Thermally Engineered Heating Elements for Diffusion and Oxidation Processes

Replacements For Horizontal and Vertical Diffusion Furnace Systems
FC-200
Low Mass Elements

For
• Low Temperature Operation
• Rapid Thermal Response

Ideal for LPCVD and thin oxidation processes, the Fibercraft FC-200 provides fast recovery and rapid cool down rates. These low-mass elements give you repeatable performance. Unique thermal engineering is used to increase the radiating surface, extending element lifetime.

Ideal for LPCVD and thin oxidation processes.

Available with heater surfaces coated black.

The Benefits of Fibercraft Design

Fibercraft design incorporates helically wound ribbon or wire embedded in the heating element insulation. By using this unique construction, Fibercraft elements more than triple the effective radiating surface. The result is maximum heat dissipation, lower operating costs, decreased thermal response time, and improved temperature uniformity.

The Benefits of Powdered-Metal Wire

Powdered-metal wire increases the overall effectiveness of a heating element in high temperature applications. At 1100° C, powdered-metal wire lasts twice as long as conventional heating element wire. At lower temperatures, the difference is even greater. At high temperatures, powdered-metal wire also shows superior resistance to sagging. The chart shows relative sag between conventional-alloy heating elements and powdered-metal elements. Powdered-metal wire also has a higher tolerance to corrosive atmospheres, making it a better choice for processes employing HCl.
DC-1300 Furnace Elements

For
• Cost-Effective High Temperature Operation

The advanced thermal engineering of the DC-1300 furnace elements provide dependable performance at the lowest cost. Power is balanced between center and end zones, providing precise temperature uniformity at varied operating temperatures while reducing heat loss.

For all high temperature processes including silicon nitride and HTO LPCVD, oxidation, anneal, and drive-in. Ideal for horizontal furnace retrofits.

DC-1300Plus Furnace Elements

For
• High Temperature Operation
• Improved performance for temperature cycling

Addition of self-locking spacers to the DC-1300 design allow the DC-1300Plus furnace elements to provide consistent, reliable operation throughout the fluctuations of repeated temperature cycling.

Ideal for all high temperature processes including silicon nitride and HTO LPCVD, oxidation, anneal, and drive-in.

The Benefits of Self-Locking Spacers

Self-locking spacers lock together around the circumference of the element, maintaining constant coil spacing and total support of each turn of the resistance coil. This design keeps the spacers in place throughout repeated temperature cycling.

DCHT-500 Furnace Elements

For
• Highest Temperature Operation
• Large Temperature Swings
• Longest Life

DCHT-500 furnace elements deliver dependable performance and long life even at the highest processing temperatures. Self-locking spacers and superior element design reduce the possibility for element sag. Like the DC1300, power is balanced between center and end zones, providing precise temperature uniformity at varied temperatures while reducing heat loss. The DCHT-500 includes heavy gauge, powdered-metal heating wire for the longest life available.

The DCHT-500 is a must for well drive, field oxidation, LOCOS, and other long, high-temperature processes.
### Specifications

<table>
<thead>
<tr>
<th></th>
<th>Fibercraft</th>
<th>Duracraft</th>
<th>Duracraft</th>
<th>Duracraft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating</td>
<td>FC-200</td>
<td>200° - 1200° C</td>
<td>DC-1300</td>
<td>DC-1300Plus</td>
</tr>
<tr>
<td>Temperature:</td>
<td>200° - 1200° C</td>
<td>200° - 1200° C</td>
<td>400° - 1300° C</td>
<td>400° - 1300° C</td>
</tr>
<tr>
<td>Shell:</td>
<td>Stainless steel</td>
<td>Stainless steel</td>
<td>Stainless steel</td>
<td>Stainless steel</td>
</tr>
<tr>
<td>Insulation:</td>
<td>Vacuum molded, 50% alumina/50% silica, ceramic fiber</td>
<td>Vacuum molded, 50% alumina/50% silica, ceramic fiber</td>
<td>Vacuum formed, 97% Alumina</td>
<td>Vacuum formed, 97% Alumina</td>
</tr>
<tr>
<td>Wire:</td>
<td>FeCrAl, double wound wire or ribbon, mounted directly in the insulation</td>
<td>Powdered metal FeCrAl, doubly wound wire or ribbon, mounted directly in the insulation</td>
<td>Heavy gauge, FeCrAl</td>
<td>Heavy gauge, FeCrAl</td>
</tr>
<tr>
<td>Inner coating:</td>
<td>Zirconia oxide</td>
<td>Zirconia oxide</td>
<td>Zirconia oxide</td>
<td>Zirconia oxide</td>
</tr>
<tr>
<td>Spacers:</td>
<td>Unique fibercraft construction</td>
<td>Unique fibercraft construction</td>
<td>Standard</td>
<td>Self-locking</td>
</tr>
<tr>
<td>Bore size:</td>
<td>Please specify</td>
<td>Please specify</td>
<td>Please specify</td>
<td>Please specify</td>
</tr>
<tr>
<td>Application:</td>
<td>Vertical or horizontal, LPCVD and oxidation/diffusion processes, up to 1200°C.</td>
<td>Vertical or horizontal, LPCVD and oxidation/diffusion processes, up to 1200°C. Long life.</td>
<td>Vertical or horizontal, LPCVD and oxidation/diffusion processes, up to 1300°C, with typical lifetimes of 5 years at the low to mid-temperature range.</td>
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</tbody>
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Thermcraft has been supplying high quality diffusion furnace heating elements to the semiconductor industry since 1976. Using knowledge gained from all facets of thermal engineering, Thermcraft designs high performance elements for the most demanding processes. All elements are available in both vertical and horizontal configurations, as retrofits or for new applications. Rapid delivery and off-the-shelf pricing make these elements the cost-effective solution for your heating needs.
Vertical Diffusion Element

Heating Elements
Heavy gage APM (provided metal manufactured iron-chrome-aluminum)
Wire helically wound and with ceramic *interlocking spacers* used to hold element vertically and longitudinally

Insulation
Light weight ceramic fiber

Shell
Stainless Steel inner liner, Aluminum outer shell
with water cooling

Exact Replacements available for all OEM models
With the availability of Thermcraft's craftsmen and engineers the *rebuilding* of a failed element can offer greater cost savings when compared to completely new elements.

**ENGINEERED ITEMS AVAILABLE**

| OEM Part #   |  
|--------------|---
| TEL (TOKYO ELECTRON)  |
| VMU-40-007   |   
| VMU-40-103   |   
| VMM-40-101   |   
| VMM-40-102   |   
| VMM-40-005   |   
| VMU-28-017   |   
| VMU-32-001   |   
| VOS-40-017   |   
| VMU-54-001   |   
| VOS-56-003   |   

| OEM Part #   |  
|--------------|---
| SVG          |   
| 602783-02    |   
| 602783-03    |   

| OEM Part #   |  
|--------------|---
| KOKUSAI      |   
| D4EX04882    |   
| D4EX03531    |   
| D4EX02648    |   

Diffusion Furnace Collars and Discs

Eliminate Loose Packing...Speed Tube Changes...Reduce Downtime...Reduce Contamination...Shorten Profiling Times...Increase Productivity...Reduce Energy Loss...Increase Reliability...

Collars and discs are made of ceramic fiber insulation packed into braided silica, formed and sized to customer specifications. The collars provide clean and easy to handle insulation at the load end while discs offer the same advantages at the source end of the furnace.

How to order:

Collars
Collars are available for temperature ranges up to 1100° C. Specify which range you require when ordering and indicate the following:
• Outside diameter of diffusion process tube
• Diameter of hole in vestibule block

Discs
Indicate the following when ordering:
• Diameter of hole in vestibule block (or outside diameter of disc)
• Diameter of center hole
Vestibule Blocks

For all diffusion furnaces

Top Quality...Prompt Delivery...Reasonable Prices...
Custom Made to Customer Specifications...

Thermcraft's vestibule blocks and insulation tubes – are high quality, high purity, vacuum formed ceramic fiber with a low sodium inorganic bond. Made to customer specification, these are available to fit all diffusion furnaces and specialty insulation applications.

Stepped or straight blocks are available for either load or source end.

How to order

**Straight**

VB - A - B - C

A = Length
B = O.D.
C = I.D.

**Stepped**

VB - A - B - C - D - E - F

A = Overall Length
B = Small O.D.
C = I.D.
D = Large O.D.
E = Small O.D. Length
F = Large O.D. Length

Order 4 1/4" I.D. Blocks for 100 mm outside diameter quartz tubes
Order 5 3/4" I.D. Blocks for 141 mm outside diameter quartz tubes

Inside diameters are available in 1/8" increments.
Eccentric I.D. blocks are also available
REPAIRS AND REPLACEMENTS - USED EQUIPMENT

Complementing our full line of new equipment, Thermcraft also offers REPAIR SERVICE, INSTALLATION AND STARTUP, as well as REPLACEMENT parts for existing equipment. Immediate 24-hour service can be offered in some situations. A prompt quote for repairs may be obtained by contacting our sales office.

USED OVENS and FURNACES re-conditioned by Thermcraft are also available for sale. Browse a list of them on our web-site or contact your sales representative or our sales office to request the latest used equipment inventory listing.

Please request detailed brochures for further explanation of the product range:

- Box Furnaces
- Ceramic Heating Elements
- Ceramic Fiber Insulation & Insulation Packages
- Control Systems
- Custom Furnaces
- Custom Ovens
- Diffusion Heating Elements
- Fibercraft® Vacuum Formed Heating Elements
- LAB-TEMP
- Marshall™ Furnaces
- Thermal Knife®
- Thermocouples
- Standard Tube Furnaces (10 day shipment)
- Vestibule Blocks

Accepted for your convenience

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