

# BOTTOM LOADING FURNACE, METAL INSULATION - HTBL MO/ W



**The HTBL MO / HTBL W is a bottom loading furnace system that is based on metallic insulation and heating elements.**

The metallic furnaces are offered with a volume of 60 litres. The HTBL 60 MO/16-1G has a maximum temperature of 1600 °C and uses molybdenum radiation shields and heating elements. The HTBL 60 W/22-1G has a maximum temperature of 2200 °C and uses tungsten radiation shields and heating elements. The metallic versions of the HTBL are suited for generating the purest atmospheres and the best working vacuum level.

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 be 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

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

## STANDARD FEATURES

- | Metallic furnaces provide precisely defined atmospheres with the highest possible purity (6 N or better)
- | Hydrogen partial pressure operation upon request
- | Precisely controlled vacuum pumping speeds appropriate for use with powders
- | Fully automatic operation
- | Data recording for quality management

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## TECHNICAL DETAILS

### View inside of the HTBL high temperature furnace

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

The HTBL furnace based on metallic materials is equipped with one heating zone (mantle heater) made from tungsten or molybdenum. The radiation shields that provide the heat insulation are constructed of the same material as the heating elements. Standard systems use nine radiation shields surrounding the heating elements. If a lower maximum temperature is required, it is possible to reduce the number of radiation shields. The HTBL, with a diameter of 400 mm and heated length of 500 mm, is well suited for high vacuum processes. Both molybdenum and tungsten exhibit very low vapor pressure even at the highest temperatures. Once the maximum temperature is achieved, the heating elements must be handled with care as they will become brittle.

All HTBL models are equipped with fully automated software and reliable data logging for later evaluation of the process. All process data are measured and logged at predefined intervals. Automated control and high volume units are especially suited for industrial applications and large scale production.



## TECHNICAL DETAILS (MODELS)

	<b>HTBL 60 MO/16-1G</b>	<b>HTBL 60 W/16-1G</b>
<b>Insulation material</b>	Molybdenum	Tungsten
<b>Dimensions:</b> <b>External H x W x D (mm)</b>	3300 x 2400 x 2200	3300 x 2400 x 2200
<b>Transport weight (kg)</b>	3400	3600
<b>Usable space</b>	//	//
<b>Volume (litres)</b>	60	60
<b>Ø x H, usable space without retort (mm)</b>	400 x 500	400 x 500
<b>Ø x H, usable space with retort (mm)</b>	380 x 480	380 x 480
<b>Thermal values</b>	//	//
<b>Tmax vacuum (°C)</b>	1600	2200
<b>Tmax atmospheric pressure (°C)</b>	1600	2200
<b>-Delta-T, between 500°C and 2200°C (K) according to DIN 17052</b>	± 10	± 10
<b>Max. heat-up rate (K/min)</b>	10	10
<b>Cooling time (h)</b>	5	6
<b>Connecting values</b>	//	//
<b>Power (kW)</b>	80	250
<b>Voltage (V)</b>	400 (3P)	400 (3P)
<b>Current (A)</b>	3 x 115	3 x 360
<b>Series fuse (A)</b>	3 x 160	3 x 500
<b>Vacuum (option)</b>	//	//
<b>Leakage rate - clean, cold and empty (mbar l/s)</b>	< 5x10 <sup>-3</sup>	< 5x10 <sup>-3</sup>
<b>Vacuum range depending on the pumping unit</b>	rough, fine, high or ultra high vacuum	rough, fine, high or ultra high vacuum
<b>Cooling water required</b>	//	//
<b>Flow (l/min)</b>	64	200
<b>Gas supply</b>	//	//

	<b>HTBL 60 MO/16-1G</b>	<b>HTBL 60 W/16-1G</b>
<b>Nitrogen or Argon flow, others on request (l/h)</b>	500-2000	500-2000
<b>Controller</b>	Siemens	Siemens

[www.carbolite-gero.com/htblmo](http://www.carbolite-gero.com/htblmo)