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3

section

Cast-In Heaters



Delivering Cutting Edge Solutions with Highly Customized/Engineered Cast-In Thermal Components

Developing Solutions Through Product Innovation

Tempco is a name synonymous with state-of-the-art technology and a strong commitment to providing practical, cost effective, quality thermal component solutions. We are a widely recognized industry-leading authority in the design, engineering and manufacturing of cast-in heaters and cast-in thermo cooling components.

Tempco's expertise and flexible manufacturing capabilities allow cast-in thermal components to be designed in virtually any imaginable size and shape, including complex and challenging geometries. Casting alloys used are aluminum, brass, and bronze.

Supporting A Diversified Segment of Industries

Tempco has a proven track record of successfully assisting our customers in solving or improving complex and challenging applications with cast-in thermal component technology, whether for heating or cooling functions. We consistently deliver on our commitment to exceed our customers' expectations in a diverse segment of industries from Original Equipment Manufacturers (OEMs), to Research and Development, Life Science, and Maintenance (MRO) Applications.

***Consult Us with Your Requirements
We Welcome Your Inquiries***



Supporting Diversified & Demanding Industrial, Life Science, Commercial & Scientific Applications



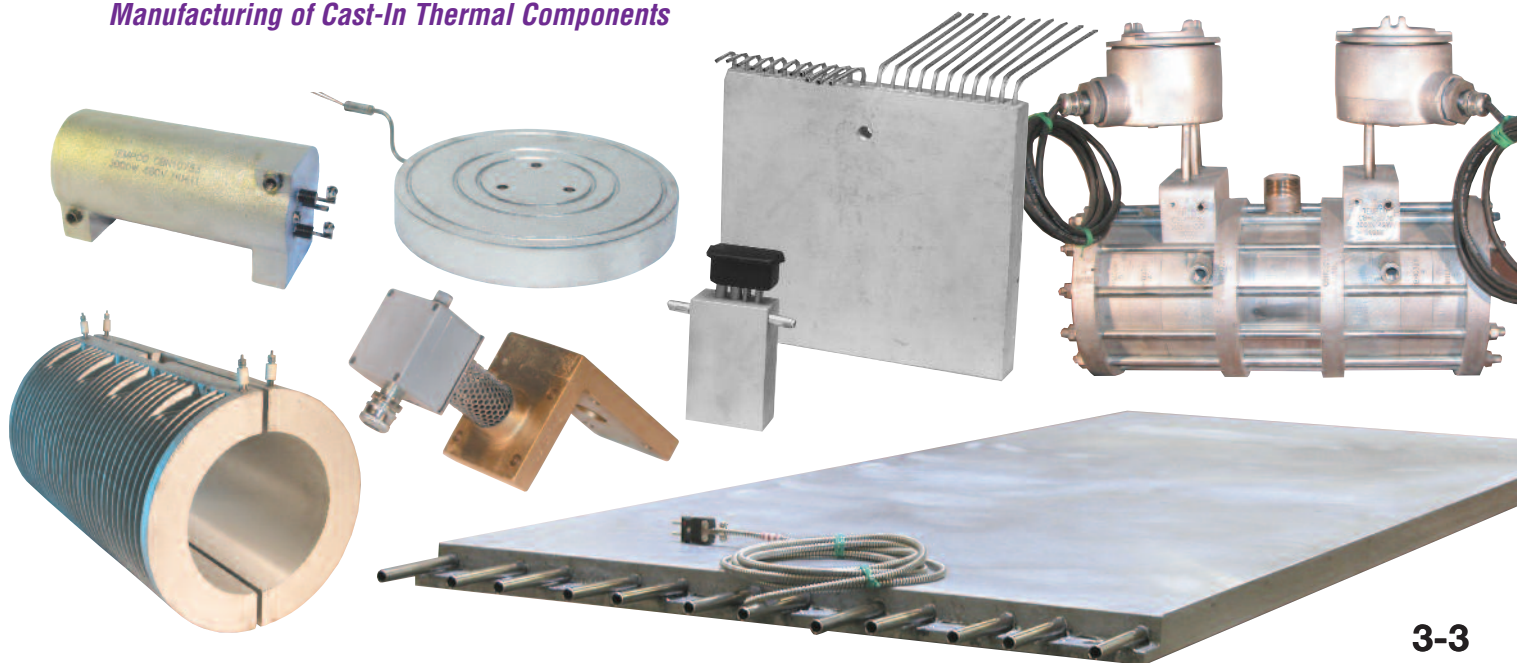
Vertically Integrated Manufacturing Capabilities

Tempco is a company uniquely qualified and committed to taking full ownership and responsibility of your Cast-In thermal component challenges. Consult Tempco at the early stages of your application requirements; we can provide you with the ultimate solution that will achieve cost savings and reliability with both functional and aesthetic quality.

Tempco's in-house manufacturing capabilities to produce Cast-In Thermal Components include:

- ✦ Custom designing and engineering utilizing 3-D and CAD/CAM solid modeling technology
- ✦ Tubular and Cable Heating Element manufacturing
- ✦ Full service foundry facility processing Aluminum, Brass, and Bronze Alloys
- ✦ Foundry tooling fabrication — Steel or Cast Iron Permanent Molds, Wood or Plastic Patterns
- ✦ Machining — Full service State-of-the-Art CNC machine shop capabilities including Coordinate Measuring Machine
- ✦ Lab services — computerized infrared heating profiles, life cycle testing, X-ray examination, 3-D solidification modeling

Experience our Passion for Excellence in the Design & Manufacturing of Cast-In Thermal Components



One Source Providing Extensive Engineering/Manufacturing Capabilities



Casting Process: Low Pressure

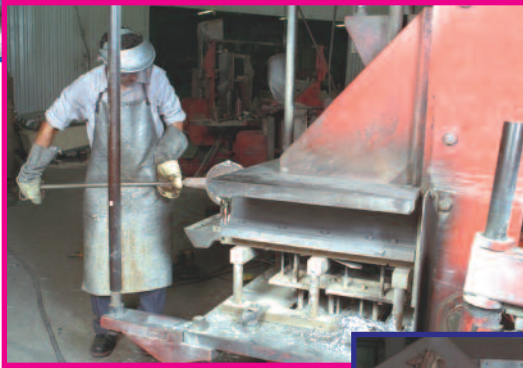
Used for large volume quantities. Specifically suited for intricate and challenging geometric shapes, producing quality castings with consistent dimensional accuracy and superior surface finish.

Alloy: Aluminum (only)

Tooling: Requires a Steel or Cast Iron Permanent Mold

Machining: Minimum to no machining

Weight Capacity: Up to 150 pounds depending on shape



Casting Process: Tilt-Pour Gravity Feed

Used extensively for medium to high volume quantities. Will accommodate simple to some irregular shape castings, producing good dimensional accuracy and surface finish.

Alloy: Aluminum (only)

Tooling: Requires a Steel or Cast Iron Permanent Mold

Machining: Moderate to Extensive

Weight Capacity: Up to 150 pounds depending on shape

Casting Process: No-Bake Sand Molds

Used for lower volume quantities, prototypes, very large irregular shapes and thermal platens.

Alloys: Aluminum, Brass, Bronze and Iron

Tooling: Requires a Wood or Plastic Pattern

Machining: Extensive

Weight Capacity: Up to 600 pounds

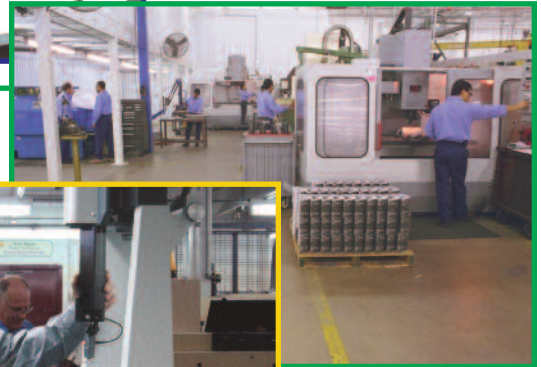


Melting Capabilities

- Electric Reverb and Induction furnaces are used to minimize gas inclusion into the molten metal, thereby producing a denser, higher quality casting.

CNC Machining

There are certain dimensional and/or finish tolerances or geometry that cannot be produced as cast and must be machined. Tempco offers a full service state-of-the-art machine shop featuring various types of CNC machine tools to perform all of the precision machining required—from simple to complex contour geometries, including turning and/or boring, with repeatable accuracy from one machined casting to the next. Machinists also build and maintain permanent mold tooling for the low pressure and tilt-pour gravity feed casting processes.



CMM Inspection

Coordinate Measuring Machine provides precise measurement of complex parts in process or at final inspection.



No one can do it better than Tempco – LET US PROVE IT!

Pattern Shop

Tempco has an in-house Pattern Shop to build and maintain the wood or plastic patterns required to produce castings with no-bake sand molds.



Experience Our Value-Added Services that are Second to None

Casting Alloys

Casting Alloy	Aluminum	Copper	Silicone	Zinc	Lead	Maximum Iron	Tin	Other
Aluminum 319	85.8 - 91.58%	3.0 - 4.0%	5.50 - 6.50%	≤ 1.0%	—	≤ 1.0%	—	≤ 1.7%
Aluminum 356	90.1 - 93.3 %	≤ 0.25%	6.50 - 7.50%	≤ 0.35%	—	≤ 0.60%	—	≤ 1.125%
Bronze	9.0 - 11.0%	≥ 86.0%	—	—	—	0.80 - 1.50%	—	≤ 1%
Yellow Brass	≤ 0.55%	58.0 - 64.0%	≤ 0.05%	32.0 - 40.0%	0.80 - 1.50%	≤ 0.70%	0.50 - 1.50%	≤ 1%

Material Properties

Material	Classification	Max. Surface Temperature °F (°C)	Density (lb/in ³)	Coefficient of Linear Thermal Expansion (in/in/°F × 10 ⁻⁶)	Specific Heat Capacity (BTU/lb-°F)	Thermal Conductivity (BTU-in/hr-ft ² -°F)	Melting Point (°F)
Aluminum 319	Aluminum 319.0	700 (371)	0.101	12.7 @ 68° - 572°F	0.23	754	960 - 1120
Aluminum 356	Aluminum 356.0	750 (399)	0.0968	12.9 @ 68° - 572°F	0.23	1160	1030 - 1140
Bronze	UNS C95300	1350 (732)	0.272	9 @ 68° - 572°F	0.0896	437	1900 - 1913
Yellow Brass	UNS C85700	1200 (649)	0.304	12.2 @ 68° - 500°F	0.0899	582	1660 - 1690

Linear Thermal Expansion Formula: $\Delta L = L_i \times \alpha \times (T_f - T_i) \times 10^{-6}$

ΔL = Change in Length

L_i = Initial Length

α = Coefficient of Linear Thermal Expansion

T_f = Final Temperature

T_i = Initial Temperature

Minimum Casting Thickness vs. Heating Element and/or Cooling Tube Diameters

Casting Thickness	Maximum Available Element Diameter Heat Only	Maximum Available Cooling Tube Diameter Cool Only	Maximum Element and Cooling Tube Combination Heat and Cool
5/8" (15.9 mm)	.260	1/4	—
3/4" (19.1 mm)	.375	3/8	—
1" (25.4 mm)	.430	1/2	—
1-1/4" (31.8 mm)	.430	1/2	.260 and 3/8
1-3/8" (34.9 mm)	.430	1/2	.315 and 1/2
1-1/2" (38.1 mm)	.430	1/2	.430 and 1/2
1-5/8" (41.3 mm)	.430	1/2	.430 and 1/2
1-3/4" (44.5 mm)	.430	1/2	.430 and 1/2
Finned Casting			
3/4" (19.1 mm)	.375	—	—
7/8" (22.2 mm)	.430	—	—
1" (25.4 mm)	.430	—	—
1-3/4" (44.5 mm)	.430	—	—

Casting Size & Weight Limitations

	Cylindrical	Platen
Minimum Inside Diameter:	1" (25.4 mm)	—
Maximum Inside Diameter:	48" (1219 mm)	—
Minimum Width:	—	1-1/2" (38.1 mm)
Maximum Width:	—	60" (1524 mm)
Minimum Length:	1-3/4" (44.5 mm)	4" (102 mm)
Maximum Length:	40" (1016 mm)	72" (1829 mm)
Finish:	125 RMS Standard or to customer spec.	
Gap (two-piece cylindrical cast-in band heaters):	1/4" (6.4 mm) top and bottom or to customer specification	
Maximum Weight:	Aluminum— 600 pounds Bronze & Brass— 300 pounds	

NOTES: Cylindrical heaters are made with two half-round heaters. Cast-In thermal components can be made in any practical size, weight and geometric shape.

Heating Element Electrical Specifications

Tubular Heater Diameter	.260"	.315"	.375"	.430"
Maximum Volts	240	277	480	600
Maximum Amps Per Element	15	30	40	40
Maximum Watt Density:	Aluminum Alloy—35 W/in ² on the element Bronze or Brass—45 W/in ² on the element			
Resistance Tolerance:	+10%, -5% Wattage Tolerance: +5%, -10%			
	Three Phase available depending on casting size. Ground Studs can be added to most cast-ins.			



Note: Tempco-Pak mineral insulated cable heaters can be used in place of tubular heating elements to fit physical constraints not possible with conventional heating elements. See catalog Section 5 for more details.

Cooling Tube Materials for Castings with Liquid Cooling

Tube Material	Tube OD and Wall Thickness
Stainless Steel (Standard)	1/4" O.D. × .028 wall
Stainless Steel (Standard)	3/8" O.D. × .035 wall
Stainless Steel (Standard)	1/2" O.D. × .049 wall
Stainless Steel (Optional)	5/8" O.D. × .049 wall
Incoloy® 840 (Optional)	1/2" O.D. × .049 wall
Tubing with heavier wall thickness is available upon request.	

Options for Cast-In Thermal Components

Casting Surface Treatments

Special surface finishes are required in some applications:

- Electroless Nickel Plating
- Anodizing
- Teflon®
- Hard-Coat Anodizing
- Magnaplate

Lab Services

- Computerized Infrared Heating Profiles
- Life Cycle Testing
- X-Rays to confirm heating element location and casting density
- Heating Ramp Rate Testing

Agency  US Approvals

Cast-In Heater Elements are UL recognized under UL File Number E90771.

If you require UL Agency Approval, please specify when ordering.

Cast-In Heaters – Complex Geometrics for Diversified Industries

Delivering Cutting-Edge Engineered Cast-In Thermal Component Solutions

Today's fast-paced and high-tech industries demand products that are high quality, unique, reliable, and diverse. Tempco is passionate about meeting those expectations and putting our customers' needs first by providing quality service and products with superior capabilities. Tempco specializes in engineering and manufacturing customized cast-in thermal component solutions to service and support virtually all major industries. The following pages illustrate a sampling of cast-in thermal components we have produced for original equipment manufacturers (OEMs) and maintenance (MRO) applications that enjoy the advantages and benefits our products offer.

**High Performance Cast-In Thermal Components are not
Just a Challenge – They Are Our Bread & Butter.
Please Consult Us with Your Requirements.
We Welcome Your Inquiries.**



Cast Iron Manifold Heater for Aluminum
Low Pressure Casting Machine

Aluminum Cast-In
Heater for Plastic
Extrusion



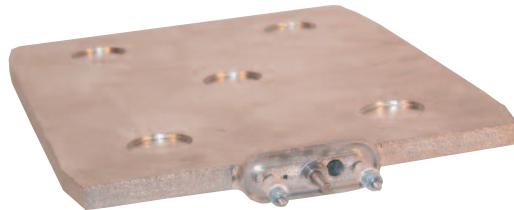
Rectangular Manifold
Cast-In Heater



Aluminum Cast-In Heater Used in
the Carpet Mill Industry



Barrel Adapter for Polymer
Extruder Equipment



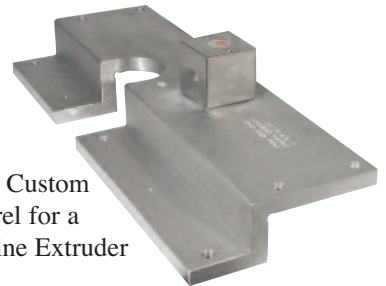
Autoclave Aluminum Cast-In Heater
Electroless Nickel-Plated for
Sterilizing Dental Instruments



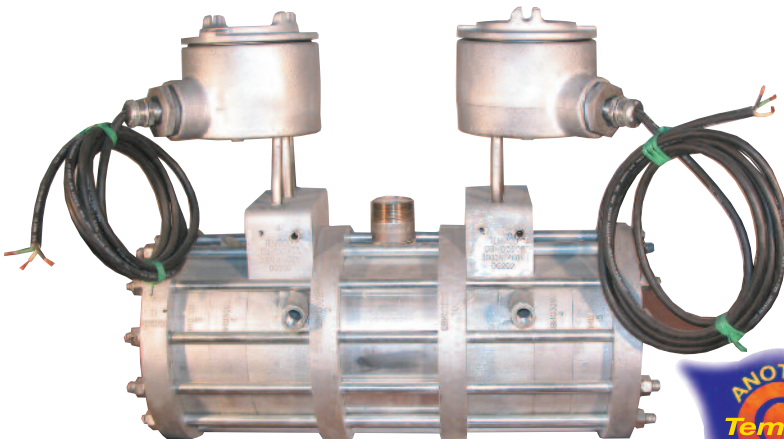
Oil Pre-Heater for
Industrial Process Equipment



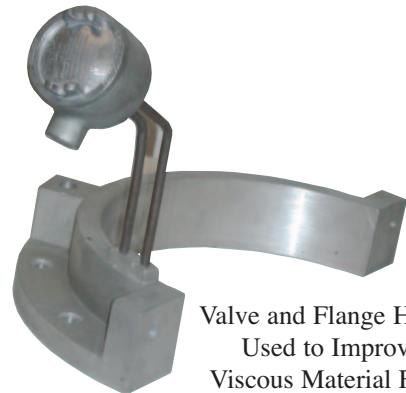
Heating Elements &
Aluminum Cast Over
Steel Transfer Feed Pipe



Heater used on a Custom
Rectangular Barrel for a
Monofilament Line Extruder



System for Pre-Heating and Mixing
Chemicals for Sand Cores



Valve and Flange Heater
Used to Improve
Viscous Material Flow

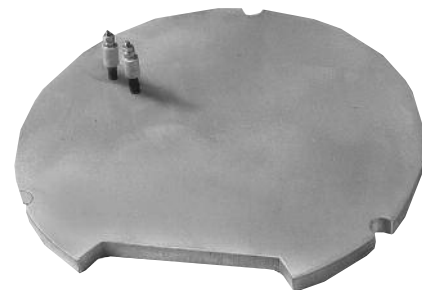


Cast-In Heaters – Complex Geometrics for Diversified Industries

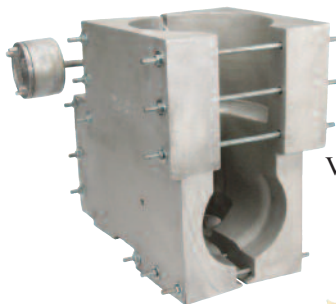


Heating & Cooling Cylinder used in Lab Testing Equipment

Cast-In Heater Used to Decrease Viscosity in Glue Processing



Waste Treatment Sanitation Equipment Heater



Manifold Valve Assembly



Bronze Cast-In Heater for Package Sealing Machine



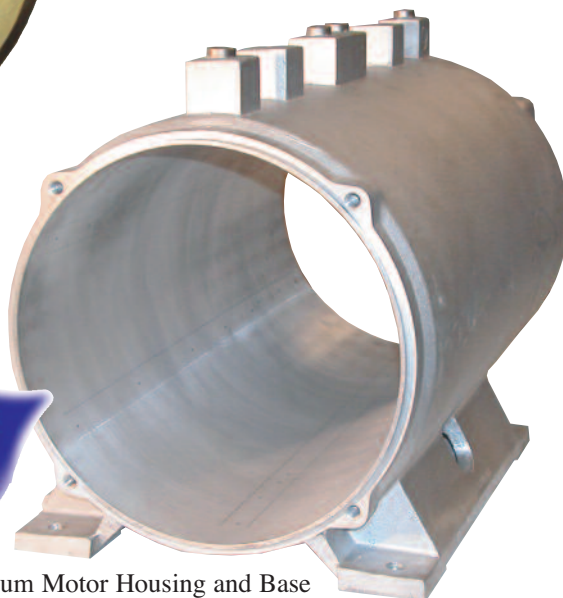
Used as a Resistor for Thermal Dynamic Braking of Large Electric Motors



Cast-In Platen used for Heating a Custom Rectangular Extruder Barrel



Bronze Cast-In Heater for Pre-Heating Salt Baths



Cast Aluminum Motor Housing and Base with Integral Liquid Cool Capabilities used for Medium to Large Horsepower Electric Motors
Can be made for any size motor.

Developed and Patented by Tempco
U.S. Patents: # 6222289 & #5939808

CONTINUED



Bronze Cast-In Heater for a Laminating Press



In-Line System for Pre-Heating Water to Induce Humidity in Baking Ovens

Cast-In Heaters – Complex Geometrics for Diversified Industries

Continued from previous page...



Used in the Packaging Industry for Adhering Tax Stamps to Cigarette Packs



Cast-In Heater for Melt Pump



Brass Casting Used in Industrial Processing Machinery



Used in a Thermoforming Mold

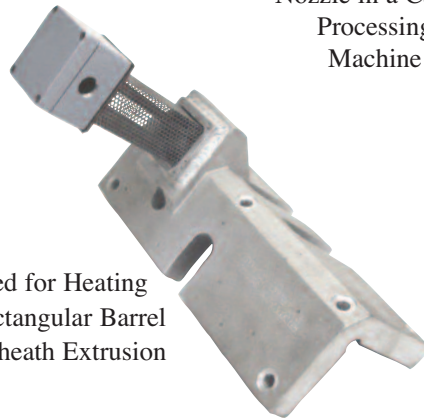
Used as Part of a Feed Nozzle in a Candy Processing Machine



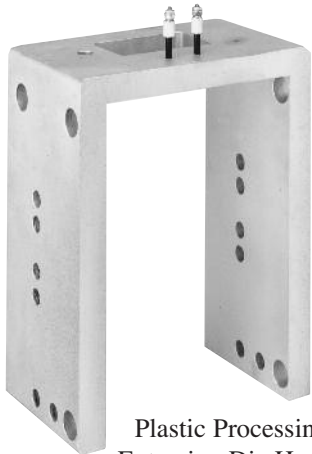
Bronze Cast-In heater used to maintain Hydraulic Oil Temperature



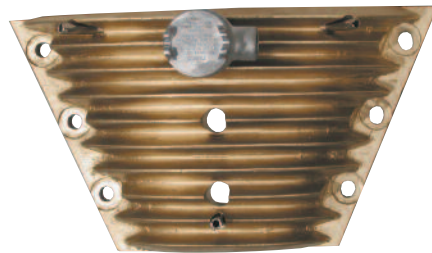
Bronze Electroless Nickel-Plated Cast-In Heater Used in Equipment that Tests Nuclear Hazardous Waste



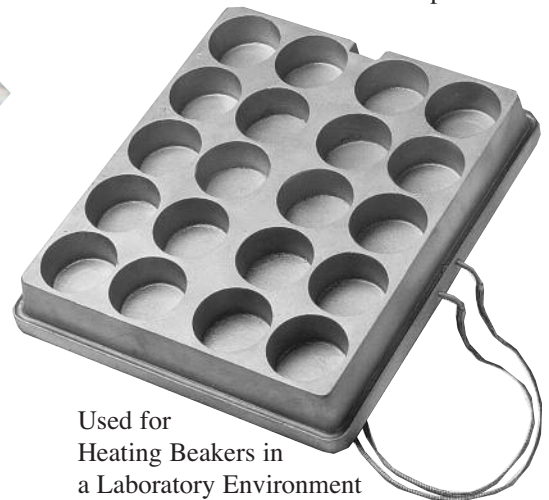
Used for Heating a Rectangular Barrel for Sheath Extrusion



Plastic Processing Extrusion Die Heater



Bronze Cast-In Heater Used in Helicone Mixture to Heat High Viscosity Material



Used for Heating Beakers in a Laboratory Environment

Additional Applications Where Tempco Cast-In Heaters Are Used

- Chemical Processing
- Extrusion Die Heaters
- Food Service Equipment
- Glue Pots
- Heat Sealing Equipment
- Heat Treating Equipment
- Hot Melt Dispensing Equipment
- Hot Stamping Machinery
- Laboratory Equipment
- Laminating Equipment
- Life Science Equipment
- Packaging Machinery
- Plastics Machinery
- Research and Development
- Silk-Screening Equipment
- Solvent Reclaim Equipment
- Steam Cleaning Equipment
- Textile Manufacturing
- Vacuum Forming



Note: The cast-in thermal components shown on pages 3-6 through 3-14 are merely a sampling of our capabilities.

Let the endless possibilities spark your imagination!

Put our knowledge and experience to work for you.

Challenge us!
You will be glad you did.

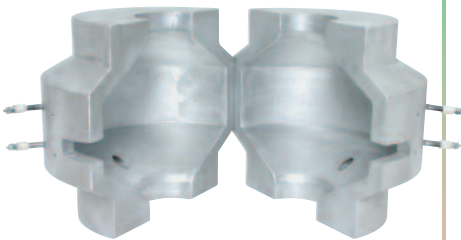
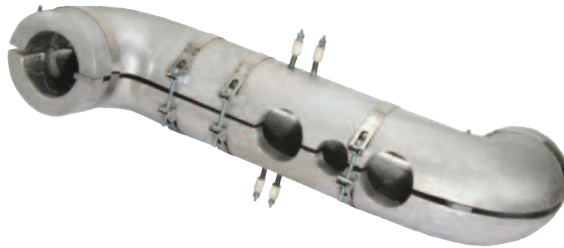
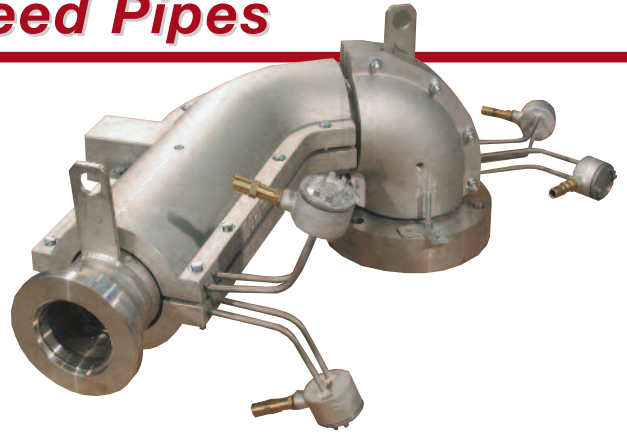
We Welcome Your Inquiries

Cast-In Heaters for Transfer/Feed Pipes

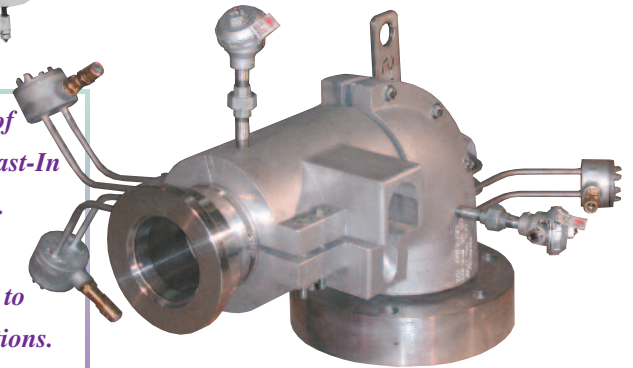
Tempco offers the perfect solution to heat Complex Transfer/Feed Pipes

Transfer pipes used in large-scale extrusion lines are difficult to heat because of their irregular geometry. They are not machined cylinders so proper contact and heat transfer are difficult to achieve.

Consequently, a special Cast-In Heater must be engineered for each pipe to accommodate its individual characteristics. Typically, this entails the customer sending the pipe to Tempco and our Engineering staff designing a Cast-In Heater System that will optimally fit the pipe. The quality of the process will be improved because hot spots and/or unevenly heated surfaces can be eliminated. In some cases, we cast the heater directly onto the pipe.



*Let Tempco's Creative Team of
Professionals Tackle Your Next Cast-In
Thermal Component Project.
We Have the Technology,
Infrastructure & Commitment to
Exceed Our Customers' Expectations.*



Special Cast-In Process for Unusual and Complex Applications



In the event that a cast-in heater cannot be made the conventional way for assembly into a machine part, Tempco has the expertise to directly attach a tubular heating element or a tube for cooling purposes to a customer supplied part.

By making a wood pattern with the required shape we can create a sand mold to encapsulate the entire assembly and pour the molten aluminum or bronze over the part.

The sample depicted in this picture represents the typical process. In this case, a tubular heating element is attached to a steel roller and is then placed in a sand mold prior to casting. After casting, the roller OD is machined per customer specifications — in addition, the aluminum roller will be vulcanized with rubber. The finished heated roller will be used in a laminating web press.

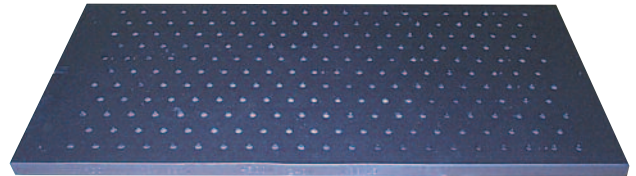
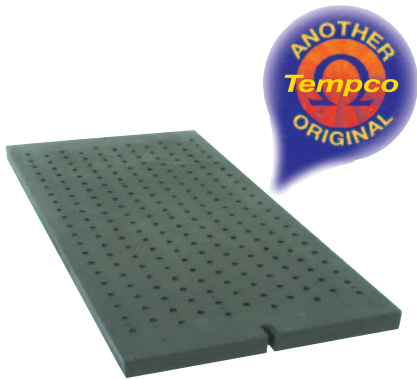


Cast-In Heaters for Semiconductor Manufacturing

Cast-In Heaters for the Semiconductor Processing Industry

Tempco has been at the forefront of the industry, addressing the challenges of stringent operating parameters and high quality requirements faced by original equipment manufacturers specializing in the semiconductor, wave solder and reflow surface mount processes.

By employing state-of-the-art technologies and by utilizing our acquired knowledge as a company, we have met the challenges by offering and delivering excellence in the design, engineering and manufacturing of a complete selection of innovative, reliable and high quality cast-in aluminum thermal component products.



Cast-In Thermal Platens for Wave Solder & Reflow Surface Mount Equipment

Tempco's highly engineered platens are capable of maintaining a temperature gradient of 5°F (2.77°C) across the entire working surface of the heater platen at the process operating temperature. The innovative design of this cast-in thermal platen incorporates the dual functions of being both a radiant and a convection heat source.

Cast-In Heaters for Wafer Processing

Tempco offers a complete selection of highly customized semiconductor process heaters which include *Pedestal Heaters, Pedestal Heaters with Integrated Cooling Capabilities, Bake Platen Heaters, High-Temperature Platen Heaters with Interference Press Fit Tubular or Cable Heating Elements*. For this type of platen heater construction the available base alloys are *Aluminum, Brass or Bronze*.

Our metallurgical knowledge and foundry expertise are the catalyst for producing cast-in heaters with the precise heat profiles and temperature gradient required for the process. Tempco's state-of-the-art CNC machining capabilities will ensure that the working surface requirements of the part are precisely machined to customer requirements, including extremely flat surfaces, to within 0.0005 in (0.0127 mm) for optimizing the performance of the application.

In order to satisfy the stringent requirements of the industry, these products are manufactured under rigid quality control standards. Specific attention is directed to the heating element design and the casting processes.



Design Features & Options

- * *Casting Maximum Surface Temperature*
Aluminum Alloy 319: 700°F (371°C)
Aluminum Alloy 356: 750°F (399°C)
- * *Interference Press Fit Construction – maximum surface temperature depends on base alloy used*
- * *Surface Finish – Hard-Coat Anodized*
- * *Built-in Temperature Sensors*
- * *Selection of heating element and cooling tube terminations*



Note: Cast-In heaters for semiconductor processing are made to customer specifications. For technical assistance, engineering data and available options

please refer to pages 3-4 and 3-5. When ordering, please provide detailed design drawings including dimensions, critical tolerances, watts, volts, and any other features or special requirements.

Cast-In Heaters for the Food Service Industry

Offering a Multitude of Eye-Opening Options

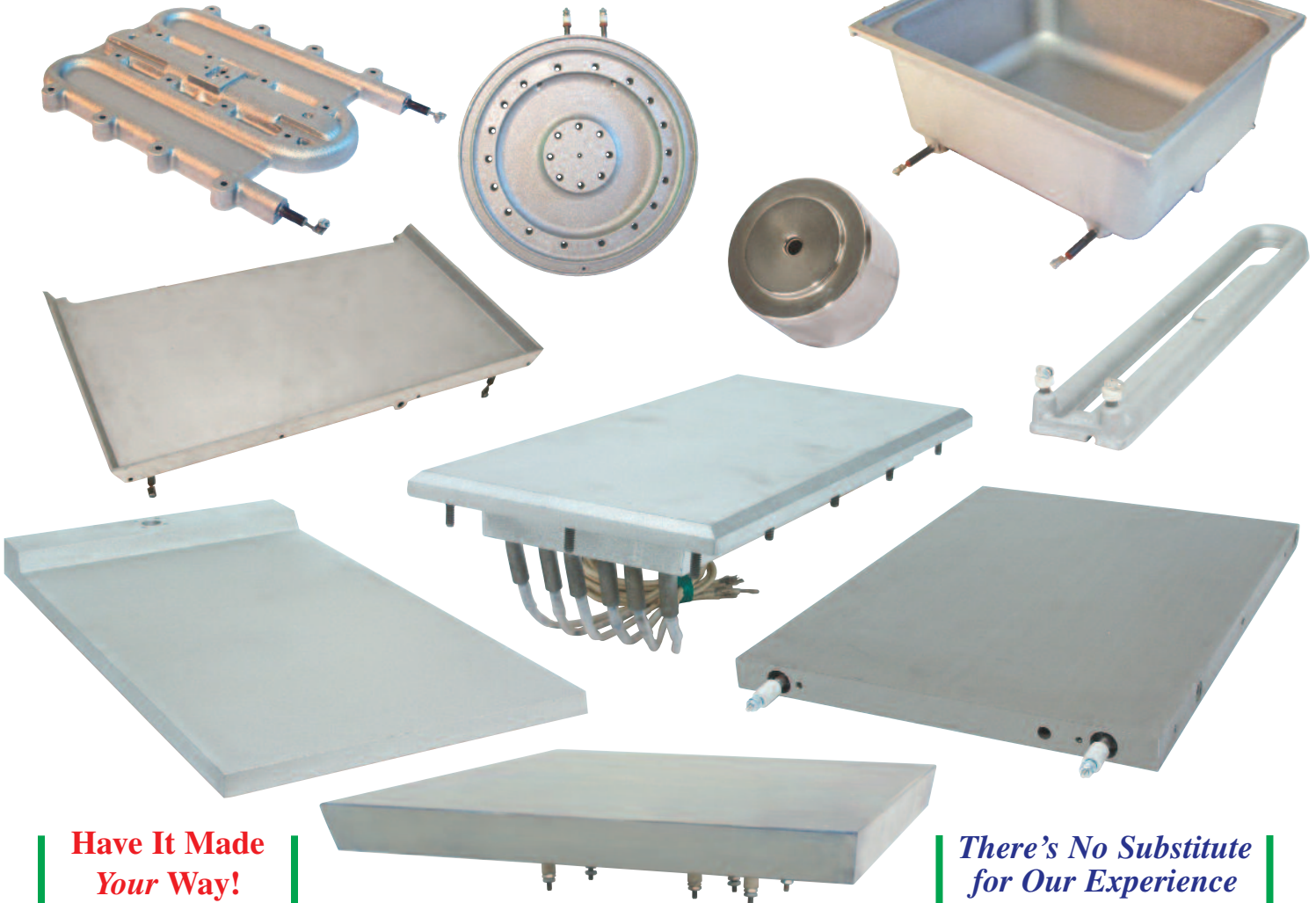
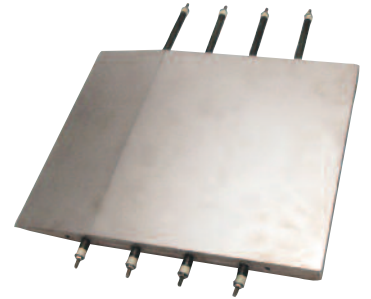
Tempco's cast-in heater products are an excellent choice to satisfy the food service industry's demanding requirements. Tempco demonstrates its value-added supplier capabilities with Food Service OEMs through our remarkable versatility and engineering expertise. Tempco offers the equipment manufacturers the option of manufacturing an existing design at a superior value, or evaluating the current heating design requirements and proposing a Cast-In Heater that offers great functionality, reliability and value.

Exceptional Performance and Reliability for Use on Food Service Equipment

Equipment manufacturers must assure their customers in the food service equipment market that their product will be reliable and trouble-free. Tempco Cast-In Heaters are a sure step toward achieving this mandate. Cast-In Heaters assure long life and exceptional performance because of their unique design characteristics. They feature a tubular heating element cast into a highly thermal conductive aluminum alloy, yielding exceptional uniform heat profiles unattainable with strip heaters or tubular heating elements that are sometimes clamped to a working surface.

Special Features to Improve Functionality

Tempco excels by incorporating unique modifications to our Cast-In heaters designed to benefit the functionality of our customers' processes. Threaded studs are cast into the aluminum body to readily accommodate mounting in the equipment. Heaters featuring cast flanges with machined grooves and "O" Rings can be made to isolate the terminal area in a wash-down environment. Special moisture resistant terminations can be provided when splash water or contaminants are present. In applications where food may come into contact with the casting, working surfaces can be Teflon® coated or Electroless-Nickel plated.

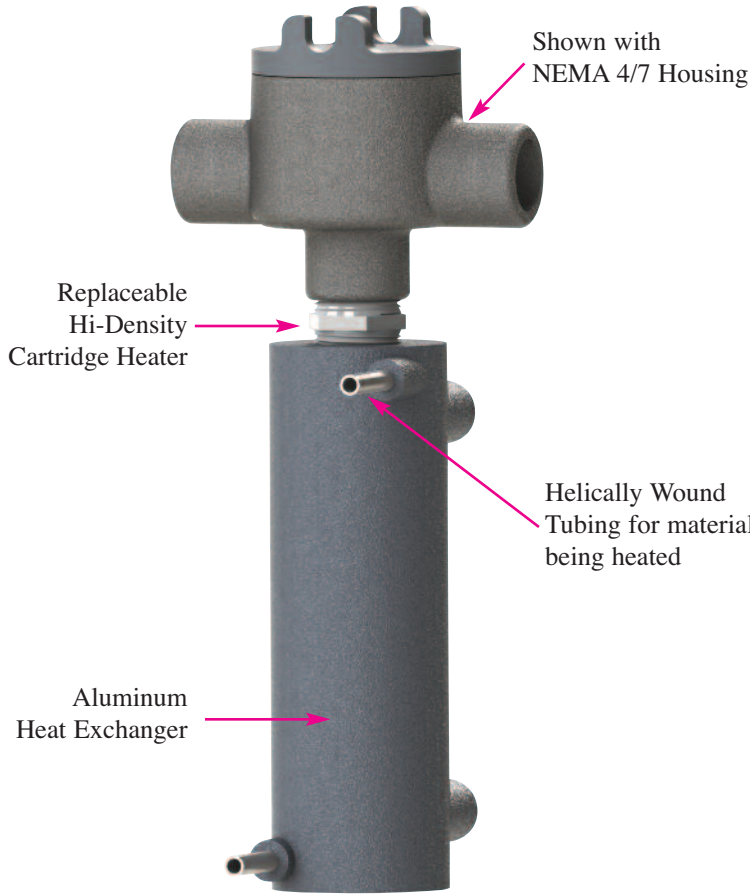


**Have It Made
Your Way!**

***There's No Substitute
for Our Experience***



CHX-100 Series Circulation Heater



Standard Design Features

- * Seamless 316 SS Tubing for fluid flow
- * Replaceable 5/8" diameter Hi-Density Cartridge Heater
- * Cast Aluminum heat exchanger body
- * Operating pressure up to 3000 PSI
- * Operating temperature up to 350°F (177°C)
- * NEMA 4/7 enclosure with standoff standard

Optional Design Features

- * Process Thermocouple
- * Overtemperature Thermocouple
- * High Limit Thermostat

Typical Applications

- Solvent heating (MEK, NMP, ACT, EKC, others)
- Heating of Air, CO₂, Nitrogen and similar gases
- Heating of non-flammable gases
- De-ionized water heating
- Steam generation
- Glycol heating
- Heating ink in printing
- Diesel and Fuel heating
- Packaging sterilization
- Analytical instrumentation
- Food and beverage heating
- Coating and Paint heating

Construction

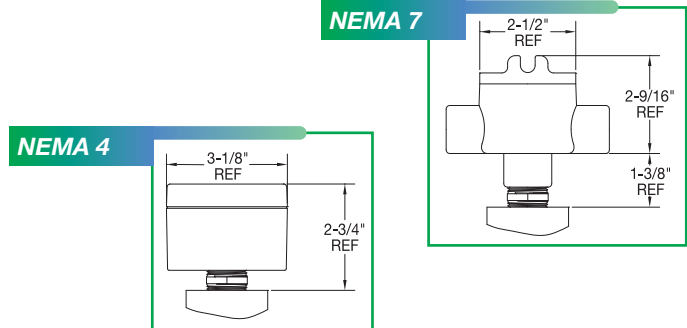
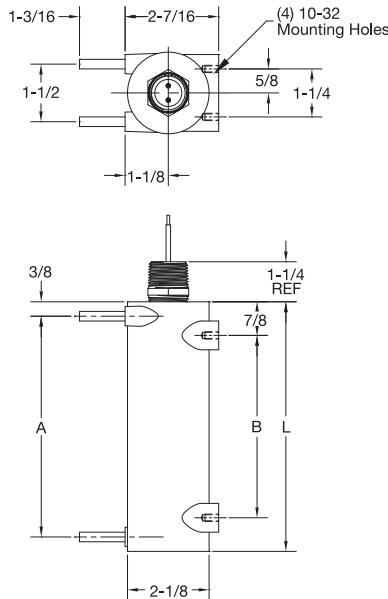
The CHX-100 circulation heater is a compact lightweight unit used for heating gases or liquids. The material being heated is pumped through the coiled seamless 316 SS tubing which has been cast into an aluminum body that acts as the heat exchanger. A replaceable Hi-Density cartridge set into a hole bored into the aluminum is the heat source. The material being heated never comes into contact with the HD cartridge heater.

Standard (Non-Stock) Sizes and Ratings

Heater Length (in)	Watts	Volts	Terminal Box Type	Tube Fitting Type	Thermocouple				Thermostat	Part Number
					Calibration Type	Style	Termination Type	Lead Length (in)		
6.5	300	120	Nema 4/7	—	J	Spring Adjustable	Std. Plug	60	—	CHX10010
6.5	300	208	—	—	—	—	—	—	Yes	CHX10070
6.5	300	240	Nema 4	—	K	Armor Cable Adjustable	Std. Plug	48	—	CHX10085
6.5	500	240	Nema 4	—	J	Spring Adjustable	Spade Lugs	48	—	CHX10135
6.5	500	208	Nema 4/7	—	—	—	—	—	Yes	CHX10148
6.5	750	208	—	—	J	Spring Adjustable	Spade Lugs	36	—	CHX10165
6.5	750	240	Nema 4	—	K	Armor Cable Adjustable	Std. Plug	60	—	CHX10182
12.5	900	240	Nema 4/7	HS	—	—	—	—	Yes	CHX10210
12.5	1000	240	Nema 4/7	—	K	Armor Cable Adjustable	Std. Plug	60	—	CHX10220
12.5	1200	240	Nema 4/7	HS	J	Spring Adjustable	Spade Lugs	36	—	CHX10235
12.5	1500	240	Nema 4/7	—	K	Armor Cable Adjustable	Std. Plug	48	—	CHX10242
12.5	1500	120	Nema 4/7	HS	K	Armor Cable Adjustable	Std. Plug	60	—	CHX10248



CHX-100 Series Circulation Heater



Length "L"	Inlet-to-Outlet Centerline "A"	Mounting Holes "B"	Flow Tube OD	Flow Tube Material
6.5	5.75	4.75	1/4	316 SS Seamless
12.5	11.75	10.75		

Ordering Information

To process your order or quotation, please specify the following information.

Heater Specifications:

Dimensions

Length "L": 6.5" 12.5" Custom _____

Electrical Specifications

Watts _____ (3,000W Max.) Volts _____ (240V Max., Single Phase only)

Termination Type

Type CN – NPT Fitting with 10" Leads

Terminal Protection Box

NEMA 4 NEMA 7

Flow Tube Fittings

None "FF" Flared Seal Fitting "HS" Hi-Seal Fitting
(See page 3-52 for complete details.)

Optional Temperature Sensor Specifications:

Calibration

Type J Type K

Bayonet Style T/C

None "Style 1" Spring Adjustable "Style 2" Armor Cable Adjustable
(See page 14-3 for complete details.)

Termination

"Style B" 2-1/2" Split Leads "Style S" Spade Lugs "Style P" Standard Plug
(See page 14-9 for details.)

Length

36" 48" 60" 72" 96" 120" 144"

Optional Thermostat:

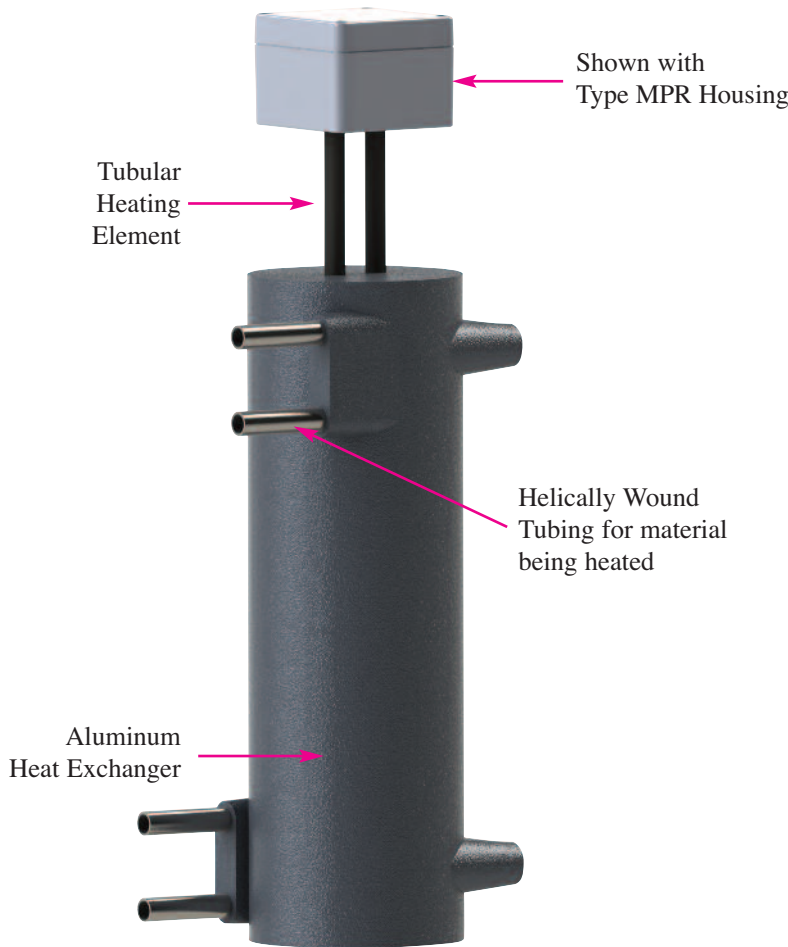
Thermostat

High Limit Manual Reset (Standard) High Limit Automatic Reset (Optional)
(See page 13-55 & 13-66 for details.)



Circulation Heaters

CHX-200 Series Circulation Heater



Standard Design Features

- * Seamless 316 SS Tubing for fluid flow
- * Cast-In Tubular Heater
- * Cast Aluminum heat exchanger body
- * Operating pressure up to 3000 PSI
- * Operating temperature up to 392°F (200°C)
- * Type C2 (General Purpose) housing with standoff

Optional Design Features

- * Process Thermocouple
- * Overtemperature Thermocouple
- * Type MPR (Moisture Resistant) or Type EP (Explosion Resistant) Housings

Typical Applications

- Solvent heating (MEK, NMP, ACT, EKC, others)
- Heating of Air, CO₂, Nitrogen and similar gases
- Heating of non-flammable gases
- De-ionized water heating
- Steam generation
- Glycol heating
- Heating ink in printing
- Diesel and Fuel heating
- Packaging sterilization
- Analytical instrumentation
- Food and beverage heating
- Coating and Paint heating

Construction

The CHX-200 circulation heater is a compact lightweight unit used for heating gases or liquids. The material being heated is pumped through the coiled seamless 316 SS tubing which has been cast into an aluminum body that acts as the heat exchanger. A tubular heating element is the heat source. The material being heated never comes into contact with the heating element.

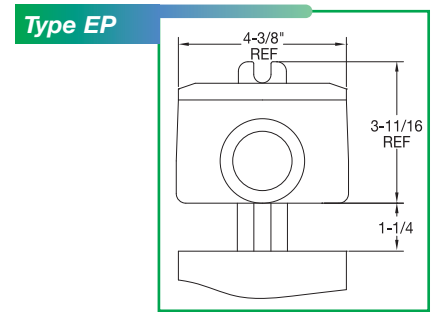
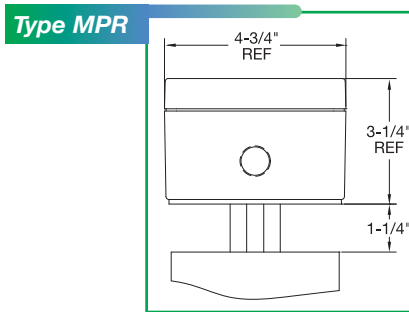
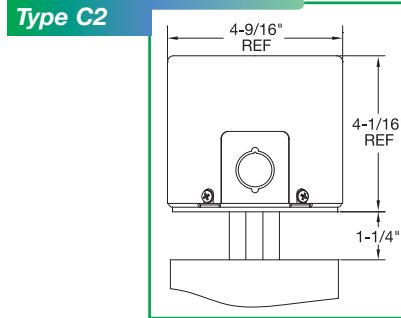
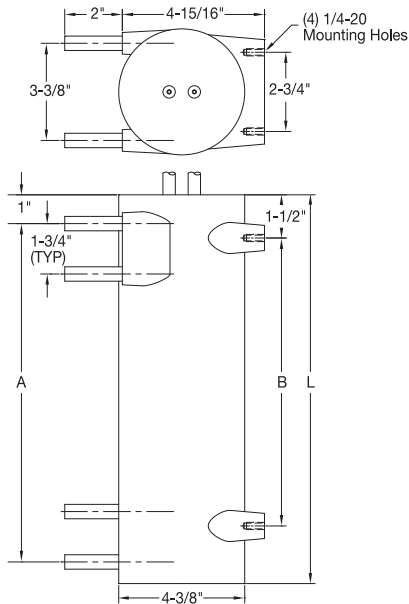
Standard (Non-Stock) Sizes and Ratings

Heater Length (in)	Watts	Volts	Phase	Termination Type	Terminal Box Type	Tube Config.	Tube Fitting Type	Thermocouple				T-Stat	Part Number
								Calibration Type	Style	Termination Type	Lead Length (in)		
13.5	1500	240	1	T7	Type EP	Single	—	J	Spring Adjustable	Std. Plug	48	—	CHX20015
13.5	1500	480	1	T7	—	Single	—	—	—	—	—	—	CHX20022
13.5	2250	240	1	T	Type C2	Single	—	K	Armor Cable Adjustable	Std. Plug	60	—	CHX20037
13.5	1500	208	1	T	Type C2	Single	—	J	Spring Adjustable	Spade Lugs	48	—	CHX20042
13.5	3000	240	1	T7	Type MPR	Single	—	—	—	—	—	—	CHX20065
17.75	3000	240	1	T7	—	Single	—	J	Spring Adjustable	Spade Lugs	60	—	CHX20072
17.75	3000	208	1	T	Type C2	Single	—	K	Armor Cable Adjustable	Std. Plug	48	Yes	CHX20084
17.75	4500	240	3	T7	Type MPR	Single	HS	—	—	—	—	—	CHX20086
17.75	3000	240	1	T	Type C2	Dual	—	K	Armor Cable Adjustable	Std. Plug	48	—	CHX20094
17.75	4500	240	1	T	Type C2	Single	HS	J	Spring Adjustable	Spade Lugs	60	Yes	CHX20098
23.75	6000	480	1	T7	Type MPR	Dual	—	K	Armor Cable Adjustable	Std. Plug	48	—	CHX20105
23.75	7500	480	1	T7	Type MPR	Single	HS	K	Armor Cable Adjustable	Std. Plug	60	—	CHX20112
23.75	9000	240	3	T7	Type EP	Dual	—	K	Armor Cable Adjustable	Std. Plug	60	—	CHX20118
23.75	12000	240	3	T7	Type EP	Dual	—	K	Spring Adjustable	Std. Plug	60	—	CHX20122
23.75	12000	480	3	T7	Type EP	Single	—	K	Armor Cable Adjustable	Std. Plug	48	—	CHX20132

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CHX-200 Series Circulation Heater



Length "L"	Inlet-to-Outlet Centerline "A"	Mounting Holes "B"	Flow Tube OD	Flow Tube Material
13.5	11.75	10	1/2	316 SS Seamless
19.5	17.75	16		
25.5	23.75	22		

Ordering Information

To process your order or quotation, please specify the following information.

Heater Specifications:

Dimensions

Length "L": 13.5" 19.5" 25.5" Custom _____

Electrical Specifications

Watts _____ (12,000W Max.) Volts _____ (480V Max.)

Single-Phase Three-Phase

Termination Type

Type "T" Type "T7" (See page 3-54 for details.)

Terminal Protection Box

Type C2 Type MPR Type EP (See pages 3-56 & 3-57 for details)

Flow Tube Configuration

Single Dual

Flow Tube Fittings

None "FF" Flared Seal Fitting "HS" Hi-Seal Fitting
(See page 3-52 for details.)

Optional Temperature Sensor Specifications:

Calibration

Type J Type K

Bayonet Style T/C

None "Style 1" Spring Adjustable "Style 2" Armor Cable Adjustable
(See page 14-3 for complete details.)

Termination

"Style B" 2-1/2" Split Leads "Style S" Spade Lugs "Style P" Standard Plug
(See page 14-9 for details.)

Length

36" 48" 60" 72" 96" 120" 144"

Optional Thermostat:

Thermostat

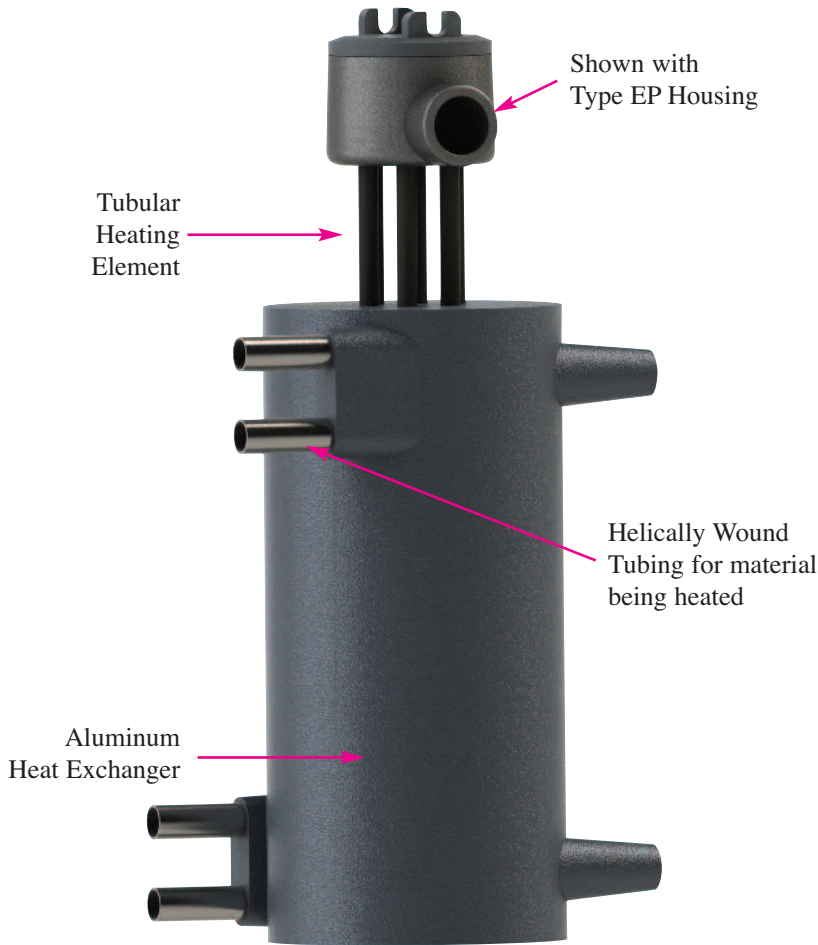
SPST DPST

NOTE: DPST requires larger Type C2 enclosure. Specify when ordering.
(See page 13-63 for details.)



Circulation Heaters

CHX-300 Series Circulation Heater



Standard Design Features

- * Seamless 316 SS Tubing for fluid flow
- * Cast-In Tubular Heater
- * Cast Aluminum heat exchanger body
- * Operating pressure up to 3000 PSI
- * Operating temperature up to 392°F (200°C)
- * Type C2 (General Purpose) housing with standoff

Optional Design Features

- * Process Thermocouple
- * Overtemperature Thermocouple
- * Type MPR (Moisture Resistant) or Type EP (Explosion Resistant) Housings

Typical Applications

- ✦ Solvent heating (MEK, NMP, ACT, EKC, others)
- ✦ Heating of Air, CO₂, Nitrogen and similar gases
- ✦ Heating of non-flammable gases
- ✦ De-ionized water heating
- ✦ Steam generation
- ✦ Glycol heating
- ✦ Heating ink in printing
- ✦ Diesel and Fuel heating
- ✦ Packaging sterilization
- ✦ Analytical instrumentation
- ✦ Food and beverage heating
- ✦ Coating and Paint heating

Construction

The CHX-300 circulation heater is a compact lightweight unit used for heating gases or liquids. The material being heated is pumped through the coiled seamless 316 SS tubing which has been cast into an aluminum body that acts as the heat exchanger. A tubular heating element is the heat source. The material being heated never comes into contact with the heating element.

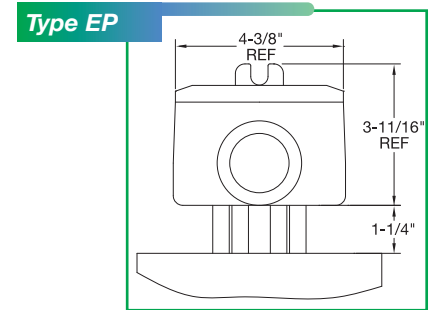
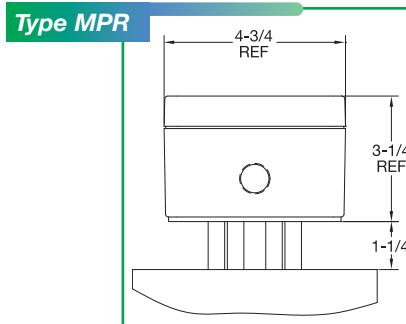
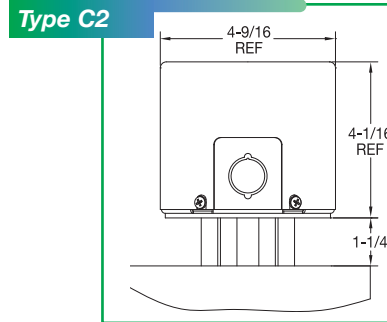
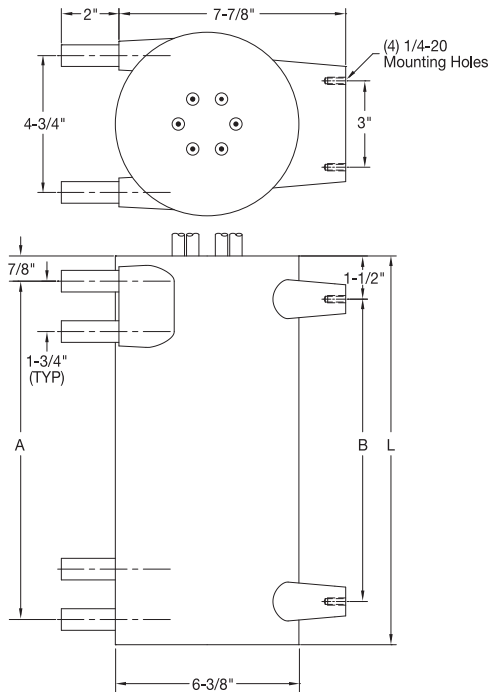
Standard (Non-Stock) Sizes and Ratings

Heater Length (in)	Watts	Volts	Phase	Termination Type	Terminal Box Type	Tube Config.	Tube Fitting Type	Thermocouple			T-Stat	Part Number	
								Calibration Type	Style	Termination Type			Length (in)
13.5	3000	240	1	T7	Type EP	Single	—	J	Spring Adjustable	Std. Plug	48	—	CHX30012
13.5	3000	480	1	T7	—	Single	—	—	—	—	—	—	CHX30016
13.5	4500	240	1	T	Type C2	Single	—	K	Armor Cable Adjustable	Std. Plug	36	—	CHX30022
13.5	3000	208	1	T	Type C2	Single	—	J	Spring Adjustable	Spade Lugs	48	—	CHX30028
13.5	4500	240	1	T7	Type MPR	Single	HS	—	—	—	—	Yes	CHX30036
19.5	6000	240	1	T7	—	Single	—	J	Armor Cable Adjustable	Spade Lugs	60	—	CHX30044
19.5	6000	480	1	T	Type C2	Dual	—	K	Spring Adjustable	Std. Plug	48	Yes	CHX30048
19.5	7500	240	3	T7	Type MPR	Single	HS	—	—	—	—	—	CHX30054
19.5	7500	480	3	T	Type C2	Dual	—	K	Armor Cable Adjustable	Std. Plug	60	—	CHX30056
19.5	9000	480	3	T	Type C2	Single	HS	J	Spring Adjustable	Spade Lugs	48	—	CHX30062
25.5	12000	480	3	T7	Type MPR	Dual	—	K	Armor Cable Adjustable	Std. Plug	36	—	CHX30068
25.5	12000	480	3	T7	Type MPR	Dual	HS	K	Spring Adjustable	Std. Plug	60	—	CHX30071
25.5	12000	240	3	T7	Type EP	Dual	—	K	Armor Cable Adjustable	Std. Plug	48	—	CHX30075
25.5	18000	240	3	T7	Type EP	Dual	—	K	Spring Adjustable	Std. Plug	60	—	CHX30078
25.5	18000	480	3	T7	Type EP	Dual	—	K	Armor Cable Adjustable	Std. Plug	48	—	CHX30084

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CHX-300 Series Circulation Heater



Length "L"	Inlet-to-Outlet Centerline "A"	Mounting Holes "B"	Flow Tube OD	Flow Tube Material
13.5	11.75	10	3/4	316 SS Seamless
19.5	17.75	16		
25.5	23.75	22		

Ordering Information

To process your order or quotation, please specify the following information.

Heater Specifications:

Dimensions

Length "L": 13.5" 19.5" 25.5" Custom _____

Electrical Specifications

Watts _____ (30,000W Max.) Volts _____ (480V Max.)

Single-Phase Three-Phase

Termination Type

Type "T" Type "T7" (See page 3-54 for details.)

Terminal Protection Box

Type C2 Type MPR Type EP (See pages 3-56 & 3-57 for details)

Flow Tube Configuration

Single Dual

Flow Tube Fittings

None "FF" Flared Seal Fitting "HS" Hi-Seal Fitting (See page 3-52 for details.)

Optional Temperature Sensor Specifications:

Calibration

Type J Type K

Bayonet Style T/C

None "Style 1" Spring Adjustable "Style 2" Armor Cable Adjustable
(See page 14-3 for complete details.)

Termination

"Style B" 2-1/2" Split Leads "Style S" Spade Lugs "Style P" Standard Plug
(See page 14-9 for details.)

Length

36" 48" 60" 72" 96" 120" 144"

Optional Thermostat:

Thermostat

SPST DPST

NOTE: DPST requires larger Type C2 enclosure. Specify when ordering.
(See page 13-63 for details.)

Cast-In Heaters – Large Thermo-Platens

Engineered Solutions With Advanced Technology in Cast-In Thermo-Platens

Tempco specializes in innovative engineering and manufacturing of thermal components. Coupled with our diverse foundry and machine shop capabilities, this expertise provides the know-how behind our product line offering of large electrically heated platens that are manufactured by using our cast-in heater technology.

This casting process incorporates the heat source (tubular heating element) as an integral component of the platen. This process provides a more cost-effective and reliable approach than drilling holes for cartridge heaters or clamping inefficient and cumbersome-to-use strip heaters to the back surface of a platen.

Tempco's thermo-platens are made from aluminum, bronze and brass alloys. These materials provide excellent thermal conductivity for rapid heat transfer with uniform temperature gradients. To further enhance heat profiles, the formation and the location of the tubular heaters within the casting are precisely engineered using the latest computer design techniques.

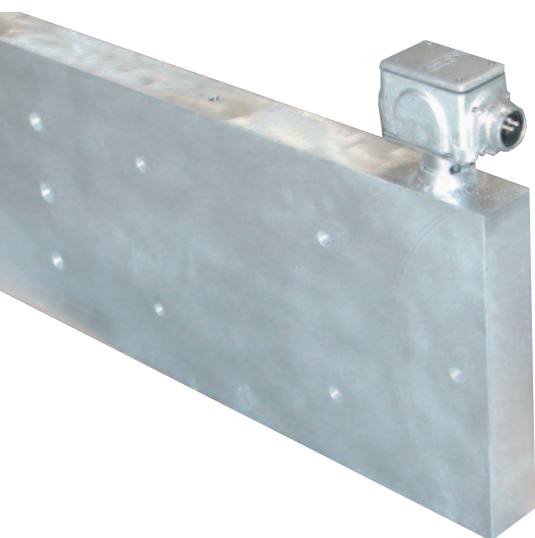
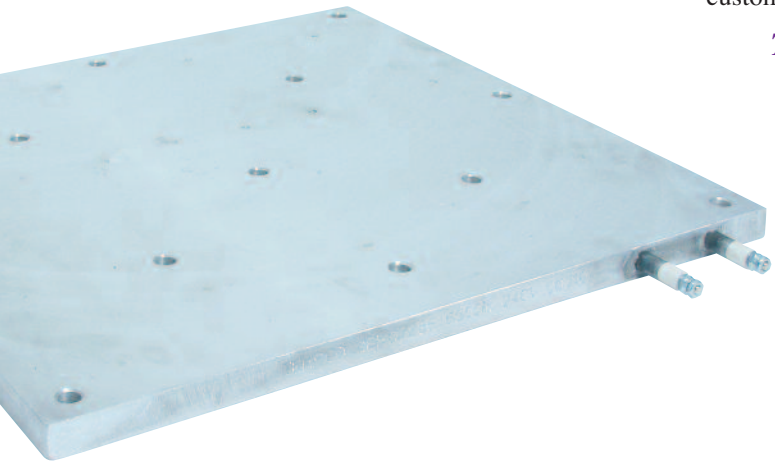
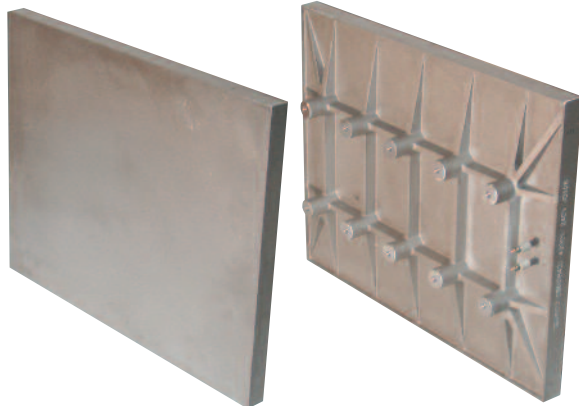
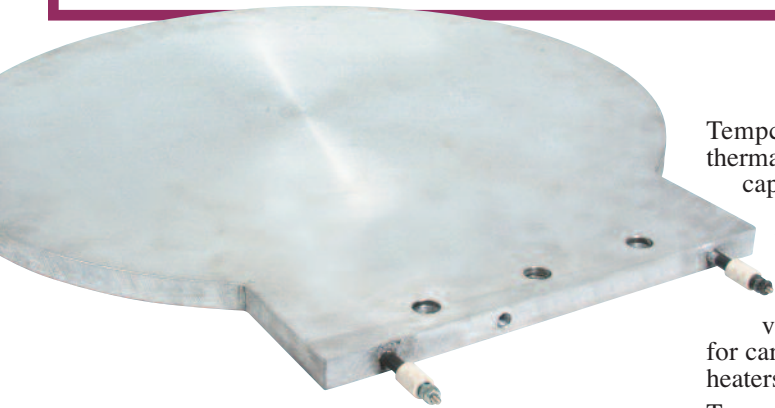
When the process requires heating and cooling cycles, thermo-platens can be manufactured with the addition of stainless steel tubing to provide liquid cooling capabilities.

The working surfaces and/or contours of the thermo-platen can be machined to your specifications up to and including blanchard ground for extremely flat surface requirements.

Our capabilities for manufacturing large thermo-platens offer you the freedom to think big in your design requirements.

We offer complete engineering services and support, working with you every step of the way from prototype to production to ensure customer satisfaction.

There is no substitute for our acquired knowledge.



Cast-In Heaters – Large Thermo-Platens

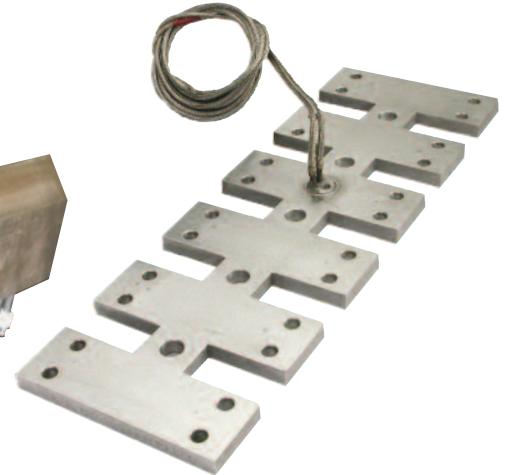
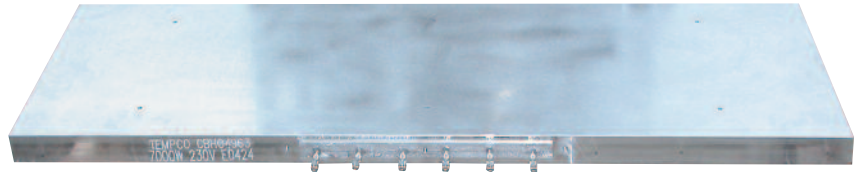
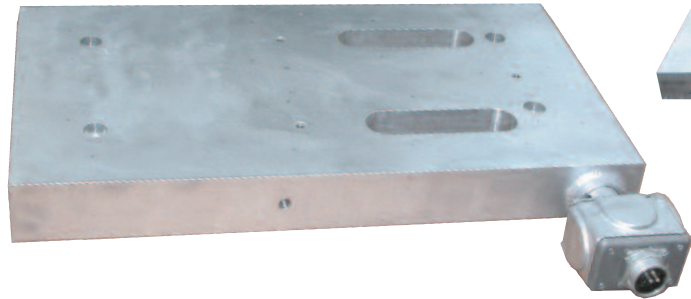
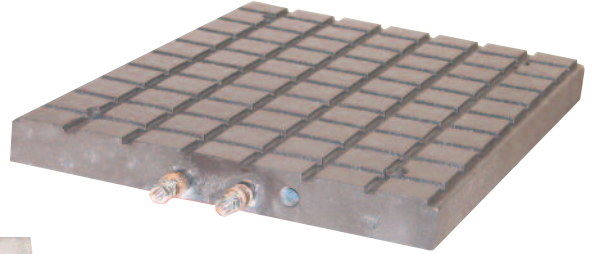
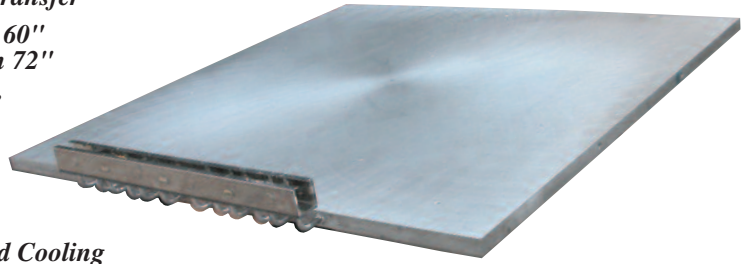
Design Features & Options

- * **Castings:**
 - Aluminum up to 600 lbs.
 - Bronze & Brass up to 300 lbs.
(Recommended for high operating pressures and temperatures)
- * **Exceptionally Long Operating Life**
- * **Single- or Three-Phase Circuit**
- * **Surface Finishes: Electroless Nickel-Plated, Teflon®, Hard-Coat Anodizing, Magnaplate**
- * **Thermowells for Temperature Sensors**
- * **Excellent Heat Transfer**
- * **Maximum width 60"
Maximum length 72"**
- * **Uniform Surface Temperatures**
- * **Machined to Customer Specifications**
- * **Heating & Liquid Cooling Functions**
- * **Various Heater & Cooling Tube Terminations**

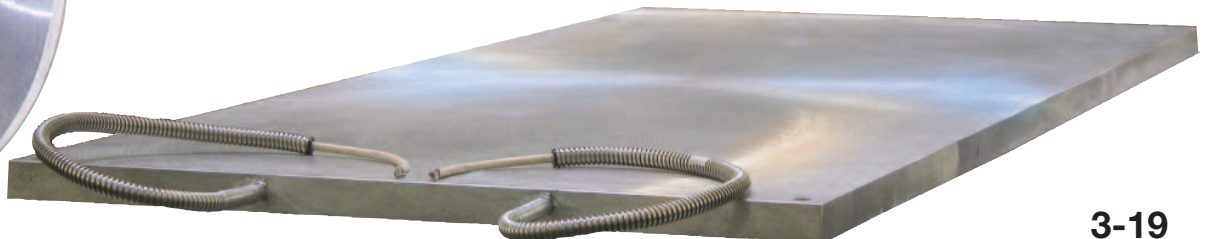


Note: Cast-In Thermo-Platens are made to customer specifications. For technical assistance, engineering data and available options please refer

to pages 3-4 & 3-5. When ordering please provide detailed design drawings, including dimensions, critical tolerances, electrical ratings, watts, volts, single- or three-phase, and any other feature or special requirements.



*When Your Needs Call for **LARGER** Than **BIG**
Cast-In Thermal Platens & You Need Them **NOW** –
Look No Further Than **Tempco!**
We Can Do It – We Have the Technology!*



Cast-In Thermal Components – Liquid Cool



Cast Aluminum Motor Housing & Base with Integral Liquid Cool Capabilities
U.S. Patents: # 6222289 & #5939808

Engineered Solutions With State-Of-The-Art Technology in Liquid Cool Aluminum Cast-In Thermal Components

You can count on Tempco to continue our tradition of leadership by providing cutting edge solutions as we address the needs and challenges of specialized segments of industries that depend on cooling for the operating efficiency and performance of their equipment.

As a result of market demand for such products, Tempco introduces our capabilities of producing a complete selection of made-to-order liquid cool aluminum cast-in thermal components, available in both complex geometrics or simple platens.

The thermodynamic relationship between the liquid heat transfer media circulating through the precisely formed and configured stainless steel cooling tube and the aluminum alloy casting maximizes heat removal efficiency. Tempco's liquid cool cast-in thermal component technology is a novel approach to clean, efficient and reliable process cooling of difficult and complex applications.

Consult Tempco with your challenging applications. Our capabilities for manufacturing these complex liquid cool thermal components offer you the advantage to think outside the box. Let the endless possibilities spark your imagination, allowing you the freedom to customize your design.



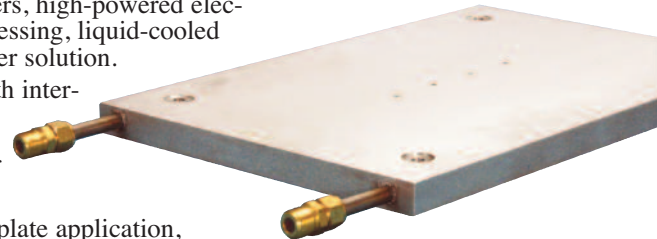
Let Tempco's Creative Team of Professionals Tackle Your Next Cast-In Liquid Cool Thermal Component Project. We Have the Technology, Infrastructure & Commitment to Exceed Our Customers' Expectations.

Thermo-Platens for Liquid Cooling of High Density Electronic Systems & Other Applications Requiring Flat Surface Cooling

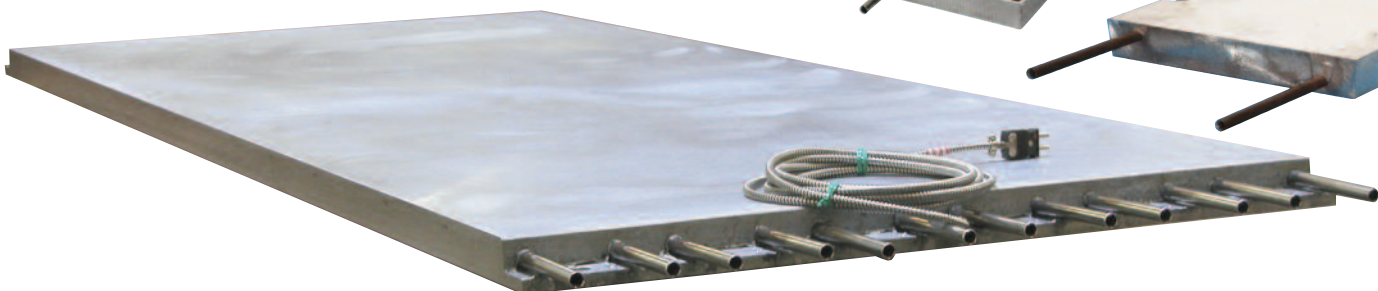
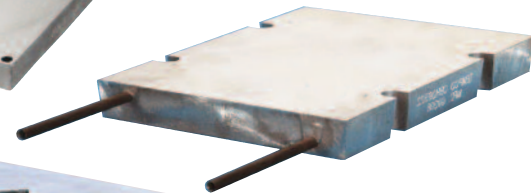
In a world of compact designs with increased power densities, more heat is being generated than can be properly dissipated by conventional air blowers. For applications that have high-watt densities such as lasers, high-powered electronics, telecommunications, and semiconductor processing, liquid-cooled cold plates are the ideal high-performance heat transfer solution.

Mounting the components on an aluminum platen with internal liquid cooling tubes replaces forced air cooling to achieve and maintain lower electronic cabinet temperatures, thus increasing the operating service life of the individual components and the system.

When drilling and/or tapping is required for the cold plate application, Tempco will perform the machining to ensure that the product's integrity is not compromised.



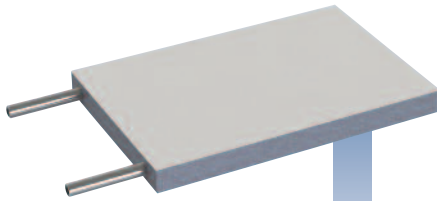
Now You Can Give Your Electronics a Chill!





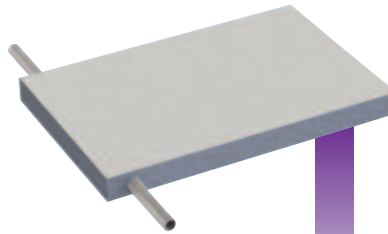
Thermo-Platen Specifications

Typical Cooling Tube Exit Locations For Cast-In Thermo-Platens



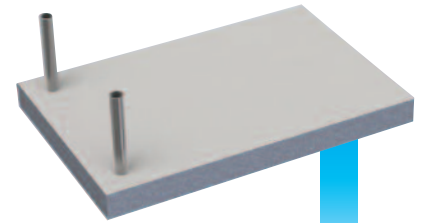
Type CT1

Cooling tubes exiting through the thickness toward the ends of the width or length.



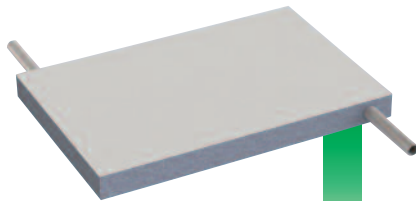
Type CT2

Cooling tubes exiting through the thickness opposite of each other toward the ends of the width or length.



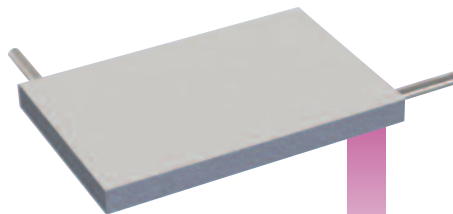
Type CT3

Cooling tubes exiting at the ends of the width or length through the top surface.



Type CT4

Cooling tubes exiting through the thickness at opposite ends of each other toward the ends of the width or length.



Type CT5

Cooling tubes exiting through the thickness at opposite ends of each other with one in the width and one in the length.

Complex Geometrics



Note: Cooling Tube Exit Locations for Complex Geometric Liquid Cool Thermal Components can be at any practical location for the shape and size of the individual thermal component.

For Cooling Tube Termination Optional Fittings and Accessories See pages 3-52 and 3-53.

Standard Cooling Tube Fittings For Cast-In Thermo-Platens

Type FF Flared Seal Fittings



Brass flared seal fittings are well adapted for low to medium pressure and resistant to mechanical pullout. Available for 3/8" and 1/2" diameter tubing with SAE 45° flare.

Diameter Tubing	Thread	Part Number
3/8"	5/8"-18	FTG-124-101
1/2"	3/4"-16	FTG-124-104

Type HS Hi-Seal Fittings



Hi-seal brass fittings are highly dependable under the most adverse conditions. For reliable and trouble-free service with ease of installation, we strongly recommend hi-seal fittings. Available for 3/8" and 1/2" diameter tubing. Male thread is 1/2" NPT for 1/2" tube and 3/8" tube.

Diameter Tubing	Part Number
3/8"	FTG-118-124
1/2"	FTG-118-116

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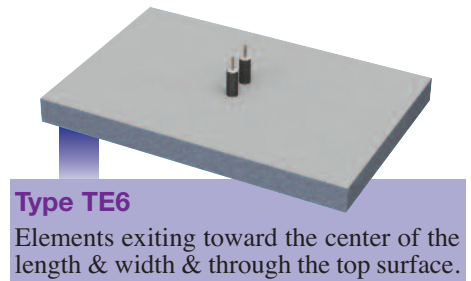
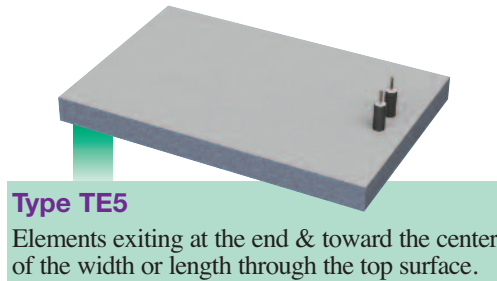
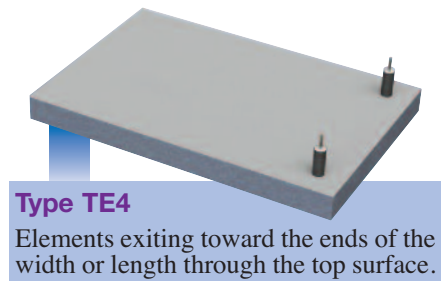
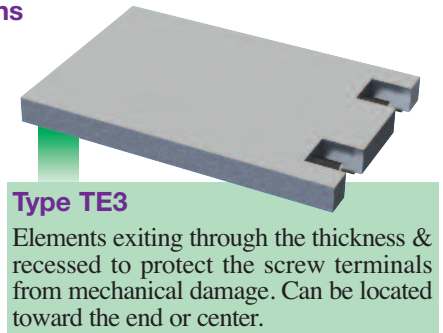
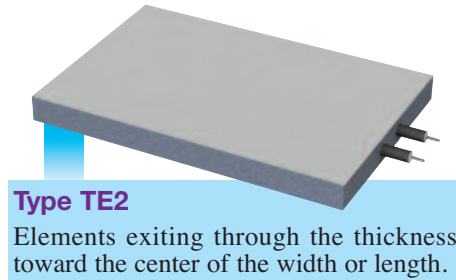
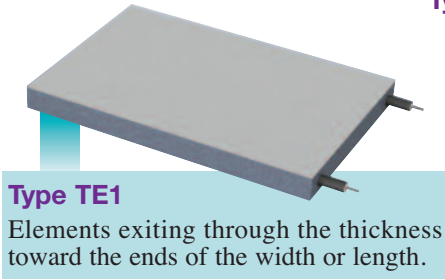


Heating Element Specifications

Continued from previous page...

Thermo-Platen Specifications

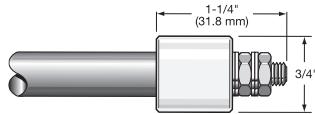
Typical Tubular Heating Element Exit Locations



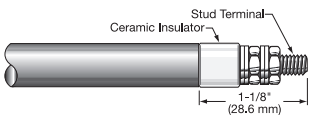
Most common thermo-platen terminations listed below; for additional terminations and complete details, see pages 3-54 and 3-55.

Standard Tubular Heater Terminations for Thermo-Platens

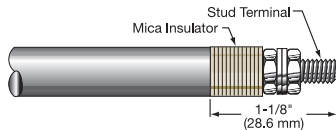
Type S – Heavy Duty Ceramic Insulators (Standard Unless Otherwise Specified)



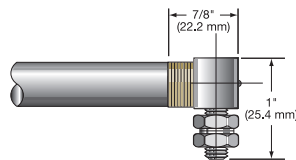
Type T7– Ceramic Insulator: same diameter as heating element



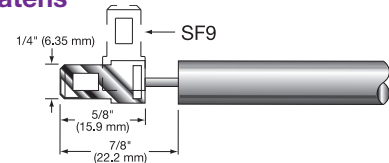
Type T – Mica Insulator: same diameter as heating element



Type R – Mica Washers with 90° Blockhead Screw Terminal



Type SF & SF9 – Quick-disconnect Spade Tabs



Type F – Flexible Leads with Fiberglass Sleeve



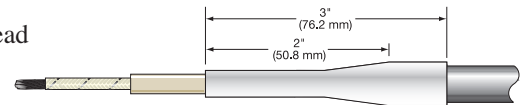
Type R1 – Flexible Stainless Steel Armor Cable



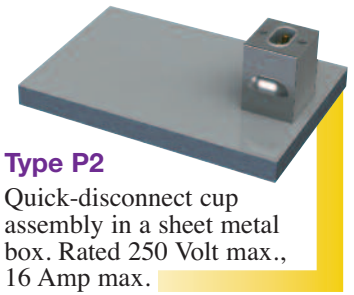
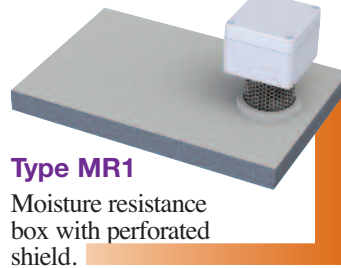
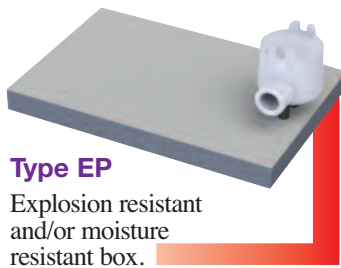
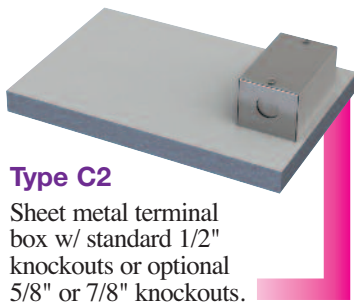
Type R1A – Stainless Steel Wire Overbraid



Type TS – Flexible Lead with Shrink-Down Teflon® Sleeve



Typical Terminal Box Options and Locations





Thermo-Platen Quote Request Form

Ordering Information

To process your order or quotation, please specify the following information.

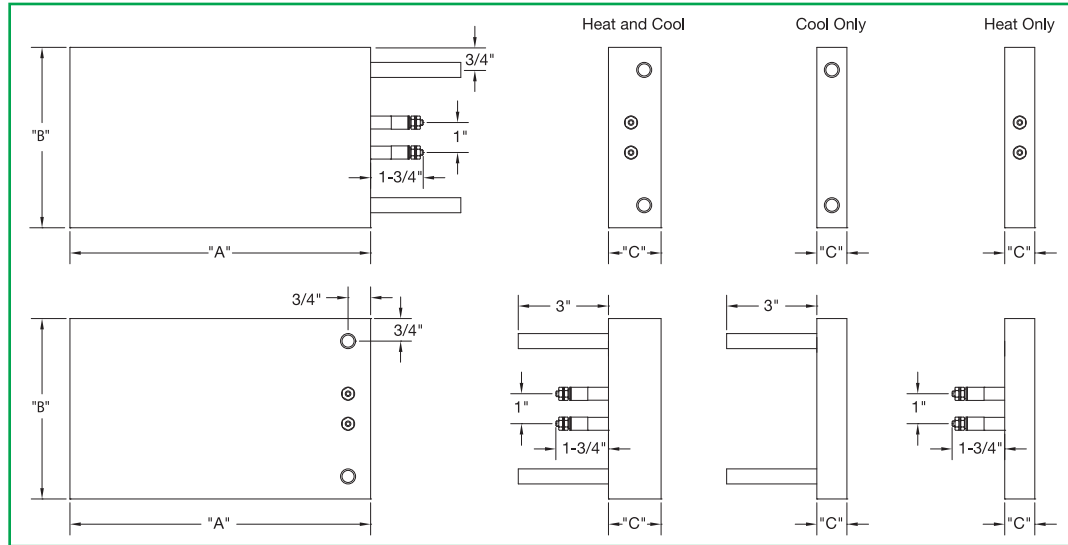


Note: Cast-In Thermo-Platens are made to customer specifications.

For technical assistance and engineering data, please refer to pages 3-4 & 3-5.

For available options, please refer to pages 3-21 & 3-22.

When ordering, please provide detailed drawings including dimensions, critical tolerances and any other feature or special requirements.



Thermo-Platen Type

- Heat Only Cool Only Heat and Cool

Dimensions

Length "A" _____ Width "B" _____ Thickness "C" _____

Material Specifications

- Aluminum Bronze Brass

Electrical Specifications

Watts each element _____ Volts each element _____ Phase _____

Element Exit Location

- "TE1" "TE2" "TE3" "TE4" "TE5" "TE6" (see page 3-22)
 Other, Specify _____ (provide detailed drawing)

Termination Style

- "S" Post Terminals "T7" Post Terminals "T" Post Terminals
 "R" 90° Blockhead "SF" Quick-disconnect Spade Tab
 "SF9" 90° Quick-disconnect Spade Tab "F" Plain Leads
 "R1" Armor Cable Leads "R1A" SS Wire Overbraid "TS" Leads and Shrink Sleeve
 "P1" Quick-Disconnect Cup assembly Other, Specify _____ (See page 3-22)

Terminal Protection Box

- None "C2" Standard "EP" Explosion Resistant "MR1" Moisture Resistant
 "P2" Quick-Disconnect Cup assembly

Cooling Tube Exit Locations

- Type CT1 Type CT2 Type CT3 Type CT4 Type CT5
(See page 3-21 for details)

Cooling Tube Specifications

- 1/4" O.D. SS 3/8" O.D. SS 1/2" O.D. SS
 3/8" O.D. Incoloy® 1/2" O.D. Incoloy® Dual Cooling Tubes
 Standard Wall Thickness Other Wall Thickness, Specify _____
(See page 3-5 for Standard Wall Thickness Information)

Cooling Tube Fittings

- "FF" Flared Seal "HS" Hi-Seal Fittings
 Other, Specify _____ (See page 3-52)

Surface Finish

Machined or As-Cast. *Indicate surfaces to be machined.*

Special Cast-In Features

Holes, Cutouts, Slots, Bevels, Mounting Studs, Stand-Offs and Taper Angles.
For special features, a detailed drawing is required.

TEMPCO Offers the Largest Selection of Quality Cast-In Heaters for Plastics Processing

Over 15,000 Existing Designs on File and Growing



Single Source Advantage – From Beginning to End

Tempco has set industry standards as the leading manufacturer of Aluminum, Brass and Bronze Cast-In Heaters in a variety of standard designs and styles for the plastics processing industry.

However, we realize not every Cast-In Heater application can be solved by one of our standard products. Our solutions help our customers and create new opportunities for Tempco. It is our engineering talents and vast application knowledge that provide a winning combination for solving specific application problems with custom designed and manufactured Cast-In Heaters.

The design, engineering and manufacturing of Tempco Cast-In Heaters is done under one roof—administered by a team of experienced professionals with a vast knowledge in product design and proven foundry expertise, producing the best quality Cast-In Heaters money can buy.

Computer Designed Tubular Heaters manufactured under our rigid quality control standards are the heat source for the Cast-In Heater. They can be formed into endless configurations to accommodate any practical Cast-In Heater shape.

Wood Pattern Shop A full-service in-house wood pattern shop builds, modifies and maintains patterns.

Foundry Capabilities Tempco's modern foundry produces Low Pressure Permanent Mold, Tilt Pour Permanent Mold, and No-Bake Mold Sand Castings. Our team of professionals with years of practical experience provides the knowledge essential for producing quality cast-in heaters for the plastics processing industry.

Cast-In Heaters are produced in-house by a team of experts for unparalleled quality!

Tempco's Exclusive **Cool TO-THE TOUCH™** Heating & Air Cooling Shroud Systems for Extrusion Processing Can be found on pages 3-26 through 3-32

Consult us with your requirements. No one can do it better than Tempco – Let us prove it!

SATISFACTION GUARANTEED!

Plastics Extrusion Processing

Our Cast-In Band Heaters have proven to be the most effective method for heating and cooling the barrels of extruders used in the plastics processing industry.

Tempco offers Cast-In Band Heaters with liquid or air cooling. Liquid cooling incorporates tubing cast in as part of the heater assembly, allowing water or heat transfer solutions to remove excess heat. Air cooling uses fins cast to the Outer Diameter surface of the band heater;

blowers and specially designed shrouds aid in heat removal.

Aluminum is the predominant alloy used for the Cast-In Heater. Copper-based alloys (Bronze and Brass) are used when the required operating temperatures exceed the maximum for Aluminum. Bronze or Brass are recommended for heated platens in molding presses as they can withstand a greater force of pressure per square inch than Aluminum.

Typical Plastics Processing Applications For Tempco's Cast-In Heaters

- ↔ Extruders
- ↔ Blow Molding
- ↔ Injection Molding
- ↔ Extrusion Die Heads
- ↔ Silk-Screening
- ↔ Laminating Equipment
- ↔ Heat Sealers
- ↔ Vacuum Forming
- ↔ Compression Molding
- ↔ Polymer Compounding

When your needs call for Cast-In Heaters for Plastics Processing & you need them NOW!
Look no further than Tempco – we have an extensive inventory.
Custom manufactured with the best lead times in the Industry!

Experience Our Value-Added Services that are Second to None

Minimum Casting Thickness vs. Heating Element and/or Cooling Tube Diameters

Casting Thickness	Maximum Available Element Diameter	Maximum Available Cooling Tube Diameter	Maximum Element and Cooling Tube Combination
	Heat Only	Cool Only	Heat and Cool
5/8" (15.9 mm)	.260	1/4	—
3/4" (19.1 mm)	.375	3/8	—
1" (25.4 mm)	.430	1/2	—
1-1/4" (31.8 mm)	.430	1/2	.260 and 3/8
1-3/8" (34.9 mm)	.430	1/2	.315 and 1/2
1-1/2" (38.1 mm)	.430	1/2	.430 and 1/2
1-5/8" (41.3 mm)	.430	1/2	.430 and 1/2
1-3/4" (44.5 mm)	.430	1/2	.430 and 1/2
Finned Casting			
3/4" (19.1 mm)	.375	—	—
7/8" (22.2 mm)	.430	—	—
1" (25.4 mm)	.430	—	—
1-3/4" (44.5 mm)	.430	—	—

Casting Size & Weight Limitations

	Cylindrical	Platen
Minimum Inside Diameter:	1" (25.4 mm)	—
Maximum Inside Diameter:	48" (1219 mm)	—
Minimum Width:	—	1-1/2" (38.1 mm)
Maximum Width:	—	60" (1524 mm)
Minimum Length:	1-3/4" (44.5 mm)	4" (102 mm)
Maximum Length:	40" (1016 mm)	72" (1829 mm)
Finish:	125 RMS Standard or to customer spec.	
Gap (two-piece cylindrical cast-in band heaters):	1/4" (6.4 mm) top and bottom or to customer specification	
Maximum Weight:	Aluminum— 600 pounds Bronze & Brass— 300 pounds	

NOTES: Cylindrical heaters are made with two half-round heaters. Cast-In thermal components can be made in any practical size, weight and geometric shape.

CNC Machining

There are certain dimensional and/or finish tolerances or geometry that cannot be produced as cast and must be machined. Tempco offers a full service state-of-the-art machine shop featuring various types of CNC machine tools to perform all of the precision machining required—from simple to complex contour geometrics, including turning and/or boring, with repeatable accuracy from one machined casting to the next. Machinists also build and maintain permanent mold tooling for the low pressure and tilt-pour gravity feed casting processes.

Heating Element Electrical Specifications

Tubular Heater Diameter	.260"	.315"	.375"	.430"
Maximum Volts	240	277	480	600
Maximum Amps Per Element	15	30	40	40
Maximum Watt Density:	Aluminum Alloy—35 W/in ² on the element Bronze or Brass—45 W/in ² on the element			
Resistance Tolerance:	+10%, -5%			
Wattage Tolerance:	+5%, -10%			
<i>Three Phase available depending on casting size. Ground Studs can be added to most cast-ins.</i>				



Note: Tempco-Pak mineral insulated cable heaters can be used in place of tubular heating elements to fit physical constraints not possible with conventional heating elements. See catalog Section 5 for more details.

Maximum Alloy Surface Temperatures

Material	Max. Surface Temperature °F (°C)
Aluminum 319	700 (371)
Aluminum 356	750 (399)
Bronze	1350 (732)
Yellow Brass	1200 (649)

Cooling Tube Materials for Castings with Liquid Cooling

Tube Material	Tube OD and Wall Thickness
Stainless Steel (Standard)	1/4" O.D. × .028 wall
Stainless Steel (Standard)	3/8" O.D. × .035 wall
Stainless Steel (Standard)	1/2" O.D. × .049 wall
Stainless Steel (Optional)	5/8" O.D. × .049 wall
Incoloy® 840 (Optional)	1/2" O.D. × .049 wall
Tubing with heavier wall thickness is available upon request.	



Agency  US  Approvals

Cast-In Heater Elements are UL recognized under
UL File Number E90771 and CSA File 043099.

If you require UL Agency Approval, please specify when ordering.



Are You Operating Your Extruders with Liquid Cooling?

If You Answer Yes –

Then You Are SO Ready for a

TEMPCO

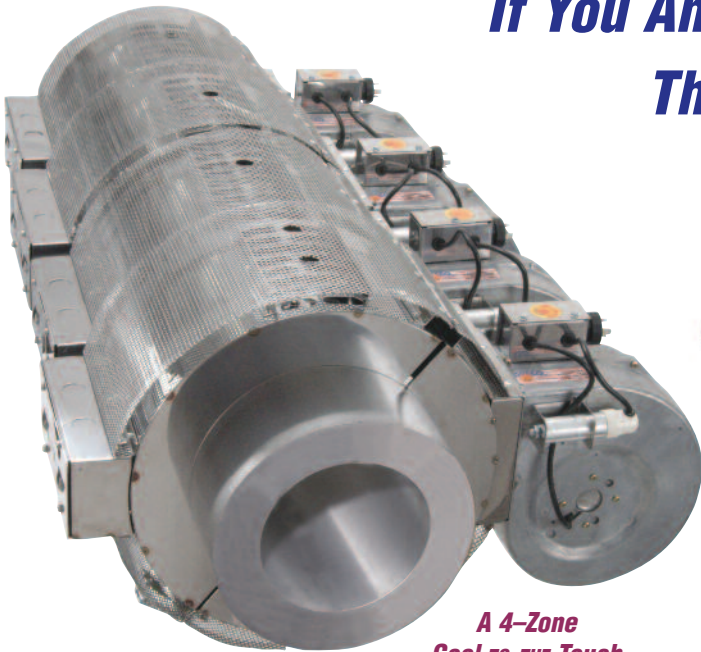
EXTREME

MAKEOVER

With Our Exclusive

Cool TO-THE Touch™

Shroud Systems



***A 4-Zone
Cool TO-THE Touch
Shroud System***

Let Tempco's state-of-the-art technology convert your extruder's existing heating and cooling system from antiquated, inefficient and costly to modern, highly efficient, and cost-effective.

We invite you to energize your extrusion business with Cool TO-THE Touch. It can take your profits to the next level.

The Challenge

We understand that choosing to make a change can be challenging and full of "What-If's?" Not to worry – Tempco warrants the performance of our systems. Our expert team will be with you every step of the conversion to help you select the ideal system for your extrusion lines.

Cool TO-THE Touch is a fully integrated system that offers powerful functionality, user-friendly installation and operation, customizable features and other benefits you simply will not find in any existing extruder heating and cooling system.

These highly engineered products are designed for durability and trouble-free operating performance.

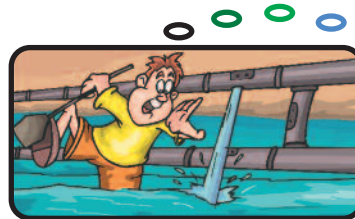
It can very well be the most important step you take when you purchase a new extruder or rebuild existing equipment.

Experience the benefits and advantages offered by upgrading to Cool TO-THE Touch Shroud Systems.

Take your extrusion operation to the next level of technology with Tempco at your side.

There is nothing to lose, except. . .

The entire closed loop recirculating system which includes: chiller, heat exchanger, heat transfer fluid, and all associated piping and electrical components.



Let's Not Forget About This!!

Think about all the great changes ahead for your business – when you no longer have to babysit your unreliable, maintenance nightmare on your extruder heating and cooling system.



It's a Reality – Extreme Makeover for Extruders Is Finally Here! Take Advantage of It If You Are . . .

Purchasing a New Extruder

Specify to your machine builder to install one of Tempco's exclusive high-efficiency Cool TO-THE Touch heating and air cooling systems.

**SMALL
INVESTMENT

BIG
RETURN**

Retrofitting

Outdated air cooled systems can be retrofitted with Tempco's efficient air cooled shroud designs without replacing your existing heaters.

**Add Value
to Your
Extrusion
Process**

Rebuilding

An outdated, high maintenance, low efficiency liquid cooled system can be rebuilt with one of Tempco's turnkey Cool TO-THE Touch heating and air cooling systems.

Improve Your Bottom Line

Designed for Durability and Trouble-Free Operating Performance

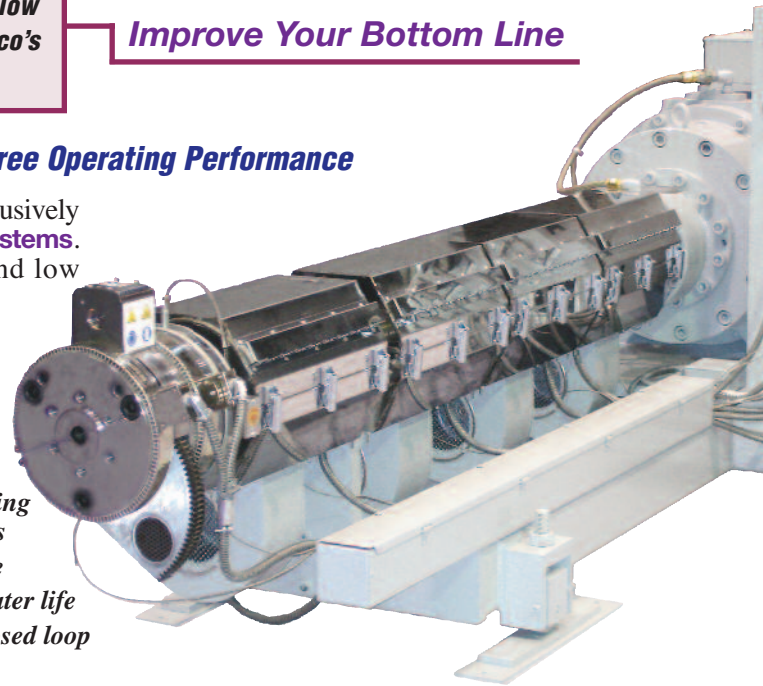
Tempco's **Finned Cast-In Heaters** with bolt clamping are exclusively designed to work with **Tempco's Cool TO-THE Touch Shroud Systems**. They are manufactured with special high-efficiency fins and low overall mass cross-section for maximizing thermodynamics.



Unmatched Quality Shroud System & Finned Cast-In Heater

Design Features

- * *Reduced operating costs*
- * *Quick, easy installation*
- * *Greater Reliability*
- * *Thermally efficient heating & cooling characteristics*
- * *Reduces costly downtime*
- * *Exceptional Cast-In Heater life*
- * *Eliminates expensive closed loop liquid cooling systems*
- * *Rugged, Durable & Appealing Design*



Liquid Cooling Cast-In Band Heaters vs. Cool TO-THE Touch Air Cooling Shroud Systems

Liquid Cooling

Up to now Liquid Cooling Cast-In Band Heaters have been the predominant method of controlling the melt temperature of extrusion barrels. Although effective in removing heat from the extrusion process, there are a number of drawbacks that are primarily maintenance related.

Extruders using liquid cooled Cast-In Heaters can be subject to unpredictable and untimely failures of the cooling tube assemblies, resulting in extremely costly downtime to the processor. Inherent maintenance problems include stress corrosion cracks, linear thermal expansion of the heater body, and clogging of the tubes due to accumulation of mineral deposits. Additionally, Liquid Cooled Cast-In Heaters require an expensive cooling tower or heat exchange system, extensive plumbing systems and labor for installation.

A Change Is In The Air

Tempco-designed air cooled systems have evolved considerably and become more thermally efficient as a result of geometric changes and implementation of sophisticated shrouding and air flow techniques. Optimized direction and ducting of airflow, coupled with selection of the proper blower CFM, are important to ensuring that the air cooling technique removes the proper amount of heat from the extrusion barrel. Air Cooled Cast-In Heaters are virtually maintenance free and therefore, when properly installed and applied, have the capability to far outlast and perform their liquid cooled counterparts.

Consult Tempco With Your Requirements. We Welcome Your Inquiries.

(800) 323-6859 • Email: sales@tempco.com



3 Turnkey State-Of-The-Art Systems to Improve Operating Efficiencies in Plastic Extrusion Equipment

Designed for Durability, Ease of Installation and Trouble-Free Service . . .

These highly engineered heating and cooling systems are an innovative concept in product design, offering a very efficient means to heat and cool the barrels of plastic extruders. They provide cooling efficiencies equal to or better than conventional liquid cooled cast-in aluminum band heaters.

These shroud designs are made with stainless steel sheet metal, cast aluminum construction.

These systems are self-contained and can be supplied as turnkey ready-to-go, requiring minimum labor and installation cost, and drastically reducing downtime and maintenance upkeep compared to conventional liquid cooling and heating cast-in band heaters.

Experience all the advantages offered by Tempco's exclusive **Cool TO-THE Touch High-Efficiency shroud and aluminum finned cast-in band heater designed system.**


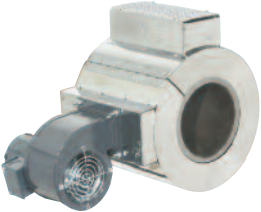

The engineering of these two components is perfectly matched to work in tandem, offering thermally efficient heating and air cooling characteristics and eliminating the shortcomings of liquid cool cast-in aluminum band heaters

Improve Efficiencies in Extrusion Processing

Need Assistance Selecting a System? We Welcome Your Inquiries.

If you have a special application requiring a custom manufactured system or need assistance selecting one of our standard systems for a new or existing installation, consult Tempco with your requirements. We offer complete engineering services and support, working with you every step of the way to ensure customer satisfaction.

Selection Guide – Plastic Extruder Heating and Cooling Shroud Design Systems

	Shroud Style Construction	Recommended Heater Types	Barrel Diameter Range		Zone Length Range	
			Min.	Max.	Min.	Max.
 1	Cool TO-THE Touch™, Page 3-26 Inner Stainless Steel Solid Layer; Outer Stainless Steel Perforated Layer	Tempco Finned Cast Aluminum Heaters, Vented Ceramic Band or Maxiband Heaters	3" 76 mm	16" 406 mm	5" 127mm	36" 915 mm
 2	Multi-Versal, Page 3-33 Single Stainless Steel Solid Layer	Tempco Finned Cast Aluminum Heaters, Vented Ceramic Band or Maxiband Heaters	3" 76 mm	16" 406 mm	3-3/4" 95 mm	36" 915 mm
 3	Arctic Cast®, Page 3-37 Single Cast Aluminum Solid Layer	Tempco Finned Cast Aluminum Heaters	4" 102 mm	16" 406 mm	6-1/2" 165 mm	30-1/2" 775 mm



Cool TO-THE Touch Extruder Heat/Cool System

Tempco's Cool TO-THE Touch extruder heat/cool systems are custom engineered to provide optimal heating and cooling while providing personnel safety with a Cool Touch perforated outer layer. These systems are designed with finned cast-in heaters that optimize overall system efficiency.

The reflective inner layer of the shroud decreases the heat-up cycle, reducing energy consumption. The "maxi-flow" unrestricted blower port directs inlet air to the hottest part of the casting and distributes it evenly over the entire cross section of the zone.

1 – Cool TO-THE Touch Construction

Cool TO-THE Touch

Dual Layer Shroud with Inner Stainless Steel Solid Layer (thermally isolated from heater) and Outer, Cool to the Touch, Perforated Stainless Steel Layer for Maximum Venting and Heat Dissipation

Usage Requirements

The Cool TO-THE Touch Construction Style achieves best results when built for Tempco's High-Efficiency Finned Cast-In Heaters.

Cool TO-THE Touch Construction Details

Dual Layer Shroud

- * *Inner Stainless Steel solid layer – radiation shield that directs the cooling air flow over the heater*
- * *Outer Stainless Steel perforated layer – isolates hot surfaces from contact (cool touch)*

Shroud Assembly Features

- * *Two Mounting Styles are available:*
 - ➔ *Hinge with Barrel Clamps – designed for ease of installation*
 - ➔ *Two Individual Halves with Barrel Clamps (Two-Piece) – used where installation space is tight or mounting is difficult*
- * *Internal Support Straps or Support U-Bolt on blower mount half of shroud permits shroud to be opened for servicing without removing unit from barrel*
- * *Anti-Rotate Tabs – used only with Finned Cast-In Heaters to prevent shroud from radial and axial movement around the barrel*
 - ➔ *Tabs are cast as part of the heater (may require a Terminal Box)*
- * *Blower Options – See page 3-41 through 3-43 for Complete Details*
 - ➔ *Single or Dual Tempco Recommended Blowers available from 148 CFM up to 1210 CFM at 115V or 230V, or 480V 3-Phase*
 - ➔ *Customer Specified blower*
 - ➔ *Blower not required for Heat-Only Shrouds*
- * *Blower Location*
 - ➔ *Horizontal or Vertical Orientation*
 - ➔ *Extension Housings Available*
- * *Standard separate top Air Outlet*
- * *Optional Air Outlet Features Include:*
 - ➔ *Air Outlet Shield deflects air flow out of shroud and shields shroud from external solid contamination*
 - ➔ *Air Outlet combined with Terminal Box*
 - ➔ *Alternate Radial Air Outlet locations available*
- * *Air-Inlet Baffle Optional*
- * *Vent Hole(s) Optional*

Cool TO-THE Touch shown with optional dual blowers mounted vertically with knockouts for heater termination(s) and top vertical air outlet



Heater Type and Components

- * *Recommended Heater Types – Finned Cast-In Heaters with standard 1/4" gap between heater halves, Ceramic Band and Maxiband Heaters*
- * *Power Input Terminal Box with 7/8" dia. K.O. for 1/2" conduit:*
 - ➔ *Standard 10-32 stud termination with ceramic or mica insulator*
 - ➔ *With Louvered Cover – used when terminal box is separate from air-outlet*
 - ➔ *Stainless Steel Screen – used when terminal box is combined with air outlet*
- * *Power Input through Blower Mount – input wiring through knockouts in blower mount eliminates terminal box and facilitates ease of heater service*

Sensing and Controlling

- * *Existing Zone Control Probe – Shroud System can be designed per customer specifications*
- * *Tempco supplied Zone Control Probe*
- * *Tempco customized Power Control Panel designed to complete Your Thermal Loop System*

Ordering Information

See Page 3-36 for complete Ordering Information.



Cool TO-THE Touch™ Shroud System

Existing Cool TO-THE Touch Extruder Heat/Cool Systems

Horizontal and Vertical Blower Motor Mount Design Specifications

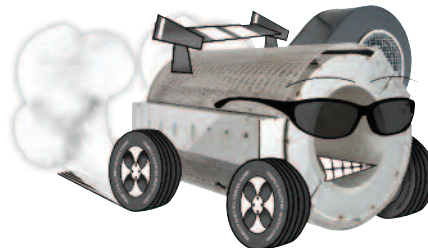
The following partial listings are part numbers and specifications for shroud designs that Tempco has engineered and manufactured. Each item listed below can be modified to fit customer requirements.

Zone Control Probes are placed per customer specifications. See page 3-29 for complete details.

Barrel OD (Shroud ID)	Shroud Width	Shroud OD (in)	Blower Location (in)	Air Outlet Location (°)	Terminal Box Location (°)	Blower CFM (°)	Maximum Heater OD	Heater Part Number (in)	Wattage Per Shroud	Heater Voltage	Ref. Drawing Number	Shroud Part Number
4.25	9.25	10.06	270	90	0	273	7.75	CBH14315	3000	240	7	ASJ00421
4.5	10.06	9.81	180	0	45	358	7.5	CBH14322	3600	230	2	ASJ00423
5	9	10.56	180	0	0	273	8.25	CBH13803	4000	240	1	ASJ00367
5	13	10.81	180	0	0	358	8.5	CBH13011	6000	230	1	ASJ00281
5	13	11.56	180	0	45	458	9.25	CBH05677	4000	230	2	ASJ00381
5	13.63	10.81	180	0	0	358	8.5	CBH13387	6600	230	1	ASJ00315
5	14	10.31	180	0	45	458	8	CBH14316	6000	230	2	ASJ00422
5	18	10.56	180	0	0	550	8.25	(2)CBH13803	8000	240	1	ASJ00366
5.12	12	10.94	270	0	0	358	8.63	CBH13659	5600	400	5	ASJ00350
5.5	18.5	11.81	180	0	90	N/A	9	CBH13012	7000	200-3PH	3	ASJ00279
6	10.5	11.81	270	90	90	550	9.5	CBH12250	4000	220	8	ASJ00238
6.25	13.63	11.56	180	0	0	485	9.25	CBH13664	6000	230	1	ASJ00346
6.25	15	11.56	180	0	0	550	9.25	CBH14306	8250	240	1	ASJ00417
6.38	8	12.19	270	90	0	273	9.88	CBH13572	4000	240	7	ASJ00333
6.38	16	12.19	270	90	0	358	9.88	CBH13573	7000	240	7	ASJ00332
6.5	11	12.81	180	0	90	265	9.75	CBH12061	4600	240	3	ASJ00223
6.5	15.63	12.06	180	0	0	550	9.75	CBH13388	10000	240	1	ASJ00316
6.5	18	11.81	270	0	0	550	9.5	N/A	N/A	N/A	5	ASJ00341
6.5	18	12.81	180	0	90	550	9.75	CBH12060	7600	240	3	ASJ00222
6.5	21	11.81	270	0	0	550	9.5	CBH14189	8800	230	5	ASJ00403
6.63	17.25	12.94	270	0	0	1200	10.38	CBH13936	8800	240	5	ASJ00378
6.63	17.5	12.19	270	0	0	550	9.88	CBH13659	7500	230	5	ASJ00344
6.64	17.63	12.45	270	0	0	550	10.14	CBH13806	8720	240	5	ASJ00371
7	19	13.06	270	90	90	1200	10.75	CBH14114	7200	480	8	ASJ00396
7	21.5	14.06	180	0	N/A	550	11.25	CBH12045	4700	480	4	ASJ00220
7.5	12	12.81	270	0	0	485	10.5	CBH13701	6500	240	5	ASJ00351
7.5	17.5	13.56	180	0	90	1200	10.75	CBH12000	7500	240	3	ASJ00213
7.5	18.5	12.69	270	0	0	550	10.38	CBH13852	9000	230-3PH	5	ASJ00372
7.5	18.5	13.31	270	0	0	1200	11	CBH14099	9000	575-3PH	5	ASJ00394
7.5	19.5	13.82	270	0	0	797	11	CBH12232	11250	240	5	ASJ00228
7.5	20	12.81	180	0	0	550	10.5	CBH13010	9500	230	1	ASJ00280
7.5	20.5	12.81	180	0	0	1200	10.38	CBH13495	10000	240-3PH	1	ASJ00323
7.5	22.5	13.31	180	0	90	797	10.5	(2)CBH13219	8600	208	3	ASJ00293
7.5	23.5	12.81	180	0	0	1200	10.5	CBH13652	10000	240-3PH	1	ASJ00342
7.5	24	12.81	270	0	0	550	10.5	CBH13700	12500	240	5	ASJ00352
7.63	12	12.95	270	0	0	358	10.63	CBH13762	5350	230	5	ASJ00362
7.63	13.5	12.95	270	0	0	358	10.63	CBH13714	3480	230	5	ASJ00359
7.63	14.38	13.44	270	0	0	550	11.125	CBH14329	7000	230	5	ASJ00426



Note: Reference Drawings can be found on page 3-32.



These Energy Conserving Units Out-Perform All Other Plastic Extruder Barrel Heating & Cooling Products.

View Product Inventory @ www.tempco.com



Existing Cool TO-THE Touch Extruder Heat/Cool Systems

Horizontal and Vertical Blower Motor Mount Design Specifications (continued)

The following partial listings are part numbers and specifications for shroud designs that Tempco has engineered and manufactured. Each item listed below can be modified to fit customer requirements. Zone Control Probes are placed per customer specifications. See page 3-29 for complete details.

Barrel OD (Shroud ID)	Shroud Width	Shroud OD (in)	Blower Location (in)	Air Outlet Location (°)	Terminal Box Location (°)	Blower CFM (°)	Maximum Heater OD	Heater Part Number (in)	Wattage Per Shroud	Heater Voltage	Ref. Drawing Number	Shroud Part Number
7.63	14.5	12.95	270	0	0	550	10.63	CBH13713	7200	230	5	ASJ00373
7.63	15	12.95	270	0	0	550	10.63	CBH13713	7200	230	5	ASJ00358
7.63	18	12.95	270	0	0	550	10.63	CBH13712	9600	230	5	ASJ00357
7.63	21.25	13.06	270	90	90	550	10.75	CBH13364	7500	240-3PH	8	ASJ00314
8	20	13.81	270	90	0	550	11.5	CBH13571	12400	240	7	ASJ00330
8	22.5	14.06	270	90	0	550	11.75	CBH13677	11000	480	7	ASJ00347
8.25	12.5	14.06	270	0	180	550	11.75	CBH14072	5500	460-3PH	6	ASJ00390
8.25	14.5	14.06	270	0	180	550	11.75	CBH14071	7000	460-3PH	6	ASJ00391
8.5	18	14.56	270	90	90	1200	12.25	CBH12944	10800	240-3PH	8	ASJ00285
9.25	23.375	15.06	180	0	0	1200	12.75	CBH13562	15000	480-3PH	1	ASJ00327
9.31	23.25	15.2	270	0	0	(2) 550	12.88	CBH12703	15000	230-3PH	5	ASJ00264
9.5	12.5	14.81	270	0	0	485	12.5	CBH13699	8500	240	5	ASJ00353
9.5	19.5	15.56	180	0	0	1200	13.25	CBH14175	16000	240	1	ASJ00402
9.5	24	14.81	270	0	0	1200	12.5	CBH13698	15900	240-3PH	5	ASJ00354
9.5	24	14.81	270	0	0	(2) 459	12.5	CBH13327	16500	240-3PH	5	ASJ00308
9.5	24.5	15.31	180	0	90	(2) 550	12.5	CBH11891	14600	240-3PH	3	ASJ00205
9.5	24.875	15.31	270	0	0	(2) 550	13	CBH14352	20000	240 -3PH	5	ASJ00429
9.5	27	15.56	270	90	90	(2) 1200	13.25	CBH13123	20000	240-3PH	8	ASJ00289
9.5	27.38	15.56	180	0	0	(2) 550	13.25	CBH13389	2400	240	1	ASJ00317
9.5	27.75	15.56	180	0	0	(2) 550	13.25	CBH13922	20000	480-3PH	1	ASJ00375
9.75	16.5	14	270	0	0	550	13.25	CBH14126	12600	240	5	ASJ00399
9.75	19	15.81	270	0	0	1200	13.5	CBH14300	13500	480	5	ASJ00415
9.75	23.375	15.56	180	0	0	1200	13.25	CBH14419	15000	480	1	ASJ00435
9.75	24	14	270	0	0	(2) 550	13.25	CBH14125	18370	240	5	ASJ00398
9.75	24	15.31	180	0	0	1200	13	(2)CBH13801	7000	240-3PH	1	ASJ00370
9.76	12.5	15.82	270	0	0	550	13.5	CBH13799	10000	240-3PH	5	ASJ00365
9.88	15.5	16.06	270	90	0	550	13.38	CBH13319	9550	240-3PH	7	ASJ00307
9.88	24.5	16.06	270	90	0	(2) 550	13.38	CBH13318	14600	240-3PH	7	ASJ00306
9.94	18	16.31	180	0	90	1200	13.44	CBH12495	16000	440	3	ASJ00249
9.94	23	16.31	180	0	90	1200	13.44	CBH12496	18000	440	3	ASJ00250
10	28	16.06	270	90	90	(2) 550	13.75	CBH14193	11000	240	8	ASJ00404
10.75	7.5	16.56	270	0	0	485	14.25	CBH14203	7500	480	5	ASJ00406
12.5	34.5	18.81	180	0	0	(2) 1200	16.5	(2)CBH13888	35000	460-3PH	1	ASJ00374
13.5	12	19.56	180	0	90	550	17.25	CBH13359	9000	460	3	ASJ00313
13.5	17.5	19.56	180	0	90	550	17.25	(2)CBH13358	14000	460	3	ASJ00312
13.5	23	19.56	180	0	90	(2) 550	17.25	(2)CBH13359	18000	460	3	ASJ00311



Note: Reference Drawings can be found on page 3-32.

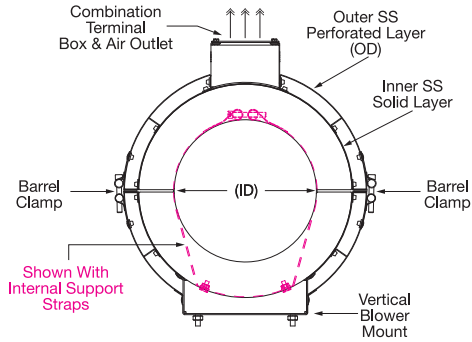
Ordering Information

If you cannot find an existing shroud design that meets your requirements precisely, please use the ordering form on page 3-36 to process your quote request.

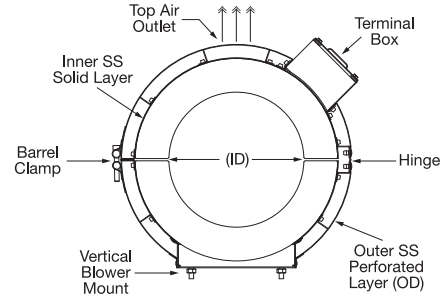
Tempco's engineering professionals will custom design a shroud system to meet your extruder process challenges.



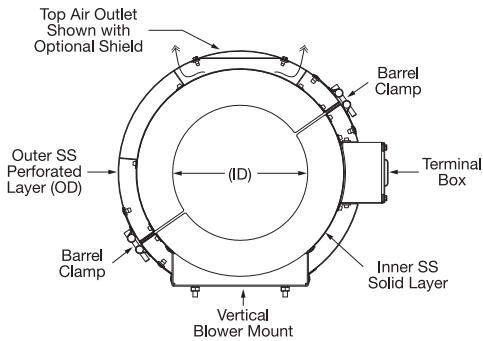
Existing Cool TO-THE Touch Extruder Heat/Cool System Reference Shroud Drawings



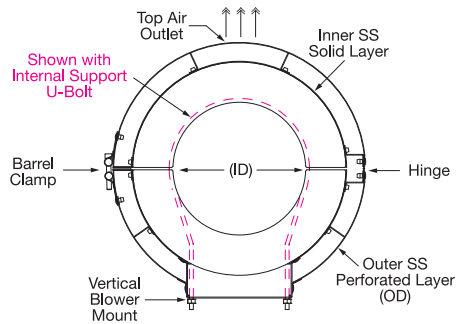
Drawing 1



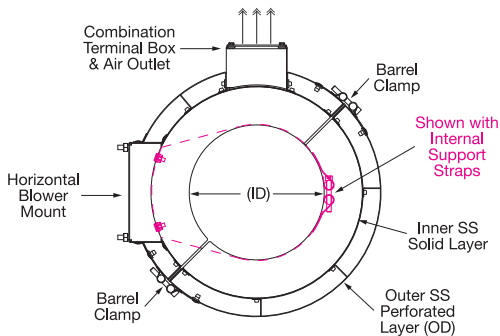
Drawing 2



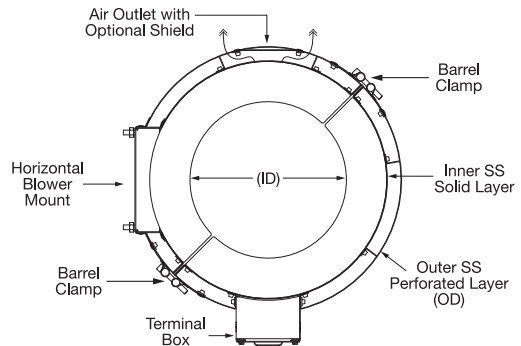
Drawing 3



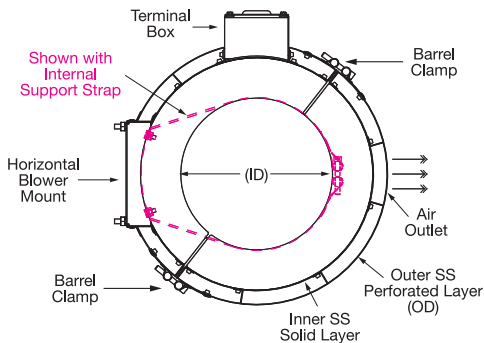
Drawing 4



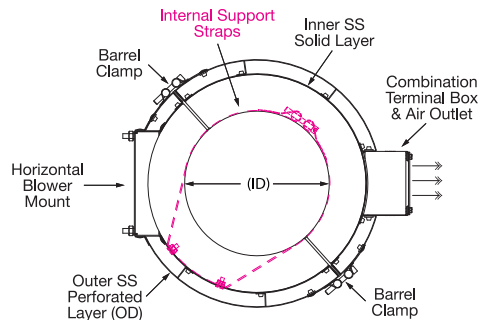
Drawing 5



Drawing 6



Drawing 7



Drawing 8



Multi-Versal Extruder Heat/Cool System

Tempco's Multi-Versal extruder heat/cool systems are designed for efficient heating and cooling. The shroud systems can be used with many styles of band heaters. Due to the single layer design, the Multi-Versal shroud system has a low profile OD.

The reflective interior of the shroud decreases the heat-up cycle, reducing energy consumption. The unrestricted blower port directs inlet air to the hottest part of the heater and distributes it evenly over the entire cross section of the zone.

2 – Multi-Versal Construction

Multi-Versal Extruder

**Solid, Stainless Steel
Single Layer Shroud**

Usage Requirements

A highly adaptable single layer shroud, suited for retrofit and/or new applications regardless of the type of barrel band heater being used.

Multi-Versal Construction Details

Single Layer Shroud

- * *Solid Stainless Steel Layer – radiation shield that directs the cooling air flow over the heater*

Shroud Assembly Features

- * *Two Mounting Styles are available:*
 - ➔ *Hinge with Barrel Clamps – designed for ease of installation*
 - ➔ *Two Individual Halves with Barrel Clamps (Two-Piece) – used where installation space is tight or mounting is difficult*
- * *Internal Support Straps or Support U-Bolt on blower mount half of shroud permits shroud to be opened for servicing without removing unit from barrel*
- * *Anti-Rotate Tabs – used only with Finned Cast-In Heaters to prevent shroud from radial and axial movement around the barrel*
 - ➔ *Tabs are cast as part of the heater and may require a Terminal Box*
- * *Blower Options – See page 3-41 through 3-43 for Complete Details*
 - ➔ *Single or Dual Tempco Recommended Blowers available from 148 CFM up to 1210 CFM at 115V or 230V, or 480V 3-Phase*
 - ➔ *Customer Specified blower*
 - ➔ *Blower not required for Heat-Only Shrouds*
- * *Blower Location*
 - ➔ *Horizontal or Vertical Orientation*
 - ➔ *Extension Housings Available*
- * *Standard separate top Screened Air Outlet*
- * *Optional Screened Air Outlet Features Include:*
 - ➔ *Air Outlet combined with Terminal Box*
 - ➔ *Alternate Radial Air Outlet locations available*
- * *Shroud Air-Inlet Baffle Optional*
- * *Vent Hole(s) Optional*



Multi-Versal shown with horizontally mounted blower & vertical combination terminal box & air outlet

Heater Type and Components

- * *Recommended Heater Types – Finned Cast-In Heaters with standard 1/4" gap between heater halves, Ceramic Band and Maxiband Heaters*
- * *Power Input Terminal Box with 7/8" dia. K.O. for 1/2" conduit:*
 - ➔ *Standard 10-32 stud termination with ceramic or mica insulator*
 - ➔ *With Louvered Cover – used when terminal box is separate from air-outlet*
 - ➔ *Stainless Steel Screen – used when terminal box is combined with air outlet*
- * *Power Input through Blower Mount – input wiring through knockouts in blower mount eliminates terminal box and facilitates ease of heater service*

Sensing and Controlling

- * *Existing Zone Control Probe – Shroud System can be designed per customer specifications*
- * *Tempco supplied Zone Control Probe*
- * *Tempco customized Power Control Panel designed to complete Your Thermal Loop System*

Ordering Information

See Page 3-36 for complete Ordering Information.

(800) 323-6859 • Email: sales@tempco.com



Multi-Versal Extruder Heat/Cool System

Horizontal and Vertical Blower Motor Mount Design Specifications

The following partial listings are part numbers and specifications for shroud designs that Tempco has engineered and manufactured. Each item listed below can be modified to fit customer requirements. Zone Control Probes are placed per customer specifications. See page 3-33 for complete details.

Barrel OD (Shroud ID)	Shroud Width	Shroud OD (in)	Blower Location (in)	Air Outlet Location (°)	Terminal Box Location (°)	Blower CFM (°)	Maximum Heater OD	Heater Part Number (in)	Wattage Per Shroud	Heater Voltage	Ref. Drawing Number	Shroud Part Number
5.5	13	9.5	180	0	0	273	8.75	CBH07945	5600	600	3	ASJ00041
5.9	16	10.97	270	0	0	550	9.875	CBH14346	8000	240-3PH	5	ASJ00427
6.25	13.5	10.82	180	0	0	550	10	BCH06668	6000	240	3	ASJ00292
6.25	14	10.5	180	0	0	550	9.75	CBH14356	6800	240	3	ASJ00431
6.25	18.5	10.25	180	0	0	550	9.5	CBH11500	8800	460	3	ASJ00177
6.5	13	10.32	180	0	0	358	9.5	CBH13473	7500	240	3	ASJ00321
6.5	15.5	10.75	180	0	0	358	10	CBH11428	8000	575	3	ASJ00167
6.625	18.5	10.625	180	0	0	550	9.875	CBH07947	8800	460	3	ASJ00042
6.63	17.5	11.2	270	0	0	485	10.38	CBH14069	9250	480	5	ASJ00389
7.5	14.25	11.25	180	0	0	550	10.5	CBH13306	7000	240	3	ASJ00304
7.5	18	11.25	180	0	0	550	10.5	CBH13305	10600	240	3	ASJ00303
7.5	20.5	11.75	90	270	270	797	11	(2)BCH07244	6000	480	1	ASJ00380
7.5	29	11.25	180		0	(2) 550	10.5	(2)CBH13307	16200	240	3	ASJ00302
8.5	10.25	12.5	270	0	0	485	11.75	BCH07114	2200	240	5	ASJ00363
8.5	15.25	13	90	0	NONE	1200	12.25	CBH13467	6000	230	2	ASJ00320
9.5	27.5	14	180	0	0	(2) 732	13.25	(2)CBH13149	12000	230	3	ASJ00290
9.5	27.75	14	180	0	0	(2) 550	13.25	CBH14088	24000	480-3PH	3	ASJ00393
9.75	11.5	13.75	180	0	0	358	13	CBH09965	9000	230	3	ASJ00078
9.75	11.5	13.75	180	0	NONE	358	13	CBH09965	9000	230	4	ASJ00131
9.75	19.5	15	180	0	NONE	1200	14.25	CBH12313	12600	240	4	ASJ00076
9.75	23.5	13.5	180	0	0	(2) 485	12.75	CBH10719	16000	240	3	ASJ00112
9.88	22	14.13	180	0	NONE	1200	13.38	CBH13711	10500	220	4	ASJ00355
10.75	11	15	180	0	0	550	14.25	CBH14235	8800	230	3	ASJ00408
11.5	15.38	16	180	0	0	797	15.25	CBH13295	11000	460	3	ASJ00301
12.25	17.75	16.75	180	0	0	1200	16	CBH13347	16500	230-3PH	3	ASJ00310

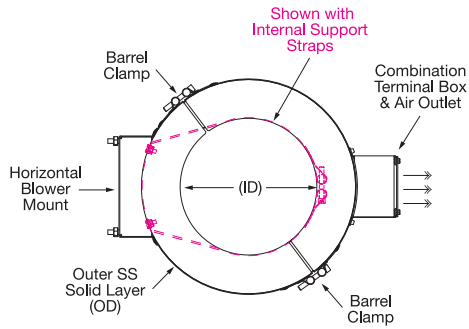
Ordering Information

If you cannot find an existing shroud design that meets your requirements precisely, please use the ordering form on page 3-36 to process your quote request.

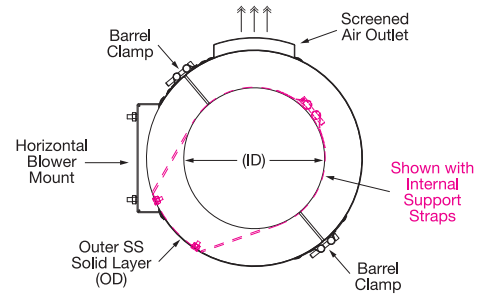
Tempco's engineering professionals will custom design a shroud system to meet your extruder process challenges.



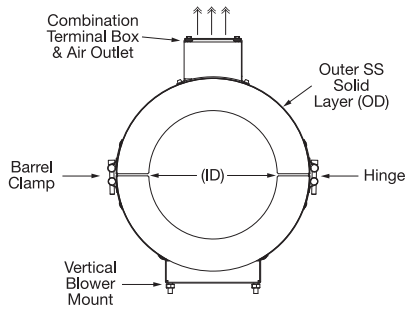
Existing Multi-Versal Extruder Heat/Cool System Reference Shroud Drawings



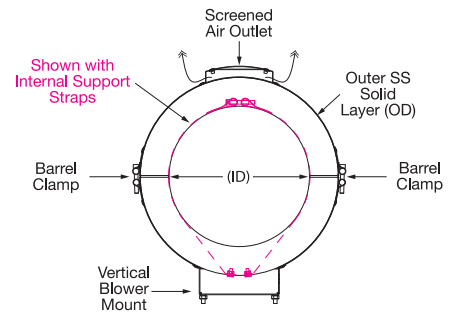
Drawing 1



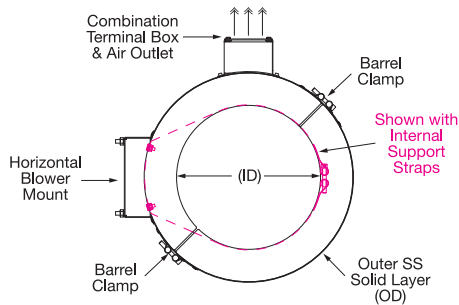
Drawing 2



Drawing 3



Drawing 4



Drawing 5

Cast-In Heaters



Stainless Steel Shroud Systems

Made-To-Order Quote Request Form — Copy and Fax Us (630-350-0232) Your Requirements

Customer Information

Name: _____ Company: _____ City: _____ State: _____
Phone: _____ Fax: _____ Email: _____
Extruder Barrel Manufacturer: _____ Model Number: _____
Resin Type: _____ Process Temperature: _____

When submitting this form, please be sure to include an extruder barrel sketch or drawing that includes the following:

- * Extruder Barrel Support(s)
- * Number of Heating Zones
- * Vent Location(s)
- * Zone Probe Location(s)
- * Input Feed Location
- * Pressure Tap Location(s)
- * Zone Length(s)
- * Additional Restriction(s)

Note: To assist Tempco in designing a shroud system, please provide digital images (in .jpg format) of the extruder barrel.

Shroud Specifications

(For replacement of existing Tempco Shroud(s), please contact your Tempco Factory or Sales Representative.)

Shroud Style: Cool TO-THE Touch™ Multi-Versal Quantity Required: _____

Shroud Dimensions

Shroud Width / Zone Length: _____ Extruder Barrel OD / Shroud ID: _____

Maximum Shroud OD: _____ (determined by Engineering unless specified by customer)

Existing Heater OD (including terminations): _____ (determined by Engineering when new Tempco Heater is purchased)

Internal Shroud Support Required: Yes No

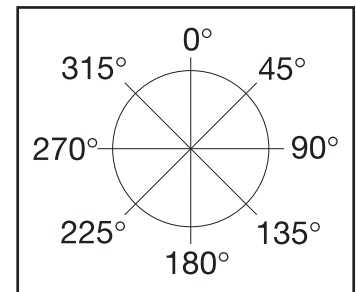
Shroud Components and Component Locations

Component Options (see pages 3-29 or 3-33 for shroud component details)

1. Blower Mount:
 Horizontal Vertical
2. Air Outlet:
 Separate from Terminal Box Combined w/ Terminal Box
3. Terminal Box:
 None Louvered (Separated from Air Outlet)
 Screened (Combined with Air Outlet)
4. Clamping Method at Shroud Opening:
 Barrel Clamps with Hinge Barrel Clamps (no Hinge)
 Adjustable Clamps with Hinge Adjustable Clamps (no Hinge)
5. Zone T/C Probe(s) - Customer Specified:
Quantity: _____ Clearance Hole Diameter(s): _____

Please indicate Component Radial Locations:

- 1 _____ Blower Mount
- 2 _____ Air outlet
- 3 _____ Terminal Box
- 4 _____ Clamps
- 5 _____ Hinge (if applicable)
- Zone T/C Probe(s)



Blower Specifications (see page 3-43 for standard Tempco blowers & configuration details)

Configuration: Single Dual Customer Supplied (*see below)

Stock Tempco Blower (Engineering will determine specifications if none specified)

P/N: _____ or CFM: _____ Volts: _____ Operating Frequency: _____ Hz

Optional Blower Extension: Horizontal Vertical Custom (Consult Tempco.)

*Customer Supplied Blower (Please attach mounting information when submitting this form.)

Manufacturer: _____ P/N: _____ CFM: _____ Volts: _____ Operating Frequency: _____ Hz

Heater Specifications

Existing Tempco Heater: P/N: _____ Replace Existing Heater Cover Existing Heater

If purchasing new Tempco Heater(s), please provide the following information if known:

Type and Quantity Required:

Qty. Cast-In(s) _____ Qty. Ceramic Bands _____ Qty. Maxibands _____

Inner Diameter: _____ Width(s): _____ Wattage per Shroud: _____ Voltage: _____



Arctic Cast® Extruder Heat/Cool System

Tempco's Arctic Cast Shroud System was our pioneer shroud design for the air-cooling of extruders. The cooling efficiency of the Arctic Cast shroud system meets or exceeds that of water-cooled systems when used with our field proven high-capacity blowers.

The Arctic Cast shroud features a vented 1/4" thick cast aluminum layer for durability. The cast-in heaters are designed with a large fin surface area to maximize cooling efficiency. The blower port directs inlet air to the hottest part of the heater, distributing it evenly over the entire cross section of the zone.

3 – Arctic Cast Construction

Arctic Cast Extruder

Single Layer Shroud – Vented Cast Aluminum layer bolted directly onto Tempco's Specially Designed Finned Cast-In Aluminum Band Heater

Usage Requirements

This rugged shroud design is recommended for installations where the shroud system could be exposed to physical damage, such as instances where the extruder barrel is low to the ground. It is suited to work with Tempco's Specially Designed Finned Cast-In Aluminum Heater and cannot be used on any existing finned cast-in heaters.

Arctic Cast Construction Details

Single Layer Shroud

- * Vented 1/4" thick Cast Aluminum layer – directs the cooling air flow over the heater

Shroud Assembly Features

- * Two Individual Halves bolted together (Two-Piece) and clamped around finned cast heater
- * Blower Options – See Pages 3-41 through 3-43 for complete details
 - ➔ Single or Dual Tempco Recommended Blowers available from 148 CFM up to 1210 CFM at 115V or 230V, or 480V 3-Phase
 - ➔ Customer Specified blower
- * Blower Location
 - ➔ Vertical Orientation – at the bottom of the shroud
 - ➔ Custom location achieved only by rotating entire shroud system
- * Standard top Air Outlet
 - ➔ Custom location achieved only by rotating entire shroud system
- * Shroud Air-Inlet Baffle with built-in air deflector that breaks up incoming airflow, distributing it across the cast-in heater(s)



Arctic Cast shown with Vertical Mount Option

Heater Type and Components

- * Recommended Heater Types – Tempco Finned Cast-In Heaters with standard 1/4" gap between heater halves and bolt and nut clamping
- * Heater Strap Clamping is available
- * Power Input with Standard 10-32 stud termination with ceramic or mica insulator
 - ➔ Bus Wiring between halves is optional

Sensing and Controlling

- * Existing Zone Control Probe – Shroud System can be designed per customer specifications
- * Tempco supplied Zone Control Probe
- * Tempco customized Power Control Panel designed to complete Your Thermal Loop System

Ordering Information

See Page 3-40 for complete Ordering Information.

Cast-In Heaters



Arctic Cast® Shroud System

Standard (Non-Stock) Arctic-Cast® Cast-In Heaters (319 Aluminum) and Shrouds

Heater I.D. in	Heater O.D. in	Heater Length in	Watts Each Half	Volts Each Half	Phase	Termination Type	Clamping Type	Cast-In Heater Part Number	Shroud Dimensions				Shroud Style	Shroud Part Number
									I.D. in	Length "L" in	"G" in	"H" in		
3	7	5.5	650	240	1	R	Bolt	CBH13085	7	4.375	3.7	3.22	A	ASF01218
3	7	7	1000	240	1	E	Bolt	CBH13537	7	7	1.5	4.125	A	ASF01221
3.75	7.75	13	2300	240	1	E	Bolt	CBH09406	7.75	13	6	5	A	ASF01160
4.25	7.5	13	2910	230	3	E	Strap	CBH08563	7.5	13	3.5	2.5	B	ASF01138
4.5	9	10.75	1620	230	1	E	Strap	CBH02937	9	10.75	5	6	A	ASF01006
4.5	7.75	12.25	1500	230	1	E	Strap	CBH05676	7.75	12.25	4.406	4.375	C	ASF01052
4.5	8.25	12.5	2500	240	1	C4	Bolt	CBH14435	8.25	12.5	6	5	A	ASF01232
5	9	12.438	2000	230	1	E	Strap	CBH05677	9	12.438	4.406	4.375	C	ASF01053
5.25	8.5	13.5	3750	190	3	E	Strap	CBH08561	8.5	13.5	3.5	2.5	B	ASF01136
5.5	10	11	2100	230	1	E	Strap	CBH02803	10	11	5	6	A	ASF01002
5.5	10	15.5	4000	240	1	E	Bolt	CBH10185	10	15.5	6.25	7.25	A	ASF01183
5.5	9.5	18	1200	277	1	E	Strap	CBH10258	9.5	18	8.813	2.188	A	ASF01186
6	10	11	3300	230	1	S	Strap	CBH04243	10	11	5	6	A	ASF01002
6	10	18	5000	240	1	E	Bolt	CBH09383	10	18	6.25	7.25	A	ASF01158
6	10	16	4000	240	1	E	Bolt	CBH11316	10	16	6.25	7.25	A	ASF01199
6	10	10	3750	240	3	T	Bolt	CBH12072	10	10	4.875	4.375	A	ASF01211
6	9.75	18	5000	240	1	S	Bolt	CBH14604	9.75	18	7.75	4	A	ASF01236
6.25	10.5	15	4800	230	1	E	Strap	CBH07349	10.5	15	4.875	4.375	A	ASF01095
6.5	11	17.5	3600	230	1	E	Strap	CBH02802	11	17.5	5	6	A	ASF01003
6.5	10	10.75	2280	240	1	E	Strap	CBH06509	10	10.75	4.875	2.375	A	ASF01076
6.5	11	17.5	3600	230	1	E	Strap	CBH07372	11	17.5	4.625	5.625	A	ASF01098
6.5	10.5	13	4000	240	1	E	Strap	CBH09413	10.5	13	4.875	4.375	A	ASF01161
6.5	10.5	16	4000	240	3	E	Strap	CBH09414	10.5	16	4.875	4.375	A	ASF01162
6.635	11	17.5	4360	240	1	S	Bolt	CBH06070	11	17.5	4.86	4.37	A	ASF01008
7	11	13.5	2400	230	1	E	Strap	CBH05871	11	13.5	4.406	4.375	C	ASF01057
7	10.25	18	6000	230	3	E	Strap	CBH08425	10.25	18	4.438	4.375	C	ASF01134
7	11	17.5	6000	240	1	S	Strap	CBH08635	11	17.5	4.375	4.875	A	ASF01143
7	11	19	6000	240	3	E	Bolt	CBH09362	11	19	6.5	7.25	A	ASF01157
7.5	12	18	3500	230	1	E	Strap	CBH05574	12	18	5	5	A	ASF01048
7.5	12	17	3000	480	1	E	Strap	CBH06561	12	17	3.5	3.5	A	ASF01035
7.5	11.5	18	6000	240	3	E	Strap	CBH08685	11.5	18	4.875	2.375	A	ASF01066
7.5	10.75	19	7500	190	3	C4	Bolt	CBH14386	10.75	19	8.75	4	A	ASF01227
7.5	10.75	19	7500	240	3	C4	Bolt	CBH15013	10.75	19	8.75	4	A	ASF01227
8	12	14	3250	230	1	E	Strap	CBH03738	12	14	5	5	A	ASF01013
8	12	18	5000	480	3	C4	Bolt	CBH06432	12	18	3.875	3.875	A	ASF01069
8	11.25	16	2750	230	1	E	Bolt	CBH13777	11.25	16	8.813	4.375	A	ASF01224
8.25	12.25	13	3850	230	1	S	Strap	CBH03994	12.25	13	5	4.875	A	ASF01019
8.5	11.75	10	4425	230	3	E	Strap	CBH08562	11.75	10	4.406	4.375	C	ASF01137
8.5	12	17	5900	240	1	E	Strap	CBH10213	12	17	6	5	A	ASF01185
9	13	18.75	5000	230	1	E	Strap	CBH08278	13	18.75	4.375	5.5	C	ASF01126
9.5	13.25	13	3000	240	0	E	Bolt	CBH13600	13.25	13	4.96	5.94	A	ASF01222
9.75	13.75	19	7500	480	3	S	Bolt	CBH05684	13.75	19	3.875	3.875	A	ASF01054
9.75	13.75	22	6000	230	1	E	Bolt	CBH08024	13.75	22	6.452	6.452	A	ASF01119
9.75	13.75	19	6000	230	1	E	Bolt	CBH08025	13.75	19	5	6	B	ASF01120
9.75	13.75	22	11000	200	3	F	Bolt	CBH10086	13.75	22	6.452	6.452	A	ASF01181
10	9	12	6480	230	3	S	Strap	CBH05102	9	12	5	6	A	ASF01006
10	13.5	24	11000	600	3	R1A	Bolt	CBH07294	13.5	24	6.25	6.25	A	ASF01094
10	14	12	6480	230	1	E	Strap	CBH07404	14	25	6	5	B	ASF01101
10	13.25	12	6480	230	3	E	Strap	CBH08424	13.25	12	4.406	4.375	C	ASF01129
10	14	12	6480	480	1	E	Strap	CBH14775	14	12	6	5	B	ASF01101
12	16	14.5	4250	240	3	E	Strap	CBH09876	16	14.5	5.504	5.504	A	ASF01172
12	16	23	6500	480	1	E	Bolt	CBH11446	16	23	6.5	4	C	ASF01203
13	16.25	13.75	6750	190	3	E	Strap	CBH09878	16.25	13.75	4.406	4.375	C	ASF01173

The typical Arctic Cast System consists of:

- A Cast-In Aluminum Finned Band Heater
- A Cast Aluminum Shroud
- An appropriately rated Forced Air Blower



Note: For additional information on sizing and selecting Cast-In Band Heaters for your application, see page 3-39. To order an Arctic-

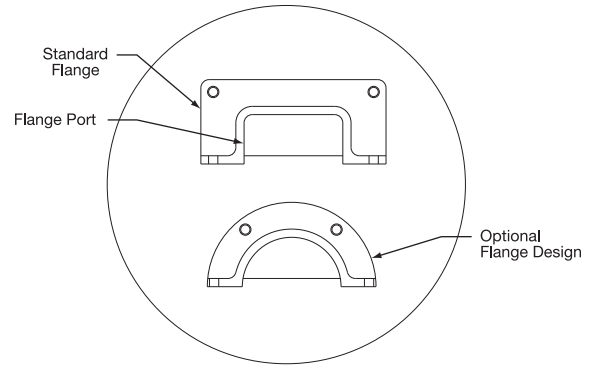
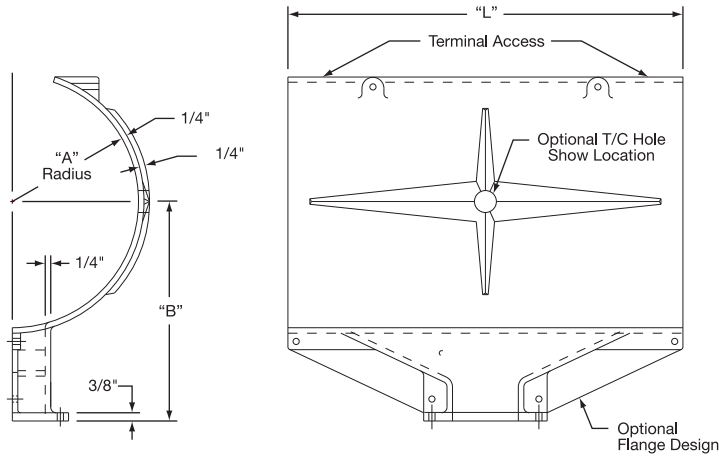
Page 3-37 illustrates the complete system as well as the components that make up each assembly. Envelope dimensions for the shrouds shown on page 3-39 are also provided. Pages 3-41 through 3-43 display different forced air blower styles and specifications.

Cast system not shown in our Standard Sizes and Ratings, consult Tempco or send us your specifications and/or drawing.



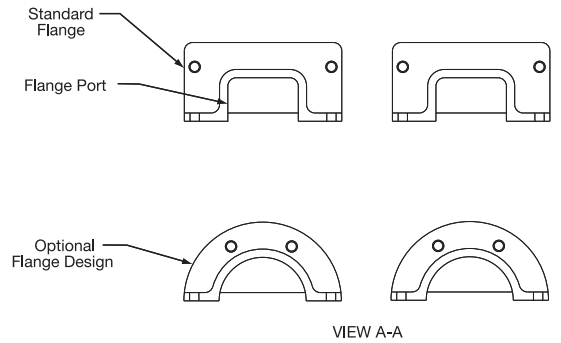
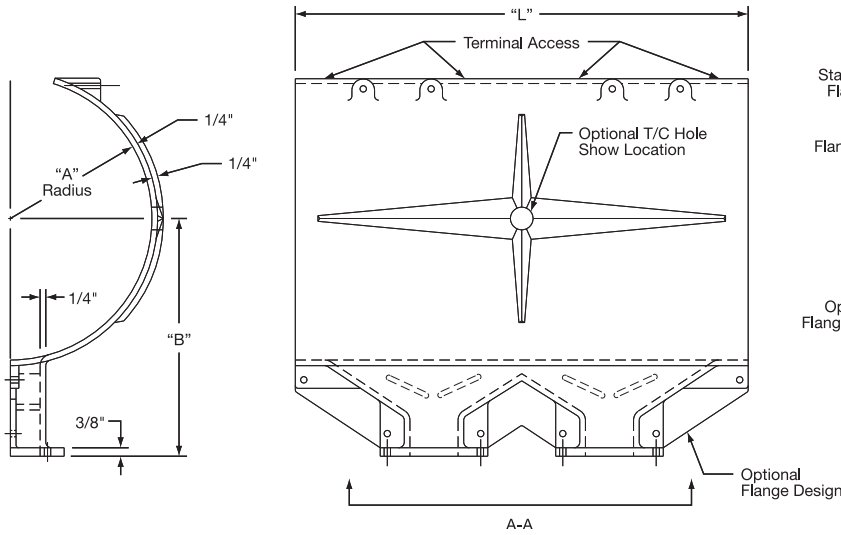
Selection of Arctic Cast® Shroud Design Styles

Shroud Style A



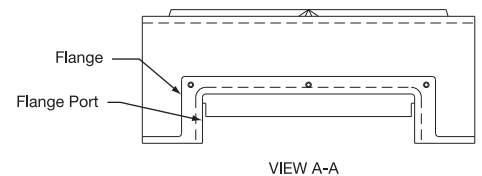
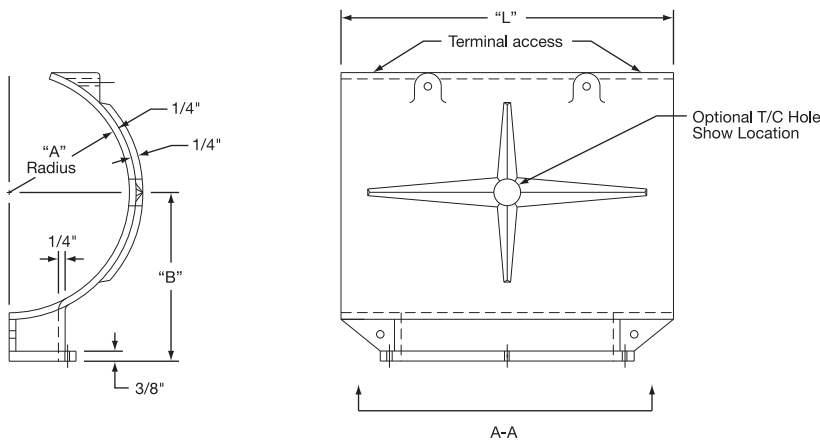
Please provide mounting hole specifications if using other than Tempco standard.

Shroud Style B



Please provide mounting hole specifications if using other than Tempco standard.

Shroud Style C



Please provide mounting hole specifications if using other than Tempco standard.

Cast-In Heaters



Arctic Cast® Shroud System

Made-To-Order Quote Request Form — Copy and Fax Us (630-350-0232) Your Requirements

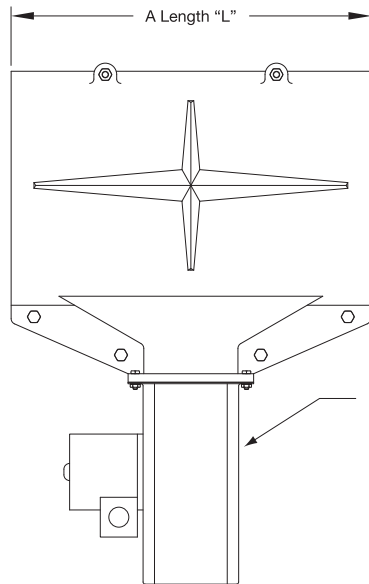
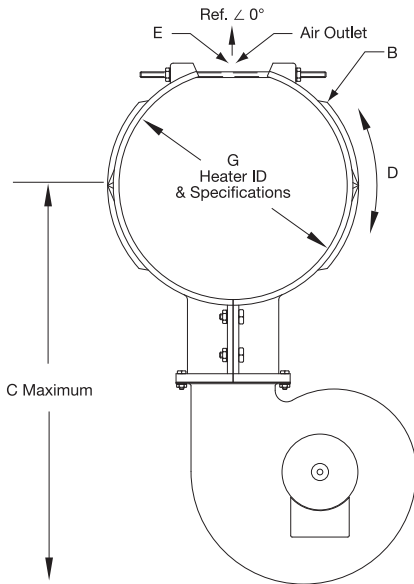
Customer Information

Name: _____ Company: _____ City: _____ State: _____
 Phone: _____ Fax: _____ Email: _____
 Extruder Barrel Manufacturer: _____ Model Number: _____
 Resin Type: _____ Process Temperature: _____

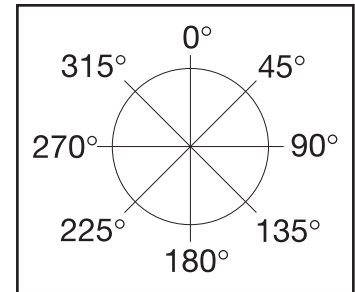
When submitting this form, please be sure to include an extruder barrel sketch or drawing that includes the following:

- * Extruder Barrel Support(s)
- * Number of Heating Zones
- * Vent Location(s)
- * Zone Probe Location(s)
- * Input Feed Location
- * Pressure Tap Location(s)
- * Zone Length(s)
- * Additional Restriction(s)

Note: To assist Tempco in designing a shroud system, please provide digital images (in .jpg format) of the extruder barrel.



Drawing Reference Angle



Shroud Specifications

(For replacement of existing Tempco Shroud(s), please contact your Tempco Factory or Sales Representative.)

- A. Shroud Width / Zone Length "L": _____
- B. Maximum Shroud OD: _____ (determined by Engineering unless specified by customer)

Shroud Component Specifications

- C. Maximum Blower Clearance: _____
- D. Standard Shroud Assembly Orientation Shown: Air Outlet at 0°, Blower at 180°
For alternate orientations, rotate shroud and heater assembly on extruder barrel.
- E. Zone T/C Probe(s): Quantity: _____ Clearance Hole Diameter: _____
Location: Centered at Top (standard) Custom: _____ (Indicate Clockwise from Drawing Reference Angle)

Blower Specifications

- F. **Configuration:** Single Dual Customer Supplied (**see below*)
- Stock Tempco Blower (Engineering will determine specifications if none specified)
- P/N: _____ or CFM: _____ Volts: _____ Operating Frequency: _____ Hz
- Optional Inlet Guard (available for most stock blowers)
- Optional Blower Extension: Horizontal Vertical Custom (Consult Tempco.)
- Mounting Dimensions: Length _____ Width _____
- *Customer Supplied Blower (**Please attach mounting information when submitting this form.**)
- Manufacturer: _____ P/N: _____ CFM: _____ Volts: _____ Operating Frequency: _____ Hz

Heater Specifications

- G. Extruder Barrel OD/Heater ID: _____ Wattage per Half: _____ Voltage per Half: _____



Forced-Air Blowers for Air-Cooled Heating Systems

A variety of sizes and styles of forced-air centrifugal blowers are used on Tempco's air-cooled extrusion systems. Tempco Forced-Air Blowers are available in a large range of CFM ratings to fit any new or existing application. All blowers include air inlet guards for your safety.



Standard Single Phase Centrifugal Blowers

Tempco standard blowers feature corrosion protected sheet metal housings and impeller wheels. The quiet operation and quick response coupled with high volume unrestricted output results in a field-proven efficient cooling means for extrusion processes. Standard blowers are readily available for single phase 115V or 230V and represent the shortest delivery times.

Single Port Blowers

Part Number	"D"	"F"	"G"	"H"	"N"	"P"	"R"	"S"	Outlet "L" x "W"	CFM	Volts	Full Load Amps	Replacement Guard PN
MTR-102-101	3.50	4.60	3.96	2.88	6.91	6.26	5.32	5.70	2.18 x 3.25	146	115	0.75	GRD-101-102
MTR-102-102	5.00	5.51	4.86	4.37	8.21	7.56	8.88	9.90	3.62 x 4.13	273	115	0.77	GRD-101-103
MTR-102-103	5.00	5.51	4.86	4.37	8.21	7.56	8.88	9.90	3.62 x 4.13	273	230	0.43	GRD-101-103
MTR-102-104	5.63	5.08	4.50	5.00	8.09	7.48	10.44	11.16	4.25 x 3.81	358	230	0.54	GRD-101-104
MTR-102-105	5.63	5.08	4.50	5.00	8.09	7.48	10.40	11.20	4.25 x 3.81	485	115	1.35	GRD-101-104
MTR-102-106	5.63	6.63	6.00	5.00	9.59	8.92	10.42	11.16	4.25 x 5.25	550	115	2.05	GRD-101-104
MTR-102-107	5.63	6.63	6.00	5.00	9.59	8.92	10.40	11.20	4.25 x 5.25	550	230	0.98	GRD-101-104
MTR-102-108	6.37	8.75	8.00	5.00	11.56	11.56	13.13	14.88	5.56 x 7.19	1202	115/230	7.30/3.70	GRD-101-108
MTR-102-113	6.37	7.75	7.00	5.00	10.31	10.31	13.13	14.88	5.56 x 6.19	794	115/230	2.75/1.45	GRD-101-108

NOTE: See Blower Drawing 1 on page 3-43

Single Port Large Volume Blowers

Part Number	"D"	"F"	"G"	"H"	"N"	"R"	"S"	Outlet "L" x "W"	CFM	Volts	Full Load Amps	Replacement Guard PN
MTR-102-109	5.00	9.69	4.41	4.38	9.25	8.81	9.88	3.69 x 8.06	458	115	1.28	GRD-101-103
MTR-102-110	5.00	9.69	4.41	4.38	9.45	8.81	9.88	3.69 x 8.06	458	230	0.65	GRD-101-103
MTR-102-111	5.63	9.31	4.38	5.00	10.75	10.31	11.13	4.19 x 8.69	797/549	115	3.20/2.20	GRD-101-104

NOTE: See Blower Drawing 2 on page 3-43

Double Port Blowers

Part Number	"D"	"F"	"G"	"H"	"M"	"N"	"P"	"R"	"S"	Outlet "L" x "W"	CFM	Volts	Full Load Amps	Replacement Guard PN
MTR-102-112	4.75	4.75	4.13	1.47	7.50	12.20	10.90	8.06	7.89	2.94 x 3.31	312	115	0.77	GRD-101-103

NOTE: See Blower Drawing 3 on page 3-43



Low-Profile Single Phase Centrifugal Blowers

Tempco low-profile 115/230V single phase blowers offer a narrower footprint than the standard blowers. The motor is integrated with the impeller so that the motor housing protrudes only slightly from the blower housing. Low-profile blowers are made of die-cast aluminum and galvanized sheet steel and are perfect for applications where space is a concern.

Single Port Blowers

Part Number	"D"	"F"	"G"	"H"	"N"	"P"	"R"	"S"	Outlet "L" x "W"	CFM	Volts	Full Load Amps	Replacement Guard PN	Replacement Capacitor PN
MTR-103-101	2.68	3.00	2.60	2.28	3.44	3.15	4.65	4.50	2.19 x 1.66	56	115	0.24	GRD-101-101	TEC-114-101
MTR-103-102	2.68	3.00	2.60	2.28	3.44	3.15	4.65	4.50	2.19 x 1.66	56	230	0.13	GRD-101-101	TEC-114-102
MTR-103-103	4.72	5.12	4.53	4.13	5.12	3.94	8.90	9.72	3.62 x 3.70	283	230	0.89	GRD-101-103	TEC-114-101
MTR-103-104	7.40	6.96	5.00	6.00	5.27	4.96	11.28	14.04	4.79 x 5.27	500	230	0.78	GRD-101-106	TEC-114-101

NOTE: See Blower Drawing 1 on page 3-45



Forced-Air Blowers

Forced-Air Blowers for Air-Cooled Heating Systems



Universal Three-Phase Centrifugal Blowers

Tempco high-end blowers use heavy duty construction for a long service life. They are available with universal three-phase motors for 50/60 HZ operation on voltages from 202 up to 530V. They meet Cenelec standards and are IP41 or IP54 rated with class B or F insulation systems. These low noise, continuous duty rated blowers operate efficiently under higher static pressure loads than our standard blowers. Optional attachments are available for transferring high temperature air up to 200-300° C and inlet filters for dusty environments.

Single Port Blowers — 3-Phase 60 Hz (202-306V 3-Ph. Delta, 350-530V 3-Ph. Y)

Part Number	"D"	"F"	"G"	"H"	"N"	"P"	"R"	"S"	Outlet "L" x "W"	CFM	Volts	Full Load Amps
MTR-104-101	3.85	4.41	3.74	3.15	9.17	8.62	7.75	3.00	2.56 x 3.11	253-300	240/480	0.51/0.29
MTR-104-102	5.11	5.51	4.72	4.33	11.85	11.06	8.81	8.97	3.54 x 3.66	459-556	240/480	1.15/0.65
MTR-104-103	5.51	5.91	5.19	4.72	13.62	13.00	9.49	10.43	3.90 x 4.29	732-853	240/480	2.30/1.35
MTR-104-104	6.14	6.61	5.94	4.96	15.02	14.25	10.51	11.73	4.41 x 4.88	1130-1200	240/480	4.00/2.30

NOTE: See Blower Drawing 1 on page 3-43

Double Port Blowers — 3-Phase 60 Hz (202-306V 3-Ph. Delta, 350-530V 3-Ph. Y)

Part Number	"D"	"F"	"G"	"H"	"M"	"N"	"P"	"R"	"S"	Outlet "L" x "W"	CFM	Volts	Full Load Amps
MTR-104-105	5.19	5.51	4.72	4.33	9.74	15.25	13.68	8.82	8.98	3.54 x 3.66	550-665	240/480	1.10/0.65

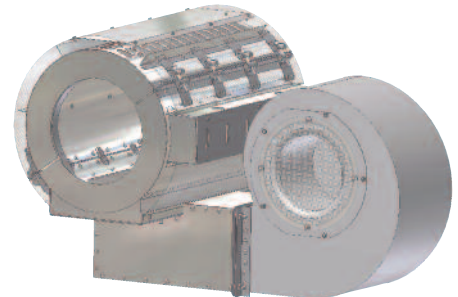
NOTE: See Blower Drawing 3 on page 3-43

Extensions for Forced-Air Blowers

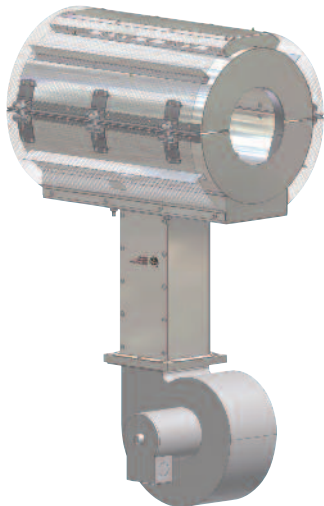
Blower extensions are available for applications where space restrictions do not allow the blower to be mounted directly to the shroud assembly.



Horizontal Blower Extension allows blower to be mounted perpendicular to the shroud. A baffle inside the blower extension smoothly guides air flow into the shroud.



Vertical Blower Extension allows blower to be vertically offset at a distance below the shroud as specified by the customer. Especially useful in retrofit applications.



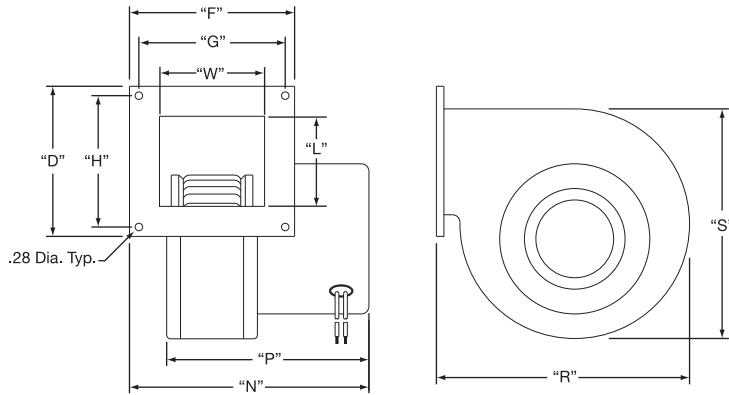
Vertical Blower Extension with 90° adapter plate allows blower to be vertically offset from the shroud. Blower can be rotated at 90° intervals relative to the extension.





Inlet Guards for Single Inlet Centrifugal Blowers

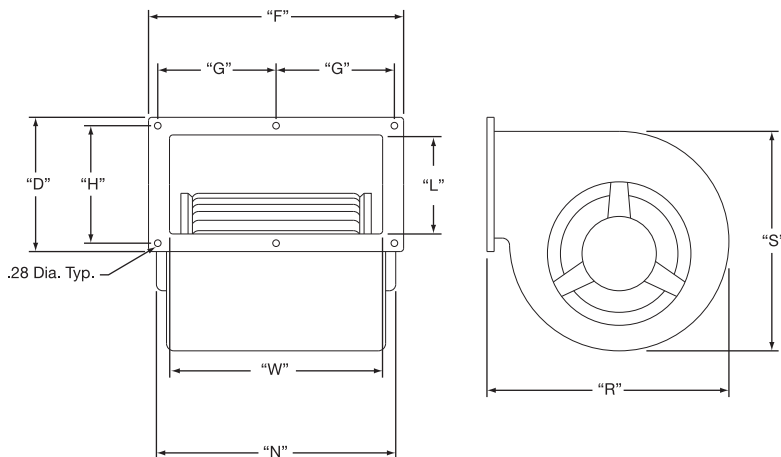
Single Port Blower: Drawing 1



Special cast housing narrow blowers for small extruders or short barrel zone widths are available from 23 up to 350 CFM.

Single port blowers can be obtained up to 1210 CFM for use in large extruder installations. Consult Tempco with your requirements.

Single Port Large Volume Blower: Drawing 2

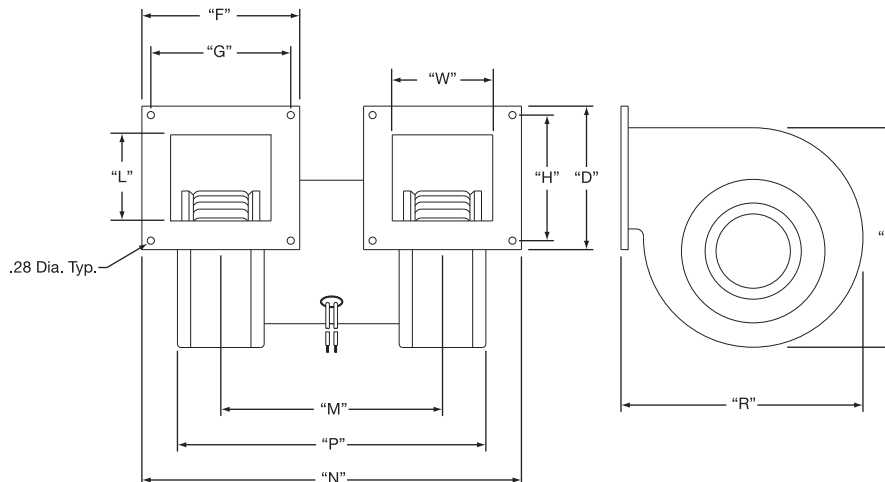


Note: Blower's wheel and motor assembly is mounted within the sheet metal housing, allowing air in from both ends.

Additional sizes of two-speed blowers rated 435/296 are also available. A full range of special dual inlet sizes from 120 CFM up to 1200 CFM can be supplied for extruder zone widths of 6" and longer. Consult Tempco with your requirements.

All CFM Values are with free inlet and discharge and 0" Static Pressure. All Dimensions are in inches.

Double Port Blower: Drawing 3



Note: A smaller 157 CFM version is also available. Special cast housing blowers rated 500 to 600 CFM for use on larger extruders can be obtained. Consult Tempco with your requirements.



Finned Air-Cooled

Standard Cast-In Finned Heater Designs for Air-Cooled Extruder Systems

Aluminum Finned Cast-In Band Heaters are used as an alternative to Liquid Cooled Cast-In Band Heaters for heating and cooling the barrels of plastic extruders.

As a standard, Finned Cast-In Band Heaters are manufactured in aluminum alloys because this material provides very good thermal conductive properties. For applications requiring higher operating temperatures and/or higher watt densities, bronze or brass alloys can be used.

Precision machining of the inside diameter yields superior heat transfer between the heater and the machine barrel, thereby

ensuring uniform heating and cooling of the extrusion process. The heaters are secured to the barrel either by Stainless Steel Clamp Bands or by means of Bolt Clamping the heater halves together.

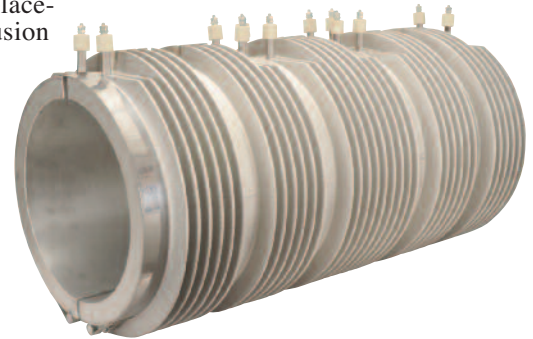
Finned Cast-In Band Heaters can be designed to meet the mechanical and physical constraints of existing extruder shroud systems. They are manufactured for Original Equipment Manufacturers (OEM) and maintenance (MRO) applications to customer specifications.

Finned Cast-In Heater End Types

Type FS1 – Finned Cast-In Heater without Side Flanges

These cast-in band heaters are normally made to be used in conjunction with the Cool to-the Touch and Multi-Versal Shroud Systems. They can also be used as stand alone replacements for other heating and cooling extrusion systems.

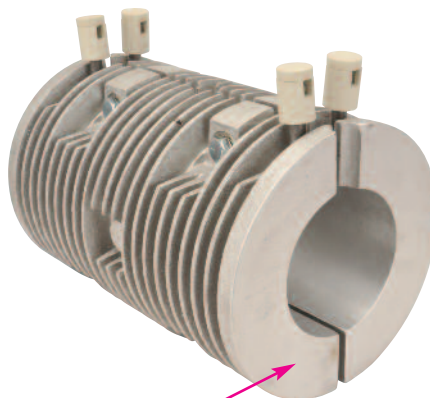
The standard mounting method for these designs is bolt clamping. An alternative mounting method is to use stainless steel straps. Type "T" screw terminals are the standard termination. For other termination styles see pages 3-54 and 3-55.



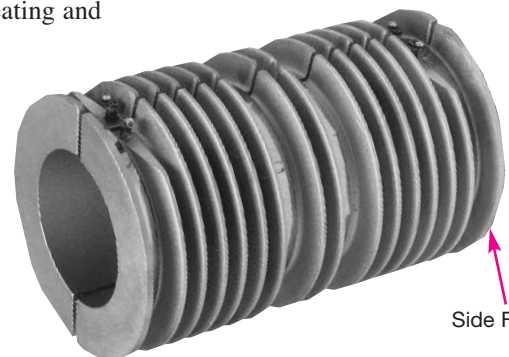
Type FS2 – Finned Cast-In Heater with Side Flanges

These cast-in band heaters are normally made to be used in conjunction with the Arctic Cast Shroud System. They can also be used as stand alone replacements for other heating and air cooling extrusion systems.

The standard mounting method for these designs is bolt clamping. An alternative mounting method is to use stainless steel straps. Type "E" screw terminals are the standard termination. For other termination styles see pages 3-54 and 3-55.



Side Flange



Side Flange

Ordering Information

See Page 3-47 for complete Ordering Information.



Stock and Standard (Non-Stock) Finned Aluminum Cast-In Band Heaters for Extrusion Processing

Standard Sizes and Ratings Listed by Extruder Size

These Sizes and Ratings are among the most commonly used. They will provide the shortest delivery times.

Stock Items Are Shown In RED

I.D. in	O.D. in	Length in	Material	Watts Each Half	Volts Each Half	Phase	Termination Type	Clamping Type	Heater End Type (pg 3-44)	Cast-In Heater Part Number
2.25	4	5.5	Bronze	600	230	1	R	Bolt	FS2	CBH12388
3	4.75	7.5	Bronze	1000	230	1	R	Bolt	FS2	CBH12387
3.75	8	9.875	Alum 319	1350	207	1	S	Bolt	FS2	CBH10404
4	8	8.75	Alum 443	2000	230	1	S	Strap	FS1	CBH09461
4	8	9	Alum 319	1500	230	1	S	Strap	FS1	CBH08712
4	8	11	Alum 319	1850	230	1	S	Strap	FS1	CBH08713
4.375	8.25	12.25	Alum 319	2000	230	1	R	Strap	FS1	CBH01139
4.5	8.25	12.5	Alum 319	2500	190	1	C4	Bolt	FS2	CBH14634
4.5	8.5	12	Alum 319	2750	240	1	R	Bolt	FS2	CBH06640
4.5	8.5	12	Alum 319	2750	200	1	R	Bolt	FS2	CBH08651
4.5	9	11.5	Alum 319	2000	230	1	S	Strap	FS1	CBH05533
4.921	8.421	9	Bronze	2500	480	3	C4	Strap	FS1	CBH08576
4.922	7.5	5.906	Alum 319	1630	230	1	T7	Bolt	FS2	CBH10044
4.922	7.5	7.087	Alum 319	2180	230	1	T7	Bolt	FS2	CBH10045
5	7.75	12.75	Alum 319	2625	200	1	R	Bolt	FS2	CBH11859
5	9	13	Alum 319	2750	240	1	S	Strap	FS1	CBH12840
5.002	9.25	12.25	Alum 319	2000	240	1	T	Strap	FS1	CBH03319
5.5	8.75	12.5	Alum 319	2800	600	1	S	Bolt	FS1	CBH07945
5.5	8.75	12.5	Alum 319	2800	460	1	S	Bolt	FS1	CBH07952
5.5	8.75	12.5	Alum 319	2800	240	1	S	Bolt	FS1	CBH10362
5.5	9.5	12	Alum 319	2300	240	1	S	Strap	FS1	CBH06724
5.5	9.5	12.5	Alum 319	2800	240	1	S	Bolt	FS2	CBH04982
5.5	9.5	12.5	Alum 319	2800	415	1	S	Bolt	FS2	CBH12906
6	10.5	11.5	Alum 319	2700	230	1	S	Strap	FS1	CBH02588
6	10.5	14.5	Alum 319	3500	230	1	T7	Strap	FS1	CBH02432
6.25	10.25	6.25	Alum 319	1400	200	1	S	Bolt	FS2	CBH08653
6.25	10.25	6.25	Alum 319	1700	240	1	R	Bolt	FS2	CBH06373
6.25	10.25	13.688	Alum 319	3000	230	1	R	Strap	FS2	CBH01406
6.25	10.25	17.75	Alum 319	5800	240	1	R	Bolt	FS2	CBH06623
6.25	11.25	15.875	Alum 319	5000	230	1	S	Bolt	FS1	CBH03365
6.3	9.55	15.75	Alum 319	5000	240	1	C4	Strap	FS1	CBH03793
6.3	9.55	15.75	Alum 319	5000	380	1	S	Strap	FS1	CBH11795
6.3	10.05	15.75	Alum 319	5000	380	1	S	Bolt	FS1	CBH12907
6.3	10.05	15.75	Alum 319	5000	415	1	S	Bolt	FS1	CBH12908
6.3	10.05	15.75	Alum 319	5000	440	1	S	Bolt	FS1	CBH12668
6.5	9.5	15	Alum 319	3250	230	1	T7	Bolt	FS1	CBH14207
6.5	9.5	17.5	Alum 356	3400	230	1	T	Bolt	FS2	CBH07553
6.5	10.5	13	Alum 319	4300	230	1	E	Bolt	FS2	CBH09631
6.5	10.5	13	Alum 319	4300	190	1	E	Bolt	FS2	CBH09424
6.6	10.625	14.75	Alum 319	3250	240	1	S	Strap	FS1	CBH07649
6.625	9.875	18	Alum 319	4400	600	1	S	Bolt	FS1	CBH07946
7	10.25	18	Alum 319	6000	290	3	E	Strap	FS2	CBH09420
7.5	11	16.5	Bronze	5100	230	1	R	Strap	FS2	CBH11105
7.5	11.25	19	Alum 319	8000	380	1	S	Bolt	FS1	CBH12447

Key for Abbreviations found under the Termination Column

- | | |
|---|---|
| C4 = Screw Terminal with Ceramic Cover | R1A = Stainless Steel Wire Overbraid |
| E = Right-Angle Lug | R2 = Blockhead Screw Terminal |
| F = Flexible Lead Wire | S = Screw Terminal with Heavy Duty Ceramic Insulator |
| R = 90° Blockhead Screw Terminal | T = Screw Terminal with Mica Insulator |
| R1 = Flexible Armor Cable | T7 = Screw Terminal with Ceramic Insulator |

CONTINUED

Cast-In Heaters



Finned Air-Cooled

Standard (Non-Stock) Finned Aluminum Cast-In Band Heaters for Extrusion Processing

Continued from previous page...

I.D. in	O.D. in	Length in	Material	Watts Each Half	Volts Each Half	Phase	Termination Type	Clamping Type	Heater End Type (pg 3-44)	Cast-In Heater Part Number
7.5	11.5	19.5	Alum 319	6000	240	1	C4	Strap	FS1	CBH10129
7.5	12	18	Alum 319	4500	230	1	S	Strap	FS2	CBH07058
7.625	11.625	14.438	Alum 319	3500	230	1	R	Strap	FS2	CBH01401
7.68	12	8.46	Alum 319	4000	230	1	R1A	Bolt	FS2	CBH10371
7.68	13.43	8.46	Alum 319	4000	230	1	R1A	Bolt	FS2	CBH07906
7.68	13.43	8.46	Alum 319	4000	230	1	C4	Bolt	FS2	CBH09690
8	12	8	Alum 319	2500	240	1	S	Bolt	FS2	CBH06574
8	12	8	Alum 319	2500	300	1	S	Bolt	FS2	CBH06144
8	12	8	Alum 319	2850	240	1	S	Bolt	FS2	CBH06642
8	12	10	Alum 319	3550	240	1	R	Bolt	FS2	CBH06643
8	12	17.5	Alum 319	4600	575	3	S	Bolt	FS1	CBH08418
8	12	20	Alum 319	5600	240	1	S	Bolt	FS2	CBH11002
8	12.01	12.625	Alum 319	2875	240	1	R	Bolt	FS2	CBH13795
8.25	12.25	16	Alum 319	7000	230	3	E	Bolt	FS2	CBH10653
8.25	12.25	16	Alum 319	10000	200	3	R1	Bolt	FS2	CBH11081
8.268	11.504	21.457	Alum 319	7500	240	3	C4	Strap	FS1	CBH04167
8.5	11	12.75	Alum 319	4500	460	3	S	Bolt	FS1	CBH12389
8.5	11.5	20.5	Alum 319	6300	240	3	T	Bolt	FS1	CBH10923
8.5	11.75	10	Alum 319	4425	190	3	E	Strap	FS2	CBH14903
8.5	12	8.5	Alum 319	2750	230	1	S	Strap	FS1	CBH05417
8.5	12.25	6	Alum 356	2250	230	1	S	Bolt	FS1	CBH13082
8.502	13.5	12.75	Alum 319	4500	415	3	S	Bolt	FS1	CBH09902
8.502	13.5	12.75	Alum 319	4500	480	3	S	Bolt	FS1	CBH07212
9.5	12.5	27.25	Alum 319	12000	230	3	T	Bolt	FS1	CBH09759
9.5	13	5	Alum 319	2250	480	1	R2	Bolt	FS2	CBH14691
9.5	13.25	25.5	Alum 319	15000	380	1	S	Bolt	FS1	CBH12448
9.5	13.75	20.5	Alum 319	6000	575	3	E	Bolt	FS1	CBH10947
9.502	14.5	13	Alum 319	5250	480	3	T7	Bolt	FS2	CBH07231
9.75	13.25	21.25	Alum 319	7500	480	3	T	Bolt	FS1	CBH14419
9.75	13.25	25	Alum 319	9000	230	3	T	Bolt	FS1	CBH10138
9.75	13.75	17.75	Alum 319	7500	230	1	S	Bolt	FS1	CBH07658
9.75	13.75	22	Alum 319	7000	230	1	C4	Bolt	FS2	CBH10177
9.75	13.75	22	Alum 319	11000	200	3	F	Bolt	FS2	CBH11080
9.75	13.875	23.875	Alum 319	6000	230	1	R	Strap	FS2	CBH02945
9.75	14	19.438	Alum 319	6000	230	1	R	Strap	FS2	CBH01262
9.84	14.156	6.06	Alum 319	4000	230	1	R1A	Bolt	FS2	CBH10372
9.875	13.875	8.5	Alum 319	3500	240	1	R	Bolt	FS2	CBH06644
10	13	8	Alum 319	4600	240	1	T	Bolt	FS2	CBH06570
10.039	13.289	12.992	Alum 319	6000	230	3	C4	Strap	FS1	CBH04738
10.623	13.625	13.75	Alum 319	3000	480	1	T	Strap	FS1	CBH11140
12.25	18.5	11.563	Alum 356	5500	460	1	R1A	Bolt	FS1	CBH11575
13	17	7	Alum 319	3450	190	1	R	Bolt	FS2	CBH09810
13	17	7	Alum 319	3450	240	1	R	Bolt	FS2	CBH06583
15.75	20.875	3.25	Alum 319	2000	282	1	F	Bolt	FS2	CBH10084
18.897	24.02	3.346	Alum 319	2250	266	1	F	Bolt	FS2	CBH10224

Key for Abbreviations found under the Termination Column

- C4** = Screw Terminal with Ceramic Cover
- E** = Right-Angle Lug
- F** = Flexible Lead Wire
- R** = 90° Blockhead Screw Terminal
- R1** = Flexible Armor Cable
- R1A** = Stainless Steel Wire Overbraid
- R2** = Blockhead Screw Terminal
- S** = Screw Terminal with Heavy Duty Ceramic Insulator
- T** = Screw Terminal with Mica Insulator
- T7** = Screw Terminal with Ceramic Insulator

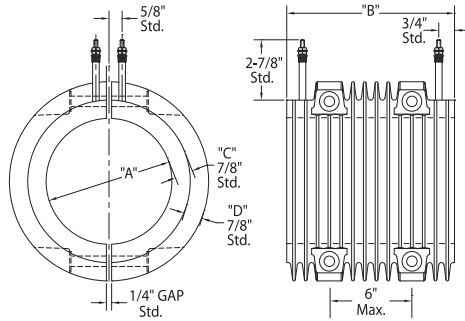


Note: For Sizes and Ratings not listed, Tempco will manufacture a Cast-In Heater to your specifications. See page 3-47 for how to order.

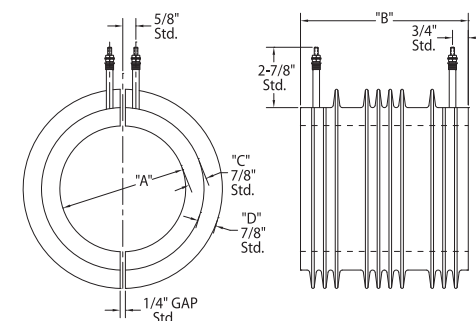


Cast-In Finned Band Heaters Quote Request Form

Finned Cast-In Band Heater Bolt Clamping



Finned Cast-In Band Heater Strap Clamping



Recommended dimensions shown.

Ordering Information

To process your order or quotation, please specify the following information.

Dimensions

Inside Dia. "A" _____
Thickness "C" _____

Length "B" _____
Fin Height "D" _____

Material Specifications

Aluminum Bronze Brass

Heater End Type

Type FS1 Type FS2
(See page 3-44 for details.)

Clamping Style

Straps Bolt Clamp

Electrical Specifications

Watts each half _____ Volts each half _____ Phase _____

Terminal Style

"S" Post Terminals "T" Mica Washers "T7" Post Terminals
 "F" Plain Leads "TS" Leads and Shrink Sleeve
 "C4" Ceramic Cover "R1" Armor Cable Leads
 "E" Right-Angle Lugs Other: See pages 3-54 and 3-55 for additional terminations

Surface Finish

125 RMS Standard or to Customer Specifications

Special Cast-In Features

Holes, Cutouts, Slots, Bevels, Mounting Studs, Stand-Offs and Taper Angles
For special features a detailed drawing is required.



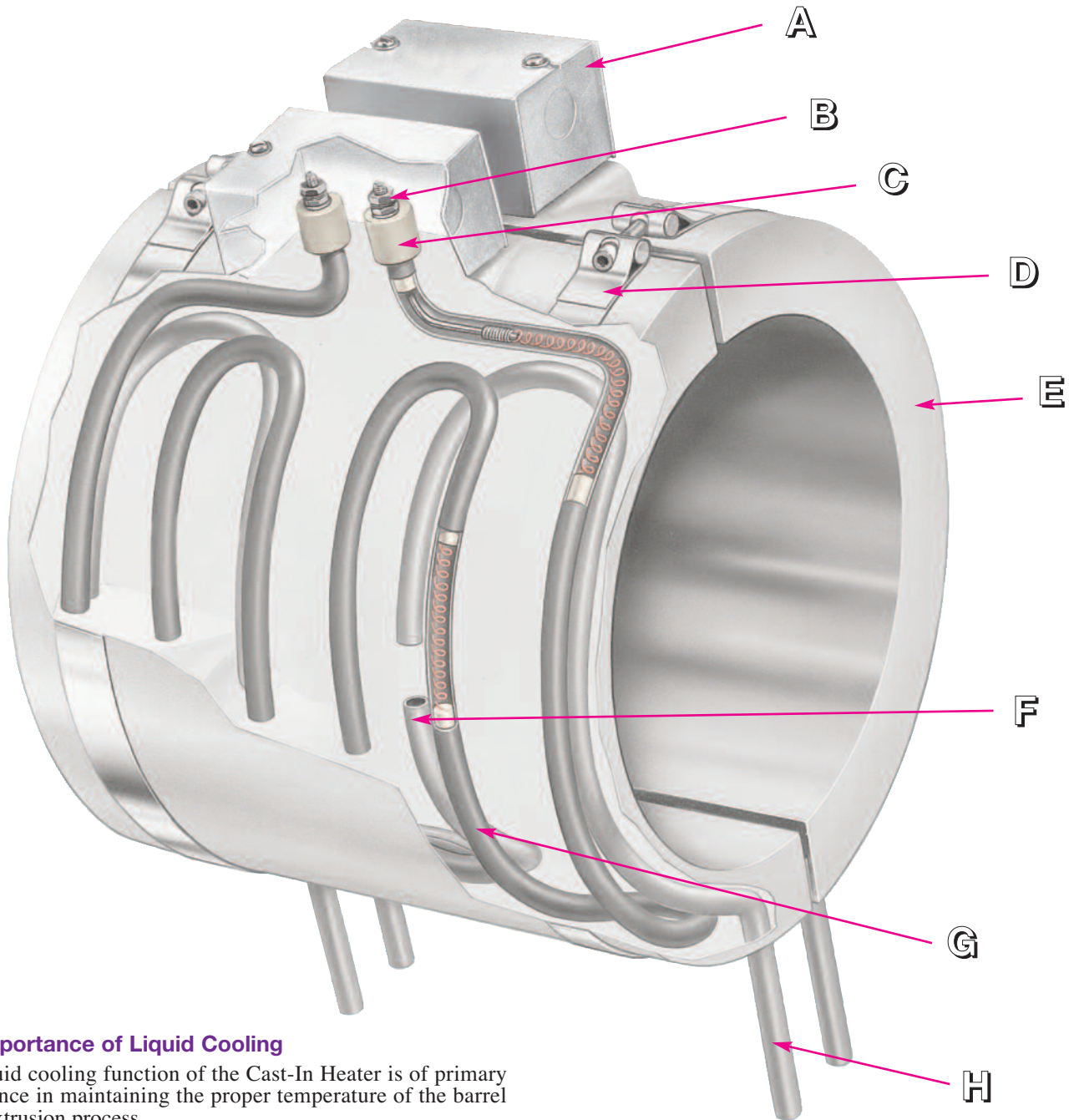
Note: For additional cooling, fin castings can be designed with cooling tubes. Consult Tempco with your requirements.



Reasons Why OEMs

Specify Tempco's Quality

Liquid-Cool Cast-In Aluminum Heaters



The Importance of Liquid Cooling

The liquid cooling function of the Cast-In Heater is of primary importance in maintaining the proper temperature of the barrel in the extrusion process.

Tempco offers many different liquid cooling variations, styles and terminations. The following pages will assist you in selecting the liquid cooling system best suited to your application. See page 3-63 for complete details on how to order.



THE PERFORMANCE FACTS

A General purpose stainless steel terminal boxes provide a simple and economical way to eliminate exposure to live electrical terminals. To simplify electrical wiring, the box has two knockouts for standard 1/2" BX cable connectors. Boxes can be supplied factory prewired with high temperature lead wire protected with armor cable or wire braid. Other boxes are available to accommodate your requirements. See pages 3-56 and 3-57.

B Threaded post terminals with 10-32 threads are securely fastened to the tubular heating element cold pin, assuring positive electrical contact for maximum amperage carrying capacity. Other terminations are available to accommodate your requirements. See pages 3-54 and 3-55.

C The standard Type "S" terminal has specially designed ceramic insulators that provide support to the screw terminals. The tubular heater is recessed into the insulator to help prevent the screw terminals from bending or breaking from mechanical abuse. Other specially designed ceramic insulators are available for the screw terminals and the connecting wire. See page 3-54.

D Specially designed, low expansion 430 stainless steel clamping straps with 1/4"-20 socket head cap screws and barrel nuts, in either 3/4" or 1-1/4" widths, are supplied as our standard method for securing the casting to the barrel. The number and width of the straps is determined by the length and weight of the heater. For optional bolt and nut clamping design see page 3-50.

E Having an in-house foundry gives us the flexibility to apply sound foundry techniques to control the quality of each casting. Specially designed steel and cast iron molds are used in our Permanent Mold Casting Process, producing a dense casting, free of internal voids with smoother as-cast surfaces. When casting small quantities, the No-Bake Sand Mold process is used. This process produces a better quality casting than other sand processes. The inside diameter of all Cast-In Band Heaters is machine finished to customer specifications.



F A critical consideration in the design of a heat and liquid cooled Cast-In Heater is the cooling tube itself, since cooling tube failures usually occur before heating element failures. Tempco has devoted many years of research and testing to select alloy tubes that are resistant to corrosion, and that will also withstand the continuous stress that is placed on the cooling tube. Our testing also included developing the proper tube forming techniques to limit the effects of thermal shock from repetitive heat/cool cycling that can produce stress cracking, especially at the point the cooling tube exits the casting.



G To maintain lower watt densities important for good heater life, the largest possible diameter steel sheath tubular heater is used. Tempco most commonly uses a .430 diameter element with 1/8" diameter cold pins. This pin size allows installation of larger and stronger screw terminal connections, providing additional strength to prevent broken terminals due to mechanical abuse.

H Cooling tube extensions can be cut to your specified length, with various types of tube fittings factory installed. The casting can also be supplied with non-exposed cooling tube fittings, which reduce cooling tube failure due to stress corrosion cracking. For a complete selection of cooling tube terminations see page 3-52.



Liquid-Cooled Cast-In Band Heaters for Extrusion Processing

Single Set of Cooling Tubes—The Industry Standard

The single set cooling tube design features 1/4", 3/8" or 1/2" diameter tubing precisely formed into a serpentine or any other suitable shape and cast into the body of the Cast-In Heater. This is the most widely used method for providing a means of cooling in liquid-cooled Cast-In Heaters.

From this basic design, the user can choose to factory equip the cooling tubes with any of the cooling tube termination options shown on page 3-52. Electrical termination options are shown on pages 3-54 and 3-55. The two most common clamping variations are shown below.



Type CW—Single Cooling Tube with Strap Clamping

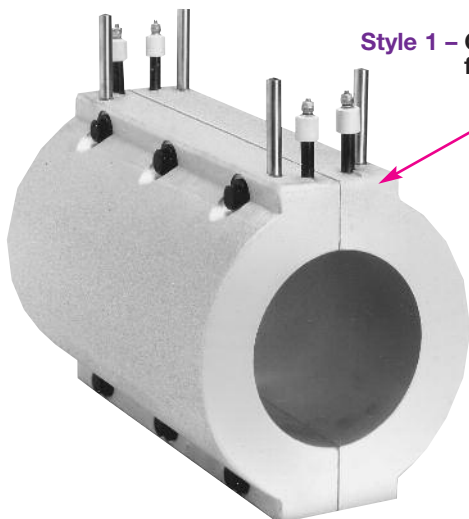
Type CW Cast-In Band Heaters consist of liquid cooled and/or heating functions, and are secured to the extruder barrel with 3/4" or 1-1/4" wide low expansion stainless steel clamping straps with 1/4"-20 socket head cap screws and barrel nuts.

If not otherwise specified, supplied with Type S electrical screw termination, 3" long cooling tube extensions and straps for clamping. For a wide selection of electrical and cooling tube termination options, see pages 3-52 through 3-55. See page 3-63 for complete details on how to order.

Type CWB—Single Cooling Tube with Bolt Clamping

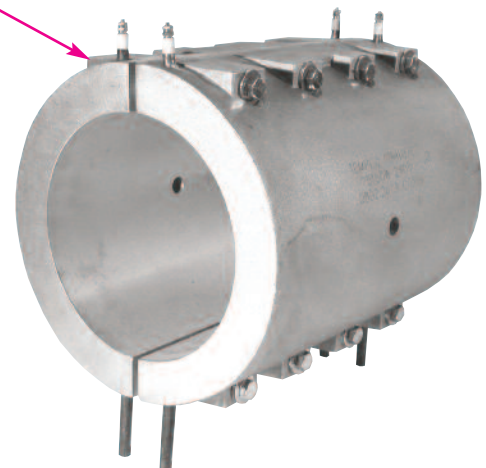
Type CWB Cast-In Band Heaters consist of liquid cooled and/or heating functions, and are secured to the barrel by bolts clamping the two halves together around the barrel. A variety of bolt clamping designs and hardware is available. Consult Tempco with your specific requirements.

If not otherwise specified, cast-in band heaters are supplied with Type S electrical screw termination and 3" long cooling tube extensions. For a wide selection of electrical and cooling tube termination options, see pages 3-52 through 3-55. See page 3-63 for complete details on how to order.



Style 1 – Continuous Flange for Bolt Clamping

Style 2 – Segmented Pads for Bolt Clamping





Liquid-Cooled Cast-In Band Heaters for Extrusion Processing

Type CWW — Dual Set of Cooling Tubes within the Same Cast-In Heater

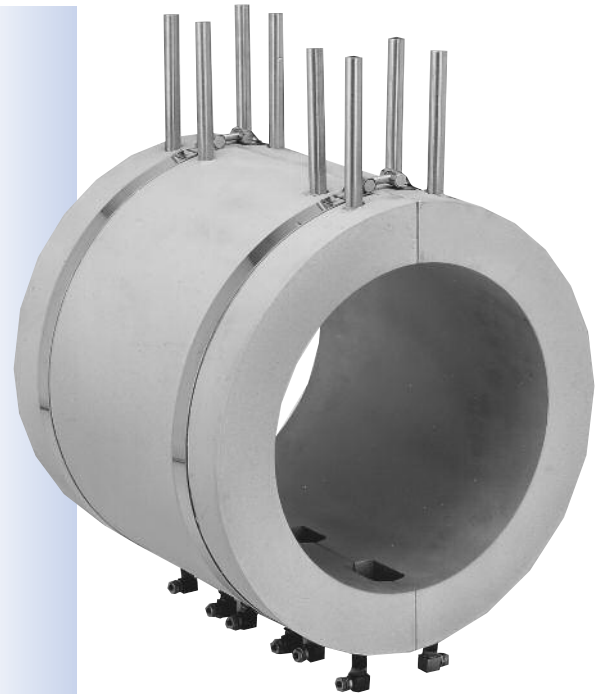
The Dual cooling tube design incorporates two sets of 3/8" or 1/2" diameter tubing formed into a serpentine or any other suitable shape within the same Cast-In Heater. Dual cooling tubes will actually double the operating life of a Cast-In Heater with liquid-cool function, since cooling tube failures usually occur before heating element failures.

There are two main causes for failure on liquid-cooled Cast-In Heaters: Stress corrosion cracking at the exiting point of the tube extensions and clogged lines due to scale build-up that reduces flow, decreasing cooling capacity and finally completely blocking the tube. Once the first set of cooling tubes has failed, reconnect to the spare set and you are back in operation, thus eliminating costly downtime and additional labor for heater replacement. Dual cooling tubes are also used when additional cooling capacity is required.

Cooling tube extensions can be factory equipped with your choice of fittings. Clamping styles are low thermal expansion alloy straps or bolt clamping. If not otherwise specified, supplied with Type S electrical screw termination, 3" long cooling tube extensions and straps for clamping. For a wide selection of electrical and cooling tube termination options, see pages 3-52 through 3-55. See page 3-63 for complete details on how to order.

Design Features

- * Double operating life
- * Greater reliability
- * Reduces costly downtime
- * Better cooling capacity
- * Reduces heater replacement inventory
- * Various heater terminations
- * Available in Bolt Clamping and Strap Clamping
- * Made to customer specifications



Type RC — Non-Exposed Cooling Tubes Recessed NPT Fittings

The recessed cooling tube design incorporates 3/8" or 1/2" diameter tubing formed into a serpentine or any other suitable shape with specially designed stainless steel NPT fittings that are welded to the tube ends and cast below the surface of the Cast-In Heater, thus eliminating the troublesome, commonly used tube extensions as they exit the casting for connection to the coolant lines.

Non-exposed fittings will drastically increase the operating life of a Cast-In Heater with liquid cool function, as this feature eliminates broken and/or damaged cooling tube extensions which are a major factor in premature heater failure. Type RC fittings are available in two female NPT thread sizes, 3/8"-18 and 1/2"-14. Standard clamping styles for Cast-In Band Heater sets are low thermal expansion alloy straps or bolt clamping. Specify fitting thread size and clamping style when ordering. If not otherwise specified, supplied with Type S electrical screw termination and straps for clamping. For fittings with special thread size, consult Tempco with your requirements. See page 3-63 for complete details on how to order.

Design Features

- * Quick and easy installation
- * Exceptionally longer Cast-In Heater life
- * Reduces costly downtime
- * Greater reliability
- * Rugged, durable construction
- * Available on all cooling tube sizes
- * Available in Bolt Clamping and Strap Clamping
- * Made to customer specifications





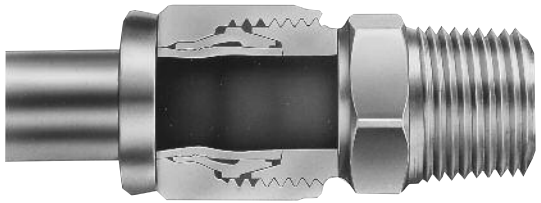
Cooling Tube Termination Options for Liquid-Cooled Cast-In Band Heaters



Type FF Flared Seal Fittings

Brass flared seal fittings are well adapted for low to medium pressure and resistant to mechanical pullout. Available for 3/8" and 1/2" diameter tubing with SAE 45° flare.

Diameter Tubing	Thread	Part Number
3/8"	5/8"-18	FTG-124-101
1/2"	3/4"-16	FTG-124-104



Type HS Hi-Seal Fittings

Hi-seal brass fittings are highly dependable under the most adverse conditions. For reliable and trouble-free service with ease of installation, we strongly recommend hi-seal fittings. Available for 3/8" and 1/2" diameter tubing. Male thread is 1/2" NPT for 1/2" tube and 3/8" tube.

Diameter Tubing	Part Number
3/8"	FTG-118-124
1/2"	FTG-118-116



Type RA 90° Copper Elbow

90° copper elbow is brazed to the Cast-In Heater cooling tube extension with additional tube extension for connecting cooling lines with compression and/or flared fittings. Available for 3/8" and 1/2" diameter tubing. If required, specify.

Diameter Tubing	Part Number
3/8"	FTG-127-102
1/2"	FTG-127-103



Type RT Cast Brass 90° Threaded Elbow

90° threaded elbow is brazed to the cooling tube extension, providing an easy and quick method for connecting cooling lines. Recommended to be factory installed to assure good braze seals. Available for 3/8" and 1/2" NPT internal threads. If required, specify.

Diameter Tubing	NPT	Part Number
1/2"	3/8"	FTG-125-101
1/2"	1/2"	FTG-125-102



Type R3 Straight Threaded Copper Fitting

Straight threaded fitting is brazed to the cooling tube extensions, providing an easy and quick method for connecting cooling lines. Recommended to be factory installed to assure good braze seals. Available for 3/8" and 1/2" diameter tubing with internal threads. If required, specify.

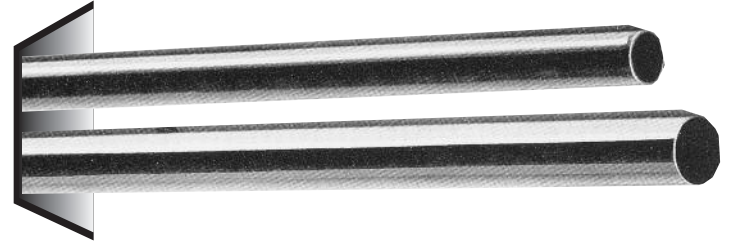
Diameter Tubing	NPT	Part Number
3/8"	3/8"	FTG-131-103
1/2"	3/8"	FTG-131-102
1/2"	1/2"	FTG-131-101



Installation Accessories for Liquid-Cooled Cast-In Band Heaters

Stock Tubing for Cooling Lines

Cooling Line Tubing can be used to connect the Tempco Cast-In heat/cool bands to the plumbing system of your extruder. Tubing is available in 6'8" lengths for U.P.S. shipments and up to 20' lengths for truck shipments. Barlow's formula below was used to calculate Working Pressure in the table.



$$\text{Maximum Working Pressure (PSIG)} = \frac{2 \times \text{Material Strength (PSI at Room Temperature)} \times \text{Wall Thickness of Tube (in)}}{\text{OD of Tube (in)} \times \text{SF (Safety Factor of 1.5 to 10 depending on application)}}$$

Tubing Diameter (in)	Material	Wall Thickness (in)	Burst Pressure (PSI)	Working Pressure (Safety Factor 4) (PSI)	Material Strength (PSI)	Volume (in ³ /ft)	Part Number
1/4	304 SS	0.028	11200	2800	75000	0.3547	TUB-101-130
3/8	304 SS	0.035	14000	3500	75000	0.8767	TUB-101-108
1/2	304 SS	0.049	14700	3675	75000	1.5231	TUB-101-110
1/2	304 SS	0.065	19500	4875	75000	1.2903	TUB-101-122
1/2	Incoloy	0.049	17052	4263	87000	1.5231	TUB-111-108

Flexible Teflon® Wire Braided Hose

Flexible Teflon® Wire Braided Hose provides an excellent means of connecting Cast-In Heaters to the extruder plumbing system. This style of hose meets the demands of medium to tight bending radius requirements. The stainless steel braid protects the Teflon® hose from any harsh mechanical conditions that may be present.

A variety of brass male and female threaded fittings can be incorporated onto the hose, making it a practical choice for use in conjunction with Tempco's Style RC Non-Exposed Fittings and other available fittings.

Rigid brass adapter fittings as listed below are used to mate the base hose assembly to your existing installation. This allows for the installation of the rigid NPT coupling into the plumbing system and then attaching the swivel fitting on the hose, making assembly relatively easy. Remember to use Teflon® tape or equivalent.

Standard Hose: Size 8 (1/2") .405" I.D., .549" O.D.
Operating Pressure: 2000 PSI
Burst Pressure: 8000 PSI



Ordering Information

The standard hose assemblies are supplied with 1/2" female 37° SAE flare swivel style crimped-on fittings. The hose assemblies can be ordered in 6" increments starting at 18" minimum. Fitting material is Brass.

Part Number*
 WHT05

*Complete the Part Number with length of hose in 6" increments starting at 18" (018).

Standard lead time is 2 weeks or less.

Adapter Fittings for Flexible Teflon® Wire Braid Hose

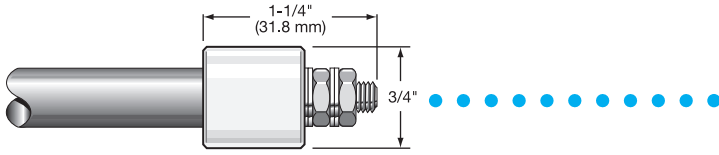
Rigid brass adapter fittings are used to mate the base hose assembly to your existing installation.

T1	T2	Part Number
1/2" male 37° SAE flare	1/2"-14 NPT male	FTG-161-103
1/2" male 37° SAE flare	1/2"-14 NPT female	FTG-161-102
1/2" male 37° SAE flare	3/8"-18 NPT male	FTG-161-104
1/2" male 37° SAE flare	3/8"-18 NPT female	FTG-161-105



Standard Tubular Heater Terminations for Cast-In Heaters

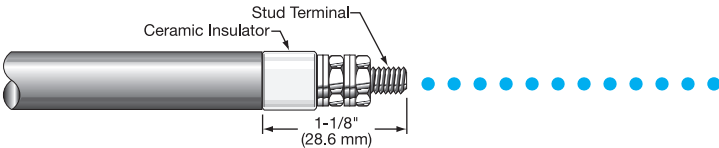
Select the termination style that meets your requirements for space, accessibility and reliability.



Type S Standard Unless Otherwise Specified

Heavy Duty Ceramic Insulators.

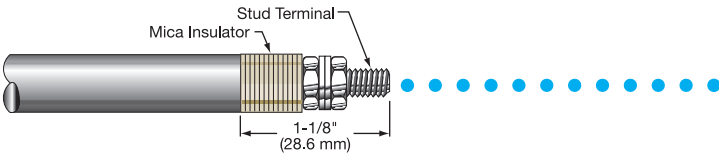
- .315" diameter heater has 8-32 screw terminals.
- .430" diameter heater has 10-32 screw terminals.



Type T7

Ceramic insulator is the same diameter as the heating element.

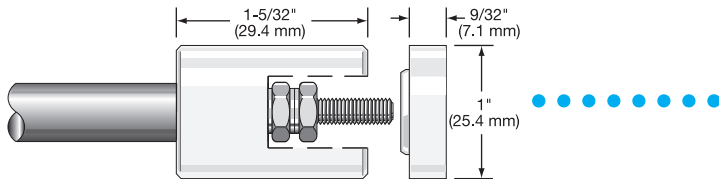
- .260" diameter heater has 6-32 screw terminals.
- .315" diameter heater has 8-32 screw terminals.
- .430" diameter heater has 10-32 screw terminals.



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.

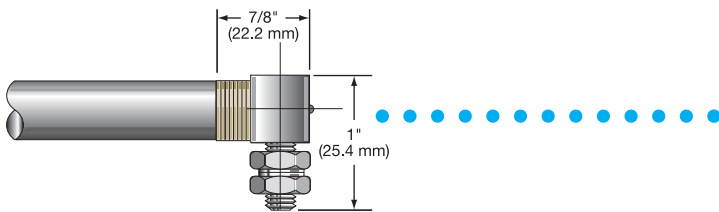
- .315" diameter heater has 10-32 screw terminals.
- .430" diameter heater has 10-32 screw terminals.



TYPE P—Plain Pin

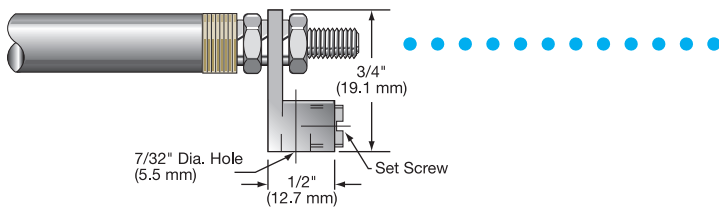
Plain terminal pin. Specify Length "L." Standard 1/2" (12.7 mm) pin length.

Element Diameter		Nominal Pin Diameter	
in	mm	in	mm
.260	6.6	.091	2.3
.315	8.0	.100	2.5
.430	10.9	.120	3.0



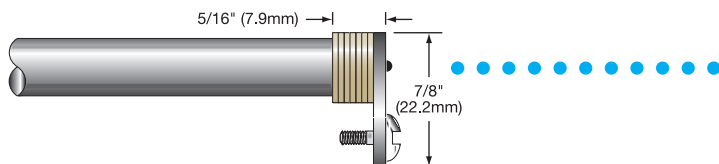
Type R

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.

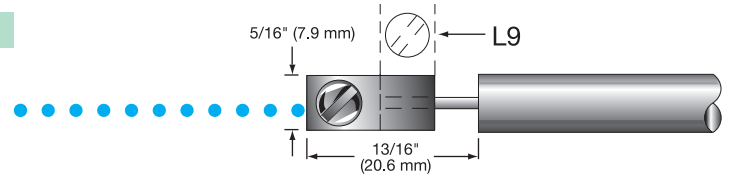


Standard Tubular Heater Terminations for Cast-In Heaters

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

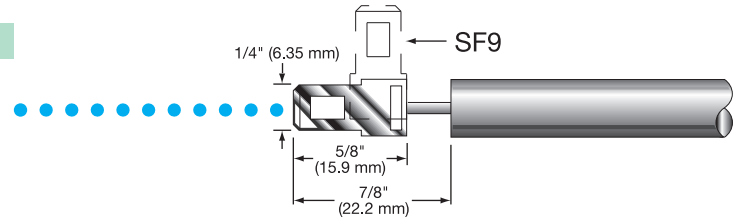
Type L & L9

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.



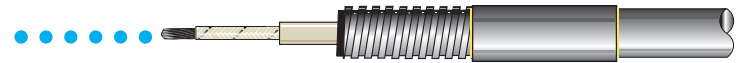
Type F

Flexible lead: insulated stranded wire crimped to cold pin. Crimp connection is insulated with fiberglass sleeving. Available for .260", .315" and .430" diameter heaters. Wire insulation rated to 250°C, 450°C optional. Specify lead length.



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.



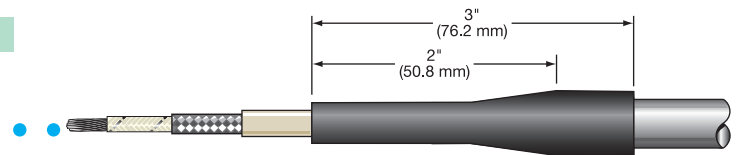
Type R1A

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.



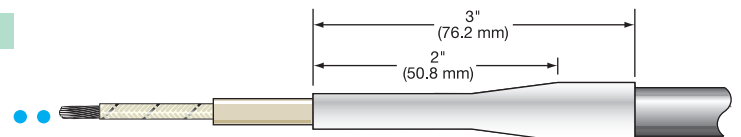
Type MR

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" and 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.





General Purpose Terminal Protection Boxes For Cast-In Heaters

Standard Box Type C2

Terminal Boxes provide a simple and economical means to eliminate exposed heater terminals and live electrical wiring, protecting employees from potential electrical shock. They also eliminate electrical shorts that can result from exposed wiring on Cast-In Heater installations.

Type C2 is an individual terminal box for protecting the terminals on each Cast-In Band Heater half. It is also used on many other Cast-In Heater designs with one set of heater terminals. The C2 box design requires a flat pad on half-round castings or a flat surface on other casting designs for mounting. It is made from heavy gauge, rust-resistant sheet metal. The cover is removable for easy access to terminals. The box has two 7/8" diameter knockouts opposite each other for standard 1/2" BX connectors.

To simplify installation, Cast-In Heaters fitted with boxes can be factory pre-wired with high temperature lead wire that can be protected with armor cable. If one of these options is required, **specify terminal box type, lead wire and cable length.** Satisfies NEMA 1 requirements.

Standard C2 box size: L = 4" W = 2-1/2" H = 2-1/8"



Terminal Protection for Both Heater Halves Type C7

Type C7 terminal boxes are made from rust-resistant sheet metal. The C7 base is fixed to the clamping straps. The box has two 7/8" diameter knockouts opposite each other for standard 1/2" BX connectors. The cover is removable, providing easy access to the screw terminals for electrical wiring.

To simplify installation, Cast-In Heaters fitted with boxes can be factory pre-wired with high temperature lead wire, protected with armor cable. If either one of these options is required, **specify terminal box type, lead wire and cable length.** Satisfies NEMA 1 requirements.

C7 Terminal Box Size varies with dimensions of casting.



Quick-Disconnect High Temperature Cup and Box Assembly Type P2

Quick-Disconnect Cup assemblies provide the simplest and safest means for applying power to any type of Cast-In Heater installation. The box extends over the screw terminals on both Cast-In Band Heater halves. The combination of prewired cup and box assembly, along with factory prewired high temperature lead wire protected with armor cable, eliminates live exposed heater terminals and electrical wiring, protecting employees from electrical shock and the possibility of electrical shorts due to exposed wiring.

If prewired plugs are required, **specify length of lead wire and cable.**

Rated 250V maximum, 15 Amp maximum

Terminal Box Size varies with dimensions of casting.





Terminal Protection Boxes for Cast-In Heaters



Type EP Explosion and Moisture Resistant Box

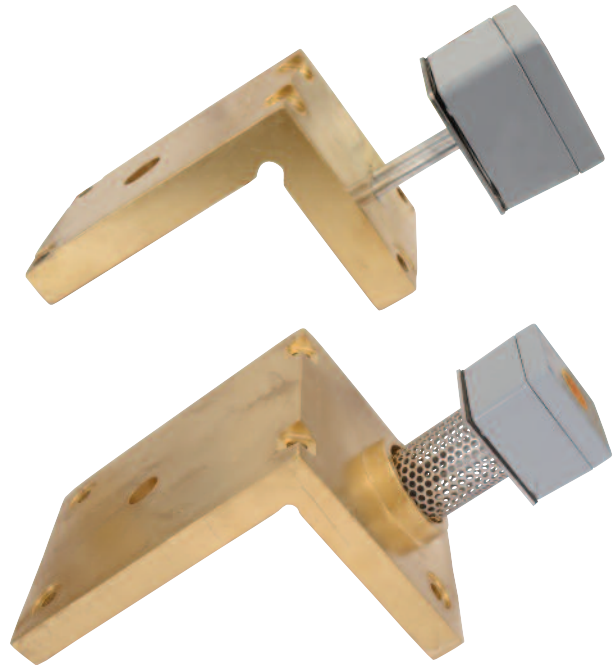
Cast iron explosion and moisture resistant boxes should be used in areas where the surrounding air may become contaminated with combustible gases or a high humidity level may exist. Installation requires one box per Cast-In Heater half and they are brazed to the tubular heater. The standard box has one 1/2" NPT hub.

Optional: Two hubs per box available. Cast-In Heater fitted with boxes can be factory prewired with high temperature lead wire, protected with special armor cable. If either of these options is required, please specify the following:

- Number of hubs
- Cable type
- Lead wire length
- Cable length

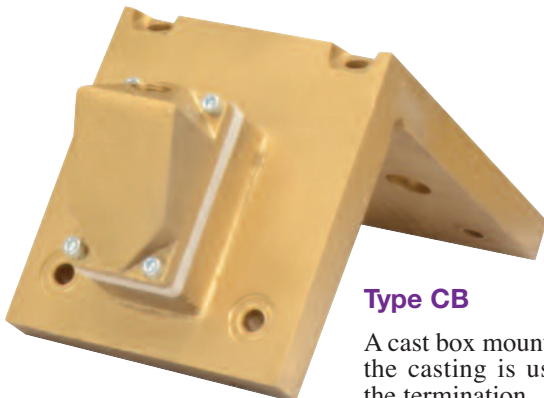
Type MPR Moisture Resistant Box

This design has a moisture resistant die cast aluminum box with a non-removable polyurethane gasket in the lid. Lid is secured with captive stainless steel screws. Body and lid are painted in basic industrial gray; interior contains copper ground screw. Box is mounted to a plate that is brazed to the element. Available in a wide variety of sizes.



Type MR1 Moisture Resistant Box with Perforated Shield

This design incorporates the MPR housing style along with a perforated tube shielding unheated extensions of the tubular heating elements. This feature provides mechanical strength to the element extension and prevents overheating of the terminals, reducing possible premature failure from corrosion and oxidation.



Type CB

A cast box mounted directly on the casting is used to protect the termination.

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



Liquid-Cooled

Cast-In Band Heater Selection for Plastics Extrusion & Downstream Equipment

The Cast-In Band Heater listings on the following pages constitute a small segment of the thousands of Cast-In Band Heaters we have produced for plastics processing equipment. So that we may assist you in selecting the exact heater replacement for your machine, adhere to the following instructions:

1. Measure the O.D. of your barrel, which in turn will be the I.D. of the heater.
2. Measure the width of your heater.
3. Check the wattage and voltage rating per half or per segment. This information is normally stamped on the heater.
4. Establish heater cooling function, if any. If water cooled, measure length and diameter of cooling tube extensions. Cooling tube extensions are 3" long, and 1/2" x .049 O.D. wall thickness unless otherwise specified. If air cooled, Cast-In Band will have fins.
5. Check for special features such as: thermocouple clearance holes, drill and tapped holes, vent cutouts and terminal boxes.
6. There are two methods for securing a Cast-In Band Heater to a barrel: separate clamping straps or nut and bolt clamping.
7. Once you have established this information, proceed to match your heater description with one of our standard Cast-In Band Heaters. Starting with the I.D., read across the chart until you have a perfect match. Wattage can vary up to 15% either way with little or no effect to your process.

Stock and Standard (Non-Stock) Cast-In Band Heaters for Plastics Extrusion

I.D. in	O.D. in	Length in	Material	Watts Each Half	Volts Each Half	Phase	Termination Type	Terminal Box Type	Cooling Tube	Cooling Termination	Clamping	Cast-In Heater Part Number
2.25	4	17	Bronze	2000	480	1	R1	None	None	None	Strap	CBH08136
2.25	4.25	5	Bronze	1200	480	1	R1A	None	None	None	Strap	CBH08421
2.375	4.375	22	Brass	500	240	1	T7	EP	None	None	Bolt	CBH14001
2.5	4	6.25	Alum 319	750	208	1	F	None	None	None	Strap	CBH09711
2.75	4.75	2	Bronze	450	230	1	R2	None	None	None	Strap	CBH09227
3	4.5	2.5	Brass	350	120	1	E	None	None	None	Strap	CBH08847
3	4.75	4.5	Bronze	500	120	1	T7	None	None	None	Bolt	CBH05210
3	5	5.5	Alum 319	1000	230	1	T	None	None	None	Strap	CBH03097
3	5	5.5	Bronze	1000	230	1	T	None	None	None	Strap	CBH06726
3.125	4.625	3	Alum 319	400	220	1	R1	None	None	None	Strap	CBH06992
3.15	4.25	2	Brass	250	110	1	R1A	None	None	None	Strap	CBH08696
3.25	6.25	10	Alum 319	750	115	1	S	None	Single	None	Strap	CBH09445
3.5	6	17	Bronze	1250	208	1	R1	None	None	None	Strap	CBH04875
3.5	6.5	7.375	Alum 319	1500	230	1	S	None	Single	None	Strap	CBH10460
3.51	5.5	3.5	Alum 319	250	120	1	C4	None	None	None	Strap	CBH13189
3.8	6.55	3.75	Brass	1000	460	1	T7	EP	Single	HS	Strap	CBH12488

Key for Abbreviations found under the Termination Type Column

- | | |
|---|---|
| C4 = Screw Terminal with Ceramic Cover | R1A = Stainless Steel Wire Overbraid |
| E = Right-Angle Lug | R2 = Blockhead Screw Terminal |
| F = Flexible Lead Wire | S = Screw Terminal with Heavy Duty Ceramic Insulator |
| R = 90° Blockhead Screw Terminal | T = Screw Terminal with Mica Insulator |
| R1 = Flexible Armor Cable | T7 = Screw Terminal with Ceramic Insulator |

Key for Abbreviations found under the Terminal Box Type Column

- | | |
|--|--|
| C2 = Standard Box | EP = Explosion and Moisture Resistant |
| C7 = Single Box over both Heater Halves | MR1 = Moisture Proof with Perforated Shield |
| CB1 = Cast Aluminum Box | |

Key for Abbreviations found under the Cooling Termination Column

- | | |
|------------------------------|---|
| HS = Hi-Seal Fittings | RC = Non-Exposed Cooling Tubes/Recessed NPT Fittings |
|------------------------------|---|



Stock and Standard (Non-Stock) Cast-In Band Heaters for Plastics Extrusion

Stock Items Are Shown In **RED**

I.D. in	O.D. in	Length in	Material	Watts Each Half	Volts Each Half	Phase	Termination Type	Terminal Box Type	Cooling Tube	Cooling Termination	Clamping	Cast-In Heater Part Number
3.99	5.25	4.312	Brass	600	240	1	R1	None	None	None	Strap	CBH04768
4	7	7.5	Alum 319	1000	115	1	T7	None	Single	None	Strap	CBH08859
4	7.5	7.5	Alum 319	1500	190	3	S	None	Single	RC	Strap	CBH06278
4.33	8.33	6.89	Bronze	600	230	1	C4	None	None	None	Bolt	CBH10533
4.331	5.831	6.89	Alum 319	600	230	1	C4	None	None	None	Bolt	CBH08244
4.331	8.331	6.89	Bronze	1300	230	1	C4	None	None	None	Bolt	CBH11210
4.5	6	9	Alum 356	1700	230	1	T7	None	None	None	Strap	CBH08756
4.5	7	4.375	Alum 319	810	240	1	E	None	Single	None	Strap	CBH01320
4.502	7	4.375	Bronze	810	190	1	R	None	Single	None	Strap	CBH06735
4.625	7.5	4	Bronze	1000	230	1	R1A	None	Single	None	Strap	CBH07254
4.75	6	24.25	Alum 319	N/A	N/A	N/A	N/A	None	Single	None	Strap	CBH09388
5.249	8.749	13.5	Alum 319	3750	230	3	S	None	Single	None	Strap	CBH05105
5.5	6.875	13.5	Alum 356	2250	230	1	T	None	None	None	Strap	CBH08088
5.5	6.875	18	Alum 356	3000	230	1	T	None	None	None	Strap	CBH08089
5.5	7.5	3.375	Bronze	1700	240	1	S	None	None	None	Strap	CBH04614
5.5	8	4	Alum 356	750	230	1	T	None	Single	None	Strap	CBH09056
5.5	8	8	Alum 356	1500	230	1	T	None	Single	None	Strap	CBH09278
5.5	8	13.5	Alum 319	2500	240	1	T	None	Single	None	Strap	CBH07489
5.5	8.75	5.5	Bronze	1050	200	1	R	None	Single	None	Strap	CBH06201
5.5	8.75	5.5	Alum 319	1050	230	1	R	None	Single	None	Strap	CBH01023
5.5	8.75	5.5	Bronze	1400	200	1	R	None	Single	None	Strap	CBH06202
5.5	9	10.5	Alum 319	3000	200	3	C4	None	Single	RC	Strap	CBH13928
6	8.5	6	Alum 356	2000	240	1	T7	C2	Single	None	Bolt	CBH14096
6.25	9.75	13.625	Alum 319	3000	230	1	R	None	Single	None	Strap	CBH01266
6.25	10	15.875	Alum 319	5000	230	1	S	None	Single	None	Bolt	CBH01726
6.299	9.45	2.56	Bronze	1250	240	1	T	MR1	Single	None	Bolt	CBH10318
6.3	8.656	14.563	Brass	5000	220	1	C4	None	None	None	Bolt	CBH06407
6.3	8.656	18.5	Brass	4500	220	1	C4	None	None	None	Bolt	CBH06409
6.3	9.813	15.75	Alum 319	5000	240	1	C4	None	Single	RC	Strap	CBH03737
6.5	8.5	4	Alum 319	900	230	1	S	None	Single	None	Strap	CBH03964
6.5	8.5	9	Alum 356	2000	230	1	T	None	Single	None	Strap	CBH09152
6.5	9	4	Alum 356	900	230	1	T	None	Single	None	Strap	CBH09049
6.5	9	8	Alum 356	1700	230	1	T	None	Single	None	Strap	CBH09050
6.5	9	11	Alum 356	2300	240	1	T	None	Single	None	Strap	CBH09129
6.5	9	18	Alum 356	3800	240	1	T	None	Single	None	Strap	CBH07310
6.5	9.75	7.75	Bronze	1800	190	1	R	None	Single	None	Strap	CBH05840
6.5	9.75	7.75	Alum 319	1800	230	1	R	None	Single	None	Strap	CBH01066
6.5	9.75	7.75	Bronze	2200	190	1	R	None	Single	None	Strap	CBH10749
6.5	9.75	7.75	Alum 319	2500	230	1	R	None	Single	None	Strap	CBH04401
6.5	10	8.5	Alum 319	1300	240	1	T7	None	Single	RC	Strap	CBH13353
6.5	10	11	Alum 319	1685	240	1	T7	None	Single	RC	Strap	CBH13396
6.5	10	11	Alum 356	2300	240	1	T7	None	Single	None	Bolt	CBH10742
6.5	10	18	Alum 319	2755	240	1	T7	None	Single	RC	Strap	CBH13341
6.5	10	18	Alum 356	3800	240	1	T7	None	Single	None	Bolt	CBH10741
6.5	10.5	3.281	Alum 319	1000	240	1	T7	EP	None	None	Bolt	CBH11254
6.625	10.125	6	Alum 319	1550	230	1	R	None	Single	None	Strap	CBH02138
6.625	10.125	8.5	Alum 319	2200	240	1	T	None	Single	None	Strap	CBH04393
6.635	9.875	17.5	Alum 319	4360	240	1	S	None	Single	None	Bolt	CBH06070

CONTINUED



Note: Made-to-Order Manufacturing:

For sizes, ratings, terminations and/or features not listed, Tempco will manufacture a Cast-In Heater to your specifications. State quantity, watts, volts and full heater description with all the appropriate specifications and features required. See Ordering Information on page 3-63.

Customer Assistance:

If you have a special application requiring a custom manufactured Cast-In Band Heater or need assistance selecting one of our standard heaters for a new or existing installation, consult Tempco with your requirements. We offer complete engineering services and support, working with you every step of the way to ensure customer satisfaction.

Cast-In Heaters



Liquid-Cooled

Stock and Standard (Non-Stock) Cast-In Band Heaters for Plastics Extrusion

Continued from previous page...

Stock Items Are Shown In **RED**

I.D. in	O.D. in	Length in	Material	Watts Each Half	Volts Each Half	Phase	Termination Type	Terminal Box Type	Cooling Tube	Cooling Termination	Clamping	Cast-In Heater Part Number
6.999	10.499	18	Alum 319	6000	230	3	S	None	Single	None	Strap	CBH05138
6.999	10.499	18	Alum 319	8000	230	3	S	None	Single	None	Strap	CBH09529
7.283	8.779	8.228	Alum 319	1300	230	1	C4	None	None	None	Bolt	CBH08232
7.283	9.659	8.228	Bronze	3700	230	1	C4	None	None	None	Bolt	CBH09953
7.5	10	4	Alum 356	900	230	1	T	None	Single	None	Strap	CBH09074
7.5	10	8	Alum 356	1700	230	1	T	None	Single	None	Strap	CBH09048
7.5	10	10	Alum 319	2150	240	1	T	None	Single	None	Strap	CBH07595
7.5	10	10	Alum 356	3225	240	1	T	None	Single	None	Strap	CBH09142
7.5	10	17.5	Alum 319	3750	240	1	T	None	Single	None	Strap	CBH12380
7.5	10	17.5	Alum 356	3750	240	1	T	None	Single	None	Strap	CBH09052
7.5	10	17.5	Alum 319	5625	240	1	T	None	Single	None	Strap	CBH12089
7.5	10	17.5	Alum 356	5625	240	1	T	None	Single	None	Strap	CBH09141
7.5	10.5	6	Alum 319	1500	230	1	C4	None	Single	None	Strap	CBH04607
7.5	10.5	10.25	Bronze	2085	200	1	S	C2	Single	None	Strap	CBH09904
7.5	10.5	10.25	Alum 319	2085	230	1	S	C2	Single	None	Strap	CBH01079
7.5	10.5	10.25	Alum 319	2085	230	1	S	C2	Dual	None	Strap	CBH02414
7.5	10.5	10.25	Bronze	3000	200	1	S	C2	Single	None	Strap	CBH09906
7.5	10.5	10.25	Alum 319	3000	230	1	S	C2	Single	None	Strap	CBH03778
7.5	11	10	Alum 319	1550	240	1	T7	None	Single	RC	Strap	CBH13274
7.5	11	10	Alum 356	2150	240	1	T7	None	Single	None	Bolt	CBH10743
7.5	11	10	Alum 356	3225	240	1	T7	None	Single	None	Bolt	CBH10768
7.5	11	16.5	Alum 319	5100	230	1	R	None	Single	None	Strap	CBH02351
7.5	11	16.5	Alum 319	5100	230	1	R	None	Single	None	Strap	CBH02878
7.5	11	16.5	Alum 319	5100	230	1	R	None	Single	RC	Strap	CBH06763
7.5	11	17.5	Alum 319	2650	240	1	T7	None	Single	RC	Strap	CBH13273
7.5	11	17.5	Alum 319	3750	240	1	R	C2	Single	None	Bolt	CBH10510
7.5	11	17.5	Alum 356	3750	240	1	T7	None	Single	None	Bolt	CBH10744
7.5	11	17.5	Alum 356	5625	240	1	S	None	Single	None	Bolt	CBH10686
7.5	11	18	Alum 319	5000	230	1	S	None	Single	None	Strap	CBH07153
7.56	11	22	Alum 319	6500	230	1	S	None	Single	None	Strap	CBH06168
7.56	11.125	18	Alum 319	4950	230	1	S	None	Single	None	Strap	CBH02240
7.625	11.125	12	Alum 319	2000	240	1	S	None	Single	None	Strap	CBH09378
7.625	11.125	14.375	Alum 319	3500	230	1	R	None	Single	None	Strap	CBH01026
7.625	11.125	14.375	Alum 319	3500	240	1	R	None	Single	None	Strap	CBH01094
7.625	11.125	14.375	Alum 319	3500	460	1	R	None	Single	None	Strap	CBH01206
7.625	11.125	18	Alum 319	3500	230	1	R	None	Single	None	Strap	CBH01140
7.625	11.125	18	Alum 319	3500	230	1	R	None	Single	None	Strap	CBH01143
7.625	11.125	18	Alum 319	3500	230	1	R	None	Dual	None	Strap	CBH07322
7.71	11.25	15	Alum 319	4600	220	1	S	None	Single	None	Bolt	CBH09595
8	11	11.5	Alum 319	2000	240	1	S	None	Single	RC	Strap	CBH06630
8	11	12.75	Alum 319	2875	240	1	S	None	Single	RC	Strap	CBH06647
8	11.5	9	Alum 319	1500	240	1	R	C2	Single	RC	Bolt	CBH08236
8.005	11.5	24.375	Alum 319	4500	480	1	C4	None	Single	HS	Strap	CBH09729
8.125	11.625	9	Alum 319	1500	240	1	T7	None	Single	RC	Strap	CBH13243
8.125	11.625	14	Alum 356	3275	240	3	T7	None	Single	None	Bolt	CBH10682
8.125	11.625	20	Alum 356	4675	240	3	T7	None	Single	None	Bolt	CBH10683
8.25	11.75	13	Alum 319	5500	460	1	R	None	Single	None	Strap	CBH02460
8.25	11.75	15.75	Alum 319	7000	460	1	R	None	Single	None	Strap	CBH02245

Key for Abbreviations found under the Termination Type Column

- | | |
|---|---|
| C4 = Screw Terminal with Ceramic Cover | R1A = Stainless Steel Wire Overbraid |
| E = Right-Angle Lug | R2 = Blockhead Screw Terminal |
| F = Flexible Lead Wire | S = Screw Terminal with Heavy Duty Ceramic Insulator |
| R = 90° Blockhead Screw Terminal | T = Screw Terminal with Mica Insulator |
| R1 = Flexible Armor Cable | T7 = Screw Terminal with Ceramic Insulator |

Key for Abbreviations found under the Terminal Box Type Column

- | | |
|--|--|
| C2 = Standard Box | EP = Explosion and Moisture Resistant |
| C7 = Single Box over both Heater Halves | MR1 = Moisture Proof with Perforated Shield |
| CB1 = Cast Aluminum Box | |

Key for Abbreviations found under the Cooling Termination Column

- | | |
|------------------------------|---|
| HS = Hi-Seal Fittings | RC = Non-Exposed Cooling Tubes/Recessed NPT Fittings |
|------------------------------|---|

View Product Inventory @ www.tempco.com



Stock and Standard (Non-Stock) Cast-In Band Heaters for Plastics Extrusion

Stock Items Are Shown In **RED**

I.D. in	O.D. in	Length in	Material	Watts Each Half	Volts Each Half	Phase	Termination Type	Terminal Box Type	Cooling Tube	Cooling Termination	Clamping	Cast-In Heater Part Number
8.268	11.768	21.457	Alum 319	7500	220	3	C4	None	Single	RC	Strap	CBH03794
8.5	12	8.75	Alum 319	2900	460	1	T7	None	Single	None	Strap	CBH07043
8.5	12	8.75	Alum 319	3000	230	1	R	None	Single	None	Strap	CBH01444
8.51	11.75	18.25	Alum 319	5900	240	3	S	None	Single	None	Bolt	CBH06068
8.661	12.244	11.024	Alum 319	3400	230	1	R1A	None	Single	RC	Bolt	CBH11606
8.666	12.25	11.625	Alum 319	3400	240	1	R1A	None	Single	RC	Bolt	CBH07586
9	12.5	12.5	Alum 319	3750	240	1	C4	None	Single	RC	Bolt	CBH09779
9.05	12.55	15.98	Alum 319	5600	230	1	R1A	None	Single	RC	Bolt	CBH08396
9.055	12.563	16	Alum 319	5750	220	1	S	None	Single	None	Bolt	CBH09999
9.312	12.625	11	Alum 319	3750	230	1	C4	None	Dual	RC	Strap	CBH07949
9.312	12.625	11	Alum 319	3750	230	1	S	C2	Single	None	Strap	CBH01108
9.313	12.625	11	Alum 319	3750	230	1	R	None	Single	None	Strap	CBH01273
9.313	12.625	11	Alum 319	4950	230	1	S	C2	Single	None	Strap	CBH01133
9.5	12	12	Alum 319	3900	230	1	T7	None	Single	None	Strap	CBH12118
9.5	12	12	Alum 356	3900	230	1	T	None	Single	None	Strap	CBH09221
9.5	12	12	Bronze	3900	230	1	T	None	Single	None	Strap	CBH11491
9.5	12	16	Alum 356	5150	240	1	T	None	Single	None	Strap	CBH09126
9.5	12	24.5	Alum 356	7850	240	1	T	None	Single	None	Strap	CBH09127
9.5	12	24.5	Brass	11750	240	1	T7	None	Single	RC	Strap	CBH08350
9.5	13	8.5	Alum 319	4000	288	1	R	None	Single	RC	Bolt	CBH12533
9.5	13	11.5	Alum 319	2575	240	1	T7	None	Single	RC	Strap	CBH13354
9.5	13	13	Alum 319	5250	460	3	S	None	Single	None	Bolt	CBH08749
9.5	13	16	Alum 319	3580	240	1	T7	None	Single	RC	Strap	CBH13342
9.5	13	16	Alum 356	5150	240	3	T7	None	Single	None	Bolt	CBH10746
9.5	13	16	Alum 356	5150	240	1	T7	None	Single	None	Bolt	CBH10767
9.5	13	16	Alum 356	7750	240	1	T7	None	Single	None	Bolt	CBH10688
9.5	13	20.25	Alum 319	7500	240	1	C4	None	Single	RC	Bolt	CBH12958
9.5	13	24.5	Alum 319	5485	240	1	T7	None	Single	RC	Strap	CBH13371
9.5	13	24.5	Alum 356	7850	240	1	T7	None	Single	None	Bolt	CBH10689
9.5	13	24.5	Alum 356	7850	240	3	T7	None	Single	None	Bolt	CBH10745
9.5	13	24.5	Alum 356	11750	240	1	T7	None	Single	None	Bolt	CBH10690
9.5	13	27.75	Alum 319	12000	230	3	S	None	Single	None	Bolt	CBH01528
9.5	13	27.75	Alum 319	12000	230	3	S	None	Dual	None	Strap	CBH08104
9.75	12.75	24	Alum 319	9185	240	1	S	None	Single	None	Strap	CBH02183
9.75	13.25	9	Alum 319	3100	230	1	R	None	Single	None	Strap	CBH01532
9.75	13.25	11	Alum 319	3500	230	1	R	None	Single	None	Strap	CBH02461
9.75	13.25	11	Alum 319	3500	250	1	R	None	Single	None	Strap	CBH02692
9.75	13.25	11	Alum 319	4500	230	1	R	None	Single	RC	Strap	CBH03873
9.75	13.25	12	Alum 319	4500	230	1	R	None	Single	None	Strap	CBH01453
9.75	13.375	19.438	Alum 319	6000	230	1	R	None	Single	None	Strap	CBH01144
9.75	13.375	19.438	Alum 319	6000	230	1	S	None	Single	None	Strap	CBH01221
9.75	13.375	23.875	Alum 319	6000	230	1	R	None	Single	None	Strap	CBH01077
9.76	13	12.25	Alum 319	5000	240	3	S	None	Single	None	Bolt	CBH06069
9.842	12.188	13.375	Brass	3500	220	1	C4	None	None	None	Bolt	CBH06408
9.875	13	8.5	Alum 319	2000	240	1	E	None	Single	RC	Strap	CBH06648
9.875	13	12.25	Alum 319	4500	240	1	S	None	Single	RC	Strap	CBH06094
9.875	13.375	8.5	Alum 319	2000	240	1	R	C2	Single	RC	Bolt	CBH08955
10	13.5	12	Alum 319	6480	230	3	S	None	Single	None	Strap	CBH05102



Made-to-Order Manufacturing

For sizes, ratings, terminations and/or features not listed, Tempco will manufacture a Cast-In Heater to your specifications. State quantity, watts, volts and full heater description with all the appropriate specifications and features required. See Ordering Information on page 3-63.

Customer Assistance

If you have a special application requiring a custom manufactured Cast-In Band Heater or need assistance selecting one of our standard heaters for a new or existing installation, consult Tempco with your requirements. We offer complete engineering services and support, working with you every step of the way to ensure customer satisfaction.

Cast-In Heaters



Liquid-Cooled

Stock and Standard (Non-Stock) Cast-In Band Heaters for Plastics Extrusion

Continued from previous page...

Stock Items Are Shown In **RED**

I.D. in	O.D. in	Length in	Material	Watts Each Half	Volts Each Half	Phase	Termination Type	Terminal Box Type	Cooling Tube	Cooling Termination	Clamping	Cast-In Heater Part Number
10	13.5	12	Bronze	6480	230	3	S	None	Single	None	Strap	CBH08755
10	13.5	12	Alum 319	6480	240	3	S	None	Dual	RC	Strap	CBH07168
10	13.5	12	Alum 319	6480	290	3	S	None	Single	None	Strap	CBH05120
10.03	13.53	24.9	Alum 319	6000	480	1	C4	None	Single	RC	Strap	CBH06260
10.039	13.535	13	Alum 319	6000	220	3	C4	None	Single	RC	Strap	CBH04378
10.236	11.438	6.313	Alum 319	N/A	N/A	N/A	N/A	None	Single	None	Strap	CBH09288
10.5	14	10	Alum 319	2900	240	1	T7	None	Single	RC	Strap	CBH13499
10.5	14	21	Alum 356	11500	240	3	T7	None	Single	None	Bolt	CBH10685
10.625	12.625	10.5	Bronze	7000	480	3	T7	Rose	None	None	Strap	CBH07880
11.024	14.606	13.976	Alum 319	6050	230	1	R1A	None	Single	RC	Bolt	CBH08121
11.024	14.606	14.252	Alum 319	6250	230	1	R1A	None	Single	RC	Bolt	CBH11237
11.41	14.92	7.48	Alum 319	3313	230	1	R1A	None	Single	RC	Bolt	CBH08394
11.41	14.92	12.28	Alum 319	5425	230	1	R1A	None	Single	RC	Bolt	CBH08395
11.5	14.75	11.625	Alum 319	4700	230	1	S	C2	Single	None	Strap	CBH01136
12	15.5	11.5	Alum 319	4500	240	1	C4	None	Single	RC	Strap	CBH09363
12.25	16.5	12.25	Alum 319	5500	230	1	S	None	Dual	None	Bolt	CBH06827
12.25	16.5	12.25	Alum 319	5500	230	1	S	None	Dual	RC	Bolt	CBH12665
12.5	16	11	Alum 319	7500	460	1	T7	C2	Single	RC	Strap	CBH10490
12.5	16	14	Alum 319	7500	460	1	T7	C2	Single	RC	Strap	CBH10489
12.5	16	14	Bronze	10000	460	1	S	None	Single	None	Strap	CBH02869
12.5	16	15	Alum 319	8750	240	1	R	None	Single	None	Strap	CBH01731
12.5	16	28	Alum 319	15000	480	3	S	None	Single	RC	Bolt	CBH07693
12.598	13.85	9.449	Alum 319	N/A	N/A	N/A	N/A	None	Single	None	Strap	CBH09287
12.598	16.181	16.653	Alum 319	8400	230	1	R1A	None	Single	RC	Bolt	CBH08122
12.996	16.5	13.75	Alum 319	6750	460	1	R	None	Single	None	Strap	CBH10840
13.5	17.25	26.5	Alum 319	10000	460	1	R	None	Single	HS	Strap	CBH01685
14	17.5	13.75	Alum 319	6250	240	1	C4	None	Single	RC	Bolt	CBH14211
14.567	18.189	17.874	Alum 319	10500	460	3	T7	Rose	Single	RC	Bolt	CBH10043
15	18.5	10	Alum 319	5500	240	1	S	None	Dual	None	Strap	CBH03477
15.354	17.354	4	Bronze	3000	240	1	R1A	CB1	None	None	Bolt	CBH08619
15.354	17.354	6	Bronze	3500	240	1	R1A	CB1	None	None	Bolt	CBH08618
15.75	17.75	2.5	Bronze	2800	240	1	T7	EP	None	None	Strap	CBH09753
16.142	18.142	7.875	Alum 319	6875	480	3	R1A	None	None	None	Strap	CBH10563
20.669	22.669	2	Alum 319	2500	220	1	S	C7	None	None	Strap	CBH04057
27	30	4	Alum 319	5000	480	1	E	Rose	None	None	Strap	CBH06807

Made-to-Order Manufacturing

For sizes, ratings, terminations and/or features not listed, Tempco will manufacture a Cast-In Heater to your specifications. State quantity, watts, volts and full heater description with all the appropriate specifications and features required. See Ordering Information on page 3-63.

Customer Assistance

If you have a special application requiring a custom manufactured Cast-In Band Heater or need assistance selecting one of our standard heaters for a new or existing installation, consult Tempco with your requirements. We offer complete engineering services and support, working with you every step of the way to ensure customer satisfaction.

Key for Abbreviations found under the Termination Type Column

- C4** = Screw Terminal with Ceramic Cover
- E** = Right-Angle Lug
- F** = Flexible Lead Wire
- R** = 90° Blockhead Screw Terminal
- R1** = Flexible Armor Cable
- R1A** = Stainless Steel Wire Overbraid
- R2** = Blockhead Screw Terminal
- S** = Screw Terminal with Heavy Duty Ceramic Insulator
- T** = Screw Terminal with Mica Insulator
- T7** = Screw Terminal with Ceramic Insulator

Key for Abbreviations found under the Terminal Box Type Column

- C2** = Standard Box
- C7** = Single Box over both Heater Halves
- CB1** = Cast Aluminum Box
- EP** = Explosion and Moisture Resistant
- MR1** = Moisture Proof with Perforated Shield

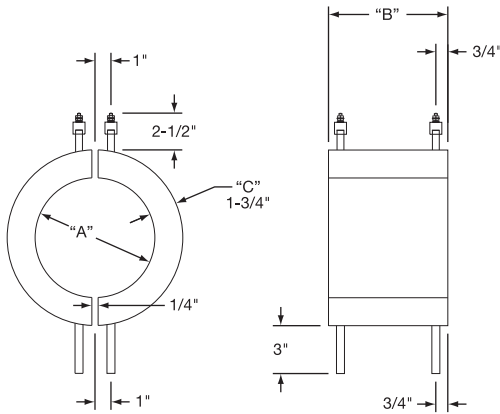
Key for Abbreviations found under the Cooling Termination Column

- HS** = Hi-Seal Fittings
- RC** = Non-Exposed Cooling Tubes/Recessed NPT Fittings

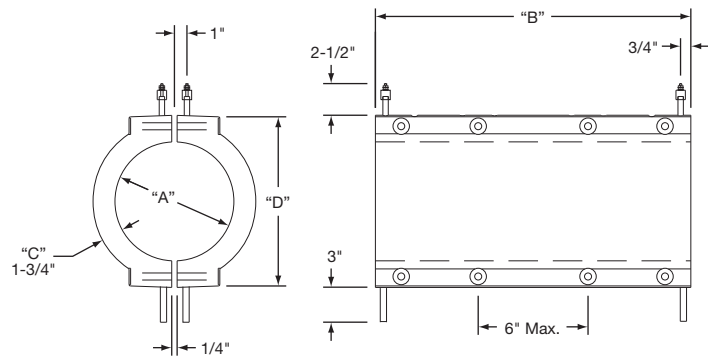


Cast-In Band Heater Ordering Information

Cast-In Band Heater Strap Clamping



Cast-In Band Heater Bolt Clamping



Recommended dimensions shown.

Ordering Information

To process your order or quotation, please specify the following information.

Variable Dimensions

Inside Diameter "A" _____ Length "B" _____ Thickness "C" _____ "D" _____

Material Specifications

Aluminum Bronze Brass

Electrical Specifications

Watts each half _____ Volts each half _____ Phase _____

Terminal Style

"S" Post Terminals "C4" Ceramic Cover "F" Plain Leads
 "R" 90° Blockhead "T7" Post Terminals "MR" Moisture Resistant
 "E" Right-Angle Lugs "T" Post Terminals "TS" Leads and Shrink Sleeve
 "R1" Armor Cable Leads "R1A" SS Wire Overbraid
 "R2" Blockhead and Through Hole See Pages 3-54 and 3-55 for additional Terminations

Terminal Protection Box

None "C2" Standard "C7" 1 Box for both halves "EP" Explosion Resistant
 "P2" High Temperature Quick-Disconnect "MPR" Moisture Resistant Box
 "MR1" Rigid Moisture Resistant Box "CB1" Cast Aluminum Box

Clamping Style

Straps Bolt Clamp

Cooling Tube Specifications

1/4" O.D. SS 3/8" O.D. SS 1/2" O.D. SS
 3/8" O.D. Incoloy® 1/2" O.D. Incoloy® Dual Cooling Tubes
 Standard Wall Thickness Other Wall Thickness, Specify _____
 (See page 3-5 for Standard Wall Thickness Information)

Cooling Tube Fittings

Non-exposed 3/8" NPTF "HS" Hi-Seal Fitting "RA" 90° Copper Elbow
 Non-exposed 1/2" NPTF "RT" 90° Threaded Elbow
 "FF" Flared Seal "R3" Straight Threaded

Surface Finish

125 RMS Standard or to Customer Specifications

Special Cast-In Features

Holes, Cutouts, Slots, Bevels, Mounting Studs, Stand-Offs and Taper Angles
For special features a detailed drawing is required.



“L” Shaped

“L” Shaped Bronze, Brass or Aluminum Cast-In Heaters for Square and Rectangular Extruder Barrels



Cast-In Heaters That Provide High Temperature and Maximum Processing Capabilities

The “L” Shaped Cast-In Heaters are typically used on square and rectangular twin screw extruder barrels in compounding and plastic resin manufacturing applications. Due to high shear rates, which are common in this process, extreme operating temperatures and high watt densities are frequently encountered. For these reasons Tempco manufactures “L” shaped heaters in bronze or brass alloys, which are capable of withstanding high temperatures at higher watt densities.

In the case of applications requiring lower temperatures and lower watt densities, aluminum alloys can be used. Aluminum castings are desirable as they have greater thermal conductivity and weigh substantially less than their bronze or brass counterparts, allowing for greater ease of installation.

For mounting purposes, the heaters can be designed with 45° flanged ear extensions that are bolted and drawn together, or can be made with through holes machined into the casting body to bolt directly onto the barrel itself. Thermocouple and transducer holes or other special features can be accommodated as well.

To enhance cooling capabilities, or to be used in place of integral feed screw cooling, “L” shaped heaters can be manufactured with cast-in cooling tubes to satisfy liquid cooling requirements. This feature allows processors the ease of changing a single unit at a time, thus representing a far less time-consuming and less expensive alternative should a cooling line become clogged or severely restricted.

Standard “L” Shaped Cast-In Heaters

Design Features

- * *Cast-In Bronze or Brass Alloys for high temperature, high shear applications*
- * *Flange bolt clamping arrangement or through holes in the heater body, allowing bolt mounting directly to the barrel*
- * *High precision machining of the inner contact surface of the heater, yielding exceptional heat transfer to the process*
- * *Choice of terminal protection housings*
- * *Moisture resistant terminal housing which is available in a variety of different styles and mounting arrangements*
- * *Elevated temperature terminations and enclosures. Prevents premature heater failure due to accelerated corrosion or oxidation of terminals caused by high heater surface temperature. See page 3-66 and 3-67 for details on how to order.*

Enhanced Features

To aid processors in reducing maintenance downtime, Tempco has introduced several optional construction features to the basic “L” shaped design.

- * *Cast-In Aluminum Alloys for applications requiring lower temperatures and less watt density*
- * *3/8" or 1/2" O.D. cooling tubes for liquid cooling*
- * *Non-Exposed cooling tubes (Type RC—See page 3-51). Eliminates cracked and broken cooling tubes.*



Note: All of the options listed above are design enhancements that will provide value-added benefits to the basic “L” shape configuration, thereby extending the life and performance of your Cast-In Heaters.



Standard (Non-Stock) "L" Shaped Cast-In Heaters



"L" Shaped Bronze, Brass or Aluminum Cast-In Heaters are sold as individual units. They are normally supplied with a moisture resistant junction box. Also available with explosion resistant or cast-on junction box, fitted with convoluted wire braided hose and high temperature lead wire. If required, specify. For additional terminations, see pages 3-54 and 3-55.

The sizes and ratings listed are among the most commonly used. They will provide the shortest lead times.

Long Leg (in)	Short Leg (in)	Width in	Thickness in	Watts	Volts	Special Features	Part Number
3.500	2.500	3.500	0.875	500	240	Cast terminal box, (3) .397" dia. holes, (1) 5/8" dia. cutout, Bronze	CBH05817
3.500	2.500	3.500	0.875	500	240	Cast terminal box, (3) .397" dia. holes, Bronze	CBH05818
3.500	2.500	7.000	0.875	1000	240	Cast terminal box, (6) .397" dia. holes, Bronze	CBH05819
2.500	1.550	1.750	0.500	300	120	(1) 1/2" long slot, R1, Hubbell® plug, Aluminum	CBH04036
2.500	1.550	1.750	0.500	300	120	(1) 1/8" NPT hole, (1) 1/2" long slot, Bronze	CBH04103
3.460	2.680	4.330	1.181	500	220	MPR terminal box, (1) 25 mm dia. hole, (4) 9 mm dia. holes, Aluminum	CBH04926
3.460	2.680	4.330	1.181	500	220	MPR terminal box, (1) 25 mm dia. hole, (4) 9 mm dia. holes, Aluminum	CBH04922
3.460	2.760	4.330	1.181	500	220	MPR terminal, (1) 25 mm dia. hole, (8) 9 mm dia. holes, Aluminum	CBH04929
3.937	3.465	4.331	1.181	500	230	MPR terminal, 3/8" NPT RA elbow C/T, Brass	CBH04045
4.173	3.071	4.310	1.000	900	240	Cast terminal box, (2) 1/2" dia. holes, (2) 1/2" dia. cutouts, Bronze	CBH01617
4.173	3.346	4.921	1.575	2000	230	MPR, (1) 25 mm dia. hole, Brass	CBH04295
4.724	3.248	4.921	1.575	1500	230	MPR terminal box, (1) 25 mm dia. hole, Brass	CBH04290
4.823	3.346	4.921	1.575	2000	230	MPR terminal box, (1) 25 mm dia. hole, Brass	CBH04294
6.000	4.449	6.417	1.000	2000	240	Cast terminal box, (4) 1/2" dia. holes, (2) 1" long cutouts, Bronze	CBH01618
6.140	4.311	7.480	0.750	2500	240	Cast terminal box, (5) 1/2" dia. holes, (2) 1/2" dia. cutouts, Bronze	CBH01971
6.180	4.215	6.690	1.000	3000	240	Cast terminal box, (5) 1/16" dia. holes, (2) 1" dia. cutouts, Bronze	CBH02140
6.188	4.313	1.000	1.000	1500	240	Cast terminal box, (1) 1" dia. hole, (4) 1/4" dia. holes, Bronze	CBH01619
7.756	11.693	14.961	1.970	4500	460	MPR terminal box, (6) .394" dia. holes, Aluminum	CBH05011
7.813	5.188	10.625	1.000	5250	480	Cast terminal box, (8) 1/16" dia. holes, Bronze	CBH03042
7.830	5.220	10.63	0.980	3500	480	Cast terminal box, (8) 1/16" dia. holes, Bronze	CBH02114
7.874	6.102	10.394	1.000	4200	480	Cast terminal box, (6) 1/16" dia. holes, Bronze	CBH01692
7.874	6.102	10.394	1.000	4200	480	Cast terminal box, (6) 1/16" dia. holes, Bronze	CBH01839
8.500	6.140	2.750	0.750	1200	240	Cast terminal cover, (1) 1" dia. hole, (2) 1/2" dia. holes, Bronze	CBH01725
8.500	6.140	7.480	0.750	5250	240	Cast terminal box, (6) 1/2" dia. holes, (2) 7/8" dia. holes, Bronze	CBH02124
8.890	5.945	6.420	1.000	3000	240	Cast terminal box, (6) 1/2" dia. holes, (1) 1" dia. hole, Bronze	CBH01550
9.055	4.684	2.362	0.591	750	240	13" Cable, 18" leads, (5) .413" dia. holes, Aluminum	CBH04591
9.134	6.000	7.480	1.000	3500	240	Cast terminal box, (4) 1/2" dia. holes, Bronze	CBH05352
9.173	6.181	10.630	1.772	5000	230	MPR terminal box, (8) .472" dia. holes, (1) 1" dia. hole, Brass	CBH03940
9.449	7.756	14.330	1.102	6800	277	Cast terminal box, 3-Ph, (8) 1/16" dia. holes, Bronze	CBH01667
9.449	7.756	14.330	1.102	6800	575	Cast terminal box, 3-Ph, (4) 1/2" dia. holes, (4) 1/16" dia. holes, Bronze	CBH01709
10.563	7.813	10.625	1.000	8800	480	Cast terminal box, 3-Ph, (8) 1/16" dia. holes, Bronze	CBH03041
10.590	7.830	10.630	1.000	5500	480	Cast terminal box, 3-Ph, (8) 1/16" dia. holes, Bronze	CBH02113
10.830	4.684	2.362	0.591	870	240	MPR terminal box, (5) .413" dia. holes, Aluminum	CBH04594
11.690	7.756	14.960	1.969	9000	460	MPR term. box, (8) .393" & (1) .984" dia holes, Al., Heat & Cool	CBH05012
11.690	7.756	14.960	1.968	N/A	N/A	(12) .393" dia. holes, (1) .984" dia. hole, Aluminum	CBH05013
11.690	7.760	14.960	1.969	9000	460	MPR terminal box, (10) .393" dia. holes, Aluminum	CBH05014
12.188	7.875	10.375	1.000	8100	480	Cast terminal box, (6) 1/16" dia. holes, Bronze	CBH04408
12.205	7.875	4.134	1.000	3000	240	Cast terminal box, (4) 1/16" dia. holes, (1) 7/8" dia. cutout, Bronze	CBH01756
12.205	7.875	10.394	1.000	6260	480	Cast terminal box, (6) 1/16" dia. holes, Bronze	CBH02144
15.712	13.000	9.250	1.250	5500	220	(6) 1/2" dia. holes, (1) 7/8" hole, Bronze	CBH05037
18.110	9.169	4.530	0.591	3030	240	(10) .493" dia. holes, 20" cable, 27" leads, Aluminum	CBH04593
18.110	9.169	4.530	0.591	3030	240	MPR terminal box, (10) .430" dia. holes, Aluminum	CBH04596

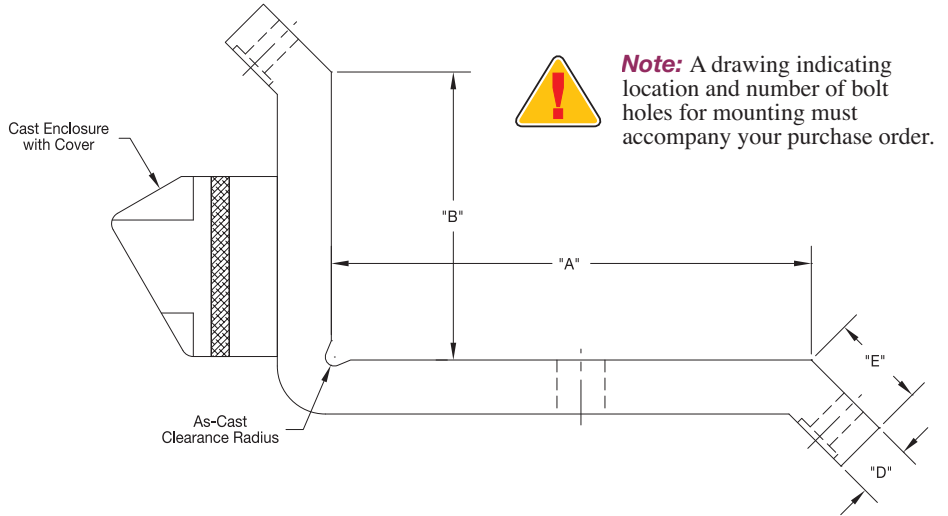
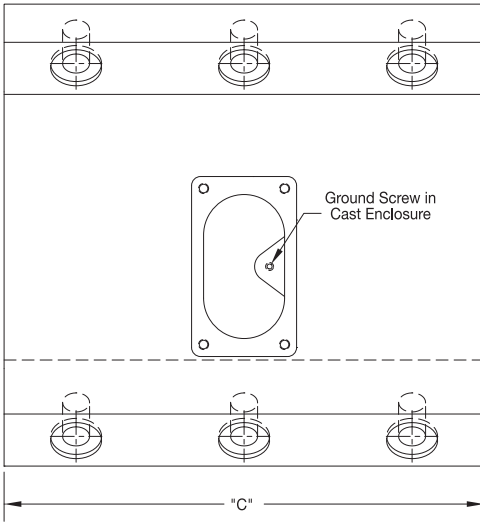
Key for Abbreviations found under the Features Column

E/H = Each Half	C/T = Cooling Tubes
EP = Explosion Resistant Terminal Housing	CW = Single Set of Cooling Tubes
MR = Moisture Resistant Terminal Housing	CWW = Dual Set of Cooling Tubes
MPR = Moisture Proof Die Cast Aluminum Box	RC = Non-Exposed Cooling Tubes/Recessed NPT Fittings



Ordering Information

"L" Shaped Cast-In Heaters – 45° Flange Mount Style Ordering Information



"L" Shaped Cast-In Heaters — 45° Flange Mount Style

Dimensions

"A" _____ "B" _____ "C" _____
 "D" _____ "E" _____

Ordering Information

To process your order or quotation, please specify the following information.

Material Specifications

Aluminum Bronze Brass

Electrical Specifications

Watts each piece _____ Volts each piece _____ Phase _____

Termination Style

"S" Post Terminals "T7" Post Terminals "T" Post Terminals
 "R1" Armor Cable Leads "E" Right Angle Lugs

Terminal Protection Box

None "C2" Standard Cast on box as shown
 "EP" Explosion Resistant "MR1" Rigid Moisture Resistant Box
 "MPR" Moisture Resistant Box "P2" High Temperature Quick Disconnect

Clamping Style

Bolt Clamp Other

Cooling Tube Specifications

1/4" O.D. SS 3/8" O.D. SS 1/2" O.D. SS
 3/8" O.D. Incoloy® 1/2" O.D. Incoloy® Dual Cooling Tubes
 Standard Wall Thickness Other Wall Thickness, Specify _____
 (See page 3-5 for Standard Wall Thickness Information)

Cooling Tube Fittings

Non-exposed 3/8" NPTF "HS" Hi-Seal Fitting "RA" 90° Copper Elbow
 Non-exposed 1/2" NPTF "RT" 90° Threaded Elbow
 "FF" Flared Seal "R3" Straight Threaded

Surface Finish

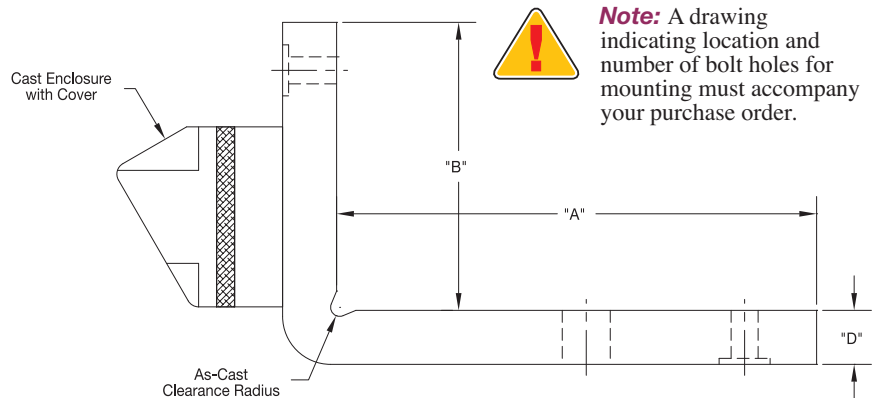
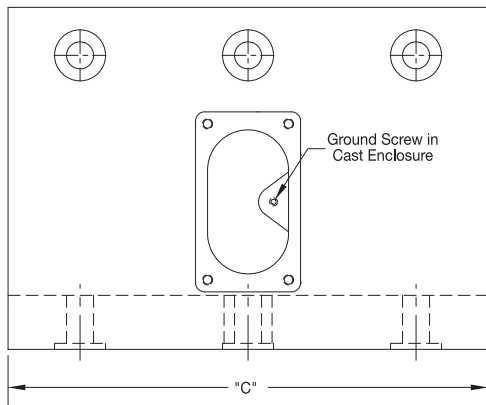
125 RMS Standard or to Customer Specifications

Special Cast-In Features

Holes, Cutouts, Slots, Bevels, Mounting Studs, Stand-Offs and Taper Angles.
For special features a detailed drawing is required.



"L" Shaped Cast-In Heaters Bolt Direct to Barrel Style Ordering Information



"L" Shaped Cast-In Heaters Bolt Direct to Barrel Style

Dimensions

"A" _____ "B" _____ "C" _____
 "D" _____

Ordering Information

To process your order or quotation, please specify the following information.

Material Specifications

Aluminum Bronze Brass

Electrical Specifications

Watts each piece _____ Volts each piece _____ Phase _____

Termination Style

"S" Post Terminals "T7" Post Terminals "T" Mica Washers
 "R1" Armor Cable Leads "E" Right-Angle Lugs

Terminal Protection Box

None "C2" Standard Cast on box as shown
 "EP" Explosion Resistant "MR1" Rigid Moisture Resistant Box
 "MPR" Moisture Resistant Box "P2" High Temperature Quick Disconnect

Clamping Style

Bolt Clamp Other

Cooling Tube Specifications

1/4" O.D. SS 3/8" O.D. SS 1/2" O.D. SS
 3/8" O.D. Incoloy® 1/2" O.D. Incoloy® Dual Cooling Tubes
 Standard Wall Thickness Other Wall Thickness, Specify _____
 (See page 3-5 for Standard Wall Thickness Information)

Cooling Tube Fittings

Non-exposed 3/8" NPTF "HS" Hi-Seal Fitting "RA" 90° Copper Elbow
 Non-exposed 1/2" NPTF "RT" 90° Threaded Elbow
 "FF" Flared Seal "R3" Straight Threaded

Surface Finish

125 RMS Standard or to Customer Specifications

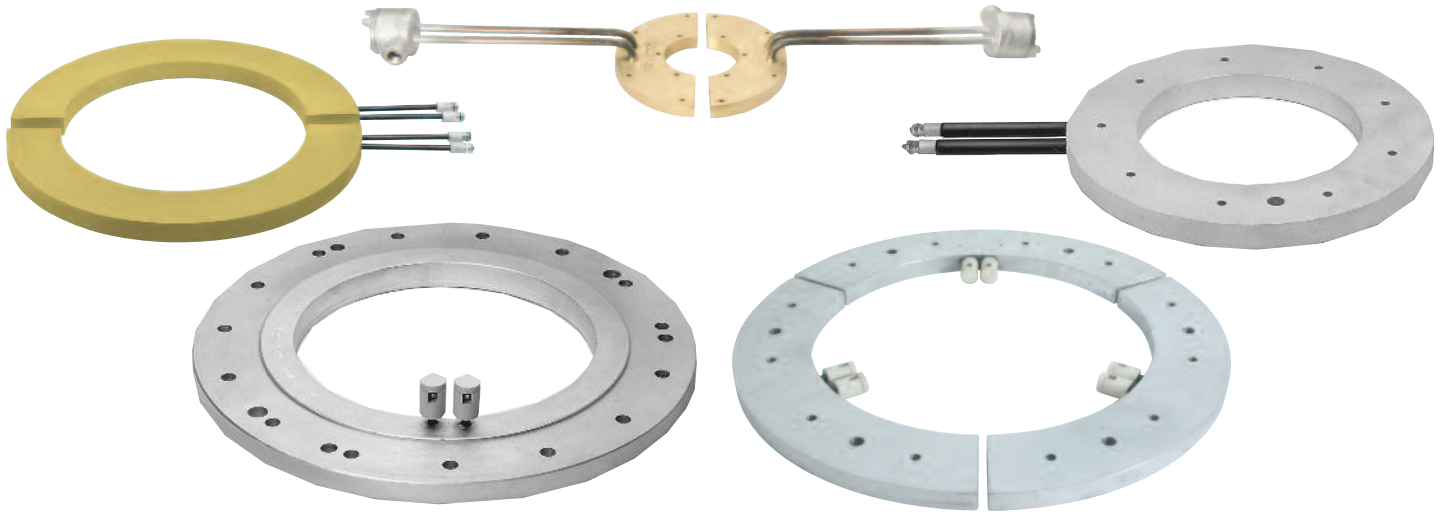
Special Cast-In Features

Holes, Cutouts, Slots, Bevels, Mounting Studs, Stand-Offs and Taper Angles.
For special features a detailed drawing is required.



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.

CUSTOM

Manufactured

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

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

Stock Items Are Shown In **RED**

I.D. in	O.D. in	Thickness in	Watts	Volts	Special Features	Part Number
5.500	14.000	1.000	2250	230	(8) 3/16" dia. holes	CBH02625
6.750	11.750	1.000	1250	480	(4) 1/16" dia. holes E/H	CBH05499
7.000	11.500	0.875	3200	240	(9) 3/16" dia. holes	CBH01084
7.000	11.500	0.875	3200	460	(9) 3/16" dia. holes, (1) 1/2" dia. hole	CBH05415
8.500	13.000	1.000	3000	230	(8) 3/16" dia. holes	CBH01101
10.000	14.500	0.875	4000	230	(8) 3/16" dia. hole, (8) 1/32" c'bore	CBH01196
10.000	14.500	0.875	1000	230	(2) 90° Segments	CBH01085
12.000	16.250	0.875	2125	230	Bronze	CBH01261
12.000	16.250	0.875	2125	230	Bronze	CBH04776
13.000	20.000	1.120	2025	460	(4) 1/16" dia. holes E/H, (2) 1/2"-13 taps	CBH04836
16.250	20.500	1.000	1500	480	(6) 1/16" dia. holes	CBH04943
17.000	20.000	1.500	1250	230	(4) 90° Segments	CBH04990
19.750	34.000	1.130	4000	460	(12) 3/16" dia. holes, (2) 1/2"-13 taps	CBH04837
23.000	29.000	1.000	2000	480	(8) 1/32" dia. holes, (1) 5/8" dia. hole	CBH04220
32.500	40.000	1.125	9000	460	(24) 3/16" dia. holes	CBH02235
43.250	56.250	1.125	4333	290	(16) 3/16" dia. holes	CBH02811



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



Cast-In Cross Head Die Heaters for Plastics Extrusion Processing Equipment

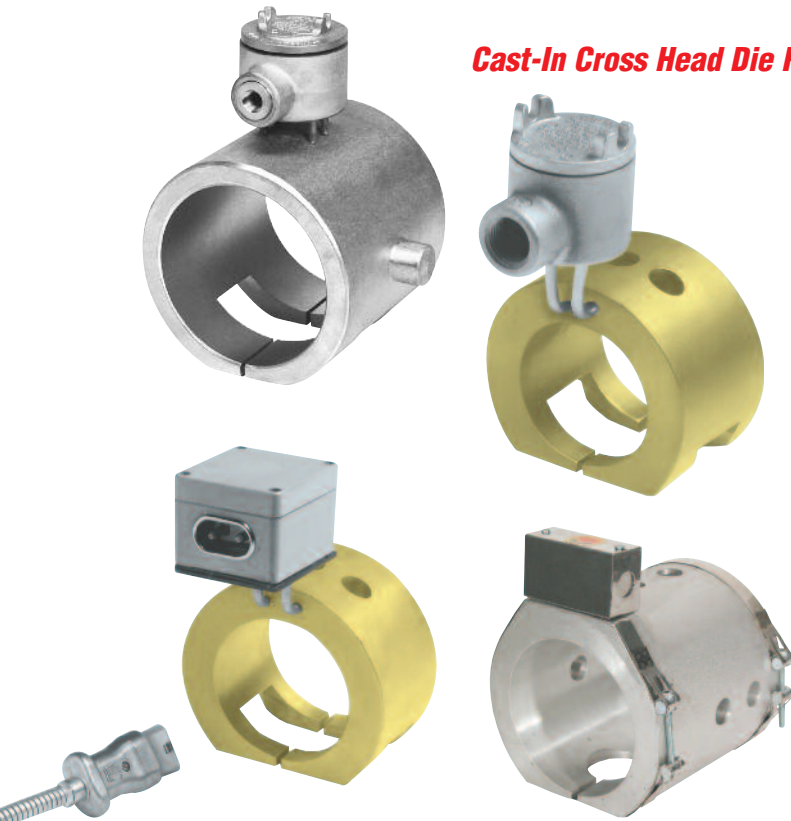
Maximize Service Life on Difficult Extrusion Die Applications

Extrusion Cross Head and related extrusion dies present extremely challenging operating parameters to most conventional heating elements. This is primarily due to the presence of excessive contamination, high watt densities and high temperature as well as unusual physical and dimensional requirements.

Many processors continue to use ceramic and mica band heaters on this application, with frequently marginal results. In these instances, Cast-In Aluminum or Bronze heaters are recommended to substantially improve heater life expectancy and performance.

Cast-In Heaters are less susceptible to contamination problems, and can operate at higher temperatures with higher watt densities. In addition, the design is structurally better suited to accommodate holes and cutouts without compromising the heater's electrical and mechanical integrity.

As a standard, Cross Head Die Heaters are typically designed in aluminum as a one-piece band with a single slot that can be slid over the die and clamped with stainless steel clamping straps. For higher temperature or high watt density requirements, bronze or brass alloys can be used.



CUSTOM Manufactured

For sizes and ratings not listed, **TEMPCO** will design and manufacture a Cross Head Die Heater to meet your requirements.

Specify the following:

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

Standard Cross Head Die 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.
- * Optional 1/4", 3/8" or 1/2" cooling tubes cast into the cross head die body for liquid cool function.
- * Variety of shapes and sizes.
- * Aluminum and bronze alloys.
- * Through holes, tap holes or cutouts to facilitate mounting or obstructions.
- * Precision machining of one or all surfaces of casting – specify your individual requirements.



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

Stock and Standard (Non-Stock) Cross Head Die Cast-In Heaters

Stock Items Are Shown In RED

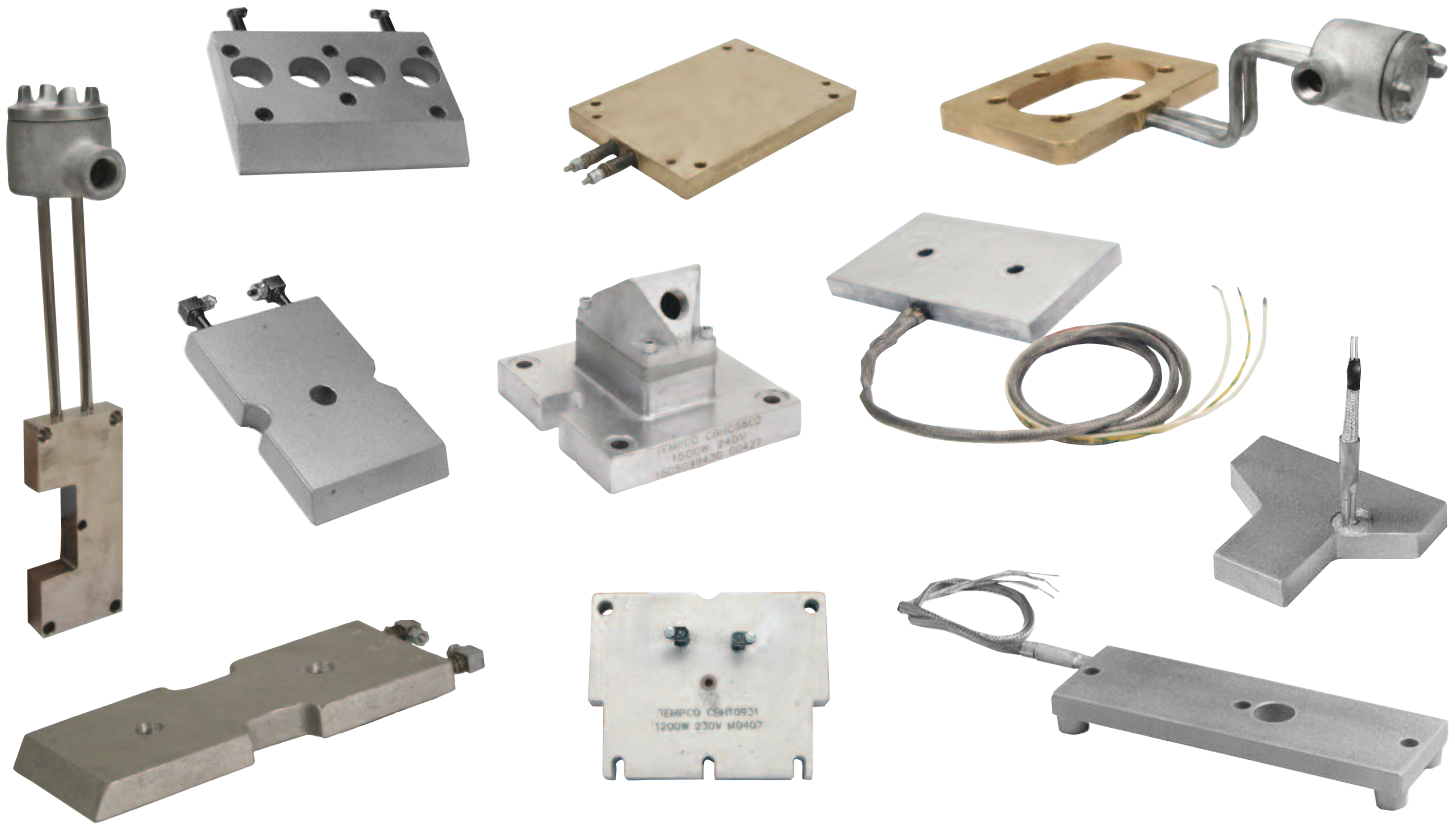
I.D. in	O.D. in	Length in	Thickness in	Watts	Volts	Special Features	Part Number
2.500	4.000	2.625	0.750	750	240	Bronze, (3) 3/8" dia. holes, C7 terminal box	CBH01913
3.000	4.500	4.000	0.750	1200	240	Bronze, (3) 3/4" dia. holes, 2" dia. cutout, R1 cable 70", 72" leads	CBH02634
3.248	5.248	3.000	1.000	750	230	(3) 3/4" dia. holes, P2 plug, 92" cable, 102" leads	CBH05491
3.248	5.25	3.000	1.000	750	230	(3) 3/4" dia. holes, EP box	CBH03741
3.248	5.25	3.000	1.000	750	230	(3) 3/4" dia. holes, EP box, 72" cable, 78" leads	CBH09274
3.250	5.250	3.000	1.000	1000	240	Bronze, (2) 5/8" and (1) 7/8" dia. hole, (1) 1 1/4" Lg. cutout EP box	CBH04153
3.250	5.25	5.625	1.000	1200	230	(2) 3/4" & (2) 7/8" dia holes, 1" slot, EP box, 72" cable, 84" leads	CBH09275
4.000	6.000	3.100	1.000	1200	240	EP Terminal box, (3) 3/4" dia. holes	CBH03979
5.000	6.500	2.250	0.750	700	240	Bronze, bolt clamp, EP box, (4) 3/4" dia. holes	CBH03753
5.000	6.500	5.875	0.750	2400	240	Bronze, (1) 2 1/2" dia. hole, (2) 7/8" dia. holes	CBH01382
5.000	7.000	6.500	1.000	3000	460	Brass, CT, EP box, 2.125 x 1.688 cutout	CBH09123
5.687	7.750	8.500	1.031	3000	230	Bronze, CT, EP box, 2.375 x 1.562 cutout	CBH09150
5.998	8.000	4.313	1.000	2400	230	Brass, EP box, (1) 3/4" dia. hole, 2.125 x 1.688 cutout	CBH09180
6.000	8.000	4.313	1.000	2400	240	C2 box, (2) 3/4" dia holes	CBH06161
6.000	8.000	4.313	1.000	2400	460	EP Terminal box, (1) 2 1/8" Lg. cutout, (2) 3/4" dia. holes	CBH04030
7.500	9.500	8.875	1.000	4000	460	Brass, CT, EP box, 2.750 x 1.875 cutout	CBH09124

Cast-In Heaters



Platen Die Heaters

Cast-In Aluminum and Bronze Platen Die Heaters for Plastics Processing Equipment



Tempco Cast-In Platen Heaters are widely accepted as the industry standard for heating critical, temperature-sensitive plastics processing downstream equipment.

Typically, plastic die applications are highly temperature sensitive and require extreme heater uniformity and reliability.

Tempco Cast-In Aluminum Platen Heaters are a logical choice to satisfy these critical application parameters, as the aluminum alloy has excellent thermal conductivity and a highly reliable, computer designed heating element which provides good contamination resistance. Optional cooling tubes can be cast-in to more precisely regulate the temperature of your process. The result is a highly efficient, uniform heater which, if used properly, can be expected to provide years of trouble-free service.

Cast-In Platen Heaters are generally manufactured in aluminum but can also be made in bronze or brass alloys to meet higher temperature processing requirements. For high volume requirements, the permanent mold process can be used to achieve the most effective economies of scale as well as yielding the best cosmetic appeal. To service customers with lower volume orders, Tempco's high quality no-bake sand mold process will be used, which assures excellent part quality and employs economical tooling.

Typical Applications for Tempco's Cast-In Platen Die Heaters:

- ↔ Sheet dies
- ↔ Plastic molds
- ↔ Plastic welding equipment
- ↔ Cast film dies
- ↔ Calendering dies
- ↔ Screen changer equipment

Standard Cast-In Platen Heaters Design Features and Options

- * *Computer designed, precisely formed tubular heating element, optimizing the heat transfer pattern*
- * *A variety of termination options including terminal enclosure housings*
- * *Optional 1/4", 3/8", or 1/2" cooling tubes cast into the platen for liquid cool function*
- * *A variety of shapes and sizes made to your specifications*
- * *Through-holes, tapped holes or cutouts to facilitate mounting or obstructions*
- * *Precision machining of one or all surfaces of casting—specify your individual requirements.*



Note: Cast-In Platen Heaters are made to customer specifications. Please review our "Standard Sizes and Ratings" data along with our "How To Order" information to determine the heater best suited to your needs. Tempco also offers numerous sizes and styles off the shelf for immediate delivery.

For further information on large platen heaters see pages 3-18 through 3-23.



Stock and Standard (Non-Stock) Platen Die Heaters For Plastics Processing Equipment

The sizes and ratings listed are among the most commonly used. They will provide the shortest lead times.

Length in	Width in	Thickness in	Wattage	Volts	Notes	Part Number
4.000	3.000	0.750	400	230	(1) 5/8" dia. hole	CBH02755
4.500	3.500	0.750	600	230	(1) 5/8" dia. hole	CBH03065
3.875	3.500	0.750	500	230	(1) 5/8" dia. hole	CBH03468
3.875	3.500	0.750	500	230	(1) 5/8" dia. hole	CBH03147
4.000	4.000	0.750	600	240	60" Leads, 58" armor cable (1) 1/16" dia. hole	CBH05665
4.750	4.500	0.750	800	220	144" Leads, 120" braid, (1) 5/8" dia. hole	CBH04845
5.000	5.000	0.750	900	220	(4) 5/16" dia. holes, (1) 1/8" NPT, C2 box	CBH01045
5.500	3.500	0.750	600	240	66" Leads, 64" braid, (1) 1/16" dia. hole	CBH03869
5.500	4.500	0.750	900	230	48" Leads, 36" braid, (1) 1/16" dia. hole	CBH02698
5.875	3.875	0.750	750	230	(1) 5/8" dia. hole, 30° at front	CBH02255
5.875	3.875	0.750	750	230	(1) 5/8" dia. hole, 30° at front, has ground screw	CBH04170
6.000	3.500	0.750	800	230	(1) 5/8" dia. hole, (1) #10-32 tap	CBH05693
6.000	4.500	0.750	800	460	(2) 5/8" dia. holes	CBH04104
6.250	5.469	1.938	1000	230	(2) 5/16-16 tap, (2) 5/16-18 tap	CBH01090
7.000	4.000	0.625	800	240	P1 cup, (4) 5/16" dia. holes, (1) 1/2" dia. hole	CBH08409
7.500	3.000	1.000	1000	110	52" Leads & 48" Wire braid, (2) 1/16" dia. holes	CBH03453
7.500	5.500	1.000	1350	230	208" Leads, 180" braid, (1) 5/8" dia. hole	CBH04234
8.000	6.250	1.000	1200	230	(2) 13/32" dia. holes, (1) 1/8" NPT tap, (3) 13/32" slots	CBH01091
8.660	7.874	0.433	1250	220	24" Leads, 10" braid, (3) .213" dia. holes, (2) .234" dia. holes	CBH04086
9.500	6.250	1.000	1700	230	(3) 13/32" dia. holes, (3) 13/32" slots, (1) 1/8" NPT tap	CBH01088
11.500	3.375	0.750	1900	240	C2 box, (8) bolt holes, (1) 5/8" dia. hole	CBH07511
23.875	11.875	0.750	4300	240	(226) 1/4" dia. holes	CBH05195
13.250	11.625	1.000	3450	230	(7) 13/32" dia. holes, (3) 13/32" slots, (1) 1/8" NPT tap	CBH01089
21.653	7.480	0.866	4500	280	P1 cup, (6) bolt holes	CBH05054
22.000	10.750	0.625	5000	240	(2) elements	CBH06970
22.750	18.000	0.750	10000	480	30" Leads, 3-phase, (403) 1/4" dia. holes	CBH06162
22.750	18.000	0.750	10000	240	30" Leads, 3-phase, (403) 1/4" dia. holes	CBH06225
22.750	22.000	0.750	12200	480	31" Leads, 3-phase, (344) 1/4" dia. holes	CBH07475
23.875	11.875	0.750	4300	240	S: 8-32, Dual element, (226) 1/4" dia. holes	CBH06947
23.875	11.875	0.750	8000	240	S: 8-32, Dual element, (226) 1/4" dia. holes	CBH06948
26.000	22.750	0.750	13200	480	16" Leads, 3-phase, (305) 1/4" dia. holes	CBH07477
26.500	3.375	0.750	4000	240	(18) bolt holes, (1) 5/8" dia. hole, C2 box	CBH07594



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



Note: Customer Assistance

If you have a special application requiring a custom manufactured Cast-In Aluminum or Bronze Platen Die Heater or need assistance selecting one of our standard die heaters, consult Tempco with your requirements. We offer complete engineering services and support, working with you every step of the way to ensure customer satisfaction.

CUSTOM Manufactured

For sizes and ratings not listed, **TEMPCO** will design and manufacture a Platen Heater to meet your requirements.

Specify the following:

- Length
- Width
- Thickness
- Wattage and Voltage
- Termination type (see pages 3-54 & 3-55)
- Alloy (Aluminum or Bronze)
- Special Features
- Machining Specifications
- Detailed Drawing



Special Shapes

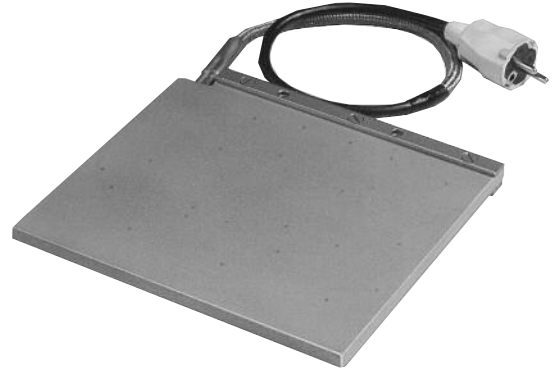
Specialty Cast-In Aluminum and Bronze Heaters Used in Plastics Processing Equipment

Plastics Processing Equipment utilizes numerous types of specially designed Cast-In Aluminum and/or Bronze Heaters. In addition to the typical and commonly used cylindrical cast-in heaters, complex geometric shapes are used extensively as well.

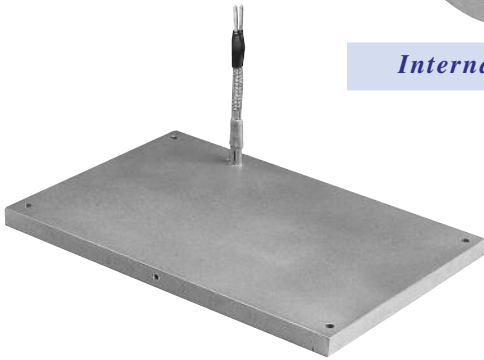
The following two pages provide you with a small overview of our manufacturing capabilities by illustrating some popular cast-in heater shapes and how they are used. Special designs can be made to your specifications. Consult Tempco with your requirements.



Internal Ring Heater



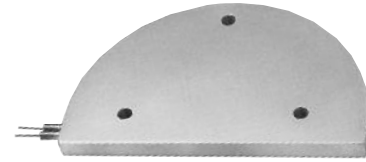
Platen for Plastic Welding Equipment



Flat Platen Heater



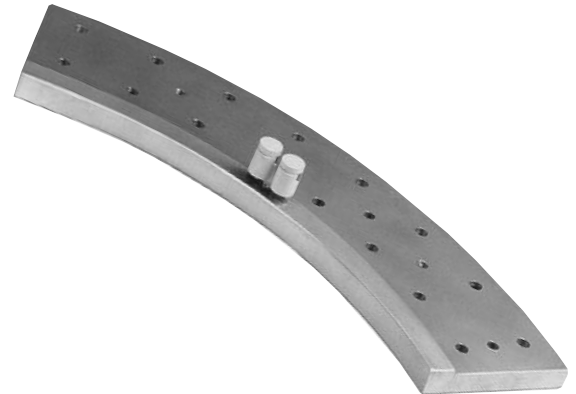
"U" Shaped Heater



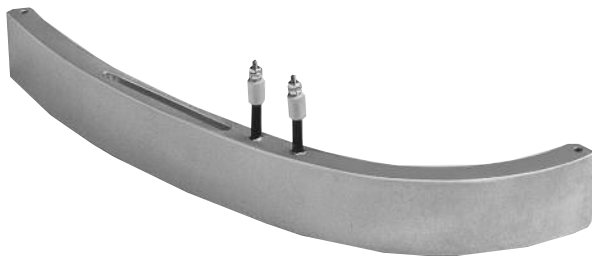
Semicircular Shaped Heater



Internal Ring Heater



Segmented Ring Heater



Laminating Radial Edge Heater



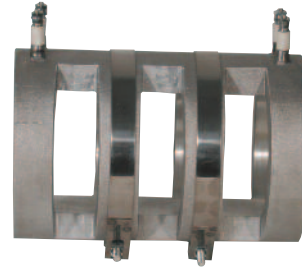
"L" Shape with Vent Clearance Hole



Specialty Cast-In Aluminum and Bronze Heaters Used in Plastics Processing Equipment



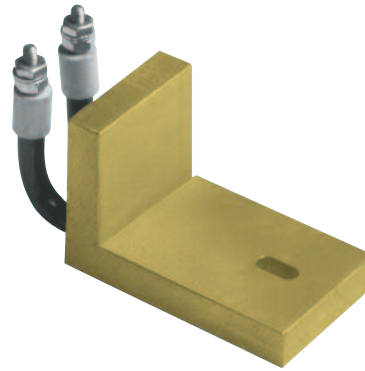
Cast Bronze Nozzle Heater Bushings For Runnerless Molding



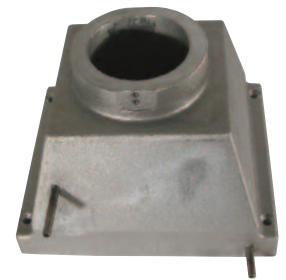
Vented Barrel Heater



Ring Heaters



"L" Shaped Heater



Hopper Feed Cooler



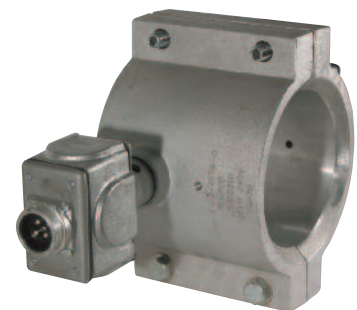
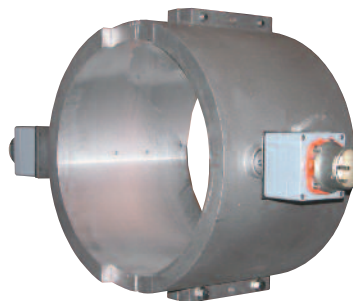
Large Holes for Vented Barrels



Feed Throat Cooler



Feed Throat Cooler



Rugged Electrical Terminal Housings With Meltric® Receptacles



Installation Recommendations

Installation Recommendations for Cast-In Thermal Components

Tempco Cast-In Heaters will provide long life and dependable, trouble-free service if properly installed, operated, and maintained as per the following 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.

Recommended Torque:

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

5. Thermal insulation can be used to reduce heat losses.
6. Avoid mounting heaters in an atmosphere containing combustible gases and vapors unless specifically manufactured for use in such conditions.
7. Liquid Cooled Cast-In Heater fittings must be securely tightened to prevent leaks.
8. 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.

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.

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

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 surface contact or a burned-out heater.
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.

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