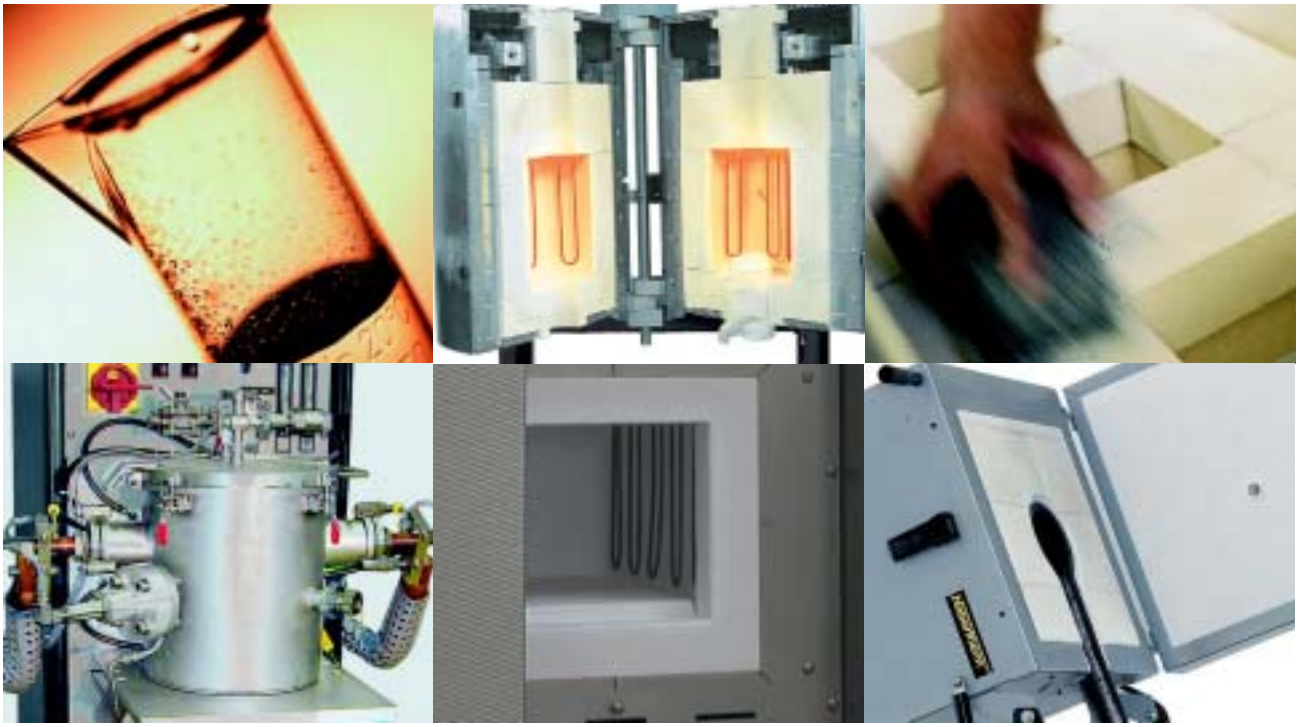
Nabertherm

MORE THAN HEAT 30-3000 °C

# Laboratory



**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.

Nabertherm
MORE THAN HEAT 30-3000 °C

# Contents







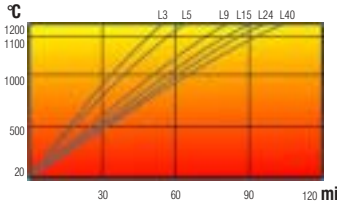

# The All-Rounders: Muffle Furnaces L 3/.. - L 40/..

L 5/11


L 3/12

Inlet air opening in the door

**Heating-up time** (empty furnace)




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

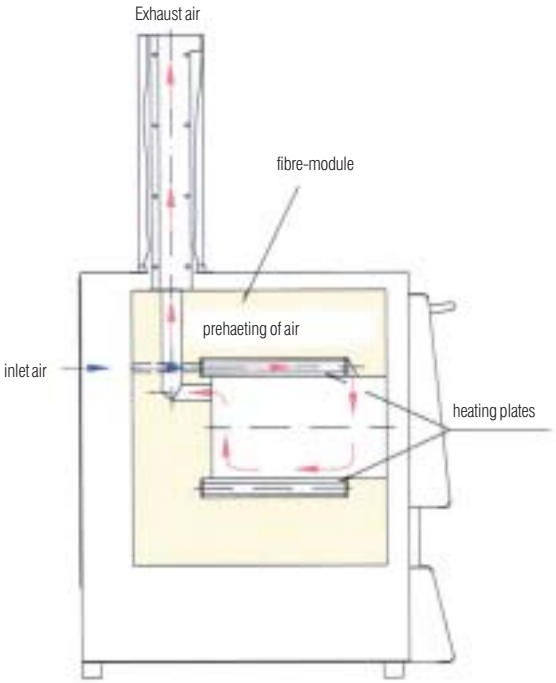
| Model | $T_{max}$ °C | Inner dimensions in mm w | d | h | Volume in L | Outer dimensions in mm W | D | H | Power/kW | Supply voltage[1] | Weight in kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| L 3/11 | 1100 | 160 | 140 | 100 | 3 | 380 | 370 | 420 | 1,2 | single-phase | 20 |
| L 5/11 | 1100 | 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 |

[1]Information 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 cbamber furnaces series L 3 - L 40
- for $T_{max}$ 1100 °C

| Model | $T_{max}$ °C | Inner dimensions in mm w | d | h | Volume in L | Outer dimensions in mm W | D | H | Power/kW | Supply voltage[1] | Weight in kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |

[1]Information 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 manuafctured 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 w | d | h | Volume in L | Outer dimensions in mm W | D | H | Power/kW | Supply voltage[1] | Weight in kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |

[1]Information on the mains voltage see page 30

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

L 2/10

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

| Model | $T_{max}$ °C | Inner dimensions in mm w | d | h | Volume in L | Outer dimensions in mm W | D | H | Power/kW | Supply voltage[1] | Weight in kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |

[1]Information on the mains voltage see page 30

## Special Furnaces with Ceramic Muffle L 9/11/SKM

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

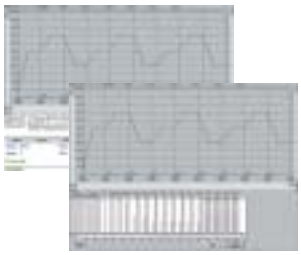
| Model | $T_{max}$ °C | Inner dimensions in mm w | D | h | Volume in L | Outer dimensions in mm W | D | H | Power/kW | Supply voltage[1] | Weight in kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| L 9/11/SKM | 1100 | 230 | 240 | 170 | 9 | 480 | 550 | 570 | 3,0 | single-phase | 50 |

[1]Information 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 combusrion weight losses

- standard furnace is identica1 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 accomodate loads between 600g* and 3100g. in increments of 0.0lg/0.lg.
- 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 w | d | h | Volume in L | Outer dimensions in mm W | D | H | Power/kW | Supply voltage[1] | Weight in kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| L 9/11/SW | 1100 | 230 | 240 | 170 | 9 | 480 | 550 | 800 | 3,0 | 1phasig | 55 |

[1]Information 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 lighweight refarytory 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 w | d | h | Volume in L | Outer dimensions in mm W | D | H | Power/kW | Supply voltage[1] | Weight in kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |

[1]Information 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.**

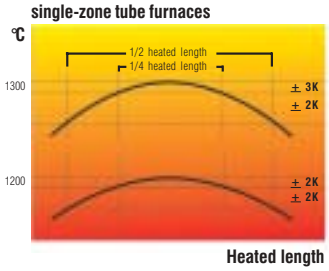
# Universal Tube Furnaces R 30/250/12 - R 100/1000/13 for horizontal Operation

**R 30/250/12,** single-zone

**R 60/750/13,** three-zone

These compact bench top fumaces 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 W | D | H | Tube-Ø mm | Heated lenght mm | Uniform zone +/-5K mm | Supply voltage[1] | Power/kW | Weight in kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 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 | 60 | 750 | 375 | 3-phase | 4,4 | 120 |
| R100/1000/13 * | 1300 | 1300 | 420 | 730 | 100 | 1000 | 500 | 3-phase | 6,5 | 230 |

[1]Information 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.

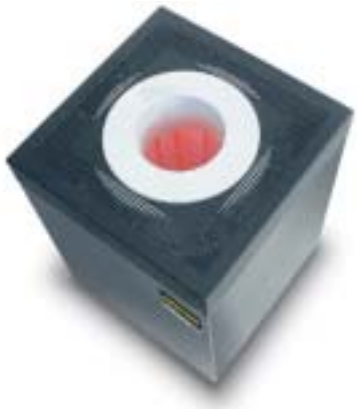
- solid construction
- available for horizontal or vertical operation
- optional frames for vertical operation
- suitable for gas-tight or vacuum operation (see accessories of tube furnaces)
- $T_{max}$ 1100 °C models designed as hinged furnaces with half shell modules for heater and insulation
- $T_{max}$ 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 W[2] | D | H | for Tube-Ø mm | Heated length mm | Tube lenght mm | Supply voltage[1] | Power/kW | Weight in kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 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 |

[1]Information on the mains voltage see page 30
[2]without tube
*heating only between 2 phases
[3]Outer dimensions for vertical operation can be provided on inquiry

# 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
- $MoSi_2$ 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 W | D | H | Tube-$Ø_i$ mm | Heated lenght | Supply voltage[1] | Power/kW | Weight in kg |
|---|---|---|---|---|---|---|---|---|---|
| HTRH 40-100 | | 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 | 1600 | 520 | 450 | 620 | 70 | 150 | 3-phase* | 4,5 | 65 |
| HTRH 70-300 | or | 520 | 590 | 620 | 70 | 300 | 3-phase* | 6,4 | 90 |
| HTRH 70-600 | 1700 | 520 | 890 | 620 | 70 | 600 | 3-phase* | 8,0 | 120 |
| HTRH 100-150 | or | 520 | 450 | 620 | 100 | 150 | 3-phase* | 4,8 | 65 |
| HTRH 100-300 | 1800 | 520 | 590 | 620 | 100 | 300 | 3-phase* | 7,5 | 90 |
| HTRH 100-600 | | 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 W | D | H | Tube-$Ø_i$ mm | Heated lenght | Supply voltage[1] | Power/kW | Weight in kg |
|---|---|---|---|---|---|---|---|---|---|
| HTRV 40-100 | | 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 | 1600 | 425 | 425 | 365 | 70 | 100 | single-phase | 3,0 | 30 |
| HTRV 70-250 | or | 425 | 425 | 515 | 70 | 250 | 3-phase* | 4,8 | 40 |
| HTRV 70-500 | 1700 | 425 | 425 | 765 | 70 | 500 | 3-phase* | 8,0 | 65 |
| HTRV 100-250 | or | 455 | 455 | 515 | 100 | 250 | 3-phase* | 6,4 | 45 |
| HTRV 100-500 | 1800 | 455 | 455 | 765 | 100 | 500 | 3-phase* | 10,4 | 70 |
| HTRV 150-250 | | 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 |

[1]Information on the mains voltage see page 30

*heating only between 2 phases

## Universal Tube Furnaces RO for horizontal and vertical Operation

RO 50-250/11

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 W | D | H | Tube-Ø mm | Heated lenght mm | Tube lenght mm | Supply voltage[1] | Power/kW | Weight in kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 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 |

[1]Information on the mains voltage see page 30

## 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 W* | D | H | Tube-Ø mm | Heated lenght mm | Tube lenght mm | Supply voltage[1] | Power/kW | Weight in kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 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 |

[1]Information on the mains voltage see page 30 *without control 420 mm *heating only between 2 phases

## Testing Furnaces HTRV-A

HTRV-A 70-250/16

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 Ø | H | Tube-Ø mm | Heated lenght mm | Tube lenght mm | Supply voltage[1] | Power/kW | Weight in kg |
|---|---|---|---|---|---|---|---|---|---|
| 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 |

[1]Information 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 teatment 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 W | D | H | Tube-Ø mm | Heated lenght mm | Tube lenght mm | Supply volltage[1] | Power/kW | Weight in kg |
|---|---|---|---|---|---|---|---|---|---|---|
| DRSR-A 70-500/11 | 1100 | 650(1200) (with rotary tube) | 480 | 400 | 70 | 500 | Reactor | single-phase | 3,0 | 30 |

[1]Information 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.

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

**Fibre plugs** with different diameters for closing the tube ends.

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

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

**Vacuum pumps** for connecting to a vacuum flange unit.

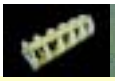
**Standard gas supply** for use in a defined atmosphere for one gas. Rotameter with hose nozzles, plastic hoses, clamps and angles for fastening according to local conditions.

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

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

**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 w | d | h | Volume in L | Outer dimensions in mm W | D | H | Power/kW | Supply voltage[1] | Plates incl. | Plates max. | Total charge max.[2] | 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 |

[1] Information on the mains voltage see page 30

[2] loading capacity per level max. 30 kg

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

**N 60/65HA** with atmosphere box as additional fitting

**N 15/65HA**

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 ± 4 °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 °C or 650 °C or 850 °C

| Model | $T_{max}$ °C | Inner dimensions in mm w | d | h | Volume in L | Outer dimensions in mm W | D | H | Power/kW | Supply voltage[1] | Weight in kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |

[1]Information on the mains voltage see page 30 [2]Deskl-top device *heating only between 2 phases

# Chamber Furnaces LH 15/12 - LH 120/14

Parallel swivel door for opening while in operation

**LH 30/13**

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.

- 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 w | d | h | Volume in L | Outer dimensions in mm W | D | H | Power/kW | Supply voltage[1] | Weight in kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |

[1]Information on the mains voltage see page 30 [2]$T_{max}$ 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 W | D | H | Power/kW | Supply voltage[1] | Weight in kg |
|---|---|---|---|---|---|---|---|---|---|
| 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 |

[1]Information on the mains voltage see page 30 [2]Outer dimensions plus transformer in separate housing *heating only between 2 phases

# Assay Furnaces Cuperration N 90/HS and N 110/HS

**N 110/HS1** with lifting door for gold melting trials

**N 110/HS**

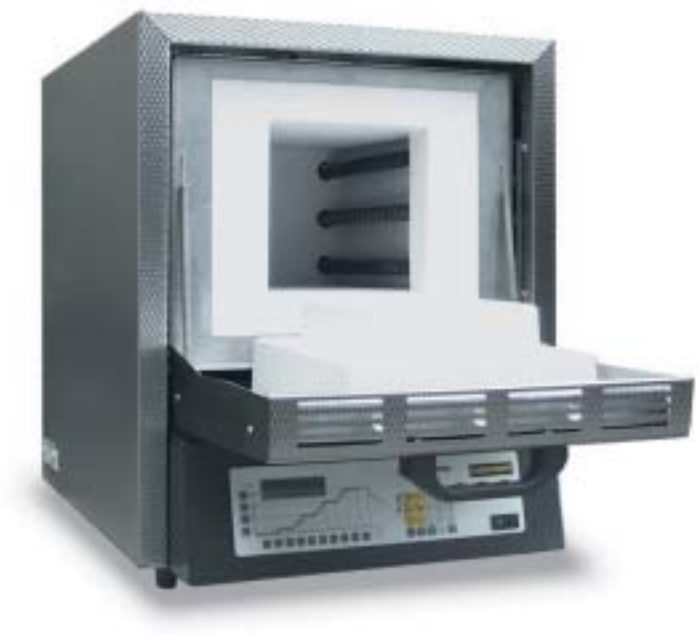
This series is ideal for the assay of precious metal samples by the cupellation method and other processes where it is essential to protect the insulation and the heating elements from harmful process gases and vapours. The furnace chamber forms a ceramic retort which is easy to replace.

- 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 w | d | h | Volume in L | Outer dimensions in mm W | D | H | Power/kW | Supply voltage[1] | Weight in kg |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |

[1]Information 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 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 w | d | h | Volume in L | Outer dimensions in mm W | D | H | 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 |

[1]Information 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 w | d | h | Volume in L | Outer dimensions in mm W | D | H | Power/kW | Supply voltage[1] | Weight in kg | Aufheizzeit bis $T_{max}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |

[1]Information 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 w | d | h | Volume in L | Outer dimensions in mm W | D | H | Power/kW | Supply voltage[1] | Weight in kg | Heating-up time bis $T_{max}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |

[1]Information 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 accomodate 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 whith 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 Ø | h | Volume[2] | Outer dimensions in mm W | D | H | Power/kW | Supply voltage[1] | Weight in kg |
|---|---|---|---|---|---|---|---|---|---|---|
| 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 |

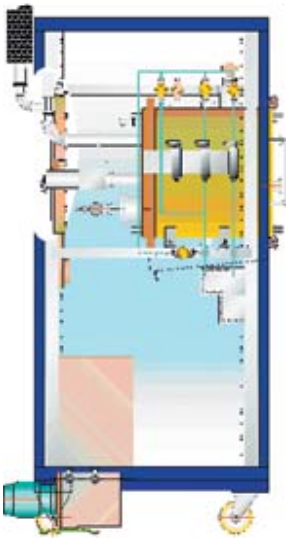
[1]Information on the mains voltage see page 30

[2]Further 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 tor further details!

Cooling water supply

- heating with either molybdenum disilicide (Mo $Si_2$), 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 w | d | h | Volume in L | Outer dimensions in mm W | D | H | Power/kW | Supply voltage[1] | Weight in kg | Element material |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 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 |

[1]Information 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 R 6

### 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 setable 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 B 170

Controller B 150

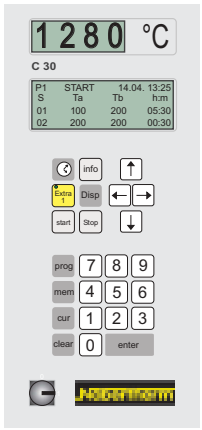
### Controller P 320:

- 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

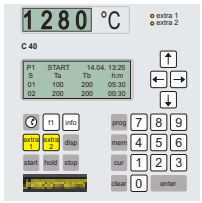
Controller C 6

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

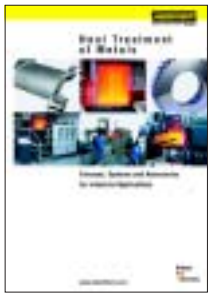
Starting from a small laboratory furnace and ending-up at fully automatic high-temperature furnace plants with afterburning systems of exhaust gases, our product range covers all demands.

**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.

**www.nabertherm.com/Products/Heat Tretament of Metals**



## Foundry

Starting from electrically or gas-heated melting furnaces and ending-up at fully automatic annealing plants for aluminium parts we answer questions from the foundry industry in the most professional manner.

**www.nabertherm.com/Products/Foundry**

Nabertherm
MORE THAN HEAT 30-3000 °C

## The whole world of Nabertherm: www.nabertherm.com

You can find whatever you like to know about us and our products under **www.nabertherm.com.**

Beside any news, trade fair and training seminar dates there is also the opportunity to get in touch directly with your respective key-account manager at our headquarters or local dealer in charge of you.

**Professional Solutions for:**
- **Glass**
- **Ceramics**
- **Laboratory/Dental**
- **Heat Treatment of Metals**
- **Foundry**

**Subsidiaries:**
GERO
HERMES

**Subsidiaries:**
Nabertherm Shanghai, China
Nabertherm S.A., France
Nabertherm Schweiz AG, Switzerland
Nabertherm Ltd., UK
Nabertherm Inc., USA
Nabertherm Ibérica, S.L., Spain

All other countries see world-wide sales.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## References

ABB, Bodycote, Ford, schunk, AEG, DaimlerChrysler, Heraeus, SIEMENS, Audi, DB, Bayer, KERAMAG, GM, Opel, VW

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