

BAND HEATERS

component parts



WATTCO™

OVERVIEW

WATTCO™ band heaters are the ideal solution for high watt densities and high operating temperature applications, especially for the plastics industry. The various types of band heaters available at WATTCO™ include mica insulated band heaters and ceramic band heaters.

FEATURES

KEY FEATURES

• **MICA BAND HEATERS**

- o Top quality mica of various thicknesses
- o Maximum sheath temperature: 900°F
- o External metallic sheath includes a special alloy
- o Broad range of construction designs, clamping mechanisms, and electrical terminal types

BENEFITS

• **MICA BAND HEATERS**

- o Energy efficient
- o Economical
- o Reliable
- o Versatile
- o Top quality mica and resistance wire
- o Uniform heat distribution



CLAMPING MECHANISMS

Select among the following clamping mechanisms, based on the requirements of your application.

Each clamping mechanism has its own features and benefits that will improve the service life of your mica band heater and directly affects the quality of the heat transfer.

See page 8.2 for details.

APPLICATIONS

• **MICA BAND HEATERS**

- o Injection molding
- o Blow-molding
- o Plastic extrusion
- o Container, pipe, or tank heating
- o Pharmaceutical applications
- o Applications in the food industry

SELECTING

WATTCO™ MICA BAND HEATER

The following sections will help you select the WATTCO™ mica band heater that meets the requirements of your application. Please call us at 1-800-4WATTCO (1-800-492-8826) if you need further assistance.



UNDERSTANDING

WATT DENSITY

The following information will help you understand watt density in order to select the proper wattage for your application.

- Wattage will affect the durability and performance of your heater. To prevent heater failure, do not exceed the maximum recommended watt density for a specific heater size.

$$\text{Watt density (W/in}^2\text{)} = \frac{\text{WATTAGE}}{(3.14 \times \text{Inner Diameter} \times \text{Width}) - (\text{Cold Section})}$$

MODEL	COLD SECTION
ONE-PIECE	1" x WIDTH
TWO-PIECE	2" x WIDTH
HOLES AND CUTOUTS	(SIZE + 1/2") x WIDTH

CLAMPING MECHANISM	FEATURES
<p>INDEPENDENT STRAP</p> 	<p>Straps are tightly clamped around the cylinder's surface and distribute the drawing force uniformly around the band heater. This force is transferred to the inside windings and improves heat transfer by providing effective surface contact and eliminating air gaps.</p>
<p>BUILT-IN BARREL NUTS</p> 	<p>Same features as the independent strap. The top sheet is made into a strap by placing barrel nut fasteners on either side of the gap. Barrel nuts are used for holes and cutouts, as an alternative to independent straps.</p>
<p>SPOT-WELDED STRAPS</p> 	<p>Design is similar to that of the built-in barrel nut. Made of an independent strap fastener that is spot welded to the top sheet on each side of the gap. This type of clamping mechanism is used to accommodate a heated section below the fastener.</p>
<p>FLANGE LOCK-UP</p> 	<p>The most economical clamping mechanism. Designed for narrow heaters.</p>
<p>WEDGE LOCK</p> 	<p>Basic design for limited space above the heater. Composed of clamp slides (wedge shape) on the lips of the heater on either side of the gap. Standard height between the inner diameter and the highest point of the wedge lock is 5/16"</p>
<p>LATCH AND TRUNION</p> 	<p>Suitable for quick detachment. The clamp releases with a flip of thumb. In the fastened position, the spring-loaded 1/4-20 bolt absorbs the thermal expansion.</p>
<p>HINGES</p> 	<p>Designed for a two-section heater band. A piano hinge is required on one side of the heater. Any other type of clamp can be used on the other side. Clearance between the 2 sections of the hinge's side is 5/16"</p>
<p>SPRING-LOADED BARREL NUTS</p> 	<p>Made of independent straps, built-in barrel nuts, and spot-welded straps with longer screws with die springs. Springs tightly affix the band heater for thermal expansion. 1/4-20 screws included.</p>
<p>CLAMPING PADS</p> 	<p>Designed for two-section partial heaters. If a complete band heater cannot be used due to an obstruction, a large gap must be created in order to fasten the heater to the cylinder on either side of the gap. Do not use clamping pads on both sides of the same section of the heater. Thermal expansion may cause the heater to detach from the cylinder.</p>

NEED ASSISTANCE? Please call us at 1-800-4WATTCO (1-800-492-8826) if you need further assistance.

ELECTRICAL TERMINATIONS

Select among the following electrical terminations based on the requirements of your application. Each termination has its own features, benefits, and limitations. Please consider the following factors when selecting your termination type:

- Diameter
- Width
- Voltage
- Amperage
- Operating temperature
- Electrical safety
- Cost

TERMINATION CATEGORIES

- Screw terminals
 - o Features:
 - Stainless steel screw terminals
 - Convenient
 - Economical
 - Recommended for high amperages of a maximum of 30 amps
 - Maximum temperature: 840°F
- Styles:



Ceramic protective cover

Note:

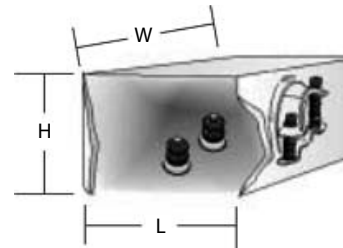
- Ceramic terminal covers are an economical solution to prevent electrical shocks and shorts.
- Standard screw size: No. 10-32.
- No. 8-32 screws are provided for specific applications.

PROTECTIVE TERMINAL BOX

Notes: Terminal boxes prevent electrical shocks and short by enclosing the terminals in a sturdy stainless steel box. Below is a size chart of the various types of terminal boxes. Specific boxes are used for three-phase and dual voltage application requirements.



Terminal box



	W	L	H
G1	1 5/8"	2"	1 5/8"
G2	2"	2 1/4"	1 3/4"

TERMINATION CATEGORIES CONT'D

- Lead wire terminals
 - o Features:
 - Internally connected high temperature wire.
 - Safer electrical connection.
 - Maximum amperage: 20 amps.
- Styles:

Armor cable

- Protects against abrasion for non-flexible elements.
- Straight lead exit / 90° bend.
- Brass fittings for secured termination.



Armor cable



TERMINATION CATEGORIES CONT'D



Used mostly with nozzle heaters



Straight lead exit

Stainless steel braid

- For applications with regular movements or with a risk of abrasion.
- Includes heat shrink sleeving at leads' end to protect the braid from fraying.



Low profile terminal cover



180° from gap



Exiting on both sides of the gap



Straight lead exit

Plain lead wire

- For applications without risk of abrasion or contamination.
- Standard temperature wire with fiberglass insulation: 840°F.
- Teflon insulated wire available.



Used mostly with nozzle heaters



180° from gap

NEED ASSISTANCE? Please call us at 1-800-4WATTCO (1-800-492-8826) if you need further assistance.

CONSTRUCTION MODELS

When selecting the construction model of a WATTCO™ mica band heater, please consider the following factors:

- Maximum performance
- Ease of installation

The most popular construction models are:

- One piece
 - o For a heater installed on a barrel without extensive expansion
 - o Diameter: 5/8" to 22"
 - o Width: 5/8" to 14"



- Two or more pieces
 - o Easy to install
 - o Convenient for large barrels
 - o Diameter: 2" to 44"
 - o Width: 5/8" to 14"

**HOW****TO INSTALL:**

- Clean the cylinder properly.
- Firmly tighten the heater on the cylinder.
- Gently tap the rims with a plastic mallet.
- Tighten the heater again.
- Compensate for thermal expansion by using large diameter heaters with spring-loaded fasteners.
- Slightly open the one-piece model heater and slide it to the cylinder.
- Use a two-piece or a flexible model when completely opening the heater.

**FACTORS****TO CONSIDER WHEN SELECTING WATT DENSITY**

- Select narrower heaters for superior heat transfer (1" – 2.5" wide).
- Select watt density according to the operating temperature.
- Select the corresponding wattage for your application in order to prevent short cycling and inefficient operation.
- Consider the safe heating pattern of the heated material, the thermal conductivity, and coefficient of expansion of the cylinder when determining puissance.

NEED ASSISTANCE?

Please call us at 1-800-4WATTCO (1-800-492-8826) if you need further assistance.

OVERVIEW

Durable, WATTCO™ ceramic heaters provide excellent energy efficiency with their built-in ceramic fiber jackets. Unlike mica band heaters, ceramic heaters transfer heat through conduction and radiation and do not require tightening around the cylinder.

Flexible, these heaters come in a wide variety of terminal styles, and with different clamping mechanisms, holes and cutouts.

KEY FEATURES

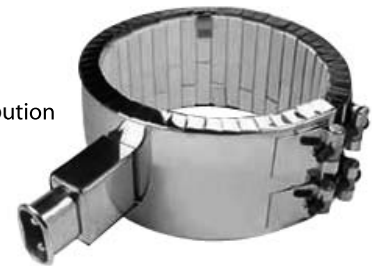
- Nickel-chrome wire in a outer wall composed of interlocking ceramic tiles.
- Inside medium-high temperature heaters up to 1200°F
- Outside shell temperature: 350° - 450°F
- Built-in ceramic fibre insulating mat.
- Stainless steel jacket.
- Minimum diameter: 2"
- Minimum width: 1"
- Thickness with ¼" insulation: 5/8"
- Regular gap: 3/8"
- Maximum watt density: 45 w/in²
- Broad range of terminal types and thicknesses of ceramic fiber insulation mats.

BENEFITS

- Energy efficient
- Energy saver
- Highly flexible
- Durable
- Maintains heat
- Provides uniform heat distribution
- CSA and CE certified

APPLICATIONS

- Injection molding
- Blow-molding
- Plastic extrusion
- Container, pipe, or tank heating
- Process applications



SELECTING WATTCO™ CERAMIC BAND HEATER

The following sections will help you select the WATTCO™ ceramic band heater that meets the requirements of your application. Please call us at 1-800-4WATTCO (1-800-492-8826) if you need further assistance.

ELECTRICAL TERMINATIONS

Select among the following electrical terminations based on the requirements of your application. Each termination has its own features, benefits, and limitations.

- A - Post terminals
 - The most popular termination style
 - For high amperage applications
- B - Terminal box
 - Protects screw terminals against damage and exposure
- C - Stainless steel braided leads
 - Flexible
 - Protects lead wires from abrasion



- D - Armor cable
 - Protects against abrasion and contamination
- E - European connector
 - For easy removal of power leads
 - Convenient electrical connections to replace a failed heater.
- F - European connector
 - For limited clearance above the heater



SELECTION GUIDELINES

- Current amperage limitation for direct lead wire exit: 10 amps.
- For applications with higher amperage: couple lead wires and the terminal box.
- European plugs are suitable for 16 amps applications.
- For an internal winding balance, install terminals at 180° according to the gap.
- Add ceramic covers to protect exposed terminals.