



# SPECIAL FURNACE CO INC

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## GHH SERIES



### 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 3100°F (1700°C) under continuous operation. The insulation system, which is the most fragile and difficult aspect of this type of furnace, is uncompromised in quality and detail. It is guaranteed for one full year, unlike much of the competition where you can expect insulation failure fairly quickly. Hot face materials are made by Zircar or Rath.

### MOLYBDENUM DISILICIDE ELEMENT FRONT LOADING BOX FURNACES 3100°F (1700°C)

### FEATURES

#### MULTILAYERED, EFFICIENT, FIBERBOARD INSULATION

The furnace is insulated with multi-layered 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 designed into the system 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 elements are molybdenum disilicide Kanthal Super 33 U-shaped elements. These will withstand (3275°F) 1800°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

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, important in long insulation life, and helps maintain a cool external case temperature. Larger furnaces feature integral cooling fans to insure good cold face strength of the insulation. The two smallest sizes are bench mounted while all others are floor mounted. 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, insure very tight sealing. A vestibule around the door opening further reduces heat loss and helps protect the elements.

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

Uniformity of +/-10°C (+/-20°F) is normal above 1200°C (2200°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 which transfer the weight of the hearth all the way to the bottom of the cold face of the bottom insulation.

**FAST HEAT UP AND COOL DOWN**

The all fiber insulation and Kanthal Super 33 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 2300 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 insures 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 cut off switch are included. A Honeywell UDC 2300 digital high limit back up control with manual reset, back up contactors and separate thermocouple is standard. Single point power connection.

**TESTING AND INSTRUCTIONS**

The furnace is tested to insure circuit integrity. A complete instruction manual includes easy start up instructions, theory of operation, maintenance instructions, parts list, and a detailed trouble shooting guide. A ladder logic diagram and panel layout are prepared on system for easy readability.

**WARRANTY**

The furnace and insulation module are warranted for one year except for elements and thermocouples (warranted for 6 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 1600°C (2910°F) in nitrogen, argon or helium, to 1300°C (2370°F) in dry hydrogen, 1400°C (2550°F) in moist hydrogen (15°C/60°F dew point), 1350°C (2460°F) in endogas, and 1600°C (2910°F) in exogas.
- **RAMP/SOAK PROGRAM CONTROLS**
- **TEMPERATURE RECORDERS:** Round or strip chart

**SPECIFICATIONS**

MODEL NUMBER	WORKING DIMENSIONS			INSIDE CHAMBER DIMENSIONS			OUTSIDE ELEMENT DIMENSIONS			NO & SIZE	K.W.	MAX LOAD WGHT	SHIP WGHT
	W	H	D	IW	IH	ID	OW	OH	OD				
GHH 5*	5	5	5 1/2	7 1/2	6 1/4	6 1/2	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	1100
GHH 14	14	10	20	18	11 1/4	23	38	48	66	12 6/12	12.7	100	1400
GHH 24	24	20	23	28	22	26	47	72	46	18 6/12	40.0	200	2100
GHH 36	30	30	46	35	33	48	51	86	66	21 9/18	80.0	500	2900

\*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 subject to change without notice.