



Energy Saving Ceramic Band Heaters

PHP Ceramic Band heaters are available with or without outer heat saving insulation covers in various sheathing materials, viz., Chrome Nickel Steel, MS (galvanised), depending upon applications which provides the best combination of physical strength, high emissivity & good thermal conductivity to heat cylindrical parts, good for sheath temperature upto 500°C.

Features

- Engineered for Uniform Temperature & Maximum Amperage carrying capacity
- Available in Chrome Nickel Steel and MS (galvanised) Sheathing with Power Saving Options
- Robust Terminal Junction with Specially Designed Protection Cap
- Special high grade Steatite Insulators for Superior Thermal Conductivity
- Available in Various Lead Terminations & Clamping expandable to fit around the barrel OD.
- Conserves Energy with Improved Heating Efficiency upto 55 Watts per square inch
- Designed for Higher Temperature up to 500°C
- Efficient Heat Transfer even on irregular surfaces in comparison to Mica Band
- Reduces Down time for replacements
- Power saving up to 30% (subject to working conditions)

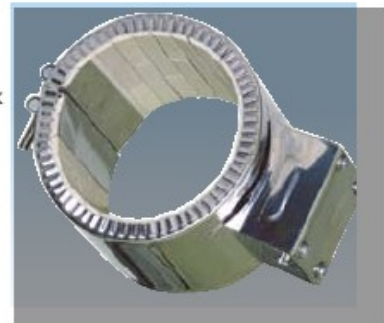
Applications

- Injection Moulding
- Film Extruders
- Blow Moulding
- Plastic & Rubber Processing Machinery
- Laboratory Equipment

3 Construction Styles To Choose From

1 PREMIUM-HEAT CONSTRUCTION

- Suggested Watt Density 35 to 40 watts/sq. in
- Chrome Nickel Steel Sheathing with 4mm thick Heat saving Thermal insulation.
- Single Piece Construction.
- 500 mm long Insulated Metal Braided Flexible Leads.
- Allen Key Barrel Nut clamping with Terminal Protection Box.
- Total wall thickness 12mm
- Min Requirement: I.D. 60mm width 35mm



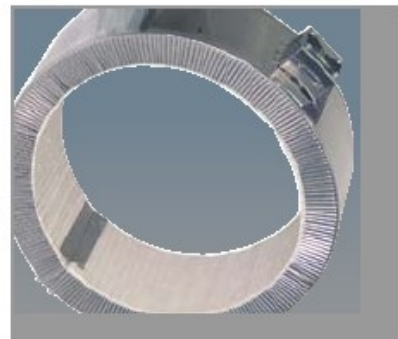
2 POWER SAVER CONSTRUCTION

- Suggested Watt Density 40 to 45 watts/sq in.
- Chrome Nickel Steel Sheathed with 16mm thick Twin Insulated Cover
- Single Piece Construction
- 500 mm long insulated Metal Braided Flexible Leads
- Allen Key Barrel Nut clamping with Terminal Protection Box
- Total Wall thickness : 25 mm (approx.)
- Min requirement : Dia 75mm, Width 75mm



3 POWER SAVER PLUS CONSTRUCTION

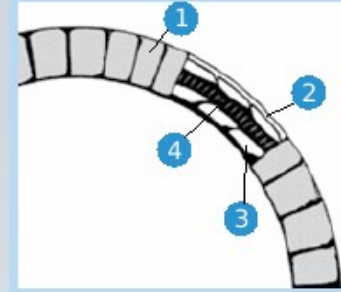
- Suggested Watt Density 50 to 55 watts/sq in.
- Chrome Nickel Steel Sheathed with Heat Optimizing Insulated Cover
- Single Piece Construction
- 500 mm long insulated Metal Braided Flexible Leads
- Allen Key Barrel Nut clamping with Terminal Protection Box
- Total Wall thickness : 45mm (approx.)
- Min requirement : I.D.-100mm, Width-100mm



Standard Features for Construction Styles

STANDARD FEATURES FOR PREMIUM HEAT CONSTRUCTION

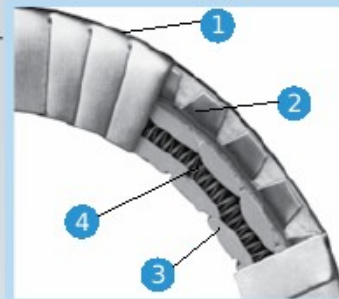
1. Chrome Nickel Steel sheathing.
Chrome Nickel Steel housing with serrated edges provides maximum flexibility for ease of installation.
2. Thermal insulation
Built-In heat saving Thermal Insulation standard (4mm) on all Ceramic Bands - "Premium Heat" will reduce power consumption. Further reduction can be obtained with higher thickness insulation which prevents heat loss, thereby lowering energy costs.
3. High Grade Ceramic Insulators.
Interlocking Steatite bricks designed for best combination of physical & dielectric strength, good thermal conductivity to heat cylindrical parts, good for sheath temperature upto 500 Deg C. provides flexibility for ease of installation on the barrel.
4. Ni-chrome Heating coil.
Helically wound superior quality (60/16 , 80/20) Nickel-Chrome resistance wire designed for maximum current carrying capacity is strung through specially designed ceramic insulating bricks providing even heat distribution, thus eliminating hot spotting that can cause premature heater failure.



STANDARD FEATURES FOR POWER SAVER CONSTRUCTION

To meet the increasing demand to conserve energy by reducing power consumption, PHP has engineered an Exclusive design with Twin Thermal Insulation which helps increase lower the external sheath temp by 40-50%. The built in insulation (as shown in sketch) which not only helps minimize heat dissipation but also produce a better working atmosphere. For eg ; If the Inside surface temp is approx 280 deg C then the outer Sheath Temp will be approx 90-120 Deg C (subject to working conditions).

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STANDARD FEATURES FOR POWER SAVER PLUS CONSTRUCTION

PHP has engineered a Robust Design to meet the increasing demand for Improved Heating Efficiency, Faster Productivity and at the same time Conserve's Energy by Reducing Power Consumption.

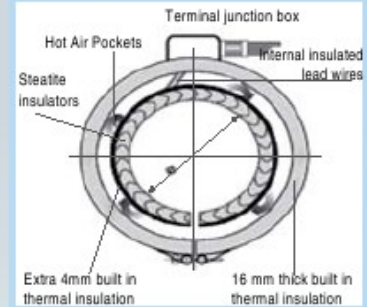
Based on the principle of radiation, conduction & convection this exclusive design comes with an Additional External HEAT OPTIMIZING Thermal Insulation apart from the Standard built in 4mm thick Insulation. The heat generated will remain inside the gap between the heater and the Additional insulation (as shown in sketch) which not only helps conserve energy up to 30% and MORE but also helps minimize heat dissipation & lowers the external sheath temp by 60-70% dramatically improving the working atmosphere. For eg ; If the Inside surface temp is appx 280 deg C then the outer Sheath Temp will be appx 50-70 Deg C (subject to working conditions) in comparison to other Ceramic Heater Bands.

1. Chrome Nickel Steel sheathing.

Chrome Nickel Steel inner housing as well as External Insulated housing with serrated edges provides maximum flexibility for ease of installation.

2. Additional Heat Optimizing Thermal insulation.

Apart from the in built 4mm Insulation A Special Additional HEAT OPTIMIZING Thermal Insulation (16mm) along with an AIR POCKET which preserves the heat inside producing a uniform hot air layer between the Heater & the outer Insulation (as shown in sketch above) This helps reduce power consumption upto 30% AND MORE (subject to working conditions) & prevents heat loss thereby lowering energy costs, improves Heating Efficiency for faster productivity and simultaneously also helps improve working atmosphere.



3. High Grade Ceramic Insulators.

Interlocking Steatite bricks designed for best combination of physical & dielectric strength, good thermal conductivity to heat cylindrical parts, good for sheath temperature upto 500 Deg C. provides flexibility for ease of installation on the barrel.

4. Nickel-chrome heating coil -

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Technical Data

Sheath material	: Chrome Nickel Steel
Insulators	: High Grade Steatite Ceramic Insulators (High Temperature)
Heat Saving Thermal Insulation	: Ceramic Fibre (std.)
Heating Elements (coil)	: NiCr 60:16, NiCr 80:20
Nominal Wall Thickness	: Premium Heat: 12mm / Power Saver: 25mm / Power Saver PLUS: 45mm
Connection	: Fiber Glass Insulated- Metal Braided Flexible Cable (std. 500mm long) mounted on rigid screw post terminals
Voltage Range	: 110V - 440V
Surface Loading	: 35-55W / in ² (depending upon model & application)
Power Rating	: Depending upon application
Power Tolerance	: ± 10%
HV Testing	: 1.5 Kv between heating element and sheath
Insulation Resistance (Cold)	: < 20 M Ohms
Sheath Temperature	: Upto 500°C maximum (Chrome Nickel Steel sheath)
Gap Between the Clamping Edge	: 5 – 10mm.
Resistance:	: +/- 10%
Width	: Minimum 35mm and there after multiples of 15mm. Minimum 75mm in case of Power saver & 100mm for Power Saver PLUS
Inner Diameter	: Minimum 60mm in case of Premium 75mm in case of Power saver & 100mm for Power Saver PLUS



Standard Features

TERMINAL JUNCTION BOX.

A Specially Designed Robust Stainless Steel Terminal Junction box, (for Heater ID 100mm & above) with Hot Air Ventilators is as Std feature in all Ceramic bands that offers safety & excellent protection to exposed terminals against hazards. To simplify electrical wiring, the box has Fibre Glass Insulated - Metal Braided flexible cable mounted on Steel screw terminals connected to solid Brass bars/ nickel wire designed to provide maximum amperage carrying capacity.

STEEL TERMINAL BOX CONSTRUCTION



Chrome Nickel Steel Terminal Box with Hot Air Ventilators



Steel screw terminals connected to solid Brass/nickel pins designed for max Amp capacity.

OTHER OPTIONS AVAILABLE



2PIN Male Plug Recommended up to 10 amps / 2250 W.



Screw post terminals

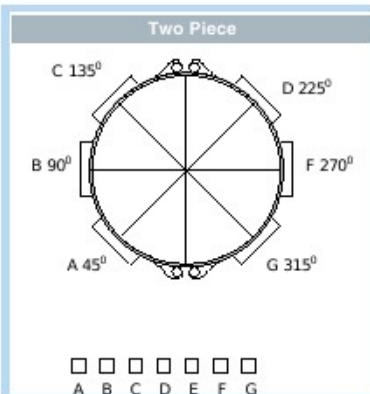
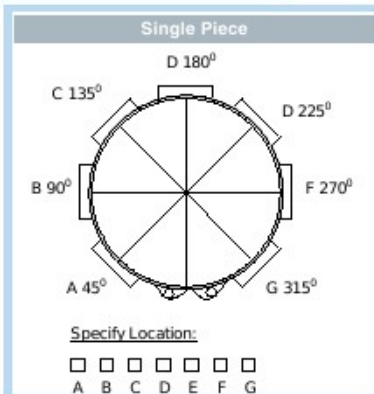
Clamping

Robust Clamping: Specially designed mounting brackets with Chrome Plated Allen Key Bolts with M-6 x 45mm are used to securely draw the heating element assembly against the cylinder evenly & tightly across its entire width, located at 180°C from the screw terminals.

Allen Key Barrel Nut
Std. size M6 x 45mm



Terminal Location

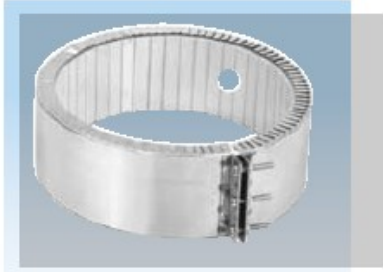


Thermocouple Holes/'U' Slots/Cutout

Normally required for clearance of the thermocouple probes or holding bolts. Oversize gap can in many cases serve the same purpose, using the centre of the gap as a starting point, specify location in terms of degrees and size of the hole or cut-out. Minimum of $\frac{1}{2}$ " is required from the hole to the edge of the heater. For critical hole or cut-out locations, please provide detailed drawing.

All Thermocouple Holes for Ceramic Band Heaters (if required) will be Provided at center of width either at 180° opposite the Clamping or 90° from Clamping, unless specified along with drawing.

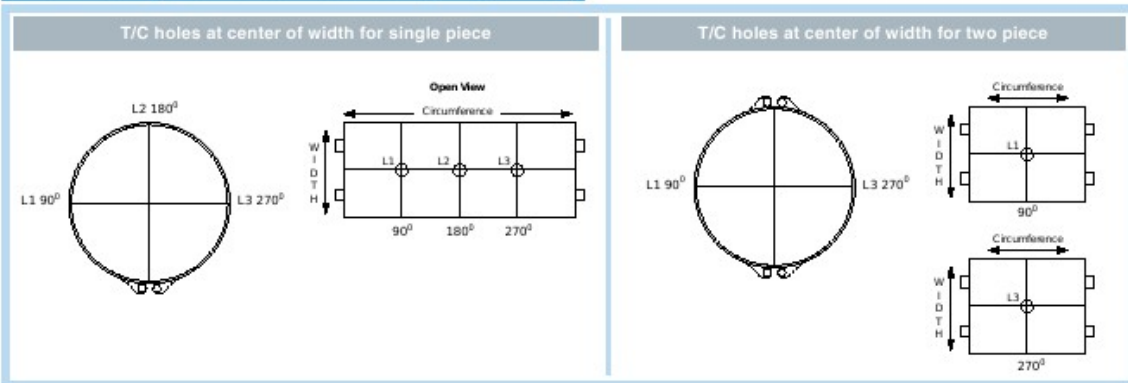
NOTE: As far as possible please avoid thermocouple holes. Try and locate them in the heater gap, since holes in the heater body complicates the internal wiring resulting in less heating area and also turns out to be more expensive.



OVERSIZE GAP

The nominal gap is $\frac{3}{8}$ ". If a larger gap is required for probes or thermocouples, specify when ordering.

Thermocouple Holes Location (if required)



Two Piece Construction

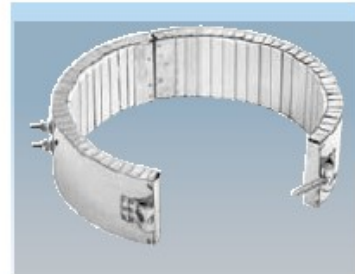
- Available on any screw and lead termination or clamping variation.
- Two piece band heaters are normally rated at half the total wattage & full line voltage.
- The Two-Piece Ceramic Band Heater is commonly used on sizes larger than 20" diameter or when it would be inconvenient to use a one-piece heater. It is available with all types of insulation, construction styles, clamping or termination variations.

Min. ID : 4" (101.6 mm)

Min. Width : 1" (25.4 mm)

Max. ID : 44" (1118 mm)

- Larger sizes are manufactured in multiple segments. Watts and volts are specified per each half when ordering.



Electrical Variations

SINGLE PHASE

PHP's band heaters are usually designed on 230 Volts single phase unless specified.

DUAL PHASE

Ceramic Band Heaters can be designed with multiple circuits to operate in single or three-phase circuits.

THREE PHASE

On very high wattage band heaters it would be advantageous to set up the wiring three-phase to reduce the current load across a single conductor. Three-Phase wiring is available with all types of insulation, Construction styles, and clamping variations.

Limitations : Minimum width : 3"(76.2mm)



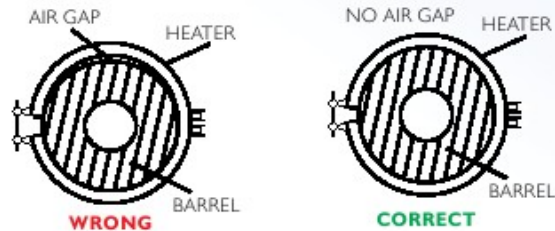
Optional Fittings & Accessories (subject to dimensional restrictions)

To avoid contamination with the element & also provide even heat transfer on to the cylinders, inner Chrome Nickel Steel sheathed Protection sleeve can be provided at an extra cost if required.

Perforated Outer sheathing for heat ventilation can be provided with an extra cost.



How to install



How to order

When ordering please specify the following

- 1 Quantity
- 2 Inside diameter and width.
 - Inside Dia should be same as outer Dia of the cylinder to be heated
 - Width is the length of band heater.
- 3 Volts /Watts
Note: In case of 2 piece construction please specify voltage/wattage in each piece
- 4 Construction Style
 - Single piece construction
 - Two piece construction (Min ID – 4” Min width –1”)IMP: Two Piece Band heaters are normally rated at half of Total Wattage & full line voltage unless specified
- 5 Construction Type
Premium Heat / Power Saver / Power Saver Plus Construction
- 6 Terminal Connection (Refer Pg 13)
- 7 Terminal location (Refer Pg 14)
Single piece construction/Two piece construction
- 8 Special holes or cut outs (please provide drawing of hole location.)
IMP: In case of thermocouple holes, mounting holes, “U” slots & cut outs (if any) please provide dimensional sketch.
Oversize Gap: If large gap is required for props or Thermocouple Hole, please specify along with the sketch
- 9 Required clamping (Refer Pg 13)

Precautions & Installation

- 1 Reduce the amount of narrow or two piece bands, Ceramic Bands are very flexible & can be made in large widths and one piece construction for easy installation, eliminating heat losses between narrow bands & sharply reducing costly labour in installation.
- 2 Calculated wattage should be as close as possible to operating wattage to minimize on-off cycling.
- 3 When replacing any other type of non-insulated band heater with PHP Ceramic Band Heaters, you can decrease your total operating wattage by approximately 25%.
- 4 To prevent overheating & heater failure, adequate temperature controls should be installed. Thermocouples must be kept free of contaminations and checked for good response to temperature changes. A bad thermocouple can be the cause for destroying an entire heating zone. For selecting temperature controls and thermocouples, PHP offers technical assistance for best results.
- 5 Avoid using heaters in an atmosphere containing combustible gases or vapours.
- 6 Prior to installation, the surface of the cylinder must be clean and free of all contamination. During operation, the band heaters and cylinder surfaces must be kept free of all contamination that might liquify under heat and find their way into the windings, carbonising and becoming conductive. The least amount of contamination can cause electrical shorts, creating heater failure.
- 7 Take up all the slak by tightening the low thermal expansion outer housing until the serrated edges become firmly in direct contact with the cylinder. A raw hide mallet can be used to lightly tap the outer edges only to get uniform contact. As you tighten the clamping screw, do not over tighten, as to the point where the serrated edges begin to collapse and thrust outwards. At this point, you are compressing the ceramic insulation & decreasing its insulation values.
- 8 Keep all electrical connections properly protected to avoid electrical hazards to machine operators. Exposed live parts are in direct violation of safety electrical codes.
- 9 Never perform any type of service on heaters prior to disconnecting all electrical power.
- 10 Electrical wiring on band heaters or any other type of heaters should be done by a qualified person complying with local electrical codes. Incorrect wiring is common cause in heater burn-out.



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