

MOLYBDENUM DISILICIDE ELEMENT FRONT LOADING BOX FURNACES 3,100°F (1,700°C)

APPLICATIONS

The GHH Series Ultra High Temperature Front Loading Box Furnaces feature a unique lightweight, ultra high temperature ceramic fiber insulation system for fast heat-up and low BTU input requirements. The GHH series achieves 3,100°F (1,700°C) under continuous operation. The insulation system, which is the most fragile and difficult aspect of this type of furnace, is unparalleled in quality and detail. Hot face materials are made by Zircar or Rath.



FEATURES

MULTILAYERED, EFFICIENT FIBERBOARD INSULATION

The furnace is insulated with multilayered high alumina and alumina-silicate ceramic fiber board. The hot face is pre-fired high alumina board by Zircar or Rath. The insulation is segmented and supported by a series of splines, alumina rods and sapphire clips. See Sketch S901001B for details of construction. This is the most critical part of the furnace design in terms of longevity. Triple heat locks are utilized for extra protection at high temperatures. A vestibule protects the molybdenum disilicide elements, and prevents excessive heat loss when the front door is opened. No asbestos is used.

MOLYBDENUM DISILICIDE ELEMENTS

The GHH furnaces feature molybdenum disilicide U-shaped elements. These will withstand (3,275°F) 1,800°C in air. All electrical connections are at the top, and the elements are suspended from the roof. The electrical resistivity of these elements remains constant over time, with little aging. This allows for replacement of one element without changing all elements, a distinct advantage over silicon carbide elements. Low-watt density is designed into the elements for maximum element life. All aluminum element connection hardware is used to prevent galvanic corrosion.

DOUBLE WALL CASE CONSTRUCTION

The insulation module has its own rigid refractory board exterior. This insulation module is inserted into a ventilated steel casing, leaving an air space between the exterior case and the insulation module. This allows for cooling of the insulation, which is important in long insulation life, and helps maintain a cool external case temperature. Larger furnaces feature integral cooling fans to ensure good cold face strength of the insulation. The two smallest sizes are bench mounted, while all others are floor standing. The case is primed with 800°F silicone paint and finished in machine enamel.

DEEP PLUG DOOR CONSTRUCTION

The horizontally opening door features a deep plug-type seal with triple heat locks. Two pivots, one on the left and one in the center of the door, ensure very tight sealing. A vestibule around the door opening further reduces heat loss and helps protect the elements.

TEMPERATURE UNIFORMITY OF +/-20°F (+/-10°C)

Uniformity of +/-10°C (+/-20°F) is normal above 1,200°C (2,200°F) within 2/3 of the working dimensions.

ALUMINA HEARTH SUPPORTED FROM COLD FACE

The hearth is a flat alumina plate (or series of plates) supported by a series of insulating alumina posts that transfer the weight of the hearth all the way to the bottom of the cold face of the bottom insulation.

SPECIFICATIONS

Model Number	Working Dimensions			Inside Dimensions			Outside Dimensions			Element No & Size	K.W.	Max Load Weight	Ship Weight
	W	H	D	W	H	D	W	H	D				
GHH 5*	5	5	5½	7½	6¼	6½	18	28	18	(6) 3/6	3.5	10	350
GHH 8*	8	8	10	13	9	12	26	36	30	(10) 3/6	4.5	30	650
GHH 12	12	12	14	16	14	16	36	51	60	(8) 6/12	8.0	60	1,100
GHH 14	14	10	20	18	11¼	23	38	48	66	(12) 6/12	12.7	100	1,400
GHH 24	24	20	23	28	22	26	47	72	46	(18) 6/12	40.0	200	2,100
GHH 36	30	30	46	35	33	48	51	86	66	(21) 9/18	80.0	500	2,900

*Bench models. Weight is in pounds. All dimensions are in inches except size of elements, which are in millimeters (i.e., 3/6 means 3mm for main body of element and 6mm for terminal end). Outside dimensions shown do not include control panels. On bench models, height to hearth is 10" from bench. Other models are 30" from floor to hearth. Control panel for bench models is 17" wide by 48" high by 30" long. Control panel for floor standing models is 17" wide by 60" high by 36" long. 240 or 460 volts is normal; 208, 380 and 575 volts are optional. Larger sizes are available by special quote. Load weight must be evenly distributed. Specifications are subject to change without notice.

FAST HEAT-UP AND COOLDOWN

The all fiber insulation and molybdenum disilicide elements provide extremely fast heating and cooling response.

PID DIGITAL CONTROL, HIGH LIMIT CONTROL AND SCR POWER CONTROL

The standard control used is a Honeywell UDC 2500 digital PID 3 mode tuning control. All fuses, transformers, contactors and controls are located in a NEMA 1 panel. A matched transformer and phase angle fired SCR controls power to the elements. This ensures even, precise control and long element life. The thermocouples are Type B. The control voltage is 120 volts. A NEMA 13 lighted on/off switch and NEMA 13 door power cutoff switch are included. A Honeywell UDC 1200 digital high limit backup control with manual reset, backup contactors and separate thermocouple is standard. Single point power connection.

TESTING AND INSTRUCTIONS

The furnace is tested to ensure circuit integrity. A complete instruction manual includes easy startup instructions, theory of operation, maintenance instructions, parts list and a detailed troubleshooting guide. A ladder logic diagram and panel layout are prepared on CAD for easy readability.

WARRANTY

The furnace is warranted for one year except for elements and thermocouples, which are warranted for six months.

OPTIONS

- **JIC CONTROL OPTION:** This includes a NEMA 12 control cabinet, all oil tight switches and a panel mounted fused disconnect switch.
- **ATMOSPHERE CONTROL:** The GHH furnaces can be fitted for use with inert or combustible atmospheres. This is accomplished by having a secondary atmosphere casing that contains the insulation module. This casing has its own gasketed door. Inlet of the atmosphere is through the element connection chamber to maintain cool element connections. A completely piped flowmeter and regulator with ball valve, pressure gauge and pressure relief valve is included. Complete safety systems for use with combustible atmospheres are available. Maximum furnace use temperature is limited to 2,910°F (1,600°C) in nitrogen, argon or helium; 2,370°F (1,300°C) in dry hydrogen; 2,550°F (1,400°C) in moist hydrogen (60°F/15°C dew point); 2,460°F (1,350°C) in endogas; and 2,910°F (1,600°C) in exogas.
- **RAMP/SOAK PROGRAM CONTROLS**
- **TEMPERATURE RECORDERS:** Round or strip chart