

Dental



Furnaces and Accessories

**Sintering Furnaces for
Translucent Zirconia**

Zirconia

CoCr Alloys

CAD/CAM Systems

Laser Sintering

Additive Manufacturing

Burnout Furnaces

Model Casting

Production Furnaces

www.nabertherm.com

■ Made
■ in
■ Germany



Made in Germany

Nabertherm with 500 employees worldwide have been developing and producing industrial furnaces for many different applications for 70 years. As a manufacturer, Nabertherm offers a very wide and deep range of furnaces. 150,000 satisfied customers in more than 100 countries offer proof of our commitment to excellent design, quality and cost efficiency. Short delivery times are ensured due to our complete inhouse production and our wide variety of standard furnaces.



Front made of textured stainless steel

Setting Standards in Quality and Reliability

Nabertherm does not only offer a wide range of standard furnaces. Professional engineering in combination with in house manufacturing provide for individual project planning and construction of tailor-made thermal process plants with material handling and charging systems. Complete thermal processes are realized by customized system solutions.

Innovative Nabertherm control technology provides for precise control as well as full documentation and remote monitoring of your processes. Our engineers apply state-of-the-art technology to improve the temperature uniformity, energy efficiency, reliability and durability of our systems with the goal of enhancing your competitive edge.

Global Sales and Service Network – Close to you

Nabertherm's strength is one of the biggest R&D departments in the furnace industry. In combination with central manufacturing in Germany and decentralized sales and service close to the customer we can provide for a competitive edge to live up to your needs. Long term sales partners in all important world markets ensure individual on-site customer service and consultation. There are certainly reference customers who are using similar furnaces or systems close to you.



Large Customer Test Center

What furnace is the right choice for this specific process? This question cannot always be answered easily. Therefore, we have set up our modern test center which is unique in respect to size and variety. A representative number of furnaces is available for tests for our customers.

Customer Service and Spare Parts

Our professional service engineers are available for you worldwide. Due to our complete inhouse production, we can despatch most spare parts from stock over night or produce with short delivery time.

Experience in Many Fields of Thermal Processing

In addition to furnaces for laboratory, Nabertherm offers a wide range of standard furnaces and plants for many other thermal processing applications. The modular design of our products provides for customized solutions to you individual needs without expensive modifications.

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High-Temperature Bottom Loading Furnace up to 1650 °C with Integrated Speed Cooling System for Sintering of Translucent Zirconia



High-temperature bottom loading furnace LHT 01/17 LB Speed with rapid cooling function



High-temperature bottom loading furnace LHT 02/17 LB Speed with rapid cooling function



Charge sagger, two levels for LHT 02/17 LB Speed

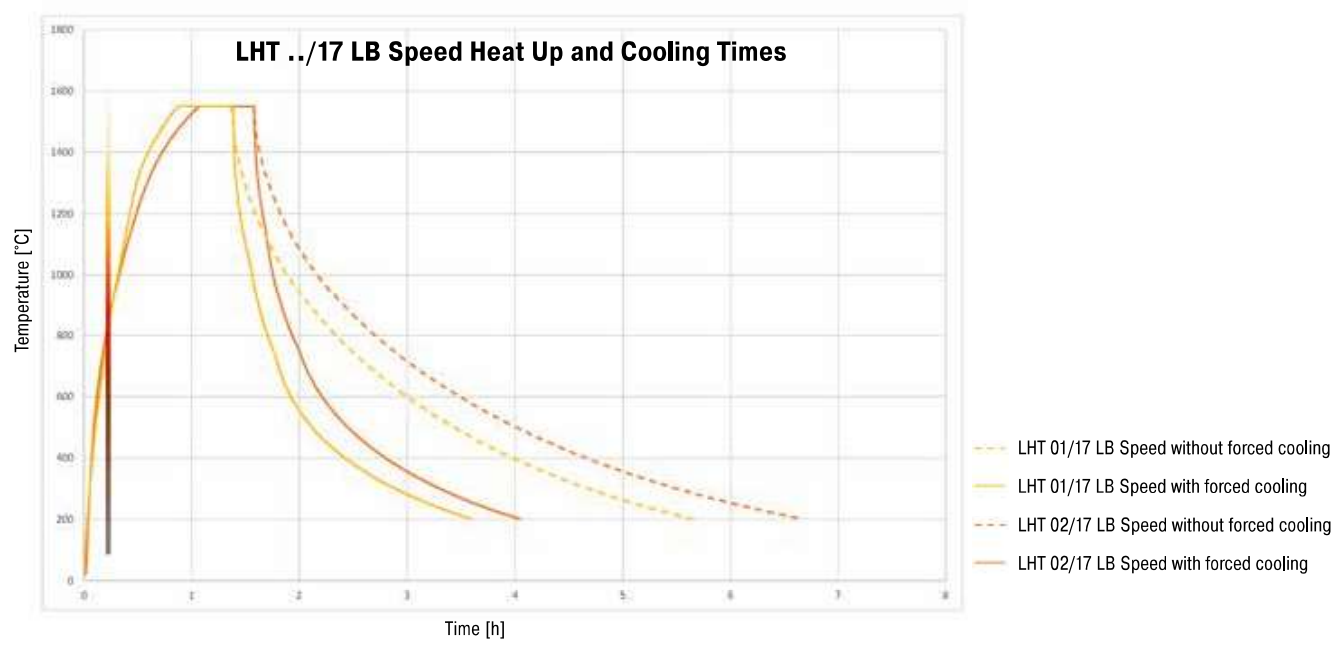


Starter set for one level for LHT 01/17 LB Speed

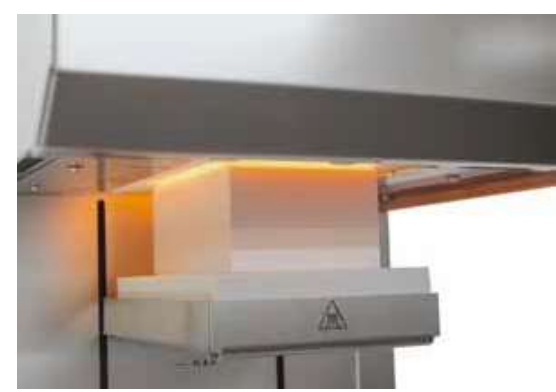
Due to their maximum temperature of 1650 °C and their large furnace chamber, the high-temperature bottom loading furnaces are perfectly suited for sintering translucent zirconia. The motor-driven lifting table significantly simplifies the charging of the high-temperature furnace. The all-around heating of the cylindrical furnace chamber ensures a very even temperature uniformity.

Equipped with special heating elements made of molybdenum disilicide, chemical interactions between the charge and the furnace components are almost avoided. The sintered material is placed in saggars made of technical ceramics. Up to two batch containers for max. 15 single crowns per level can be accommodated in the LHT 01/17 LB Speed. The LHT 02/17 LB Speed offers space for up to three saggars for max. 25 individual crowns per level and thus guarantees high productivity.

The high-temperature bottom loading furnaces are additionally equipped with a drying as well as a forced cooling function. For residual drying, the oven remains open gapwise during heating up to a defined temperature and thus ensures reliable removal of moisture. For accelerated cooling, the furnace is automatically opened step by step under program control. Depending on the batch used and the saggars, these high-temperature furnaces can achieve total cycle times of less than two and a half hours. The furnaces can be individually programmed for all recommended sintering curves of all zirconia manufacturers.



- Tmax 1650 °C
- Furnace chamber with a volume of 1 or 2 liters, table with large floor space
- High-quality heating elements made of molybdenum disilicide offer very good protection against chemical interaction between charge and heating elements
- Appealing, double-walled stainless steel housing
- Only fiber materials are used which are not classified as carcinogenic according to TRGS 905, class 1 or 2
- Outstanding temperature uniformity due to all-round furnace chamber heating
- Scope of delivery includes a starter set for charging on one level, additional levels as additional equipment
- Precise, motorized toothed belt drive of the table with button operation
- Forced cooling function with automatic, step-by-step opening from a preset temperature
- Exhaust air vent in the roof
- Type S thermocouple
- Controller P480 with memory for 50 programs, 2 sample programs
- Usable for sintering blanks of all leading manufacturers
- Drying function: When starting the program the table will be driven in drying position and closes automatically at 500 °C
- Defined application within the constraints of the operating instructions
- NTLog Basic for Nabertherm controller: recording of process data with USB-flash drive
- Controls description see page 22



Automated table lowering for fast cooling

Additional equipment

- Over-temperature limiter with adjustable cutout temperature for thermal protection class 2 in accordance with EN 60519-2 as temperature limiter to protect the furnace and load
- Stackable saggars for loading in up to two or three levels, depending on model, see page 9
- Process control and documentation via VCD software package for monitoring, documentation and control see page 23

Model	Tmax °C	Inner dimensions in mm			Volume in l	Maximum units	Outer dimensions in mm ¹			Connected load kW	Electrical connection*	Weight in kg	Minutes to Tmax
		w	d	h			W	D	H				
LHT 01/17 LB Speed	1650	145	180	100	1	30	350	590	680	2.2	1-phase	40	85
LHT 02/17 LB Speed	1650	185	180	185	2	75	390	590	765	3.4	1-phase	50	75

*These furnaces are available for main voltage of 200 V, 208 V, 220 V - 240 V, 1/N/PE or 2/PE
¹External dimensions vary when furnace is equipped with additional equipment. Dimensions on request.

High-Temperature Furnaces up to 1650 °C for Sintering Translucent Zirconia



LHT 01/17 D



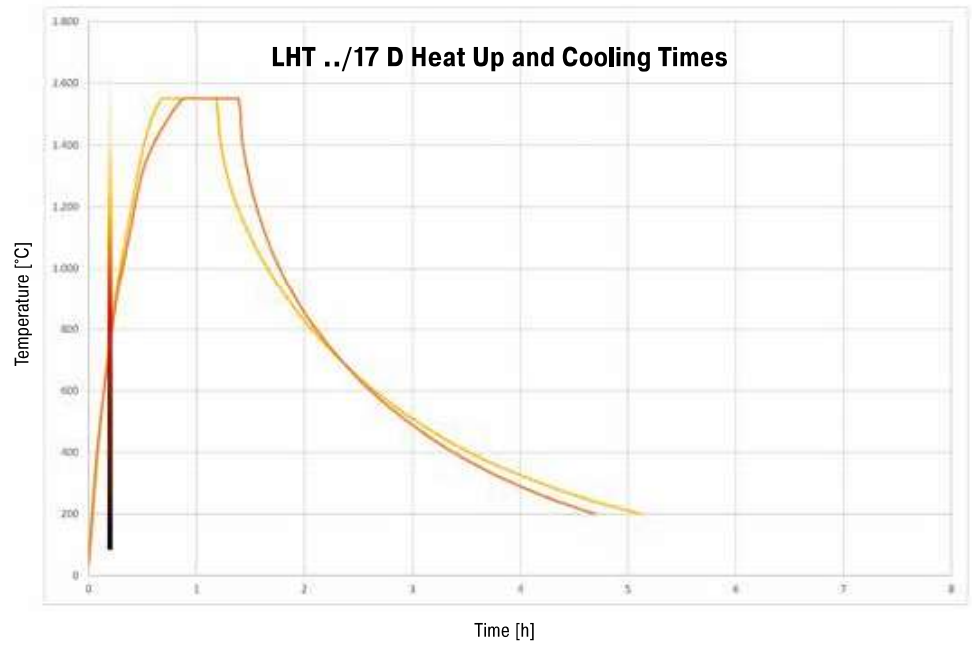
LHT 03/17 D



Over-temperature limiter

These high-temperature furnaces are ideally suited for sintering bridges and crowns made of translucent zirconia. The special heating elements made of molybdenum disilicide promise very good protection against chemical interaction between the charge and the furnace components. The bridges and crowns are loaded in ceramic saggars. These high-temperature furnaces are particularly convincing due to their very good price-performance ratio. The furnaces can be individually programmed for all recommended sintering curves by almost all zirconium manufacturers.

- Tmax 1650 °C
- Furnace chamber with a volume of 1 or 4 liters
- Special heating elements made of molybdenum disilicide offer very good protection against chemical interaction between charge and heating elements
- Dual shell housing made of textured stainless steel sheets with additional fan cooling for low surface temperature
- Only fiber materials are used which are not classified as carcinogenic according to TRGS 905, class 1 or 2
- Compact design with lift door, opening upwards
- Scope of delivery includes a starter set for charging on one level, additional levels as additional equipment
- Adjustable air inlet
- Furnace chamber can be charged with up to two (LHT 01/17D) or three (LHT 03/17D) saggars, 15 or 25 individual crowns per level (depending on model)
- Exhaust air opening in the roof
- Type S thermocouple



— LHT 01/17 D
 — LHT 03/17 D

- Precise temperature control, also in the lower temperature range for drying
- Controller P480 (LHT 01/17 D) or P470 (LHT 03/17 D) with memory for 50 programs
- Switchgear with steady control of the heating elements
- Freely usable for sintering blanks of almost all leading manufacturers
- Defined application within the constraints of the operating instructions
- NTLLog Basic for Nabertherm controller: recording of process data with USB-flash drive
- Controls description see page 22

Additional equipment

- Over-temperature limiter with adjustable cutout temperature for thermal protection class 2 in accordance with EN 60519-2 as temperature limiter to protect the furnace and load
- Stackable saggars for loading in up to two or three levels, depending on model, see page 9
- Process control and documentation via VCD software package for monitoring, documentation and control see page 23



Starter set for high-temperature furnace LHT 01/17 D



Charge saggars, two levels for high-temperature furnace LHT 03/17 D

Model	Tmax °C	Inner dimensions in mm			Volume in l	Maximum units	Outer dimensions in mm ³			Connected load kW	Electrical connection*	Weight in kg	Minutes to Tmax ¹
		w	d	h			W	D	H ²				
LHT 01/17 D	1650	110	120	120	1	30	385	425	525+195	2.2	1-phase	28	10
LHT 03/17 D	1650	135	155	200	4	75	470	630	770+260	3.0	1-phase	75	60

¹In the empty and closed furnace, connected to 230 V 1/N/PE resp. 400 V 3/N/PE *These furnaces are available for main voltage of 200 V, 208 V, 220 V - 240 V, 1/N/PE or 2/PE
²Including opened lift door
³External dimensions vary when furnace is equipped with additional equipment. Dimensions on request.

High-Temperature Furnace with SiC Rod Heating for Sintering Zirconia up to 1550 °C



LHTCT 01/16



LHTCT 01/16

Designed as a table-top model with SiC heating rods, this comparably inexpensive high-temperature furnace offers numerous advantages when sintering non-translucent zirconia with an operating temperature of up to 1500 °C. Compared to other models, however, the costs for changing the heating elements are higher. The large heating chamber and fast heat-up times make this model a good choice for CAD/CAM machining of zirconia. The controller of the furnace is freely programmable for the individual sintering of the zirconia material. The high-temperature furnace is also designed for connection to the single-phase power grid.



Furnace chamber with high-quality fiber materials and SiC heating rods on both sides of the furnace



Starter set for high-temperature furnace LHTCT 01/16

- Tmax 1550 °C
- Working temperature 1500 °C, increased wear and tear must be expected in case of working at higher temperatures
- Single-phase connection (LHTCT 01/16)
- Dual shell housing made of textured stainless steel sheets with additional fan cooling for low surface temperature
- Only fiber materials are used which are not classified as carcinogenic according to TRGS 905, class 1 or 2
- Scope of delivery includes a starter set for charging on one level, additional levels as additional equipment
- Adjustable air inlet
- Type S thermocouple
- Controller C450, freely programmable
- Switching system with solid-state-relays, power tuned to the SiC rods
- Easy replacement of heating rods
- Defined application within the constraints of the operating instructions
- NTLog Basic for Nabertherm controller: recording of process data with USB-flash drive
- Controls description see page 22

Additional equipment

- Over-temperature limiter with adjustable cutout temperature for thermal protection class 2 in accordance with EN 60519-2 as temperature limiter to protect the furnace and load
- Square sagger for charging of up to two layers (15 single crowns) see page 9
- Lid for top sagger
- Process control and documentation via VCD software package for monitoring, documentation and control see page 23

Model	Tmax °C	Inner dimensions in mm			Volume in l	Maximum units	Outer dimensions in mm ⁴			Connected load kW	Electrical connection*	Weight in kg	Minutes to Tmax ²
		w	d	h			W	D	H ¹				
LHTCT 01/16	1550	110	120	120	1.5	30	340	300	460 + 195	3.5	1-phase	18	40
LHTCT 03/16	1550	120	210	120	3.0	60	400	535	530 + 215	9.0	3-phase ³	40	40

*These furnaces are available for main voltage of 200 V, 208 V, 220 V - 240 V, 1/N/PE or 2/PE

²In the empty and closed furnace, connected to 230 V 1/N/PE resp. 400 V 3/N/PE

⁴External dimensions vary when furnace is equipped with additional equipment. Dimensions on request.

¹Including opened lift door

³Heating only between two phases

Accessories for Sintering Furnaces



Starter Set, Ø 115 mm
Article No.: 699001066



Sintering Dish, Ø 115 mm
Article No.: 699001054



Spacer Ring with Ventilation Openings
Article No.: 699001055

Charge Saggars for Sintering Furnaces LHT 02/17 LB Speed, LHTCT 03/16 and LHT 03/17 D

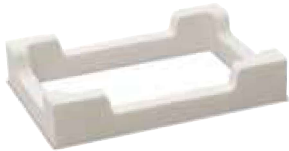
For charging zirconia workpieces charge saggars are recommended. A saggar basically consists of the sintering dish as base and the spacer ring with ventilation openings. The material is highly resistant to temperature fluctuations and can be used for processes with short heat-up and cool-down times.

When charging the furnace it must be ensured that the lower charge carrier is generally resting on the spacer ring. This provides for air-circulation under this carrier and improves the temperature uniformity. It is recommended to cover upper saggar with another sintering dish as lid.

The starter set consists of a charge saggar, a spacer ring as a base and a second sintering dish as lid. The use of additional saggars (sintering dish and spacer ring) allows charging on additional levels. Both furnace models are designed to get charged with up to three charge saggars.

Number of required charge levels in overview:

- 1 level: Starter set which includes 2 sintering dishes and 2 spacer rings
- 2 levels: Starter set + 1 sintering dish + 1 spacer ring
- 3 levels: Starter set + 2 sintering dishes + 2 spacer rings



Spacer with Ventilation Openings
Article No.: 699000529



Charge Saggar with Ventilation Openings, 110 x 75 x 30 mm
Article No.: 699000279



Lid for Charge Saggar
Article No.: 699000985



Starter Set, rectangular
Article No.: 699001124

Charge Saggar for Sintering Furnaces LHT 01/17 Speed, LHTCT 01/16 and LHT 01/17 D

Placing the zirconia product in charge saggars provides for optimum utilization of the furnace chamber. Up to two saggars + spacer can be stacked in the furnaces. The integrated air slots in the saggars and spacer ensure a better air circulation of the charge. The upper saggar can be closed with a separate ceramic lid.

Note: The Accessories Described above are Designed for Cold Charging and Discharging. Removing the Accessories in Hot Condition is not Possible.

Spare Parts for Sintering Furnaces

Model	Heating elements		Support tubes	Thermocouple	Spring lift door	Bottom plate	
	Article No.	Image					
LHT 01/17 D	4 x 692253380		-	540300384	2 x 691400598	601604420	
LHT 03/17 D	4 x 692252721		-	540300554	2 x 691400599	-	
LHTCT ../16	4 x 602212884		-	540300384	2 x 691400598	601604420	
LHT ../17 LB Speed	4 x 692252721		-	-	540300554	-	-
LT 02/13 CR	2 x 692253400		12 x 692040251	540300257	2 x 691400598	-	

Additional Information or Detailed Offers for Spare Parts are Available on Request. Our Spare Part Department is Available by Phone at +49 (4298) 922-474.