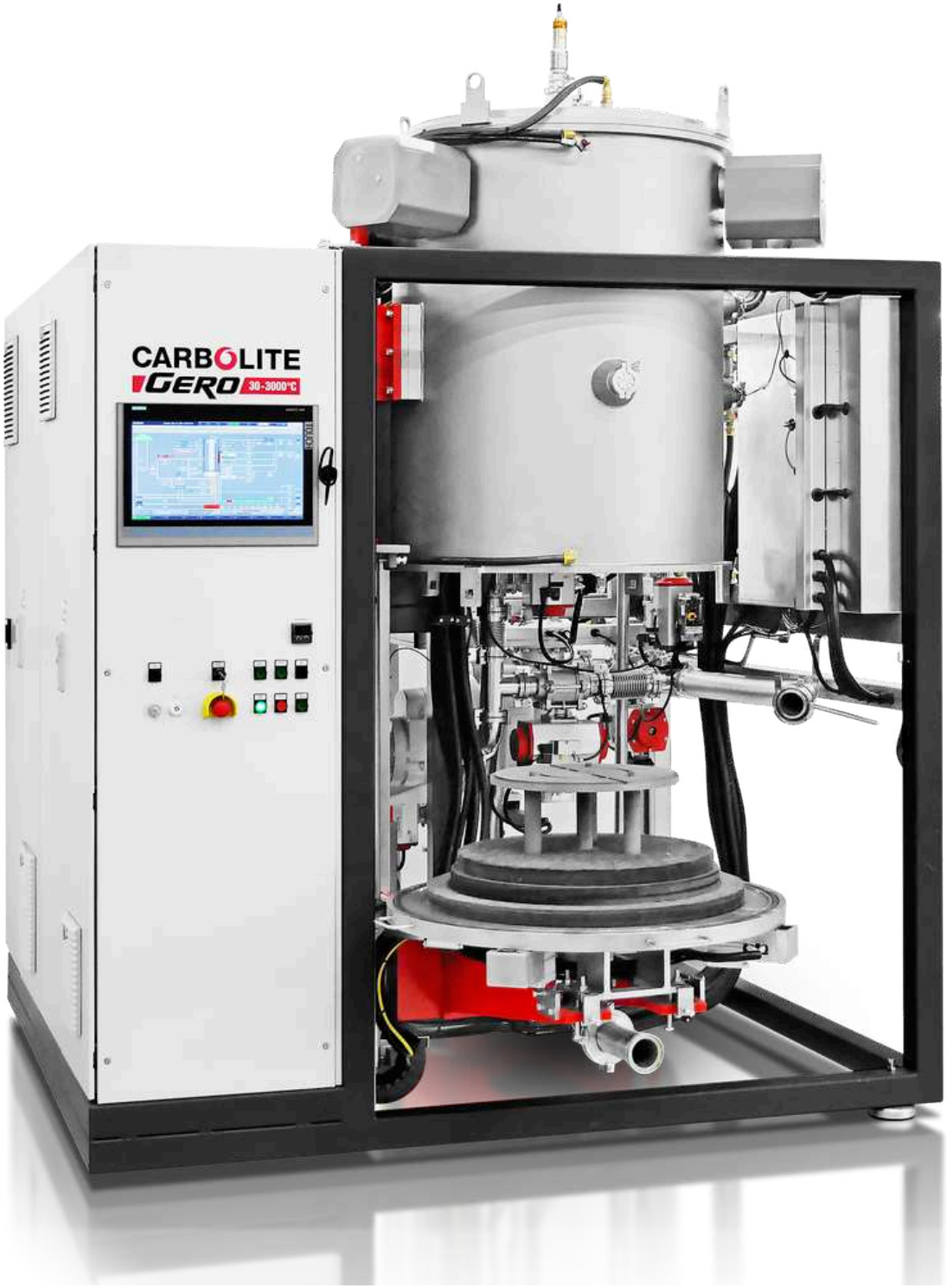


BOTTOM LOADING FURNACE, GRAPHITE INSULATION - HTBL GR

HTBL bottom loading graphite furnaces offer temperatures of 2200 °C or 3000 °C upon request. Graphite models of the HTBL are offered in volumes of 50, 80 and 200 litres.

One clear advantage is the easy loading and unloading of the HTBL type furnaces. Once the hearth has been lowered, the sample is accessible from all sides without limitations. Sample loading is extremely easy and user-friendly, especially with delicate samples. Additionally, sample thermocouples can placed at specified locations within the chamber. A retort may also be used with the HTBL. The movement of the loading area is fully automated and driven by a hydraulic arm. Once the loading area has reached the lowest position, the user can manually rotate the loading platform outward by 90 °.

Nitrogen, Argon, and Hydrogen gases are available for use as either pure or mixed gas. Other gases may be installed upon request. A slight overpressure or controlled partial pressure, to establish a defined gas flow, can be used in the furnace. Operation with air is not possible.

Various dosing and controlling devices control all gases. Depending on the vacuum requirements, vacuum pumps are configured specifically for the application or as requested. The temperature is independently controlled to achieve the best uniformity.

APPLICATION EXAMPLES

annealing, brazing, carbonisation, ceramic injection moulding (CIM), debinding, degassing, drying, hardening, metal injection moulding (MIM), pyrolysis, quenching, rapid prototyping, siliconization, sintering, soldering, sublimation, synthesis, tempering

STANDARD FEATURES

- Graphite furnaces offer the highest possible temperatures
- Hydrogen partial pressure operation upon request
- Precisely controlled vacuum pumping speeds appropriate for use with powders
- Fully automatic operation
- Data recording for quality management

EXAMPLES

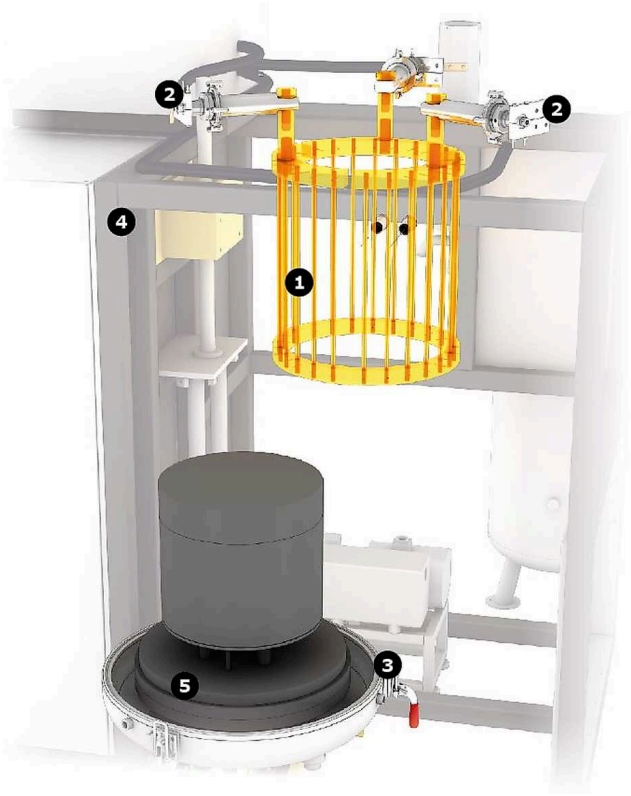
View inside of the HTBL GR

1. heating elements
2. water cooled current
3. bottom locking device
4. frame
5. bottom plate

The HTBL GR has one heating zone made from graphite. The mantle heater is software controlled and provided with a controller and thermocouple dedicated for over-temperature protection. The mantle heater consists of several graphite rods arranged along the cylindrical hearth that are secured to the top of the chamber. The insulation of this system consists of graphite felt. The system is surrounded by a water cooled vessel.

To load and unload the furnace, locking clamps are manually operated. Vacuum tubes must also be be attached and detached manually. Aside from these two steps, all remaining movements of the furnace hearth are fully automated. After the bottom, loading area has reached the lowest position, the user can rotate the platform outward by 90°. The automated features of the HTBL are ideal for large scale production.

The graphite based HTBL is equipped with a pyrometer and a sliding thermocouple. A retort can be supplied on request. Graphite is a very versatile construction material for high temperature furnaces. However, if the sample is sensitive to carbon, a metallic furnace must be used.



View inside HTBL GR

TECHNICAL DETAILS (MODELS)

	HTBL-H 50 GR/22-1G	HTBL 50 GR/22-1G
Insulation material	Graphite	Graphite
Dimensions: External H x W x D (mm)	4300 x 2400 x 2200	3500 x 2400 x 2200
Transport weight (kg)	3200	3200
Usable space		
Volume (l)	50	50
Ø x H, usable space without retort (mm)	300 x 700	400 x 400
Ø x H, usable space with retort (mm)	280 x 680	380 x 380
Thermal values		
Tmax vacuum (°C)	2200	2200
Tmax atmospheric pressure (°C)	2200	2200
-Delta-T, between 500°C and 2200°C (K) according to DIN 17052	± 10	± 10
Max. heat-up rate (K/min)	10	10
Cooling time (h)	8	8
Connecting values		
Power (kW)	120	120
Voltage (V)	400 (3P)	400 (3P)
Current (A)	3 x 175	3 x 175
Series fuse (A)	3 x 250	3 x 250
Vacuum (option)		
Leakage rate - clean, cold and empty (mbar l/s)	< 5x10-3	< 5x10-3
Vacuum range depending on the pumping unit	rough or fine vacuum	rough or fine vacuum
Cooling water required		
Flow (l/min)	100	100
Gas supply		
Nitrogen or Argon flow, others on request (l/h)	500-2000	500-2000

	HTBL-H 50 GR/22-1G	HTBL 50 GR/22-1G
Controller	Siemens WinCC flex	Siemens

	HTBL 80 GR/22-1G	HTBL 200 GR/22-1G
Insulation material	Graphite	Graphite
Dimensions: External H x W x D (mm)	4300 x 2400 x 2200	4800 x 2400 x 2600
Transport weight (kg)	3500	4200
Usable space		
Volume (l)	80	200
Ø x H, usable space without retort (mm)	400 x 700	500 x 900
Ø x H, usable space with retort (mm)	380 x 680	480 x 880
Thermal values		
Tmax vacuum (°C)	2200	2200
Tmax atmospheric pressure (°C)	2200	2200
-Delta-T, between 500°C and 2200°C (K) according to DIN 17052	± 10	± 10
Max. heat-up rate (K/min)	10	10
Cooling time (h)	12	16
Connecting values		
Power (kW)	200	300
Voltage (V)	400 (3P)	400 (3P)
Current (A)	3 x 290	3 x 430
Series fuse (A)	3 x 400	3 x 630
Vacuum (option)		
Leakage rate - clean, cold and empty (mbar l/s)	< 5x10-3	< 5x10-3
Vacuum range depending on the pumping unit	rough or fine vacuum	rough or fine vacuum
Cooling water required		
Flow (l/min)	150	220
Gas supply		
Nitrogen or Argon flow, others on request (l/h)	500-2000	500-2000
Controller	Siemens	Siemens

www.carbolite.com/htblgr