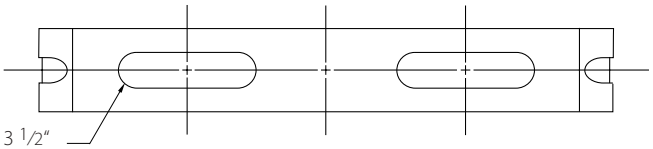
TYPE 1



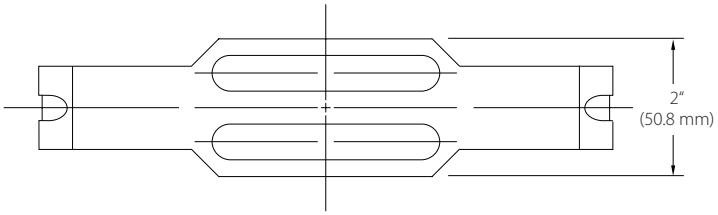
TYPE 2



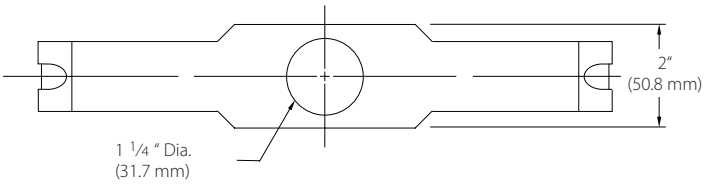
TYPE 3



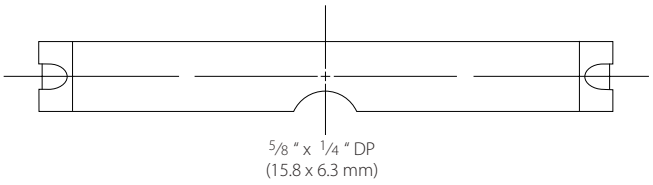
TYPE 4



TYPE 6



TYPE 7



STRAP STANDARDS

Straps can be vastly modified to fit a wide variety of bands. As wider bands are used, multiple straps will most likely be designed in.

Normally barrel nuts are built into the ends: one threaded, one through hole. Slots shown are to clear termination areas.

Unless otherwise specified, straps are assigned by our engineering staff to best suit each application.

STRAP WIDTH IN	STRAP WIDTH MM	SCREW
1/2	12.7	6-32
5/8, 1, 1 1/4	25.4	10-24
1, 1 1/4	31.8	1/4-20 (NOTE 1)

NOTE 1: Standard for 9" (22.9 cm) I.D. or greater band heaters.

CLAMPING

Illustrated are the various available styles of clamping for band heaters.

When a band is provided the material is of a low coefficient of expansion type.

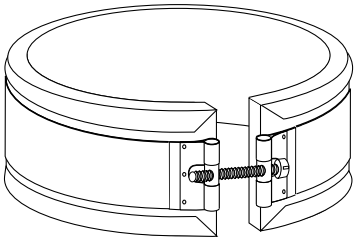
Width of the clamping band or the number used per heater is dictated by the design standards.

There are a variety of clamping mechanisms that can be attached to the band or directly to the heater. The most common forms are the strap and strap ends.

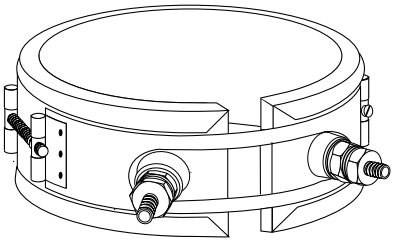
Factors influencing the type and size of clamping are:

- Type of band heater
- Diameter and width
- Termination type and location
- Holes or notches in heater
- Preference of the user

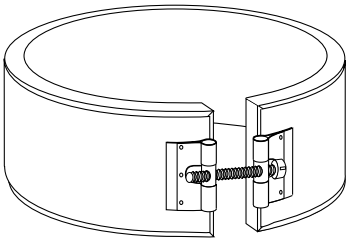
ONE-PIECE STRAP



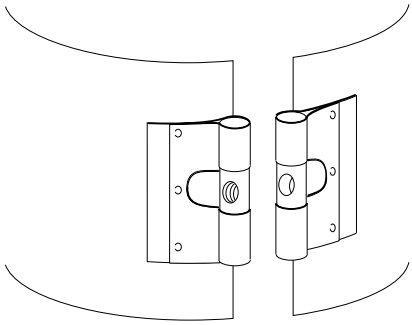
TWO-PIECE STRAP



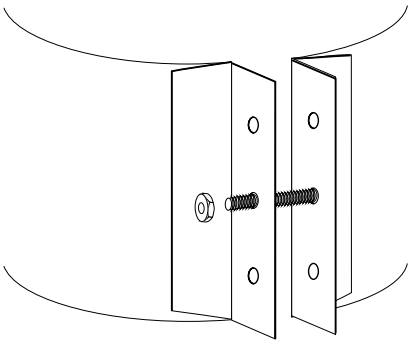
FULL-WIDTH STRAP



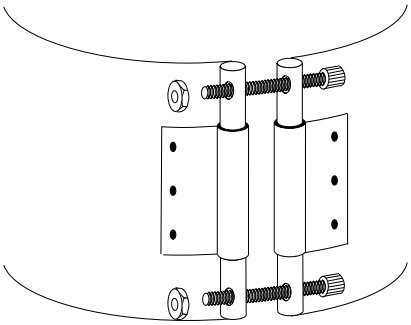
STRAP ENDS



EAR CLAMPING

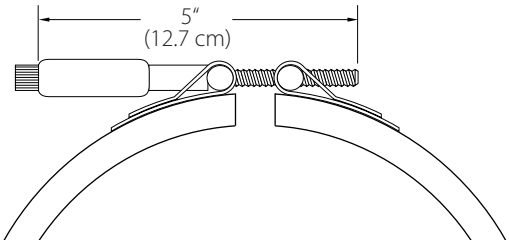


BAR CLAMPING



CLAMPING
BAND HEATERS

BELLEVILLE CLAMPING

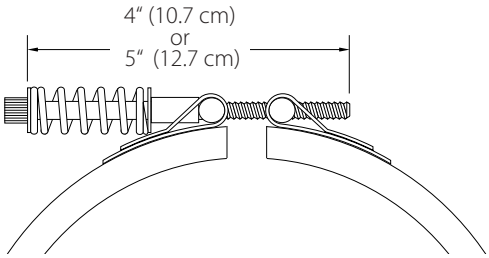


A clamping system is generally selected for use with large diameter heaters where additional compensation of band elongation is required.

Belleville and spring bolt are two styles of available clamping. Selection of style is a matter of the customer's preference.

Belleville clamping comes with a standard 1/4 - 20 X 5" (12.7 cm) long screw.

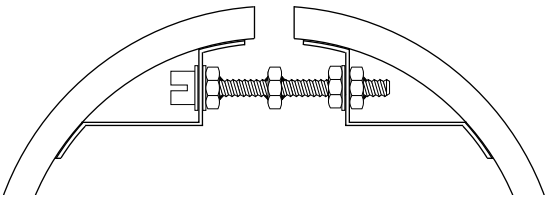
SPRING BOLT CLAMPING



Spring bolt clamping applies constant tension on the clamping mechanism to compensate for heater elongation once it has been energized.

Spring bolt clamping comes with either a 1/4 - 20 X 4" (10.7cm) or 1/4 - 20 X 5" (12.7cm) long screw.

TURNBUCKLE

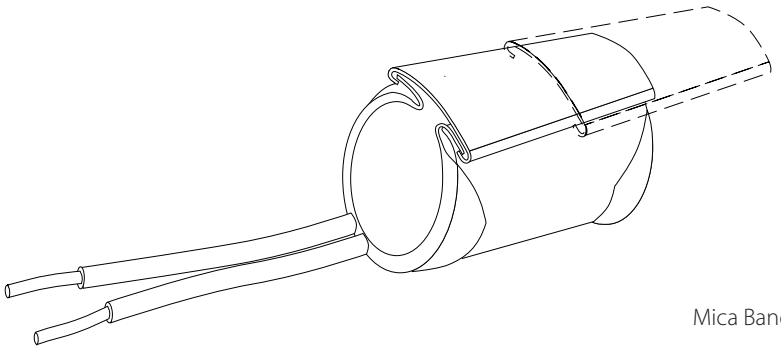


Specified where a heater is used to heat an I.D. surface. Use of this mechanism is governed by the heater diameter and width. Obstructions such as shafts passing along the center line of the heater may present an interference problem.

Contact Fast Heat for review of your requirement.

1/4 - 20 X 2 1/2" (63.5 mm) long screw.

WEDGE-LOCK



Mica Band

Specially designed for mounting where space is limited.

Eliminates the need for straps.

Leads must exit opposite gap. (Limited availability, contact Fast Heat.)

Available for Mica Bands and Better bands, contact Fast Heat for termination styles.

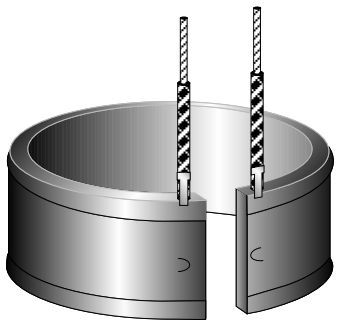
BETTER
BAND HEATERS

BETTER BAND

I.D. IN.	I.D. MM	WIDTH IN.	WIDTH MM	WATTS	120V	240V
1	25.4	1	25.4	150	◆	◆
1	25.4	1 1/2	38.1	200	◆	◆
1	25.4	2	50.8	275	◆	◆
1	25.4	2 1/2	63.5	350	◆	◆
1 1/4	31.7	1	25.4	200	◆	◆
1 1/4	31.7	1 1/2	38.1	300	◆	◆
1 1/4	31.7	2	50.8	350	◆	◆
1 1/4	31.7	2 1/2	63.5	450	◆	◆
1 1/2	38.1	1	25.4	225	◆	◆
1 1/2	38.1	1 1/2	38.1	350	◆	◆
1 1/2	38.1	2	50.8	400	◆	◆
1 1/2	38.1	2 1/2	63.5	525	◆	◆
1 3/4	44.4	1	25.4	275	◆	◆
1 3/4	44.4	1 1/2	38.1	375	◆	◆
1 3/4	44.4	2	50.8	500	◆	◆
1 3/4	44.4	2 1/2	63.5	600	◆	◆
1 7/8	47.6	1	25.4	300	◆	◆
1 7/8	47.6	1 1/2	38.1	400	◆	◆
1 7/8	47.6	2	50.8	525	◆	◆
1 7/8	47.6	2 1/2	63.5	650	◆	◆
2	50.8	1	25.4	325	◆	◆
2	50.8	1 1/2	38.1	425	◆	◆
2	50.8	2	50.8	550	◆	◆
2	50.8	2 1/2	63.5	700	◆	◆
2 1/4	57.1	1	25.4	350	◆	◆
2 1/4	57.1	1 1/2	38.1	525	◆	◆
2 1/4	57.1	2	50.8	625	◆	◆
2 1/4	57.1	2 1/2	63.5	775	◆	◆
2 1/2	63.5	1	25.4	400	◆	◆
2 1/2	63.5	1 1/2	38.1	525	◆	◆
2 1/2	63.5	2	50.8	700	◆	◆
2 1/2	63.5	2 1/2	63.5	875	◆	◆
2 3/4	69.8	1	25.4	425	◆	◆
2 3/4	69.8	1 1/2	38.1	575	◆	◆
2 3/4	69.8	2	50.8	775	◆	◆
2 3/4	69.8	2 1/2	63.5	950	◆	◆
3	76.2	1	25.4	475	◆	◆
3	76.2	1 1/2	38.1	625	◆	◆
3	76.2	2	50.8	825	◆	◆
3	76.2	2 1/2	63.5	1025	◆	◆
3 1/4	82.5	1	25.4	500	◆	◆
3 1/4	82.5	1 1/2	38.1	700	◆	◆
3 1/4	82.5	2	50.8	900	◆	◆
3 1/4	82.5	2 1/2	63.5	1125	◆	◆
3 1/2	88.9	1	25.4	525	◆	◆
3 1/2	88.9	1 1/2	38.1	725	◆	◆
3 1/2	88.9	2	50.8	950	◆	◆
3 1/2	88.9	2 1/2	63.5	1200	◆	◆
3 3/4	95.2	1	25.4	575	◆	◆
3 3/4	95.2	1 1/2	38.1	775	◆	◆
3 3/4	95.2	2	50.8	1025	◆	◆
3 3/4	95.2	2 1/2	63.5	1300	◆	◆

All band heaters listed below include:

- 10" (25.4 cm) mica tape leads (300 volt rated) exiting axially from each side of the gap.
- One-piece construction.



QuickShip

IS IT IN STOCK?

- Consult Fast Heat for details. If it is a QuickShip item, it will ship the same day – just call before 3 p.m. CST.
- Check out our QuickShip Catalog.

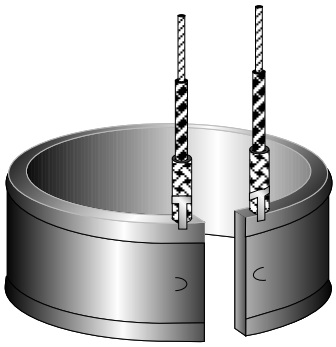
BETTER
BAND HEATERS

BETTER BAND

I.D. IN.	I.D. MM	WIDTH IN.	WIDTH MM	WATTS	120V	240V
3/4	19.0	1	25.4	125	◆	◆
3/4	19.0	1 1/2	38.1	150	◆	◆
7/8	22.2	1	25.4	150	◆	◆
7/8	22.2	1 1/2	38.1	175	◆	◆
1	25.4	1	25.4	150	◆	◆
1	25.4	1 1/2	38.1	200	◆	◆
1	25.4	2	50.8	275	◆	◆
1	25.4	2 1/2	63.5	350	◆	◆
1 1/4	31.7	1	25.4	200	◆	◆
1 1/4	31.7	1 1/2	38.1	300	◆	◆
1 1/4	31.7	2	50.8	350	◆	◆
1 1/4	31.7	2 1/2	63.5	450	◆	◆
1 1/2	38.1	1	25.4	225	◆	◆
1 1/2	38.1	1 1/2	38.1	350	◆	◆
1 1/2	38.1	2	50.8	400	◆	◆
1 1/2	38.1	2 1/2	63.5	525	◆	◆
1 3/4	44.4	1	25.4	275	◆	◆
1 3/4	44.4	1 1/2	38.1	375	◆	◆
1 3/4	44.4	2	50.8	500	◆	◆
1 3/4	44.4	2 1/2	63.5	600	◆	◆
1 7/8	47.6	1	25.4	300	◆	◆
1 7/8	47.6	1 1/2	38.1	400	◆	◆
1 7/8	47.6	2	50.8	525	◆	◆
1 7/8	47.6	2 1/2	63.5	650	◆	◆
2	50.8	1	25.4	325	◆	◆
2	50.8	1 1/2	38.1	425	◆	◆
2	50.8	2	50.8	550	◆	◆
2	50.8	2 1/2	63.5	700	◆	◆
2 1/4	57.1	1	25.4	350	◆	◆
2 1/4	57.1	1 1/2	38.1	525	◆	◆
2 1/4	57.1	2	50.8	625	◆	◆
2 1/4	57.1	2 1/2	63.5	775	◆	◆
2 1/2	63.5	1	25.4	400	◆	◆
2 1/2	63.5	1 1/2	38.1	525	◆	◆
2 1/2	63.5	2	50.8	700	◆	◆
2 1/2	63.5	2 1/2	63.5	875	◆	◆
2 3/4	69.8	1	25.4	425	◆	◆
2 3/4	69.8	1 1/2	38.1	575	◆	◆
2 3/4	69.8	2	50.8	775	◆	◆
2 3/4	69.8	2 1/2	63.5	950	◆	◆
3	76.2	1	25.4	475	◆	◆
3	76.2	1 1/2	38.1	625	◆	◆
3	76.2	2	50.8	825	◆	◆
3	76.2	2 1/2	63.5	1025	◆	◆
3 1/4	82.5	1	25.4	500	◆	◆
3 1/4	82.5	1 1/2	38.1	700	◆	◆
3 1/4	82.5	2	50.8	900	◆	◆
3 1/4	82.5	2 1/2	63.5	1125	◆	◆
3 1/2	88.9	1	25.4	525	◆	◆
3 1/2	88.9	1 1/2	38.1	725	◆	◆
3 1/2	88.9	2	50.8	950	◆	◆
3 1/2	88.9	2 1/2	63.5	1200	◆	◆
3 3/4	95.2	1	25.4	575	◆	◆
3 3/4	95.2	1 1/2	38.1	775	◆	◆
3 3/4	95.2	2	50.8	1025	◆	◆
3 3/4	95.2	2 1/2	63.5	1300	◆	◆

All band heaters listed below include:

- 10" (25.4 cm) mica tape leads (300 volt rated) with stainless steel braid exiting axially from each side of the gap.
- One-piece construction.

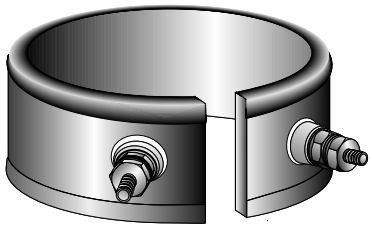


BETTER BAND

I.D. IN.	I.D. MM	WIDTH IN.	WIDTH MM	WATTS	120V	240V
4	101.6	1	25.4	625	◆	◆
4	101.6	1 1/2	38.1	750		◆
4	101.6	1 1/2	38.1	825	◆	◆
4	101.6	2	50.8	550		◆
4	101.6	2	50.8	800		◆
4	101.6	2	50.8	1100	◆	◆
4	101.6	2 1/2	63.5	1375	◆	◆
4 1/4	107.9	1	25.4	650	◆	◆
4 1/4	107.9	1 1/2	38.1	875	◆	◆
4 1/4	107.9	2	50.8	1175	◆	◆
4 1/4	107.9	2 1/2	63.5	1475	◆	◆
4 1/2	114.3	1	25.4	350		◆
4 1/2	114.3	1	25.4	700	◆	◆
4 1/2	114.3	1 1/2	38.1	750		◆
4 1/2	114.3	1 1/2	38.1	950	◆	◆
4 1/2	114.3	2	50.8	500		◆
4 1/2	114.3	2	50.8	1250	◆	◆
4 1/2	114.3	2 1/2	63.5	1550	◆	◆
4 3/4	120.6	1	25.4	725	◆	◆
4 3/4	120.6	1 1/2	38.1	1000	◆	◆
4 3/4	120.6	2	50.8	1325	◆	◆
4 3/4	120.6	2 1/2	63.5	1650	◆	◆
5	127.0	1 1/2	38.1	900		◆
5 1/4	133.4	1 1/2	38.1	600		◆
5 1/2	139.7	1 1/2	38.1	1000		◆
6	152.4	1 1/2	38.1	1000		◆
6 1/2	165.1	1 1/2	38.1	1000		◆
6 3/4	171.5	1 1/2	38.1	1000		◆

All band heaters listed below include:

- Screw terminals on top; one on each side of the gap.
- One-piece construction.



QuickShip

IS IT IN STOCK?

- Consult Fast Heat for details. If it is a QuickShip item, it will ship the same day – just call before 3 p.m. CST.
- Check out our QuickShip Catalog.

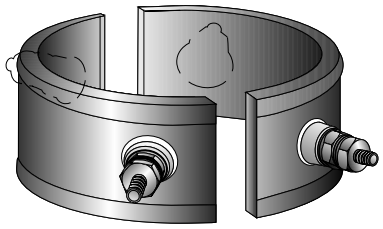
BETTER
BAND HEATERS

BETTER BAND

I.D. IN.	I.D. MM	WIDTH IN.	WIDTH MM	TOTAL WATTS	240V
5	127.0	1	25.4	700	◆
5	127.0	1 1/2	38.1	1000	◆
5	127.0	2	50.8	1300	◆
5	127.0	2 1/2	63.5	1650	◆
5 1/4	133.4	1 1/2	38.1	600	◆
5 1/4	133.4	1 1/2	38.1	1000	◆
5 1/2	139.7	1	25.4	750	◆
5 1/2	139.7	1 1/2	38.1	800	◆
5 1/2	139.7	1 1/2	38.1	1100	◆
5 1/2	139.7	2	50.8	1450	◆
5 1/2	139.7	2 1/2	63.5	1800	◆
6	152.4	1	25.4	850	◆
6	152.4	1 1/2	38.1	600	◆
6	152.4	1 1/2	38.1	1000	◆
6	152.4	1 1/2	38.1	1200	◆
6	152.4	2	50.8	1550	◆
6	152.4	2 1/2	63.5	1950	◆
6 1/2	165.1	1 1/2	38.1	900	◆
6 1/2	165.1	1 1/2	38.1	1200	◆
6 3/4	171.4	1 1/2	38.1	1000	◆
6 3/4	171.4	2	50.8	1300	◆
7	177.8	1 1/2	38.1	1000	◆
7	177.8	1 1/2	38.1	1200	◆
7 1/2	191.0	1 1/2	38.1	1200	◆
7 1/2	191.0	1 1/2	38.1	1500	◆
7 7/8	200.0	1 1/2	38.1	1000	◆
8	203.2	1 1/2	38.1	950	◆
8	203.2	1 1/2	38.1	1250	◆
8	203.2	1 1/2	38.1	1550	◆
8	203.2	2	50.8	2100	◆
8 1/2	215.9	1 1/2	38.1	1200	◆
8 1/2	215.9	1 1/2	38.1	1650	◆
8 1/2	215.9	2	50.8	2250	◆
8 1/2	215.9	2 1/2	63.5	3850	◆
8 3/4	222.2	1	25.4	1575	◆
8 3/4	222.2	1 1/2	38.1	2400	◆
8 3/4	222.2	2	50.8	3150	◆
8 3/4	222.2	2 1/2	63.5	3975	◆
9	228.6	1	25.4	1650	◆
9	228.6	1 1/2	38.1	1500	◆
9	228.6	1 1/2	38.1	2425	◆
9	228.6	2	50.8	3250	◆
9	228.6	2 1/2	63.5	4050	◆
9 1/4	229.1	1	25.4	1675	◆
9 1/4	229.1	1 1/2	38.1	2500	◆
9 1/4	229.1	2	50.8	3375	◆
9 1/4	229.1	2 1/2	63.5	4200	◆
9 1/2	241.3	1	25.4	1725	◆
9 1/2	241.3	1 1/2	38.1	2550	◆
9 1/2	241.3	2	50.8	1800	◆
9 1/2	241.3	2	50.8	3450	◆
9 1/2	241.3	2 1/2	63.5	4300	◆
9 3/4	247.6	1	25.4	1750	◆
9 3/4	247.6	1 1/2	38.1	2650	◆
9 3/4	247.6	2	50.8	3550	◆
9 3/4	247.6	2 1/2	63.5	4425	◆

All band heaters listed below include:

- Screw terminals on top; one on each side of the gap.
- Two-piece construction.

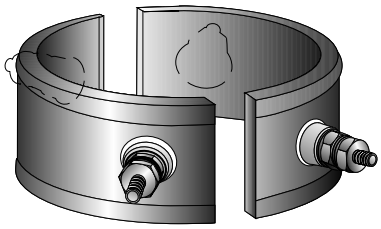


BETTER BAND

I.D. IN.	I.D. MM	WIDTH IN.	WIDTH MM	TOTAL WATTS	240V (EACH HALF)
10	254.0	1	25.4	1825	◆
10	254.0	1 1/2	38.1	1400	◆
10	254.0	1 1/2	38.1	2725	◆
10	254.0	2	50.8	3625	◆
10	254.0	2 1/2	63.5	4575	◆
10 1/4	260.3	1	25.4	1875	◆
10 1/4	260.3	1 1/2	38.1	2800	◆
10 1/4	260.3	2	50.8	3750	◆
10 1/4	260.3	2 1/2	63.5	4650	◆
10 1/2	266.7	1	25.4	1900	◆
10 1/2	266.7	1 1/2	38.1	2850	◆
10 1/2	266.7	2	50.8	3825	◆
10 1/2	266.7	2 1/2	63.5	4800	◆
10 3/4	273.0	1 1/2	38.1	1950	◆
10 3/4	273.0	2	50.8	2950	◆
10 3/4	273.0	1 1/2	38.1	3925	◆
10 3/4	273.0	2	50.8	4900	◆
11	279.4	2 1/2	63.5	2025	◆
11	279.4	1	25.4	3025	◆
11	279.4	1 1/2	38.1	4000	◆
11	279.4	2	50.8	5025	◆
11 1/4	285.7	2 1/2	63.5	2050	◆
11 1/4	285.7	1	25.4	3075	◆
11 1/4	285.7	1 1/2	38.1	4125	◆
11 1/4	285.7	2	50.8	5125	◆
11 1/2	292.1	2 1/2	63.5	2100	◆
11 1/2	292.1	1	25.4	3150	◆
11 1/2	292.1	1 1/2	38.1	4200	◆
11 1/2	292.1	2	50.8	5250	◆
11 3/4	298.4	2 1/2	63.5	2125	◆
11 3/4	298.4	1	25.4	3225	◆
11 3/4	298.4	1 1/2	38.1	4300	◆
11 3/4	298.4	2	50.8	5400	◆
12	304.8	2 1/2	63.5	2175	◆
12	304.8	1	25.4	3300	◆
12	304.8	1 1/2	38.1	4350	◆
12	304.8	2	50.8	5500	◆

All band heaters listed below include:

- Screw terminals on top; one on each side of the gap.
- Two-piece construction.



QuickShip

IS IT IN STOCK?

- Consult Fast Heat for details. If it is a QuickShip item, it will ship the same day – just call before 3 p.m. CST.
- Check out our QuickShip Catalog.

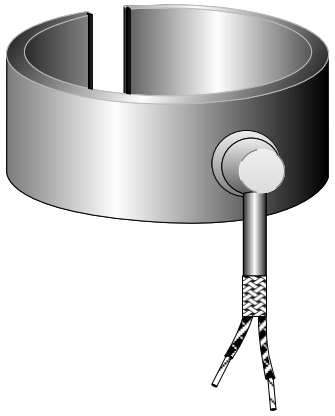
SEALED BETTER
BAND HEATERS

SEALED BETTER BAND

I.D.		WIDTH				
IN.	MM	IN.	MM	WATTS	120V	240V
1	25.4	3/4	19.0	100	◆	◆
1	25.4	1	25.4	150	◆	◆
1	25.4	1 1/4	31.7	175	◆	◆
1	25.4	1 5/16	33.3	175	◆	◆
1	25.4	1 3/8	34.9	175	◆	◆
1	25.4	2	50.8	275	◆	◆
1	25.4	2 1/2	63.5	350	◆	◆
1 1/4	31.7	3/4	19.0	150	◆	◆
1 1/4	31.7	1	25.4	200	◆	◆
1 1/2	38.1	1 1/4	31.7	275	◆	◆
1 1/2	38.1	1 5/16	33.3	275	◆	◆
1 1/2	38.1	1 3/8	34.9	275	◆	◆
1 1/2	38.1	1 1/2	38.1	325	◆	◆
1 1/2	38.1	2	50.8	425	◆	◆
1 1/2	38.1	2 1/2	63.5	525	◆	◆
1 3/4	44.4	3/4	19.0	200	◆	◆
1 3/4	44.4	1	25.4	275	◆	◆
1 3/4	44.4	1 1/4	31.7	325	◆	◆
1 3/4	44.4	1 5/16	33.3	325	◆	◆
1 3/4	44.4	1 3/8	34.9	325	◆	◆
1 3/4	44.4	1 1/2	38.1	375	◆	◆
1 3/4	44.4	2	50.8	475	◆	◆
1 3/4	44.4	2 1/2	63.5	600	◆	◆
2	50.8	3/4	19.0	225	◆	◆
2	50.8	1	25.4	300	◆	◆
2	50.8	1 1/4	31.7	375	◆	◆
2	50.8	1 5/16	33.3	375	◆	◆
2	50.8	1 3/8	34.9	375	◆	◆
2	50.8	1 1/2	38.1	425	◆	◆
2	50.8	2	50.8	550	◆	◆
2	50.8	2 1/2	63.5	700	◆	◆

All band heaters listed below include:

- 10" mica (25.4 cm) tape leads (300 volt rated) with stainless steel braid exiting axially through cap and tube opposite the gap.
- One-piece construction.



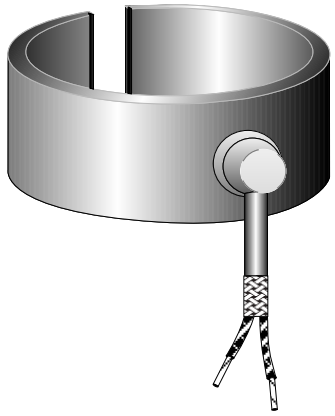
SEALED BETTER BAND HEATERS

SEALED BETTER BAND

I.D. IN.	I.D. MM	WIDTH IN.	WIDTH MM	WATTS	120V	240V
2 1/4	57.1	3/4	19.0	250	◆	◆
2 1/4	57.1	1	25.4	350	◆	◆
2 1/4	57.1	1 1/4	31.7	425	◆	◆
2 1/4	57.1	1 5/16	33.3	425	◆	◆
2 1/4	57.1	1 3/8	34.9	425	◆	◆
2 1/4	57.1	1 1/2	38.1	475	◆	◆
2 1/4	57.1	2	50.8	600	◆	◆
2 1/4	57.1	2 1/2	63.5	775	◆	◆
2 1/2	63.5	3/4	19.0	275	◆	◆
2 1/2	63.5	1	25.4	375	◆	◆
2 1/2	63.5	1 1/4	31.7	475	◆	◆
2 1/2	63.5	1 5/16	33.3	475	◆	◆
2 1/2	63.5	1 3/8	34.9	475	◆	◆
2 1/2	63.5	1 1/2	38.1	525	◆	◆
2 1/2	63.5	2	50.8	700	◆	◆
2 1/2	63.5	2 1/2	63.5	875	◆	◆
2 3/4	69.8	3/4	19.0	325	◆	◆
2 3/4	69.8	1	25.4	425	◆	◆
2 3/4	69.8	1 1/4	31.7	525	◆	◆
2 3/4	69.8	1 5/16	33.3	525	◆	◆
2 3/4	69.8	1 3/8	34.9	525	◆	◆
2 3/4	69.8	1 1/2	38.1	575	◆	◆
2 3/4	69.8	2	50.8	750	◆	◆
2 3/4	69.8	2 1/2	63.5	950	◆	◆
3	76.2	3/4	19.0	350	◆	◆
3	76.2	1	25.4	450	◆	◆
3	76.2	1 1/4	31.7	575	◆	◆
3	76.2	1 5/16	33.3	575	◆	◆
3	76.2	1 3/8	34.9	575	◆	◆
3	76.2	1 1/2	38.1	625	◆	◆
3	76.2	2	50.8	800	◆	◆
3	76.2	2 1/2	63.5	1000	◆	◆

All band heaters listed below include:

- 10" (25.4 cm) mica tape leads (300 volt rated) with stainless steel braid exiting axially through cap and tube opposite the gap.
- One-piece construction.



QuickShip

IS IT IN STOCK?

- Consult Fast Heat for details. If it is a QuickShip item, it will ship the same day – just call before 3 p.m. CST.
- Check out our QuickShip Catalog.

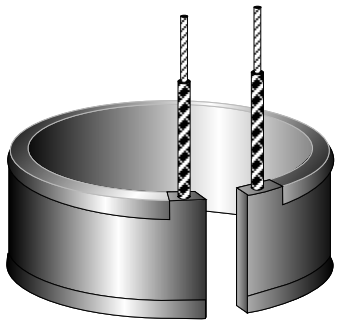
MICA
BAND HEATERS

MICA BAND

I.D. IN.	I.D. MM	WIDTH IN.	WIDTH MM	WATTS	120V	240V
3/4	19.0	1	25.4	100	◆	◆
1	25.4	1	25.4	100	◆	◆
1	25.4	1	25.4	125	◆	◆
1	25.4	1 1/2	38.1	200	◆	◆
1	25.4	2	50.8	275	◆	◆
1 1/4	31.7	1	25.4	125	◆	◆
1 1/4	31.7	1 1/4	31.7	125		◆
1 1/4	31.7	1 1/4	31.7	250	◆	◆
1 1/4	31.7	1 1/2	38.1	200	◆	◆
1 1/4	31.7	3	76.2	150		◆
1 1/4	31.7	3	76.2	250		◆
1 1/4	31.7	3	76.2	300	◆	◆
1 1/2	38.1	3/4	19.0	125	◆	◆
1 1/2	38.1	7/8	22.2	100		◆
1 1/2	38.1	1	25.4	100		◆
1 1/2	38.1	1	25.4	200	◆	◆
1 1/2	38.1	1 1/4	31.7	250		◆
1 1/2	38.1	1 1/2	38.1	200		◆
1 1/2	38.1	1 1/2	38.1	250		◆
1 1/2	38.1	1 1/2	38.1	275	◆	◆
1 1/2	38.1	2	50.8	300	◆	◆
1 1/2	38.1	2 1/2	63.5	400	◆	◆
1 1/2	38.1	3	76.2	350		◆
1 1/2	38.1	3	76.2	385	◆	◆
1 1/2	38.1	3	76.2	500	◆	◆
1 1/2	38.1	3 1/2	88.9	500	◆	◆
1 3/4	44.4	1 1/2	38.1	175	◆	◆
1 3/4	44.4	1 1/2	38.1	200		◆
1 3/4	44.4	1 1/2	38.1	225		◆
1 3/4	44.4	1 1/2	38.1	250		◆
1 3/4	44.4	1 1/2	38.1	300	◆	◆
1 3/4	44.4	3	76.2	500	◆	◆
2	50.8	1	25.4	200	◆	◆
2	50.8	1 1/2	38.1	300	◆	◆
2 1/4	57.1	1	25.4	250	◆	◆
2 3/8	60.3	1	25.4	275	◆	◆
2 1/2	63.5	1	25.4	300	◆	◆
2 1/2	63.5	1 1/2	38.1	200		◆
2 1/2	63.5	1 1/2	38.1	350	◆	◆
3	76.2	1	25.4	250		◆
3	76.2	1	25.4	400	◆	◆
3	76.2	1 1/2	38.1	600	◆	◆
3	76.2	2	50.8	600		◆
3 1/4	82.5	1 1/2	38.1	400	◆	◆
3 1/2	88.9	1 1/2	38.1	500	◆	◆
3 3/4	95.2	1	25.4	350	◆	◆

All band heaters listed below include:

- 10" (25.4 cm) fiberglass leads (300 volt rated) exiting axially from each side of the gap.
- One-piece construction.



QuickShip

IS IT IN STOCK?

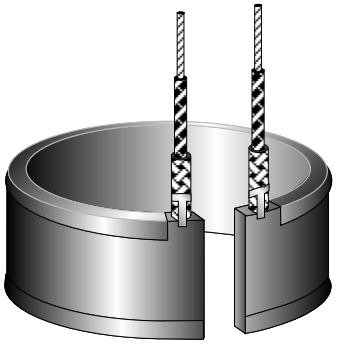
- Consult Fast Heat for details. If it is a QuickShip item, it will ship the same day – just call before 3 p.m. CST.
- Check out our QuickShip Catalog.

MICA BAND

I.D. IN.	I.D. MM	WIDTH IN.	WIDTH MM	WATTS	120V	240V
1	25.4	1	25.4	100	◆	◆
1	25.4	1	25.4	125		◆
1	25.4	1 1/2	38.1	150		◆
1 1/4	31.7	1	25.4	125	◆	◆
1 1/4	31.7	1 1/4	31.7	125		◆
1 1/4	31.7	1 1/4	31.7	250	◆	◆
1 1/4	31.7	1 1/2	38.1	200	◆	◆
1 1/4	31.7	3	76.2	150		◆
1 1/4	31.7	3	76.2	250		◆
1 1/4	31.7	3	76.2	300	◆	◆
1 1/2	38.1	3/4	19.0	125	◆	◆
1 1/2	38.1	7/8	22.2	100		◆
1 1/2	38.1	1	25.4	100		◆
1 1/2	38.1	1	25.4	150		◆
1 1/2	38.1	1	25.4	200		◆
1 1/2	38.1	1 1/4	31.7	250		◆
1 1/2	38.1	1 1/2	38.1	200		◆
1 1/2	38.1	1 1/2	38.1	250		◆
1 1/2	38.1	1 1/2	38.1	275	◆	◆
1 1/2	38.1	2	50.8	300	◆	◆
1 1/2	38.1	2 1/2	63.5	400	◆	◆
1 1/2	38.1	3	76.2	500	◆	◆
1 1/2	38.1	3 1/2	88.9	500	◆	◆
1 3/4	44.4	1 1/2	38.1	175	◆	◆
1 3/4	44.4	1 1/2	38.1	200		◆
1 3/4	44.4	1 1/2	38.1	250		◆
1 3/4	44.4	1 1/2	38.1	300	◆	◆
1 3/4	44.4	3	76.2	500	◆	◆
2	50.8	1	25.4	200	◆	◆
2	50.8	1	25.4	300	◆	◆
2 1/4	57.1	1	25.4	250	◆	◆
2 3/8	60.3	1	25.4	275	◆	◆
2 1/2	60.3	1	25.4	300	◆	◆
2 1/2	63.5	1 1/2	38.1	200		◆
2 1/2	63.5	1 1/2	38.1	350	◆	◆
3	76.2	1	25.4	250		◆
3	76.2	2	50.8	600	◆	◆
3 1/4	82.5	1 1/2	38.1	400	◆	◆
3 1/2	88.9	1 1/2	38.1	500	◆	◆
3 3/4	95.2	1	25.4	350	◆	◆

All band heaters listed below include:

- 10" (25.4 cm) fiberglass leads (300 volt rated) with stainless steel braid exiting axially from each side of the gap.
- One-piece construction.



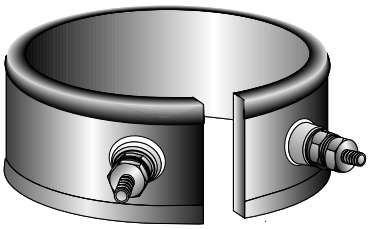
MICA
BAND HEATERS

MICA BAND

All band heaters listed below include:

- Screw terminals on top, each side of the gap.
- One-piece construction.

I.D. IN.	I.D. MM	WIDTH IN.	WIDTH MM	WATTS	120V	240V
4	101.6	1 1/2	38.1	750	◆	◆
4	101.6	2	50.8	800	◆	◆
4 1/2	114.3	1 1/2	38.1	750	◆	◆
5	127.0	1 1/2	38.1	900	◆	◆
5 1/4	133.3	1 1/2	38.1	600	◆	◆
5 1/4	133.3	1 1/2	38.1	1150		◆
5 1/2	139.7	1 1/2	38.1	1000	◆	◆
6	152.4	1 1/2	38.1	1000	◆	◆
6 1/2	165.1	1 1/2	38.1	1000	◆	◆
6 3/4	171.4	1 1/2	38.1	1000	◆	◆

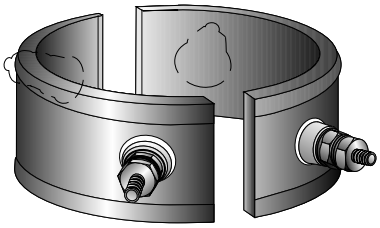


MICA BAND

All band heaters listed below include:

- Screw terminals on top, each side of each gap.
- Two-piece construction.

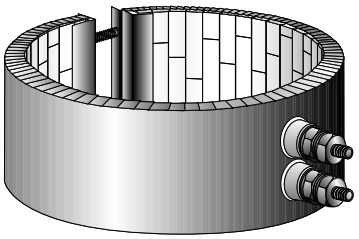
I.D. IN.	I.D. MM	WIDTH IN.	WIDTH MM	TOTAL WATTS	240V (each half)
4	101.6	1 1/2	38.1	750	◆
4 1/2	114.3	1 1/2	38.1	750	◆
5	127.0	1 1/2	38.1	900	◆
5 1/2	139.7	1 1/2	38.1	800	◆
6	152.4	1 1/2	38.1	600	◆
6	152.4	1 1/2	38.1	1000	◆
7	177.8	1 1/2	38.1	1000	◆
7	177.8	1 1/2	38.1	1200	◆
7 1/2	190.5	1 1/2	38.1	1200	◆
7 7/8	200.0	1 1/2	38.1	1000	◆
8	203.2	1 1/2	38.1	950	◆
8 1/2	215.9	1 1/2	38.1	1200	◆
9	228.6	1 1/2	38.1	1500	◆
9 1/4	235.0	1 1/2	38.1	1260	◆
9 1/2	241.3	1 1/2	38.1	1300	◆
9 1/2	241.3	2	50.8	1800	◆
9 3/4	247.6	1 1/2	38.1	1330	◆
10	254.0	1 1/2	38.1	1370	◆
10	254.0	1 1/2	38.1	1400	◆
11	279.4	1 1/2	38.1	1525	◆
11	279.4	1 1/2	38.1	1600	◆
12	304.8	1 1/2	38.1	1680	◆
13	330.2	1 1/2	38.1	1825	◆
14	355.6	1 1/2	38.1	1965	◆
15	381.0	1 1/2	38.1	2100	◆
16	406.4	1 1/2	38.1	2240	◆
17	431.8	1 1/2	38.1	2385	◆
18	457.2	1 1/2	38.1	2525	◆
19	482.6	1 1/2	38.1	2665	◆
20	508.0	1 1/2	38.1	2800	◆



KNUCKLE BAND

All band heaters listed below include:

- Screw terminals opposite the gap.
- One-piece construction with ears.



I.D. IN.	I.D. MM	2 1/2" WIDE (63.5 mm) WATTS	240V
4	101.6	1050	◆
4 1/2	114.3	1150	◆
5	127.0	1300	◆
5 1/2	139.7	1450	◆
6	152.4	1600	◆
6 1/2	165.1	1700	◆
7	177.8	1850	◆
7 1/2	190.5	2000	◆
8	203.2	2150	◆
8 1/2	215.9	2250	◆
9	228.6	2400	◆
9 1/2	241.3	2550	◆
10	254.0	2700	◆
10 1/2	266.7	2800	◆
11	279.4	2950	◆
11 1/2	292.1	3100	◆
12	304.8	3250	◆
13	330.2	3500	◆
14	355.6	3800	◆
15	381.0	4050	◆
16	406.4	4350	◆
4" (10 cm) WIDE			
4	101.6	1650	◆
4 1/2	114.3	1900	◆
5	127.0	2100	◆
5 1/2	139.7	2350	◆
6	152.4	2550	◆
6 1/2	165.1	2750	◆
7	177.8	3000	◆
7 1/2	190.5	3200	◆
8	203.2	3450	◆
8 1/2	215.9	3650	◆
9	228.6	3800	◆
9 1/2	241.3	4100	◆
10	254.0	4300	◆
10 1/2	266.7	4550	◆
11	279.4	4750	◆
11 1/2	292.1	4950	◆
12	304.8	5200	◆
12 1/2	317.5	5425	◆
13	330.2	5650	◆
13 1/2	342.9	5850	◆
14	355.6	6050	◆
14 1/2	368.3	6275	◆
15	381.0	6500	◆
15 1/2	393.7	6725	◆
16	406.4	6950	◆
16 1/2	419.1	7175	◆

I.D. IN.	I.D. MM	3" WIDE (76.2 mm) WATTS	240V
4	101.6	1250	◆
4 1/2	114.3	1400	◆
5	127.0	1550	◆
5 1/2	139.7	1750	◆
6	152.4	1900	◆
6 1/2	165.1	2050	◆
7	177.8	2250	◆
7 1/2	190.5	2400	◆
8	203.2	2550	◆
8 1/2	215.9	2750	◆
9	228.6	2900	◆
9 1/2	241.3	3050	◆
10	254.0	3200	◆
10 1/2	266.7	3400	◆
11	279.4	3550	◆
11 1/2	292.1	3700	◆
12	304.8	3900	◆
13	330.2	4200	◆
14	355.6	4550	◆
15	381.0	4850	◆
15 1/2	393.7	5025	◆
16	406.4	5200	◆
16 1/2	419.1	5375	◆
4 1/2" (11 cm) WIDE			
4	101.6	1900	◆
4 1/2	114.3	2150	◆
5	127.0	2350	◆
5 1/2	139.7	2600	◆
6	152.4	2850	◆
6 1/2	165.1	3100	◆
7	177.8	3350	◆
7 1/2	190.5	3600	◆
8	203.2	3850	◆
8 1/2	215.9	4100	◆
9	228.6	4350	◆
9 1/2	241.3	4600	◆
10	254.0	4850	◆
10 1/2	266.7	5100	◆
11	279.4	5350	◆
11 1/2	292.1	5600	◆
12	304.8	5850	◆
12 1/2	317.5	6100	◆
13	330.2	6350	◆
13 1/2	342.9	6600	◆
14	355.6	6850	◆
14 1/2	368.3	7075	◆
15	381.0	7300	◆
15 1/2	393.7	7550	◆
16	406.4	7800	◆
16 1/2	419.1	8025	◆

KNUCKLE
BAND HEATERS

KNUCKLE BAND

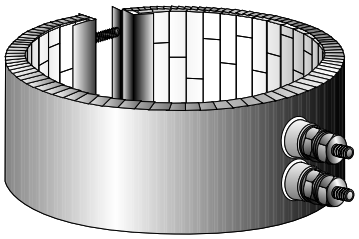
All band heaters listed below include:

- Screw terminals opposite the gap.
- One-piece construction with ears.

I.D. IN.	I.D. MM	5" WIDE (12 cm) WATTS	240V
4	101.6	2100	◆
4 1/2	114.3	2350	◆
5	127.0	2650	◆
5 1/2	139.7	2900	◆
6	152.4	3200	◆
6 1/2	165.1	3450	◆
7	177.8	3750	◆
7 1/2	190.5	4000	◆
8	203.2	4300	◆
8 1/2	215.9	4550	◆
9	228.6	4750	◆
9 1/2	241.3	4950	◆
10	254.0	5150	◆
10 1/2	266.7	5350	◆
11	279.4	5550	◆
11 1/2	292.1	5750	◆
12	304.8	5950	◆
12 1/2	317.5	6150	◆
13	330.2	6350	◆
13 1/2	342.9	6550	◆
14	355.6	6750	◆
14 1/2	368.3	6950	◆
15	381.0	7150	◆
15 1/2	393.7	7350	◆
16	406.4	7550	◆
16 1/2	419.1	7750	◆

7 1/2" WIDE (19 cm)			
4	101.6	2950	◆
4 1/2	114.3	3300	◆
5	127.0	3700	◆
5 1/2	139.7	4100	◆
6	152.4	4450	◆
6 1/2	165.1	4850	◆
7	177.8	5250	◆
7 1/2	190.5	5650	◆
8	203.2	6000	◆
8 1/2	215.9	6400	◆
9	228.6	6750	◆
9 1/2	241.3	7100	◆
10	254.0	7450	◆
10 1/2	266.7	7800	◆
11	279.4	8150	◆
11 1/2	292.1	8550	◆
12	304.8	8500	◆
12 1/2	317.5	8850	◆
13	330.2	9200	◆
13 1/2	342.9	9550	◆

I.D. IN.	I.D. MM	9" WIDE (22 cm) WATTS	240V
4	101.6	3800	◆
4 1/2	114.3	4250	◆
5	127.0	4750	◆
5 1/2	139.7	5250	◆
6	152.4	5750	◆
6 1/2	165.1	6250	◆
7	177.8	6750	◆
7 1/2	190.5	7250	◆
8	203.2	7750	◆
8 1/2	215.9	8250	◆
9	228.6	8700	◆
9 1/2	241.3	9150	◆
10	254.0	9600	◆



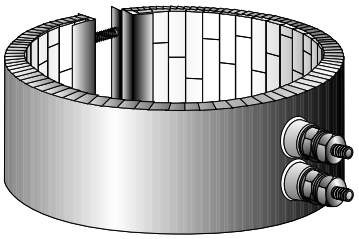
KNUCKLE BAND

All band heaters listed below include:

- Screw terminals opposite the gap.
- One-piece construction with ears.

I.D. IN.	I.D. MM	6″ WIDE (15 cm) WATTS	240V
4	101.6	2500	◆
4 1/2	114.3	2850	◆
5	127.0	3150	◆
5 1/2	139.7	3500	◆
6	152.4	3850	◆
6 1/2	165.1	4150	◆
7	177.8	4500	◆
7 1/2	190.5	4800	◆
8	203.2	5150	◆
8 1/2	215.9	5500	◆
9	228.6	5800	◆
9 1/2	241.3	6100	◆
10	254.0	6400	◆
10 1/2	266.7	6700	◆
11	279.4	7000	◆
11 1/2	292.1	7300	◆
12	304.8	7600	◆
12 1/2	317.5	7900	◆
13	330.2	8200	◆
13 1/2	342.9	8500	◆
14	355.6	8800	◆
14 1/2	368.3	9100	◆
15	381.0	9400	◆
15 1/2	393.7	9700	◆
8″ WIDE (20 cm)			
4	101.6	3350	◆
4 1/2	114.3	3800	◆
5	127.0	4250	◆
5 1/2	139.7	4650	◆
6	152.4	5100	◆
6 1/2	165.1	5550	◆
7	177.8	6000	◆
7 1/2	190.5	6450	◆
8	203.2	6850	◆
8 1/2	215.9	7300	◆
9	228.6	7700	◆
9 1/2	241.3	8100	◆
10	254.0	8000	◆
10 1/2	266.7	8900	◆
11	279.4	9300	◆
11 1/2	292.1	9700	◆

I.D. IN.	I.D. MM	10″ WIDE (25 cm) WATTS	240V
4	101.6	4200	◆
4 1/2	114.3	4750	◆
5	127.0	5300	◆
5 1/2	139.7	5850	◆
6	152.4	6400	◆
6 1/2	165.1	6950	◆
7	177.8	7500	◆
7 1/2	190.5	8050	◆
8	203.2	8600	◆
8 1/2	215.9	9150	◆
9	228.6	9650	◆



TUBULAR
BAND HEATERS

TUBULAR BAND

All band heaters listed below include:

- 10" (25.4 cm) fiberglass leads (300 volt rated) exiting axially on one side of the gap.
- Clamping ears.

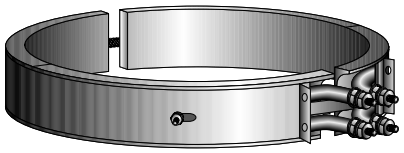
I.D. IN.	I.D. MM	WIDTH IN.	WIDTH MM	WATTS	120V	240V
1 1/2	38.1	1	25.4	150	◆	
1 1/2	38.1	1 1/2	38.1	175	◆	
1 1/2	38.1	2	50.8	275	◆	◆
1 1/2	38.1	2 1/2	63.5	325	◆	◆
1 1/2	38.1	3	76.2	450	◆	◆
1 3/4	44.4	1	25.4	150	◆	
1 3/4	44.4	1 1/2	38.1	275	◆	◆
1 3/4	44.4	2	50.8	325	◆	◆
2	50.8	1	25.4	190	◆	
2	50.8	1 1/2	38.1	275	◆	◆
2	50.8	2	50.8	400	◆	◆
2	50.8	2 1/2	63.5	450	◆	◆
2	50.8	3	76.2	550	◆	◆
2 1/4	57.1	1	25.4	250	◆	
2 1/4	57.1	1 1/2	38.1	325	◆	◆
2 1/4	57.1	2	50.8	450	◆	◆
2 1/2	63.5	1	25.4	250	◆	
2 1/2	63.5	1 1/2	38.1	325	◆	◆
2 1/2	63.5	2	50.8	450	◆	◆
2 1/2	63.5	2 1/2	63.5	600	◆	◆
2 1/2	63.5	3	76.2	725	◆	◆
2 3/4	69.8	1	25.4	250	◆	
2 3/4	69.8	1 1/2	38.1	400	◆	◆
2 3/4	69.8	2	50.8	550	◆	◆
3	76.2	1	25.4	300	◆	◆
3	76.2	1 1/2	38.1	450	◆	◆
3	76.2	2	50.8	600	◆	◆
3	76.2	2 1/2	63.5	725	◆	◆
3	76.2	3	76.2	875	◆	◆

PERMAHEAT BAND

All band heaters listed below include:

- Screw terminals on each side of the gap.
- Two-piece construction.

I.D.		1 1/2" WIDE (38.1mm)		2 1/2" WIDE (63.5mm)		3" WIDE (76.2mm)		4" WIDE (10 cm)	
IN.	MM	TOTAL WATTS	240V	TOTAL WATTS	240V	TOTAL WATTS	240V	TOTAL WATTS	240V
6	152.4	1100	◆	1600	◆	1700	◆	2275	◆
6 1/4	158.7	1150	◆	1675	◆	1775	◆	2375	◆
6 1/2	165.1	1200	◆	1750	◆	1825	◆	2475	◆
6 3/4	171.4	1250	◆	1800	◆	1900	◆	2575	◆
7	177.8	1300	◆	1875	◆	1975	◆	2675	◆
7 1/4	184.1	1345	◆	1950	◆	2050	◆	2750	◆
7 1/2	190.5	1390	◆	2025	◆	2125	◆	2850	◆
7 3/4	196.8	1435	◆	2075	◆	2200	◆	2950	◆
8	203.2	1475	◆	2150	◆	2275	◆	3050	◆
8 1/4	209.5	1520	◆	2225	◆	2325	◆	3150	◆
8 1/2	215.9	1665	◆	3200	◆	2400	◆	3250	◆
8 3/4	222.2	1610	◆	2350	◆	2475	◆	3350	◆
9	228.6	1675	◆	2425	◆	2550	◆	3550	◆
9 1/2	241.3	1765	◆	2575	◆	2675	◆	3650	◆
9 3/4	247.6	1810	◆	2625	◆	2750	◆	3750	◆
10	254.0	1850	◆	2700	◆	2825	◆	3825	◆
10 1/4	260.3	1895	◆	2775	◆	2900	◆	3925	◆
10 1/2	266.7	1940	◆	2850	◆	2975	◆	4025	◆
10 3/4	273.0	1985	◆	2900	◆	3025	◆	4125	◆
11	279.4	2025	◆	2975	◆	3100	◆	4225	◆
11 1/4	285.7	2075	◆	3050	◆	3175	◆	4325	◆
11 1/2	292.1	2125	◆	3125	◆	3250	◆	4425	◆
11 3/4	298.4	2175	◆	3175	◆	3325	◆	4500	◆
12	304.8	2225	◆	3250	◆	3400	◆	4600	◆
12 1/4	311.1	2275	◆	3370	◆	3475	◆	4700	◆
12 1/2	317.5	2325	◆	3425	◆	3525	◆	4800	◆
12 3/4	323.8	2375	◆	3500	◆	3600	◆	4900	◆
13	320.2	2425	◆	3575	◆	3675	◆	5000	◆
13 1/4	336.6	2465	◆	3650	◆	3750	◆	5100	◆
13 1/2	342.9	2500	◆	3710	◆	3800	◆	5200	◆
13 3/4	349.3	2550	◆	3775	◆	3875	◆	5320	◆
14	355.6	2600	◆	3850	◆	3950	◆	5450	◆



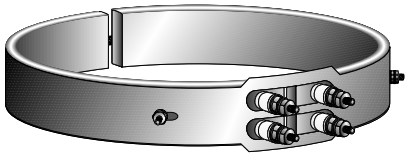
ULTIMA
BAND HEATERS

ULTIMA BAND

I.D. IN.	I.D. MM	TOTAL WATTS	240V
5	127.0	900	◆
5 1/2	139.7	1000	◆
6	152.4	1100	◆
6 1/2	165.1	1200	◆
7	177.8	1300	◆
7 1/2	190.5	1400	◆
8	203.2	1550	◆
8 1/2	215.9	1550	◆
9	228.6	1650	◆
9 1/2	241.3	1750	◆
10	254.0	1850	◆
10 1/2	266.7	1900	◆
11	279.4	2000	◆
11 1/2	292.1	2100	◆
12	304.8	2200	◆
12 1/2	317.5	2300	◆
13	330.2	2400	◆
13 1/2	342.9	2500	◆
14	355.6	2600	◆
14 1/2	368.3	2700	◆
15	381.0	2800	◆
15 1/2	393.7	2900	◆
16	406.4	3000	◆
16 1/2	419.1	3100	◆
17	431.8	3200	◆
17 1/2	444.5	3300	◆
18	457.2	3400	◆
19	482.6	3600	◆
20	508.0	3700	◆
21	533.4	3900	◆
22	558.8	4100	◆
23	584.2	4300	◆
24	609.6	4500	◆
25	635.0	4700	◆

All band heaters listed below include:

- Screw terminals on each side of the gap.
- Two-piece construction.

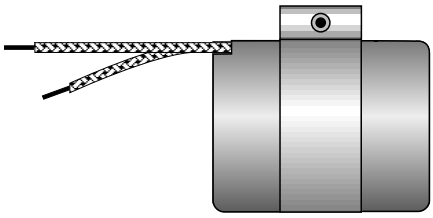


VALUE BAND

I.D. IN.	I.D. MM	WIDTH IN.	WIDTH MM	WATTS	120V	240V
1	25.4	1	25.4	100	◆	
1	25.4	1	25.4	100		◆
1	25.4	1 1/2	38.1	150	◆	
1	25.4	1 1/2	38.1	150		◆
1	25.4	2	50.8	200	◆	
1	25.4	2	50.8	200		◆
1 1/2	38.1	1	25.4	150	◆	
1 1/2	38.1	1	25.4	150		◆
1 1/2	38.1	1 1/2	38.1	300	◆	
1 1/2	38.1	1 1/2	38.1	300		◆
1 1/2	38.1	1 1/2	38.1	275	◆	
1 1/2	38.1	1 1/2	38.1	275		◆
1 1/2	38.1	2	50.8	300	◆	
1 1/2	38.1	2	50.8	300		◆
1 1/2	38.1	3	76.2	400	◆	
1 1/2	38.1	3	76.2	400		◆
1 3/4	44.45	1 1/2	38.1	300	◆	
1 3/4	44.45	1 1/2	38.1	300		◆
2	50.8	1 1/2	38.1	300	◆	
2	50.8	1 1/2	38.1	300		◆
2 1/2	63.5	1 1/2	38.1	350	◆	
2 1/2	63.5	1 1/2	38.1	350		◆

All band heaters listed below include:

- 10" (25.4 cm) fiberglass leads (300 volt rated) exiting axially from thickness on each side of the gap.
- One-piece construction.



QuickShip

IS IT IN STOCK?

- Consult Fast Heat for details. If it is a QuickShip item, it will ship the same day – just call before 3 p.m. CST.
- Check out our QuickShip Catalog.

FLEXTRACOIL
BAND HEATERS

FLEXTRACOIL (SQUARE)

All heaters listed are straight and can be coiled to meet your specific requirements, reference the ordering guide below.

TOTAL STRAIGHT LENGTH IN.	TOTAL STRAIGHT LENGTH MM	HEATED LENGTH IN.	HEATED LENGTH MM	WATTS	230V	T/C	PART NUMBER
15.35	389.9	11.18	283.9	180	◆	•	AS-BF-0021
15.35	389.9	11.18	283.9	180	◆		AS-BF-0016
21.30	541.0	17.73	450.3	270	◆	•	AS-BF-0022
21.30	541.0	17.73	450.3	270	◆		AS-BF-0017
29.15	740.4	25.59	649.9	470	◆	•	AS-BF-0023
29.15	740.4	25.59	649.9	470	◆		AS-BF-0018
37.00	939.8	33.45	849.6	610	◆	•	AS-BF-0024
37.00	939.8	33.45	849.6	610	◆		AS-BF-0019
44.90	1140.5	41.33	1049.7	630	◆	•	AS-BF-0025
44.90	1140.5	41.33	1049.7	630	◆		AS-BF-0020

All heaters listed below include:

- .118" x .118" (2.9 x 2.9 mm).
- 40" (101 cm) leads.
- Reference the illustrations below for lead exit types.

FLEXTRACOIL (FLAT)

All heaters listed are straight and can be coiled to meet your specific requirements, reference the ordering guide below.

TOTAL STRAIGHT LENGTH IN.	TOTAL STRAIGHT LENGTH MM	HEATED LENGTH IN.	HEATED LENGTH MM	WATTS	230V	T/C	PART NUMBER
13.40	340.4	9.84	249.9	195	◆	•	AS-BF-0009
13.40	340.4	9.84	249.9	195	◆		AS-BF-0003
14.58	370.3	11.02	279.9	215	◆	•	AS-BF-0014
14.58	370.3	11.02	279.9	215	◆		AS-BF-0002
16.75	425.5	13.19	335.0	240	◆	•	AS-BF-0015
16.75	425.5	13.19	335.0	240	◆		AS-BF-0005
18.72	475.5	15.16	385.0	295	◆	•	AS-BF-0011
18.72	475.5	15.16	385.0	295	◆		AS-BF-0006
21.67	550.4	18.11	460.0	350	◆	•	AS-BF-0012
21.67	550.4	18.11	460.0	350	◆		AS-BF-0004
24.03	610.4	20.47	519.9	400	◆		AS-BF-0007
27.18	690.4	23.62	599.9	460	◆	•	AS-BF-0010
27.18	690.4	23.62	599.9	460	◆		AS-BF-0001
33.48	850.4	29.92	760.0	610	◆		AS-BF-0008
38.99	850.4	35.43	899.9	690	◆	•	AS-BF-0013

Replacement heaters for D-M-E, Incoe and Husky are available.
Consult Fast Heat for more information.

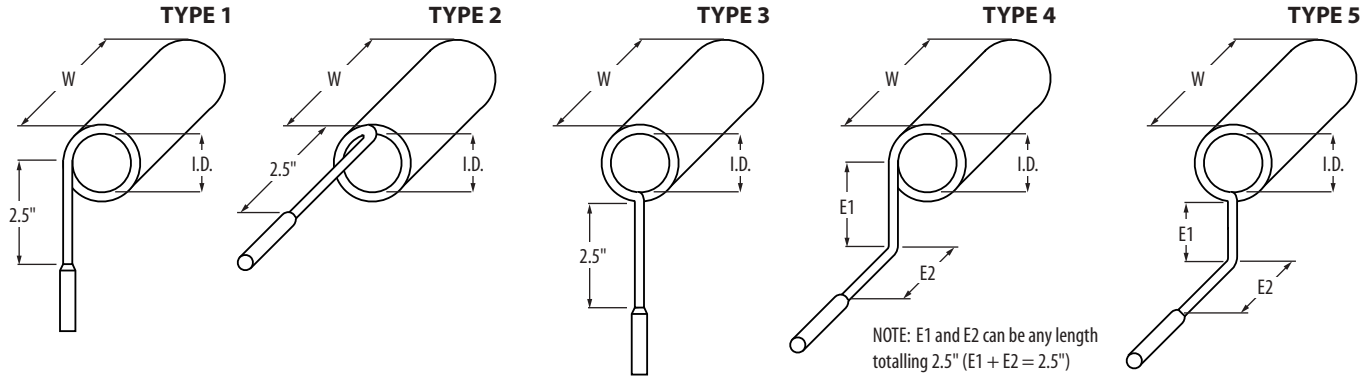
All heaters listed below include:

- .087" x .165" (2.2 x 4.1 mm).
- 40" (101 cm) leads.
- Reference the illustrations below for lead exit types.

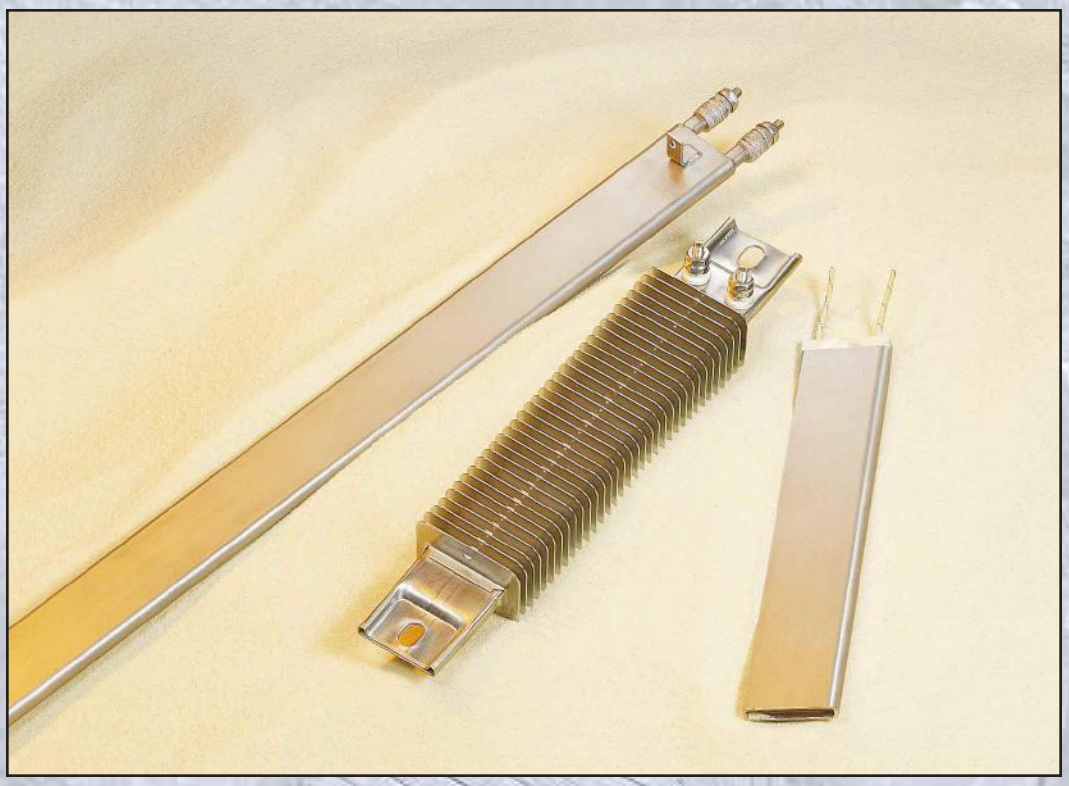
HOW TO ORDER:

1. Specify wattage and if a T/C is required.
2. Specify required I.D. and width (W).
3. Select lead exit type for coiling. (When selecting type 4 or 5, specify E1 and E2 length, totalling 2.5").

FLEXTRACOIL LEAD EXIT TYPES



S T R I P H E A T E R S



Our Better Strip heaters feature maximum watt densities for your demanding high temperature applications.

fast heat®

BETTER
STRIP HEATERS

BETTER STRIP HEATER

Fast Heat's Better Strips were developed to provide longer life at higher watt densities and operating temperatures than the standard Mica Strip heater. Its ceramic insulation provides for minimal air gaps and superior heat transfer efficiency.

Better Strips can withstand sheath temperatures of up to 1400º F (760º C) while providing high heat transfer rates and fast heat-up.

Better Strips can meet U.L./C.S.A. approval, refer to page 151 for reference and consult factory.

APPLICATIONS

The Better Strip's ability to withstand extremely high temperatures makes it the best choice for many applications, including compression molding, heating of extrusion dies, sealing bars and food processing.

In addition, Better Strips can be modified to meet the demands of virtually any special application. Our engineers can utilize a variety of alternative features and options to customize the heater to your specific needs.

FEATURES AND BENEFITS

- Maximum watt densities; far in excess of other style strips.
- Highest application temperatures available.
- Longest life available and the resulting reduction of equipment downtime.
- High heat transfer rates and fast heat-up.
- Reduced number and physical size of heaters for many applications.

SPECIFICATIONS

TOLERANCES:

Length: ± 1/8" (3.1 mm) width + .0 "- .040" (1 mm)
Wattage: + 5% -10%
Thickness: .187" (4.7 mm) nominal
Widths from 3/4" (19 mm) up to 6" (152.4 mm) maximum.
Lengths from 2" (50.8 mm) up to 48" (121.9 cm) typical.

TERMINAL SIZE:

8-32 S. St. [1" (25.4 mm) wide or less]
10-24 S. St.
1/4-20 S. St. (20 amps or greater)

LEADS:

842º F (450º C) - 300 volt or 600 volt U.L. listed mica type insulated wire

MAXIMUM SHEATH TEMPERATURES:

1400º F (760º C)

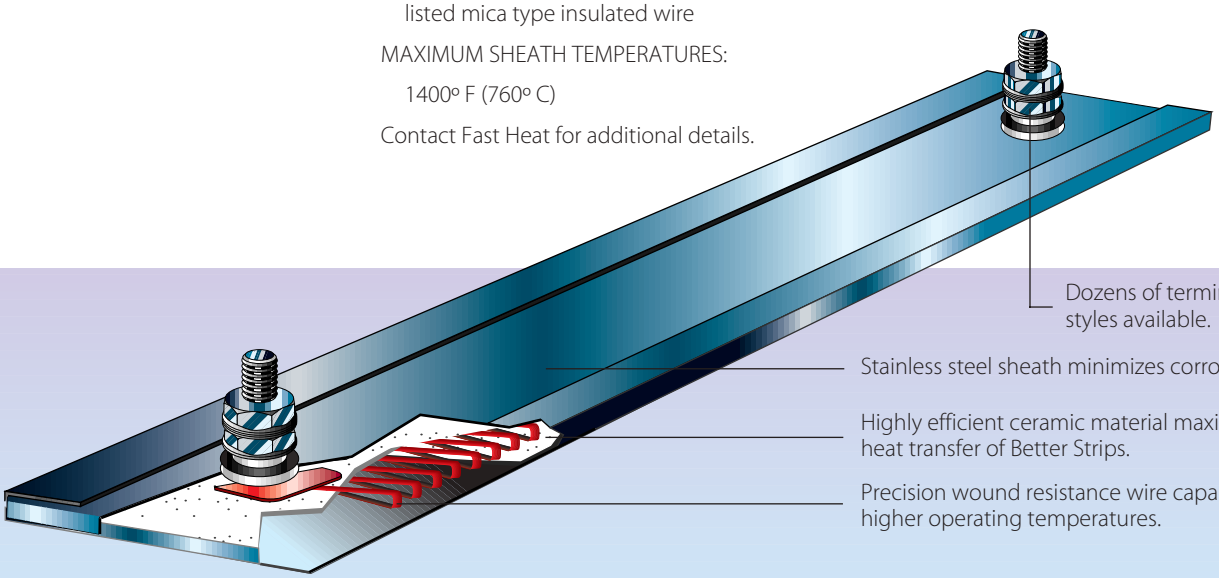
Contact Fast Heat for additional details.

MOUNTING SYSTEMS

Proper clamping is important in the application of all strip heaters. Preferred clamping systems include full coverage 1/4" (6.3 mm) thick clamp plate securely bolted to heated block at 3"- 4" (76.2 mm-10.1 cm) intervals on both sides of heater and 1" (25.4 mm) wide 1/4" (6.3 mm) thick clamping bars bolted across heater at 3" - 4" (76.2 mm-101.6 mm) intervals along length.

Useful in oven mounting and short heater applications is screw slot mounting; however, this type of mounting is not recommended for high-wattage applications.

See adjacent page.



BETTER STRIP HEATER

MICA
STRIP HEATERS

THE MICA STRIP HEATER

Our Mica Strip heaters are a cost-effective and reliable way to provide uniform heat over a flat surface. Best suited for low to moderate temperatures, Mica Strips offer a wide variety of screw and lead termination styles.

Mica Strips feature thin construction and high quality insulation for effective heat transfer and excellent dielectric qualities.

APPLICATIONS

Mica Strips are ideal for situations in which medium to low temperature strip heating is required. Typical applications include heating rubber platens, compression molding, heating inks and sealing bars.

In addition, Mica Strips can be modified to meet the demands of virtually any special application. Our engineers can utilize a variety of alternative features and options to customize the heater to your specific needs.

Mica Strips can meet U.L./C.S.A. approval, refer to page 151 for reference and consult factory.

FEATURES AND BENEFITS

- Computer calculated design.
- Quality mica electrical insulation.
- Ribbon resistor offers broad surface contact for extended life.
- Welded terminal attachments to resistor.
- Heat resistant sheath material.
- Variety of screw or lead terminations and arrangements.
- Mounting holes available upon request.

SPECIFICATIONS

TOLERANCES:

Length: ± 1/16" (1.5 mm)
Wattage: +5%-10%
Thickness: 3/16" (4.7 mm) nominal
Widths from 3/4" (19 mm) up to 18" (45.7 cm) typical.
Lengths from 2" (50.8 mm) up to 80" (203.2 cm) typical.

Thick Plate Mica Strips are also available in thicknesses of 1/4" (6.4 mm), 3/8" (9.5 mm), and 1/2" (12.7 mm).

TERMINAL SIZE:

8-32 S. St. [1" (25.4 mm) wide or less]
10-24 S. St.
1/4-20 S. St. (20 amps or greater)

LEADS:

482º F (250º C) - 300 volt or 600 volt U.L. listed

MAXIMUM SHEATH TEMPERATURE:

900º F (482º C)

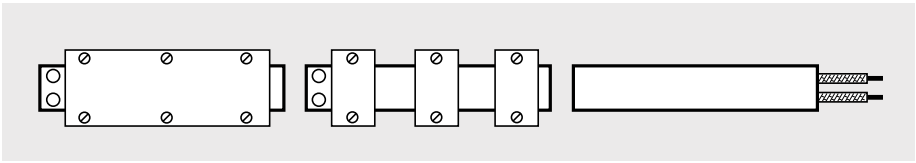
VOLTAGE:

480 maximum

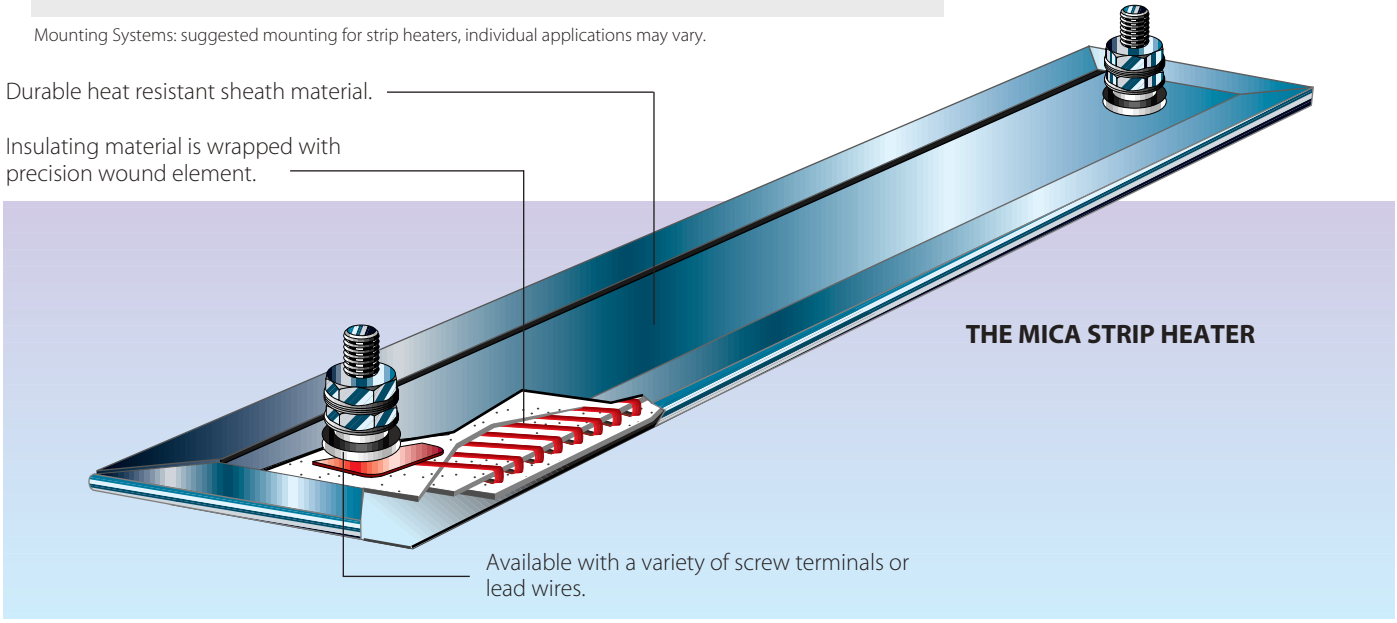
Contact Fast Heat for additional details.

MOUNTING SYSTEMS

Preferred clamping systems include full coverage 1/4" (6.3 mm) thick clamp plate securely bolted to heated block at 3"- 4" (76.2 mm-10.1 cm) intervals on both sides of heater and 1" (25.4 mm) wide 1/4" (6.3 mm) thick clamping bars bolted across heater at 3"- 4" (76.2 mm-10.1 cm) intervals along length. Useful in oven mounting and short heater applications is screw slot mounting; however, this type of mounting is not recommended for high-wattage applications.



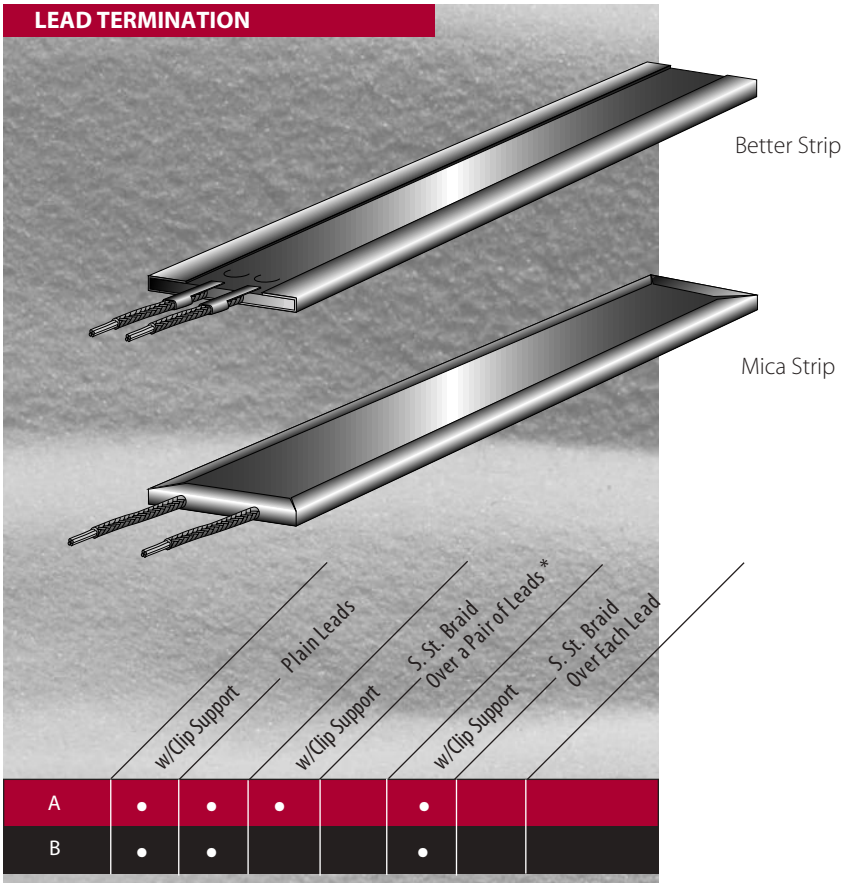
Mounting Systems: suggested mounting for strip heaters, individual applications may vary.



THE MICA STRIP HEATER

BETTER & MICA
STRIP HEATERS

LEAD TERMINATION



Simple lead arrangement designed for applications where lead access is only possible from one side.

Available in widths 3/4" (19.0 mm) and wider.

10" (25.4 cm) leads standard; other lengths available.

Stainless steel braided lead is optional, please specify length.

Better Strip comes standard with mica tape leads.

Clip support is standard on Better Strip.

Mica Strip comes standard with fiberglass leads.

See chart A.

* Available on Mica Strip only.

● This heater termination style available.

LEAD TERMINATION

Simple lead arrangement to accommodate applications where lead access is available on both ends.

Available in widths 3/4" (19.0 mm) or wider.

10" (25.4 cm) leads standard; other lengths available.

10" (25.4 cm) stainless steel braided lead is optional.

Better Strip comes standard with mica tape leads.

Mica Strip comes standard with fiberglass leads.

Please indicate mounting hole location and size.

See chart B.

LEAD TERMINATION

Simple straight leads designed for applications where lead access is only possible from one side on top.

10" (25.4 cm) leads standard; longer lengths available.

Abrasion resistant armor or stainless steel braid over leads is optional.

Available in widths of 3/4" (19 mm) and wider.

See chart A.

* Two caps required, consult Fast Heat.

** Also available with S. St. armor over each lead when amps exceed 15.2.

A	•	•	•	•	•	•	•	•

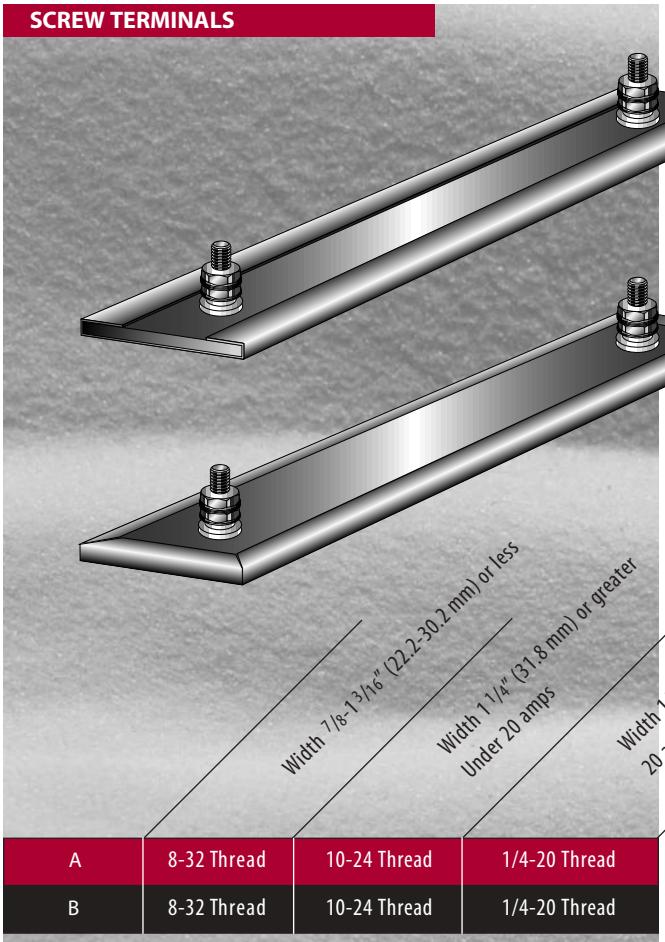
• This heater termination style available.

ENGINEERING NOTE

- Improperly chosen lead arrangements are a major cause of application problems. Use special care in selection of leads where physical abuse and high temperatures are likely.
- For assistance in problem applications, please contact Fast Heat.

BETTER & MICA
STRIP HEATERS

SCREW TERMINALS



A	8-32 Thread	10-24 Thread	1/4-20 Thread
B	8-32 Thread	10-24 Thread	1/4-20 Thread

Stainless Steel screw terminals at each end on top.

Simple-to-wire screw terminals arranged to accommodate applications where large multiple heater systems wiring is very heavy and requires extra space.

Available in 7/8" (22.2 mm) and wider.

See chart A.

SCREW TERMINALS

Stainless Steel screw terminals on one end along the length.

Simple-to-wire screw terminals designed to accommodate applications where lead access is only possible from one side .

Available in 7/8" (22.2 mm) and wider.

See chart B.

SCREW TERMINALS

Simple-to-wire Stainless Steel screw terminals well suited for applications where lead access can only be arranged from one side along the width.

Available in 2" (50.8 mm) and wider.

See chart A.

CALCULATING MICA STRIP HEATER WATTS/IN^2

• WITHOUT MOUNTING HOLES

$$\frac{\text{wattage}}{\text{heater length x heater width}}$$

• WITH MOUNTING HOLES

$$\frac{\text{wattage}}{(\text{heater length x heater width}) - (n \times .785 \times D^2)}$$

n = Number of holes
D = Dia. of holes

Example: heater length = 5"
heater width = 2"
2 mounting holes = 1/4" D
400 W, 240 V

$$\frac{400 \text{ watts}}{(5 \times 2) - (2 \times .785 \times .25^2)} = 40.4 \text{ watts/in}^2$$

SEALED BETTER
STRIP HEATERS

SEALED BETTER STRIPS

For situations in which risk of contamination is present, the Sealed Better Strip offers the most complete protection available.

Its construction consists of a virtually impermeable stainless steel sheath; the heater can be further protected by adding convoluted armor over the leads.

The Sealed Better Strip offers all of the outstanding features of the regular Better Strip, including the ability to withstand sheath temperatures of up to 1400º F (760º C).

APPLICATIONS

Select the Sealed Better Strip for applications such as food and chemical processing, heating rubber platens or any application requiring complete protection from contamination.

The Sealed Better Strip is also available with several alternative screw and lead termination styles.

FEATURES AND BENEFITS

- Specifically designed sheath prevents most contaminants.
- Maximum watt densities; far in excess of other styles of strips.
- Highest application temperatures available.
- Longest life available and the resulting reduction of equipment downtime.
- Highest heat transfer rates and fast heat-up.
- Reduces number and physical size of heaters for many applications.

SPECIFICATIONS

TOLERANCES:

Length: ± 1/8" (3.1 mm), width + .0"- .040" (1.0 mm)
Wattage: + 5% -10%
Thickness: .225" - .250" (5.7 mm - 6.3 mm) (depending on term. style)

TERMINAL SIZE:

8-32 S. St. (1" wide or less)
10-24 S. St.
1/4-20 S. St. (20 amps or greater)

LEADS:

842º F (450º C) - 300 volt or 600 volt U.L. listed mica tape wire

MAXIMUM SHEATH TEMPERATURES:

1400º F (760º C)

Widths from 3/4", 15/16", 1", 1 1/16", 1 1/4", 1 5/16", 1 3/8", 1 1/2", 1 3/4", 2", and 2 1/2" (19.0 mm, 23.8 mm, 25.4 mm, 27 mm, 31.7 mm, 33.3 mm, 34.9 mm, 38.1 mm, 44.5 mm, 50.8 mm, 63.5 mm)

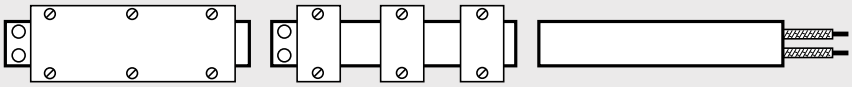
Lengths from 2" (50.8 mm) up to 48" (121.9 cm) typical.

Contact Fast Heat for additional details.

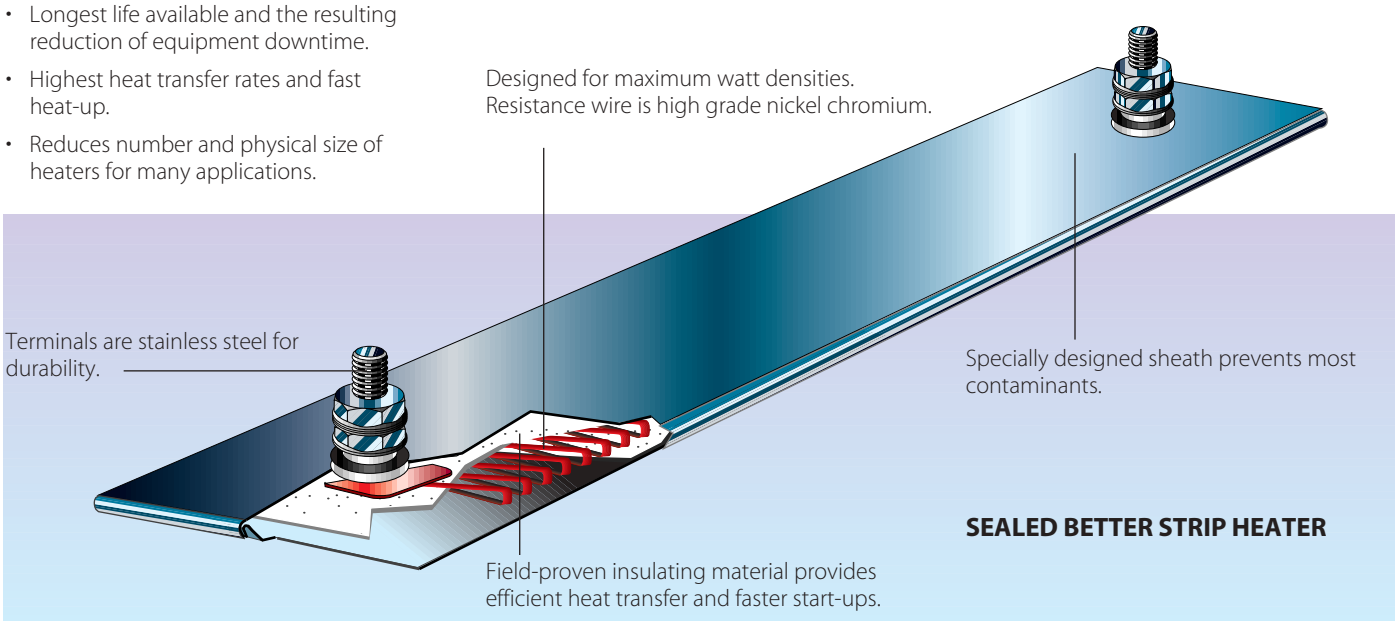
MOUNTING SYSTEMS

Preferred clamping systems include full coverage 1/4" (6.3 mm) thick clamp plate securely bolted to heated block at 3"- 4" (76.2 mm -10.1 cm) intervals on both sides of heater and 1" (25.4 mm) wide 1/4" (6.35 mm) thick clamping bars bolted across heater at 3"- 4" (76.2 mm -10.1 cm) intervals along length.

Useful in oven mounting and short heater applications is screw slot mounting; however, this type of mounting is not recommended for high-wattage applications.



Mounting Systems: suggested mounting for strip heaters, individual applications may vary.



SEALED BETTER STRIP HEATER

SCREW TERMINALS

Sealed Better Strip

Simple-to-wire screw terminals are well suited for applications where lead access is most practical from one side.

See chart A.

	Width 1" (25.4 mm) or less	Width 1 1/4" (31.8 mm) or greater Under 20 amps	Width 1 1/4" (31.8 mm) or greater 20 amps or greater
A	8-32 Thread	10-24 Thread	1/4-20 Thread
B	8-32 Thread	10-24 Thread	1/4-20 Thread

SCREW TERMINALS

Sealed Better Strip

Simple-to-wire screw terminals are well suited for applications where lead access can only be arranged from one side.

Available in widths of 2" (50.8 mm) and 2 1/2" (63.5 mm).

See chart B.

FAST STRIP 38/CERAMIC
STRIP HEATERS

FAST STRIP 38

The Fast Strip 38, strip heater is $^{3}/_{8}$" thick, $1^{1}/_{2}$" wide and is available with a variety of terminations to suit your application.

This strip heater comes configured for either high or low density applications.

CERAMIC STRIPS

Fast Heat's Ceramic Strip heater provides the ability to withstand higher temperatures (typically limited to 40 to 45 watts per square inch, depending on the application). The heater consists of a stainless steel sheath containing a high-temperature ceramic insulating a nickel chrome wire coil. Magnesium oxide (MgO) is used to fill any air pockets, thus providing the best heat transfer possible.

The terminals are also constructed of stainless steel and are securely anchored to prevent twisting out under normal conditions. Several terminations are available, including water-resistance.

Warranty coverage up to 480 Volts.

Ceramic Strips can meet U.L./C.S.A. approval, refer to page 151 for reference and consult factory.

APPLICATIONS

Our Ceramic Strip heaters provide a dependable, versatile and efficient heat source for a wide range of applications, such as heating air, injection and extrusion dies, food tables and platens.

They are available in many lengths; if a desired length or type does not appear in the catalog, consult Fast Heat. Whenever possible, please provide a dimensional sketch of your requirements with your order.

FEATURES AND BENEFITS

- Low expansion characteristics minimize movement away from block on applications not utilizing full clamping plate.
- Long life and the resulting reduction of equipment downtime.
- High heat transfer rates and rapid heat-up.
- Reduces number and physical size of heaters for many applications.
- 3-Phase available.
- Distributed wattage available.

SPECIFICATIONS

TOLERANCES:

Length: ± $^{1}/_{8}$" (3.1 mm), width + .0"- .040" (1.0 mm)
Wattage: + 5% - 10%

Fast Strip 38 Thickness:
$^{3}/_{8}$" (9.5 mm) nominal
Ceramic Strip Thickness:
$^{5}/_{16}$" (7.9 mm) nominal
Width: 1 $^{1}/_{2}$" (38.1 mm) nominal

TERMINAL SIZE:

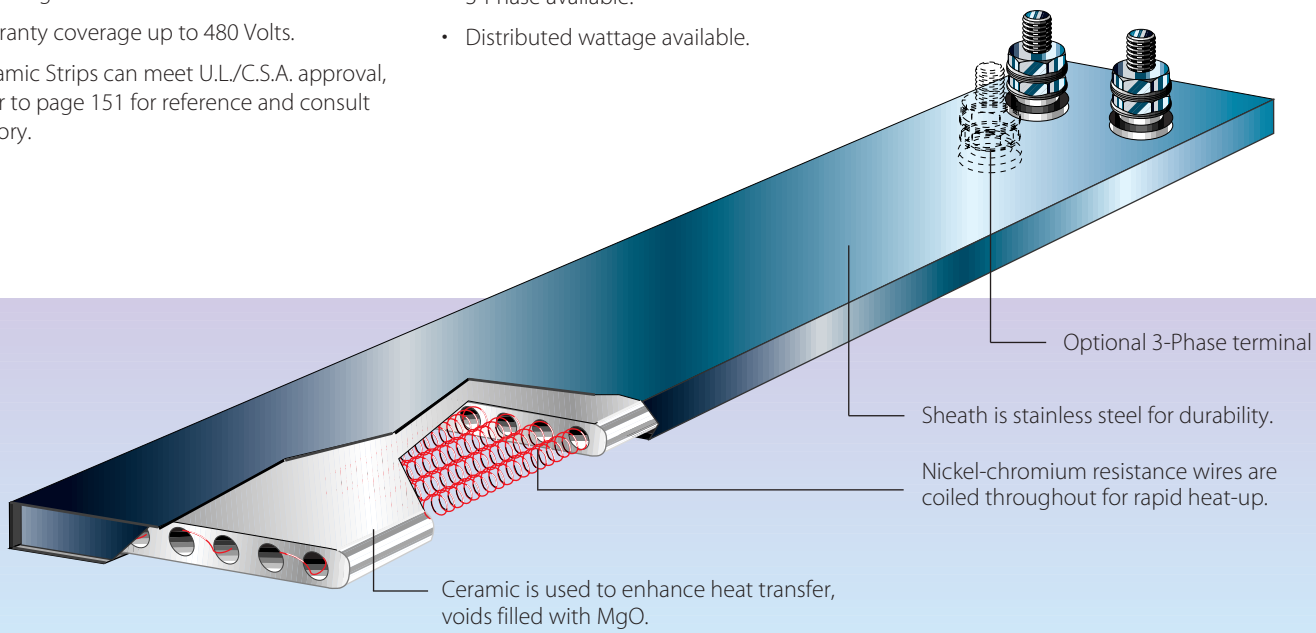
Standard 10-32 stainless steel with 20 amp rating.
(Other sizes are available, consult factory.)

LEADS:

482º F (250º C) - 300 volt or 600 volt fiberglass leads U.L. listed, C.S.A. approved.

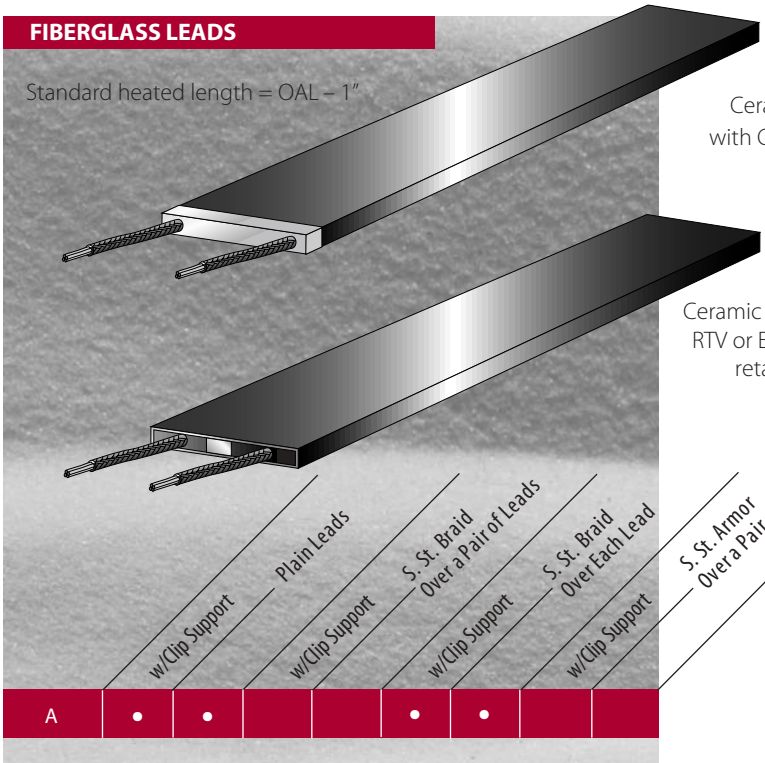
Standard strip heater dimensions are $^{5}/_{16}$" (8.0 mm) thick and 1 $^{1}/_{2}$" (38.1mm) wide.

Contact Fast Heat for additional details.



CERAMIC STRIP HEATER

FIBERGLASS LEADS



A	•	•			•	•		

Simple leads designed for maximum heated length and to accommodate applications where leads can only be accessed from one end and height clearance is a concern.

10″ (25.4 cm) leads standard, other lengths available.

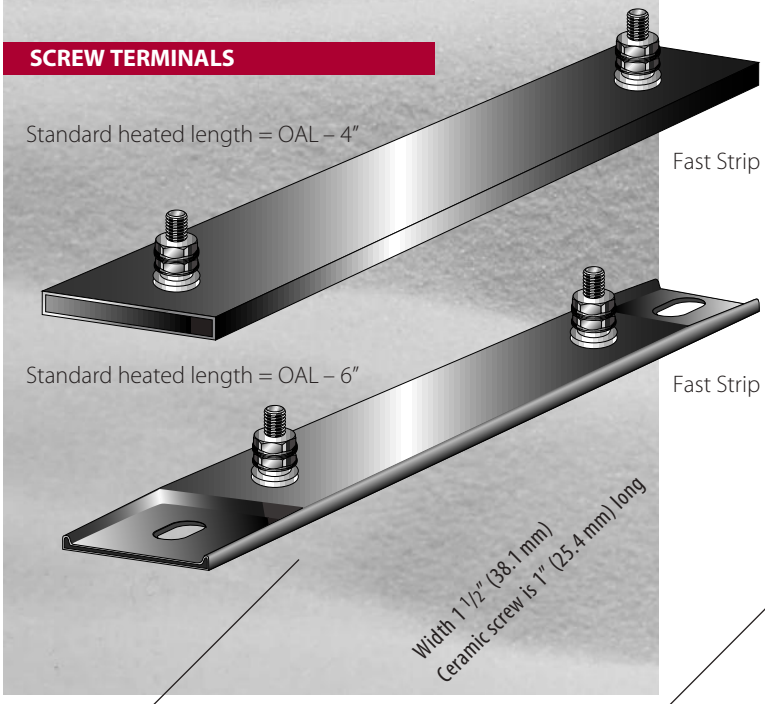
Stainless steel braided lead is optional.

Mounting tab option is available only on end opposite lead end.

See chart A.

• This heater termination style available.

SCREW TERMINALS



B	10-32 Thread

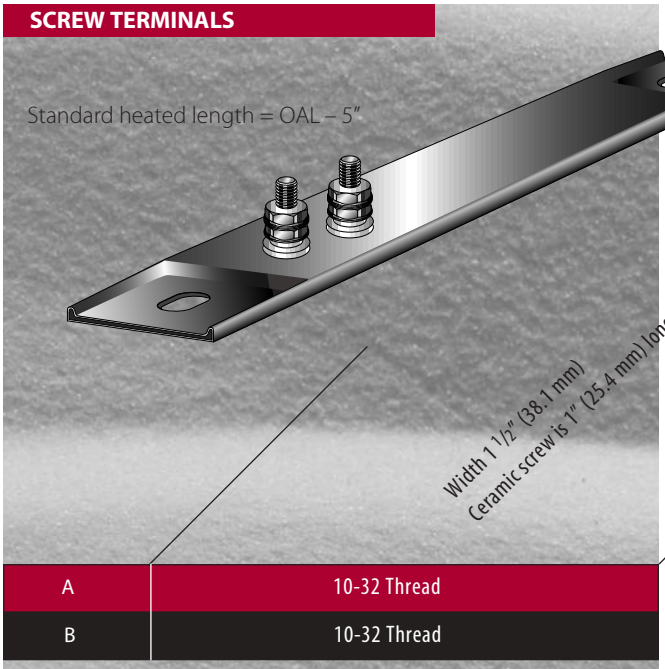
Simple-to-wire screw terminals arranged for applications where large multiple heater systems wiring is very heavy and requires extra space.

Available with mounting tab option. (Single tab available.)

See chart B.

FAST STRIP 38/CERAMIC
STRIP HEATERS

SCREW TERMINALS



Fast Strip 38 / Ceramic Strip

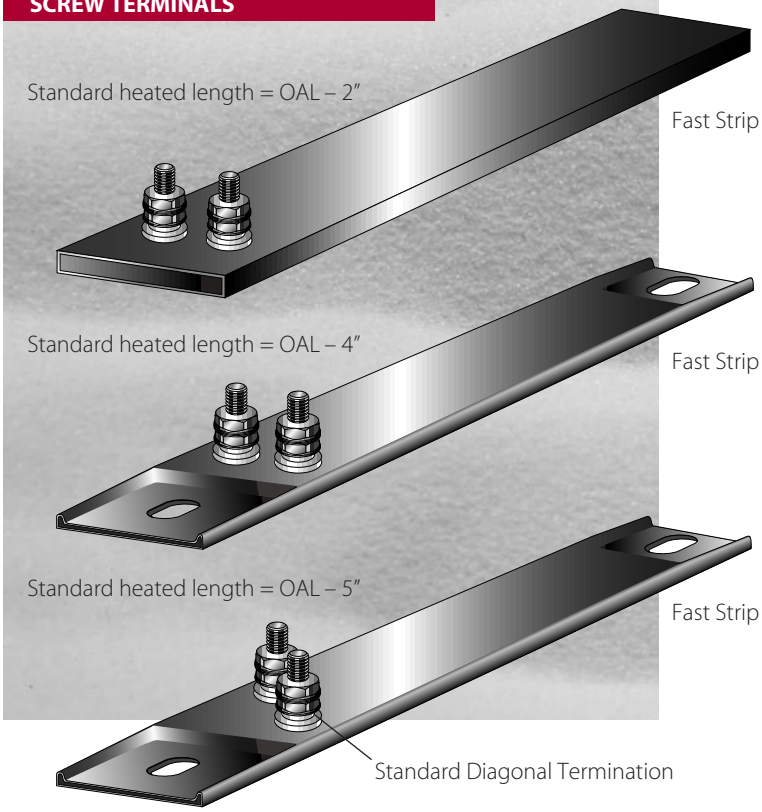
A	10-32 Thread
B	10-32 Thread

Simple-to-wire screw terminals for applications where lead access is only available from one side & suited for "bus bar" type hook up.

Shown with mounting tab option, approximate unheated length is 4″ (10 cm) including tab at screw terminal end and 1″ (25.4 mm) at opposite end.

See chart A.

SCREW TERMINALS



Fast Strip 38 / Ceramic Strip

Fast Strip 38 / Ceramic Strip

Fast Strip 38 / Ceramic Strip

Simple-to-wire screw terminals designed to accommodate applications where lead access can only be available from one side.

Also shown with mounting tab option.

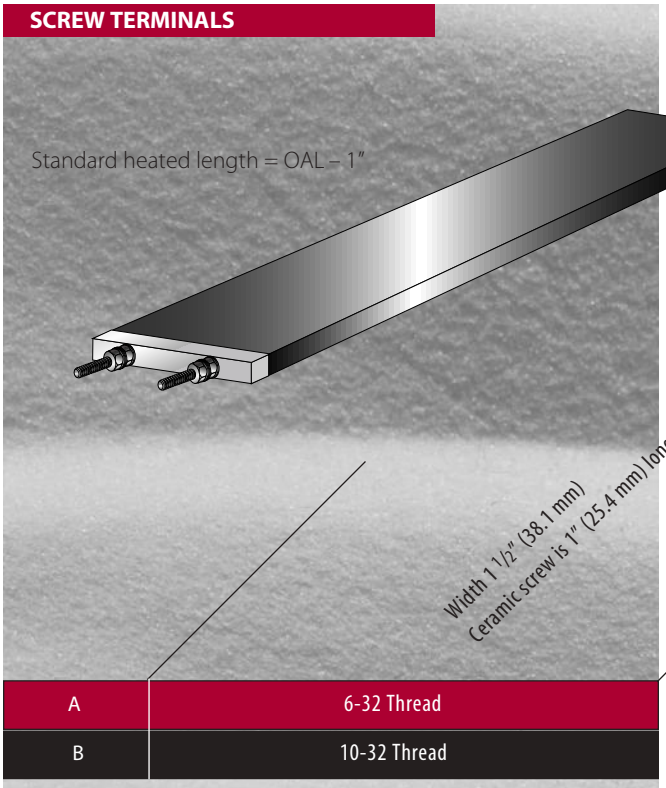
See chart B.

Simple-to-wire screw terminals designed to accommodate applications where lead access can only be available from one side.

Shown with diagonal terminals and mounting tab option.

See chart B.

SCREW TERMINALS



A	6-32 Thread
B	10-32 Thread

Simple-to-wire 6-32 stainless steel screw terminals arranged for maximum heated length, and for applications where lead access is only possible from one side and height clearance is a concern.

Mounting tab option is available only on end opposite screw terminal.

See chart A.

SCREW TERMINALS W/FINS

Fast Heat has a complete line of finned strip heaters designed to provide excellent heat transfer to air. Finned strip heaters are available in a full range of sizes, wattages and voltage ranges.

Typical applications for finned strip heaters include duct heaters, space heaters, drying ovens and shrink tunnels.

Standard with stainless steel fins.
FIN DIMENSIONS:
2″ (50.8mm) wide x $1\frac{3}{8}$″ (34.9mm) high
*Refer to page 114 for strip dimensions.

See chart B.

ULTIMA
STRIP HEATERS

ULTIMA STRIPS

Our Ultima Strip heater uses a reliable tubular heating element encased in a stainless steel sheath. Designed to withstand most corrosive and high temperature environments (up to 1200º F/648º C), the Ultima's performance is above and beyond the norm.

The heavy duty stainless steel sheath and welded stainless steel end caps of the Ultima eliminate distortion and deformation problems often associated with other strip heaters when operating at higher temperatures.

APPLICATIONS

Choose the Ultima Strip heater for higher temperature applications in which contamination is a problem. Common applications include chemical processing, heating extrusion dies, tin melting and food processing.

There are many lengths available for the Ultima Strip heater; if a desired length or type does not appear in the catalog, contact Fast Heat. Whenever possible, please provide a dimensional sketch of your requirements with your order.

FEATURES AND BENEFITS

- Low expansion characteristics minimize movement away from block on applications not utilizing full clamping plate.
- Long life and the resulting reduction of equipment downtime.
- High heat transfer rates and fast heat-up.
- Reduces number and physical size of heaters for many applications.

SPECIFICATIONS

TOLERANCES:

Length: ± 1/8" (3.2 mm)
Width: 1 1/2" (38.1 mm) ± .015" (.4 mm)
Wattage: + 5% -10%
Thickness: 3/8" (9.5 mm) nominal

TERMINAL SIZE:

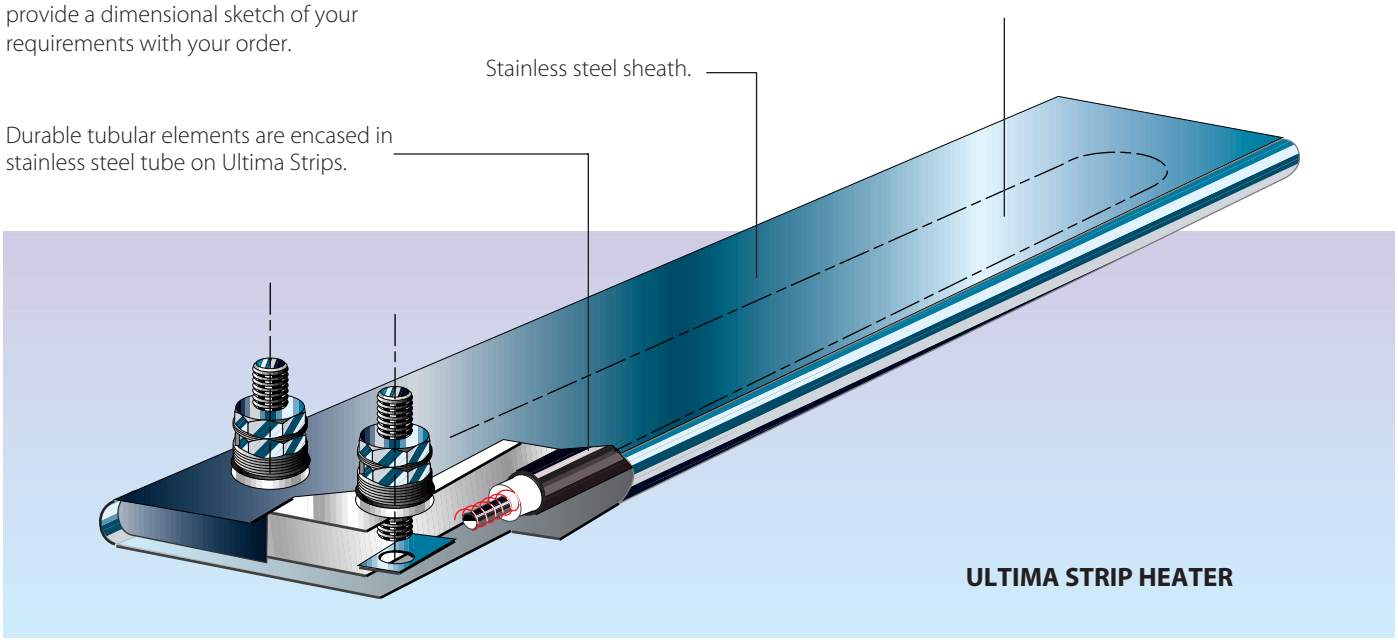
10-32 stainless steel 20 amp rating.

SHEATH TEMPERATURE:

1200° F (648° C) Maximum.

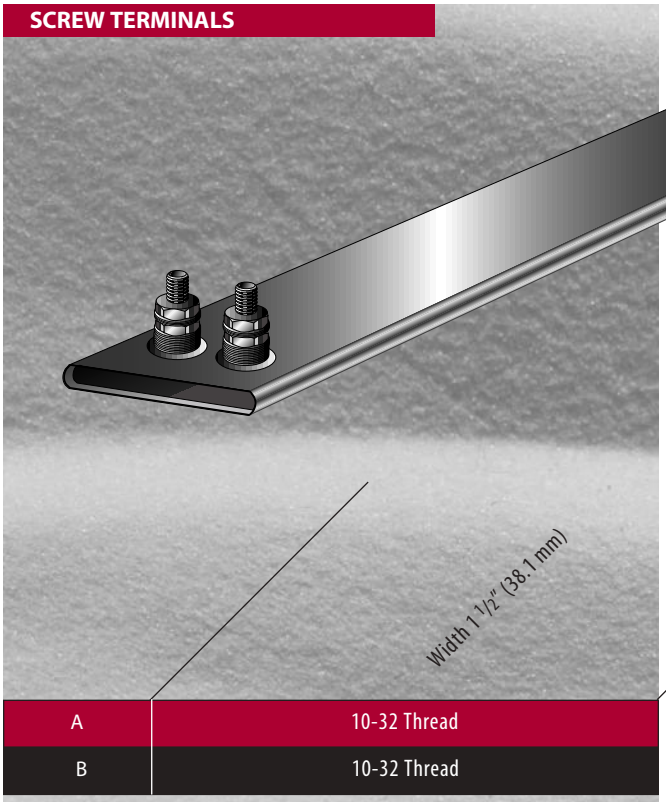
VOLTAGE:

240 Volts Maximum.



ULTIMA STRIP HEATER

SCREW TERMINALS



A	10-32 Thread
B	10-32 Thread

Ultima Strip

Simple-to-wire screw terminals for applications where lead access is only available from one side & suited for "bus bar" type hook up.

Shown without mounting tab option, approximate unheated length is 2 1/4" (57.2 mm) at screw terminal end and 1/2" (12.7 mm) at opposite end.

See chart A.

SCREW TERMINALS W/FINS

Ultima Strip

Fast Heat has a complete line of finned strip heaters designed to provide excellent heat transfer to air. Finned strip heaters are available in a full range of sizes, wattages and voltage ranges.

Typical applications for finned strip heaters include duct heaters, space heaters, drying oven and shrink tunnels.

Standard with stainless steel fins.

See chart B.

PERMAHEAT
STRIP HEATERS

PERMAHEAT STRIPS

The Permaheat Strip heater is designed for heavy duty applications and is the most rugged strip heater we offer. It uses a tubular heating element to provide excellent heat transfer and resistance to contamination, and its aluminum body allows for better conformity to slightly irregular surfaces.

The tubular elements are placed in a precisely extruded aluminum base. The aluminum body also serves as an excellent transfer medium for rapid heat-up while providing a uniform temperature throughout the entire heater.

APPLICATIONS

Permaheats can be used in many different situations, including extrusion die heating, chemical processing, compression molding or any application involving vibration and the risk of contamination.

FEATURES AND BENEFITS

- Excellent heat distribution; rapid heat-up.
- Various termination arrangements can be adapted to this heater style.
- Rugged construction.
- Long life due to tubular construction.
- Excellent heat transfer with aluminum extrusion as transfer medium.

SPECIFICATIONS

TOLERANCES:

Length: Consult Fast Heat regarding your specific requirements
Wattage: + 5% - 10%
Thickness: .5" (12.7 mm)
Widths: 1 1/2" (38.1 mm), 2 1/2" (63.5 mm), 3" (76.2 mm), 4" (10.1 cm)
Voltage: 120, 240

TERMINAL SIZE:

10-32 stainless steel 20 amp rating.

LEADS:

842° F (450° C) - 300 volt or 600 volt U.L. listed mica tape wire

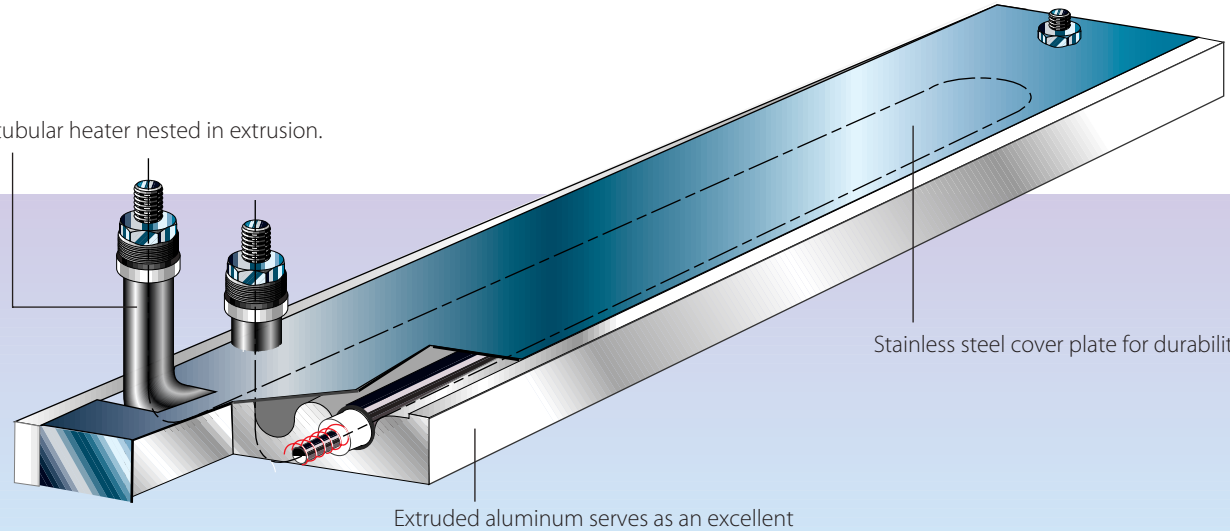
MAX. WATTS: 35 watts/sq. in. (5.6 watts/sq. cm)

MINIMUM AND MAXIMUM LENGTH:

1 1/2" (38.1 mm) wide: 6" - 50" (15.2 cm -127 cm) 2 1/2" (63.5 mm), 3" (76.2 mm), 4" (10.1 cm) wide: 6"- 25" (15.2 cm-63.5 cm)

Optional 5/16" (7.9 mm) dia. mounting holes on centerline, typical. Other mounting hole placements are available depending upon heater width and length.

Contact Fast Heat for additional details.



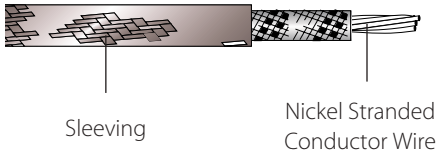
PERMAHEAT STRIP HEATER

PLAIN LEADS

Jacketed for continuous service up to 482° F (250° C) with nickel stranded conductors. It is recommended to use Monel® lugs.

High temperature mica tape lead wire is suitable up to 842° F (450° C) max.

SLEEVING

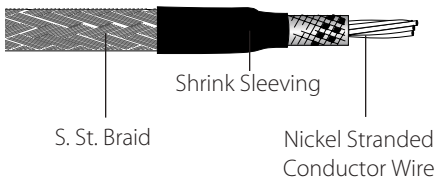


Fiberglass silicone rubber coated sleeving Class C -1; 392° F (200° C) service.

Provides extra insulation where wire is exposed to heat, molten plastics or abrasion.

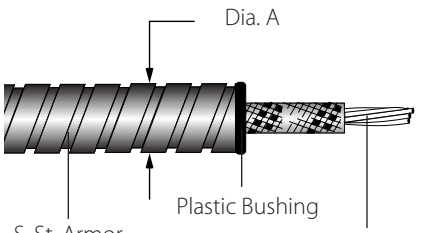
Rated 1500 volts at 482° F (220° C), except 5/16" (7.9 mm) size, which has no voltage rating. This size used primarily to enclose multiple insulation wires in heat and abrasion resistant covering.

S. ST. BRAID



Stainless steel over braid is most commonly specified in applications where leads may be subjected to abrasion due to movement of the application. Lead wires may be rubbing together or passing over sharp objects.

S. ST. ARMOR

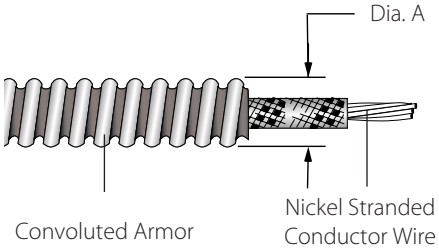


Used over leads in areas where more protection is necessary. Designed for applications where lead access can only be available from one side in addition to applications where non-fluid contamination may come in contact with the leads. This lead protection is not as flexible as S. St. braid.

Stainless steel square lock construction.

10" (25.4 cm) standard, other lengths available.

CONVOLUTED S. ST. ARMOR



This is a seamless product and can be attached to the heater so that fluids do not contaminate the leads.

Convoluted tubing is silver brazed to keep out moisture or other contaminants.

300 VOLTS 482° F (250° C) FIBERGLASS LEAD WIRE	
GAGE	MAX. CURRENT @ 200° C
16	6.6 amps
18	5.2 amps
20	3.7 amps
22	2.8 amps

600 VOLTS 482° F (250° C) FIBERGLASS LEAD WIRE	
GAGE	MAX. CURRENT @ 200° C
8	22.1 amps
10	16.5 amps
12	12.2 amps
14	9.0 amps
16	6.6 amps
18	5.2 amps
20	3.7 amps
22	2.8 amps

600 VOLTS 842° F (450° C) MICA TAPE LEAD WIRE	
GAGE	MAX. CURRENT @ 200° C
12	15.2 amps
14	11.3 amps
16	8.3 amps
18	6.4 amps
20	4.6 amps
22	3.4 amps

300 VOLTS 842° F (450° C) MICA TAPE LEAD WIRE	
GAGE	MAX. CURRENT @ 200° C
16	8.3 amps
18	6.4 amps
20	4.6 amps
22	3.4 amps

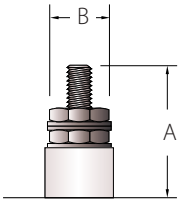
TERMINATION

- Lead protection may be required where a problem of lead abrasion arises. This protection may be provided by the use of stainless steel wire braid or armor cable, both of which are firmly anchored to the heater and are readily available in most sizes.

FIBERGLASS SILICONE RUBBER COATED SLEEVING	
SLEEVING SIZES	I. D.
12	.085" (2.1 mm)
10	.106" (2.6 mm)
8	.133" (3.3 mm)
6	.166" (4.2 mm)
5	.190" (4.8 mm)
3	.234" (5.9 mm)
5/16	.313" (7.9 mm)

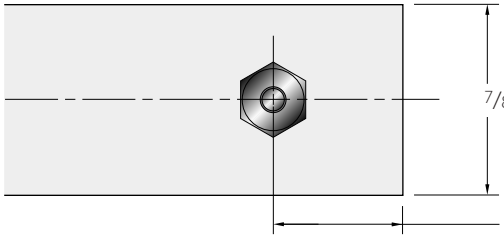
MICA/BETTER OPTIONS
STRIP HEATERS

TYPICAL SCREW TERMINAL

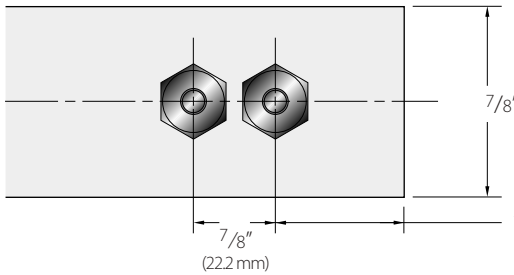


Terminals are a very convenient way of connecting our heaters to power; typically, Monel® lugs are used to secure wiring.

SCREW TERMINAL (ON TOP)

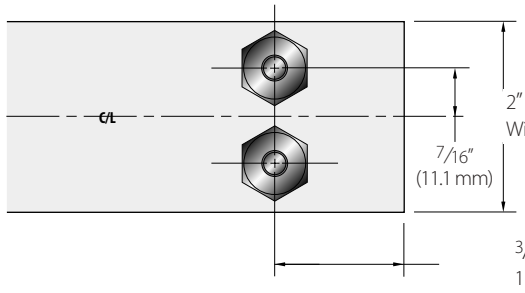


SCREW TERMINALS (ALONG THE LENGTH)

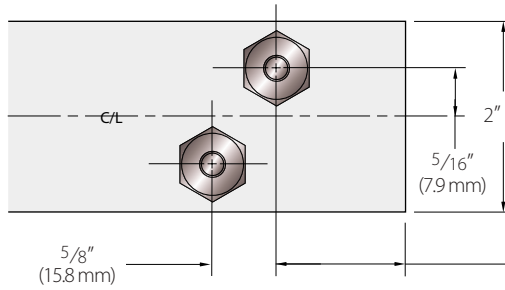


SCREW SIZE	A		B	
	IN	MM	IN	MM
8-32	3/4	19.0	7/16	11.0
8-32	1	25.4	7/16	11.0
10-24	3/4	19.0	1/2	12.7
10-24	1	25.4	1/2	12.7
1/4-20	1	25.4	7/8	22.2

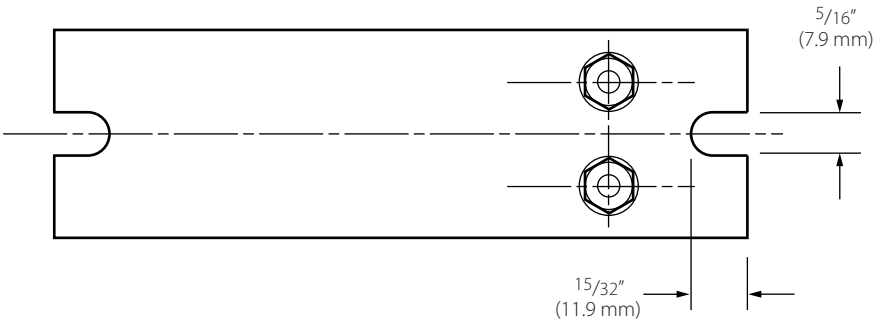
SCREW TERMINALS (ALONG THE WIDTH)



SCREW TERMINALS (DIAGONAL ALONG THE WIDTH)



BETTER STRIP

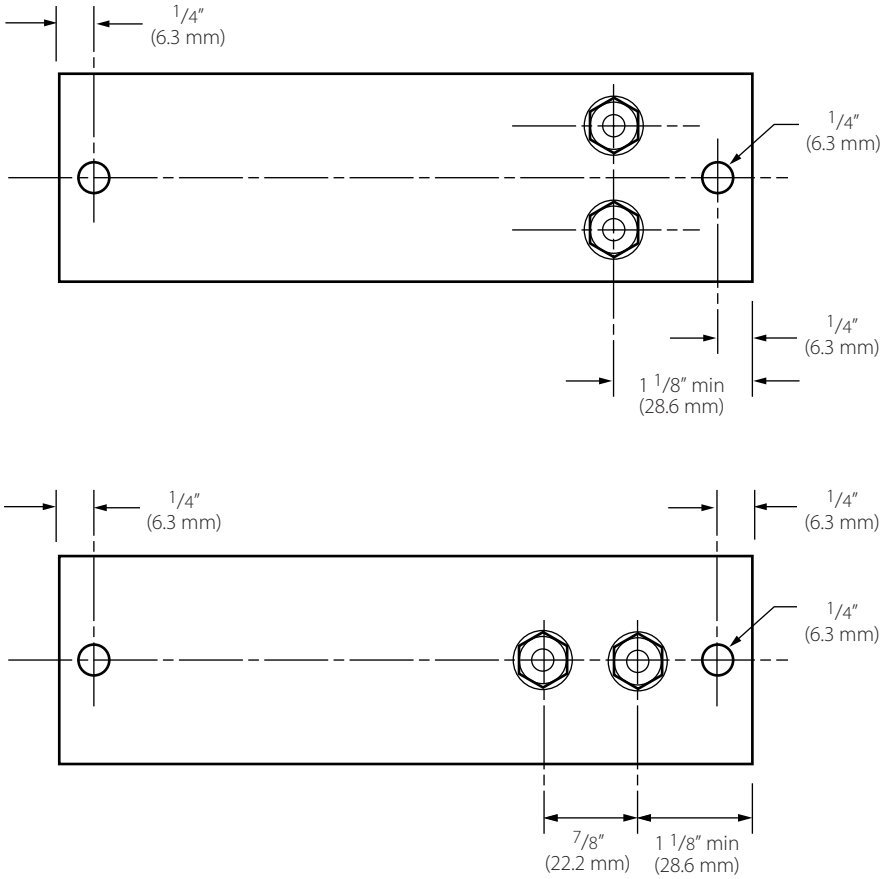


MOUNTING HOLE AND TAB STANDARDS

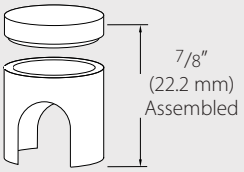
Other sizes available.

Contact Fast Heat for details.

MICA STRIP



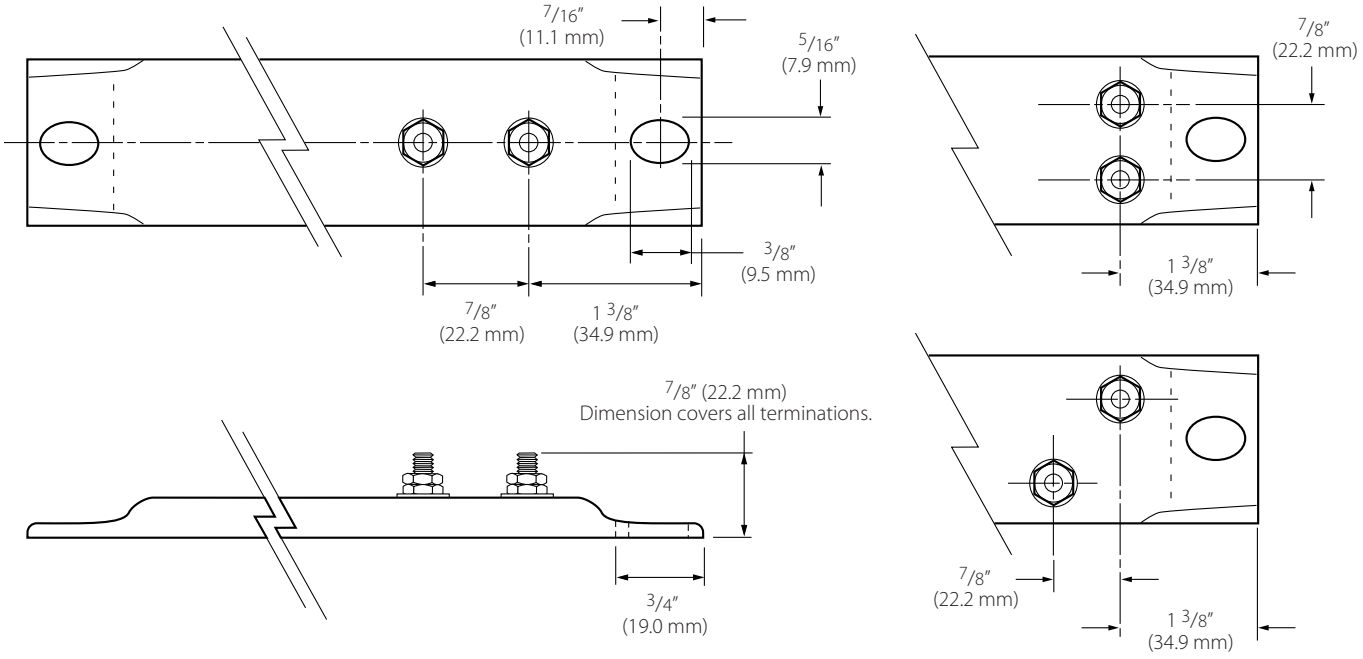
CERAMIC COVER AVAILABLE



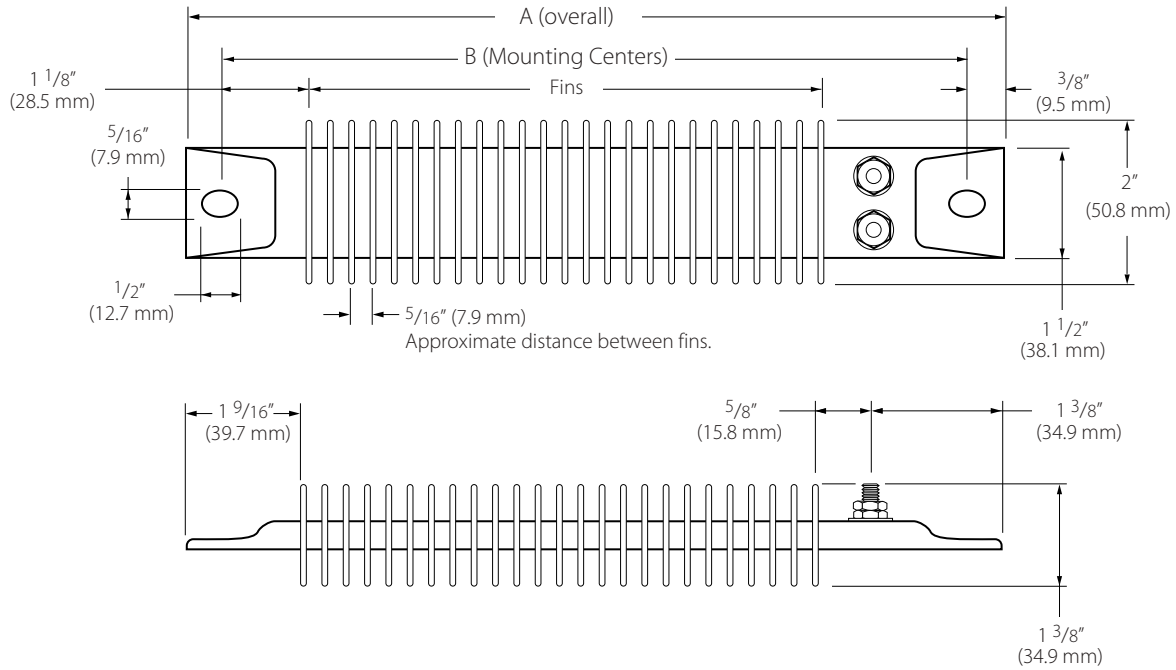
- Ceramic terminal cover fits size 10-24 by 1″ long screw terminals.
- Please specify ceramic terminal covers when ordering.

CERAMIC/ULTIMA OPTIONS
STRIP HEATERS

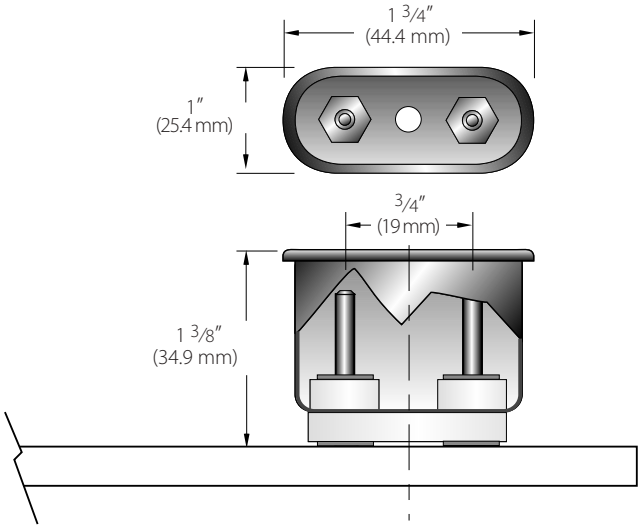
CERAMIC STRIP



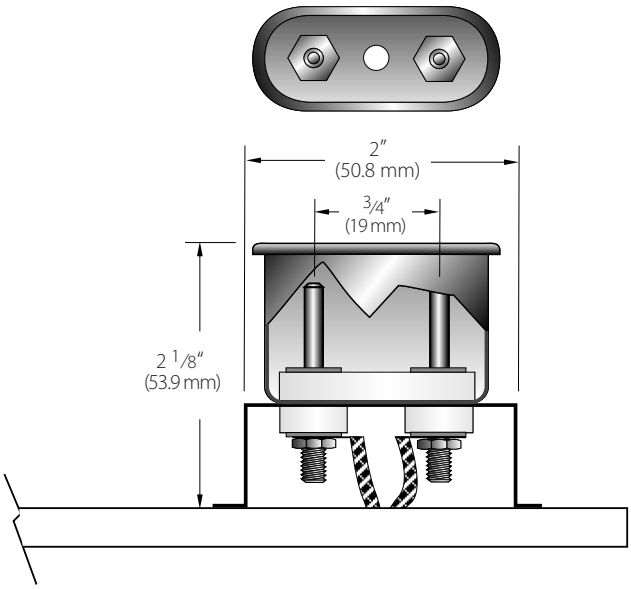
ULTIMA/CERAMIC FINNED STRIP



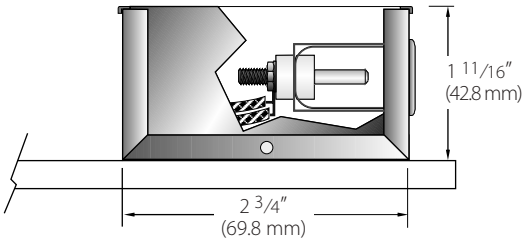
EUROPEAN PLUG

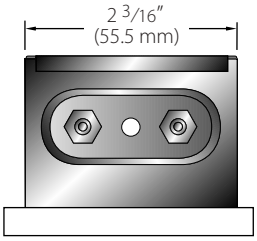


EUROPEAN PLUG W/BRACKET



EUROPEAN PLUG W/BOX

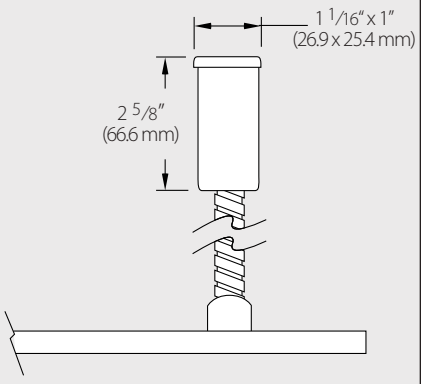




Plug is illustrated in the most common position. There are occasions for special boxes where the plug may be positioned on the top surface of the box.

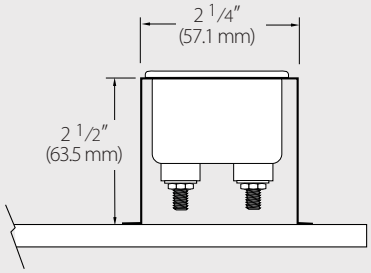
For Better & Mica Strips only.

EUROPEAN PLUG IN TUBE



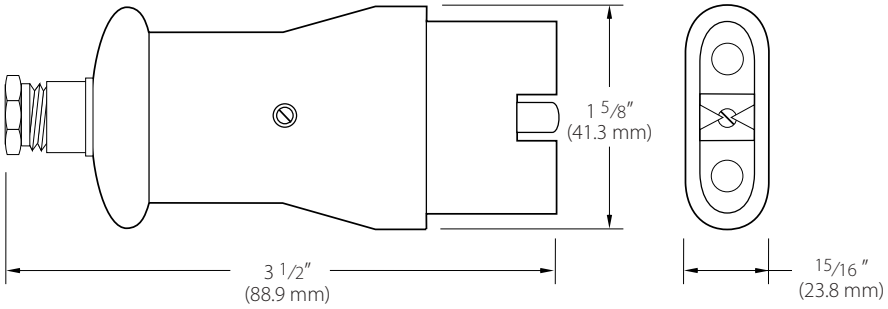
- Shown here with flexible S. St. Armor

EUROPEAN PLUG W/BRACKET (INTERNAL MOUNT)



OPTIONS
STRIP HEATERS

QUICK-DISCONNECT SOCKET

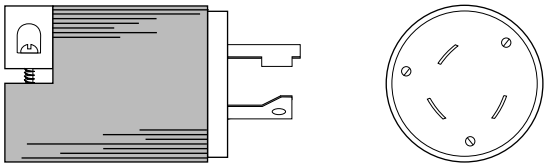


2 pole -25 amp -250V 600º F (315.5º C) service. Ideal for power connection to male plug on page 115.

Durable cast aluminum body on female side.

Both sides have ceramic insert insulators. Ground connection via contact fingers.

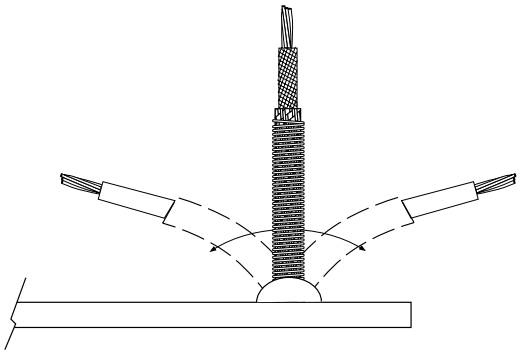
HUBBELL® PLUG (OR EQUIVALENT)



Simple power plug attached to strip heater; accommodates applications where lead access is available only at one end and a quick connect/disconnect power plug is a requirement.

Must specify Hubbell® or equivalent power plug number.

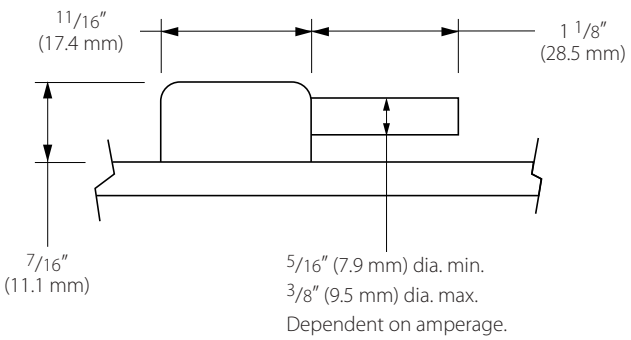
RELIEF SPRING



This optional relief spring is welded to the band sheath. It adds protection from abrasion while keeping the leads very flexible.

Specify length, maximum length: 12" (30 cm)

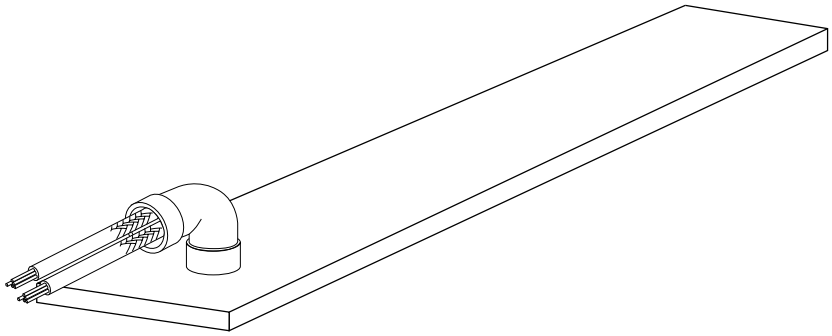
CAP AND TUBE



SILICONE RUBBER QUICK-DISCONNECT SOCKET

- This all-silicone rubber disconnect plug is generally selected for applications where the plug is frequently disconnected, thus submitting the plug to possible damage such as cracking the ceramic.
- When selecting, be aware of the temperature limitation of silicone rubber, which is 400º F (204.4º C).

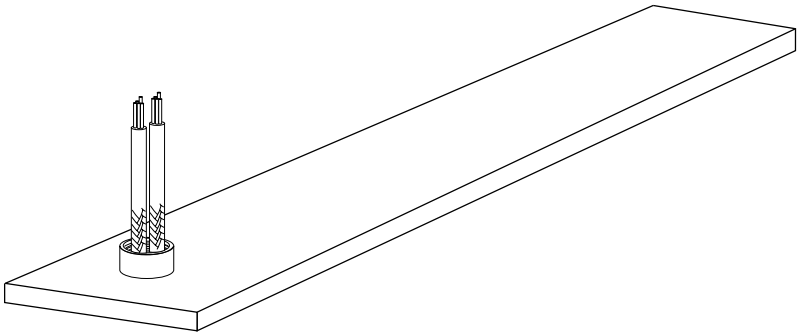
COPPER ELBOW



Simple straight abrasion-resistant stainless steel armor or moisture-resistant armor is attached to a 90° copper elbow to accommodate applications where lead access is only possible from one side and armor exit direction is a concern.

When ordering without a swivel option, specify direction of 90° copper elbow.

PIPE COUPLING / EXTENSION TUBE



These pipe couplings, welded to the heater sheath, provide a method of fastening conduit or armor to the heater which can be disconnected from the heater as required.

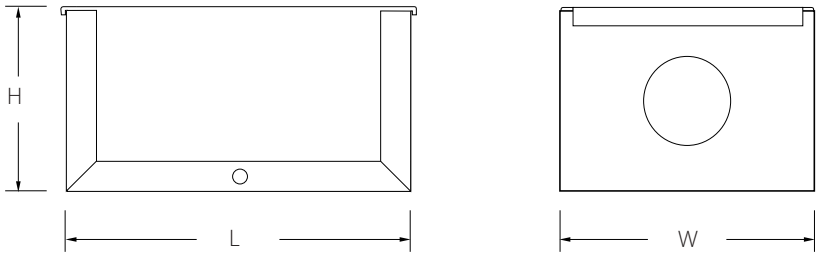
Standard stainless steel for Better strips and galvanized for Mica Strips.

To adapt different sizes of box connectors. Allows customer installation of his BX or box.

Coupling available in standard size: 3/8" (9.53 mm) and 1/2" (12.7 mm) NPT.

Other sizes are available.

STANDARD TERMINAL BOX



Designed for protection safety, snap-off cover leaves terminals easily accessible.

For heaters 1 1/2" (38.1 mm) or wider with screw terminals at one end along length on top. Also with screw terminals at one end across width, on top 2 5/8" (67.0 mm) or wider.

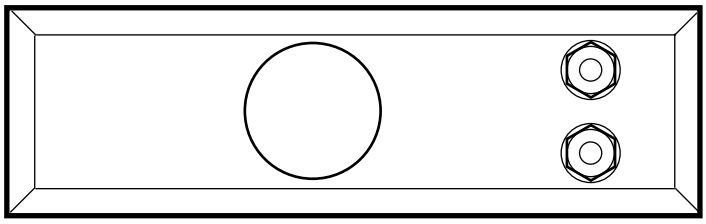
Dimensions:

Type 1	Type 2
W = 1 1/2" (38.1 mm)	W = 2 3/16" (55.5 mm)
L = 2 1/8" (53.9 mm)	L = 2 13/16" (71.4 mm)
H = 2 5/16" (74.6 mm)	H = 1 3/4" (44.4 mm)

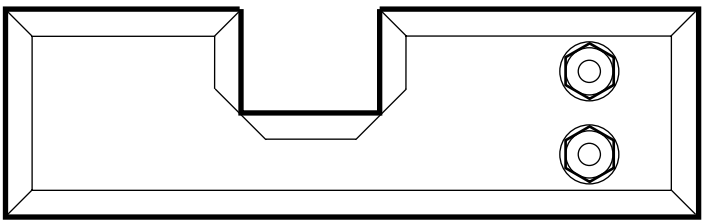
Terminal cover protects terminals against accidental grounding or short circuit due to spillage.

OPTIONS
STRIP HEATERS

SPECIAL W/HOLE



SPECIAL W/CUT-OUT



STRIP HEATERS SPECIAL CONFIGURATION

Special units manufactured to meet your unusual requirements are available. Typical examples of special variations would include shapes, sizes, lengths, holes, cutouts, wattage, voltage, terminations and mounting systems.

Consult Fast Heat for alternate sheath material [stainless steel for 1200º F (649º C) maximum sheath operating temperature], cutouts, unusual holes, special curvatures to fit on pipes or cylinders.

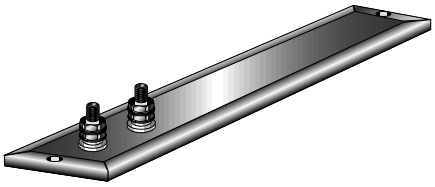
NOTE: As mentioned previously, the Better, Mica and Sealed Better Strips are the only strip heaters which can be modified to include holes, notches and special configurations.

1 1/2" (38.1 MM) WIDE MICA STRIP HEATERS

L		WATTS				
IN	MM	TOTAL	W/IN^2	W/CM^2	120V	240V
4	101.6	65	11.0	1.7	◆	◆
5	127.0	75	10.1	1.6	◆	◆
6	152.4	100	11.2	1.8	◆	◆
6	152.4	150	16.9	2.6	◆	◆
7	177.8	100	9.6	1.5	◆	◆
7	177.8	150	14.4	2.3	◆	◆
8	203.2	100	8.4	1.3	◆	◆
8	203.2	150	12.6	2.0	◆	◆
9	228.6	150	11.2	1.7	◆	◆
10 1/2	266.7	200	12.8	2.0	◆	◆
11	279.4	225	13.7	2.1	◆	◆
12	304.8	250	14.0	2.2	◆	◆
14	355.6	250	12.0	1.9	◆	◆
14	355.6	300	14.4	2.2	◆	◆
15	381.0	350	15.6	2.4	◆	◆
16 1/2	419.1	375	15.2	2.4	◆	◆
17 1/2	444.5	400	15.3	2.4	◆	◆
18	457.2	450	16.7	2.6	◆	◆
19 1/2	495.3	500	17.2	2.7	◆	◆
21	533.4	525	16.7	2.6	◆	◆
22	533.4	550	16.7	2.6	◆	◆
23	584.2	575	16.7	2.6	◆	◆
24	609.6	600	16.7	2.6	◆	◆
25 1/2	647.7	850	22.3	3.5	◆	◆

TERMINATION

- With screw terminals on one end along length, on top.
- With mounting holes.



ORDERING GUIDE

For better customer service, the following information will be needed when placing an order:

1. Your customer number, if you have been assigned one.
2. Your P.O. number.
3. Shipping instructions.
4. Our catalog number or: product line, length, width, termination style, watts, volts and mounting requirements (tabs, holes).
5. Customer Service will provide you with a catalog number. Please record this for future reference.
6. Specify the quantity you wish to order and whether or not your order is taxable.

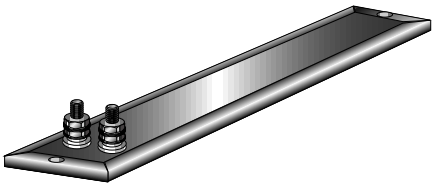
MICA
STRIP HEATERS

2" (50.8 MM) WIDE
MICA STRIP HEATERS

L		WATTS				
IN	MM	TOTAL	W/IN^2	W/CM^2	120V	240V
4	101.6	100	12.7	2.0	◆	◆
5	127.0	125	12.6	2.0	◆	◆
6	152.4	150	12.6	2.0	◆	◆
6	152.4	200	16.8	2.6	◆	◆
7	177.8	150	10.8	1.7	◆	◆
7	177.8	200	14.4	2.2	◆	◆
8	203.2	150	9.4	1.5	◆	◆
8	203.2	200	12.6	2.0	◆	◆
9	228.6	200	11.2	1.7	◆	◆
10 1/2	266.7	225	10.8	1.7	◆	◆
11	279.4	250	11.4	1.8	◆	◆
12	304.8	300	12.6	2.0	◆	◆
14	355.6	300	10.8	1.7	◆	◆
14	355.6	350	12.5	2.0	◆	◆
15	381.0	400	13.4	2.1	◆	◆
16 1/2	419.1	425	12.9	2.0	◆	◆
17 1/2	444.5	450	12.9	12.0	◆	◆
18	457.2	500	13.9	2.2	◆	◆
19 1/2	495.3	550	14.1	2.2	◆	◆
21	533.4	575	13.7	2.1	◆	◆
22	533.4	600	13.7	2.1	◆	◆
23	584.2	625	13.6	2.1	◆	◆
24	609.6	650	13.6	2.1	◆	◆
25 1/2	647.7	700	13.8	2.1	◆	◆

TERMINATION

- With screw terminals on one end across width, on top.
- With mounting holes.



FAST TRACK®

IS IT AVAILABLE THROUGH FAST TRACK?

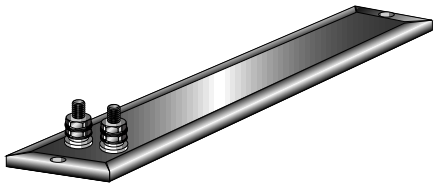
- Fast Track is our rapid-response program for custom made heaters.
- See page 2 or consult Fast Heat for details.

2 1/2" (63.5 MM) WIDE MICA STRIP HEATERS

L		WATTS				
IN	MM	TOTAL	W/IN^2	W/CM^2	120V	240V
4	101.6	150	15.2	2.4	◆	◆
5	127.0	175	14.1	2.2	◆	◆
6	152.4	200	13.4	2.1	◆	◆
6	152.4	300	20.1	3.1	◆	◆
7	177.8	250	14.4	2.2	◆	◆
7	177.8	300	17.3	2.7	◆	◆
8	203.2	250	12.6	2.0	◆	◆
8	203.2	300	15.1	2.3	◆	◆
9	228.6	300	13.4	2.1	◆	◆
10 1/2	266.7	325	12.4	1.9	◆	◆
11	279.4	350	12.8	2.0	◆	◆
12	304.8	400	13.4	2.1	◆	◆
14	355.6	400	11.5	1.8	◆	◆
14	355.6	450	12.9	2.0	◆	◆
15	381.0	450	12.1	1.9	◆	◆
16 1/2	419.1	525	12.7	2.0	◆	◆
17 1/2	444.5	450	10.3	1.6	◆	◆
18	457.2	550	12.3	1.9	◆	◆
19 1/2	495.3	650	13.4	2.1	◆	◆
21	533.4	675	12.9	2.0	◆	◆
22	533.4	700	12.8	2.0	◆	◆
23	584.2	725	12.6	2.0	◆	◆
24	609.6	750	12.5	1.9	◆	◆
25 1/2	647.7	800	12.6	2.0	◆	◆

TERMINATION

- With screw terminals on one end across width, on top.
- With mounting holes.



OTHER SIZES AVAILABLE

- Other sizes and variations are available as made to order items.
- Please consult Fast Heat for the current lead times.

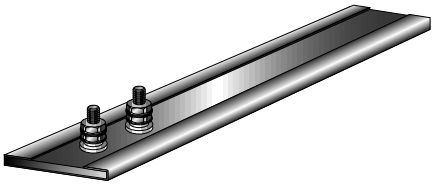
BETTER
STRIP HEATERS

1 1/2" (38.1 MM) WIDE
BETTER STRIP HEATERS

L		WATTS				
IN	MM	TOTAL	W/IN^2	W/CM^2	120V	240V
4	101.6	100	16.7	2.6	◆	◆
5	127.0	115	15.3	2.4	◆	◆
6	152.4	175	19.4	3.0	◆	◆
7	177.8	225	21.4	3.3	◆	◆
8	203.2	275	22.9	3.6	◆	◆
9	228.6	325	24.0	3.7	◆	◆
10	254.0	350	23.3	3.6	◆	◆
11	279.4	400	24.2	3.8	◆	◆
12	304.8	450	25.0	3.8	◆	◆
13	330.2	500	25.6	3.9	◆	◆
14	355.6	550	26.2	4.1	◆	◆
15	381.0	600	26.7	4.1	◆	◆
16	406.4	625	26.0	4.0	◆	◆
17	431.8	675	26.5	4.1	◆	◆
18	457.2	725	26.9	4.2	◆	◆
19	482.6	775	27.2	4.2	◆	◆
20	508.0	800	26.7	4.1	◆	◆

TERMINATION

- With screw terminals on one end along length on top.



OTHER SIZES AVAILABLE

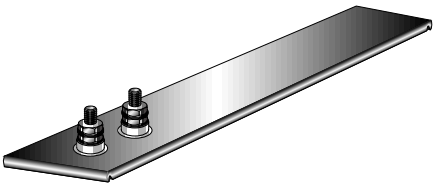
- Other sizes and variations are available as made to order items.
- Please consult Fast Heat for the current lead times.

1 1/2" (38.1 MM) WIDE SEALED BETTER STRIP HEATERS

L		WATTS				
IN	MM	TOTAL	W/IN^2	W/CM^2	120V	240V
4	101.6	100	17.1	2.7	◆	◆
5	127.0	115	15.7	2.4	◆	◆
6	152.4	175	19.8	3.1	◆	◆
7	177.8	225	21.8	3.4	◆	◆
8	203.2	275	23.2	3.6	◆	◆
9	228.6	325	24.4	3.8	◆	◆
10	254.0	350	23.6	3.7	◆	◆
11	279.4	400	24.5	3.8	◆	◆
12	304.8	450	25.2	3.9	◆	◆
13	330.2	500	25.9	4.0	◆	◆
14	355.6	550	26.4	4.1	◆	◆
15	381.0	600	26.9	4.2	◆	◆
16	406.4	625	26.2	4.1	◆	◆
17	431.8	675	26.7	4.1	◆	◆
18	457.2	725	27.0	4.2	◆	◆
19	482.6	775	27.4	4.2	◆	◆
20	508.0	800	26.8	4.2	◆	◆

TERMINATION

- With screw terminals on one end along length, on top.
- Without mounting holes.

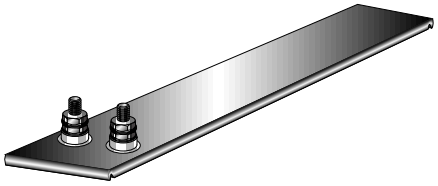


2" (50.8 MM) WIDE SEALED BETTER STRIP HEATERS

L		WATTS				
IN	MM	TOTAL	W/IN^2	W/CM^2	120V	240V
4	101.6	125	15.9	2.5	◆	◆
5	127.0	175	17.8	2.8	◆	◆
6	152.4	250	21.1	3.3	◆	◆
7	177.8	300	21.7	3.4	◆	◆
8	203.2	350	22.1	3.4	◆	◆
9	228.6	425	23.8	3.7	◆	◆
10	254.0	475	23.9	3.7	◆	◆
11	279.4	550	25.2	3.9	◆	◆
12	304.8	600	25.2	3.9	◆	◆
13	330.2	650	25.2	3.9	◆	◆
14	355.6	725	26.0	4.0	◆	◆
15	381.0	775	26.0	4.0	◆	◆
16	406.4	850	26.7	4.1	◆	◆
17	431.8	900	26.6	4.1	◆	◆
18	457.2	950	26.5	4.1	◆	◆
19	482.6	1025	27.1	4.2	◆	◆
20	508.0	1075	27.0	4.2	◆	◆

TERMINATION

- With screw terminals on one end across width, on top.
- Without mounting hole/slot.



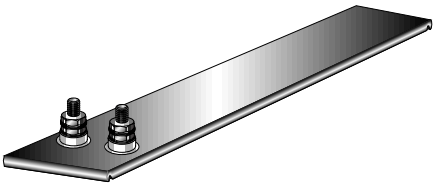
SEALED BETTER
STRIP HEATERS

2 1/2" (63.5 MM) WIDE
SEALED BETTER STRIP HEATERS

L		WATTS				
IN	MM	TOTAL	W/IN^2	W/CM^2	120V	240V
4	101.6	150	15.2	2.4	◆	◆
5	127.0	225	18.2	2.8	◆	◆
6	152.4	325	21.9	3.4	◆	◆
7	177.8	375	21.6	3.4	◆	◆
8	203.2	425	21.4	3.3	◆	◆
9	228.6	525	23.5	3.6	◆	◆
10	254.0	600	24.2	3.7	◆	◆
11	279.4	700	25.6	4.0	◆	◆
12	304.8	750	25.1	3.9	◆	◆
13	330.2	800	24.7	3.8	◆	◆
14	355.6	900	25.8	4.0	◆	◆
15	381.0	975	26.1	4.1	◆	◆
16	406.4	1050	26.4	4.1	◆	◆
17	431.8	1025	24.2	3.8	◆	◆
18	457.2	1200	26.8	4.2	◆	◆
19	482.6	1275	26.9	4.2	◆	◆
20	508.0	1350	27.1	4.2	◆	◆

TERMINATION

- With screw terminals on one end across width, on top.
- Without mounting hole/slot.



OTHER SIZES AVAILABLE

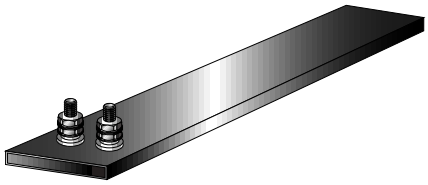
- Other sizes and variations are available as made to order items.
- Please consult Fast Heat for the current lead times.

1 1/2" (38.1 MM) WIDE CERAMIC STRIP HEATERS

L		WATTS				
IN	MM	TOTAL	W/IN^2	W/CM^2	120V	240V
4 1/2	114.3	100	26.7	4.1	◆	◆
6	152.4	175	29.2	4.5	◆	◆
6 1/2	165.1	200	29.6	4.6	◆	◆
9	228.6	350	33.3	5.2	◆	◆
10 1/2	266.7	400	31.4	4.9	◆	◆
12 1/2	317.5	500	31.7	4.9	◆	◆
13 3/4	349.2	550	31.2	4.8	◆	◆
16 3/8	415.9	750	34.8	5.4	◆	◆
18	457.2	850	35.4	5.5	◆	◆
19 1/2	495.3	900	34.3	5.3	◆	◆
22 1/4	565.1	1000	32.9	5.1	◆	◆
23	584.2	1100	34.9	5.4	◆	◆
29	736.6	1400	34.6	5.4	◆	◆
34 1/2	876.3	1600	32.8	5.1	◆	◆
37	939.8	1800	34.3	5.3	◆	◆
41	1041.4	2000	34.2	5.3	◆	◆
46 1/2	1181.1	2250	33.7	5.2	◆	◆
52 1/2	1333.5	2500	33.0	5.1	◆	◆
62 1/2	1587.5	3000	33.0	5.1	◆	◆
70 1/2	1790.7	3500	34.1	5.3	◆	◆

TERMINATION

- With screw terminals on one end across width, on top.
- Without mounting tabs.

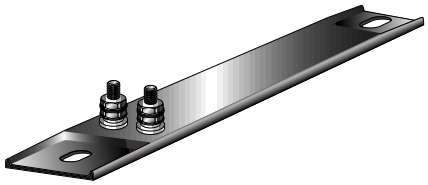


1 1/2" (38.1 MM) WIDE CERAMIC STRIP HEATERS

L		WATTS				
IN	MM	TOTAL	W/IN^2	W/CM^2	120V	240V
8	203.2	200	33.3	5.2	◆	◆
10 1/2	266.7	275	28.2	4.4	◆	◆
12	304.8	350	29.2	4.5	◆	◆
14	355.6	400	26.7	4.1	◆	◆
15 1/4	387.3	450	26.7	4.1	◆	◆
17 7/8	454.0	500	24.0	3.7	◆	◆
19 1/2	495.3	550	23.7	3.7	◆	◆
21	533.4	600	23.5	3.6	◆	◆
23 3/4	603.2	700	23.6	3.7	◆	◆
24 1/2	622.3	1000	32.5	5.0	◆	◆
30 1/2	774.7	1200	30.2	4.7	◆	◆
36	914.4	1300	27.1	4.2	◆	◆
38 1/2	977.9	1400	27.0	4.2	◆	◆
42 1/2	1079.5	1500	26.0	4.0	◆	◆
48	1219.2	2250	34.1	5.3	◆	◆
54	1371.6	2250	30.0	4.7	◆	◆
64	1625.6	3000	33.3	5.2	◆	◆
72	1828.8	3300	32.4	5.0	◆	◆

TERMINATION

- With screw terminals on one end across width, on top.
- With mounting tabs.



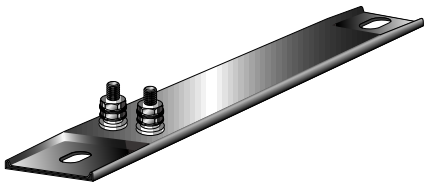
ULTIMA
STRIP HEATERS

1 1/2" (38.1 MM) WIDE ULTIMA STRIP HEATERS

L		WATTS				
IN	MM	TOTAL	W/IN^2	W/CM^2	120V	240V
8	203.2	350	54.9	8.5	◆	
9	228.6	425	54.0	8.4	◆	
10	254.0	475	50.7	7.9	◆	◆
11	279.4	550	50.6	7.8	◆	◆
12	304.8	600	48.5	7.5	◆	◆
13	330.2	650	46.9	7.3	◆	◆
14	355.6	725	47.2	7.3	◆	◆
15	381.0	800	47.4	7.4	◆	◆
16	406.4	850	46.3	7.2	◆	◆
17	431.8	900	45.3	7.0	◆	◆
18	457.2	950	44.4	6.9	◆	◆
19	482.6	1000	43.7	6.8	◆	◆
20	508.0	1100	45.1	7.0	◆	◆
21	533.4	1150	44.4	6.9	◆	◆
22	558.8	1200	43.8	6.8	◆	◆
23	584.2	1250	43.3	6.7		◆
24	609.6	1300	42.8	6.6		◆
25	635.0	1400	43.9	6.8		◆
26	660.4	1500	44.9	7.0		◆
27	685.8	1550	44.4	6.9		◆

TERMINATION

- With screw terminals on one end across width, on top.
- With mounting tabs.

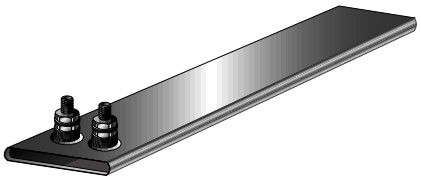


1 1/2" (38.1 MM) WIDE ULTIMA STRIP HEATERS

L		WATTS				
IN	MM	TOTAL	W/IN^2	W/CM^2	120V	240V
5	127.0	300	61.5	9.9	◆	
6	152.4	350	54.9	8.8	◆	
7	177.8	425	54.0	8.6	◆	
8	203.2	475	50.7	8.0	◆	◆
9	228.6	550	50.6	8.0	◆	◆
10	254.0	600	48.5	7.6	◆	◆
11	279.4	650	46.9	7.4	◆	◆
12	304.8	725	47.2	7.4	◆	◆
13	330.2	800	47.4	7.4	◆	◆
14	355.6	850	46.3	7.2	◆	◆
15	381.0	900	45.3	7.1	◆	◆
16	406.4	950	44.4	7.0	◆	◆
17	431.8	1000	43.7	6.8	◆	◆
18	457.2	1100	45.1	7.1	◆	◆
19	482.6	1150	44.4	6.9	◆	◆
20	508.0	1200	43.8	6.8	◆	◆
21	533.4	1250	43.3	6.8	◆	
22	558.8	1300	42.8	6.7	◆	
23	584.2	1400	43.9	6.9	◆	
24	609.6	1500	44.9	7.0	◆	
25	635.0	1550	44.4	6.9	◆	

TERMINATION

- With screw terminals on one end across width, on top.
- Without mounting tabs.

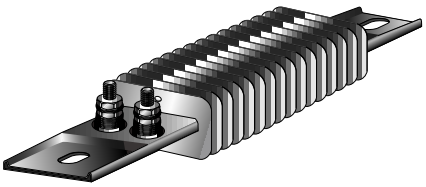


1 1/2" (38.1 MM) WIDE
ULTIMA FINNED STRIP HEATERS

L		WATTS				
IN	MM	TOTAL	W/IN^2	W/CM^2	120V	240V
8	203.2	725	45.5	7.1	◆	◆
9	228.6	975	49.5	7.6	◆	◆
10	254.0	1050	44.8	6.9	◆	◆
11	279.4	1225	45.1	7.0	◆	◆
12	304.8	1400	45.3	7.0	◆	◆
13	330.2	1550	44.7	6.9	◆	◆
14	355.6	1725	44.9	7.0	◆	◆
15	381.0	1900	45.0	7.0	◆	◆
16	406.4	2075	45.2	7.0	◆	◆
17	431.8	2225	44.8	6.9	◆	◆
18	457.2	2425	45.4	7.1	◆	◆
19	482.6	2575	45.0	7.0	◆	◆
20	508.0	2750	45.1	7.0	◆	◆
21	533.4	2900	44.8	6.9	◆	◆
22	558.8	3075	45.0	7.0	◆	◆
23	584.2	3250	45.0	7.0	◆	◆
24	609.6	3425	45.1	7.0	◆	◆
25	635.0	3575	44.9	7.0	◆	◆
26	660.4	3750	44.9	7.0	◆	◆
27	685.8	3925	45.0	7.0	◆	◆

TERMINATION

- With screw terminals on one end along width, on top.
- With stainless steel fins.
- With mounting tabs.
- For forced air applications only.



OTHER SIZES AVAILABLE

- Other sizes and variations are available as made to order items.
- Please consult Fast Heat for the current lead times.

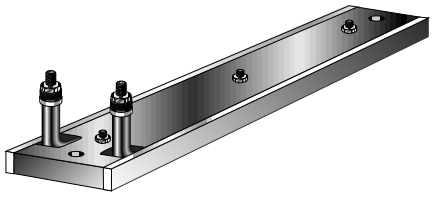
PERMAHEAT
STRIP HEATERS

1 1/2" (38.1 MM) WIDE
PERMAHEAT STRIP HEATERS

L		WATTS				
IN	MM	TOTAL	W/IN^2	W/CM^2	120V	240V
6	152.4	300	50.0	7.8	◆	
7	177.8	350	46.7	7.2	◆	◆
8	203.2	400	44.4	6.9	◆	◆
9	228.6	450	42.9	6.6	◆	◆
10	254.0	525	43.8	6.8	◆	◆
11	279.4	575	42.6	6.6	◆	◆
12	304.8	625	41.7	6.5	◆	◆
13	330.2	675	40.9	6.3	◆	◆
14	355.6	725	40.3	6.2	◆	◆
15	381.0	775	39.7	6.2	◆	◆
16	406.4	825	39.3	6.1	◆	◆
17	431.8	875	38.9	6.0	◆	◆
18	457.2	925	38.5	6.0	◆	◆
19	482.6	975	38.2	6.0	◆	◆
20	508.0	1050	38.9	6.0	◆	◆
21	533.4	1100	38.6	6.0	◆	◆
22	558.8	1150	38.3	6.0	◆	◆
23	584.2	1200	38.1	5.9	◆	◆
24	609.6	1250	37.9	5.9	◆	◆
25	635.0	1300	37.7	5.8	◆	◆
26	660.4	1350	37.5	5.8	◆	◆
27	685.8	1400	37.3	5.8	◆	◆
28	711.2	1450	37.2	5.8	◆	◆
29	736.6	1500	37.0	5.7	◆	◆
30	762.0	1575	37.5	5.8	◆	◆
31	787.4	1625	37.4	5.8	◆	◆
32	812.8	1675	37.2	5.8	◆	◆
33	838.2	1725	37.1	5.8	◆	◆
34	863.6	1775	37.0	5.7	◆	◆
35	889.0	1825	36.9	5.7	◆	◆
36	914.4	1875	36.8	5.7	◆	◆
37	939.8	1925	36.7	5.7	◆	◆
38	965.2	1975	36.6	5.7	◆	◆
39	990.6	2025	36.5	5.7	◆	◆
40	1016.0	2100	36.8	5.7	◆	◆
41	1041.4	2150	36.8	5.7	◆	◆
42	1066.8	2200	36.7	5.7	◆	◆
43	1092.2	2250	36.6	5.7	◆	◆
44	1117.6	2300	36.5	5.7	◆	◆
45	1143.0	2350	36.4	5.7	◆	◆
46	1168.4	2400	36.4	5.6	◆	◆
47	1193.8	2450	36.3	5.6	◆	◆
48	1219.2	2500	36.2	5.6	◆	◆
49	1244.6	2550	36.2	5.6	◆	◆
50	1270.0	2625	36.5	5.7	◆	◆

TERMINATION

- With screw terminals on one end across width, on top.
- With mounting holes.

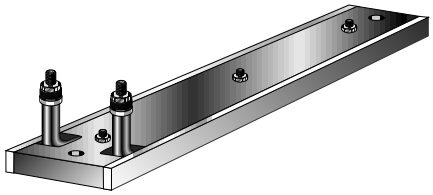


2 1/2" (63.5 MM) WIDE PERMAHEAT STRIP HEATERS

L		WATTS				
IN	MM	TOTAL	W/IN^2	W/CM^2	120V	240V
6	152.4	525	52.5	8.1	◆	◆
7	177.8	600	48.0	7.4	◆	◆
8	203.2	700	46.7	7.2	◆	◆
9	228.6	775	44.3	6.9	◆	◆
10	254.0	875	43.8	6.8	◆	◆
11	279.4	950	42.2	6.5	◆	◆
12	304.8	1050	42.0	6.5	◆	◆
13	330.2	1125	40.9	6.3	◆	◆
14	355.6	1225	40.8	6.3	◆	◆
15	381.0	1300	40.0	6.2	◆	◆
16	406.4	1400	40.0	6.2	◆	◆
17	431.8	1475	39.3	6.1	◆	◆
18	457.2	1575	39.4	6.1	◆	◆
19	482.6	1650	38.8	6.1	◆	◆
20	508.0	1750	38.9	6.1	◆	◆
21	533.4	1825	38.4	6.0	◆	◆
22	558.8	1925	38.5	6.0	◆	◆
23	584.2	2000	38.1	5.9	◆	◆
24	609.6	2100	38.2	5.9	◆	◆
25	635.0	2175	37.8	5.9	◆	◆

TERMINATION

- With screw terminals on one end across width, on top.
- With mounting holes.



OTHER SIZES AVAILABLE

- Other sizes and variations are available as made to order items.
- Please consult Fast Heat for the current lead times.

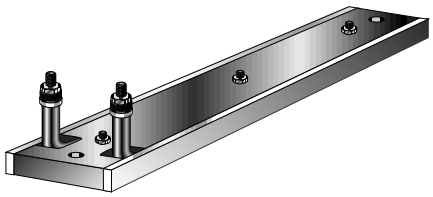
PERMAHEAT
STRIP HEATERS

3" (76.2 MM) WIDE PERMAHEAT STRIP HEATERS

L		WATTS				
IN	MM	TOTAL	W/IN^2	W/CM^2	120V	240V
6	152.4	625	52.1	8.1	◆	◆
7	177.8	725	48.3	7.5	◆	◆
8	203.2	825	45.8	7.1	◆	◆
9	228.6	925	44.1	6.8	◆	◆
10	254.0	1050	43.8	6.8	◆	◆
11	279.4	1150	42.6	6.6	◆	◆
12	304.8	1250	41.7	6.5	◆	◆
13	330.2	1350	40.9	6.3	◆	◆
14	355.6	1450	40.3	6.2	◆	◆
15	381.0	1575	40.4	6.3	◆	◆
16	406.4	1675	39.9	6.2	◆	◆
17	431.8	1775	39.4	6.1	◆	◆
18	457.2	1875	39.1	6.1	◆	◆
19	482.6	1975	38.7	6.0	◆	◆
20	508.0	2100	38.9	6.0	◆	◆
21	533.4	2200	38.6	6.0	◆	◆
22	558.8	2300	38.3	5.9	◆	◆
23	584.2	2400	38.1	5.9	◆	◆
24	609.6	2500	37.9	5.9	◆	◆
25	635.0	2625	38.0	5.9	◆	◆

TERMINATION

- With screw terminals on one end across width, on top.
- With mounting holes.

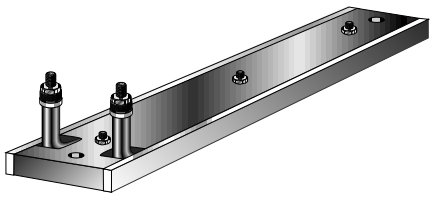


4" (101.6 MM) WIDE PERMAHEAT STRIP HEATERS

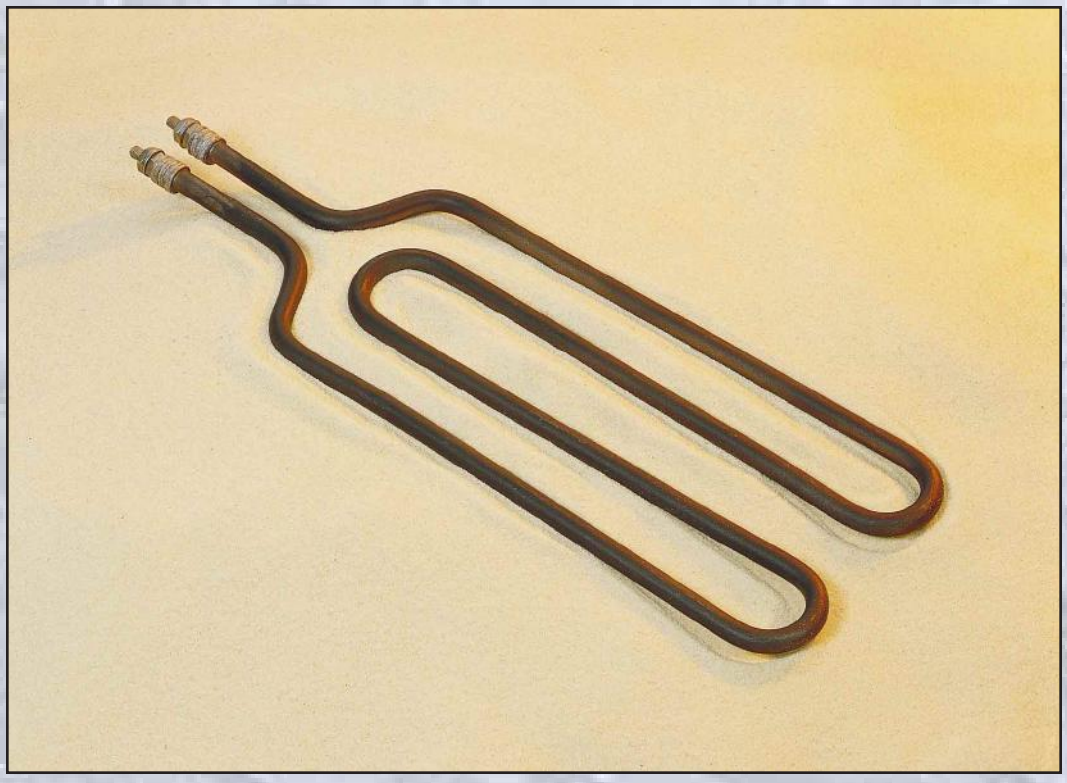
L		WATTS				
IN	MM	TOTAL	W/IN^2	W/CM^2	120V	240V
6	152.4	825	51.6	8.0	◆	◆
7	177.8	975	48.8	7.6	◆	◆
8	203.2	1100	45.8	7.1	◆	◆
9	228.6	1250	44.6	6.9	◆	◆
10	254.0	1400	43.8	6.8	◆	◆
11	279.4	1525	42.4	6.6	◆	◆
12	304.8	1675	41.9	6.5	◆	◆
13	330.2	1800	40.9	6.3	◆	◆
14	355.6	1950	40.6	6.3	◆	◆
15	381.0	2100	40.4	6.3	◆	◆
16	406.4	2225	39.7	6.2	◆	◆
17	431.8	2375	39.6	6.1	◆	◆
18	457.2	2500	39.1	6.1	◆	◆
19	482.6	2650	39.0	6.0	◆	◆
20	508.0	2800	38.9	6.0	◆	◆
21	533.4	2925	38.5	6.0	◆	◆
22	558.8	3075	38.4	6.0	◆	◆
23	584.2	3200	38.1	5.9	◆	◆
24	609.6	3350	38.1	5.9	◆	◆
25	635.0	3500	38.0	5.9	◆	◆

TERMINATION

- With screw terminals on one end across width, on top.
- With mounting holes.



TUBULAR HEATERS



So versatile that they can be formed to suit most tubular applications. Various sheath materials are available, including high performance Incoloy®–capable of reaching 1,600° F (871° C).

fast heat®

TUBULAR HEATERS

TUBULAR HEATERS

Fast Heat's versatile Tubular heaters are custom-formed in a wide variety of shapes to correspond to your requirements.

Incoloy®, stainless steel or steel sheath materials are available, as well as a large selection of termination styles. Magnesium oxide (MgO) insulation ensures superior heat transfer, and the resistance wire is precision-wound for long heater life.

APPLICATIONS

Tubular heaters can be used in almost any application. Straight Tubulars can be clamped to metal surfaces or inserted in machined grooves for conductive heat transfer. Or use a formed Tubular to provide consistent heat in any type of special application.

SPECIFICATIONS

SHEATH MATERIALS:
Max. recommended sheath temperature:

Steel . . . . . 750º F (398º C)
Stainless Steel . . . . . 1,200º F (648º C)
Incoloy . . . . . 1,600º F (871º C)

Tolerances: Resistance +10% – 5%
Wattage + 5% –10%
Length +/– 1%

SHEATH DIAMETERS:
Fast Heat Tubular heating elements are available in the following diameters and a variety of lengths.

.260" . . . . . +/– .003" . . . . . 6.6 mm
.315" . . . . . +/– .003" . . . . . 8.0 mm
.430" . . . . . +/– .003" . . . . . 10.9 mm
.490" . . . . . +/– .003" . . . . . 12.4 mm

Maximum Sheath Watt Density . . . . 45w / in^2

NOTE: Cold zone at each end; 1-1/2" min.

TYPES OF SEAL:

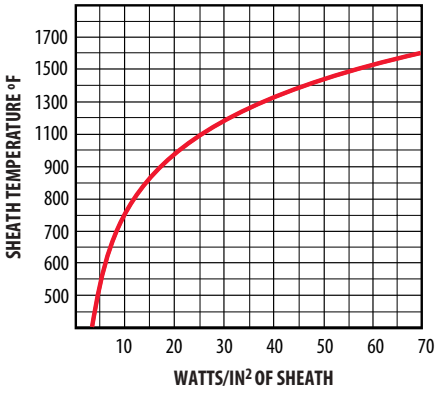
Silicone Resin: Tubular heaters are sealed at ends to restrict moisture penetration.

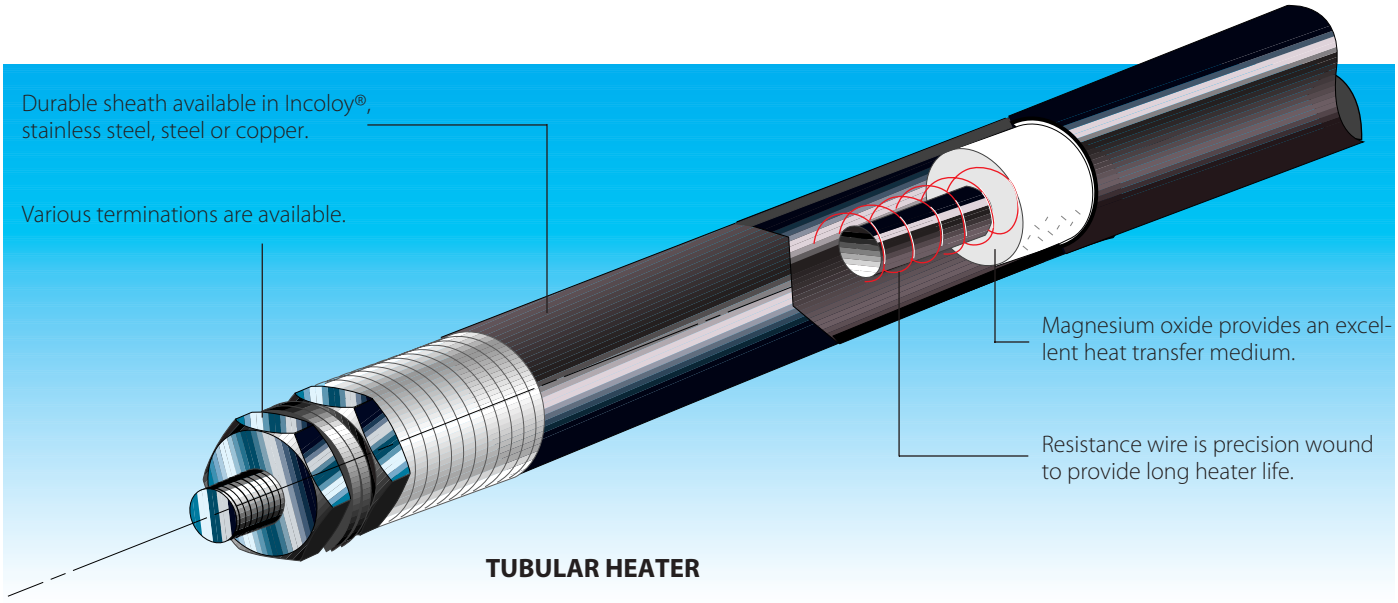
Silicone Rubber: Seal for moisture protection and accidental fluid splashing.

WATTS PER SQUARE INCH VERSUS SHEATH TEMPERATURE

The following chart is for reference only. Values are approximate and could vary depending upon the actual conditions. Consult Fast Heat for more details.

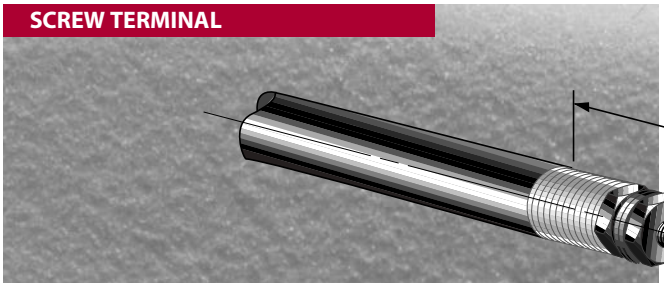
Test is based on using Incoloy® sheath at 70º F (21º C) ambient temperature.





TUBULAR HEATER

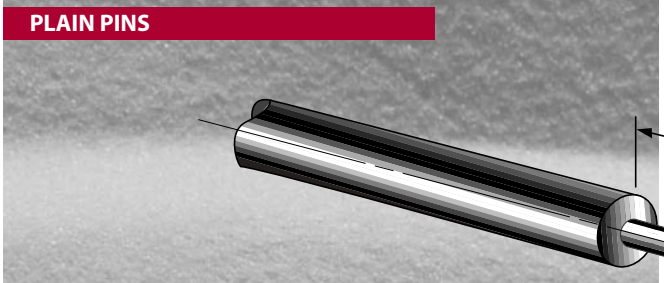
SCREW TERMINAL



With mica washer insulation:

DIAMETER		SCREW
IN	MM	STUD
.260	6.6	#10-32
.315-.430	8.0-10.9	#10-32

PLAIN PINS



Customer can finish termination to suit their application.

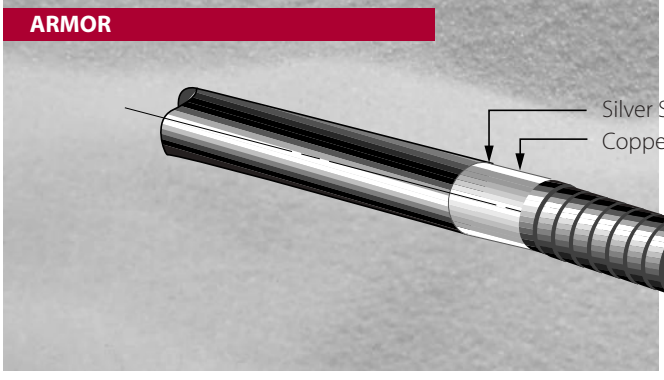
5/16″ (7.9 mm) pin length is standard.

FLAG TERMINALS

With #10-32 screw.

Specify direction.

ARMOR

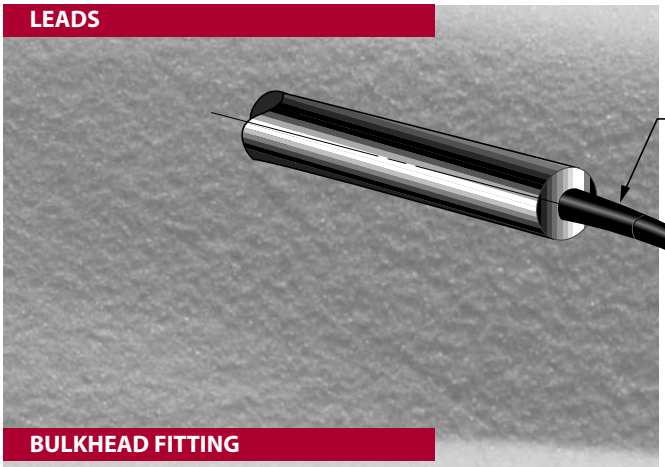


Stainless steel armor to prevent abrasion and wear of leads (Type A).

Also available with leak-proof bellows.

Specify length of leads and armor.

LEADS

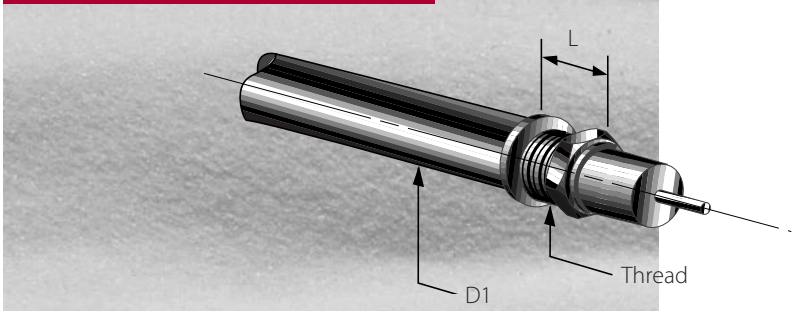


High-temperature 250º F (121º C) lead wire brazed onto the heater terminals.

Insulated with fiberglass sleeving and covered with shrink tubing.

Specify length of leads.

BULKHEAD FITTING



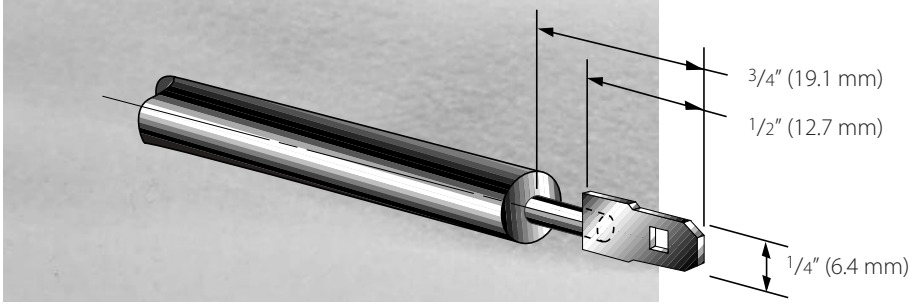
Brazed to heater.

For quick feed-through mounting.

Specify round or hex head, stainless steel or brass.

D1		THD. SIZE	L		HEAD SIZE	
IN	MM		IN	MM	IN	MM
.260	6.6	7/16-20	7/8	22.2	3/4	19.1
.315	8.0	1/2-20	7/8	22.2	3/4	19.1
.430	10.9	5/8-18	1	25.4	7/8	22.2
.430	10.9	3/4-16	1 1/8	28.6	1	25.4

SPADE TERMINALS



Specify direction of spade terminals.

TUBULAR ORDERING GUIDE

For better customer service, the following information will be needed when placing an order:

1. Your customer number, if you have been assigned one.
2. Your P.O. number.
3. Shipping instructions.
4. Our catalog number or: product line, length, diameter, termination style, watts, volts, medium to be heated, temperature limits, space limitations, heated length, cold zone at each end, and drawing as to forming requirements.

   Please note that cold length may not stop in a sharp bend area, but may stop just before or just after such an area.
5. Customer service will provide you with a catalog number. Please record this for future reference.
6. Specify the quantity you wish to order and whether or not your order is taxable.

BENDING OF TUBULARS GUIDE

TUBULAR DIA. IN	TUBULAR DIA. MM	FACTORY BENDING RADIUS (MIN.) IN	FACTORY BENDING RADIUS (MIN.) MM
.260	6.6	1/4	6.4
.315	8.0	5/16	7.9
.430	10.9	7/16	11.1
.490	12.4	5/8	15.9

TYPICAL FORMATIONS

The following are a few, but by no means the only, ways tubular heaters can be formed. For other shapes, please supply details and/or prints.

FIG. 1– Straight Element

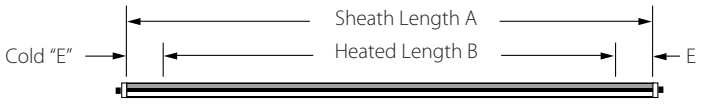


FIG. 2– "U" Shape

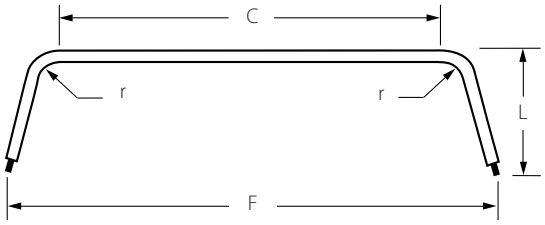
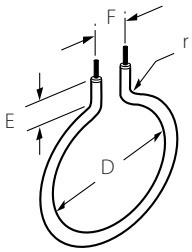


FIG. 3– Circular



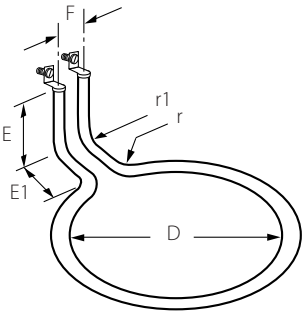


FIG. 4– Circular with extension

FIG. 5– Hairpin

FIG. 6– "W" Shape

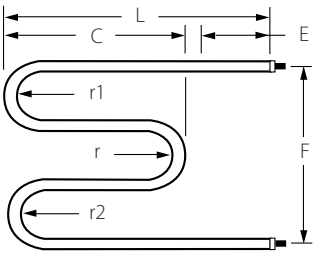
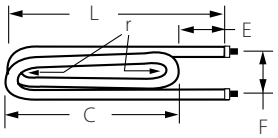


FIG. 7– Double Loop



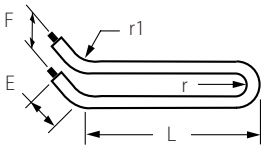
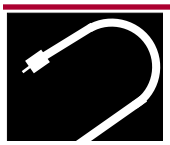


FIG. 8– Bent Hairpin



TUBULAR HEATERS

.260" DIA. (6.6 MM) TUBULAR

Incoloy® 800 sheath, fully annealed, 3" (76.2 mm) cold @ end; screw term.

LENGTH IN	LENGTH CM	WATTS	120 V	240 V
21	53	400	◆	◆
26	66	500	◆	◆
31	79	600	◆	◆
36	91	800	◆	◆
41	104	900	◆	◆
46	117	1000	◆	◆
51	130	1200		◆
56	142	1300		◆
61	155	1400		◆

.315" DIA. (8.0 MM) TUBULAR

Incoloy® sheath, annealed, 3" (76.2 mm) cold @ end; screw term.

LENGTH IN	LENGTH CM	WATTS	120 V	240 V
14	36	165	◆	
14	36	250	◆	
14	36	330	◆	
16	41	300	◆	
16	41	415	◆	
18	46	250	◆	
18	46	375	◆	
18	46	500	◆	
20	51	300	◆	
20	51	450	◆	
20	51	600	◆	
22	56	325	◆	
22	56	500	◆	
22	56	665	◆	
22	56	375	◆	◆
24	61	565	◆	◆
24	61	750	◆	◆
26	66	415	◆	◆
26	66	625	◆	◆
26	66	835	◆	◆
26	66	460	◆	◆
28	71	700	◆	◆
28	71	920	◆	◆
30	76	500	◆	◆
30	76	750	◆	◆
30	76	1000	◆	◆
34	86	1340	◆	◆
34	86	875	◆	◆
34	86	1150	◆	◆
34	86	1150	◆	◆
38	97	670	◆	◆
38	97	1000	◆	◆
38	97	1340	◆	◆
42	107	750	◆	◆
42	107	1125	◆	◆
46	117	835	◆	◆
46	117	1250	◆	◆

.315" DIA. (8.0 MM) TUBULAR (CONT'D)

Incoloy® sheath, annealed, 3" (76.2 mm) cold @ end; screw term.

LENGTH IN	LENGTH CM	WATTS	120 V	240 V
46	117	1650	◆	◆
48	122	880	◆	◆
48	122	1300	◆	◆
48	122	1750	◆	◆
50	127	920	◆	◆
50	127	1375	◆	◆
50	127	1840	◆	◆
54	137	1000	◆	◆
54	137	1500	◆	◆
54	137	2000	◆	◆
62	157	1150	◆	◆
62	157	1750	◆	◆
62	157	2300	◆	◆
70	178	1300	◆	◆
70	178	2000	◆	◆
70	178	2600	◆	◆
78	198	1500	◆	◆
78	198	2250	◆	◆
78	198	3000	◆	◆
88	224	1650	◆	◆
88	224	2500	◆	◆
88	224	3300	◆	◆
96	244	1850	◆	◆
96	244	2750		◆
96	244	3600		◆
102	259	2000		◆
102	259	3000		◆
102	259	4000		◆

.430" DIA. (10.9 MM) TUBULAR

Incoloy® sheath, annealed, 3" (76.2 mm) cold @ end; screw term.

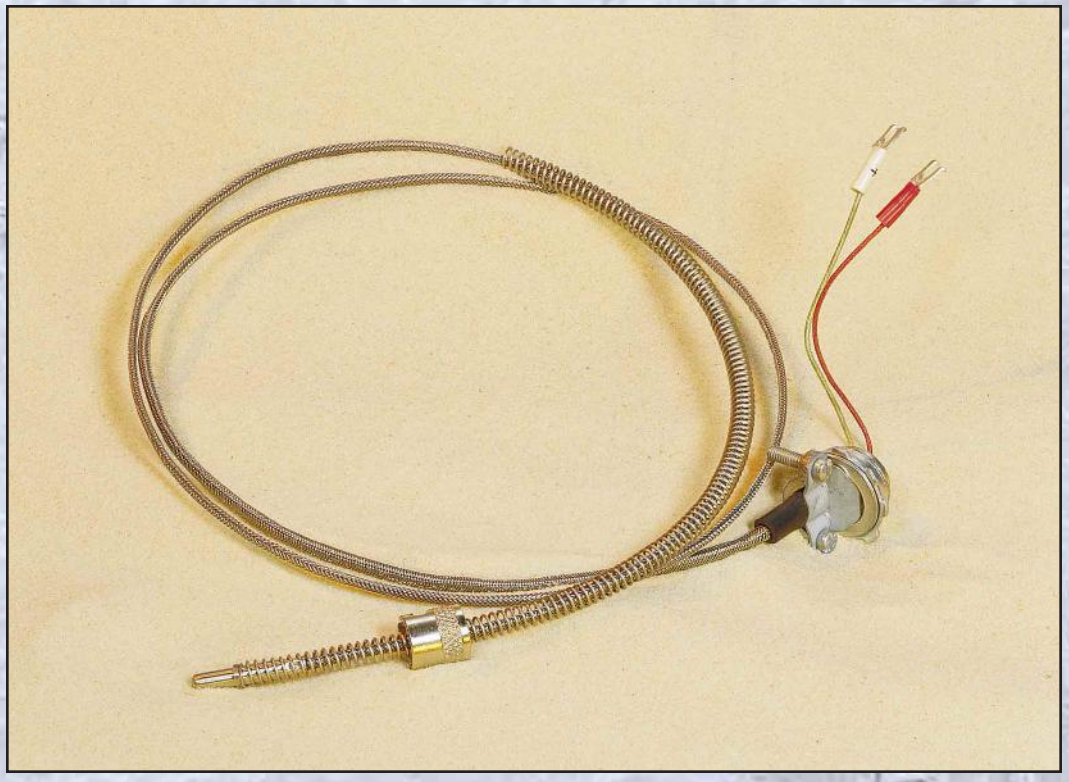
LENGTH IN	LENGTH CM	WATTS	120 V	240 V	480 V
12	31	165	◆		
12	31	250	◆		
12	31	330	◆		
14	36	220	◆		
14	36	330	◆		
14	36	440	◆		
16	41	275	◆		
16	41	350	◆		
16	41	550	◆		
18	46	325	◆		
18	46	500	◆		
18	46	650	◆		
20	51	375	◆		
20	51	575	◆		
20	51	765	◆		
22	56	440	◆	◆	
22	56	660	◆	◆	
22	56	880	◆	◆	
23	58	465	◆	◆	

.430" DIA. (10.9 MM) TUBULAR (CONT'D)

Incoloy® sheath, annealed, 3" (76.2 mm) cold @ end; screw term.

LENGTH IN	LENGTH CM	WATTS	120 V	240 V	480 V
23	58	700	◆	◆	
23	58	930	◆	◆	
25	64	520	◆	◆	
25	64	780	◆	◆	
25	64	1000	◆	◆	
27	69	575	◆	◆	
27	69	865	◆	◆	
27	69	1150	◆	◆	
29	74	630	◆	◆	
29	74	950	◆	◆	
29	74	1250	◆	◆	
31	79	685	◆	◆	
31	79	1100	◆	◆	
31	79	1350	◆	◆	
33	84	740	◆	◆	◆
33	84	1100	◆	◆	◆
33	84	1450	◆	◆	◆
35	89	800	◆	◆	◆
35	89	1200	◆	◆	◆
35	89	1600	◆	◆	◆
37	94	850	◆	◆	◆
37	94	1250	◆	◆	◆
37	94	1700	◆	◆	◆
39	99	900	◆	◆	◆
39	99	1350	◆	◆	◆
39	99	1800	◆	◆	◆
41	104	960	◆	◆	◆
41	104	960	◆	◆	◆
41	104	1400	◆	◆	◆
41	104	1900	◆	◆	◆
43	109	1000	◆	◆	◆
43	109	1500	◆		◆
43	109	2000	◆		◆
45	114	1070	◆	◆	◆
45	114	1600	◆	◆	◆
45	114	2100	◆	◆	◆
47	119	1100		◆	◆
47	119	1700		◆	◆
47	119	2200		◆	◆
49	125	1180		◆	◆
49	125	1750		◆	◆
49	125	2350		◆	◆
51	130	1200		◆	◆
51	130	1850		◆	◆
51	130	2450		◆	◆
53	135	1300		◆	◆
53	135	1900		◆	◆
53	135	2550		◆	◆
55	140	1350		◆	◆
55	140	2000		◆	◆
55	140	2700		◆	◆
57	145	1400		◆	◆
57	145	2100		◆	◆
57	145	2800		◆	◆

TEMPERATURE SENSORS



Precision manufacturing for
demanding applications.
Fast Heat's thermocouples are meticulously
made to ensure reliability, quick response
and accurate sensing.

fast heat®

THERMOCOUPLE
TEMPERATURE SENSORS

QUICK RESPONSE, ACCURATE SENSING

Fast Heat's proven reliability in the manufacture of thermocouples is evident in the many applications in which they're being used.

SPECIFICATIONS

An infinite variety of combinations can be designed to suit all temperature sensing applications.

Type J is the most commonly requested thermocouple wire, followed by type K. Both are readily available, and other types are available by special request.

All popular thermocouple probes are available, with many available from stock. These include Adjustable Bayonet, Compression Fitting, Nozzle, Manifold, Extruder, Washer and Surface Mounted styles.

Thermocouples for the plastics industry and other medium duty applications are made using thermocouple grade wires. Each leg of the thermocouple wire is insulated with color-coded fiberglass (primary insulation), and both wires together have another layer of fiberglass (secondary insulation). These wires, at the junction point and beyond, are protected by a rigid stainless steel tubing. This protection tube is generally 3/16" (4.8 mm) in diameter. However, it can be supplied in either 1/8", 1/4" or 3/8" (3.2, 6.4 or 9.5 mm) diameter.

Fiberglass-insulated flexible lead wire coming out of this protection tube can be further protected against abrasion by either stainless steel braid, stainless steel flexible armor or fiberglass sleeving. Rigid stainless steel protection tube can be provided with the proper mounting hardware as shown on the following pages.

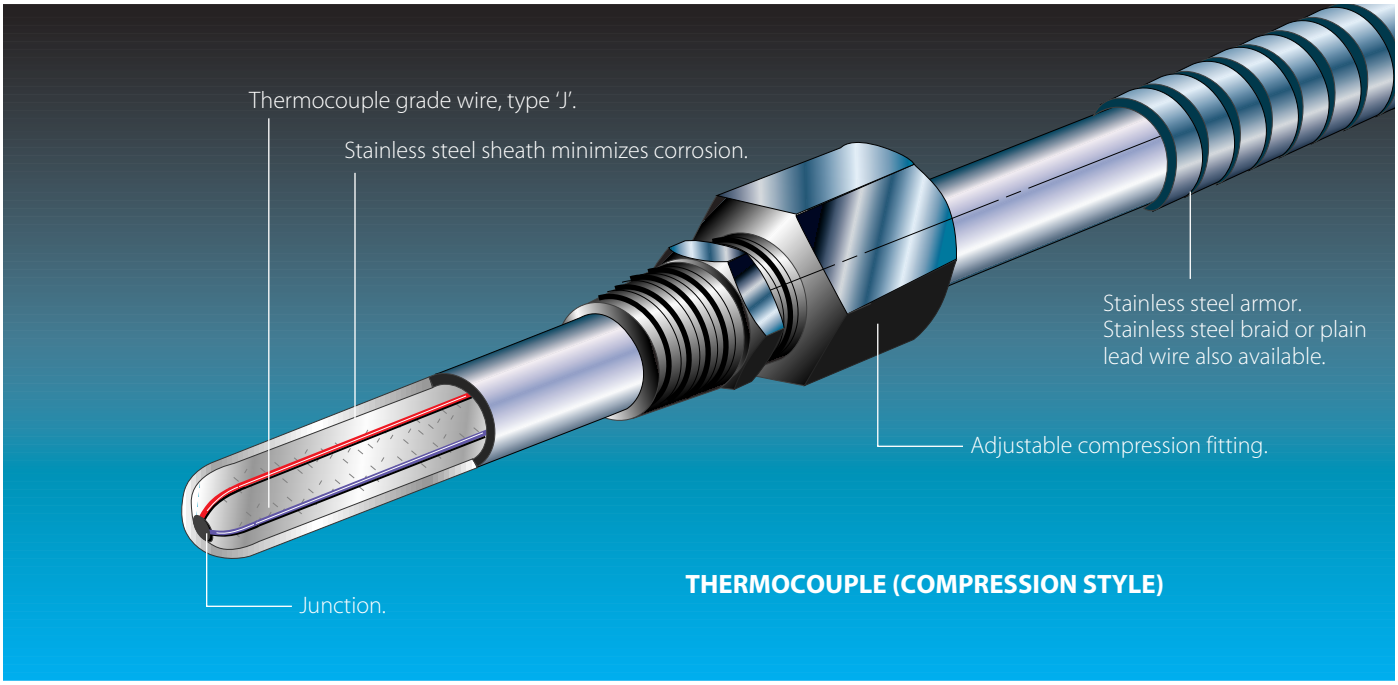
Even though thermocouple grade wires are capable of operating at higher temperatures, there is a limitation of about 900° F (482° C) (continuous operation) on the fiberglass insulation.

All thermocouple shown are for grounded junction. Ungrounded junction thermocouples can be special ordered – contact Fast Heat.

HOW DOES A T/C WORK?

When a heat source is brought near the junction of two dissimilar metals, a voltage is generated. This voltage is directly proportional to the junction temperature and can be read and related to the junction temperature by an electronic instrument.

The most common domestically used thermocouple is the "J", which consists of an iron and a constantan wire. The "J" is recommended for temperatures of 32° F (0° C) to 1382° F (750° C).



THERMOCOUPLE (COMPRESSION STYLE)

COMPRESSION FITTING THERMOCOUPLE

Thermocouples with compression fittings allow easy installation on existing drilled and tapped holes.

Compression fitting is shipped finger tight on thermocouple sheath. *Note that once compression fitting is in place, it cannot be relocated.*

Compression fitting and the ferrule inside are made of brass.

Probe style available as standard, straight, 45º and 90º. Grounded thermocouple junction positioned at balled end.

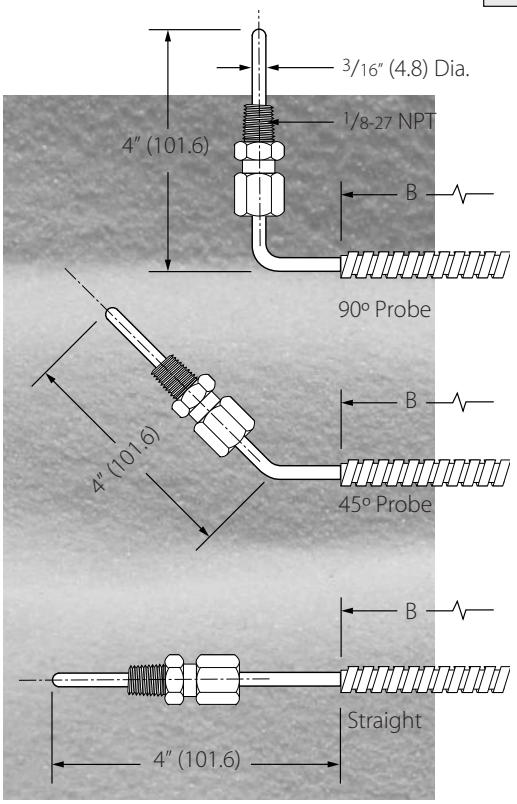
Choose one style from each of the three columns: probe, lead wire and terminal. Any combination is possible.

NOTE:
Dimensions in parenthesis are millimeters.
Do not scale drawings.

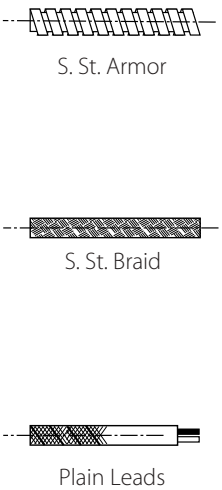
COMPRESSION FITTING T/C

STAINLESS STEEL ARMOR LEADS	STAINLESS STEEL BRAID LEADS	PLAIN WIRE LEADS	"B" (IN)	"B" (CM)	PROBE STYLE	TERMINAL STYLE
◆	◆	◆	48	122	straight	1
◆	◆	◆	72	183	straight	1
◆	◆	◆	96	244	straight	1
◆	◆	◆	48	122	straight	2
◆	◆	◆	72	183	straight	2
◆	◆	◆	96	244	straight	2
◆	◆	◆	48	122	straight	3
◆	◆	◆	72	183	straight	3
◆	◆	◆	96	244	straight	3
◆	◆	◆	48	122	45º	1
◆	◆	◆	72	183	45º	1
◆	◆	◆	96	244	45º	1
◆	◆	◆	48	122	45º	2
◆	◆	◆	72	183	45º	2
◆	◆	◆	96	244	45º	2
◆	◆	◆	48	122	45º	3
◆	◆	◆	72	183	45º	3
◆	◆	◆	96	244	45º	3
◆	◆	◆	48	122	90º	1
◆	◆	◆	72	183	90º	1
◆	◆	◆	96	244	90º	1
◆	◆	◆	48	122	90º	2
◆	◆	◆	72	183	90º	2
◆	◆	◆	96	244	90º	2
◆	◆	◆	48	122	90º	3
◆	◆	◆	72	183	90º	3
◆	◆	◆	96	244	90º	3

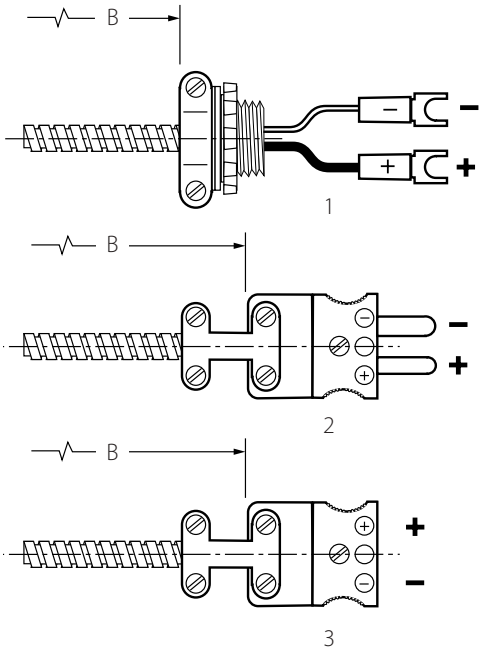
PROBE STYLES



LEAD WIRE STYLES



TERMINAL STYLES



ADJUSTABLE BAYONET **THERMOCOUPLES**

ADJUSTABLE BAYONET THERMOCOUPLES

Bayonet caps turn to desired immersion depth.

Conforms to most angles.

Cuts inventory costs.

Fits 1/4" (6.4 mm) hole, depths from 1" (25.4 mm) to 10" (25.4 cm). *Note that thermocouple does not include bayonet adapter; order as separate line item.*

Choose one style from each of the two columns: probe and terminal. Any combination is possible.

HOW TO ORDER:
1. Indicate "B" length from chart.
2. Choose terminal style.

NOTE:
Dimensions in parenthesis are millimeters.
Do not scale drawings.

ADJUSTABLE BAYONET SPRING TYPE T/C

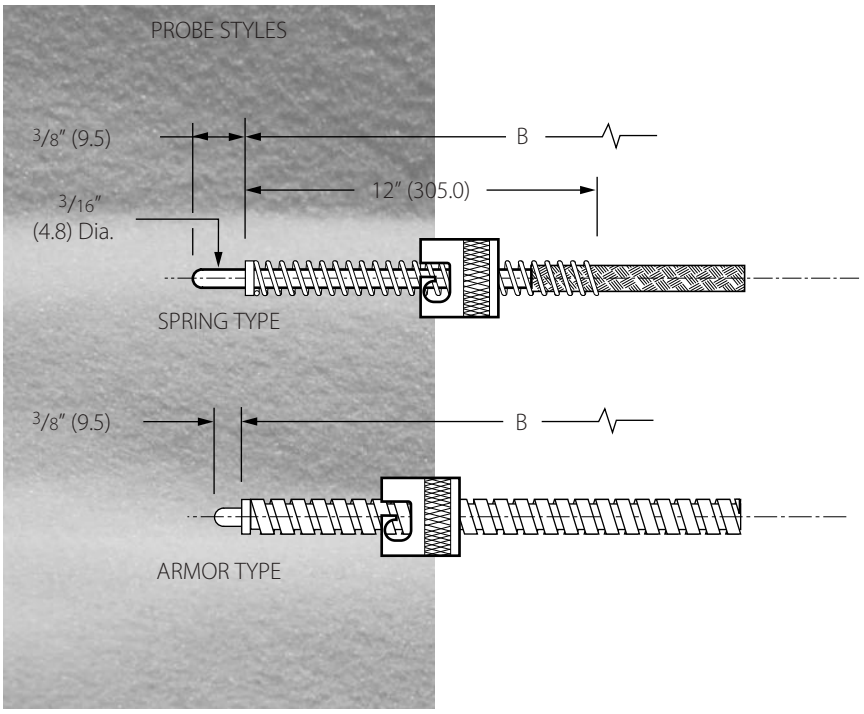
Highly flexible spring with stainless steel braid protected leads.

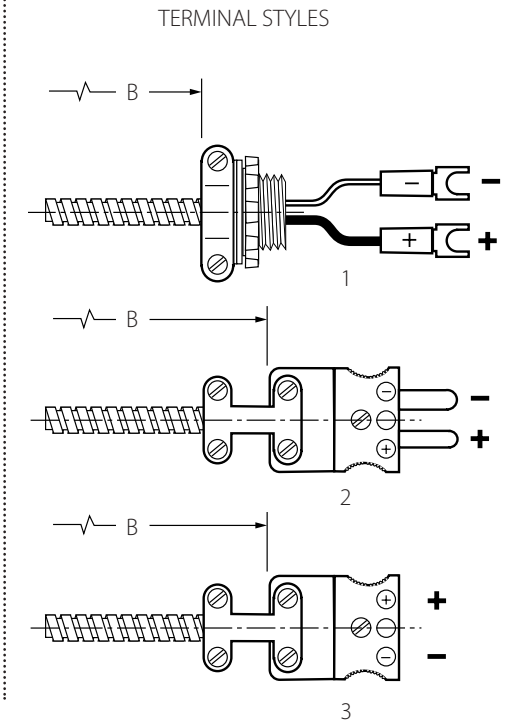
"B"		TERMINAL
IN	CM	STYLE
48	122	1
72	183	1
96	244	1
48	122	2
72	183	2
96	244	2
48	122	3
72	183	3
96	244	3

ADJUSTABLE BAYONET ARMOR TYPE T/C

Same as spring but not as flexible. Stainless steel armor protected leads.

"B"		TERMINAL
IN	CM	STYLE
48	122	1
72	183	1
96	244	1
48	122	2
72	183	2
96	244	2
48	122	3
72	183	3
96	244	3





FIXED LENGTH BAYONET
THERMOCOUPLES

FIXED BAYONET THERMOCOUPLE

This thermocouple allows quick and consistent connection each time.

Constant spring pressure assures consistent measurement and fast response time. *Note that thermocouple does not include bayonet adapter; order as separate line item.*

Choose one style from each of the three columns. Any combination is possible.

HOW TO ORDER:

1. Indicate "A" and "B" length from chart.
2. Choose terminal style.

NOTE:

Dimensions in parenthesis are millimeters. Do not scale drawings.

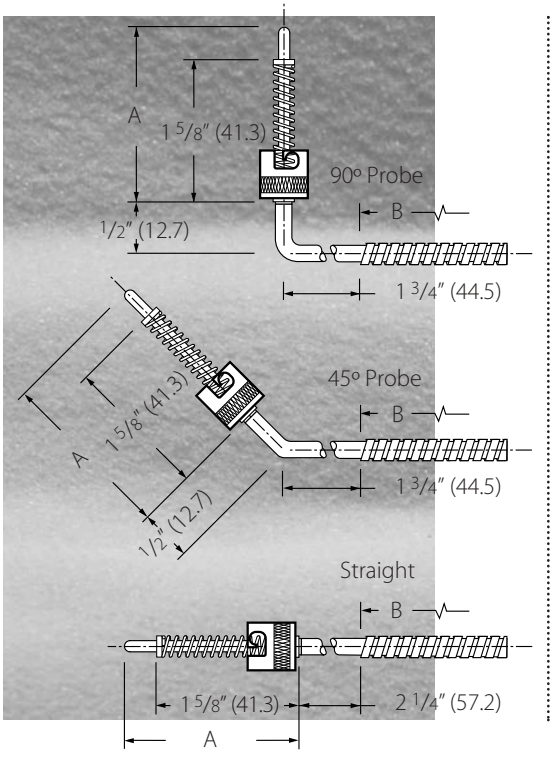
Additional lead wire configurations available per customer specifications.

Consult Fast Heat for details.

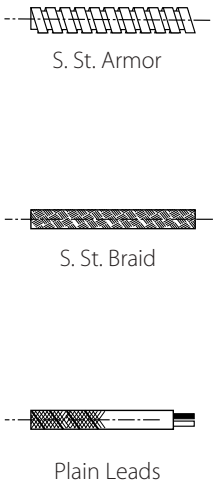
FIXED BAYONET T/C ARMOR LEADS

STRAIGHT BAYONET	45° BEND BAYONET	90° BEND BAYONET	"A" (IN)	"A" (CM)	"B" (IN)	"B" (CM)	TERMINAL STYLE
◆	◆	◆	2	5.1	48	122	1
◆	◆	◆	2	5.1	72	183	1
◆	◆	◆	2	5.1	96	244	1
◆	◆	◆	2	5.1	48	122	2
◆	◆	◆	2	5.1	72	183	2
◆	◆	◆	2	5.1	96	244	2
◆	◆	◆	2	5.1	48	122	3
◆	◆	◆	2	5.1	72	183	3
◆	◆	◆	2	5.1	96	244	3
◆	◆	◆	4	10.2	48	122	1
◆	◆	◆	4	10.2	72	183	1
◆	◆	◆	4	10.2	96	244	1
◆	◆	◆	4	10.2	48	122	2
◆	◆	◆	4	10.2	72	183	2
◆	◆	◆	4	10.2	96	244	2
◆	◆	◆	4	10.2	48	122	3
◆	◆	◆	4	10.2	72	183	3
◆	◆	◆	4	10.2	96	244	3
◆	◆	◆	6	15.2	48	122	1
◆	◆	◆	6	15.2	72	183	1
◆	◆	◆	6	15.2	96	244	1
◆	◆	◆	6	15.2	48	122	2
◆	◆	◆	6	15.2	72	183	2
◆	◆	◆	6	15.2	96	244	2
◆	◆	◆	6	15.2	48	122	3
◆	◆	◆	6	15.2	72	183	3
◆	◆	◆	6	15.2	96	244	3

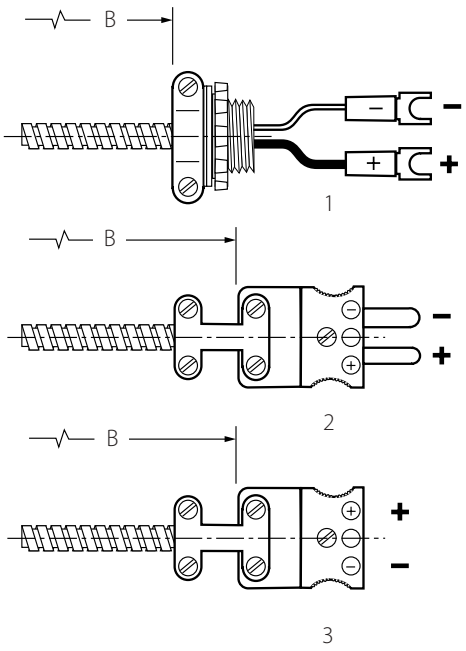
PROBE STYLES



LEAD WIRE STYLES



TERMINAL STYLES



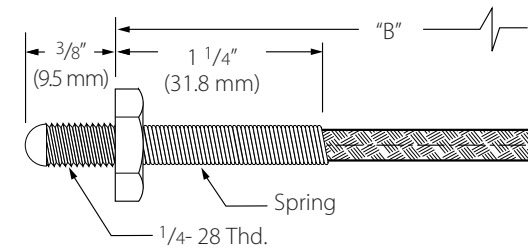
THERMOCOUPLE
TEMPERATURE SENSORS

NOZZLE T/C

The nozzle thermocouple has a short installation depth and a low profile.

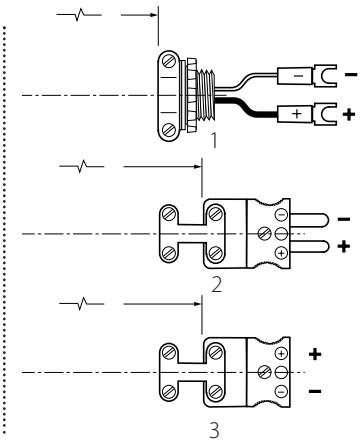
Maximum hole depth is 3/8" (9.5 mm).

"B" IN	"B" CM	TERMINAL STYLE
48	122	1
72	183	1
96	244	1
48	122	2
72	183	2
96	244	2
48	122	3
72	183	3
96	244	3



NOTE:
Dimensions in parenthesis are millimeters.
Do not scale drawings.

TERMINAL STYLES

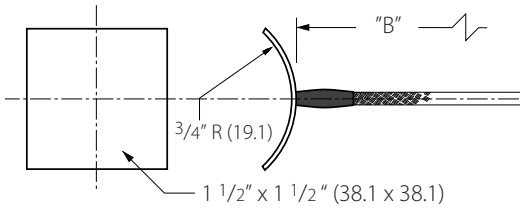


CURVED SURFACE THERMOCOUPLE

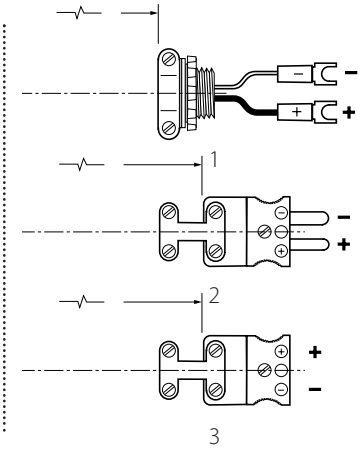
Use to conform to cylindrical surfaces. Available with 3 types of terminations.

For special surface or configuration, contact Fast Heat.

"B" IN	"B" CM	TERMINAL STYLE
48	122	1
72	183	1
96	244	1
48	122	2
72	183	2
96	244	2
48	122	3
72	183	3
96	244	3



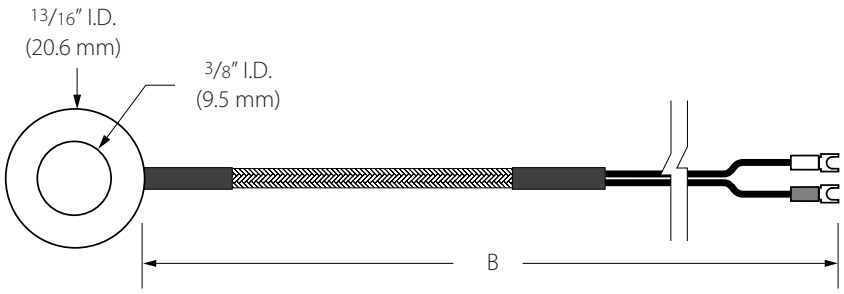
TERMINAL STYLES



WASHER TYPE THERMOCOUPLE

Uses 20 gage duplex thermocouple wire.

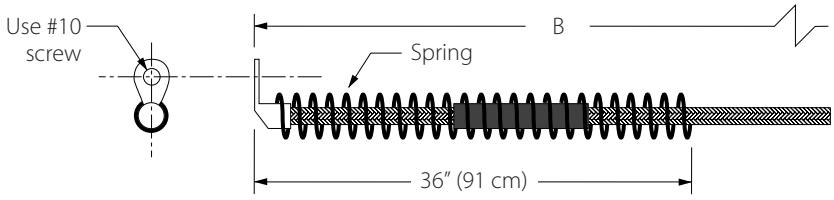
"B" IN	"B" CM
48	122
72	183
96	244

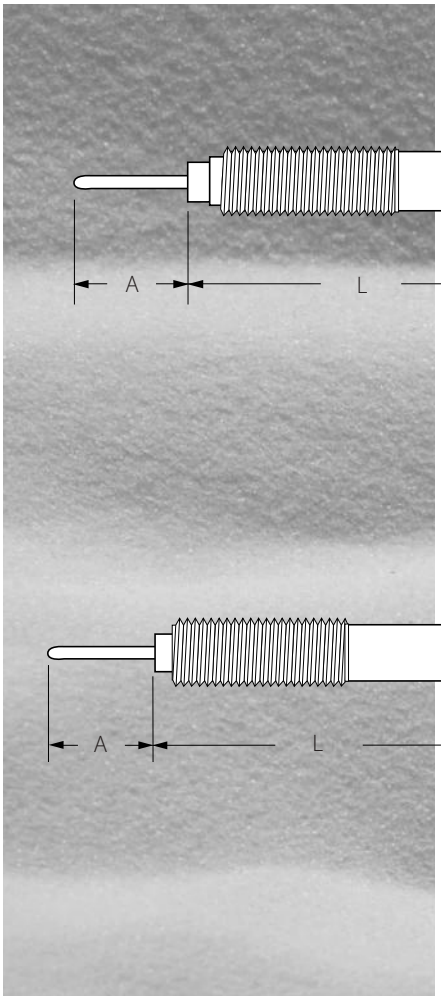


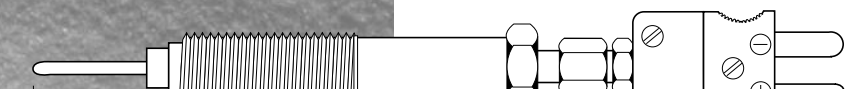
MANIFOLD THERMOCOUPLE

Attach with a no. 10 screw on surface required.

"B" IN	"B" CM
72	183







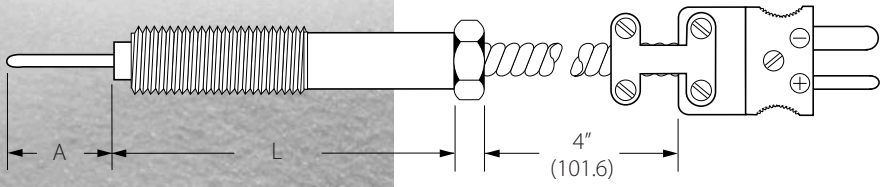
NOTE:
Dimensions in parenthesis are millimeters.
Do not scale drawings.

EXTRUDER T/C, RIGID PLUG EXTENSION (Melt T/C)

ISA calibration is type J.

Dual elements are also available; contact Fast Heat.

A		L	
IN	MM	IN	MM
flush	flush	3	76.2
1/4	6.4	3	76.2
1/2	12.7	3	76.2
3/4	19.1	3	76.2
1	25.4	3	76.2
flush	flush	6	152.4
1/4	6.4	6	152.4
1/2	12.7	6	152.4
3/4	19.1	6	152.4
1	25.4	6	152.4

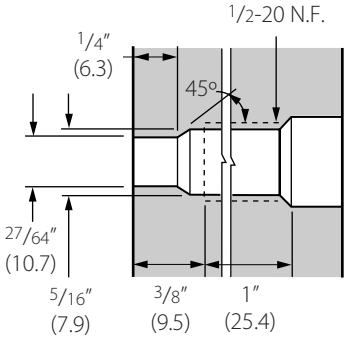


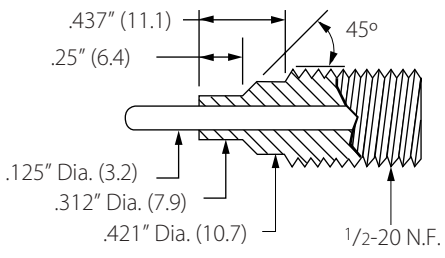
EXTRUDER T/C, FLEXIBLE PLUG EXTENSION (Melt T/C)

Made with 30 ga. fiberglass insulated wire. ISA calibration is type J.

Dual elements are also available; contact Fast Heat.

A		L	
IN	MM	IN	MM
flush	flush	3	76.2
1/4	6.4	3	76.2
1/2	12.7	3	76.2
3/4	19.1	3	76.2
1	25.4	3	76.2
flush	flush	6	152.4
1/4	6.4	6	152.4
1/2	12.7	6	152.4
3/4	19.1	6	152.4
1	25.4	6	152.4





RECOMMENDED MOUNTING DIMENSIONS

NOTE:
Dimensions in parenthesis are millimeters.
Do not scale drawings.

THERMOCOUPLE **ACCESSORIES**

ARMORED EXTENSION WIRE

When necessary, matched thermocouple extension wire makes it easy to extend length of connecting wire without introducing any error of measurement.

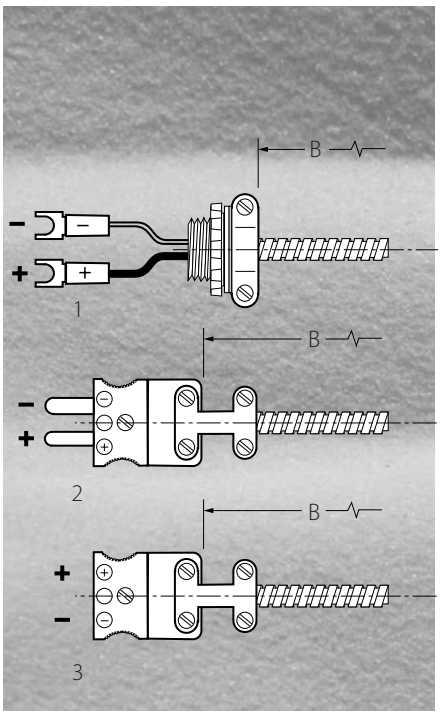
Listed extension wire is stainless steel armor. Other lead wire styles and combinations of terminal styles are available.

Consult Fast Heat for details.

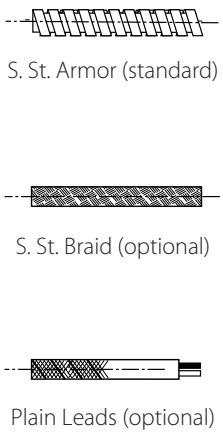
NOTE:
Do not scale drawings.
Extensions are iron-constantan grade.

TERM. STYLE: 1, 2	TERM. STYLE: 2, 3	TERM. STYLE: 1, 3	"B" (IN)	"B" (CM)
◆	◆	◆	12	30
◆	◆	◆	24	61
◆	◆	◆	36	91
◆	◆	◆	48	122
◆	◆	◆	60	152
◆	◆	◆	72	183

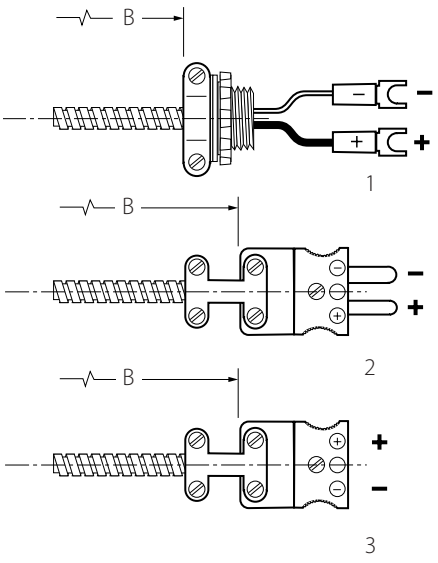
TERMINAL STYLES



LEAD WIRE STYLES



TERMINAL STYLES



THERMOCOUPLE
LEAD WIRE SELECTION GUIDE

LEAD AND EXTENSION WIRE

WIRE CONDUCTOR

The most accurate results are obtained when using the same type of lead wire as in the thermocouple.

The most commonly used insulated solid wire is listed in the table.

Other wire can be furnished upon request.

INSULATIONS PVC/PVC

Polyvinyl is extruded on each bare conductor. A polyvinyl jacket is extruded over the insulated conductors. Offers good resistance to abrasion and moisture absorption. Can be used in temperatures from -20° F to +221° F (-28° C to 105° C).

Used for outdoor and underground installation.

SILICONE IMPREGNATED GLASS BRAID / SILICONE IMPREGNATED GLASS BRAID (GLASS/GLASS)

Each conductor is covered with glass yarn braid, then impregnated with modified silicone resin. A silicone impregnated glass braid is applied overall.

Moisture absorption resistance is retained to 400° F (204° C). Will withstand temperatures to 900° F (482° C).

OVERBRAID OR WRAP

Additional physical protection can be supplied by applying an overbraid.

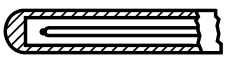
Common materials, used for this metallic shielding is stainless steel overbraid.

JUNCTIONS

UNGROUNDED JUNCTION

Comparatively long response time. Measuring circuit electrically isolated from measured medium.

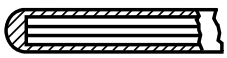
Allows maximum life under conditions of vibration, shock and corrosion.



GROUNDED JUNCTION

Faster response time. Long life in corrosive gas, liquids and solids.

Good for high pressure applications.



THERMOCOUPLE GRADE LEAD WIRE

ISA CALIBRATION	WIRE			INSULATION		NOMINAL SIZE	
	GAGE	DIAMETER	MM	EACH WIRE	OVERALL	IN	MM
K	20	.032	.813	GLASS	GLASS	.057 x .102	1.448 x 2.591
K	24	.020	.508	GLASS	GLASS	.045 x .078	1.143 x 1.981
J	20	.032	.813	GLASS	GLASS	.057 x .102	1.448 x 2.591
J	24	.020	.508	GLASS	GLASS	.045 x .078	1.143 x 1.981

EXTENSION GRADE T/C WIRE

ISA CALIBRATION	WIRE			INSULATION		NOMINAL SIZE	
	GAGE	DIAMETER	MM	EACH WIRE	OVERALL	IN	MM
KX	14	.064	1.623	PVC	PVC	.136 x .236	3.454 x 5.994
KX	16	.051	1.300	PVC	PVC	.123 x .210	3.124 x 5.334
KX	20	.032	.813	PVC	PVC	.100 x .165	2.540 x 4.191
JX	14	.064	1.623	PVC	PVC	.136 x .236	3.454 x 5.994
JX	16	.051	1.300	PVC	PVC	.123 x .210	3.124 x 5.334
JX	20	.032	.813	PVC	PVC	.100 x .165	2.540 x 4.191

BASIC TROUBLESHOOTING OF THERMOCOUPLE CIRCUITS

1. Check polarity of connections (+) to (+) and (-) to (-). The colors for type "J" are white (+) and red (-). Type "K", yellow (+) and red (-).

2. Check for continuity from (+) to (-) wires.

3. To check a Type "J" grounded thermocouple junction, only measure the ohms between junction tip and one lead. Measure the ohms between the junction and the other lead. If the thermocouple is good, the ohm ratio should be between 3 to 5.

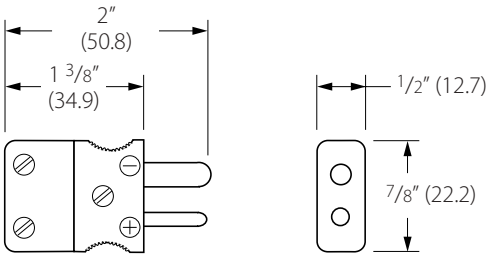
4. A dry heat source can be applied to the junction, and if a rise in temperature is noted on a millivolt meter, the junction can be considered operable.

5. When a dry heat source is applied along the thermocouple length and a rise in temperature is observed, a false junction can be suspect at that point.

THERMOCOUPLE ACCESSORIES

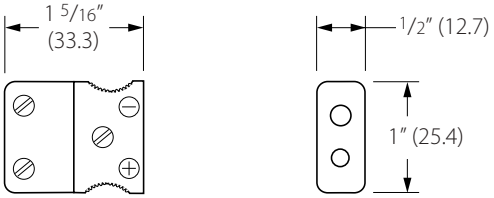
THERMOCOUPLE PLUG

TYPE/COLOR
Iron-Constantan (J) / Black Chromel-Alumel (K) / Yellow



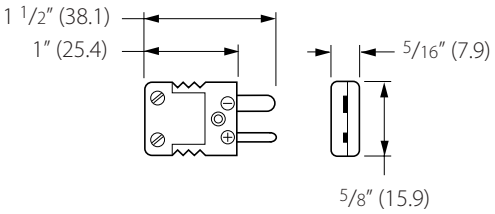
THERMOCOUPLE JACK

TYPE/COLOR
Iron-Constantan (J) / Black Chromel-Alumel (K) / Yellow



MINIATURE THERMOCOUPLE PLUG

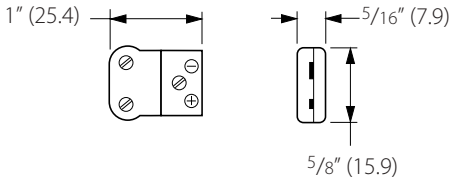
TYPE/COLOR
Iron-Constantan (J) / Black Chromel-Alumel (K) / Yellow



MINIATURE THERMOCOUPLE JACK

Mini Jacks listed are for non-panel mount versions.

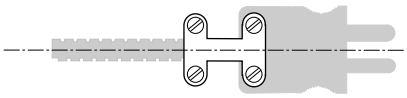
TYPE/COLOR
Iron-Constantan (J) / Black Chromel-Alumel (K) / Yellow



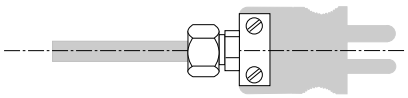
NOTE:
Dimensions in parenthesis are millimeters.
Do not scale drawings.

BRACKET, ADAPTER & CLAMP

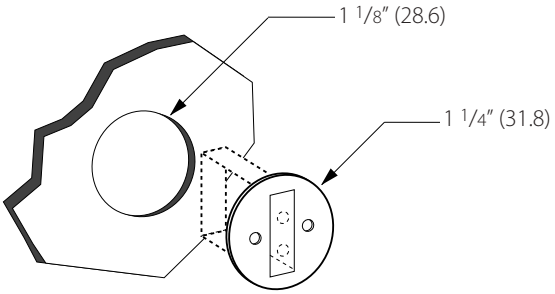
ITEM
Tube adapter 1/16" & 1/8" dia.
Tube adapter 3/16" dia.
Tube adapter 1/4" dia.
Cable clamp
Panel mounting bracket



Cable Clamp



Tubing Adapter



Mounting Bracket

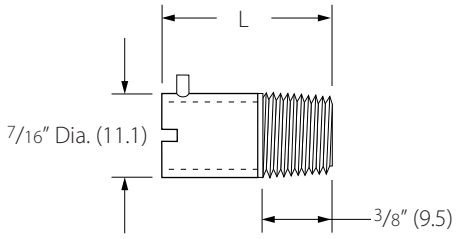
ADAPTERS FOR BAYONET T/C'S

Threaded type adapters for bayonet type thermocouples.

Material is plated steel.

Other lengths are available on special order; contact Fast Heat.

L		
IN	MM	THREAD
7/8	22.2	1/8-27NPT
7/8	22.2	3/8-24
1 3/8	34.9	1/8-27NPT
1 3/8	34.9	3/8-24
2 1/2	63.5	1/8-27NPT
2 1/2	63.5	3/8-24



NOTE: Calibration is ISA standard grade type 'J' iron-constantan. Type 'K' thermocouples can be furnished on request. Construction is stainless steel 3/16" rigid and tubing. Wire is 20 gage insulated with fiberglass. Order adapters as separate line item.

NOTE:
Dimensions in parenthesis are millimeters.
Do not scale drawings.

HOW TO ORDER:

1. On non-standard items: specify "A" length & "B" length.
2. Dual element thermocouples can be made on special order.

NOTES:

1. Brass compression fitting is furnished with each thermocouple. Thermocouples of 1/8" dia. consult Fast Heat.
2. Thermocouple does not include bayonet adapter; order as a separate line item.

RTD SENSORS

RTD'S FOR ACCURATE, LINEAR & STABLE SYSTEMS

Fast Heat's proven reliability in the manufacture of RTD's is evident in the many applications in which they're being used. An infinite variety of combinations can be designed to suit all your temperature sensing applications.

SPECIFICATIONS

The Resistance Temperature Detector (RTD) is built on the principle that most metals have a positive change in electrical resistance with a change in temperature. Platinum is widely used for RTD construction, since it can withstand high temperatures while maintaining excellent stability. As a noble metal, it shows limited susceptibility to contamination. Typically, fine platinum wire is wound on a glass or ceramic bobbin and then insulated with glass or ceramic.

A newer construction technique involves a platinum or metal-glass slurry film which is deposited or screened on a small flat ceramic layer, etched and sealed.

This RTD film cuts assembly time and increases resistance. This technology reduces the size of the device and translates into a quicker response in temperature fluctuations.

An infinite variety of combinations can be designed to suit all temperature sensing applications.

All popular RTD probes are available. These include Adjustable Bayonet and Compression Fitting.

RTD wires, at the bulb and beyond, are protected by a rigid stainless steel tubing. This protection tube is generally 3/16" (4.8 mm) in diameter. However, it can be supplied in either 1/4" or 3/8" (6.4 or 9.5 mm) diameter.

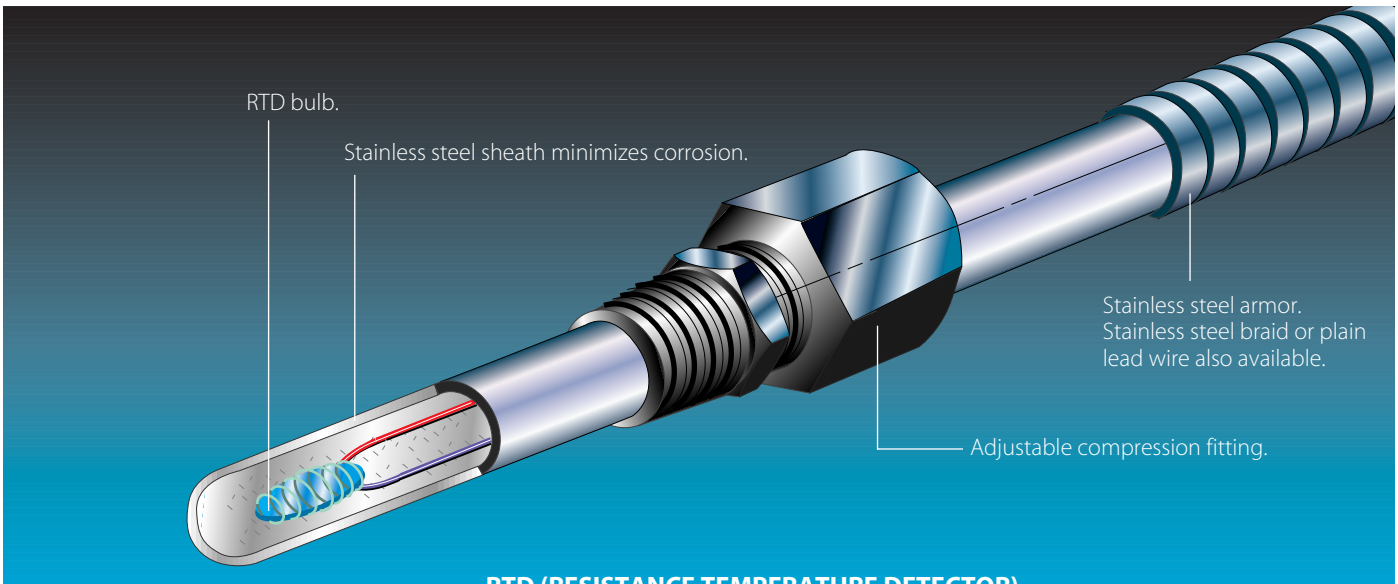
RTD flexible lead wire coming out of this protection tube can be further protected against abrasion by either stainless steel braid, stainless steel flexible armor or fiberglass sleeving. Rigid stainless steel protection tube can be provided using the proper mounting hardware.

WHAT IS AN RTD?

RTD stands for Resistance Temperature Detector. The more common construction of this device has been to use a wire wound sensor which will exhibit an increase in resistance as there is an increase in temperature.

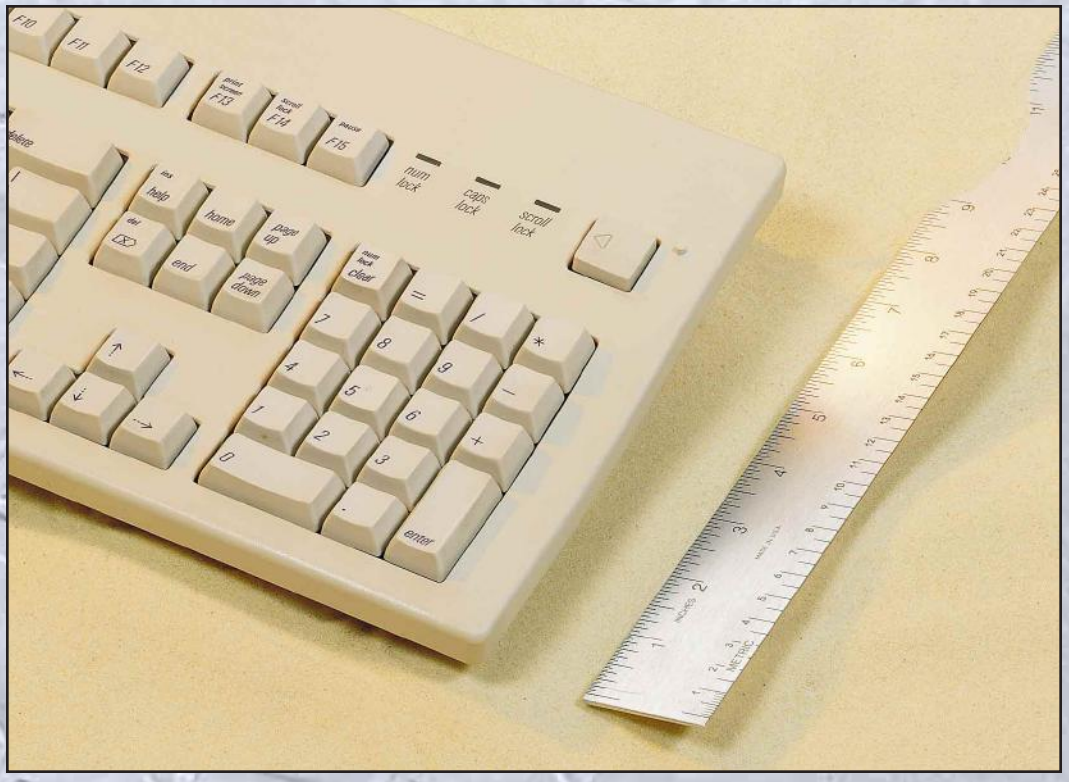
Other constructed systems of this device have given way to using different materials and smaller packages, resulting in greater sensitivity.

It should be noted that unlike the thermocouple that generates its own power, the RTD requires instrumentation circuits that have a current passing through them.



RTD (RESISTANCE TEMPERATURE DETECTOR)

REFERENCE GUIDE



fast heat®

REFERENCE GUIDE

WATT DENSITY TABLE

MATERIAL	MAXIMUM OPERATING TEMPERATURE	MAXIMUM WATTS PER SQUARE INCH
Acid Solutions	180	40
Alkaline Solutions and Oakite	212	40
Ammonia Plating Solutions	50	25
Aroclor	600	20
Asphalt, Tar or Heavy Compounds	200	10 circ. 5 non circ.
	300	8 circ. 4 non circ.
	400	7 circ. 4 non circ.
	500	6 circ. 3 non circ.
Bunker "C" Fuel Oil	160	10-15 fast circ. 4-7 non circ.
Caustic Soda 2 %	210	45
Caustic Soda 10 %	210	25 and down
Caustic Soda 75 %	180	25 and down
Citrus Juices	185	20
Degreasing Solution Vapor	275	20
Dowtherm A		
Liquid Phase	750	18 and down
Vapor Phase	750	12 and down
Dowtherm E	400	12
Electro Plating Solutions	180	40
Ethylene Glycol	300	30
Fatty Acids	150	20
Freon	300	3
Fuel Oil/Preheating		
Light Grade	180+	25-30 circulating
Heavy (see bunker c)		
Gasoline	300	2-5
Glycerine	50	40
Heat Transfer Oil	500	20
	600	15
Lead Stereotype Pot	600	35 on casting
Linseed Oil	150	50
		20-25 circ.
Machine Oil SAE 30	250	15-20 non circ.
Metal Melting Pot	500-900	20-27
Mineral Oil	200	20
	400	16
Molasses	100	4-5
Molten Salt Bath	800-900	25-30
Molten Tin	600	20
Oakite (see alkaline solutions)		
Oil Draw Bath	600	20
	400	24
Oils (see type of oil)	SOLID	4
Paraffin or Wax	150	16
Percholr-Ethylene	200	20
Potassium Hydroxide	160	25
Propylene Glycol	150	20
Sodium, Cyanide	140	40
Sodium, Hydride	720	28
Steel Tubing Cast into Aluminum	500-750	50
Steel Tubing Cast into Iron	750-1000	55
Socony Vacuum Type		
Transfer Oil	600	20
Sulphur, Molten	600	10
Therminols and	500	20
Heat Transfer Oils	600	20
	650	15
Trichlorethylene	150	20
Vapor Degreasing Solution	275	20
Vegetable Oil and		30-40 circ.
Shortening in Liquid	400	15-25 non circ.
State Below 100° F (37.7° C)		5
		100-125 circ.
Water (process)	35-150	75-100 non circ.
	212	75 circ.
		50 non circ.
	300	low flow vol. 10
		high flow vol. 25-30
Steam	500	low flow 5-10
		high flow 20-25
	700	low flow 5
		high flow 15-20

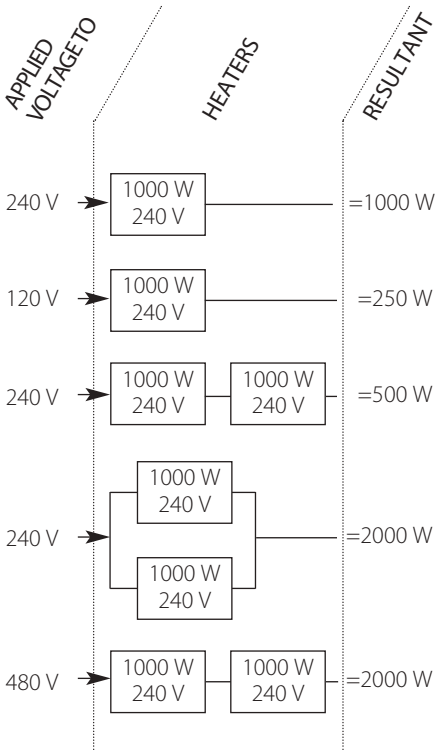
NOTE: Watt densities will vary with flow rates, densities and temperature. Apply these values with caution in some applications.

CONVERSION FACTORS

1 cu. ft. = 1728 cu. in. = 7.48 gal.
1 gallon = 231 cu. in. = .1337 cu. ft.
1 gallon of water = 8.3 lbs. = 3.785 kg.
1 cubic ft. of water = 62.5 lbs.
1 kilowatt hour = 3412 BTU per hour
1 kw/hr. will raise 22.8 lb. of water from 62˚F to 212˚F
1 BTU/lb = 1.8 cal/gram
1 lb. = .453 kg.
1 gal. = 3.785 liters
1 inch = 25.4 mm
1 in^2 = 6.45 cm^2
1 in^3 = 16.39 cm^3
°F = 9/5°C + 32
°C = 5/9 (°F – 32)

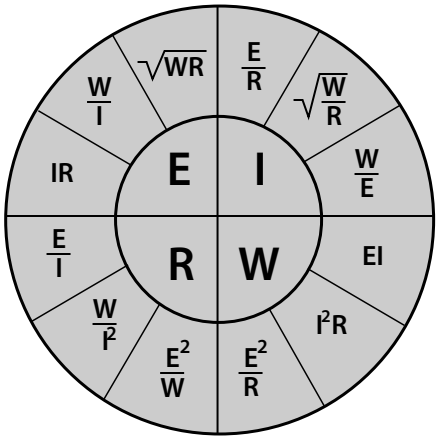
GENERAL CIRCUITS

Sketches illustrate how different voltages affect the resultant wattage when applied to single, series or parallel connected heaters .



OHM'S LAW

E = VOLTS I = AMPS R = OHMS W = WATTS



STD. WEIGHTS & DIMENSIONS OF WELDED WROUGHT-IRON PIPE

NOM. SIZE O.D." (MM)	WALL THICKNESS" (MM)	WT./FT. PLAIN ENDS, LBS.	ID SCHEDULE NO.
1/8"	.069" (1.75)	.24	40
.405" (10.28)	.096 (2.43)	.31	80
1/4	.090 (2.28)	.42	40
.540 (13.71)	.122 (3.09)	.54	80
3/8	.093 (2.36)	.57	40
.627 (15.92)	.129 (3.27)	.74	80
1/2	.111 (2.81)	.85	40
.840 (21.33)	.151 (3.83)	1.09	80
3/4	.115 (2.92)	1.13	40
1.050 (26.67)	.157 (3.98)	1.47	80
1	.136 (3.45)	1.68	40
1.315 (33.40)	.183 (4.64)	2.17	80
	.369 (9.37)	3.66	...
1 1/4	.143 (3.63)	2.27	40
1.660 (42.16)	.195 (4.95)	3.00	80
1 1/2	.148 (3.75)	2.72	40
1.900 (48.26)	.204 (5.18)	3.63	80
2	.158 (4.01)	3.65	40
2.375 (60.32)	.223 (5.66)	5.02	80
2 1/2	.208 (5.28)	5.79	40
2.875 (73.02)	.223 (5.66)	5.02	80
3	.221 (5.61)	7.58	40
3.500 (88.9)	.306 (7.77)	10.25	80

UL®/CSA® LISTING

Fast Heat heating elements are recognized under the component program of Underwriter's Laboratories, Inc. file no. E80914 and are also certified by the Canadian Standards Association file no. LR53641-2. The accompaning chart is for reference only. The maximum watts per square inch shown is for standard configurated heaters.

Higher watt densities and voltages are available. Contact Fast Heat.

***Please specify when ordering if U.L. and/or C.S.A. approval is required.**

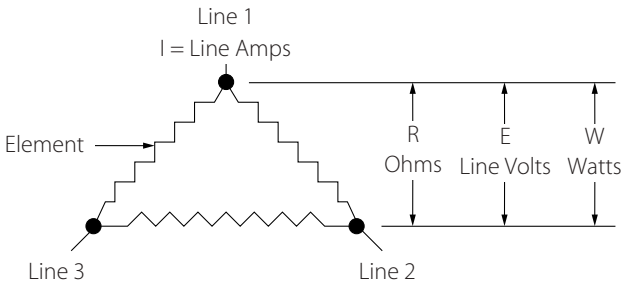
HEATER TYPE	MAX. WATTS/IN^2	MAX VOLTAGE	UL	CSA	COMMENTS
Standard Cartridge	40	240	YES	YES	
Hi-Temp Cartridge	UL - 100 / CSA - 200	240	YES	YES	
Square Cartridge Std.	35	240	YES	YES	
Ceramic Strip	35	480	YES	YES	
Mica Strip	40	480	YES	YES	
Better Strip	100	240	YES	YES	
Finned Strip	30/Side	480	YES	YES	
Mica Band	40	480	YES	YES	
Better Band	100	240	YES	YES	
Knuckle Band	40	240	NO	NO	
Ultima Strip	40	240	YES	NO	NOTE 1
Permaheat	35	240	NO	NO	NOTE 2
Tubular	40	240	YES	NO	NOTE 3

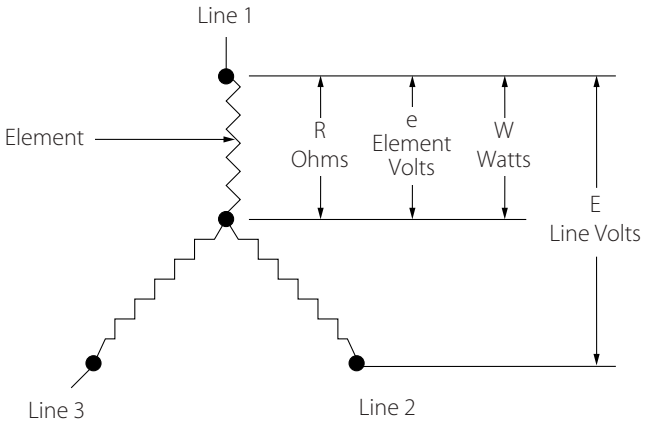
NOTE 1 - UL recognized where leads exit heater from end on thickness.

NOTE 2 - Only tubular heater is UL recognized.

NOTE 3 - Applies to .315" and .430" diameter tubulars.

ELECTRICAL DATA FOR 3 PHASE WIRING





The following table will help on the computation of actual operating wattage.

APPLIED VOLTAGE	RATED VOLTAGE	TO OBTAIN OPERATING WATTAGE MULTIPLY RATED WATTAGE BY
110	115	.92
110	120	.82
115	110	1.09
115	120	.92
120	110	1.19
120	115	1.09
220	230	.92
220	240	.84
230	220	1.09
230	240	.92
240	220	1.19
240	230	1.09
440	480	.84
480	440	1.19

DELTA CONNECTION

When elements are designed for 3 phase delta connection, wattage output may be reduced to 1/3 by rewiring to 3 phase WYE.

Element Volts = e = Line Volts (E)

Element Watts = W = Total Watts ÷ 3

Hot Resistance of Elements = R (OHMS) = E x E ÷ W

Element Current = W ÷ E = i

WYE OR STAR CONNECTION

e = element volts = Line Volts (E) ÷ 1.73

Hot Resistance of Element = R (OHMS) = e x e ÷ W

W = element watts = Total Watts ÷ 3

i = element current = W ÷ e = I = line current

WATTAGE OUTPUT AT OTHER VOLTAGES

When heaters are used at voltages other than the rated voltage, the actual power can be calculated as follows:

$$\text{Actual wattage} = \text{Rated wattage} \times \frac{(\text{Actual voltage})^2}{(\text{Rated voltage})^2}$$

For instance, if a heater is rated 1000 W at 220 volts but the actual operating voltage is 240 V, the actual wattage of the heater will be

$$\text{Actual wattage} = 1000 \times \frac{(240)^2}{(220)^2} = 1190 \text{ W}$$

Care must be taken that the actual power does not exceed the rated current-carrying capacity of the lead wires and of the resistance wire.

TERMS & **CONDITIONS OF SALES**

All orders are accepted in accordance with the terms and conditions herein specified, unless otherwise noted by purchaser within 5 working days of date of receipt.

The Seller is not bound by and hereby rejects the terms or conditions submitted by Buyer on the Buyer's acceptance forms or orders, and the Buyer's failure to reject in writing within ten (10) days of receipt hereof of the Buyer's acceptance of any portion of the products covered by the Buyer's order shall be deemed in acceptance of the terms herein. All contracts or orders are subject to acceptance and approval by the Seller at its main office in Elmhurst, Illinois, and no waiver or alteration of any terms herein provided shall be binding unless in writing, signed by an executive officer of the Seller.

Unless specifically set forth on the face hereof, prices will be those in effect on delivery dates. Verbal quotations are subject to daily changes and expire the same day they are made. Written quotations expire in ten (10) days unless otherwise advised in writing and are subject to termination by written notice within that time.

Following acceptance by Fast Heat, orders are not subject to cancellation or modification, except upon written approval by Fast Heat and shall be subject to cancellation charges as determined by Fast Heat.

Any sales taxes or other fees and charges which the Seller may be required to pay, under any existing law, shall be for the account of the Buyer, who shall promptly pay the amount taxed to the Seller upon demand. The Buyer, however, reserves the right to issue in lieu of payment of such taxes, tax exemption certificates in form and acceptable to the appropriate taxing authorities.

In case the Buyer shall fail to make payments in accordance with the Seller's terms, or if in the judgment of the Seller the financial condition of the Buyer at any time does not justify continuance of production or shipment on the terms of payment specified, the Seller may require full or partial payment in advance, defer further shipments until payment is made, or cancel the order for the unshipped balance. Further, in such circumstances, Seller shall have the right, at Buyer's expense, to recall goods in transit, retake same and repossess all goods which may be stored with Seller for Buyer's account, without the necessity of taking any other required proceedings or after such proceeding as may be required by law. Buyer acknowledges that all the merchandise so recalled, retaken or repossessed shall be the property of the Seller. In the event of Buyer's default, Buyer shall pay all the cost of collection, including without limitation attorney's fees. If one or more shipments are delayed by the Buyer or at the request of the Buyer, payment shall become due from the date when the Seller is prepared to make shipment. If the manufacturer is delayed by the Buyer or at the request of the Buyer, payment shall be made based on the contract price and the percentage of completion. Any goods or apparatus held from the Buyer or at the request of the Buyer shall be at the risk and expense of the Buyer.

Except as otherwise provided on the face hereof, all prices are F.O.B. Seller's place of business. All shipments shall be insured by the Buyer at the Buyer's risk. Method and route of shipment will be at the discretion of the Seller, unless Buyer specifies same. Seller reserves the right to make delivery in installments and all such installments when separately invoiced shall be paid for when due per invoice, without regard to the dates of subsequent deliveries. All goods accepted shall be paid for regardless of any claim relating to other delivered or undelivered goods.

Seller shall attempt to meet any shipment or delivery date specified, but in no event shall Seller be responsible for or liable for failure to ship or deliver by such date. Seller shall not be liable to Buyer or any third party for indirect or consequential damages due to delays in shipment or delivery of goods.

The products covered by this Order shall be deemed finally inspected and accepted within ten (10) days after receipt of product unless notice of claim is given in writing to the Seller within that period. The Seller's liability shall not exceed the replacement value of the products actually defective.

All E&S goods manufactured by Fast Heat are guaranteed to be free of defects in material and workmanship for a period of one year after receipt of such E&S goods by Buyer. There is no implied warranty of merchantability and no other warranty, expressed or implied, except such as is expressly set forth herein. Seller will not be liable for any general, consequential,

(continued)

TERMS & **CONDITIONS OF SALES**

or incidental damages, including without limitation any damages from loss of profits from any breach of warranty or for negligence. Seller's liability and Buyer's exclusive remedy being expressly limited to the repair of defective goods, or the shipment of equivalent goods F.O.B. the shipping point indicated on face hereof or the repayment of the purchase price upon return of goods or the granting of a reasonable allowance on account of any defects, as Seller may elect. Any claim on account of defective goods or for any other cause whatsoever will conclusively be deemed waived by Buyer unless written notice is given to the Seller within the warranty period. Seller will be given reasonable opportunity to investigate all claims. Warranties granted or liabilities assumed hereunder will not apply to goods that have been damaged in transit, altered, repaired or misused by Buyer. The selection, application and proper installation of heater and controls are the purchaser's sole
responsibility. There is no warranty against damages resulting from corrosion, misapplication, improper specification or other operation conditions beyond our control. Further, there is no warranty against product failure due to improper installation or contamination.

Prior to returning any goods, Buyer shall obtain written authorization by submitting to Seller a written request for authorization and a statement of its claim including full particulars in support thereof. All costs of returned goods must be prepaid by Buyer. Seller may refuse goods shipped collect and reserves the right to charge back and set off all transportation costs. Returned goods found by Fast Heat to meet its warranty requirements may be subject to reasonable service charges for examination and testing. All transportation charges for the reshipment of returned goods (whether or not repaired) to the Buyer and for the shipment of replacement goods, if any, shall be the responsibility of Buyer. Risk of loss for all goods returned to Seller shall at all times be upon Buyer, and if any replacement goods are shipped, then the loss of such goods shall be upon Buyer during shipment. Under no circumstances may goods be returned to Seller without the Seller's prior written consent.

This counteroffer upon acceptance by Buyer can be cancelled, suspended or modified only with Seller's written consent and upon terms that will indemnify Seller against loss arising from cancellation, suspension or modification. Any cancellation by Buyer shall be subject to cancellation charges based on special materials purchased for order, parts in process, special tools, special handling or other special expense, pertinent to the order.

All rights of and remedies available to Seller hereunder shall be cumulative and in addition to all rights and remedies available to Seller under all applicable laws including without limitation the Uniform Commercial Code in effect in Illinois. No waiver of any right or remedy available to Seller in any instance shall constitute a waiver of any right or remedy subsequently.

When industrial heaters and heating devices are manufactured to order, it is necessary to allow for manufacturing yields. Production quantities may vary. Shortages or overshipments will be limited to 1 unit on orders of 6-19 units, 2 units on orders of 20-66 units and 3% on orders over 66 units.

This instrument and performance hereunder shall be governed by the laws of the State of Illinois, and this instrument shall be considered a contract made in Illinois. Buyer agrees that it may bring suit against Seller only in said state and for purposes of suit against Seller, submits itself to the jurisdiction of that state.

Note: Terms and conditions of sales for Fast Heat offices or agents outside of the United States may differ from above.