Fiber-Insulated Heater Type RDI

General Information

ZIRCAR Ceramics' Fiber-Insulated Heaters Type RDI are high-powered combinations of high-quality FeCrAl resistance wire and high-purity ceramic-fiber thermal insulation. RDI heaters are designed to heat furnaces to a maximum temperature of 1300°C (2372°F) with power densities to 2200 w/ft^2. ZIRCAR Ceramics specializes in the design and manufacture of custom heaters for OEM furnace and thermal process equipment manufacturers as well as for end-users with unique and demanding radiant heater requirements.

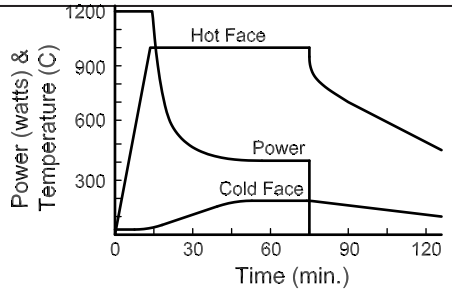
The resistance wire built into RDI heaters undergoes minimal grain growth as it is cycled and exhibits exceptional form stability at high temperatures. Coiled heating elements are firmly formed into ZIRCAR Ceramics' Alumina-Silica Type AXHTM insulation. These hollow coils are recessed in open grooves in the supporting insulation, enabling a very high radiant efficiency. These features work together to minimize the difference between the element and chamber temperature, allowing them to operate at higher power and at higher temperatures for longer periods of time than other types of insulated heater systems.

All ZIRCAR Ceramics' Fiber-Insulated Heaters are 100% organic-free and will not smoke or outgas when heated.

Characteristics & Properties

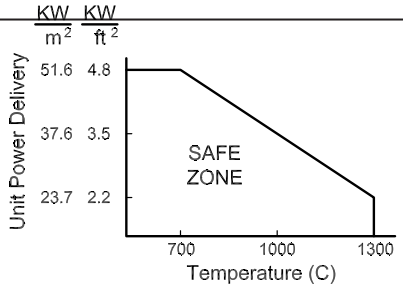
Thermal Response: RDI heaters are capable of very rapid heating. As process temperature is reached, the very efficient thermal insulation works to minimize heat loss, requiring less power to maintain temperature.

The graph to the right shows Power (watts) plus Hot & Cold Face Temperatures (°C) vs. time on a furnace composed of a cylindrical FIH, 6" ID x 10" OD x 6" L, 1200W, 120V, capped with 2" thick Alumina-Silica Type AXHTM ends.



Safe Operation Zone: When operated within the "safe-zone" RDI heaters deliver reliable high performance.

Fiber-Insulated Heaters Type RDI are designed to operate at power densities up to 2200 watts/ft^2 at 1300°C. They may be operated at significantly higher power densities if SCR Power Controllers are used or if run at lower temperatures.



The data presented herein is intended to help the user to determine the appropriateness of this material for their application. This data is a nominal representation of this product's properties and characteristics and therefore should not be used in preparing specifications.

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Availability

RDI Fiber-Insulated Heaters are produced on a custom basis. Typically they are manufactured to customer specifications. ZIRCAR Ceramics can design and construct RDI heaters to satisfy a range of heating needs.

To Order

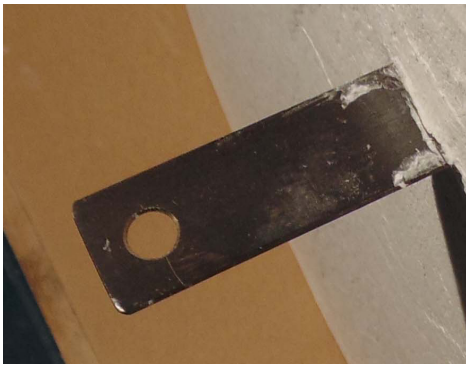
Custom RDI Heaters are produced in numerous configurations including: flat panels, semi-cylinders, full round cylinders and other custom shapes. They are manufactured in single-zone and multiple-zone designs with a variety of lead styles and connecting hardware.

Typical RDI Tolerances: Unless otherwise specified, the dimensional tolerances for RDI heaters are those shown below.

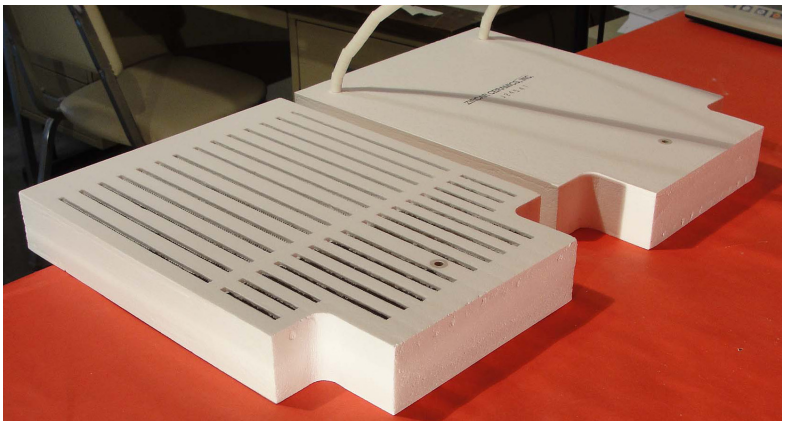
Typical RDI Resistance Tolerance: Unless otherwise specified, the resistance tolerance is +/-5%

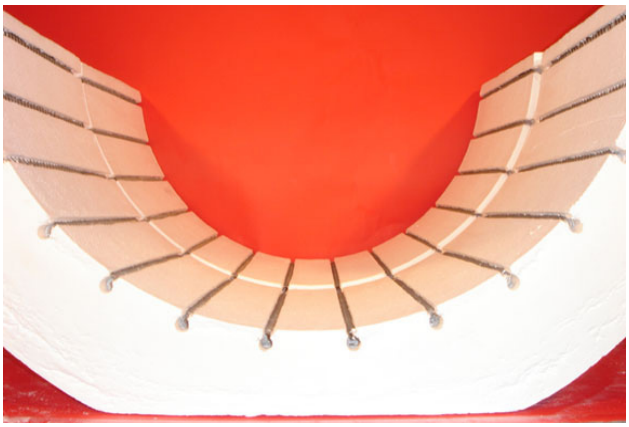
Double-Twisted Leads as shown above are routinely built into RDI Heaters. Such leads can be wrapped around a terminal post, secured into a terminal block or terminated in high-temperature crimped or welded connections.

Solid rod leads with or without threaded ends are securely mig-welded to the FeCrAl resistance wire. Welded leads are stress-annealed before the RDI heating element assembly is vacuum-formed.



Easily bolted, strip leads are sized to accomodate the current draw of each custom-made RDI heating element. Strip sizes range from 1mm(0.04”) to 3mm(1.3”) thick x 12.5mm(0.5”) to 25mm(1.0”) wide.





Shown above left are RDI Heaters containing two heating elements (for two zone operation), flexible insulated leads and mullite thermocouple hole liners. Shown above right are RDI Heaters vacuum formed with a custom shape.

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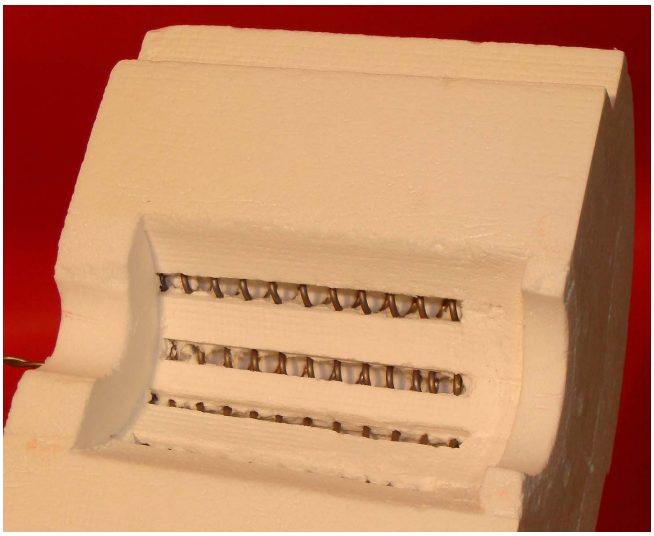

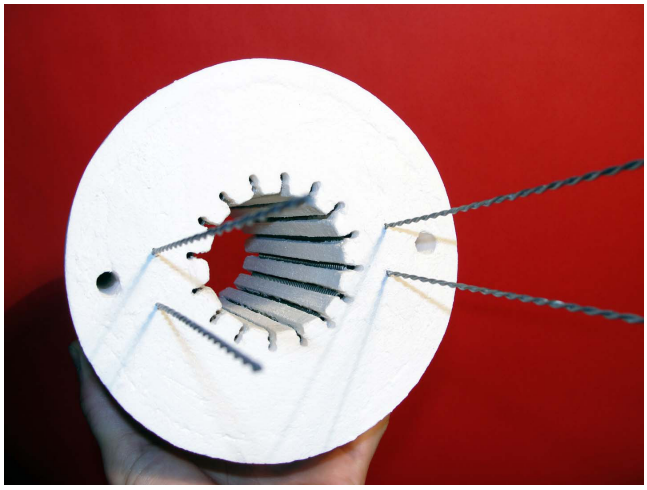

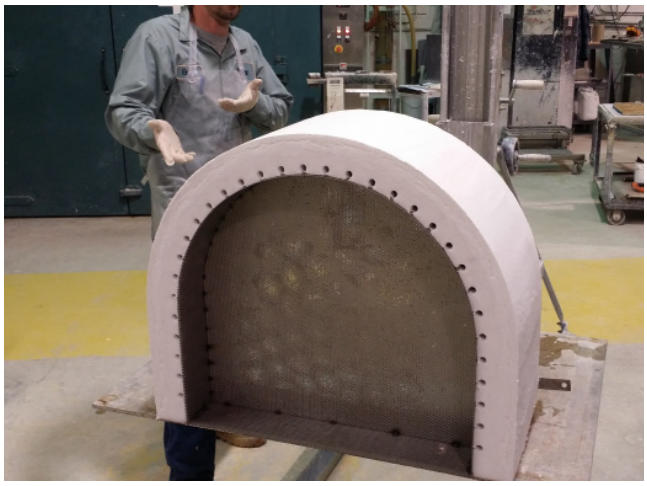

ZIRCAR Ceramics' RDI Heaters are custom designed and manufactured to serve both OEM and End User customers with unique and challenging heating and thermal process applications. Please contact ZIRCAR Ceramics to discuss your custom RDI Heater requirements.

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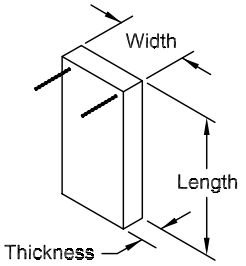
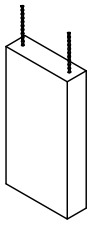
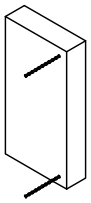
The following figures show a range of heater styles and lead locations.



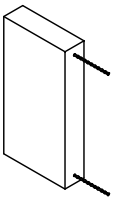
Type A



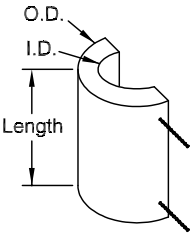
Type B



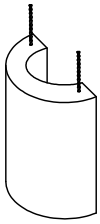
Type C



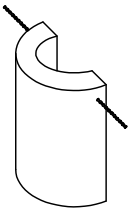
Type D



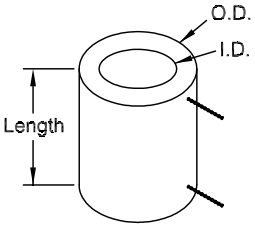
Type A



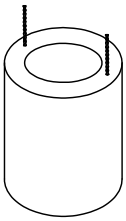
Type B



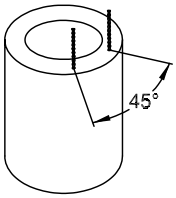
Type C



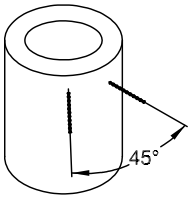
Type A



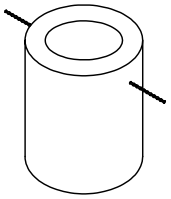
Type B



Type C



Type D



Type E

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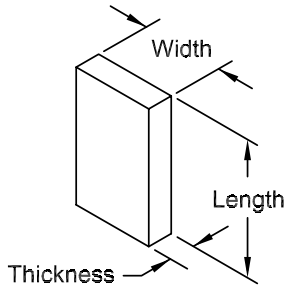
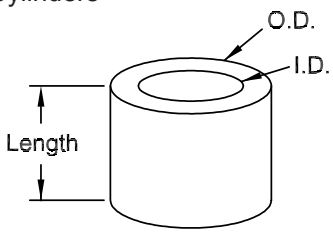
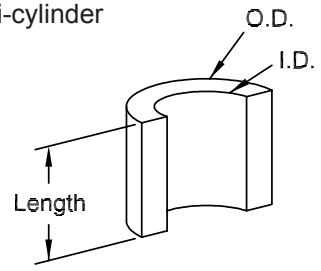
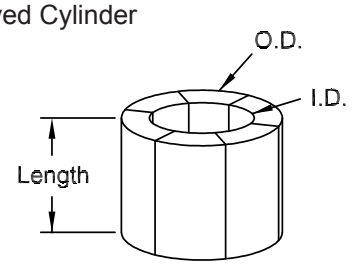
Tolerances: This chart shows dimensional tolerances for products that are formed, demolded and dried only. Tighter tolerances are available with the use of drying fixtures or custom machining.

<table>
<tr><td rowspan="2">Boards
 
</td><td colspan="2">Length (in.)</td><td colspan="2">Width (in.)</td><td colspan="2">Thickness (in.)</td></tr>
<tr><td colspan="2">+/- 1/4</td><td colspan="2">+/- 1/4</td><td>1</td><td>2 to 6</td></tr>
<tr><td rowspan="3">Full Cylinders
 
</td><td colspan="2">Inside Diameter (in.)</td><td colspan="2">Outside Diameter (in.)</td><td colspan="2">Length (in.)</td></tr>
<tr><td>3/4 to 4</td><td>5 to 30</td><td>3 & 3 1/2</td><td>5 to 40</td><td>6</td><td>12 to 36</td></tr>
<tr><td>+/- 1/8</td><td>+/- 1/4</td><td>+/- 1/8</td><td>+/- 1/4</td><td>+/- 1/8</td><td>+/- 1/4</td></tr>
<tr><td rowspan="3">Semi-cylinder
 
</td><td colspan="2">Inside Diameter (in.)</td><td colspan="2">Outside Diameter (in.)</td><td colspan="2">Length (in.)</td></tr>
<tr><td>1 to 3 1/2</td><td>5 to 18</td><td colspan="2" rowspan="2">+/- 1/4</td><td>6</td><td>12 to 36</td></tr>
<tr><td>+/- 1/8</td><td>+/- 1/4</td><td>+/- 1/8</td><td>+/- 1/4</td></tr>
<tr><td rowspan="2">Staved Cylinder
 
</td><td colspan="2">Inside Diameter (in.)</td><td colspan="2">Outside Diameter (in.)</td><td colspan="2">Length (in.)</td></tr>
<tr><td colspan="2">+/- 1/4</td><td colspan="2">+3/8/-1/4</td><td colspan="2">+/- 1/4</td></tr>
</table>

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