Dental

Furnaces and Accessories

Sintering Furnaces for Zirconia

Made in Germany

www.nabertherm.com

Front made of textured stainless steel

Made in Germany

Nabertherm with 450 employees worldwide have been developing and producing industrial furnaces for many different applications for over 60 years. As a manufacturer, Nabertherm offers the widest and deepest range of furnaces worldwide. 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.

Setting Standards in Quality and Reliability

Nabertherm does not only offer the widest range of standard furnaces. Professional engineering in combination with inhouse manufactoring 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 department 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 and distribution partners in all important world markets ensure individual on-site customer service and consultation. There are various reference customers in your neighborhood who have similar furnaces or systems.

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 your individual needs without expensive modifications.

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

LHT 02/17 LB Speed

Due to its maximum temperature of 1650 °C and the large chamber the high-temperature bottom loading furnace is perfectly suited for sintering of translucent zirconia. The electrically driven lift-bottom provides for easy charging. The heating all around the cylindrical furnace chamber provides for a good temperature uniformity.

By using special heating elements made of molydenum disilicide crowns and bridges are protected against chemical contamination at the best. The charge will be placed in saggars made of technical ceramics. Up to three saggars on top of each other guarantee high productivity.

The high-temperature bottom loading furnace is additionally equipped with rapid cooling device. The furnace automatically opens stepwise for faster cooling. Depending on the charge and the type of saggars process times shorter than two hours can be realized.

- ☐ Tmax 1650 °C
- ☐ High-quality heating elements made of molybdenum disilicide offer best possible protection against chemical interaction between charge and heating elements
- ☐ Furnace chamber lined with first-class, long-life fiber material, unclassified
- ☐ Outstanding temperature uniformity due to all-round furnace chamber heating
- ☐ Furnace chamber with a volume of 2 liters, table with large floor space
- ☐ Electric screw drive with push button operation, automatic opening of Speed model for cooling possible
- ☐ Housing made of sheets of textured stainless steel
- ☐ Exhaust air vent in the roof
- ☐ Controller P470
- ☐ NTLog for Nabertherm controller: recording of process data with USB-flash drive
- ☐ Speed model with drying function. When starting the program the table will be driven in drying position and closes automatically at 500 °C
- ☐ Delivery incl. one starter set to charge the zirconia works
- ☐ Defined application within the constraints of the operating instructions
- ☐ Controls description see page 18

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
- ☐ Saggar for charging of up to three layers see page 9
- ☐ Process control and documentation via VCD software package for monitoring, documentation and control see page 19

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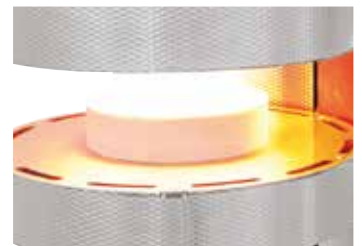
Automated table lowering for cooling

Charge saggar, starter-set

Model	Tmax °C	Inner dimensions in mm		Volume in l	Maximum units	Outer dimensions in mm			Connected load kW	Electrical connection*	Weight in kg	Minutes to Tmax[1]
		Ø	h			W	D	H				
LHT 02/17 LB Speed	1650	Ø 120	130	2	75	540	610	740	3.3	1-phase	85	80

*These furnaces are available for main voltage of 110 V - 120 V resp. 200 V - 240 V, 1/N/PE or 2/PE
[1]If connected at 230 V 1/N/PE

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 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

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

Lid for Charge Saggar
Article No.: 699000985

Safe charging on up to three levels

Charge Saggar for Sintering Furnaces HTCT 01/16 and LHT 01/17 D

Placing the zirconia product in charge saggars provides for optimum utilization of the furnace chamber. Up to three saggars can be stacked in the furnaces. The integrated air slots 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	Article No.	Article No.	Article No.	Article No.
LHT 01/17 D	4 x 692253380		-	540300384	2 x 691400598	601604420
LHT 03/17 D	4 x 692252721		-	540300554	2 x 691400599	-
HTCT 01/16	4 x 602212884		-	540300384	2 x 691400598	601604420
LHT 02/17 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.

Process Control and Documentation

Controller

Nabertherm has many years of experience in the design and construction of both standard and custom control alternatives. All controls are remarkable for their ease of use and even in the basic version have a wide variety of functions.

Standard Controllers

Our extensive line of standard controllers satisfies most customer requirements. Based on the specific furnace model, the controller regulates the furnace temperature reliably and is equipped with an integrated USB-interface for documentation of process data (NTLog/NTGraph).

The standard controllers are developed and fabricated within the Nabertherm group. When developing controllers, our focus is on ease of use. From a technical standpoint, these devices are custom-fit for each furnace model or the associated application. From the simple controller with an adjustable temperature to the control unit with freely configurable control parameters, stored programs and PID microprocessor control with self-diagnosis system, we have a solution to meet your requirements.

B400

C440

P470

Allocation of the Standard Controller to the Furnace Groups	LT 02/13 CR	LHT 01/17 D	LHT 03/17 D	LHT 02/17 LB Speed	HTCT 01/16	N 7/H - N 41/H	LE 1/11 - LE 14/11	L 1/12 - LT 15/12	N 7/H - N 17/HR
Catalog page	4	6	6	7	8	10	14	12	15
Controller									
R7							●		
3216								○	
B400						●			●
C440						○			○
P470			●	●					
B410								●	
C450	●				●			○	
P480		●							

Functionality of the Standard Controllers	R7	3216	B400 B410	C440 C450	P470 P480
Number of programs	1	1	5	10	50
Segments	1	8	4	20	40
Extra functions (e.g. fan or autom. flaps) maximum			2	2	2-6
Maximum number of control zones	1	1	1	1	3
Drive of manual zone regulation			●	●	●
Auto tune		●	●	●	●
Real-time clock			●	●	●
Status messages in clear text			●	●	●
Data input via jog dial and buttons			●	●	●
Entering program names (i.e."Sintering")			●	●	●
Keypad lock			●	●	●
User administration			●	●	●
Skip-button for segment jump			●	●	●
Program entry in steps of 1 °C or 1 min.	●	●	●	●	●
Start time configurable (e.g. to use night power rates)			●	●	●
Switch-over °C/°F	○	○	●	●	●
kWh meter			●	●	●
Operating hour counter			●	●	●
Set point output			●	●	●
NTLog for Nabertherm Controller: Recording of process data with USB-flash drive			●	●	●
Interface for VCD software			○	○	○
Malfunction memory			●	●	●

● Standard
○ Option

B410/C450/P480

Supply Voltages for Nabertherm Furnaces

1-phase: All furnaces are available for 110 V - 240 V, 50 or 60 Hz.

3-phase: All furnaces are available for 200 V - 240 V and/or 380 V - 480 V, 50 or 60 Hz.

The connecting rates in the catalog refer to the standard furnace with 400 V (3/N/PE) respectively 230 V (1/N/PE).

Process Control and Documentation

Processdocumentation

Data Storing of Nabertherm Controllers with NTLog Basic

The Controller B400/B410, C440/C450 and P470/P480 are equipped with a USB interface as standard, which allows data recording via the NTLog Basic. The process data is recorded with a client-side USB-stick which is inserted during the process.

The process documentation with NTLog Basic requires no additional thermocouples or sensors. Only data recorded which are available in the controller.

The data stored on the USB stick (up to 80,000 data records, format CSV) can afterwards be evaluated on the PC either via NTGraph or a spreadsheet software used by the customer (e.g. MS Excel).

For protection against data manipulation the generated data records contain checksums.

Visualization with NTGraph

The process data from NTLog can be visualized either using the customer's own spreadsheet program (e.g. MS-Excel) or NTGraph (Freeware). With NTGraph Nabertherm provides for a user-friendly tool free of charge for the visualization of the data generated by NTLog. Prerequisite for its use is the installation of the program MS Excel for Windows (version 2003/2010/2013). After data import presentation as diagram, table or report can be chosen. The design (color, scaling, reference labels) can be adapted by using prepared sets.

NTGraph is available in seven languages (DE/EN/FR/SP/IT/CH/RU). In addition, selected texts can be generated in other languages.
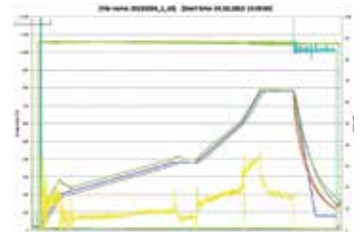
NTGraph, a freeware for the easy-to-read analysis of recorded data using MS Excel

VCD-Software for Visualization, Control and Documentation

Documentation and reproducibility are more and more important for quality assurance. The powerful VCD software represents an optimal solution for single multi furnace systems as well as charg documentation on the basis of Nabertherm controllers.

The VCD software is used to record process data from the controllers B400/B410, C440/C450 and P470/P480. Up to 400 different heat treatment programs can be stored. The controllers are started and stopped via the software. The process is documented and archived accordingly. The data display can can be carried-out in a diagram or as data table. Even a transfer of process data to MS Excel (.csv format *) or the generation of reports in PDF format is possible.

Features
- ▨ Available for controllers B400/B410/C440/C450/P470/P480
- ▨ Suitable for operating systems Microsoft Windows 7 (32/64 Bit) or 8/8.1 (32/64 Bit)
- ▨ Simple installation
- ▨ Setting, Archiving and print of programs and graphics
- ▨ Operation of controllers via PC
- ▨ Archiving of process curves from up to 16 furnaces (also multi-zone controlled)
- ▨ Redundant saving of archives on a server drive
- ▨ Higher security level due to binary data storage
- ▨ Free input of charge data with comfortable search function
- ▨ Possibility to evaluate data, files can be converted to Excel
- ▨ Generation of a PDF-report
- ▨ 17 languages selectable

VCD Software for Control, Visualisation and Documentation

The whole World of Nabertherm: www.nabertherm.com

Please visit our website
www.nabertherm.com and find out all you
want to know about us - and especially about
our products.

Besides news and our current calendar of
trade fairs, there is also the opportunity to get
in touch directly with your local sales office or
nearest dealer worldwide.

Professional Solutions for:
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