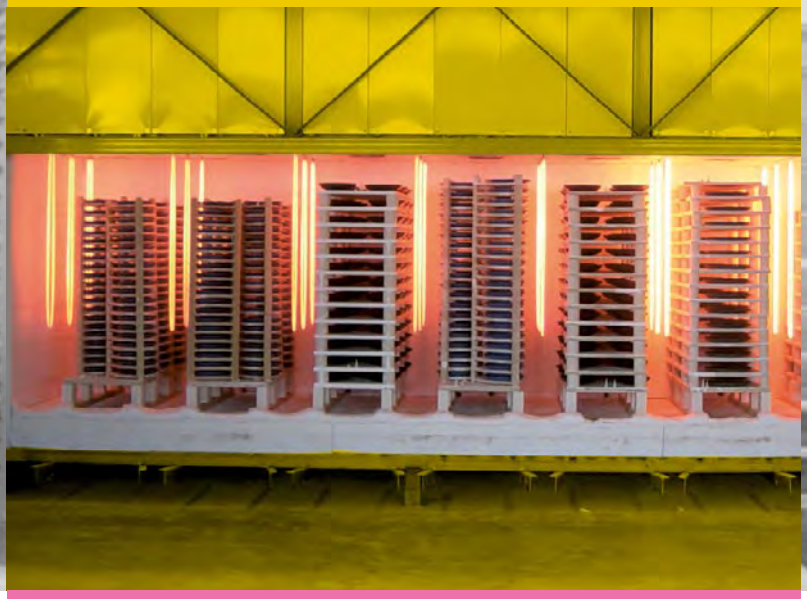
THERM CONCEPT

THERMPROCESS-TECHNOLOGY

TECHNICAL CERAMICS
BIO-CERAMICS
HIGH-END CERAMICS



Furnaces and thermal processing Plants
for innovative materials from 60 °C –1800 °C

DRYING | DEBINDING | SINTERING | RESEARCH
PRE-SINTERING | FIRING | ADDITIVE MANUFACTURING

THERMCONCEPT

High-performance furnaces for advanced ceramics

Technical ceramics have developed into one of the most powerful materials of our time. Where other materials reach their limits, components made of technical ceramics are used. The areas of application for high-performance ceramics are already almost unmanageable today and continue to grow. Products, components and parts made of different ceramic materials can be found in almost all areas of our lives, e.g. in vehicle construction, particularly in electro-mobility, electrical engineering, energy and environmental technology, as well as in medicine. Ceramic material provide top performance in all areas of application.

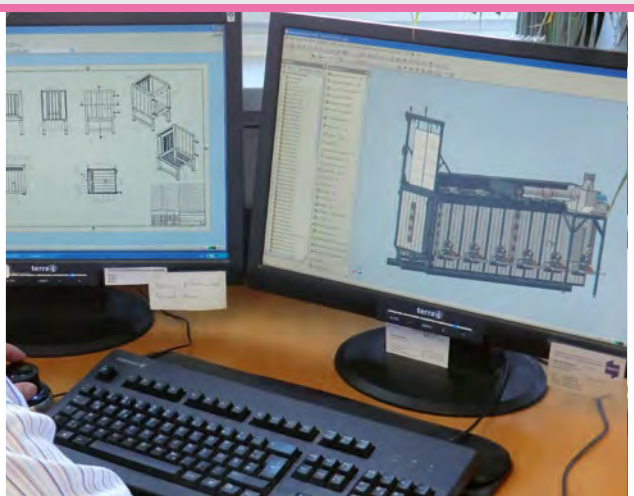
Heat treatment plays a decisive role in the creation of ceramic products. The components have to be dried, de-bindered and sintered in order to achieve their outstanding properties. High-performance furnaces are required for the production of high-performance ceramics. THERMCONCEPT has decades of experience in development, design and manufacturing of high-performance furnaces and systems for products, components and parts made of technical ceramics. Our innovative engineering results in strong products for the highest demands.

Engineering

Our highly qualified development engineers and designers, hardware and software professionals, technicians and mechanics develop cost-effective and reliable furnace solutions. The direct proximity to the user enables us to design practical furnaces. Our aim is to provide you with the decisive technical and economic advantage.

Flexibility and speedness

Many applications can be solved with our standard furnace range. The advantages for you: tried and tested models, excellent price-performance ratio and short delivery times. Of course, we can also supply you with a furnace system specially tailored to your application. In close consultation with you, we will create a furnace system with which you can solve your demanding tasks reliably and economically.



Automation and Industry 4.0

The need for automation in all areas of production is constantly increasing. THERMCONCEPT complements furnace systems with adapted systems for batch movement. We are just as familiar with linear handling as with robot-assisted systems.

We use sophisticated software and hardware components for monitoring, controlling and regulating the heat treatment processes. Machine communication and technical assistance worldwide is part of our service profile.

Global Sales and Service Network

THERMCONCEPT furnaces and systems prove their worth in daily use by satisfied customers in many countries around the world. Our international sales network guarantees our customers individual support, fast response times and qualified service on site.

THERMCONCEPT *powered by innovation*

THERMCONCEPT high-performance furnaces and plants for drying, de-binding and sintering of products, components and parts made of technical ceramics stand for:

- TOP quality and sophisticated technology
- Practical and service-friendly designs
- Customised and application-oriented solutions
- Highest possible thermal efficiency and economy
- environmentally friendly materials
- Professional service and plant support to ensure reliable operation

THERMCONCEPT is your partner when it comes to high-performance furnaces and systems for the diverse and demanding applications in production and research in the world of high-performance ceramics.

Contents

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THERMCONCEPT

and the world of advanced ceramics

THERMCONCEPT

High-performance furnaces in the ceramic manufacturing process

Technical ceramics have developed into one of the most efficient materials of our time. Where other materials reach their limits, components made of technical ceramics are used. The areas of application for high- performance ceramics are already almost unimaginable today and are constantly growing.

Products, components and parts made of various ceramic materials can be found in almost all areas of our lives, e.g. in vehicle construction, especially in electro-mobility, electrical engineering, energy and environmental technology as well as in medicine. Ceramic materials deliver top performance in all areas of application.

Heat treatment plays a decisive role in the creation of ceramic products. The components must be dried, debinded and sintered in order to achieve their outstanding properties. High-performance furnaces are required for the production of high-performance ceramics.

THERMCONCEPT has decades of experience in the development, design and manufacture of high-performance furnaces and systems for products, components and parts made of technical ceramics. Our innovative engineering results in strong products for the highest demands.

THERMCONCEPT furnaces and systems are used

- for drying the blank / green compacts
- for the burn-out of binders and other additives as well as
- for sintering ceramic components.

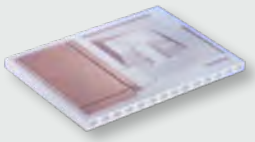
All major manufacturers of high-performance ceramics worldwide use THERMCONCEPT furnaces and systems for the various processes.

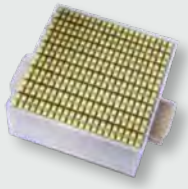
THERMCONCEPT furnaces and systems are used in all relevant industrial sectors, from e-mobility, energy and environmental technology to medical technology.

Fields of application

of THERMCONCEPT-furnaces

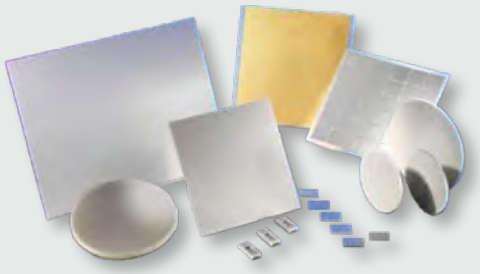
Vehicle construction – mobility & e-mobility

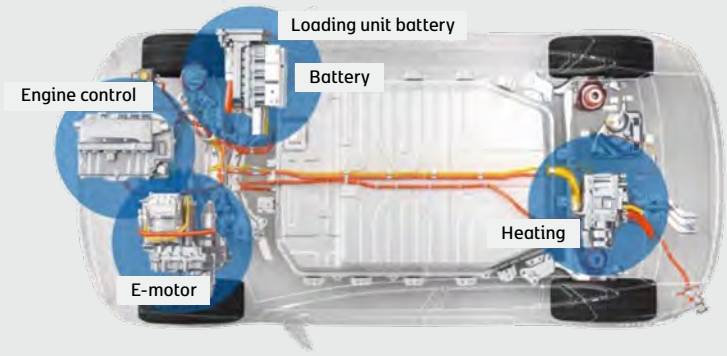




Technical ceramics make decisive contributions to mobility: in vehicles as well as in production facilities for vehicle construction; as components and parts in the most diverse applications.

In e-mobility, whether fully electric or hybrid, high- performance components make a significant contribution to increasing the economy, comfort and safety of e-cars, e-buses, e-trucks and e-trains.





Fields of application and use

of THERMCONCEPT-furnaces

Electrical Engineering & Electronics

Technical ceramics are widely used in electronics and electrical engineering as well as in information and communication technology. Technical ceramics are used in a wide range of applications such as circuit carriers, core materials, protective components, actuators and sensors.

Energy Technology & Environmental Technology

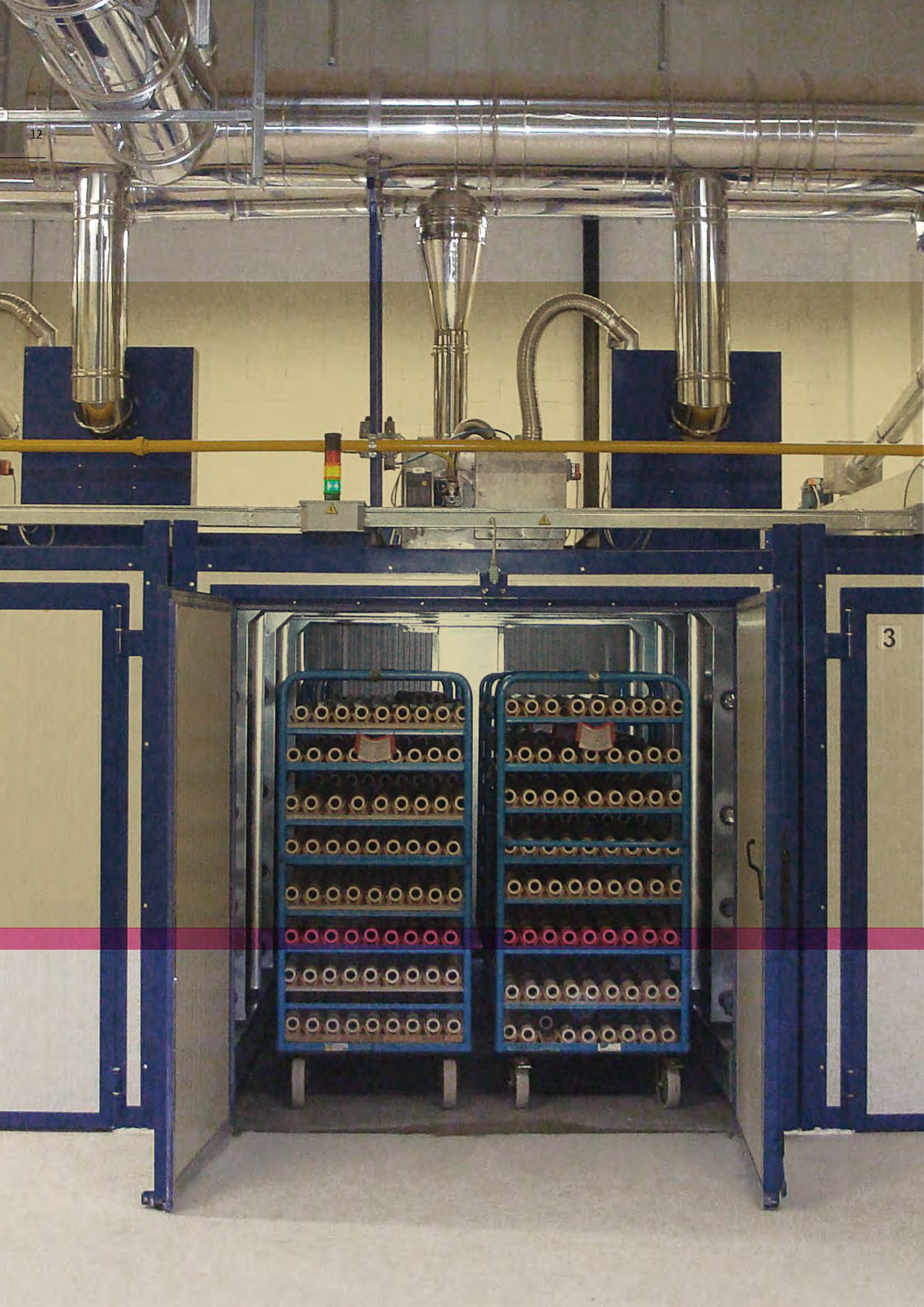
In many areas of energy supply and environmental technology, technical ceramics enable the safe and low- wear control of processes, the reduction of emissions and the efficient use of resources.

Mechanical engineering, apparatus engineering & plant construction

Components made of ceramic materials are used in many technical systems and devices. Technical ceramics enable the safe functioning of systems, machines and devices, the control of processes, the reduction of emissions and the responsible use of our resources.

Medical technology

Advanced ceramics are widely used as surgical implants in orthopaedics, dentistry and veterinary medicine. High-performance ceramics are also indispensable in medical devices and equipment.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Furnaces and systems up to 150 °C

for drying of blanks

Furnaces and systems up to 150 °C

The process

In plastic moulding processes, such as extruding or slip casting, the high water content added must be driven out of the green compact. For these drying processes, electrically heated or indirectly gas- heated furnaces are used.

The drying process must be controlled and uniform in order to avoid stresses in the component; at the same time, efficiency, durability and a low-maintenance design help to minimise costs.

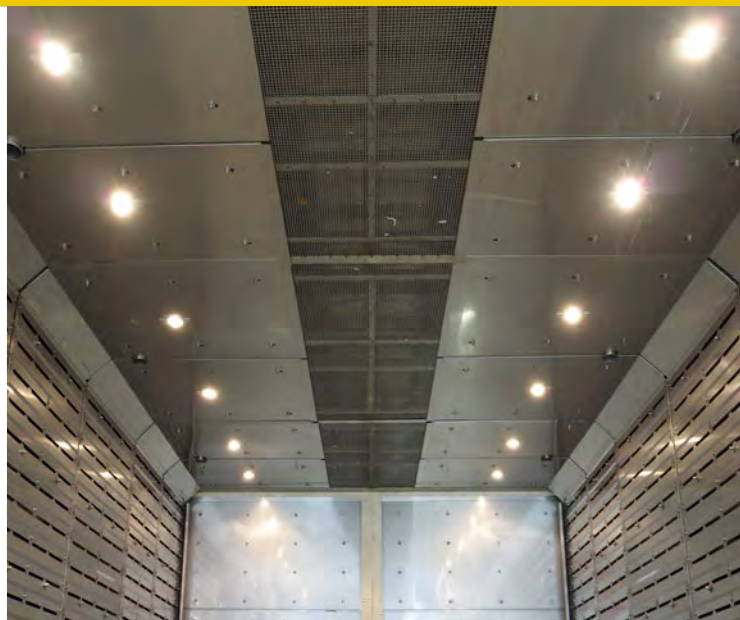
Drying furnace up to 250 °C
in the automotive industry

Tempering furnace for bearing shells in the automotive industry with fast and uniform heating and cooling under EN 1539 specification

Photo left:
3 indirect gas-heated furnaces for drying ceramic filters before sintering in a gas-heated furnace.

Photo right:
Pulsed continuous furnaces up to 150 °C with high accuracy for tempering sliding layers. Automated batch- and process data-logging according to Industry 4.0

84 m³ drying furnace up to 250 °C, integrated into the production as an airlock for passing through. Ground-level charging with small trolleys or with plug-in guide rails for 2 large charging trolleys | temperature distribution of up to +-3K



Furnaces and systems up to 150 °C

The solution

A modular design of THERMCONCEPT's KT drying furnaces from various standard components enables customised adaptation to the components, the process, the size, the capacity as well as the charging.

High-quality insulation combined with an efficient heating system ensures low energy consumption and thus also low external wall temperatures for a pleasant working climate.

Various swing doors and space-saving lift doors are available for loading and unloading. For optimum and uniform air circulation around the components, the air circulation can be designed horizontally or vertically for a high temperature accuracy of up to +-5K in accordance with DIN 17052 in the usable space or better.

For precise and controlled drying of ceramic components with high temperature accuracy, professional touch panel controllers from 4" display and, if required, PLC systems are available. For quality assurance, the process can of course be documented.

A THERMCONCEPT drying furnaces can be further customised with a wide range of options, including special colours.

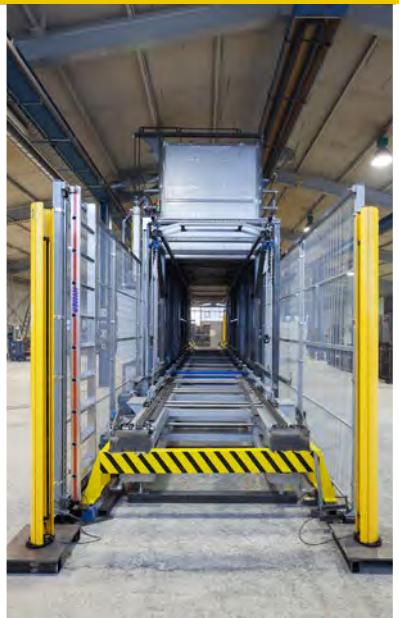


Photo left:
Intermittent continuous furnace with gas heating up to 280 °C, for up to 16 t loading weight and forklift loading

Photo right:
150 °C drawer furnace for pre-heating fast-cycle components. Drawers with interlock and time monitoring

Furnaces and systems up to 150 °C

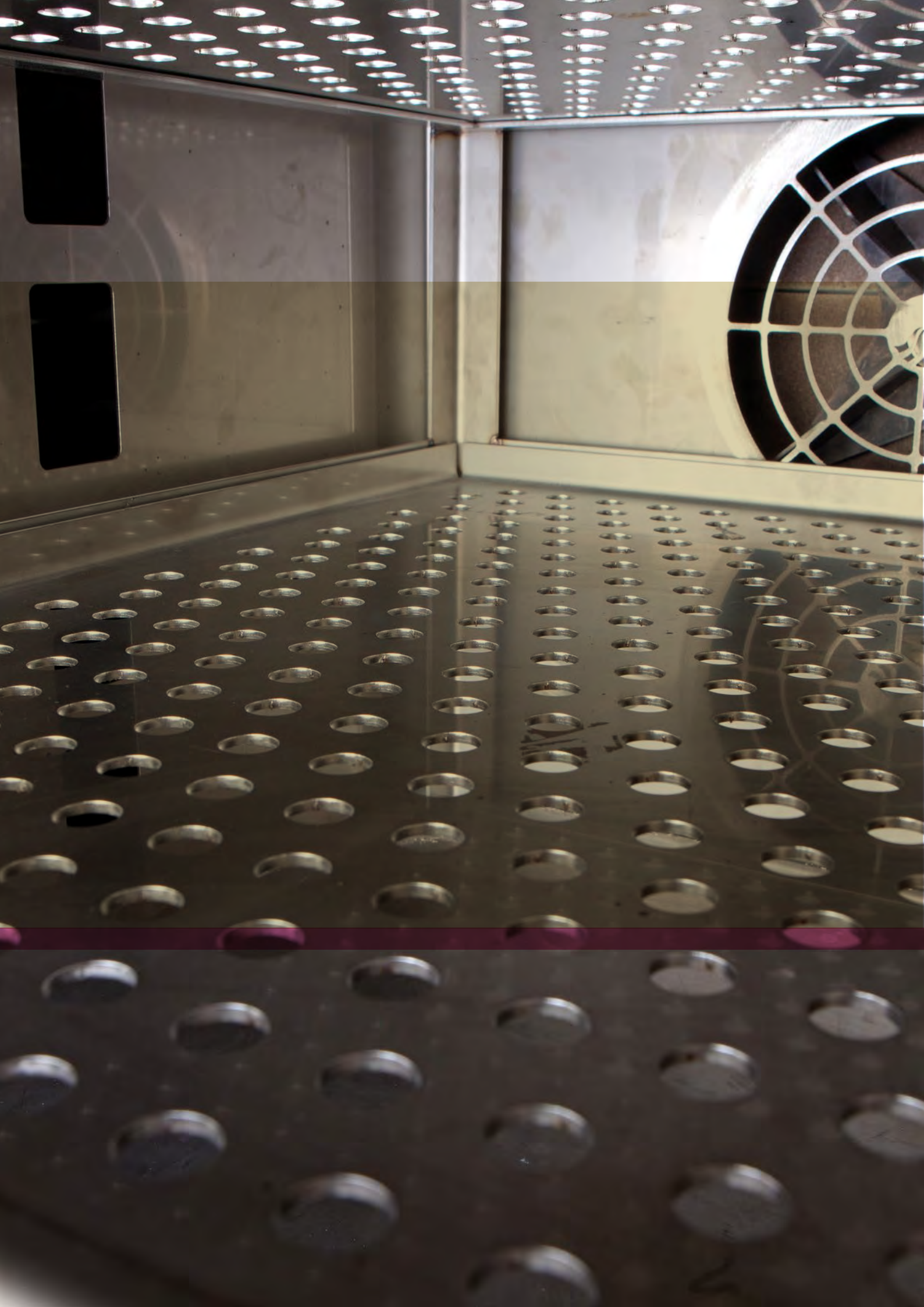
Options

- Electric lift door
- Entry ramp/drive-in-tracks for entry at ground level with charging trolleys
- Individually adapted charging trolleys with and without shelf system
- Rail-mounted charging trolleys with electric drive
- Automatic supply and exhaust air flap control for furnace venting
- Supply air fan for forced furnace ventilation
- Viewing window and furnace chamber lighting
- Also available with indirect gas heating
- Optical/acoustic signals
- Second door instead of furnace rear wall
- Connections for thermocouples

Photo left:
6 tempering and drying furnces, each with double-wing doors for independent time sequences with common heating and circulating air. For easy charging with drawer

Photo right:
Stainless steel drying furnace, sealed for low pressure operation

Low-temperature furnace for 150 °C with roller doors on both sides for integration into a customer's production line. Automatically controlled assembly trolleys with components pass through the furnace for an automatic drying process.



Furances up to 750 °C

for burnout of binding agents and other additives

High temperature accuracy in the medium temperature range

Air-circulation chamber furnaces for temperatures up to 750 °C achieve good temperature distribution quickly and reliably due to the forced, horizontal air circulation technology.

These models are therefore particularly suitable for de-binding technical ceramics.

TECHNICAL DATA

KU-DB models with T max. 750 °C	Internal dimensions [mm] Width x depth x height	Volume [l]	Voltage [V]
KU 40/07/A-DB	300 x 400 x 300	35	400 V 3/N
KU 70/07/A-DB	350 x 500 x 400	70	400 V 3/N
KU 140/07/A-DB	450 x 600 x 500	135	400 V 3/N
KU 270/07/A-DB	600 x 750 x 600	270	400 V 3/N
KU 540/07/A-DB	750 x 900 x 800	540	400 V 3/N
KU 800/07/A-DB	800 x 1250 x 800	800	400 V 3/N

Air circulating chamber furnaces KU DB

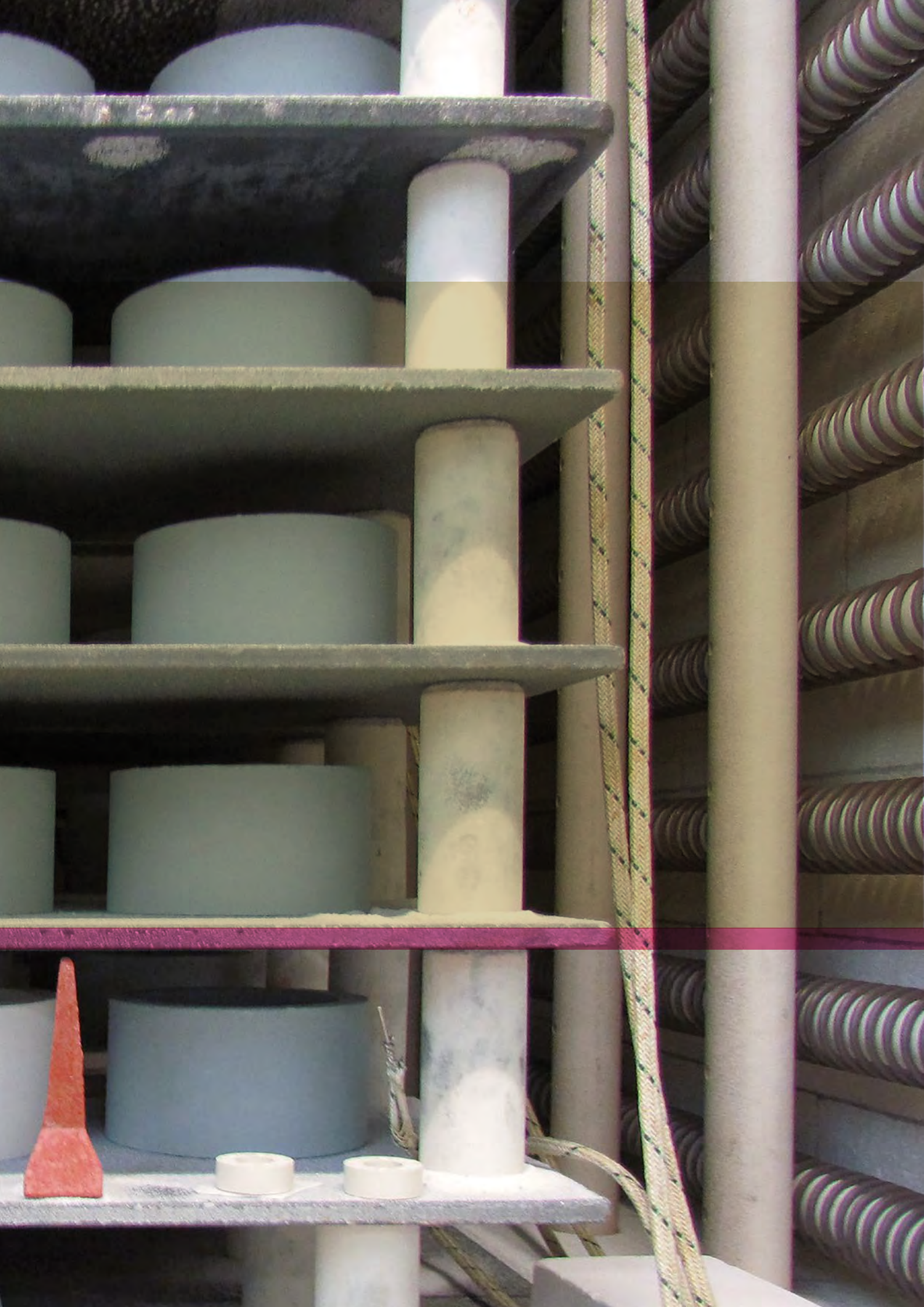
with horizontal air circulating | T max. 750 °C

Features

- Robust housing constructions made of high-quality sheet steel
- Pivot door hinged on the right
- Inner casing as air guide box made of heat- resistant stainless steel, with long service life, extremely resistant and corrosion-resistant
- In the standard version with 2 pairs of slide-in laths for optional slide-in shelves, individually extendable
- High-quality heating elements with long service life, for even and fast heat transfer mounted in the air stream
- Powerful horizontal air circulation ensures uniform temperature distribution up to +/- 3 K according to DIN 17052
- High-quality insulation for low energy consumption and low electricity costs
- Base frame included in standard scope of delivery

Options

- Safety device
- Automatic supply and exhaust air flap control for furnace venting
- Automatic cooling system for chamber ventilation and forced cooling
- Catalytic and thermal exhaust air purification systems
- Ducts as access to the furnace chamber
- Pneumatic lift door with manual pushbutton
- Gas supply boxes for applications under inert gas, also with matching charging trolley or forklift truck
- Gas flushing system for furnace chamber and gas flushing boxes
- Controller with recorder function, interfaces and software for documentation
- Calibration of thermocouple and controller at different temperatures
- Optical/acoustic signals
- Left mounted door hinge
- Customised special designs



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Sintering furnaces up to 1400 °C

for sintering or combined de-binding
and sintering in one process

Chamber furnaces

T max. 1300 °C and 1400 °C

Features

- Robust housing construction with double-walled cladding, exceptionally low outer wall temperature
- Swing door hinged on the right, easy and wide to open approx. 180°
- Supply air flap in the furnace floor to regulate the cooling air, exhaust air flap in the furnace ceiling
- Multi-layer, insulation (lightweight refractory bricks and back insulation), low heat loss, low energy consumption
- 5-sided heating (from both sides, rear wall, door and floor), even temperature distribution in the furnace chamber
- High-quality heating wire mounted secured against slipping
- Heating elements mounted on ceramic support tubes and installed in front of the furnace wall, free heat radiation into the furnace chamber, thus saving energy and extending the service life
- Covering of the floor heating elements with heat-permeable SiC plates, high mechanical load capacity, protection for floor heating
- Base frame for convenient loading height or integrated substructure included in standard scope of delivery
- As ELS version with extendable, heated furnace floor for easy loading and unloading in front of the furnace chamber

TECHNICAL DATA

KK models with T max. 1300 °C	Internal dimensions [mm] Width x depth x height	Volume [l]	Power [kW]	Voltage [V]
KK 100/13	410 x 470 x 540	104	8	400 V 3/N
KK 150/13	460 x 470 x 680	147	10,5	400 V 3/N
KK 200/13	460 x 630 x 680	197	13,2	400 V 3/N
KK 250/13	520 x 630 x 770	250	16,5	400 V 3/N
KK 330/13	590 x 710 x 790	330	22	400 V 3/N
KK 480/13	640 x 760 x 960	467	32	400 V 3/N
KK 600/13	720 x 850 x 1020	624	40	400 V 3/N
KK 750/13	720 x 1050 x 1020	770	50	400 V 3/N
KK 1000/13	920 x 1040 x 1140	1090	70	400 V 3/N

KK ELS models with T max. 1300 °C	Internal dimensions [mm] Width x depth x height	Volume [l]	Power [kW]	Voltage [V]
KK 150/13 ELS	460 x 460 x 680	104	10,5	400 V 3/N
KK 200/13 ELS	460 x 620 x 680	148	15	400 V 3/N
KK 250/13 ELS	520 x 630 x 770	197	18	400 V 3/N
KK 330/13 ELS	590 x 720 x 800	250	24	400 V 3/N
KK 480/13 ELS	640 x 770 x 995	330	32	400 V 3/N
KK 750/13 ELS	730 x 1110 x 1030	467	40	400 V 3/N
KK 1000/13 ELS	920 x 1060 x 1145	624	40	400 V 3/N

Options

- Furnace sizes customised
- 3-zone control for optimised temperature uniformity
- Automatic supply and exhaust air flap control for furnace venting
- Cooling system with manual or automatic control
- Exhaust hoods for the controlled discharge of exhaust air
- Thermal or catalytic exhaust air purification systems
- Bores and feedthroughs for customer-specific applications
- Left mounted door hinge
- Motorised drive for retractable furnace bottom of ELS models
- Furnace furniture according to customer requirements
- Optical/acoustic signals

KK models with T max. 1400 °C	Internal dimensions [mm] width x depth x height	Volume [l]	Power [kW]	Voltage [V]
KK 100/14	460 x 480 x 530	104	10,5	400 V 3/N
KK 150/14	460 x 475 x 680	148	15	400 V 3/N
KK 200/14	460 x 630 x 680	197	18	400 V 3/N
KK 250/14	520 x 630 x 770	250	24	400 V 3/N
KK 330/14	590 x 710 x 790	330	32	400 V 3/N
KK 480/14	640 x 760 x 960	467	40	400 V 3/N

Bogie hearth car furnaces WK

T max 1300 °C

Features

- Robust housing construction with double-walled cladding and rear ventilation, exceptionally low outer wall temperature
- Furnace door designed as a swing door, easy and wide to open
- Stainless steel lintel, non-rusting
- Sturdy bogie hearth on steel wheels, freely movable and easy to steer
- Exhaust air flap in the furnace ceiling
- Supply air slider in the bogie hearth for regulating the cooling air
- Multi-layer, insulation (lightweight refractory bricks and back insulation), low heat loss, low energy consumption

TECHNICAL DATA

Models with T max. 1300 °C	Internal dimensions [mm] Width x depth x height	Volume [l]	Power [kW]	Power [V]
WK 1000/13	850 x 1200 x 1000	1000	70	400 V3/N
WK 1500/13	1000 x 1500 x 1000	1500	95	400 V3/N
WK 2000/13	1000 x 2000 x 1000	2000	125	400 V3/N
WK 3000/13	1250 x 2400 x 1000	3000	140	400 V3/N
WK 4000/13	1250 x 3200 x 1000	4000	160	400 V3/N
WK 6000/13	1250 x 4000 x 1200	6000	200	400 V3/N
WK 7000/13	1250 x 4000 x 1400	7000	240	400 V3/N

- 5-sided heating (from both sides, rear wall, door and floor), even temperature distribution in the furnace chamber
- High-quality heating wire mounted secured against slipping
- Heating elements mounted on ceramic support tubes and installed in front of the furnace wall, free heat radiation into the furnace chamber, thus energy saving and longer service life
- Covering of the floor heating elements in the bogie hearth with heat-permeable SiC plates, high mechanical load capacity, protection for floor heating

Options

- Customised furnace sizes and temperatures
- Furnaces also available completely in fibre insulation for fast firing cycles
- Version with second door instead of rear wall and several bogies for charging from both sides
- Lifting doors with electric or hydraulic drive
- Bogie hearth on rails with steel wheels for heavy loads
- Electric bogie hearth drive
- Individually adapted transverse shifting device in front of the furnace with parking tracks
- Automatic control of the supply and exhaust air flap
- Cooling system with manual or automatic control
- Multi-zone control for optimised temperature uniformity
- Thermal or catalytic exhaust air purification systems
- Furnace furniture according to customer requirements
- Also available for T max. 1400 °C

Bogie hearth furnaces in customised special version

Bogie hearth for high load on rails, cooling system for short cycle times and furnace door mounted on the bogie hearth.

Photos above and left:
Electrically heated top-hat furnace for de-binding and sintering technical ceramics in a process up to 1500 °C with 2 horizontally movable tables the alternatively lifted into the furnace chamber with a scissor lift table.

Photos right:
Installation of 3 identical top-hat furnaces for the heat treatment of quartz glass components, each with a table that is moved horizontally by motor from the charging position in front of the furnace under the furnace chamber and lifted.

Hood furnaces HK

T max. up to 1400 °C

Top-hat furnaces are often used when the furnace chamber must be easily accessible in order to load small and fragile products easily and carefully.

Furnace sizes and temperatures of the hood furnaces are individually adapted to the user's process and products.

Matched to the production process and the products, top-hat furnaces are available as lift-bottom version (table with charge moves into the heating hood from below) or as lift-top version (heating hood lowers onto the table) with proven jolt- and vibration-free electro-mechanical drives for table or hood.

Top-hat furnaces can be supplied with a fixed or mobile table and also with interchangeable table systems (swivel or double table systems) for semi- or fully automatic operation.

Due to the uniform heating from several sides, hood furnaces achieve a very good temperature distribution, which can be further increased by a multi-zone control. A double-walled housing with forced cooling ensures very low external wall temperatures.

Depending on the individual process requirements of the customer, the furnace insulation consists of robust lightweight refractory bricks or high-quality fibre materials with low thermal mass, which enable rapid heating and cooling.

Labyrinth seal between table and hood ensures tight closing.

In addition, it is possible to open the hood step by step for rapid cooling.

State-of-the-art switching and control technology and a particularly precise furnace control with semiconductor relays or thyristors as well as clearly arranged 4" or 10" touch panel controllers enable a precise sintering process. A PLC can be used for more complex process sequences.

Combi furnace production line for de-binding and sintering of ceramic components up to 1400 °C. For high flexibility in the production of small batches, each furnace has an individual control system and catalytic exhaust air purification.

Combi furnaces KK-DB

for de-binding and sintering –
with fresh air pre-heating and safety device
T max. 1300 °C to 1400 °C

Combi furnaces enable de-binding and sintering processes without changing furnaces. For the de-binding process in the lower temperature range, preheated fresh air is gently blown into the furnace chamber via a large number of optimally positioned ceramic tubes with air outlet openings. The result is a very good temperature distribution and a high change of atmosphere

The removal of organic components from the furnace is reliably guaranteed.

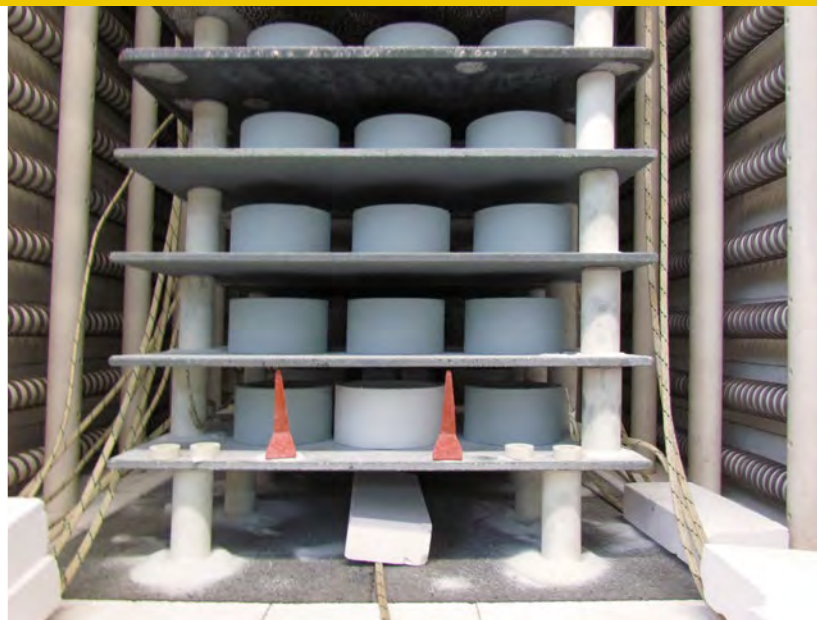
Once de-binding is complete, the sintering process is initiated under programme control without any transition or intermediate cooling. The plant is then operated as a sintering furnace with the advantages of high-temperature capability, a calm sintering atmosphere and long service life.

Safety device

Combi furnaces can be equipped with safety devices for monitoring the internal furnace pressure, the fresh air flow and the flue gas volume flow with emergency functions to avoid explosive mixtures.

Exhaust gas cleaning

On request, all combi furnaces can be equipped with systems for thermal or catalytic exhaust gas cleaning. These exhaust gas cleaning systems are designed on the basis of the process-dependent pollutant components in the exhaust air and are an integral part of the process control system.



Combi furnaces KK-DB

for de-binding and sintering – with fresh air pre-heating and safety device

T max. 1300 °C to 1400 °C

Safety technology

With the DB packages, a safe and controlled release of exhaust gases takes place during the de-binding phase by slowly increasing the temperature in a defined temperature range.

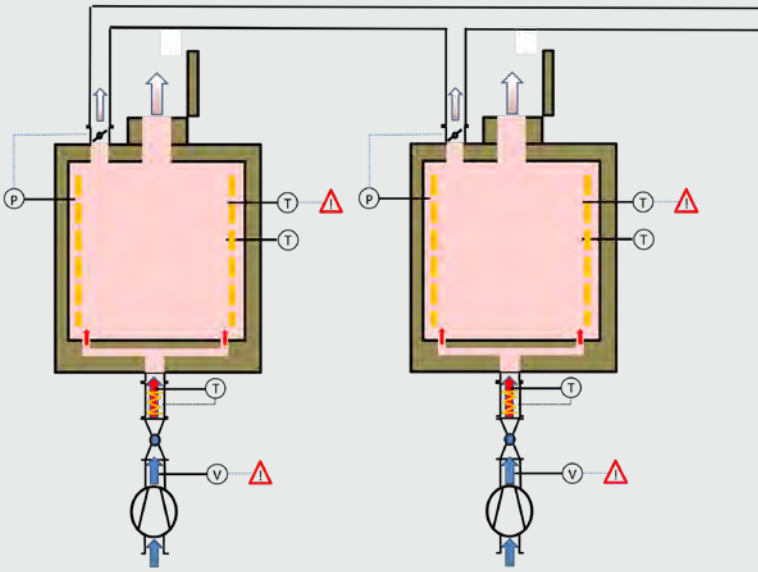
Process safety is ensured by flushing the furnace chamber with fresh air. The necessary flushing quantities are individually determined in the case of an order and monitored by technical equipment on the furnace.

Powerful air preheaters are used to preheat the fresh air; these can also be used to accelerate the cooling of the furnace after the sintering process. The preheated fresh air blown in is distributed in a targeted manner in the furnace chamber via ceramic pipes.

The speed of the rinsing fan is set depending on the furnace pressure. There is a slight negative pressure to ensure that exhaust gases are only discharged via the exhaust air system and do not enter the installation room.

The suction fan in the exhaust air system is designed to remove the exhaust gas quantities during de-binding. During rapid cooling of the furnace at high temperatures, the exhaust air is discharged via the normal exhaust air flap.

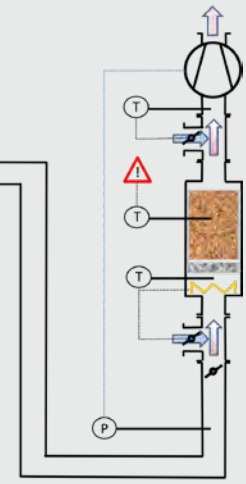
Depending on the purge air volume flow and the amount of organics released, catalytic converters or thermal systems can be used for exhaust air purification.



TECHNICAL DATA

KK-DB models with T max. 1300 °C	Internal dimensions [mm] Width x depth x height	Volume [l]	Power [kW]	Voltage [V]
KK 200/13	460 x 630 x 680	197	29	400 V3/N
KK 480/13	640 x 770 x 1020	502	56	400 V3/N
KK 750/13	720 x 1100 x 1030	815	80	400 V3/N
KK 1000/13	920 x 1070 x 1140	1122	110	400 V3/N

KK-DB models with T max. 1400 °C	Internal dimensions [mm] Width x depth x height	Volume [l]	Power [kW]	Voltage [V]
KK 200/14	460 x 630 x 680	197	29	400 V 3/N
KK 480/14	630 x 770 x 995	482	56	400 V 3/N
KK 750/14	720 x 1100 x 1030	815	80	400 V 3/N
KK 1000/14	920 x 1005 x 1145	1058	110	400 V 3/N



In addition, at very high furnace temperatures, fresh air is automatically added via a controlled bypass flap to prevent the catalyst from overheating.
Catalytic exhaust air purification systems are individually designed and adapted to the process.

Depending on the process and requirement, different DB packages are available.

Furnace series
KK 200/13 DB – KK 1000/14 DB

- Conceptually designed like the chamber furnaces of the KK series, but with an additional DB version
- Fresh air pre-heating: Preheated fresh air is blown in horizontally up to max. 500 °C
- Separate exhaust air piping with stainless steel exhaust air measurement
- Automatic exhaust air flap control
- Multi-zone furnace control with additional separate control of fresh air pre-heating
- Excellent temperature distribution in the furnace chamber
- Fully automatic control and regulation technology
- Thermal or catalytic exhaust air purification systemsn
- Furnace furniture according to customer requirements

Options

- Customised versions with adapted furnace size, temperature, furnace control etc.
- Multi-zone control of the furnace heating for optimised temperature distribution in the furnace chamber
- Protective gas operation
- Software packages for operating the furnace system, visualisation and evaluation of the processes

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Gas-heated bogie hearth furnace for thermal cleaning of tools before re-coating in the glass industry. With lifting door, bogie hearth on rails with drive and thermal afterburning for exhaust air purification.

Gas fired furnaces

T max. 900 °C up to 1400 °C

Especially for short, fast firing cycles and for the production of mass-produced goods with high quantities, gas-fired furnaces are advantageous, particularly also in terms of operating costs.

For the temperature range from 900 °C to 1400 °C, THERMCONCEPT supplies different furnace concepts that are specially tailored to the customers' requirements.

- Furnace systems up to T max. 1400 °C
- Universally applicable furnace types (chamber furnaces, bogie hearth furnaces, hood furnaces)
- Excellent firing results
- Burner systems with a wide performance range, specially matched to the furnace system
- Low energy consumption due to a special multi-layer refractory lining with best insulating properties
- Automatic control of the burner atmosphere
- Start-up of the furnace at low temperature with high temperature accuracy and without temperature jumps
- Optimum temperature distribution due to multi-zone control and special flue gas routing
- State-of-the-art control and regulation technology with optimum management of the processes, for fully automatic operation of the plants, with perfect adaptation to the needs of the users
- Minimal maintenance effort

Gas-heated hood furnace for the production of mass-produced goods. The hood is lifted hydraulically

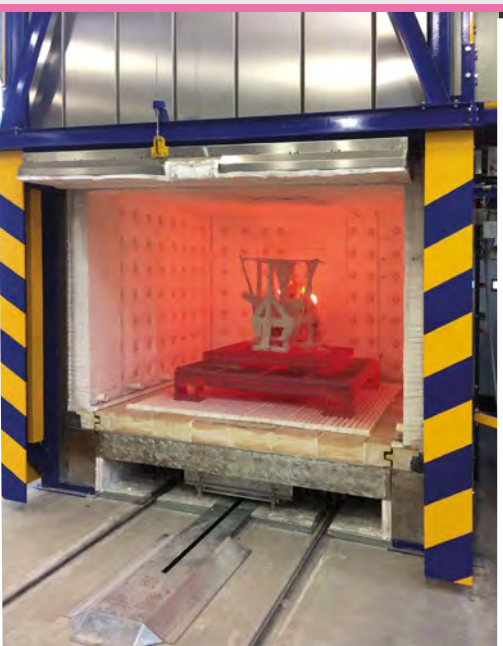

Y22
Y21
E11

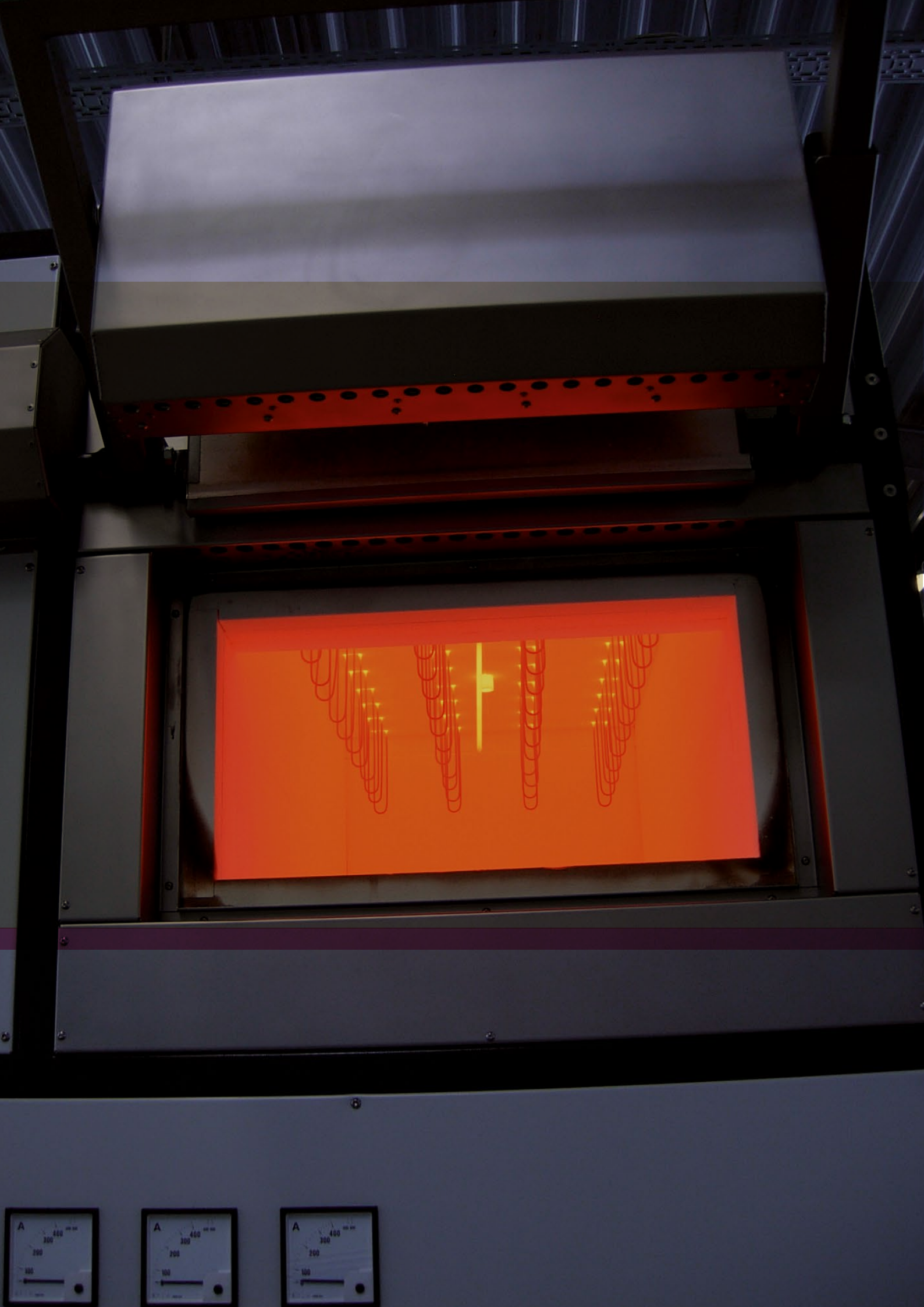
Gas fired furnaces

T max. 900 °C up to 1400 °C

Photos above:
Gas-fired bogie hearth furnaces for sintering and de-binding with electric lift door, thermal post- combustion and movable bogie hearth.

Photos below:
Gas-heated furnaces with bogie hearth, for firing and pre-heating ceramic casting moulds in prototype construction and the individual production of special parts. With rails and drive recessed in the floor.





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Sintering furnaces up to 1800 °C

for sintering or combined de-binding
and sintering in one process

Chamber furnace heated on 2 sides with $MoSi_2$ elements in standard design with light and high-purity Al_2O_3 fibre insulaton for sintering technical ceramics up to max. 1800 °C.

TECHNICAL DATA

Models with T max. 1600 °C	Models with T max. 1750 °C	Models with T max. 1800 °C	Internal dimensions [mm] width x depth x height	Volume [l]	External dimensions [mm] width x depth x height	Power [kW]	Voltage [V]	Weight [kg]
HTK16/16	HTK16/17	HTK16/18	200 x 300 x 260	16	820 x 655 x 1650	11	400 V 3/N	310
HTK 20/16	HTK 20/17	HTK 20/18	250 x 320 x 260	20	870 x 675 x 1650	11	400 V 3/N	325
HTK 40/16	HTK 40/17	HTK 40/18	300 x 350 x 350	40	920 x 705 x 1740	11	400 V 3/N	370
HTK 50/16	HTK 50/17	HTK 50/18	250 x 550 x 350	50	870 x 905 x 1740	18	400 V 3/N	455
HTK 70/16	HTK 70/17	HTK 70/18	400 x 400 x 400	65	1100 x 835 x 1740	16	400 V 3/N	540
HTK 100/16	HTK 100/17	HTK 100/18	400 x 600 x 400	100	1100 x 1035 x 1790	21	400 V 3/N	620
HTK 130/16	HTK 130/17	HTK 130/18	400 x 800 x 400	130	1100 x 1235 x 1790	23	400 V 3/N	780
HTK 160/16	HTK 160/17	HTK 160/18	500 x 550 x 550	150	1200 x 975 x 1940	21	400 V 3/N	670
HTK 220/16	HTK 220/17	HTK 220/18	500 x 550 x 800	220	1200 x 975 x 2190	27	400 V 3/N	1000
HTK 300/16	HTK 300/17	HTK 300/18	500 x 1100 x 550	300	1260 x 1605 x 1940	32	400 V 3/N	1270
HTK 500/16	HTK 500/17	HTK 500/18	500 x 1200 x 800	480	1260 x 1705 x 2190	58	400 V 3/N	1310

High-temperature chamber furnaces HTK

T max. 1600 °C, 1750 °C and 1800 °C

Features

- Wide standard furnace range with a useful volume of 16-500 l.
- Supply of customised furnaces for precise adaptation to the desired processes
- Free-standing models with maximum precision and comfort, fast heating and cooling times, low connected loads.
- Outer casing in stable and shapely frame construction
- Double-walled housing with forced cooling, thus very low outer wall temperatures
- Stainless steel door and door frame
- Door with parallel guide, swings hot side away from operator
- Furnace insulation made of high-quality aluminium oxide fibre materials with low thermal mass, rapid heating and cooling possible, exhaust air opening in the oven ceiling
- Bottom reinforcement for increased charging weight
- Heating is via the side walls. Additional heating via the rear wall is possible.
- State-of-the-art switching and control technology, switching of the heating elements via thyristors, particularly precise furnace control, wear-free, noiseless
- Automatic exhaust air flap in the oven ceiling
- Start-up circuit

Additional equipment

- Additional door on the rear wall of the furnace
- Stainless steel exhaust hood
- Exhaust air purification systems
- Fully automatic system control
- Fresh air preheating for debinding processes
- Lifting door
- Cooling fan
- Protective gas operation

Special lightweight refractory bricks for glass melts

Independent exhaust for exhaust gases and cooling

Floor reinforcement for increased loading weight

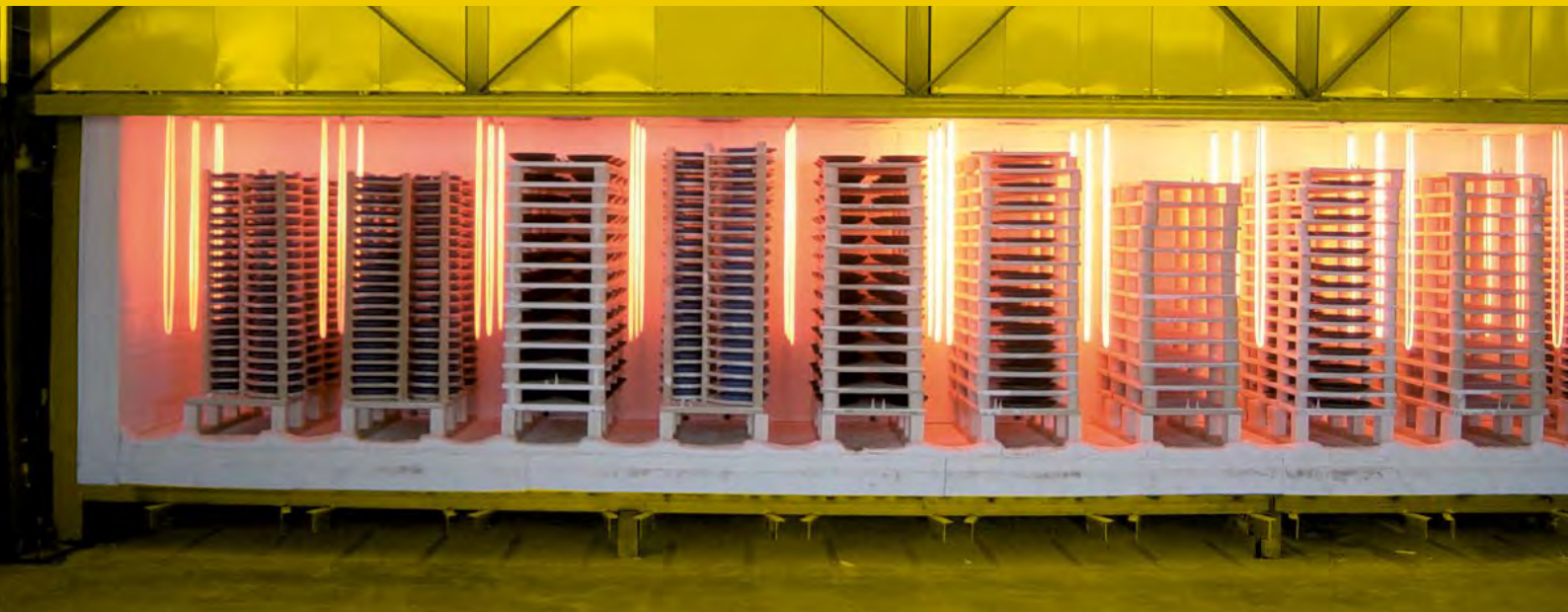
TECHNICAL DATA

Models with T max. 1600 °C	Models with T max. 1750 °C	Models with T max. 1800 °C	Internal dimensions [mm] width x depth x height	Volume [l]	External dimensions [mm] width x depth x height	Power [kW]	Voltage [V]	Weight [kg]
HTK16/16	HTK16/17	HTK16/18	200 x 300 x 260	16	820 x 655 x 1650	11	400 V 3/N	310
HTK 20/16	HTK 20/17	HTK 20/18	250 x 320 x 260	20	870 x 675 x 1650	11	400 V 3/N	325
HTK 40/16	HTK 40/17	HTK 40/18	300 x 350 x 350	40	920 x 705 x 1740	11	400 V 3/N	370
HTK 50/16	HTK 50/17	HTK 50/18	250 x 550 x 350	50	870 x 905 x 1740	18	400 V 3/N	455
HTK 70/16	HTK 70/17	HTK 70/18	400 x 400 x 400	65	1100 x 835 x 1740	16	400 V 3/N	540
HTK 100/16	HTK 100/17	HTK 100/18	400 x 600 x 400	100	1100 x 1035 x 1790	21	400 V 3/N	620
HTK 130/16	HTK 130/17	HTK 130/18	400 x 800 x 400	130	1100 x 1235 x 1790	23	400 V 3/N	780
HTK 160/16	HTK 160/17	HTK 160/18	500 x 550 x 550	150	1200 x 975 x 1940	21	400 V 3/N	670
HTK 220/16	HTK 220/17	HTK 220/18	500 x 550 x 800	220	1200 x 975 x 2190	27	400 V 3/N	1000
HTK 300/16	HTK 300/17	HTK 300/18	500 x 1100 x 550	300	1260 x 1605 x 1940	32	400 V 3/N	1270
HTK 500/16	HTK 500/17	HTK 500/18	500 x 1200 x 800	480	1260 x 1705 x 2190	58	400 V 3/N	1310

High-temperature chamber furnaces HTK

T max. 1600 °C, 1750 °C and 1800 °C

Customised HTK high-temperature chamber furnace with de-binding system and optional negative pressure-control system and gas-fired thermal afterburning



Chamber furnace up to 1600 °C

Chamber furnace with ceiling heating via 48 $MoSi_2$ heating elements for pre-heating precious metal sheets made of platinum, rhodium, palladium. Electro-mechanical lifting door opening upwards with foot switch.

Double chamber furnace 1700 °C

Special test furnace for $MoSi_2$ heating elements with two separate heating chambers. Furnace doors with inspection hole, measurement of the upper and lower temperature. Surface temperature of the batch by means of a pyrometer.

Chamber furnace up to 1600 °C

Chamber furnace equipped with a second door at the rear of the furnace, both doors are reinforced to accept charge racks which can be fed into the furnace chamber from both sides.

Equipped with 8 heating elements, mounted on both outer walls and in two rows radiating freely across the furnace chamber.

Siemens PLC control with LabView process visualisation. Operating unit housed in a swivel arm.

High-temperature chamber furnaces HTK

T max. 1600 °C, 1750 °C and 1800 °C

Additional equipment

- **3-sided heating (1)**

  The standard heating along the side walls can be supplemented by additional heating on the rear wall of the furnace.

- **Additional door on the rear wall of the furnace (2)**

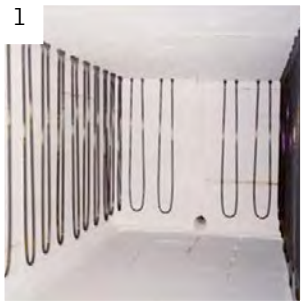
  For furnaces with a large chamber depth, the furnace rear wall can be replaced by a door. This facilitates access and shortens loading and unloading times.

- **Reinforced bottom (3)**

  To accommodate heavy batches and to relieve the fibre insulation, from HTK 70/... included in the standard scope of delivery.

- Stainless steel exhaust hoods
- Automatic exhaust air flap in the furnace ceiling
- Exhaust air purification systems
- Start-up circuit
- Fully automatic system control
- Fresh air pre-heating for de-binding processes
- Lifting door
- Cooling fan
- Protective gas operation

1



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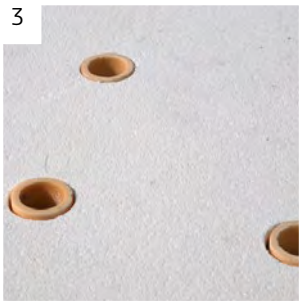


1. Photo right:
Oversized high temperature furnace for special atmosphere in the chamber

2. Photo right:
Chamber furnace with heating between charging stacks

High-Temperature bogie hearth furnaces HTW

T max. 1600 °C, 1750 °C and 1800 °C

Features

- Standard furnace range with a chamber volume of up to 2000 l.
- Supply of customised furnaces for precise adaptation to the desired processes
- The bogie hearth can be moved completely out of the furnace for convenient loading and unloading, on heavy-duty castors for free movement in front of the furnace
- Stable bogie hearth construction, completely insulated with high-quality fibre materials, sealing to the furnace housing via labyrinth guide
- Bogie hearth floor reinforced for high loads
- Double-walled furnace housing with forced cooling, thus very low outer wall temperatures
- Furnace insulation made of high-quality aluminium oxide fibre materials with low thermal mass, rapid heating and cooling possible, exhaust air openings in the furnace roof
- Bottom reinforcement for increased charging weight
- Heating via high-quality $MoSi_2$ heating elements
- Heating is via the side walls. Additional heating via the rear wall is possible.
- State-of-the-art switching and control technology, switching of the heating elements via thyristors, particularly precise furnace control, wear-free, noiseless

TECHNICAL DATA

HTW models with T max. 1600 °C	HTW models with T max. 1750 °C	HTW models with T max. 1800 °C	Internal dimensions [mm] width x depth x height	Volume [l]	Power [kW]	Voltage [V]
HTW 500/16	HTW 500/17	HTW 500/18	500 x 1200 x 800	480	80	400 V 3/N
HTW 1000/16	HTW 1000/17	HTW 1000/18	700 x 1800 x 800	1000	143	400 V 3/N
HTW 1500/16	HTW 1500/17	HTW 1500/18	850 x 2200 x 800	1500	190	400 V 3/N
HTW 2000/16	HTW 2000/17	HTW 2000/18	1000 x 2400 x 800	1920	210	400 V 3/N

Options

- **Lifting door**
  Furnaces can also be equipped with space-saving, vertically opening lift doors instead of swing doors. They are driven electrically or hydraulically. The hot side of the insulation is turned away from the user
- **Rail-bound bogie hearth**
  Bogie hearth with steel wheels on rails, for single movement even with high batch weights
- **Bogie drive**
  Electric chain slide drive for easy movement of rail-mounted bogies with heavy loads and when opening the furnace when warm hearth
- **Transverse shifting device**
  Individually adapted transverse shifting device in front of the furnace with parking tracks next to the furnace for operation with 2 bogies
- **Additional door on the rear wall of the** furnace
  - **3-sided heating**
    The standard heating along the side walls can be supplemented by additional heating on the rear wall of the furnace.
- **Start-up circuit**
  The start-up circuit ensures slow heating in the lower temperature range up to 250 °C for particularly sensitive components that must not be heated up too quickly.
- **Fully automatic system control**
- **Cooling fan**
  For better ventilation of the furnace chamber and to accelerate cycle times. Operation of the fan is automatic via the controller, fan speed can be preselected segment by segment.
- **Automatic exhaust air dampers**
- **Exhaust hoods**
- **Exhaust air purification systems**
  Supplementing the furnace systems with catalytic or thermal exhaust air purification systems as an integrated system unit.
  - **Fresh air pre-heating**
    for de-binding processes
  - **Individual kiln furniture superstructures**

High-temperature hood furnaces HTH-LB

in lift-bottom version | T max. 1600 °C, 1750 °C and 1800 °C

Features

- Wide standard furnace range with a chamber volume of 70-2000 l
- The model range includes hood furnaces a fixed or movable table
- Also with shuttle table systems (swivel tables or double table systems) for semi- or fully automatic operation.
- Customised design for precise adaptation of the system to the desired processes
- All furnace models are characterised by maximum precision and comfort as well as fast heating and cooling times with low connected loads

TECHNICAL DATA

Models with T max. 1600 °C	Models with T max. 1750 °C	Models with T max. 1800 °C	Internal dimensions [mm] width x depth x height	Volume [l]	Power [kW]	Voltage [V]
HTH 70/16 LB	HTH 70/17 LB	HTH 70/18 LB	420 x 420 x 420	70	24	400 V 3/N
HTH 170/16 LB	HTH 170/17 LB	HTH 170/18 LB	550 x 550 x 550	170	32	400 V 3/N
HTH 300/16 LB	HTH 300/17 LB	HTH 300/18 LB	1100 x 500 x 550	300	54	400 V 3/N
HTH 500/16 LB	HTH 500/17 LB	HTH 500/18 LB	1200 x 500 x 800	480	96	400 V 3/N
HTH 1000/16 LB	HTH 1000/17 LB	HTH 1000/18 LB	1800 x 700 x 800	1000	170	400 V 3/N
HTH 1500/16 LB	HTH 1500/17 LB	HTH 1500/18 LB	2200 x 850 x 800	1500	225	400 V 3/N
HTH 2000/16 LB	HTH 2000/17 LB	HTH 2000/18 LB	2400 x 1000 x 800	1920	240	400 V 3/N

- Outer casing in stable and attractive frame construction
- Double-walled housing with forced cooling, thus very low outer wall temperatures
- Proven jerk- and vibration-free table movement via electro-mechanics
- Bottom reinforcement for increased charging weight
- Furnace insulation made of high-quality aluminium oxide fibre materials with low thermal mass, rapid heating and cooling possible, exhaust air opening in the furnace ceiling
- Labyrinth seal in table and hood ensures tight closing
- Heating takes place via all four side walls, very good temperature distribution in the furnace chamber
- State-of-the-art switching and control technology, switching of the heating elements via thyristors, particularly precise furnace control, wear-free, noiseless

Options:

- Cooling fan
  For better ventilation of the furnace chamber and to accelerate cycle times. Operation of the fan is automatic via the controller, fan speed can be preselected segment by segment.
- Stainless steel exhaust hoods
  For the combined discharge of exhaust gases and hot air from the furnace, adapted to the furnace dimensions, Individually made of stainless steel and with adapted flange
- Exhaust air purification systems
  Supplementing the furnace systems with catalytic or thermal exhaust air purification systems as an integrated system unit
- Automatic exhaust air flaps in the furnace ceiling
- Start-up circuit
- Fully automatic system control
- Fresh air pre-heating for de-binding processes
- Protective gas operation

Hood furnaces with lift-bottom design

Top-hat furnaces with 1 or 2 tables that are moved horizontally in front of the furnace for loading and unloading and are lifted vertically under the furnace chamber for the heating cycle.

High-temperature hood furnaces HTH-LT

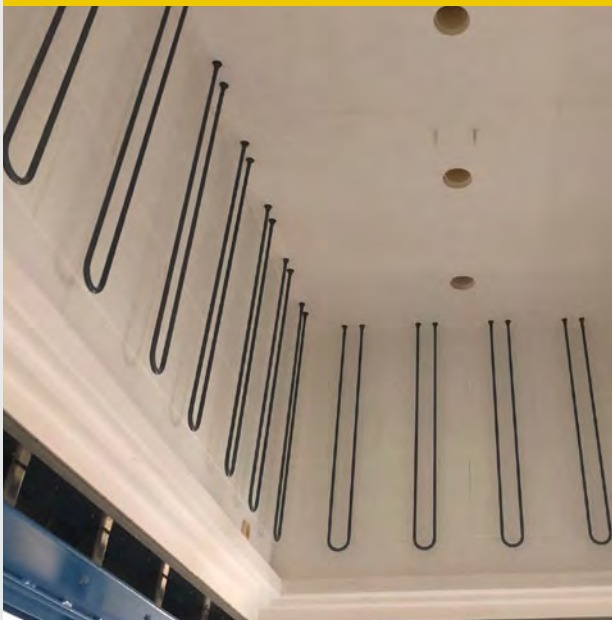
in lift-top version | T max. 1600 °C, 1750 °C and 1800 °C

4-sided heated high-temperature furnace with movable hood
for sintering vibration-sensitive components up to 1750 °C

Features

- Wide standard furnace range with a chamber volume of 70-2000 l
- The model range includes hood furnaces with a vertically movable hood and a fixed table or alternatively a horizontally movable table
- Also with shuttle table systems (swivel tables or double table systems) for semi- or fully automatic operation.
- Customised design for precise adaptation to the desired processes
- All furnace models are characterised by maximum precision and comfort as well as fast heating and cooling times with low connected loads
- For temperature ranges from 1500 °C to 1600 °C with SiC heating, for temperatures from 1600 °C to 1800 °C with $MoSi_2$ heating elements

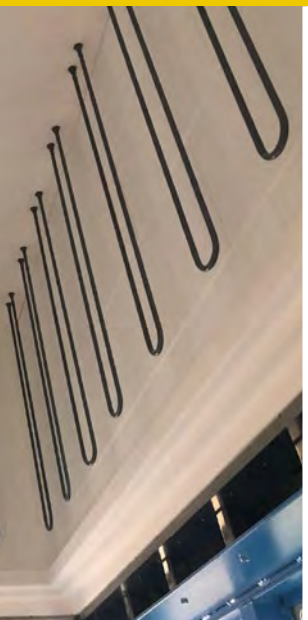
TECHNICAL DATA



- Outer casing in stable and attractive frame construction
- Double-walled housing with forced cooling, thus very low outer wall temperatures
- Proven jerk- and vibration-free motion sequences via electro-mechanics
- Furnace insulation made of high-quality aluminium oxide fibre materials with low thermal mass, enables fast heating and cooling, exhaust air opening in the furnace ceiling
- Bottom reinforcement for increased charging weight
- Labyrinth seal in table and hood ensures tight closing
- Heating takes place via all four side walls, very good temperature distribution in the furnace chamber
- State-of-the-art switching and control technology, switching of the heating elements via thyristors, particularly precise furnace control, wear-free, noiseless

Options

- Exhaust air flaps in the furnace ceiling
  for faster ventilation of the furnace chamber, controlled manually or automatically via the controller
- Start-up circuit
  The start-up circuit ensures slow heating in the lower temperature range up to 250 °C for particularly sensitive components that must not be heated up too quickly.
- Fresh air pre-heating for de-binding processes
  Programme controlled injection of preheated fresh air up to max. 500 °C for de-binding processes. Ensures reliable removal of organic components from the furnace chamber through gentle heat input in the lower temperature range. After de-binding, transfer to the sintering process. No need for time-consuming reloading of the batch or furnace change.
- Stainless steel exhaust hoods
- Exhaust air purification systems
- Fully automatic system control
- Cooling fan
- Protective gas operation

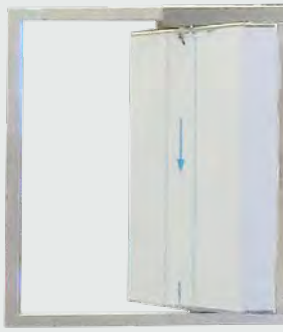


HTH models with T max. 1600 °C	HTH models with T max. 1750 °C	HTH models with T max. 1800 °C	Internal dimensions [mm] width x depth x height	Volume [l]	Power [kW]	Voltage [V]
HTH 70/16 LT	HTH 70/17 LT	HTH 70/18 LT	420 x 420 x 420	70	24	400 V 3/N
HTH 170/16 LT	HTH 170/17 LT	HTH 170/18 LT	550 x 550 x 550	170	32	400 V 3/N
HTH 300/16 LT	HTH 300/17 LT	HTH 300/18 LT	1100 x 500 x 550	300	54	400 V 3/N
HTL 500/16 LT	HTL 500/17 LT	HTL 500/18 LT	1200 x 500 x 800	480	96	400 V 3/N
HTH 1000/16 LT	HTH 1000/17 LT	HTH 1000/18 LT	1800 x 700 x 800	1000	170	400 V 3/N
HTH 1500/16 LT	HTH 1500/17 LT	HTH 1500/18 LT	2200 x 850 x 800	1500	225	400 V 3/N
HTH 2000/16 LT	HTH 2000/17 LT	HTH 2000/18 LT	2400 x 1000 x 800	1920	240	400 V 3/N

Combi furnaces for de-binding and sintering HTK-DB

High-temperature chamber furnaces with fresh air pre-heating and safety device

T max. 1600 °C up to 1750 °C



HTK 70/16 DB – HTK 300/17 DB

- High-temperature chamber furnaces technically like the standard models HTK, but as combi furnaces up to 300 l volume and T max. 1750 °C
- Fresh air preheating: Preheated fresh air is blown in horizontally up to max. 500 °C
- Automatic transition to the sintering process up to maximum temperature
- Double-walled housing with forced cooling, thus very low outer wall temperatures
- Furnace insulation made of high-quality aluminium oxide fibre materials with low thermal mass, rapid heating and cooling possible
- Bottom reinforcement for increased charging weight
- Automatic exhaust air flap control with separate exhaust air piping and stainless steel exhaust air measuring unit
- Multi-zone furnace control with additional separate control of fresh air preheating
- Fully automatic plant control via Siemens PLC S7-300

TECHNICAL DATA

Models with T max. 1600 °C	Models with T max. 1750 °C	Internal dimensions [mm] width x depth x height	Volume [l]	Power [kW]	Voltage [V]
HTK 70/16-DB	HTK 70/17-DB	400 x 400 x 400	64	19	400 V 3/N
HTK 160/16-DB	HTK 160/17-DB	500 x 550 x 550	150	25	400 V 3/N
HTK 300/16-DB	HTK 300/17-DB	500 x 1100 x 550	300	50	400 V 3/N

HTK chamber furnaces up to 1800°C, modified and individually adapted to specific processes with negative pressure systems, process gas control or exhaust air cleaning.

Gas-fired high-temperature furnaces

T max. 1600 °C

In the production of technical ceramics and refractory materials, gas-heated high-temperature furnaces are often used for sintering the components. THERMCONCEPT offers various furnace concepts that enable precise adaptation to the process required in each case.

- Furnace systems up to T max. 1600 °C
- Universally applicable furnace types (chamber furnaces, bogie hearth furnaces, hood furnaces, mobile furnaces)
- Excellent firing results
- Low energy consumption due to a special multi- layer refractory lining with best insulating properties
- Burner systems with a wide performance range, specially matched to the furnace system
- Automatic control of the burner atmosphere
- Start-up of the furnace at low temperature with high temperature accuracy and without temperature jumps
- Optimum temperature distribution due to multi-zone control and special flue gas routing
- State-of-the-art control and regulation technology with optimum management of the processes, for fully automatic operation of the plant, with perfect adaptation to the needs of the user
- Minimal maintenance effort

Mobile **furnace 1600 °C**
Gas-fired mobile furnace for firing SiC crucibles up to T max. 1600 °C. Usable dimensions: 2800 x 8300 x 2500 mm (wxdxh). The heated furnace hood moves alternately over two loading positions. Electric drive. Delivery and assembly incl. complete exhaust system.


JUNGHEINRICH

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Laboratory furnaces 200–1800 °C

Laboratory furnaces

Drying cabinets, Air-circulation furnaces, Chamber furnaces, Tube furnaces

For the development of new material compositions, modified debinding and sintering processes or for the adaptation of customer-specific processes, laboratory furnaces from the THERMCONCEPT range are suitable in the first step for testing individual pieces or small batches.

Drying furnaces and convection ovens with volumes from 15 to 800 litres for the temperature range from 5 °C over ambient temperature up to 850 °C are ideally suited for the development of drying and debinding processes on a small scale due to their high temperature accuracy

For temperatures of 800-1800 °C, muffle and chamber furnaces with volumes of 3-128 litres and various configurations can be used.

For applications under protective gas or vacuum, tube furnaces with corresponding flanges are a good choice.
Like production furnaces, the different series can be modified and optionally adapted to the individual processes with extensive accessories.

You will find the full programme in our catalogue „Laboratory - Research - Development“, please do not hesitate to contact us for advice.

Furnace types

- Muffle furnaces 1100–1200 °C
- Chamber furnaces 1100–1400 °C
- High temperature furnaces 1400–1800 °C
- Elevator furnaces 1100–1800 °C
- Tube furnaces 1100–1800°C
- Drying furnaces 200–300°C
- Air-circulation chamber furnaces 450–850°C
- Accessories, individually adapted to different series

Vacuum drying furnaces KTL-V

T max. 200 °C

Accurate and fast vacuum dryers

Vacuum drying furnaces feature noise-free operation and fine sample heating, provide high-quality, safe heating and drying of samples up to constant weight

- Fast, gentle, ecological - laboratory dryers for the highest demands
- Particularly suitable for thermally unstable and oxidation-sensitive materials as well as for components with complicated geometry in vacuum
- High operating comfort and precise temperature regulation
- Standard version with microprocessor control, operating elements on the membrane keypad, LCD display with process information
- Wide range of additional equipment and accessories such as pumps and matching cabinets

Our »Laboratory – Research – Development« catalogue provides further detailed information

TECHNICAL DATA

Series	Temperature	Chamber volume	Feature
KTL	250 °C / 300 °C	23, 55, 112, 221, 411, 715	Thermal circulating air for sensitive goods, e.c. powder
KTL /A	250 °C / 300 °C	23, 55, 112, 221, 411, 715	All-round series with forced circulating air
KTL /V	200 °C	26, 55, 106	Vacuum-drying furnace
KU /04/A	450 °C	15, 35, 70, 135, 270, 540, 800	Robust furnace up to 450°C for drying and pre-heating
KU /06/A	650 °C	15, 35, 70, 135, 270, 540, 800	Multifunction furnace with a wide range of applications
KU /07/A	750 °C	15, 35, 70, 135, 270, 540, 800	Heated on 4 sides with very high temperature accuracy
KU /08/A	850 °C	15, 35, 70, 135, 270, 540, 800	Very high temperature with air circulation

Drying cabinets KTL

with thermal and forced convection

T max. 250 °C

Air circulating chamber furnaces KU

with horizontal circulating air

T max. 850 °C

Precise and gentle drying +10 °C above ambient up to 250 °C

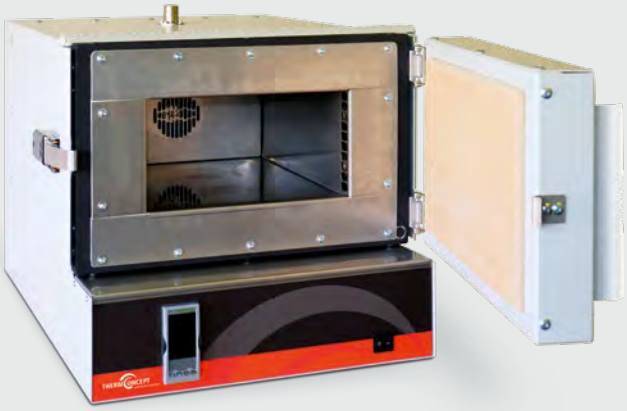
High-quality and safe drying, heating and tempering of samples in the laboratory and industrial sector. Particularly suitable for materials with high moisture content, for demanding and accurate tests and drying processes.

- Special air circulation within the chamber for homogeneous temperature distribution during drying and heating of materials
- High operating comfort, precise temperature regulation and short temperature equalisation times in the chamber after charging
- KTL 20/02 to KTL 700/02 with thermal air circulation and very fine air flow e.g. for powder drying, noise-free operation
- Extensive range of accessories

High temperature accuracy in the temperature range 100–850 °C

Air-circulation chamber furnaces for temperatures up to 850 °C achieve good temperature distribution quickly and reliably due to the forced, horizontal air circulation technology. These models are therefore particularly suitable for drying, pre-heating and tempering.

- Robust housing made of high-quality sheet steel
- Inner casing as air guide box made of heat-resistant stainless steel, with long service life, extremely robust and corrosion-resistant
- With 2 pairs of sliding ledges for optional trays
- High-performance horizontal air circulation ensures uniform temperature distribution up to +/- 3 K (750 °C furnaces) according to DIN 17052
- Various different controllers for advanced process control
- Extensive range of accessories and options for adaptation to the process
- Individual special versions can be realised on request



Chamber furnaces, muffle furnaces and elevator furnaces for the laboratory

T max. 1100 °C up to 1800 °C

All-round furnaces for a wide range of applications

Laboratory chamber and muffle furnaces with volumes of 3- 60 litres are used for a wide variety of applications in laboratories and industry, e.g. for testing, inspecting, ashing, pre-heating, de-binding, firing, sintering, annealing, melting, bake-out, etc.

TECHNICAL DATA

Series	Temperature	Chamber volume	Feature
KLS	1100 °C / 1200 °C / 1300 °C	3, 5, 10, 15, 30, 45, 60	With lifting door, heating elements on support tubes
KLC	1400 °C / 1500 °C / 1600 °C	3, 5, 10, 15, 30	SiC rod heated, with lifting door
KC	1300 °C / 1400 °C	16, 32, 64, 128	Cubic utility room, heated on 5 side
HTL	1500 °C/ 1600 °C / 1750 °C / 1800 °C	1, 2, 4, 10, 16, 20	Compact high temperature furnaces
ELS	1100 °C / 1200 °C / 1300 °C	8	Elevator furnaces for the low temperature range
ELC	1400 °C / 1600 °C	8	SiC rod-heated elevator furnaces
ELHT	1700 °C / 1800 °C	8, 16	High-temperature elevator furnaces

Options

With an extensive range of accessories, options and extras, the furnaces can be specially adapted to individual processes.

You will find detailed information in our »Laboratory – Research – Development« catalogue

Tube furnaces

T max. 1100 °C up to 1800 °C

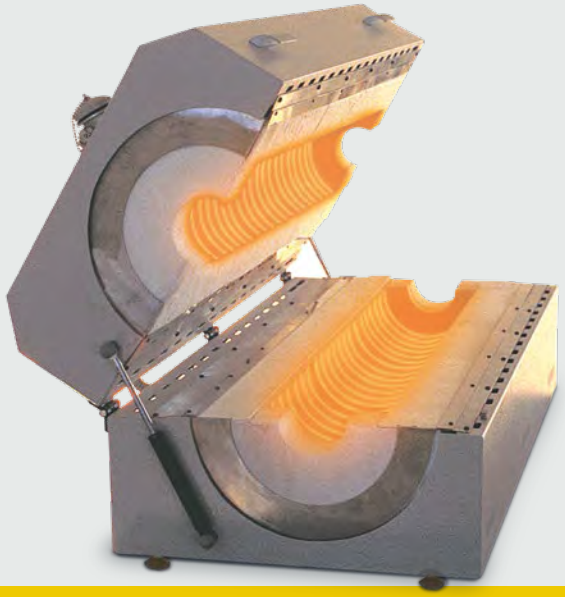
High temperature accuracy and good inert gas atmosphere

Tube furnaces are particularly suitable when small samples are to be tested with high temperature accuracy. The small sample chamber and the very intensive, uniform heating thus ensure very good results over a defined length.

Very good protective gas atmospheres or a vacuum can be achieved with tube furnaces.

Depending on the series, tube furnaces can be operated horizontally, diagonally and/or vertically or can also be customised for installation in a test setup.

- Robust housing constructions
- High-quality insulation for low energy consumption and low electricity costs
- Heating elements with long service life, for even heat transfer



TECHNICAL DATA

Series	Temperature	Heated length	Pipe diameter	Feature
ROT	1200 °C / 1300 °C	300 / 450 / 600 mm	Max. Outer -Ø -60, -85, -120 mm	Tube can be replaced quickly and easily
ROS	1200 °C	250 / 450 / 600 / 750 / 900 mm	Max. Inner-Ø 20, 40, 50, 75, 105 mm	Flexible as a built-in unit and for individual applications
ROTK	1200 °C / 1300 °C	300 / 450 / 600 mm	Max. Outer -Ø -60, -85, -120 mm	Tube can be replaced quickly and easily, hinged
ROK	1100 °C	modular 250 / 500 / ... mm	Max. Outer -Ø -70, -100, -130, -160, -200, - 250 mm	Can be folded up and used vertically
ROC	1400 °C / 1500 °C / 1600 °C	250 / 450 / 610 mm	Max. Inner-Ø -60, -85, -120 mm	High temperature range and vertical use
ROHT	1700 °C / 1800 °C	200 / 300 / 400 / 600 mm	Max. Outer -Ø -50, -60, -85 mm	Very high temperature range

Options

- Ceramic or quartz working tubes
- Controller with extended programming possibilities as well as batch temperature measurement and -regulation
- Special lengths and multi-zone versions available on request
- Flanges for inert gas and/or vacuum operation as well as manual and automatic gassing systems
- Vacuum pumps and cooling units

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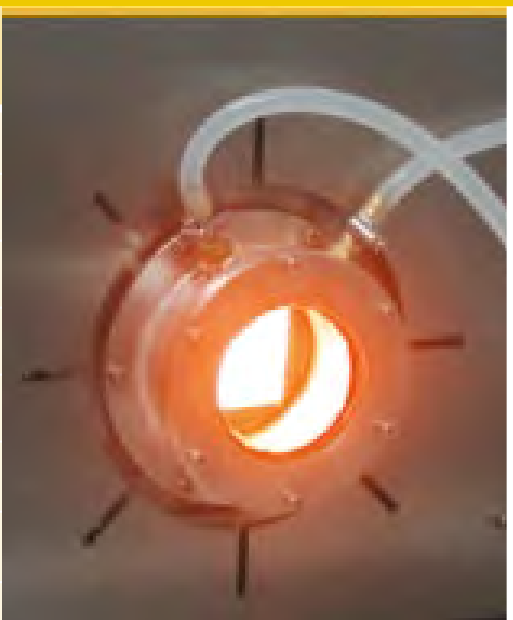
You will find detailed information in our »Laboratory – Research – Development« catalogue




08.01.2022
Hauptmenü
WK 7900/07/S
Charge:
Probebrand
Programm:
Probebrand
Anzahl / akt. Segment:
Programmlaufzeit:
Segmentlaufzeit:
Solltemperatur:
TNV:
Kühlung linear:
Zuluft konstante Drehz
29,9%
0,0%
149°C
254°C
254°C
254°C
-10,0Pa
Aal
0,0%
THERMCONCEPT

thermconcept.com

Process Control

Process Control and Documentation

Control technology tailored to the application and the furnace is part of the basic equipment of THERMCONCEPT furnaces. Controllers from renowned manufacturers ensure extremely precise control of the processes. If necessary, the control technology can be expanded to include appropriate software for programming, monitoring and evaluating the processes. PLC controls with touch panels as user interfaces are also available. Our proven standard systems can also be supplied in compliance with factory standards and equipment regulations.

Heating element control

Contactors

- Practice-oriented switching frequencies, sufficient for many processes
- Cost-effective and efficient solution

Solid state relays (SSR)

- High switching frequency and thus fast reaction time for temperature control
- Wear-free and quiet
- Inexpensive solution for higher demands on control and temperature accuracy
- Heating circuit monitoring with notification of defective heating elements as an option

Thyristors (phase control)

- Extremely precise temperature control
- Also wear-free and quiet
- Smooth, constant mains load, no mains fluctuations, protection of the heating elements
- Heating circuit monitoring with notification of defective heating elements as an option

Furnace temperature control

Furnace chamber control 1

- Measurement at a mechanically protected position in the furnace chamber, which from experience represents a good average value for the regulation

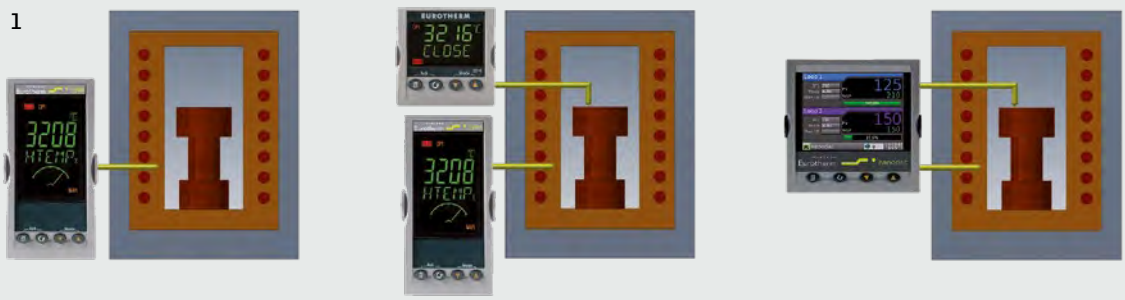
Furnace chamber control with batch measurement 2

- Independent display of the measured temperatures
- For manual checking of the programmed temperature values
- No influence on the regulation

Batch control (cascades) 3

- Temperature measurement and control in the furnace chamber and directly at the batch
- Display of both temperatures
- Very precise temperature control through continuous adjustment of furnace chamber and batch temperature

1



Program Controller

Eurotherm 3208/3216

- 1 programm with 8 segments (4 ramps and 4 hold times)
- 1 Extra function
- RS 485 interface and iTools software as option
- Multi-zone control optional

Eurotherm 3216i/32h8i

- Can be used as temperature selector monitor or adjustable temperature selector limiter
- Alarm message as plain text
- Can also be used as a permanently mounted temperature display, optionally also with interface for documentation via iTools software

Eurotherm Nanodac

- Can be used as a programme controller/recorder combination for multi-zone or cascade control
- Clear colour display
- Freely programmable as a programme controller with 100 programmes with 25 segments each
- 4 thermocouple inputs freely configurable
- USB port for removable media, integrated flash memory
- Ethernet interface
- Incl. software for programming, control and documentation

Programm Controller

THERMCONCEPT PID controller TCP 400 with 4.3“ and TCP 1000 with 10“ touch panel

- 100 programmes with 24 segments each
- PID programme controller with input via touch panel
- Precise temperature control, self-optimisation
- Clear and intuitive operation largely language-neutral via pictograms
- Up to 5 programme-controlled event functions / control contacts possible
- Resistive touch screen, operation also possible with gloves
- Programmes can be individually named with plain text
- Display of up to 3 operating states (depending on the furnace version)
- Graphical view of the programme progress
- Language selection (DEU, GBR, FRA, CZE, CHN, NED, ES, PT, IT)
- Alarm messages in plain text
- Real-time display with date and timer for up to 20 days lead time
- History display of the last 48 h on the display
- USB interface for reading out data history on USB stick integrated (plug-in socket optional)
- Ethernet interface for connection to a PC with corresponding software integrated (plug-in socket optional)
- Excel script for simple graphical evaluation of the measurement data
- Holdback for guaranteed warm-up time

Optional

- Module for cascade control:
  Programme controller with furnace chamber and batch temperature control with 1 thermocouple each, switchable between furnace chamber and batch control for optimum temperature control in each case
- Multi-zone control module: For precise temperature control over multiple heating zones in the furnace chamber.
- Webviewer to monitor and operate the furnace via mobile phone or computer
- Temperature controller with 7-day preselection clock for programmable switching between day and night temperature, especially for furnaces in shift and continuous operation

Steuerung und Dokumentation

Control

THERMCONCEPT uses the Siemens PLC S7 to control complex processes and programme sequences, taking into account any necessary safety devcies.These are created and optimised individually and specifically for the respective application in close cooperation with the user.

Siemens SPS S7 control/operator interfaces

- Individually matched and programmed to the furnace and process
- Customised, individual user interfaces as an option
- Optimal solution for systems with a wide range of functions and high process reliability
- Detailed process messages with full text output (multilingual)
- Simple tabular programme input via touch panel
- Clear colour display

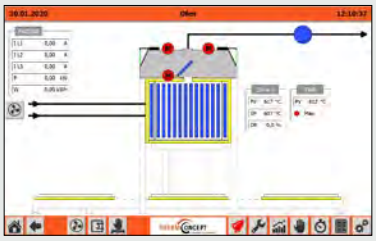
Documentation

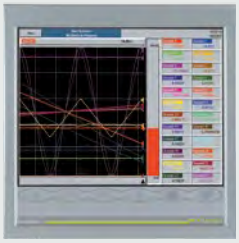
The documentation of all process-relevant data plays an important role as proof of compliance with heat treatment regulations and for quality assurance. THERMCONCEPT offers a range of options for this purpose:

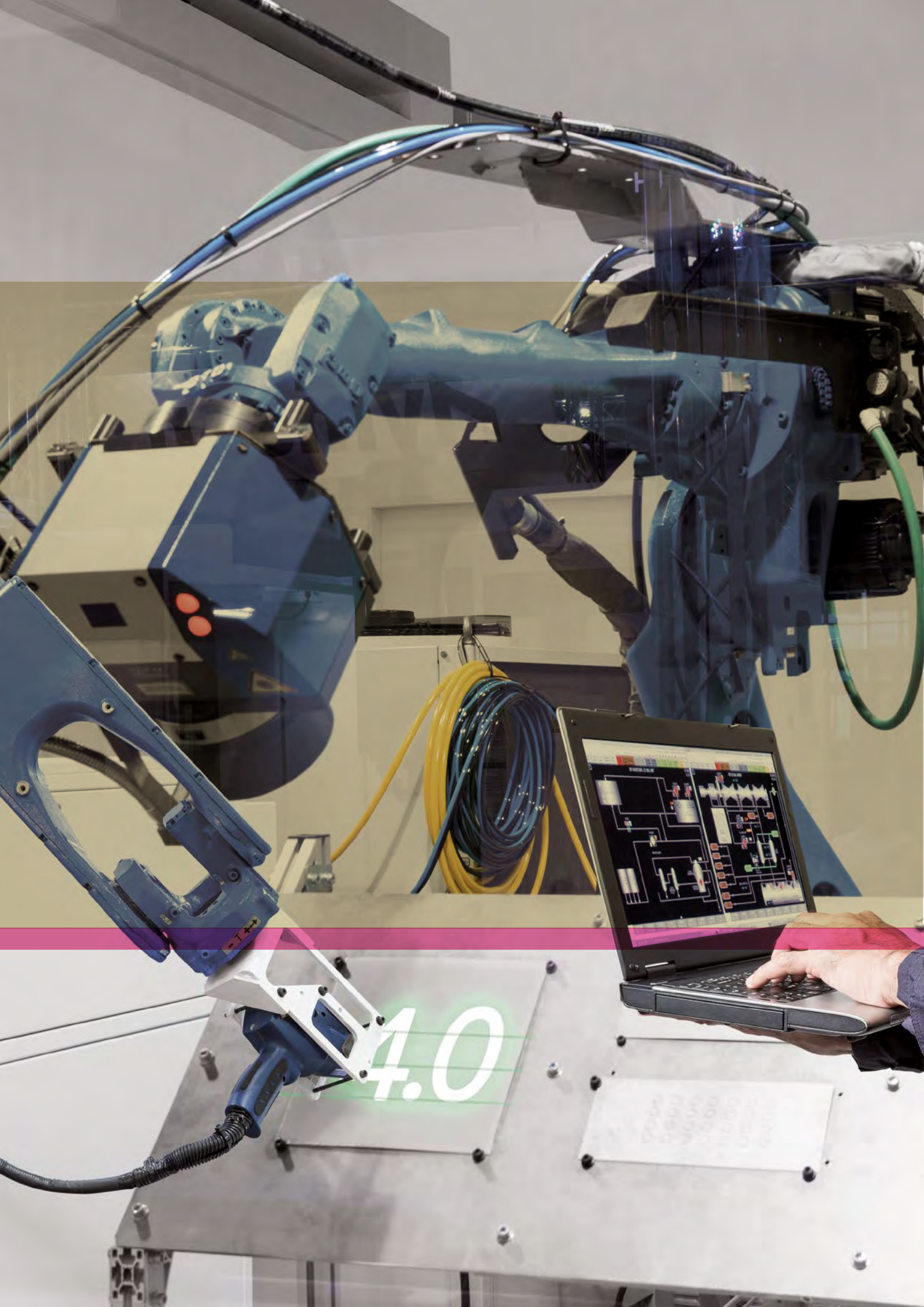
- Eurotherm iTools and Eurotherm controllers with connection to a PC for programming, monitoring and documentation
- Digital recorders with up to 18 channels, USB interfaces, Ethernet, memory cards
- Process standard compliant recorders such as Eurotherm Aerodac 6100A, 6180A, 6100XIO, Nanodac

Software for control and analysis:

- Eurotherm iTools for professional process control and documentation of temperature-time profiles and batch data
- Multiple furnaces can be managed simultaneously
- Control from a central PC or via a Network
- Great operating comfort



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Plant periphery

Plant automation

The need for automation in all areas of industrial production is constantly increasing. THERM-CONCEPT complements furnace systems with integrated systems.

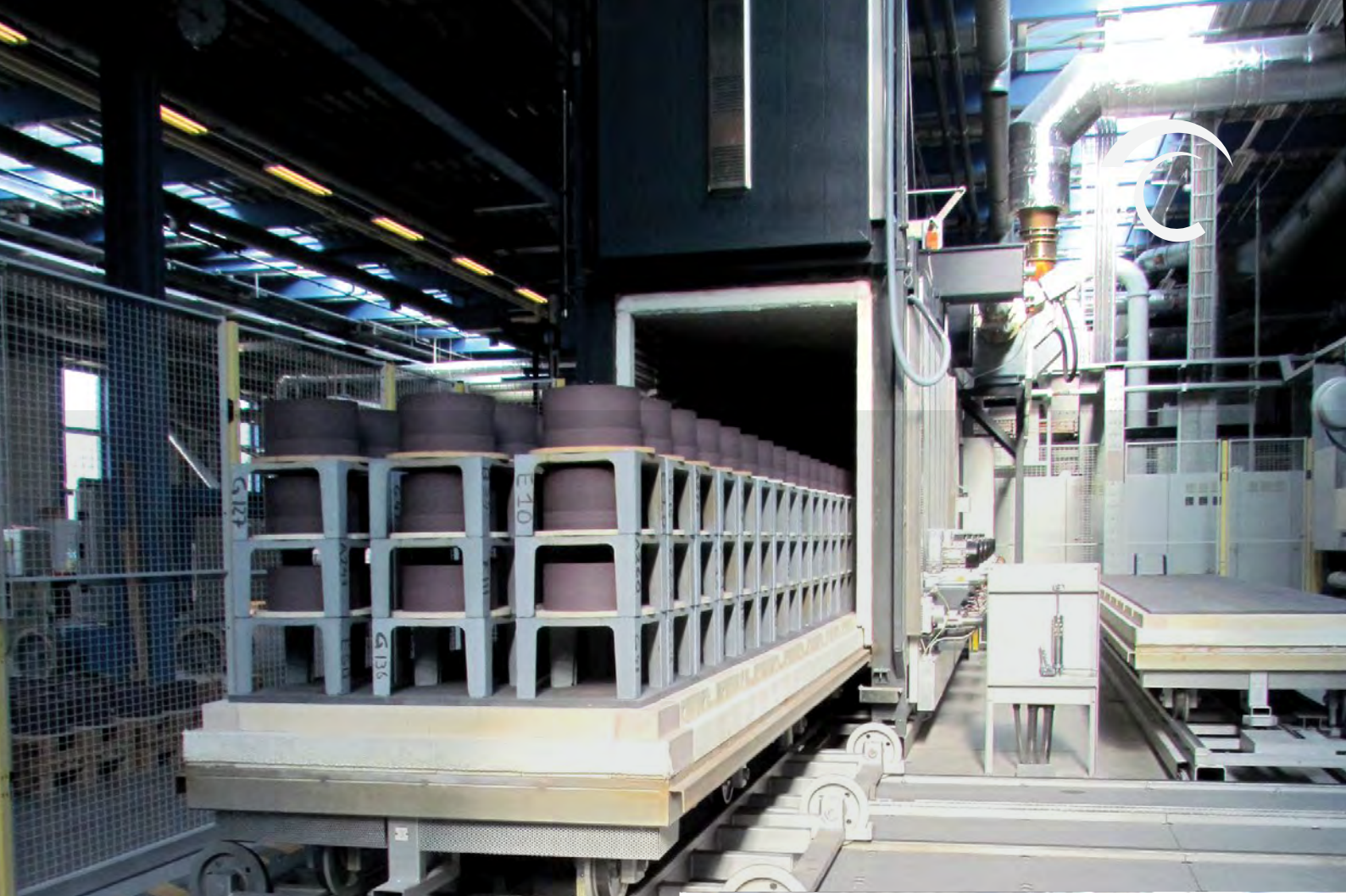
- for loading and placing products on batch carriers, tables and bogies outside the furnace,
- for direct loading and unloading of an furnace chamber
- for forwarding hot and cold products after the process and
- with systems for transport into and out of the furnace.

These systems can be manually supporting, exclusively related to the temperature process or fully integrated.

The following systems are used:

- Suspended transport systems
- Roller conveyor
- Automatic transverse shifting devices for rail-mounted bogie hearths
- Rail-bound linear conveyors
- Fully automatic loading and unloading systems based on 6-axis industrial robots

Automation is carried out in close coordination and cooperation with the user and the respective suppliers of individual assemblies.



Catalytic and thermal exhaust air purification systems

Volatile organic substances are released during many thermal processes in industry. Compliance with emission limits requires the use of downstream exhaust air purification systems.

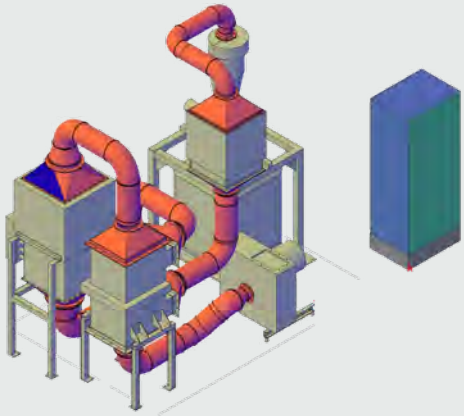
THERMCONCEPT supplies catalytic and thermal exhaust air purification systems that are individually adapted to the process.

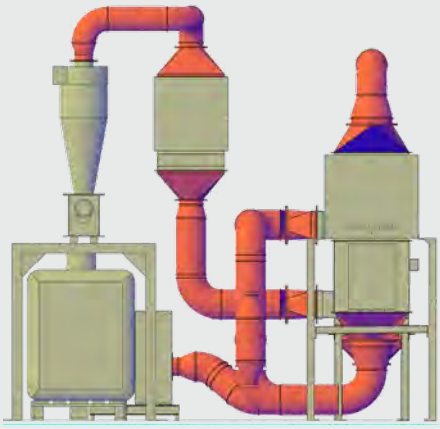
Catalytic exhaust air purification (KNV)

THERMCONCEPT catalytic converters work with ceramic honeycomb bodies coated with needle perovskite crystals, which have a high resistance to most catalyst poisons. The design of the catalytic exhaust air purification systems is based on the exhaust gas volume flow and the composition and concentration of the organic constituents. Depending on the application, these are catalytically oxidised at temperatures between 280 °C and 500 °C and completely converted into carbon dioxide and water.

THERMCONCEPT supplies integrated plant systems consisting of the furnace system, the catalytic exhaust air purification system and a PLC overall process control system.

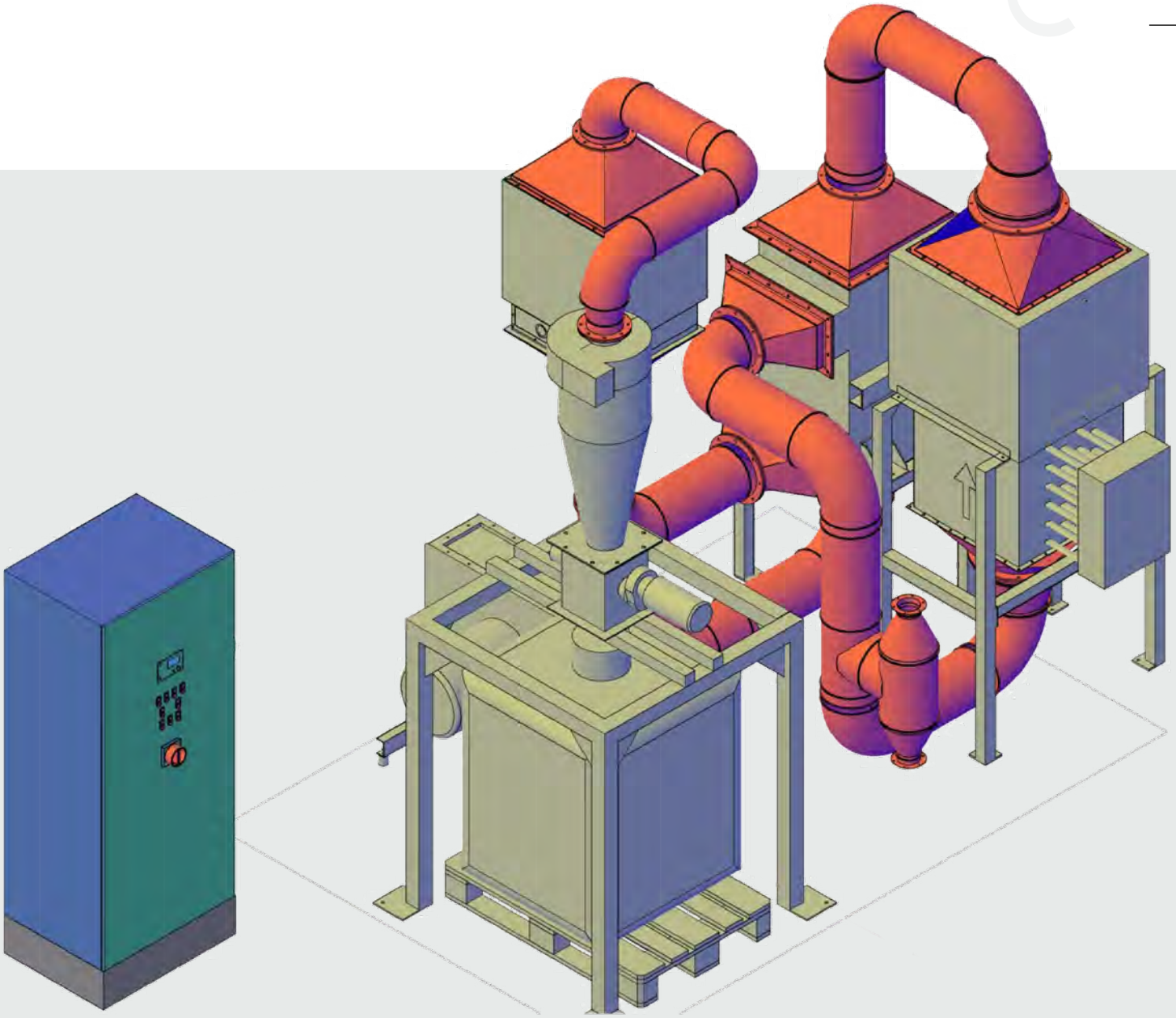
The plant system also includes the required safety technology according to EN 1539.



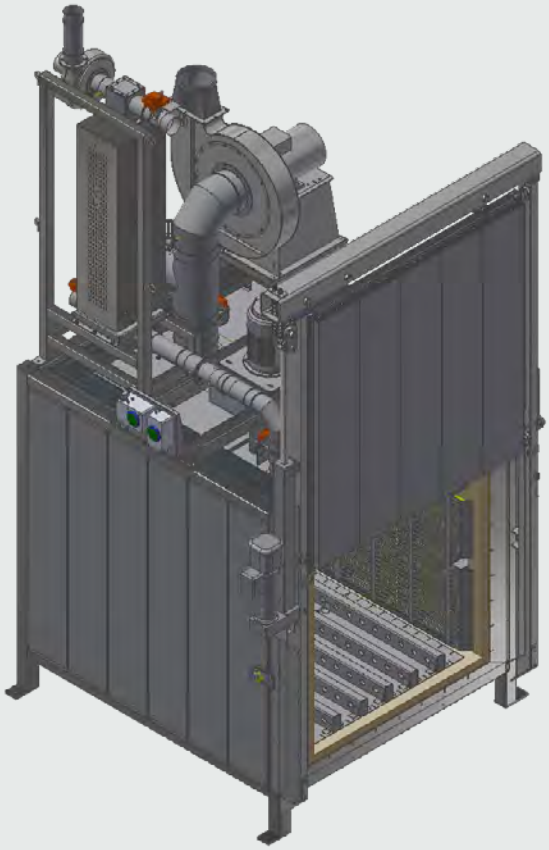


Photos left: :
Catalytic exhaust system, individually designed for process-specific exhaust gas quantities and components

Photos right:
Larger standard catalytic converter with different cleaning stages via honeycombs and chutes as well as heating coils.



Catalytic and thermal Exhaust air purification systems



Thermal exhaust air purification (TNV)

THERMCONCEPT develops, builds and supplies thermal afterburners for various applications. This robust and versatile type of exhaust air purification is usually used in the case of an undefined raw gas or when catalyst poisons preclude the use of a KNV. Organic components in the exhaust air are completely incinerated.

- Version in upright, horizontal or suspended design
- With sound insulation measures (Installation of silencers, soundproof booths)
- Insulation with high-quality ceramic fibre for combustion temperatures up to 1200 °C
- Heating via gas or oil burner, electric heating also possible
- Volume flows from 50 nm³/h to 15,000 nm³/h
- Can be equipped with heat exchanger for heat recovery
- Plant system equipped with the required safety technology

THERMCONCEPT range of services:

- Planning and design of exhaust air purification systems for new and old plants
- Accompaniment of official approval processes and emission measurements
- Connection to upstream and downstream process steps
- Integration into existing conveying and handling solutions

THERMCONCEPT uses thermal afterburners for electrically or gas-fired furnace systems. The focus is always on supplying a complete solution individually tailored to the user‘s process, which includes the furnace, the thermal afterburner, the safety technology and also the process control.

thermconcept.com

THERMCONCEPT Service

Professional service

We make your furnace project ours

Success through consultation

Trust in the experience we have gained over the years in industrial furnace construction. We turn your special wishes into optimal solutions.

Your application is the focus

We support you in selecting the right furnace system so that you make the right investment decision.

Everything from one source

As a system provider, we not only advise you on the selection of the right furnace system. You can also contact us when it comes to plant automation and the use of supplementary aids, tools and systems.

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Qualified service staff

With our qualified staff, we offer a wide range of professional services around the furnace system, for your safety right from the start. Our service technicians are involved in the production at our headquarters and thus keep their knowledge up to date at all times. They are specialists for

- Insulation
- Control and regulation technology
- Heating technology
- Software
- Electrical engineering/electronics
- Mechanics

The holistic support and maintenance of your furnace system is our focus.

Retrofit and adaptation to standards

THERMCONCEPT furnaces are known for their durability. After many years of hard use, they are far from being old iron. We take care of your systems and make them fit for the future. Often, considerable energy savings can be achieved with little effort. Adaptations to current standards are also possible, so that the furnace system can also be used for additional applications and processes. Modern control systems increase the ease of operation and expand the possibilities of process documentation.

Fit for Future

What you can expect from us is a comprehensive package of professional services to keep your furnace fit for the future.

Furnace inspections

During a furnace inspection, we thoroughly check the condition and functionality of your furnace system. On request, this also includes measuring the temperature uniformity according to DIN 17052-1, SAT, TUS and checking whether your system still complies with the applicable standards. The results are documented in a test report.

summarised in a report. In addition, we provide you with profitability analyses for the necessary retrofit measures.

Preventive maintenance – Predictive maintenance – Life-cycle costing

Unexpected system downtimes cause trouble and considerable follow-up costs. That's why we offer you flexible maintenance contracts with regular inspections as well as preventive and cost-effective replacement of critical spare parts. The maintenance work is comprehensively documented and analysed. This is the prerequisite for optimising life cycle costs.

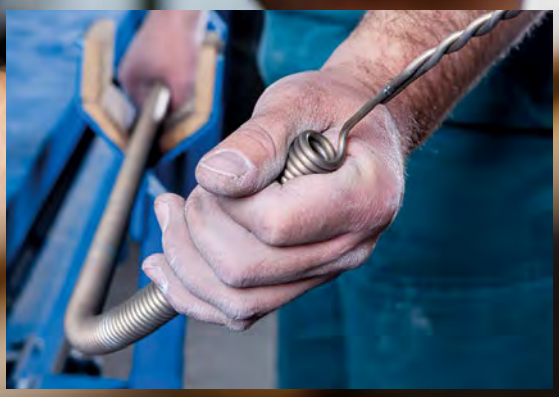
Spare and wear parts - Only the original is first choice

Spare and wear parts from THERMCONCEPT offer you:

- always original equipment quality
- are 100 % safe to use and a perfect fit
- maximum service life
- a better price-performance ratio than supposedly cheaper replica parts
- constant availability
- the adoption of product improvements also for spare parts
- responsive logistics

Online monitoring/online support

With online support, we offer our customers an extremely economical service for support, e.g. for programme optimisation, troubleshooting, etc. This often avoids costly on-site visits by service technicians.



Our product range

Technical Ceramics | Bio-Ceramics
High-End Ceramics

THERMCONCEPT furnaces and heat treatment systems are used for many applications in industry for the development and production of technical ceramics. Our chamber furnaces, bogie hearth furnaces and hood furnaces are electrically or gas heated. In addition to a wide range of practical standard models, we also supply furnace systems specially tailored to your application, plant automation systems and suitable exhaust air cleaning systems.

Labor | Forschung | Entwicklung

Furnaces for research and laboratory applications are available for temperatures from 200 °C to 1800 °C. Our programme includes muffle furnaces, tube furnaces, drying furnaces, elevator furnaces and high-temperature furnaces.

Metal | Industry | Production

THERMCONCEPT manufactures industrial furnaces and plants for a wide range of applications and a temperature range from 50 - 1300 °C. You have the choice between different furnace types, electrically heated and gas-fired systems and furnace systems operating under inert gas. The main areas of application are heat treatment of steel materials, non-ferrous metals, plastics and fibre-reinforced composite materials.

Foundry

The foundry programme includes electrically and fuel-heated melting and holding furnaces for light and heavy metals, which are designed both as bale-out and tilting furnaces. We also supply furnaces for a wide range of heat treatments in foundry use.

THERMCONCEPT GmbH

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