Cast-In Heaters

Ring-Shaped

Cast-In Aluminum or Bronze Ring Heaters for Plastics Processing Equipment

Designed to Heat Limited Access Locations

Tempco Cast-In Ring Heaters provide an excellent means of applying extremely uniform heat to limited access application areas. Cast-In Ring Heaters are frequently used in Blown Film Die, Extrusion Die, Screen Changer and Extruder Barrel Adapter applications where long life and minimal maintenance concerns are prevalent.

The design scope of this product line makes it possible to cast large or small diameter disc shaped rings with nominal thicknesses of 5/8" to 1". These units are an excellent choice for heating the top or bottom of a cylindrical die.

As a standard, Cast-In Ring Heaters are generally manufactured in aluminum because of its superior thermal conductivity. For higher temperature or high watt density requirements, bronze or brass alloys can be used. A variety of standard terminations shown on pages 3-54 and 3-55 are available. The units can be fully machined to include through holes for mounting, thermocouple holes and surface machining.

Standard Cast-In Ring Heaters

Design Features and Options:

- Computer designed, precisely formed tubular heating element optimizing the heat transfer pattern
- Variety of termination options including terminal enclosure housings
- Variety of shapes and sizes
- Through holes, tapped holes or cutouts to facilitate mounting or obstructions
- Precision machining of one or all surfaces of casting – specify your individual requirements.

Stock and Standard (Non-Stock) Cast-In Ring Heaters

Stock Items Are Shown In RED

<table>
<thead>
<tr>
<th>I.D.</th>
<th>O.D.</th>
<th>Thickness</th>
<th>Watts</th>
<th>Volts</th>
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<td>56.250</td>
<td>1.125</td>
<td>4333</td>
<td>290</td>
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</tbody>
</table>

Special Features

- (8) ½" dia. holes
- (4) ⅜" dia. holes E/H
- (9) ⅜" dia. holes
- (9) ⅜" dia. holes, (1) ½" dia. hole
- (8) ⅜" dia. holes
- (8) ⅜" dia. hole, (8) ⅝" c’bore
- (2) 90° Segments
- Bronze
- (4) ⅜" dia. holes E/H, (2) ¼"-13 taps
- (6) ⅜" dia. holes
- (4) 90° Segments
- (12) ⅜" dia. holes, (2) ½"-13 taps
- (8) ⅜" dia. holes, (1) ⅝" dia. hole
- (24) ⅜" dia. holes
- (16) ⅝" dia. holes

Part Numbers

- CBH02625
- CBH05499
- CBH01084
- CBH05415
- CBH01101
- CBH01196
- CBH01085
- CBH01261
- CBH04776
- CBH04836
- CBH01261

For sizes and ratings not listed, TEMPCO will design and manufacture a Cast-In Ring Heater to meet your requirements. Specify the following:

- Inside Diameter
- Outside Diameter
- Thickness
- Wattage and Voltage
- Number of Segments
- Termination Type (see pages 3-54 and 3-55)
- Alloy (Aluminum or Bronze)
- Special Features
- Machining Specifications
- Detailed Drawing

Note: Part numbers are for aluminum heaters unless otherwise specified.

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CUSTOM Manufactured

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**WARNING:** Cancer and Reproductive Harm - www.P65Warnings.ca.gov.

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Cast-In Heaters

Electrical Termination Options

Standard Tubular Heater Terminations for Cast-In Heaters

Select the termination style that meets your requirements for space, accessibility and reliability.

**Type S** Standard Unless Otherwise Specified
- Heavy Duty Ceramic Insulators.
- .315” diameter heater has 8-32 screw terminals.
- .430” diameter heater has 10-32 screw terminals.

**Type T7**
- Ceramic insulator is the same diameter as the heating element.
- .260” diameter heater has 6-32 screw terminals.
- .315” diameter heater has 8-32 screw terminals.
- .430” diameter heater has 10-32 screw terminals.

**Type T**
- Mica insulator is the same diameter as the heating element.
- .260” diameter heater has 6-32 screw terminals.
- .315” diameter heater has 8-32 screw terminals.
- .430” diameter heater has 10-32 screw terminals.

**Type C4**
- Heavy duty ceramic insulator with terminal cover.
- .315” diameter heater has 10-32 screw terminals.
- .430” diameter heater has 10-32 screw terminals.

**TYPE P—Plain Pin**
- Plain terminal pin. Specify Length “L.” Standard 1/2” (12.7 mm) pin length.

<table>
<thead>
<tr>
<th>Element Diameter</th>
<th>Nominal Pin Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>in</td>
<td>mm</td>
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<tr>
<td>in</td>
<td>mm</td>
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<tr>
<td>.260</td>
<td>.091 .23</td>
</tr>
<tr>
<td>.315</td>
<td>.100 .25</td>
</tr>
<tr>
<td>.430</td>
<td>.120 .30</td>
</tr>
</tbody>
</table>

**Type R**
- Mica washers with 90° blockhead screw terminal with 10-32 screw threads. Available for .315” and .430” diameter heaters.

**Type R2**
- Mica washers with blockhead and through hole for lead wire connection. Eliminates the use of ring terminals. Available for .315” and .430” diameter heaters. Accepts 6-14 gauge wire.

**Type E**
- Right-angle lug welded to pin with mica washer insulators and 10-32 binding head screw. Available for .260”, .315” and .430” diameter heaters.
Standard Tubular Heater Terminations for Cast-In Heaters

**Type L & L9**
Terminal lug spot welded to pin with 10-32 binding head screw. Available for .260", .315" and .430" diameter heaters. Type L represents straight; Type L9 represents 90° to pin. Specify lug orientation.

**Type SF & SF9**
Quick-disconnect spade tabs spot welded to pin. Available for .260", .315" and .430" diameter heaters. Type SF represents straight. Type SF9 represents 90° to pin. Specify tab orientation.

**Type F**

**Type R1**
Flexible Armor Cable provides excellent protection to lead wires against abrasion and contaminants. Available for .260", .315" and .430" diameter heaters. Specify cable length and lead length. Style may vary from depiction depending on heater diameter and cable diameter used.

**Type R1A**
Stainless Steel Wire Overbraid provides flexibility and excellent protection to lead wires against abrasion. Available for .260", .315" and .430" diameter heaters. Specify stainless steel wire overbraid length and lead length. Style may vary from depiction depending on heater diameter and braid diameter used.

**Type MR**
Moisture resistant shrink strain relief and lead wire with or without stainless steel overbraid. Available for .260", .315" and .430" diameter heaters. Specify lead wire and overbraid length. Maximum operating temperature is 350°F (177°C).

**Type TS**
Contamination seal shrink-down Teflon® sleeving over the heater and lead wire splice. Provides a good moisture resistant seal. Maximum operating temperature 500°F (260°C). Available for .260", .315" and .430" diameter heaters. Specify lead length.

**Type P1**
Quick-disconnect plug, either mounted directly on casting or on elements ends offset a specified distance from casting. Rating: 16A-250VAC.
Installation Recommendations

**Installation**

1. Allow sufficient space for thermal expansion. The amount of space required depends upon the Cast-In Heater size, operating temperature and alloy.
2. Surface being heated must be free of any foreign materials and have a smooth finish.
3. Make sure that the casting is properly seated. The clamping devices used should be tightened down to the correct recommended torque. After initial heat-up, retighten fasteners to the correct recommended torque.
4. Thermal insulation can be used to reduce heat losses.
5. Avoid mounting heaters in an atmosphere containing combustible gases and vapors unless specifically manufactured for use in such conditions.
6. Liquid Cooled Cast-In Heater fittings must be securely tightened to prevent leak.
7. To prevent overheating and heater failure, adequate temperature controls should be installed. For assistance in selecting temperature controls and thermocouples, see Tempco’s (in-stock) complete line of Plug-In type Proportional Temperature Controls for heating and cooling applications in Section 13. Also see the listing on standard and hot melt thermocouples in Section 14.

**Recommended Torque:**

- 10 ft-lb for 1/4–5/16 bolts, 20 ft-lb for 7/16–5/8 bolts

**Operation**

1. It is recommended to slow start the process during first use.
2. Do not operate above rated voltage. Excess voltage will result in heater failure.
3. Do not operate Cast-In Heaters above recommended temperatures. Heater temperature must be monitored and controlled. Use of over-temperature T/C is strongly recommended for higher temperature applications. Excess temperatures will result in heater failure and/or melting.
4. Electrical terminals must be kept free of contaminants, as spillage of plastic, water, oils, and their vapors can cause electric shorts, resulting in heater failure.
5. Liquid Cooled Cast-In Heaters must not be cycled to operate simultaneously. Thermal stresses may result in shorter heater life.
6. The water used on Liquid Cooled Cast-In Heaters must be properly treated. Hard water contains corrosive media that will contaminate the tubing, producing stress corrosion cracks and resulting in shorter heater life. Presence of minerals in water can cause clogged tubes that can result in poor heat transfer and eventually heater failure.

**Maintenance**

1. Never perform any type of service on heaters prior to disconnecting all electrical power.
2. To ensure good surface contact, periodically check clamping. Retighten clamping to the correct torque when required.
3. Repeat cycling of temperature controls can indicate poor response to temperature changes. Our recommendation is to change them periodically, as a bad thermocouple can be the cause of destroying an entire heating zone.
4. Heater terminals must be kept free of plastics, oil, water, and any other foreign matter. As these materials carbonize, they create electrical shorts.
5. Heater terminal electrical connections must be kept tight. Loose connections can overheat and eventual destroy the connection or the heater terminal.
6. Water lines must be periodically checked for leaks. Water on heater terminals can be detrimental to the entire heating system.
7. Thermocouples must be kept free of contaminants and be checked for good response to temperature changes. Our recommendation is to change them periodically, as a bad thermocouple can be the cause of destroying an entire heating zone.

**Wiring**

1. For connections at the heater terminals, use high temperature nickel conductor or nickel clad copper lead wire or alloy bus bar. Keep all electrical connections properly protected to eliminate electric shock to machine operators.
2. Heaters of equal wattage and voltage can be connected in series for higher voltage.
3. Heater installations must be properly grounded to eliminate electric shock hazard, and wiring must comply with electrical codes.
4. Always have a qualified electrician perform all wiring and connection of heaters and control components. Terminals must be tightened to the correct torque (2.5 ft/lb for terminal connections).

**CAUTION:** Castings are not designed to be lifted or carried by the terminations or leads.

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**Exposed electrical wiring on cast-in heater installations is a violation of Electrical Safety Codes including O.S.H.A.**

**Note:** See page 16-11 for Wiring Diagrams and page 15-2 for lead wire selection.

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**Complete Your Installation With**

**Accessories Available From Stock**

**Stainless Steel Tubing and Fittings For Cooling Lines** 3

**Pressure Transducers and Rupture Disks** 12

**Temperature Controllers** 13

**Temperature Sensors, Thermocouple Wire, Jacks & Plugs** 14

**High Temperature Lead Wire & Fiberglass Tape, Ceramic Terminal Covers and Electric Plugs** 15

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