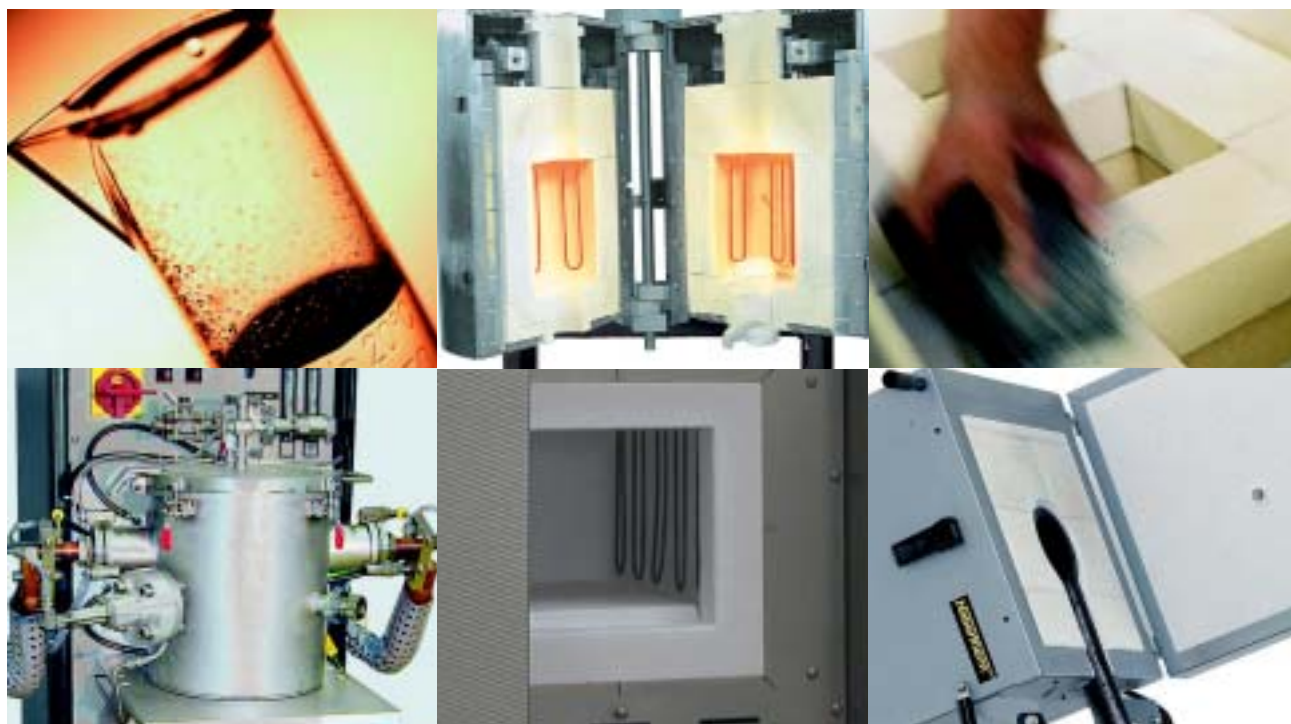


Nabertherm

MORE THAN HEAT 30-3000 °C

L a b o r a t o r y



**Muffle Furnaces
Ashing Furnaces
Tube Furnaces
Ovens
Air Circulation Furnaces
Chamber Furnaces
Melting Furnaces
High-Temperature Furnaces
Vacuum Furnaces**

www.nabertherm.com

■ Made
■ in
■ Germany

Laboratory/Dental



Problem solutions - standard or customised

Our wide range of standard products cater for most applications and at extremely competitive prices. All furnaces shown in this brochure are now manufactured from high grade structured stainless steel displaying an attractive finish. What is more, we can also provide custom built furnaces to meet your individual requirements.

Time is money

We know that time is of the essence in order to perform experiments, tests and trials within strict deadlines. For this reason many models can be supplied from stock and delivered direct from our warehouse. You can count on us for punctuality and even complex laboratory furnaces are supplied within the agreed delivery time.

Quality made in Germany

Nabertherm with its over 300 employees has been developing and producing furnaces and systems for development & laboratories, ceramics and the heat treatment of metals and foundries for more than 50 years.

GERO, our subsidiary corporation is a leading company in the design and production of high temperature furnaces with a specialist range of tube furnaces. These sophisticated units offering protective atmospheres and/or vacuum facilities complement the wide range of Nabertherm products listed in this catalogue. The combined product range, together with our customized design capability ensures that we can find a solution for your specific application.

Nabertherm Engineering

We regularly review our product range to ensure that the latest technology and materials are used in furnace building and electronic control. More than 20 engineers are engaged in this activity and closely monitor new product development, quality control and special furnace designs.

Unbeatable when it comes to spare parts!

We deliver most spare parts within 24 hours - this service world-wide and offered at fair prices - no matter how old the furnace may be.

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The All-Rounders: Muffle Furnaces L 3/.. - L 40/..



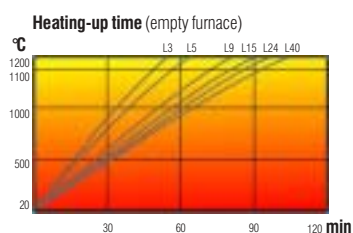
L 5/11



L 3/12



Inlet air opening in the door



Every year several thousand satisfied new customers acknowledge the quality and performance of Nabertherm's general purpose laboratory chamber furnaces. The balance of high functionality and appealing design combined with an excellent price/performance ratio makes this range the ultimate choice.

- double-walled casing for stability and low outside case temperature
- adjustable air inlet in the door (see illustration)
- casing manufactured from high grade structured stainless steel
- exhaust air outlet in the furnace rear wall
- optionally available with vent, vent with fan or catalyst
- hardened vacuum-fibre module with high resistance
- models L 3/.. -L 9/.. can also be delivered with an insulation made of heat resistant insulating bricks as an option
- ceramic heating plates with built-in heating wire, easy to replace and very reasonably priced
- digital PID Controller B 170 with adjustable ramp, holding temperature and holding time as standard. Optional Controller P 320 with 9 programs, each with 4 ramps and holding times
- silent electronic relay
- available for T_{max} up to 1100 or 1200 °C

Model	T_{max} °C	Inner dimensions in mm			Volume in L	Outer dimensions in mm			Power/kW	Supply voltage ¹	Weight in kg
		w	d	h		W	D	H			
L 3/11	1100	160	140	100	3	380	370	420	1,2	single-phase	20
L 5/11	1100	200	170	130	5	440	470	520	2,4	single-phase	35
L 9/11	1100	230	240	170	9	480	550	570	3,0	single-phase	45
L 15/11	1100	230	340	170	15	480	650	570	3,6	single-phase	55
L 24/11	1100	280	340	250	24	560	660	650	4,5	3-phase*	75
L 40/11	1100	320	490	250	40	600	790	650	6,0	3-phase*	95
L 3/12	1200	160	140	100	3	380	370	420	1,2	single-phase	20
L 5/12	1200	200	170	130	5	440	470	520	2,4	single-phase	35
L 9/12	1200	230	240	170	9	480	550	570	3,0	single-phase	45
L 15/12	1200	230	340	170	15	480	650	570	3,6	single-phase	55
L 24/12	1200	280	340	250	24	560	660	650	4,5	3-phase*	75
L 40/12	1200	320	490	250	40	600	790	650	6,0	3-phase*	95

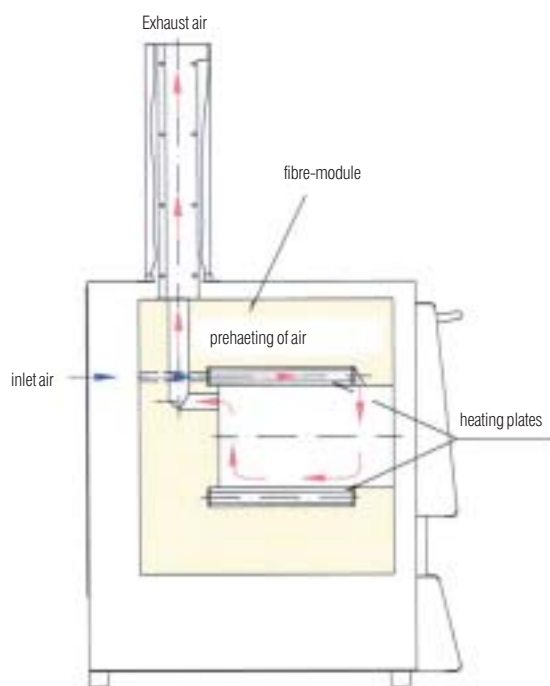
¹Information on the mains voltage see page 30

*heating only between 2 phases

Ashing Furnaces LV 5 - LV 15



LV 5



Inlet and exhaust air principle

The models LV5 - LV 15 are specially developed for ashing and burn off processes in the laboratory. Inlet air is preheated before it enters the chamber and even with more than 5 air changes per minute good temperature distribution is obtained.

- more than five air changes per minute
- excellent temperature uniformity due to pre-heated inlet air
- high quality, vacuum moulded fibre module with high resistance
- casing manufactured from high grade structured stainless steel
- double walled casing for stability and low outside case temperature
- ceramic heating plates with built-in heating wire, easy to replace and very reasonably priced
- silent electronic relay
- digital PID Controller B 170 with adjustable ramp, holding temperature and holding time as standard, optionally equipped with Controller P 320 with 9 programs with 4 ramps and holding times each
- other quality features, see chamber furnaces series L 3 - L 40
- for T_{max} 1100 °C

Model	T_{max} °C	Inner dimensions in mm			Volume in L	Outer dimensions in mm			Power/kW	Supply voltage ¹	Weight in kg
		w	d	h		W	D	H			
LV 5	1100	200	170	130	5	440	470	520	2,4	single-phase	35
LV 9	1100	230	240	170	9	480	550	570	3,0	single-phase	45
LV 15	1100	230	340	170	15	480	650	570	3,6	single-phase	55

¹Information on the mains voltage see page 30

*incl. air outlet (Ø 80 mm)

Universal Muffle Furnaces LA 11/11 und LA 11/12



LA 11/11



This universal muffle furnace, with its unbeatable price/performance ratio, can be used for numerous applications in research and in laboratory.

- 3-sided heating, from both sides and the bottom guarantees excellent temperature distribution
- hearth heating protected by an inserted base plate
- vent and exhaust openings
- double-walled casing for low outside temperatures
- casing manufactured from high-grade structured steel
- furnace chamber lined with high-quality insulating bricks
- door with fibre lining
- silent electronic relay
- digital temperature controller R 6 as basis, controller B 150 and C 250 as option
- for T_{max} 1100 °C and 1200 °C

Model	T_{max} °C	Inner dimensions in mm			Volume in L	Outer dimensions in mm			Power/kW	Supply voltage ¹	Weight in kg
		w	d	h		W	D	H			
LA 11/11	1100	210	230	210	11	485	425	565	3,0	single-phase	27
LA 11/12	1200	210	230	210	11	485	425	565	3,0	single-phase	27

¹Information on the mains voltage see page 30

Economy Laboratory Furnaces L 2/10 und L 4/10

If you only require a small chamber furnace for intermittent use at a low cost then our models L2 + L4 provide a viable alternative to our well established chamber furnaces

- double-walled casing for stability and low outside case temperature
- adjustable air inlet in the door
- casing manufactured from high grade structured stainless steel
- exhaust air outlet in the furnace rear wall
- hardened vacuum-fibre module with high resistance
- ceramic heating plates with built-in heating wire, easy to replace and very reasonably priced
- available with optional vent, vent with fan or fan with catalyst
- digital temperature controller R6
- silent electronic relay
- for T_{max} 1100 °C



L 2/10

Model	T_{max} °C	Inner dimensions in mm			Volume in L	Outer dimensions in mm			Power/kW	Supply voltage ¹	Weight in kg
w	d	h	W	D	H						
L 2/10	1000	160	140	100	2	380	370	420	1,2	single-phase	20
L 4/10	1000	200	170	130	4	440	470	520	2,4	single-phase	35

¹Information on the mains voltage see page 30

Special Furnaces with Ceramic Muffle L 9/11/SKM

Model L 9/11/SKM offers protection of the heater against aggressive substances emitted during the heating cycle. The hard wearing ceramic muffle also reduces wear and tear, and provides resistance to abrasion and vapour attack, minimising operating costs.

- casing manufactured from high grade structured stainless steel
- furnace chamber with ceramic retort, highly resistant against aggressive gases and vapours
- heating on all sides of the retort (i.e. from 4 sides)
- lockable air inlet opening in the furnace door
- exhaust air outlet in the furnace rear wall
- available with optional vent, vent with fan or fan with catalyst
- digital PID Controller B 170 with adjustable ramp, holding temperature and holding time as standard. Optional Controller P 320 with 9 programs, each with 4 ramps and holding times
- for T_{max} 1100 °C



L 9/11/SKM

Model	T_{max} °C	Inner dimensions in mm			Volume in L	Outer dimensions in mm			Power/kW	Supply voltage ¹	Weight in kg
w	D	h	W	D	H						
L 9/11/SKM	1100	230	240	170	9	480	550	570	3,0	single-phase	50

¹Information on the mains voltage see page 30



ceramic retort with heating on all sides

Furnaces with weighing device L 9/11/SW



L 9/11/SW



PC software for documenting the temperature curve and the loss by combustion

Based on the muffle furnace L9/11 this unit was developed to incorporate a built-in precision weighing system. It is ideal for laboratory use in determining combustion weight losses

- standard furnace is identical to model L9/11 (see page 4)
- ceramic duct through the furnace bottom
- weighing platform with high strength special ceramic connecting rod and pad
- balance to accommodate loads between 600g* and 3100g. in increments of 0.01g/0.1g.
- Controller P 320 with 9 programs, each with 4 ramps and holding times
- PC software for documenting the temperature curve and the loss by combustion
- for T_{max} 1100 °C

* Values in the incremental range

Model	T _{max} °C	Inner dimensions in mm			Volume in L	Outer dimensions in mm			Power/kW	Supply voltage ¹	Weight in kg
		w	d	h		W	D	H			
L 9/11/SW	1100	230	240	170	9	480	550	800	3,0	1phasig	55

¹Information on the mains voltage see page 30

Accessories for Muffle Furnaces

Heat-proof gloves for operator protection during charging/discharging products from the hot furnace, resistant up to 600 °C and/or 900 °C.



Gloves, $T_{\max}$ 600 °C



Gloves, $T_{\max}$ 900 °C



Various **tongs** for safe and easy loading/unloading of the furnace

Make your choice from various **base plates** and **collecting trays** to protect your furnace and to allow easy charging (available for models L 3 - L 40).



Ceramic plate with ribbed surface



Ceramic collecting tray



Steel collecting tray



Vent for the connection to an exhaust air outlet.



Vent with fan to improve the discharge of exhaust air from the furnace.



Catalyst for cleaning organic waste gases. A built-in heater ensures the optimum pre-warming of waste gases or exhaust air. Tried and tested thousands of times in dental laboratories, this universal catalyst can also be used for many other laboratory applications.

Muffle Furnaces with Brick Insulation N 7/H - N 61/H



N 7/H as bench-top model



N 41/H

This range of furnaces is designed for workshop use and other harsh environments and processes which demand hard wearing brick insulation. The robust insulation of lightweight refractory bricks is able to withstand heavy loads associated with the heat treatment of metals and is suitable for even the most demanding applications

- 3-sided heating, from both sides and the bottom
- underhearth heating protected by thermostable SiC plate
- multilayer insulation of high-quality lightweight refractory bricks in the furnace chamber
- exhaust opening in the furnace side, from N 31 onwards in the rear wall
- Controller B 150 or C 250 mounted on the furnace side
- parallel guided door, which opens downwards
- base from model N 31/H onwards included

Model	T _{max} °C	Inner dimensions in mm			Volume in L	Outer dimensions in mm			Power/kW	Supply voltage ¹	Weight in kg
w	d	h	W	D	H						
N 7/H	1280	250	250	120	7	720	640	510	3,0	single-phase	60
N 11/H	1280	250	350	140	11	720	740	510	3,6	single-phase	70
N 11/HR	1280	250	350	140	11	720	740	510	5,5	3-phase*	70
N 17/H	1280	250	500	140	17	720	890	510	5,5	3-phase*	90
N 17/HR	1280	250	500	140	17	720	890	510	6,5	3-phase*	90
N 31/H	1280	350	350	250	31	840	950	1320	13,0	3-phase	210
N 41/H	1280	350	500	250	41	840	1100	1320	15,0	3-phase	260
N 61/H	1280	350	750	250	61	840	1350	1320	20,0	3-phase	400

¹Information on the mains voltage see page 30

*heating only between 2 phases

Hardening Shop auxiliary Equipment

Annealing box

- annealing box with and without protective gas inlet up to 1100 °C for models N 7/H to N 61/H for annealing under protective gas or in powder



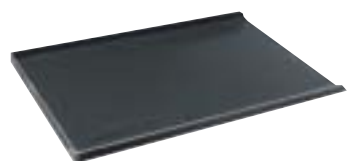
Annealing hood

- annealing hood up to 1200 °C with protective gas inlets for models N 7/H to N 41/H for annealing and hardening under protective gas



Hearth plates

- hearth plates up to 1100 °C for protecting the furnace hearth for models N 7/H to N 61/H, edges on 3 sides



Hardening tongs

- hardening tongs in various shapes and sizes for annealing and hardening



Hardening foil

- foil for non-oxidising annealing and hardening of steels up to 1200 °C



Gloves

- heat-resistant gloves suitable for 600 or 900 °C



For further details please ask for our separate data sheet.

Universal Tube Furnaces R 30/250/12 - R 100/1000/13 for horizontal Operation



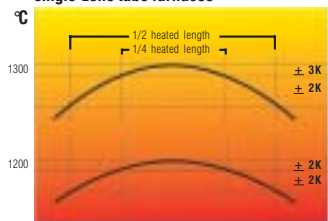
R 30/250/12, single-zone



R 60/750/13, three-zone

These compact bench top furnaces are the ideal introduction to our wide range of tube furnaces. Even the standard version is provided with a work tube made of Sillimantin 60 and two locking end plugs to enable many conventional laboratory applications to be performed

Temperature uniformity, single-zone tube furnaces



Heated length

- casing manufactured from high grade structured stainless steel
- tube diameters between 30 and 100 mm, heated lengths between 250 and 1000 mm
- work tube made of Sillimantin 60 and two locking end plugs included as standard
- silent electronic relay
- digital PID Controller B 170 with adjustable ramp, holding temperature and holding time as standard.
- optional Controller P 320 with 9 programs, each with 8 segments
- optional three-zone model with Controller C 40 as master Controller and 2 x zone Controllers C 6z (from a heated length of 750 mm and above for 1300 °C models)
- available for T_{max} 1200 °C or 1300 °C

Additional accessories, see page 17.

Model	T _{max} °C	Outer dimensions in mm			Tube-Ø mm	Heated length mm	Uniform zone +/-5Kmm	Supply voltage ¹	Power/kW	Weight in kg
		W	D	H						
R 30/250/12	1200	400	240	490	30	250	125	single-phase	1,2	20
R 40/250/12	1200	400	240	490	40	250	125	single-phase	1,2	20
R 30/500/12	1200	650	240	490	30	500	250	single-phase	1,8	25
R 40/500/12	1200	650	240	490	40	500	250	single-phase	1,8	25
R 60/750/12	1200	1000	360	640	60	750	375	single-phase	3,6	80
R 80/750/12	1200	1000	360	640	80	750	375	single-phase	3,6	80
R100/1000/12	1200	1300	420	730	100	1000	500	3-phase	6,0	170
R 30/250/13	1300	400	240	490	30	250	125	single-phase	1,3	35
R 40/250/13	1300	400	240	490	40	250	125	single-phase	1,3	35
R 30/500/13	1300	650	240	490	30	500	250	single-phase	1,8	48
R 40/500/13	1300	650	240	490	40	500	250	single-phase	1,8	48
R 60/750/13 *	1300	1000	360	640	60	750	375	3-phase	4,4	120
R 80/750/13 *	1300	1000	360	640	80	750	375	3-phase	4,4	120
R100/1000/13 *	1300	1300	420	730	100	1000	500	3-phase	6,5	230

¹Information on the mains voltage see page 30

*these models are also available as 3-zone versions

Box-Type Furnaces RS 50/300/11 - RS 100/750/13 for horizontal or vertical Operation respectively



RS 50/300/11 for horizontal operation



RS 50/300/11 with tripod as
additional fitting for vertical operation

Since switchgear and controller are separate from the furnace, these tube furnaces can be operated either horizontally or vertically. Different frames are available for vertical operation.

- solid construction
- available for horizontal or vertical operation
- optional frames for vertical operation
- suitable for gas-tight or vacuum operation (see accessories of tube furnaces)
- T_{max} 1100 °C models designed as hinged furnaces with half shell modules for heater and insulation
- T_{max} 1300 °C models as closed versions with circular modules arranged around the work tube
- optional three-zone model with Controller C 40 as master Controller and 2 x zone Controllers C 6z
- different tubes can be supplied as option

Additional accessories, see page 17.

Model	T _{max} °C	Outer dimensions ³ in mm			for Tube-Ø mm	Heated length mm	Tube length mm	Supply voltage ¹	Power/kW	Weight in kg
		W ²	D	H						
RS 50/300/11	1100	552	430	377	50	300	650	single-phase	1,6	80
RS 50/500/11	1100	750	430	377	50	500	850	single-phase	3,2	90
RS 50/750/11	1100	1002	430	377	50	750	1100	single-phase	4,0	100
RS 70/500/11	1100	752	440	387	70	500	850	single-phase	3,4	90
RS 70/750/11	1100	1002	440	387	70	750	1100	single-phase	4,6	100
RS 100/500/11	1100	756	500	447	100	500	850	single-phase	4,8	90
RS 100/750/11	1100	1003	500	447	100	750	1100	3-phase*	7,0	100
RS 100/1000/11	1100	1265	500	450	100	1000	1350	3-phase*	10,8	110
RS 50/300/13	1300	552	450	397	50	300	650	single-phase	3,3	80
RS 50/500/13	1300	752	450	397	50	500	850	single-phase	5,2	90
RS 50/750/13	1300	1002	450	397	50	750	1100	single-phase	8,0	100
RS 70/500/13	1300	752	460	407	70	500	850	single-phase	6,7	90
RS 70/750/13	1300	1002	460	407	70	750	1100	3-phase*	10,0	100
RS 100/500/13	1300	756	520	467	100	500	850	3-phase*	7,1	90
RS 100/750/13	1300	1006	520	467	100	750	1100	3-phase*	11,6	100

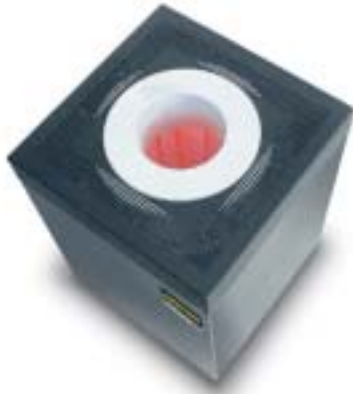
¹Information on the mains voltage see page 30

³Outer dimensions for vertical operation can be provided on inquiry

²without tube

*heating only between 2 phases

High Temperature Tube Furnaces HTRH and HTRV for horizontal or vertical operation respectively



Tube furnace **HTRV 150-500/17**



Tube furnaces with vacuum flange as additional fitting

Turn-key high-temperature tube furnaces in vertical (type HTRV) as well as horizontal (type HTRH) design can be supplied for temperatures up to 1800 °C. High quality insulation materials from vacuum shaped fibre boards provide for energy saving usage and high heating rates due to low stored heat and heat conductivity.

- rectangular exterior housing with perforated sheet metal for convection cooling
- vacuum shaped ceramic fibre boards as insulation
- MoSi₂ heating elements, hanging from ceiling, easy to exchange
- control thermocouple type B
- power unit with low voltage transformer and thyristors
- temperature limiter type B

Additional accessories, see page 17.

Horizontal model

Model	T _{max} °C	Outer dimensions in mm			Tube-Ø mm	Heated length	Supply voltage ¹	Power/kW	Weight in kg
		W	D	H					
HTRH 40-100	1600 or 1700 or 1800	420	390	510	40	100	single-phase	2,2	45
HTRH 40-250		420	540	510	40	250	3-phase*	3,6	60
HTRH 40-500		420	790	510	40	500	3-phase*	8,0	90
HTRH 70-150		520	450	620	70	150	3-phase*	4,5	65
HTRH 70-300	1700 or 1800	520	590	620	70	300	3-phase*	6,4	90
HTRH 70-600		520	890	620	70	600	3-phase*	8,0	120
HTRH 100-150		520	450	620	100	150	3-phase*	4,8	65
HTRH 100-300		520	590	620	100	300	3-phase*	7,5	90
HTRH 100-600	1800	520	890	620	100	600	3-phase*	10,9	120
HTRH 150-300		570	590	670	150	300	3-phase*	8,0	140
HTRH 150-600		570	890	670	150	600	3-phase*	12,0	180
HTRH 200-300		620	590	720	200	300	3-phase*	10,0	140
HTRH 200-600		620	890	720	200	600	3-phase*	12,0	180

Vertical model

Model	T _{max} °C	Outer dimensions in mm			Tube-Ø mm	Heated length	Supply voltage ¹	Power/kW	Weight in kg
		W	D	H					
HTRV 40-100	1600 or 1700 or 1800	425	425	365	40	100	single-phase	2,0	30
HTRV 40-250		425	425	515	40	250	single-phase	3,0	40
HTRV 40-500		425	425	765	40	500	3-phase*	6,0	65
HTRV 70-100		425	425	365	70	100	single-phase	3,0	30
HTRV 70-250	1700 or 1800	425	425	515	70	250	3-phase*	4,8	40
HTRV 70-500		425	425	765	70	500	3-phase*	8,0	65
HTRV 100-250		455	455	515	100	250	3-phase*	6,4	45
HTRV 100-500		455	455	765	100	500	3-phase*	10,4	70
HTRV 150-250	1800	510	510	515	150	250	3-phase*	8,0	55
HTRV 150-500		510	510	765	150	500	3-phase*	12,0	80
HTRV 200-250		560	560	515	200	250	3-phase*	10,0	70
HTRV 200-500		560	560	765	200	500	3-phase*	18,5	95

¹Information on the mains voltage see page 30

*heating only between 2 phases

Universal Tube Furnaces RO for horizontal and vertical Operation

These compact tube furnaces are used to enable laboratory experiments to be carried out in either a horizontal or vertical position or at a particular angle

- simple and compact construction
- Controner C 6 with three term PID microprocessor
- suitable for vertical or horizontal operation
- scope of delivery ready for operation, incl. operational tube
- available for T_{max} 1100 °C, 1300 °C or 1500 °C

Additional accessories, see page 17.

Model	T_{max} °C	Outer dimensions in mm			Tube-Ø mm	Heated length mm	Tube length mm	Supply voltage ¹	Power/kW	Weight in kg
		W	D	H						
RO 50-250/11	1100	580	450	750	50	250	360	single-phase	1,8	23
RO 50-250/13	1300	580	450	750	50	250	360	single-phase	1,8	40
RO 30-200/15	1500	580	450	750	30	200	360	single-phase	2,0	48

¹Information on the mains voltage see page 30



RO 50-250/11

Universal High-Temperature Tube Furnaces HTSS with SiC-Rod heating for horizontal Operation



HTSS 75-610

These powerful laboratory tube furnaces can be used for temperatures up to 1600 °C. A short heating-up and cooling time as well as an optimum temperature distribution can be guaranteed through the use of SiC rods.

- vertical or horizontal operation freely selectable
- short heating-up and cooling times
- supplied without work tube (work tubes please refer to „Accessories for tube furnaces“)
- power of switchgear with semiconductor relay adjusted to the SiC-rods
- digital PID controller with adjustable ramp, holding temperature and holding time as standard
- available for T_{max} 1600 °C

Additional accessories, see page 17.

Model	T_{max} °C	Outer dimensions in mm			Tube-Ø mm	Heated length mm	Tube length mm	Supply voltage ¹	Power/kW	Weight in kg
		W*	D	H						
HTSS 75-180	1600	620	600	520	75	180	600	single-phase	4	50
HTSS 75-450	1600	620	900	520	75	450	900	3-phase*	6	70
HTSS 75-610	1600	620	1200	520	75	610	1200	3-phase*	7	90

¹Information on the mains voltage see page 30

*without control 420 mm

*heating only between 2 phases



HTRV-A 70-250/16

Testing Furnaces HTRV-A

This series of vertical tube furnaces with hinged opening is ideal for in material test rigs with oxidizing atmospheres and maximum temperatures up to 1800 °C.

- compact unit with low overall height
- easy to install in test rigs
- fast heating and cooling possible
- excellent temperature uniformity
- additional apertures for specific measuring instruments available as options on request
- standard versions up to 1700 °C with 1800 °C available as an option

Additional accessories, see page 17.

Model	T _{max} °C	Outer dimensions/ mm		Tube-Ø mm	Heated length mm	Tube length mm	Supply voltage ¹	Power/kW	Weight in kg
		Ø	H						
HTRV-A 70-250/16	1600	420	600	70	250	600	3-phase*	6,0	45
HTRV-A 70-250/17	1700	420	600	70	250	600	3-phase*	6,0	45

¹Information on the mains voltage see page 30

*heating only between 2 phases

Rotary Tube Furnaces DRSR



DRSR-A 70-500/11

Rotary tube furnaces are often used for the continuous drying of granules under a protective atmosphere and where it is important to maintain the characteristic of a single grain structure. The furnace provides a laboratory scale simulation of industrial rotary calcining kilns and is also suitable for the controlled heat treatment of pigments.

- compact unit designed for bench-top use
- includes quartz reactor with built-in ribs as standard
- hinged lid for easy access for insertion and removal of the quartz vessel
- rotational speed can be continuously set in the range 1-20 rpm
- continuous drive with gas inlet
- excellent flushing of the product with process gas via inlet and outlet connections
- for T_{max} 1100 °C

Additional accessories, see page 17.

Model	T _{max} °C	Outer dimensions in mm			Tube-Ø mm	Heated length mm	Tube length mm	Supply voltage ¹	Power/kW	Weight in kg
		W	D	H						
DRSR-A 70-500/11	1100	650(1200) (with rotary tube)	480	400	70	500	Reactor	single-phase	3,0	30

¹Information on the mains voltage see page 30

Accessories for Tube Furnaces



Fibre plugs of heat-resistant ceramic fibre with glued-in gas inlet or outlet tube for simple application under protective gas.



Vacuum pumps for connecting to a vacuum flange unit.



Ceramic work tube in different material qualities 530, 610 and 799 according to DIN VDE 0335 as well as in CrFeAl.



Standard gas supply for use in a defined atmosphere for one gas. Rotameter with hose nozzles, plastic hoses, clamps and angles for fastening according to local conditions.



Fibre plugs with different diameters for closing the tube ends.



Automatic gas supply device consisting of: pressure reducer, flow meter, solenoid valves, time switch clock.



Sliver protection for split-type tube furnaces for protection of the heating elements and as a supporting surface for the test material.



Radiation protection packets for optimisation of the temperature profile for applications with vacuum-/protective gas fittings.



Water-cooled end-flanges for high-vacuum up to 10⁻⁵ mbar. With central small flange e.g. for connecting a vacuum pump.



Snap buckles of the flange for vacuum/protective gas operation.

Availability Matrix

Model										
R..	X	X					X	X		
RS..	X	X		X			X	X		
HTRH ..	X	X			X	X	X	X	X	X
HTRV..	X	X			X	X	X	X	X	X
RO..	X	X	X				X	X		
R..SiC	X	X			X	X	X	X		X
HTRV-A..	X	X	X		X	X	X	X	X	X
DRSR..							X	X		
HTSS..		X								

X = as an option



- Made in Germany – Used World-Wide
- High-Tech from Tradition
- Thermal Engineering
- Leaders in Engineering and Innovation

Universal Drying Ovens TR 60 - TR 1050



TR 420



TR 60

These drying ovens can be used for applications up to 300 °C max and provide excellent temperature uniformity over the entire chamber. Several shelf positions permit charging at different levels

- compact construction, bench top models (TR 1050 as free-standing model)
- available in different dimensions
- horizontal air circulation with temperature uniformity better than ± 4 °C
- several shelf positions for flexibility of loading
- furnace chamber manufactured from 1.4301 stainless steel
- digital PID Controller B 170 with an adjustable ramp, holding temperature and holding time as standard, optionally equipped with Controller P 320 with 9 programs with 4 ramps and holding times each
- for T_{max} 300 °C

Model	T_{max} °C	Inner dimensions in mm			Volume in L	Outer dimensions in mm			Power/kW	Supply voltage ¹	Plates incl.	Plates max.	Total charge ² max.	Weight in kg
TR 60	300	490	360	340	60	650	550	640	2,1	single-phase	1	4	120	45
TR 120	300	600	360	480	105	750	550	780	2,1	single-phase	2	7	150	70
TR 240	300	700	550	640	240	860	730	940	3,1	single-phase	2	9	150	100
TR 420	300	710	550	1080	420	860	830	1370	4,0	3-phase	3	17	150	120
TR 1050	300	1240	570	1510	1050	1430	860	1920	6,3	3-phase	4	22	170	380

¹Information on the mains voltage see page 30

²loading capacity per level max. 30 kg

Air Circulation Furnaces N 15/65HA, N 30/45HA - N 120/85HA



N 15/65HA



N 60/65HA with atmosphere box as additional fitting

For excellent temperature uniformity for heat treatment applications such as tempering or annealing, these models with horizontal air circulation are the ideal solution.

- the N 15/65A is a bench-top model, all other sizes and temperature ranges are free standing, incorporating a base frame
- horizontal air circulation for excellent temperature distribution. Better than $\pm 4\text{ }^{\circ}\text{C}$ within the working space (without load)
- charging of several levels through shelves possible. In the case of the models N 30/.. - N 120/.. there is already one plate included in the supplied kit.
- furnace chamber manufactured from stainless steel
- digital Controller B 159 as regular equipment (B 170 on N 15/65HA), C 250 as option
- available for T_{max} up to $450\text{ }^{\circ}\text{C}$ or $650\text{ }^{\circ}\text{C}$ or $850\text{ }^{\circ}\text{C}$

Model	T_{max} $^{\circ}\text{C}$	Inner dimensions in mm			Volume in L	Outer dimensions in mm			Power/kW	Supply voltage ¹	Weight in kg
		w	d	h		W	D	H			
N 30/45HA	450	290	420	260	30	607 + 255	1175	1315	3,0	single-phase	195
N 60/45HA	450	350	500	350	60	667 + 255	1250	1400	3,6	single-phase	240
N 120/45HA	450	450	600	450	120	767 + 255	1350	1500	7,0	3-phase*	310
N 15/65HA ²	650	295	340	170	15	470	875	460	3,0	single-phase	55
N 30/65HA	650	290	420	260	30	607 + 255	1175	1315	3,6	single-phase	195
N 60/65HA	650	350	500	350	60	667 + 255	1250	1400	6,6	single-phase	240
N 120/65HA	650	450	600	450	120	767 + 255	1350	1500	9,6	3-phase	310
N 30/85HA	850	290	420	260	30	607 + 255	1175	1315	6,1	3-phase	195
N 60/85HA	850	350	500	350	60	667 + 255	1250	1400	9,6	3-phase	240
N 120/85HA	850	450	600	450	120	767 + 255	1350	1500	13,6	3-phase	310

¹Information on the mains voltage see page 30

²Desk-top device

*heating only between 2 phases

Chamber Furnaces LH 15/12 - LH 120/14



Parallel swivel door for opening while in operation

These chamber furnaces are perfectly suited for simulating firing processes from production. The 5-side heating and the sturdy insulation with lightweight refractory bricks make these kilns a must for every laboratory.



LH 30/13

- 5-side heating for an exceptionally good heat distribution uniformity
- available for 1200, 1300 and 1400 °C
- heating elements on support tubes provide for free heat radiation and a long service life
- short heating-up times due to high connected power
- vapour vent on side with bypass connection for exhaust pipe
- self-supporting arch-shaped roof provides for high stability and optimum dust avoidance
- door sealed brick-on-brick, professionally adjusted
- quick-release door
- infinitely variable air-inlet damper
- multi-layer, fibre-free insulation made of lightweight refractory bricks and special rear insulation
- stand included
- floor heating elements protected by inlaid SiC plate providing level stacking support
- digital PID Controller B 150 with adjustable ramp, holding temperature and holding time as standard.
- optional Controller C 250 with 9 programs, each with 12 segments

Extras

- parallel swivel door, swivelling away from user, allows for opening during firing cycle
- automatic vapour vent flap
- fibre insulation in place of brick insulation for shorter heating-up and cooling-down cycles
- cooling fan
- 3-side heating with SiC rods instead of wire for faster heating-up times and max. temperatures of up to 1500 °C



LF 60/15 with fibre insulation and heating with SiC-rods as option

Model	T _{max} ² °C	Inner dimensions in mm			Volume in L	Outer dimensions in mm			Power/kW	Supply voltage ¹	Weight in kg
		w	d	h		W	D	H			
LH 15/12	1200	250	250	250	15	570	790	1170	5,0	3-phase*	150
LH 30/12	1200	320	320	320	30	640	860	1240	7,0	3-phase*	170
LH 60/12	1200	400	400	400	60	720	1010	1320	8,0	3-phase	260
LH 120/12	1200	500	500	500	120	820	1110	1420	12,0	3-phase	340
LH 15/13	1300	250	250	250	15	570	790	1170	7,0	3-phase*	150
LH 30/13	1300	320	320	320	30	640	860	1240	8,0	3-phase*	170
LH 60/13	1300	400	400	400	60	720	1010	1320	11,0	3-phase	260
LH 120/13	1300	500	500	500	120	820	1110	1420	15,0	3-phase	340
LH 15/14	1400	250	250	250	15	570	790	1170	8,0	3-phase*	150
LH 30/14	1400	320	320	320	30	640	860	1240	10,0	3-phase*	170
LH 60/14	1400	400	400	400	60	720	1010	1320	12,0	3-phase	260
LH 120/14	1400	500	500	500	120	820	1110	1420	18,0	3-phase	340

¹Information on the mains voltage see page 30

²T_{max} 1500 °C with SiC-heating can be supplied on request

*heating only between 2 phases

Melting Furnaces K 1/10 - K 4/13



K 1/10



These compact melting furnaces with numerous technical advantages satisfy the demands in melting of non ferrous metals for laboratory applications. Designed for bench mounted operation these units can be used for a wide range of applications. The handy tilting aid, operated via hydraulic shock absorbers, makes pouring easier and safe when casting molten metal.

- crucible with 1, 2 and 4 litres capacities
- crucible with pouring spout included as standard
- compact bench-top design, crucible can easily be emptied by use of the tilting mechanism with hydraulic support
- top of crucible insulated with a hinged lid
- digital controller for regulating the furnace chamber temperature, included as standard
- controller C 6 included in delivery
- available for max. furnace chamber temperatures of 1000 °C or 1300 °C
(melting temperature is approx. 80-110 °C lower)

Model	T _{max} °C	Crucible	Volume in L	Outer dimensions in mm			Power/kW	Supply voltage ¹	Weight in kg
				W	D	H			
K 1/10	1000	A6	1,0	520	680	660	3,0	single-phase	85
K 2/10	1000	A10	2,0	520	680	660	3,0	single-phase	90
K 4/10	1000	A25	4,0	570	755	705	3,3	single-phase	110
K 1/13 ²	1300	A6	1,0	520	680	660	3,0	single-phase	120
K 2/13 ²	1300	A10	2,0	520	680	660	3,0	single-phase	125
K 4/13 ²	1300	A25	4,0	570	755	705	5,5	3-phase*	170

¹Information on the mains voltage see page 30

²Outer dimensions plus transformer in separate housing

*heating only between 2 phases

Assay Furnaces Cupellation N 90/HS and N 110/HS



N 110/HS1 with lifting door for gold melting trials



N 110/HS

This series is ideal for the assay of precious metal samples by the cupellation method and other processes where it is essential to protect the insulation and the heating elements from harmful process gases and vapours. The furnace chamber forms a ceramic retort which is easy to replace.

- heating elements and insulation protected by a ceramic retort
- heating on all 4 sides around the ceramic retort
- small loading aperture with pull-out plug
- chimney for connection to an exhaust vent for the extraction of fumes
- controller C 40 together with switchgear housed in separate wall mounting cabinet
- for $T_{\max}$ 1300 °C

Model	$T_{\max}$ °C	Inner dimensions in mm			Volume in L	Outer dimensions in mm			Power/kW	Supply voltage ¹	Weight in kg
		w	d	h		W	D	H			
N 90/HS	1300	190	250	80	4	660	790	1435	20	3-phase	270
N 110/HS	1300	260	340	95	8	760	790	1435	22	3-phase	310

¹Information on the mains voltage see page 30

SiC-rod heated Chamber Furnaces HTC 03/14 - HTC 08/16



HTC 08/15



The furnace chamber is insulated with high quality fibre material and the heating elements are positioned at the sides of the chamber.

These general purpose high temperature chamber furnaces are heated with silicon carbide heating elements which are able to withstand the demanding conditions and firing cycles of various laboratory furnace applications. The heating elements provide fast heat up times - typically 40 minutes to 1400 °C depending on the model and conditions of operation. They also have a long service life and remain stable throughout their temperature range.

- double walled casing for stability and low outer case temperature
- adjustable air inlet in the door
- casing manufactured from high grade structured stainless steel plate
- high quality fibre insulation suitable for the respective operating temperatures
- performance of switchgear with semi-conductor relays harmonize with SiC rods
- simple replacement of the heating rods
- Controller P 320 with 9 programs, each with 4 ramps and dwells
- available for T_{max} 1400 °C, 1500 °C or 1600 °C

Model	T_{max} °C	Inner dimensions in mm			Volume in L	Outer dimensions in mm			Power/kW	Rated power Furnace/kW	Supply voltage ¹	Weight in kg
HTC 03/14	1400	120	210	120	3	400	510	500	9,0	4,5	3-phase	30
HTC 08/14	1400	170	290	170	8	450	610	550	10,5	5,5	3-phase	40
HTC 03/15	1500	120	210	120	3	400	510	500	9,0	4,5	3-phase	30
HTC 08/15	1500	170	290	170	8	450	610	550	10,5	5,5	3-phase	40
HTC 03/16	1600	120	210	120	3	400	510	500	9,0	4,5	3-phase	30
HTC 08/16	1600	170	290	170	8	450	610	550	10,5	5,5	3-phase	40

¹Information on the mains voltage see page 30

High-Temperature Furnaces Bench-Top Models LHT 02/16 - LHT 08/18



LHT 04/17

Designed as bench-top models these compact high temperature furnaces contain numerous advantages supported by proven performance in specialised research and other laboratories. The first class processing of high quality materials, combined with ease of operation make these furnaces the ideal solution for a variety of applications. These furnaces are also optimally suitable for sintering of ceramics for dental applications, e.g. tooth bridges of zirconia.

- furnace capacities 2, 4 or 8 litres
- parallel swing door, guided by chain, allows safe opening and closing without damaging the fibre insulation. It also offers protection for the operator with the hot face door insulation away from the user
- casing manufactured from high grade structured stainless steel
- type B thermocouple
- furnace chamber insulation of high quality ceramic fibre designed for long life
- high quality molybdenum disilicide heating elements
- controller C 42 included as standard
- available for T_{max} 1600 °C, 1750 °C or 1800 °C



Parallel swivel door for opening during firing cycle

Model	T_{max} °C	Inner dimensions in mm			Volume in L	Outer dimensions in mm			Power/kW	Supply voltage ¹	Weight in kg	Aufheizzeit bis T_{max}
		w	d	h		W	D	H				
LHT 02/16	1600	90	150	150	2	655	370	575	3,0	single-phase	75	30
LHT 04/16	1600	150	150	150	4	655	370	575	5,0	single-phase	85	25
LHT 08/16	1600	150	300	150	8	655	520	575	8,0	3-phase	100	25
LHT 02/17	1750	90	150	150	2	655	370	575	3,0	single-phase	75	60
LHT 04/17	1750	150	150	150	4	655	370	575	5,0	3-phase	85	40
LHT 08/17	1750	150	300	150	8	655	520	575	8,0	3-phase	100	40
LHT 02/18	1800	90	150	150	2	655	370	575	3,6	single-phase	75	75
LHT 04/18	1800	150	150	150	4	655	370	575	5,0	3-phase	85	60
LHT 08/18	1800	150	300	150	8	655	520	575	9,0	3-phase	100	60

¹Information on the mains voltage see page 30



HT 16/17

High-Temperature Furnaces, free standing Models HT 04/16 - HT 16/18

These high temperature furnaces are solid in construction and designed as free standing models, suitable for laboratory processes requiring the highest precision.

- furnace capacities between 4 and 16 litres
- parallel swivel door, guided by chain allows safe opening and closing without damaging the insulation.
Screw cap fixing ensures safe door closure
- type B thermocouple
- temperature selection limiter for protection of the load included as standard
- furnace chamber insulated with first class long-life fibre insulation
- extras include protective gas connections and cooling fans available as options
- high quality molybdenum disilicide heating elements
- controller C 42 included as standard
- available for T_{max} 1600 °C, 1750 °C or 1800 °C

Model	T _{max} °C	Inner dimensions in mm			Volume in L	Outer dimensions in mm			Power/kW	Supply voltage ¹	Weight in kg	Heating-up time bio T _{max}
		w	d	h		W	D	H				
HT 04/16	1600	150	150	150	4	610	470	1400	5,0	3-phase	150	25
HT 08/16	1600	150	300	150	8	610	610	1400	8,0	3-phase	200	25
HT 16/16	1600	200	300	260	16	710	650	1500	12,0	3-phase	270	25
HT 04/17	1750	150	150	150	4	610	470	1400	5,0	3-phase	150	40
HT 08/17	1750	150	300	150	8	610	610	1400	8,0	3-phase	200	40
HT 16/17	1750	200	300	260	16	710	650	1500	12,0	3-phase	270	40
HT 04/18	1800	150	150	150	4	610	470	1400	5,0	3-phase	150	40
HT 08/18	1800	150	300	150	8	610	610	1400	8,0	3-phase	200	40
HT 16/18	1800	200	300	260	16	710	650	1500	12,0	3-phase	270	40

¹Information on the mains voltage see page 30



Automatic vapour vent flap



Cooling fan

Extras

All furnaces from our extensive range can be supplied with extra options to meet your specific processing requirements.

- bottom reinforcement to accommodate very heavy loads
- manual or automatically controlled exhaust air lid for improved ventilation of the furnace chamber
- fan for improved ventilation of the combustion chamber and for faster cooling of the furnace
- gas connection and sealing of the furnace casing to permit purging with protective gases

If you require assistance to determine the most appropriate model from this series, we are at your disposal!

High-Temperature Protective Gas Vacuum Top-Loader LHTW and LHTG



LHTG 60-80



LHTG 100-200



Graphite heating chamber



Molybdenum/Tungsten heating chamber

The LHTG series is optimally suited for laboratory trials in defined atmosphere and under vacuum as a cost efficient solution. Due to their compact exterior dimensions and diverse application profile up to 2000 °C (W) or 3000 °C (G) these furnaces are true all-rounders for ceramic processes.

- Graphite (LHTG) or tungsten (LHTW) insulation and heating elements
- Vacuum container with lid lock
- Lid and housing water-cooled
- Thermocouple: type C up to 2000 °C, IR-radiation pyrometer from 2000 °C onwards
- Gas supply for one gas (Ar) including rotameter and valves
- Vacuum pump for evacuation including pressure supply, pumping speed 4 m3/h, final pressure 0.1 mbar

Model	T _{max} °C	Effective space ² in mm		Volume ²	Outer dimensions in mm			Power/kW	Supply voltage ¹	Weight in kg
		Ø	h		W	D	H			
LHTW 60-80	2000	60	80	0,22	800	1500	1800	12	3-phase*	500
LHTG 60-80	3000	60	80	0,22	800	1500	1800	20	3-phase*	500
LHTG 100-200	3000	100	200	1,57	850	1500	1800	40	3-phase*	650
LHTG 200-300	3000	200	300	9,42	950	1600	1800	60	3-phase*	750

¹Information on the mains voltage see page 30

²Further effective volumes available upon request

*heating only between 2 phases



High-Temperature Protective Gas Vacuum Chamber Furnace HTK 8



HTK 8



Our range of laboratory furnaces is completed by the model HTK 8. The furnace is designed so that with selected attachments it is possible to assemble the furnace to perform different processes utilising various atmospheres, vacuum and application temperatures.

The model can be used for sintering metal carbides, such as tungsten carbide. However, it can also be used for sintering oxides or non-oxide materials in defined atmospheres. Also coarse, fine and high vacuum applications can be performed with the HTK 8. Have a word with us for further details!



Cooling water supply

- heating with either molybdenum disilicide (MoSi_2), molybdenum or graphite heating elements
- gassing installation with rotameter for non-flammable process gases included
- vacuum pumping for atmosphere changes and for rough vacuum applications, including pressure
- range 10^{-2} to 10^{-5} mbar (depending on the model)
- numerous accessories available on request
- available for T_{max} 1600 °C, 1800 °C or 2200 °C



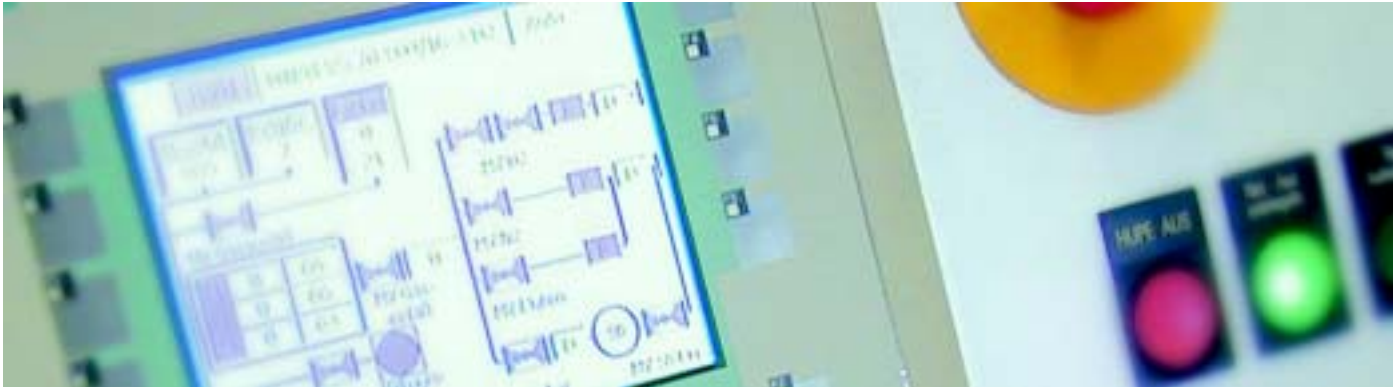
Graphite retort as option

Model	T_{max} °C	Inner dimensions in mm			Volume in L	Outer dimensions in mm			Power/kW	Supply voltage ¹	Weight in kg	Element material
HTK 8	1600	w	d	h		W	D	H				
HTK 8	1600	150	150	200	4,5	700	900	2000	25	3-phase*	500	Molybdenum
HTK 8	1800	150	150	200	4,5	700	900	2000	15	3-phase*	500	MoSi_2
HTK 8	2200	150	150	200	4,5	700	900	2000	25	3-phase*	500	Graphite

¹Information on the mains voltage see page 30

*heating only between 2 phases

Measuring and Regulation Technology



Standard Controller

Controller R 6

- digital temperature controller
- adjustable temperature
- manual switch-off

Controller B 170, B 150 and C 6:

Depending on the furnace construction and the installation location, these digital PID temperature controllers are used as the basic controllers for most laboratory furnaces.

- one freely settable program
- an adjustable heating-up ramp as well as holding time
- programmable starting time (not in C 6)
- can be calibrated (not in C 6)
- self-tune (not in C 6)
- RS 422 port optional
- integrated overtemperature monitoring (not in C 6)
- kWh-meter (not in C 6)
- operating hours counter (not in C 6)

Controller P 320:

- 9 programs storable
- 4 heating-up ramps as well as 4 holding times per program
- real-time clock with programmable start time
- linking of up to 3 programs
- simple operation
- programmable acoustic signal
- programmable outlet for fan and catalyser
- can be calibrated
- self-optimisation
- RS 422 for connecting to the Nabertherm software
- integrated overtemperature monitoring
- kWh-meter
- operating hours counter



Controller R 6



Controller B 170



Controller B 150



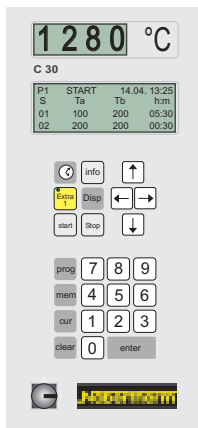
Controller C 6



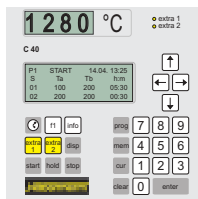
Controller P 320



Controller C 250



Controller C 30



Controller C 40



temperature selection limiter



Software Controltherm

Measuring and Regulation Technology

Controller C 250:

- 9 programs storable
- 6 ramps, 6 holding times per program
- programmable starting time
- can be calibrated
- self-tune
- simple operation
- 2 extra functions
- RS 422 interfaces optional
- integrated overtemperature monitoring
- kWh-meter
- operating hours counter

Controller C 30 and C40/C42:

- simple operation
- 9 freely storable programs with 18 segments each
- extra function (C 40/C 42: 2 extra functions)
- real-time clock with programmable start time
- LCD display for program depiction and continuous display of the actual temperature
- can be calibrated
- RS 422 for connecting to the Nabertherm software
- integrated overtemperature monitoring

As an option, we equip our furnaces with a **temperature selection limiter** for protecting the materials and furnace. Should the furnace exceed the safety temperature that has been set, this safety regulator switches off the heating of the furnace.

Software for monitoring, documentation and control

Documentation and reproducibility are gaining more and more importance for the quality assurance in the laboratory area. Here, the powerful **software Controltherm** developed by us provides you with the optimum solution.

Features:

- usable for Nabertherm Controllers/Controltherm with digital interface
- parallel operation/monitoring and documentation of up to 16 furnaces
- setting of programs
- archiving and printing of programs and graphics
- documentation of relevant operation data
- free input of texts (batch data)
- facilities for data evaluation
- start/stop of the Controller from the PC
- data convertible into Excel format

Mains Voltages for Nabertherm Laboratory Furnaces

Single-phase: All furnaces are available for mains voltages of 110 V (up to 2.2 kW) to 240 V, 50 or 60 Hz.

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

Survey of the Nabertherm Product Spectrum

Arts & Crafts

No matter if for pottery, glass or porcelain painting, fusing or for enameling we have the right kiln for your demands.

www.nabertherm.com/Products/Ceramics/Arts & Crafts



Glass

Different furnace concepts for bending, slumping, decorating, tempering and fusing characterise Nabertherm as your strong partner for heat treatment of glass.

www.nabertherm.com/Products/Glass



Ceramics

Starting from a small laboratory furnace and ending-up at fully automatic high-temperature furnace plants with afterburning systems of exhaust gases, our product range covers all demands.

www.nabertherm.com/Products/Ceramics/Industry- and Technical Ceramics



Heat Treatment of Metals

Tempering, Ageing, Annealing, Hardening, Nitriding, Brazing under protective gas, Tempering, Drying, Quenching and Tempering – these are only a few of the applications that can be realised by our full range of furnaces and plants for heat treatment of metals.

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info@nabertherm-cn.com
info@nabertherm.fr
info@nabertherm.ch
contact@nabertherm.co.uk
contact@nabertherm-usa.com
info@nabertherm.es

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References

