Thermprocess-Technology

LABORATORY RESEARCH DEVELOPMENT

Furnaces and Thermprocessing Plants for

- TESTING
- ANALYZING
- ASHING
- DRYING
- PREHEATING
- DEBINDUNG
- FIRING
- SINTERING
- ANNEALING
- MELTING
- 3D-PRINTING
- TEMPERING
- HEATING
- STRESS RELEASING
- CALCINATING
- ....

THERMCONCEPT
powered by innovation

Experts in furnaces

THERMCONCEPT develops, designs and manufactures furnaces and industrial systems for a broad range of applications in production and R&D. Many of our employees have decades of experience in the field of furnace construction. We use the resulting expertise every day to plan and realize an optimal furnace solution.

Engineering

Our highly qualified engineers and technicians, hard- and software engineers and mechanics work out cost-effective and reliable solutions. A close contact to the user enables us to design furnaces that are practical to operate. Our aim is to provide crucial technical and economic benefits.

Fast and flexible

Many applications can be solved with our standard furnace range. Your advantages: Sophisticated equipment, proven in practice with excellent price/performance ratio and short delivery times. Of course we also deliver furnace systems especially tailored to your application. In close coordination with you a furnace system is created, which will meet your demanding tasks reliably and economically.

Automation and Industry 4.0

The need for automation in all areas of production is increasing constantly. THERMCONCEPT supplies adapted automated systems for batch handling. We are just as familiar with linear handling as we are with robot supported systems.

For monitoring, control and regulation of heat treatment processes we use sophisticated software and hardware components. Machine communication and technical assistance worldwide is part of our service profile.

Global Sales and Service Network

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

THERMCONCEPT *powered by innovation*

THERMCONCEPT furnaces and industrial heat treatment plants stand for:

- TOP quality and sophisticated technology
- Practical and service-friendly constructions
- Customer-specific and application-oriented solutions
- Highest possible thermal efficiency and economy
- Environmentally compatible materials
- Professional service, plant support and assurance of a reliable operation

THERMCONCEPT is your partner for high performance furnaces and plants for versatile and demanding applications in production and research.

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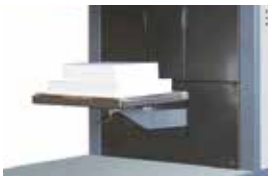
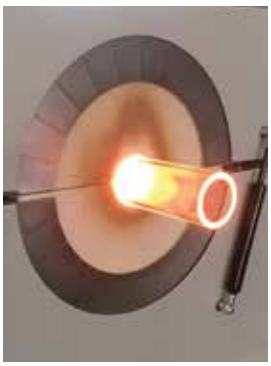




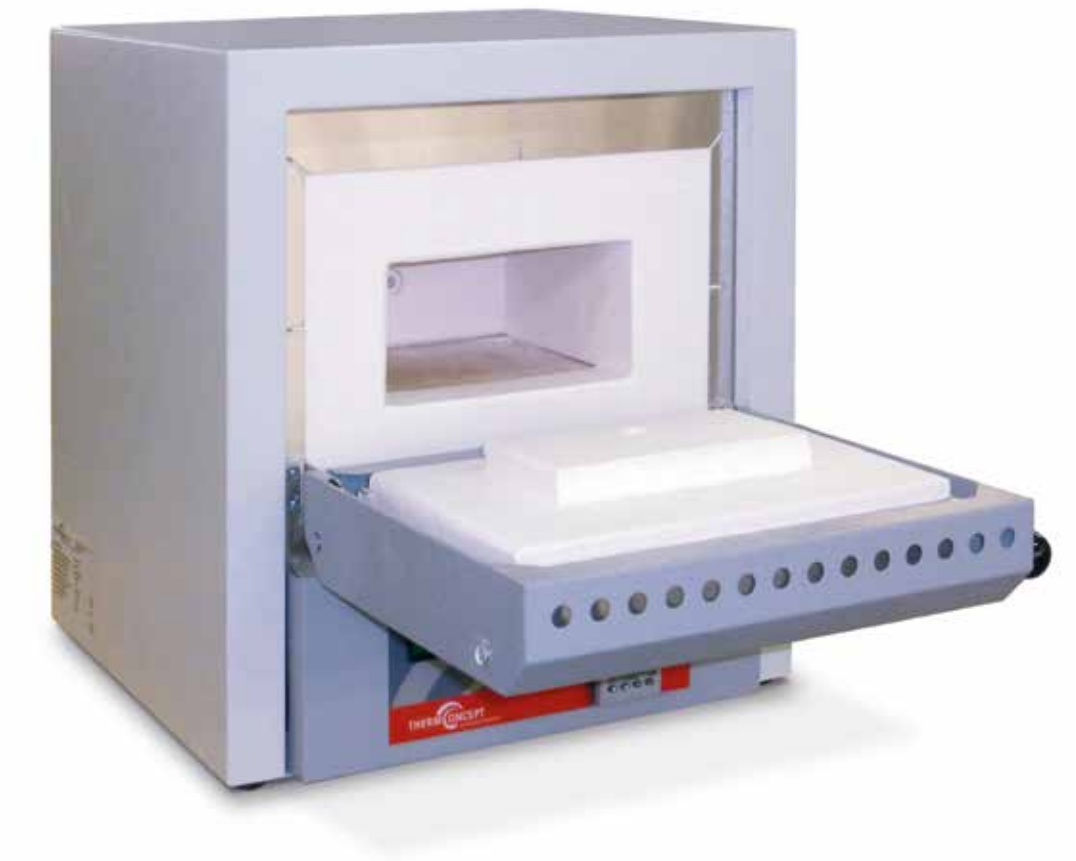
MUFFLE FURNACES KL

T max. 1100 °C and 1200 °C

- Double-walled design with rear ventilation for extremely low outside wall temperature
- Durable, painted housing with stainless steel front frame
- Double-walled flap door with handle, can be opened easily and far down, with integrated, adjustable air inlet duct
- Furnace insulation made of high-quality fiber materials with low thermal mass, thus fast heating cycle, low energy consumption
- High-quality heating wire drawn into ceramic plates, very good protection against chemical influences from the samples and against mechanical damage to the heating wire, long service life
- Switching via solid state relay, very precise furnace control, wear-free, noiseless
- Horizontal vapor vent duct in the rear wall of the furnace

Versatile application possibilities

These universal muffle furnaces with heating elements in ceramic plates and their sophisticated, robust construction are designed for a temperature range up to 1100 °C and 1200 °C and can be used for a variety of laboratory applications. The compact outer dimensions ensure a minimum space requirement.



Additional equipment

Additional equipment and accessories available on the furnaces allows individual customizing to different application.

- Controller with extended programming options
- Batch temperature measurement and control
- Adjustable over temperature protection for furnace and load according to EN 60519-2
- Programming and data-logging software and interfaces to connect e.g. „Labview"
- Inert gas connection as well as manual and automatic gas feed systems
- Exhaust chimney with/without fan as well as with fan and catalyst
- Charging racks for loading on several levels

Technical data

Model	T max. [°C]	Inside dimensions [mm] width x depth x height	Volume [l]	External dimensions [mm] width x depth x height	Power [kW]	Voltage [V]	Weight [kg]
KL 03/11	1100	190 x 140 x 100	3	440 x 445 x 490	1,2	230 1/N	20
KL 05/11	1100	240 x 170 x 130	5	460 x 465 x 520	2,4	230 1/N	35
KL 09/11	1100	240 x 260 x 170	10	495 x 540 x 560	3	230 1/N	45
KL 15/11	1100	250 x 370 x 170	15	500 x 650 x 560	3,5	230 1/N	50
KL 03/12	1200	190 x 140 x 100	3	440 x 445 x 490	1,2	230 1/N	20
KL 05/12	1200	240 x 170 x 130	5	460 x 465 x 520	2,4	230 1/N	35
KL 09/12	1200	240 x 260 x 170	10	495 x 540 x 560	3	230 1/N	45
KL 15/12	1200	250 x 370 x 170	15	500 x 650 x 560	3,5	230 1/N	50

LABORATORY CHAMBER FURNACES KLS

T max. 1100 °C, 1200 °C and 1300 °C

- Very good temperature uniformity in the furnace chamber
- Double-walled design with rear ventilation, extremely low outside wall temperature
- Parallel guided door moving up-wards, user is protected from hot door insulation surface
- Furnace insulation of high-quality fiber materials with low thermal mass
- Furnace front frame made of robust lightweight refractory bricks
- Abrasion-resistant lightweight refractory brick in the furnace floor
- Delivery incl. ceramic base plate
- Heating elements mounted on ceramic support tubes and mounted in front of the insulation with free heat radiation into the furnace chamber
- Powerful heating elements in both sides of the furnace, fast heating rates
- Switching via solid state relay, very precise furnace control, wear-free, noiseless
- Vapor vent duct with exhaust chimney on the rear wall of the furnace (from KLS 45/... in the furnace roof)

Technical data

Model	T max. [°C]	Inside dimensions [mm] width x depth x height	Volume [l]	External dimensions [mm] width x depth x height	Power [kW]	Voltage [V]
KLS 05/11	1100	200 x 250 x 140	7	550 x 580 x 650	2,0	230 1/N
KLS 10/11	1100	200 x 250 x 200	10	560 x 640 x 720	3,6	230 1/N
KLS 15/11	1100	220 x 300 x 230	15	560 x 640 x 720	3,6	230 1/N
KLS 30/11	1100	280 x 380 x 280	30	590 x 690 x 790	6,0	400 3/N
KLS 45/11	1100	300 x 500 x 300	45	660 x 810 x 820	7,5	400 3/N
KLS 60/11	1100	400 x 500 x 300	60	760 x 840 x 800	9,6	400 3/N
KLS 05/12	1200	200 x 250 x 140	7	550 x 580 x 650	2,0	230 1/N
KLS 10/12	1200	200 x 250 x 200	10	560 x 640 x 720	3,6	230 1/N
KLS 15/12	1200	220 x 300 x 230	15	560 x 640 x 720	3,6	230 1/N
KLS 30/12	1200	280 x 380 x 280	30	590 x 690 x 790	6,0	400 3/N
KLS 45/12	1200	300 x 500 x 300	45	660 x 810 x 820	7,5	400 3/N
KLS 60/12	1200	400 x 500 x 300	60	760 x 840 x 800	9,6	400 3/N
KLS 05/13	1300	200 x 250 x 140	7	550 x 580 x 650	2,5	230 1/N
KLS 10/13	1300	200 x 250 x 200	10	560 x 640 x 720	3,6	230 1/N
KLS 15/13	1300	220 x 300 x 230	15	560 x 640 x 720	3,6	230 1/N
KLS 30/13	1300	280 x 380 x 280	30	590 x 690 x 790	6,0	400 3/N
KLS 45/13	1300	300 x 500 x 300	45	660 x 810 x 820	7,5	400 3/N
KLS 60/13	1300	400 x 500 x 300	60	760 x 840 x 800	9,6	400 3/N

Wide range of furnaces

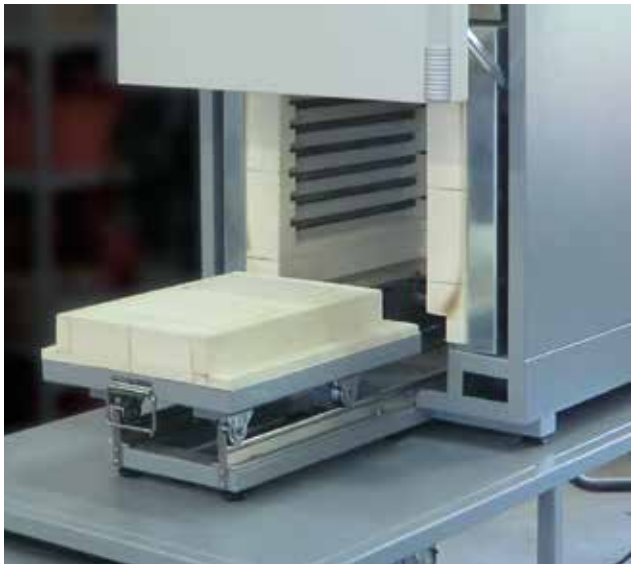
The THERMCONCEPT KLS laboratory chamber furnaces are supplied in sizes from 5 l to 60 l volume. These furnaces with open heating elements and free heat radiation are designed for most common working temperatures, the inner dimensions are adapted to the usual laboratory requirements

Additional equipment

Due to the wide range of additional equipment and extensive accessories, the laboratory chamber furnaces can be adapted to many different processes:

- Controller with extended programming options
- Batch temperature measurement and control
- Adjustable over-temperature protection to protect furnace and load according to EN 60519-2
- Programming and data-logging software and interfaces
- Inert gas connection as well as manual and automatic gas feed systems
- Adjustable supply air opening in the door
- Exhaust chimney with fan and additionally with catalyst
- Parallel swing door
- Charging racks for loading on several levels
- Retractable furnace hearth

On request, laboratory chamber furnaces from KLS 45/... up to 1200 °C can be supplied with a retractable furnace hearth. This allows the furnace to be easily loaded from three sides.



LABORATORY CHAMBER FURNACES KLS-M

with closed muffle

T max. 1000 °C and 1150 °C

- Furnaces equipped with a closed ceramic muffle, high mechanical strength of the furnace interior
- Muffle furnaces particularly suitable for demanding tasks, recommended for tests with aggressive substances
- Can also be used as cupola and ashing furnaces
- Delivery with integrated ceramic muffle
- Heating elements mounted outside around ceramic muffle, thus 4-sided heating, excellent temperature distribution in the furnace chamber
- Heating elements protected against aggressive atmospheres
- Switching via solid state relay, very precise furnace control, wear-free, noiseless
- Horizontal vapor vent duct with exhaust chimney at the rear wall of the furnace

KLS 07/11/M in double-walled design with rear ventilation, extremely low outside wall temperature and with parallel guided door moving up-wards, user is protected from hot door insulation surface, door frame made of robust lightweight refractory bricks, furnace insulation made of high-quality fiber materials

KLS 03/10/M with user-friendly, side-opening swing door, compact external dimensions, minimum space requirement.

Additional equipment (depending on model)

- Controller with extended programming options
- Batch temperature measurement and control
- Adjustable over-temperature protection for furnace and load according to EN 60519-2
- Programming and data-logging software and interfaces
- Inert gas connection as well as manual and automatic gas feed systems
- Exhaust chimney with fan

Technical data

Model	T max. [°C]	Inside dimensions [mm] width x depth x height	Volume [l]	External dimensions [mm] width x depth x height	Power [kW]	Voltage [V]
KLS 03/10/M	1000	140 x 200 x 110	3	320 x 350 x 410	2,0	230 1/N
KLS 07/11/M	1150	210 x 280 x 110	7	550 x 580 x 650	2,7	230 1/N

ASHING FURNACES KLS-ASH

T max. 1100 °C and 1200 °C

A series of specially adapted furnaces

In construction identical to the chamber furnaces of the KLS series (page 6), however, these models are specially equipped for the incineration of organic components and feature combustion air preheating, protected heating elements and a large exhaust air chimney in the furnace roof.

- Combustion air preheating via ceramic inlet channels in the furnace floor
- Cover of the heating elements with quartz glass tubes
- Generously dimensioned flue in the furnace roof and stainless steel chimney with a height of 350 mm on the furnace
- Double-walled design with rear ventilation, exceptionally low outside wall temperature
- Parallel guided door moving up-wards, user is protected from hot door insulation surface
- Furnace insulation of high-quality fiber materials with low thermal mass
- Furnace front frame made of robust lightweight refractory bricks
- Abrasion-resistant lightweight refractory brick in the furnace floor
- Delivery incl. ceramic base plate
- Heating elements mounted on ceramic support tubes and mounted in front of the furnace insulation
- Powerful heating elements in both sides of the furnace, fast heating rates
- Switching via solid state relay, very precise furnace control, wear-free, noiseless

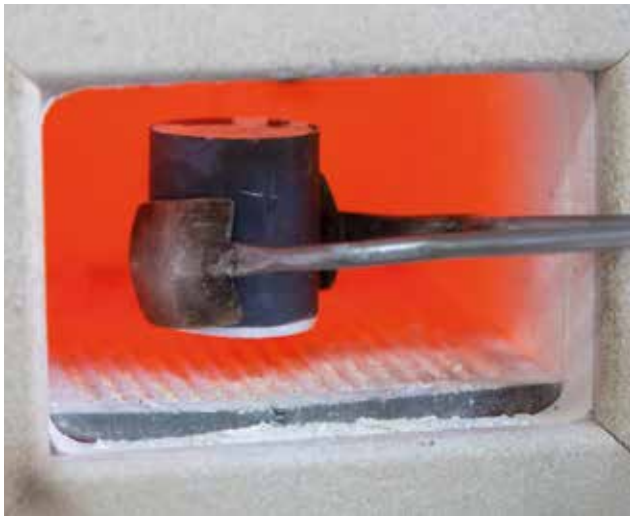
Technical data

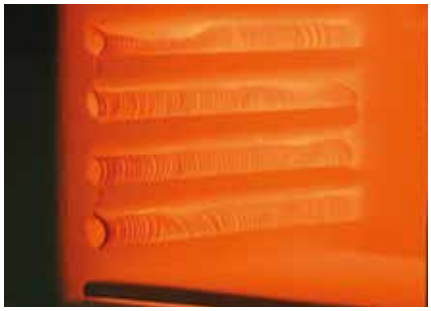
Model	T max. [°C]	Inside dimensions [mm] width x depth x height	Volume [l]	External dimensions* [mm] width x depth x height	Power [kW]	Voltage [V]
KLS 05/11/ASH	1100	200 x 250 x 140	7	550 x 580 x 650	2,0	230 1/N
KLS 10/11/ASH	1100	200 x 250 x 200	10	560 x 640 x 720	3,6	230 1/N
KLS 15/11/ASH	1100	220 x 300 x 230	15	560 x 640 x 720	3,6	230 1/N
KLS 30/11/ASH	1100	280 x 380 x 280	30	590 x 690 x 790	6,0	400 3/N
KLS 45/11/ASH	1100	300 x 500 x 300	45	660 x 810 x 820	7,5	400 3/N
KLS 60/11/ASH	1100	400 x 500 x 300	60	760 x 840 x 800	9,6	400 3/N
KLS 05/12/ASH	1200	200 x 250 x 140	7	550 x 580 x 650	2,0	230 1/N
KLS 10/12/ASH	1200	200 x 250 x 200	10	560 x 640 x 720	3,6	230 1/N
KLS 15/12/ASH	1200	220 x 300 x 230	15	560 x 640 x 720	3,6	230 1/N
KLS 30/12/ASH	1200	280 x 380 x 280	30	590 x 690 x 790	6,0	400 3/N
KLS 45/12/ASH	1200	300 x 500 x 300	45	660 x 810 x 820	7,5	400 3/N
KLS 60/12/ASH	1200	400 x 500 x 300	60	760 x 840 x 800	9,6	400 3/N

*Height + 350 mm for stack

Additional equipment

- Controller with extended programming possibilities
- Batch temperature measurement and control
- Adjustable over-temperature protection to protect furnace and load according to EN 60519-2
- Programming and data-logging software and interfaces
- Parallel swing door
- Charging racks for loading on several levels





LABORATORY WEIGHING FURNACES KLS-WS

T max. 1200 °C

- Furnace with special base frame to support scale and control system
- Delivery on request with scale and data-logging software
- Charging tray in the furnace chamber included
- Scale compartment below the furnace chamber
- Switchgear in separate housing placed also in the base frame below the furnace
- Double-walled design with rear ventilation, exceptionally low outside wall temperature
- Parallel guided door moving up-wards, user is protected from hot door insulation surface
- Heating elements mounted on ceramic support tubes and mounted in front of the furnace wall, free heat radiation into the furnace chamber
- Very good temperature uniformity in the furnace chamber
- Powerful heating elements in both sides of the furnace, fast heating rates
- Furnace insulation of high-quality fiber materials with low thermal mass
- Door border made of robust lightweight refractory bricks
- Abrasion-resistant lightweight refractory brick in the furnace floor
- Switching via solid state relay, very precise furnace control, wear-free, noiseless
- Exhaust air opening with exhaust chimney on the rear wall of the furnace (from KLS 45/... in the furnace roof)

Technical data

Model	T max. [°C]	Inside dimensions [mm] width x depth x height	Volume [l]	External dimensions* [mm] width x depth x height	Power [kW]	Voltage [V]
KLS 05/12/WS	1200	200 x 250 x 140	7	550 x 580 x 1470	2,0	230 1/N
KLS 10/12/WS	1200	200 x 250 x 200	10	560 x 640 x 1540	3,6	230 1/N
KLS 15/12/WS	1200	220 x 300 x 230	15	560 x 640 x 1540	3,6	230 1/N
KLS 30/12/WS	1200	280 x 380 x 280	30	590 x 690 x 1610	6,0	400 3/N
KLS 45/12/WS	1200	300 x 500 x 300	45	660 x 810 x 1640	7,5	400 3/N
KLS 60/12/WS	1200	400 x 500 x 300	60	760 x 840 x 1640	9,6	400 3/N

*Height incl. furnace table

For combined processes

Identical in construction to the chamber furnaces of the KLS series (page 6), but equipped with an integrated weighing system, these furnaces can be used for measuring and data-logging of mass losses at various temperatures.

Additional equipment

- Controller with extended programming possibilities
- Batch temperature measurement and control
- Adjustable over-temperature protection to protect furnace and load according to EN 60519-2
- Programming and data-logging software and interfaces
- Adjustable supply air opening in the door
- Exhaust chimney with fan or with fan and catalyst

CHAMBER FURNACES KC

with 5-sided heating

T max. 1300 °C and 1400 °C

For high demands

Classical chamber furnaces for demanding laboratory applications e.g. in pilot plants for simulations of production processes.

- Double-walled design with rear ventilation, extremely low outside wall temperature
- Durable housing with stainless steel side panel and robust painted steel frame, stainless steel lintel
- Hinged door with door safety switch, hinged on right side
- Multi-layer insulation (lightweight refractory bricks and rear insulation), low heat loss, low energy consumption, low electricity costs
- Heating from 5 sides (left, right, door, rear wall, floor), very even temperature distribution in the furnace chamber
- Heating elements mounted on ceramic support tubes, in front of the furnace wall, free heat radiation into the furnace chamber.
- Floor heating elements covered with heat permeable silicon carbide plates, high mechanical load capacity, protection for floor heating
- Base frame already included in standard scope of delivery
- Air inlet opening in the furnace floor, exhaust air opening with exhaust chimney at the rear wall of the furnace, both operable from the front
- Controller mounted on the side of the furnace housing, convenient operation
- Also available as production furnace for larger batches, e.g. as bogie hearth or chamber furnace with individual dimensions and temperatures

Additional equipment

- Parallel swing door, user is protected from hot door insulation surface
- Door hinges left instead of right side
- Multi-zone control
- Motorized supply and exhaust air flaps for ventilation, automatically switched via the controller's event function
- Fan for rapid cooling of the oven chamber
- Prepared for inert gas operation
- Manual or automatic gas feed systems
- Batching systems and stackable batch carriers
- Exhaust air purification systems

Technical data

Model	T max. [°C]	Inside dimensions [mm] width x depth x height	Volume [l]	External dimensions* [mm] width x depth x height	Power [kW]	Voltage [V]	Weight [kg]
KC 16/13	1300	250 x 250 x 250	16	650 x 800 x 1400	7,0	400 3/N	160
KC 32/13	1300	320 x 320 x 320	32	700 x 850 x 1450	8,0	400 3/N	190
KC 64/13	1300	400 x 400 x 400	64	780 x 950 x 1520	11,0	400 3/N	250
KC 128/13	1300	500 x 500 x 500	125	880 x 1050 x 1620	15,0	400 3/N	300
KC 16/14	1400	250 x 250 x 250	16	700 x 850 x 1400	8,0	400 3/N	250
KC 32/14	1400	320 x 320 x 320	32	780 x 900 x 1450	10,0	400 3/N	330
KC 64/14	1400	400 x 400 x 400	64	860 x 970 x 1520	12,0	400 3/N	365
KC 128/14	1400	500 x 500 x 500	125	960 x 1080 x 1620	18,0	400 3/N	470

*incl. base frame

ANNEALING AND HARDENING FURNACES KM

T max. 1300 °C

Solid & durable

Robust chamber furnaces, especially designed for the rough handling during heat treatment of metals in the laboratory, pilot plant, training and workshop.

- Double-walled design with rear ventilation, extremely low outer wall temperature
- Durable housing with side panel and door lintel made of stainless steel and robust, painted steel frame
- Parallel swing door, opening downwards, door can be opened to T max.
- Door safety switch
- Multi-layer insulation (lightweight refractory bricks and rear insulation), low heat loss, low energy consumption, low electricity costs
- Heating from 3 sides (left, right, floor)
- High-quality heating wire mounted on ceramic support tubes, in front of the furnace wall, free heat radiation into the furnace chamber.
- Floor heating elements covered with heat permeable silicon carbide plates, high mechanical load capacity, protection for floor heating
- Also available as production furnace for larger batches, e.g. as bogie hearth or chamber furnace with individual dimensions
- From KM 50/13 with base frame

Additional equipment (depending on model)

- Inert gas operation with manual or automatic gas feed systems
- Cover of the side heating elements with SiC plates for protection
- Protective gas boxes for oxidation-free heat treatment
- Charging plates to protect the furnace floor
- Pneumatic door drive
- Motorized exhaust air flap for faster ventilation
- Cooling system for accelerated cooling of furnace and charge

Technical data

Model	T max. [°C]	Inside dimensions [mm] width x depth x height	Volume [l]	External dimensions [mm] width x depth x height	Power [kW]	Voltage [V]	Weight [kg]
KM 10/13	1300	250 x 250 x 120	8	500 x 600 x 700 (1)	2,5	230 1/N	69
KM 15/13	1300	250 x 250 x 200	13	500 x 700 x 700 (1)	3,6	230 1/N	75
KM 20/13	1300	250 x 350 x 200	18	500 x 700 x 700 (1)	6,0	400 3/N	91
KM 30/13	1300	250 x 500 x 200	30	500 x 850 x 700 (1)	7,0	400 3/N	105
KM 50/13	1300	350 x 500 x 250	44	950 x 1500 x 1490 (1) (2)	13	400 3/N	268
KM 70/13	1300	350 x 750 x 250	66	950 x 1500 x 1740 (1) (2)	20	400 3/N	330

(1) Each + approx. 200 mm for controller on the side of the furnace; (2) Depth incl. door mechanism | Other sizes on request

HIGH-TEMPERATURE FURNACES KLC

with SiC rod heating

T max. 1400 °C, 1500 °C and 1600 °C

Practical and reliable for higher temperatures

High-temperature furnaces with SiC rod heating reliably cover the temperature range from 1400 to 1600 °C and are supplied in 4 sizes from 5 l volume to 30 l volume.

- Very good temperature uniformity in the furnace chamber
- Double-walled design with rear ventilation, extremely low outside wall temperature
- Parallel guided door moving up-wards, hot door insulation surface averted from the user
- Furnace insulation of high quality fiber materials with low thermal mass
- Furnace front frame made of robust lightweight refractory bricks
- Abrasion-resistant lightweight refractory brick in the furnace floor
- Delivery incl. ceramic base plate
- Powerful SiC heating elements in both furnace sides, very fast heating rates
- Switching via solid state relay, particularly precise furnace control, wear-free, noiseless
- Vapor vent duct with exhaust chimney on the rear wall of the furnace

Technical data

Model	T max. [°C]	Inside dimensions [mm] width x depth x height	Volume [l]	External dimensions [mm] width x depth x height	Power [kW]	Voltage [V]
KLC 05/14	1400	150 x 250 x 140	5	550 x 580 x 650	3,8	400 3/N
KLC 10/14	1400	200 x 250 x 180	9	560 x 640 x 720	5,0	400 3/N
KLC 15/14	1400	220 x 310 x 220	15	590 x 690 x 790	7,0	400 3/N
KLC 30/14	1400	250 x 440 x 270	30	660 x 730 x 800	11,5	400 3/N
KLC 05/15	1500	150 x 250 x 140	5	550 x 580 x 650	4,8	400 3/N
KLC 10/15	1500	200 x 250 x 180	9	560 x 640 x 720	6,6	400 3/N
KLC 15/15	1500	220 x 310 x 220	15	590 x 690 x 790	7,5	400 3/N
KLC 30/15	1500	250 x 440 x 270	30	660 x 730 x 800	12,5	400 3/N
KLC 05/16	1600	150 x 250 x 140	5	550 x 580 x 650	5,2	400 3/N
KLC 10/16	1600	200 x 250 x 180	9	560 x 640 x 720	6,9	400 3/N
KLC 15/16	1600	220 x 310 x 220	15	590 x 690 x 790	8,0	400 3/N
KLC 30/16	1600	250 x 440 x 270	30	660 x 730 x 800	13,5	400 3/N

Additional equipment

With a wide range of additional equipment and accessories, the high temperature furnaces can be individually adapted to customer-specific processes and requirements:

- Controller with extended programming options
- Batch temperature measurement and control
- Adjustable over-temperature protection to protect furnace and load according to EN 60519-2
- Programming and data-logging software and interfaces
- Inert gas connection as well as manual and automatic gas feed systems
- Adjustable supply air opening in the door
- Exhaust chimney with fan or with fan and catalyst

HIGH-TEMPERATURE FURNACES HTL

with $MoSi_2$ heating elements

T max. 1500 °C, 1600 °C, 1750 °C and 1800 °C

- Compact tabletop furnaces with user-friendly parallel guided door moving up-wards
- Double-walled design with fan cooling, low outer wall temperature
- Furnace insulation made of Aluminium-oxide material with low thermal mass, fast heating and cooling possible
- High-quality heating elements made of molybdenum-disilicide ($MoSi_2$)
- Low connected loads
- State-of-the-art switching and control technology via thyristors for very precise, wear-free and noiseless furnace control
- High temperature accuracy in the furnace chamber
- Exhaust air opening in the furnace roof

Additional equipment (depending on model)

With the wide range of additional equipment and accessories, the high temperature furnaces can be individually

adapted to customer-specific processes and requirements:

- Controller with extended programming options
- Batch temperature measurement and control
- Programming and data-logging software and interfaces
- Start-up circuit for targeted, slow heating in the lower temperature range
- Inert gas connection as well as manual and automatic gas feed systems
- Ceramic base plate for protection

Technical data

Model	T max. [°C]	Inside dimensions [mm] width x depth x height	Volume [l]	External dimensions [mm] width x depth x height	Power [kW]	Voltage [V]	Weight [kg]
HTL 01/15	1500	120 x 90 x 120	1	520 x 470 x 680	1,6	230 1/N	75
HTL 01/16	1600	120 x 90 x 120	1	520 x 470 x 680	1,6	230 1/N	75
HTL 02/16	1600	110 x 120 x 150	2	740 x 440 x 630	1,5	230 1/N	75
HTL 04/16	1600	150 x 150 x 150	4	740 x 440 x 630	3	230 1/N	85
HTL 10/16	1600	200 x 250 x 200	10	790 x 540 x 680	4	400 3/N	100
HTL 16/16	1600	200 x 300 x 260	16	830 x 550 x 735	8	400 3/N	175
HTL 20/16	1600	250 x 320 x 260	21	880 x 570 x 735	8	400 3/N	210
HTL 02/17	1750	110 x 120 x 150	2	740 x 440 x 630	1,5	230 1/N	75
HTL 04/17	1750	150 x 150 x 150	4	740 x 440 x 630	3	230 1/N	85
HTL 10/17	1750	200 x 250 x 200	10	790 x 540 x 680	4	400 3/N	100
HTL 16/17	1750	200 x 300 x 260	16	830 x 550 x 735	8	400 3/N	175
HTL 20/17	1750	200 x 320 x 260	21	880 x 570 x 735	8	400 3/N	210
HTL 02/18	1800	110 x 120 x 150	2	740 x 440 x 630	1,5	230 1/N	75
HTL 04/18	1800	150 x 150 x 150	4	740 x 440 x 630	3	230 1/N	85
HTL 10/18	1800	200 x 250 x 200	10	790 x 540 x 680	4	400 3/N	100
HTL 16/18	1800	200 x 300 x 260	16	830 x 550 x 735	8	400 3/N	175
HTL 20/18	1800	200 x 320 x 260	21	880 x 570 x 735	8	400 3/N	210

HIGH-TEMPERATURE FURNACES HTK

with $MoSi_2$ heating elements

T max. 1600 °C, 1750 °C and 1800 °C

- Floor standing furnaces with operator-friendly parallel guided door moving side-wards, hot door insulation surface averted from the user
- Furnaces with maximum precision and convenience, fast heat-up and cool-down times and low connected loads
- Very good temperature uniformity in the furnace chamber
- Double-walled design with forced rear ventilation, extremely low outside wall temperature
- Furnace insulation made of high-quality alumina material with very low thermal mass for rapid heating and cooling
- Adjustable over-temperature protection for furnace and load acc. EN 60519-2
- High-quality $MoSi_2$ heating elements mounted on both sides in front of the insulation, for free heat radiation into the furnace chamber and very fast heating rates
- Start-up circuit for targeted, slow heating in the lower temperature range
- State-of-the-art switching and control technology via thyristors for very precise, wear-free and noiseless furnace control
- Exhaust air opening in the furnace roof with motorized flap controlled via event function of the programmer
- Ceramic base plate for protection

Technical data

Model	T max. [°C]	Inside dimensions [mm] width x depth x height	Volume [l]	External dimensions [mm] width x depth x height	Power [kW]	Voltage [V]	Weight [kg]
HTK 16/16	1600	200 x 300 x 260	16	820 x 655 x 1570	8	400 3/N	285
HTK 20/16	1600	250 x 320 x 260	21	870 x 675 x 1570	8	400 3/N	295
HTK 40/16	1600	300 x 350 x 350	37	920 x 705 x 1660	11	400 3/N	375
HTK 50/16	1600	250 x 550 x 350	48	870 x 905 x 1660	18	400 3/N	655
HTK 70/16	1600	400 x 400 x 400	64	1020 x 755 x 1710	12	400 3/N	545
HTK 16/17	1750	200 x 300 x 260	16	820 x 655 x 1570	8	400 3/N	285
HTK 20/17	1750	250 x 320 x 260	21	870 x 675 x 1570	8	400 3/N	295
HTK 40/17	1750	300 x 350 x 350	37	920 x 705 x 1660	11	400 3/N	375
HTK 50/17	1750	250 x 550 x 350	48	870 x 905 x 1660	18	400 3/N	655
HTK 70/17	1750	400 x 400 x 400	64	1020 x 755 x 1710	12	400 3/N	545
HTK 16/18	1800	200 x 300 x 260	16	820 x 655 x 1570	8	400 3/N	285
HTK 20/18	1800	250 x 320 x 260	21	870 x 675 x 1570	8	400 3/N	295
HTK 40/18	1800	300 x 350 x 350	37	920 x 705 x 1660	11	400 3/N	375
HTK 50/18	1800	250 x 550 x 350	48	870 x 905 x 1660	18	400 3/N	655
HTK 70/18	1800	400 x 400 x 400	64	1020 x 755 x 1710	12	400 3/N	545

Other sizes on request

For further information about our high temperature furnaces please refer to our catalogue "Furnaces for Ceramics, Glass, Solar

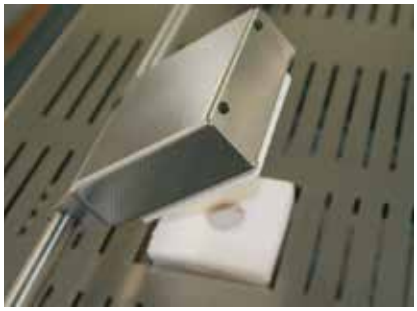
High temperature for the pilot plant

Chamber furnaces with $MoSi_2$ heating elements and larger chamber volumes (16-64 litres) for pilot plant and small batch production.

Additional equipment (depending on model)

With the wide range of additional equipment and accessories, the high temperature furnaces can be individually adapted to customer-specific processes and requirements:

- Controller with extended programming options
- Batch temperature measurement and control
- Programming and data-logging software and interfaces
- Also available as combi-furnace for de-binding and sintering in one process
- Protective gas connection and furnace sealing as well as manual and automatic gas feed system
- Cooling system for drop cooling or linear cooling
- Exhaust air hoods



ELEVATOR FURNACES ELS, ELC AND ELHT

T max. 1100 °C to 1800 °C

- Table-top and floor standing models with electro-mechanically driven furnace hearth, pressure and vibration-free movement, vertical opening with low heat radiation to the user
- Very good temperature uniformity due to heating of the chambers on four sides
- Double-walled design with rear ventilation, extremely low outside wall temperature
- Furnace insulation made of high-quality alumina material with very low thermal mass for rapid heating and cooling
- High-quality heating elements on four sides with free heat radiation into the furnace chamber
- Heating elements switched via solid state relays or thyristors for precise, wear-free and noiseless furnace control
- Exhaust air opening in the furnace roof
- Floor standing models on castors

Technical data

Model	T max. [°C]	Inside dimensions [mm] width x depth x height	Volume [l]	External dimensions [mm] width x depth x height	Power [kW]	Voltage [V]
ELS 08/11	1100	200 x 200 x 200	8	630 x 810 x 1220	2,5	230 1/N
ELS 08/12	1200	200 x 200 x 200	8	630 x 810 x 1220	3,0	230 1/N
ELS 08/13	1300	200 x 200 x 200	8	630 x 810 x 1220	3,4	230 1/N
ELC 08/14	1400	180 x 230 x 180	8	630 x 810 x 1220	5,0	400 3/N
ELC 08/16	1600	180 x 230 x 180	8	620 x 770 x 1900	6,9	400 3/N
ELHT 08/16	1600	200 x 200 x 200	8	620 x 770 x 1900	7,2	400 3/N
ELHT 16/16	1600	250 x 250 x 250	16	660 x 840 x 2050	11,3	400 3/N
ELHT 08/17	1700	200 x 200 x 200	8	620 x 770 x 1900	7,2	400 3/N
ELHT 16/17	1700	250 x 250 x 250	16	660 x 840 x 2050	11,3	400 3/N
ELHT 08/18	1800	200 x 200 x 200	8	620 x 770 x 1900	7,8	400 3/N
ELHT 16/18	1800	250 x 250 x 250	16	660 x 840 x 2050	11,3	400 3/N

Comfortable loading at high temperatures

Elevator furnaces with volumes of 8 and 16 liters can be opened comfortably and quickly for hot loading/unloading. At the same time, the furnace design allows 4-sided heating with high temperature accuracy.

Additional equipment (depending on model)

Accessories and options allow the elevator furnaces to be individually adapted to a wide range of processes and requirements:

- Controller with extended programming options
- Batch temperature measurement and control
- Adjustable over-temperature protection to protect furnace and load according to EN 60519-2
- Programming and data-logging software and interfaces
- Start-up circuit for targeted, slow heating in the lower temperature range
- Protective gas connection and furnace sealing as well as manual and automatic gas feed systems
- Ceramic base plate for protection

For batch production, furnace systems up to a volume of 2000 l are in use.

FURNACE ACCESSORIES

Supply and exhaust air systems

Manual or automatic supply air inlet ducts for fresh process air or cooling air, on request also with pre-heating.

Automatic supply/exhaust air flap control, regulated by the furnace control system depending on the program.

Vapor vent for targeted discharge of exhaust gases and warm air, mounted on the rear wall of the furnace, suitable for connection to an existing exhaust air system.

Vapor vent with fan for accelerated extraction of exhaust air from the furnace chamber. Connection and controlled via an extra function of the controller.

Vapor vent with integrated catalytic exhaust air purification. Organic components contained in the exhaust air are burned catalytically, i.e. split into CO_2 and water vapor. This minimizes the development of odors. Connection and controlled via an event function of the controller.

Inert gas atmosphere

Protective gas connection on furnace housing for purging the chamber with non-combustible protective gases such as argon, nitrogen or forming gas 95/5.

Semi-gas-tight design of the furnace housing with additional silicone seal, minimizes purging losses and provides a purer protective gas atmosphere.

Manual, semi-automatic and fully automatic gas feed systems, adapted to the individual application, with flow control, valves and pressure reducer, controlled via the furnace control system.

Charging racks and baskets

Charging racks with pull-out trays for KL and KLS models. Stackable charging racks made of ceramic, baskets made of heat-resistant wire mesh in different sizes and for different temperatures.

Charging tongs and heat-protective gloves

Charging tongs as well as heat-protective gloves and clothing for easy and safe charging of a hot furnace. Heat protection gloves for short-term contact temperatures up to 600 °C or up to 900 °C. Charging tongs with lengths of 300 or 500 mm.

SYSTEMS FOR WORKPIECE TREATMENT AND COMPONENT ANALYSIS

Oxidation-free heat treatment

THERMCONCEPT supplies specially developed accessories that have been tried and tested in practice over many years. The range of accessories is matched to KM-furnaces and enables inert gas annealing or oxidation-free hardening by simple means. We would be pleased to advise you on the selection of accessories and on the practical handling.

For scale- and decarburization-free annealing, hardening and tempering of entire batches, various types of hardening and gas boxes, foil carriers and foil containers can be used in combination with protective gas, annealing carbon, carburizing granules and nitriding-powder.

All processes are characterized by easy handling and a simple and reliable process flow.

Metallurgy

THERMCONCEPT supplies machines, accessories and consumables for metallography and material testing in laboratories and for quality assurance:

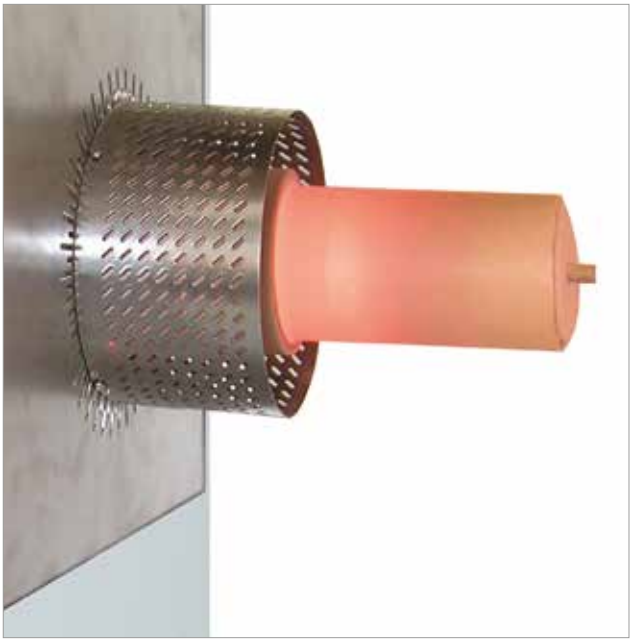
- Cutting machines, clamping tools
- Hot presses
- Grinding and polishing machines
- Spindle pressure and central pressure system
- Levelling disc
- Hardness, tension and compression testing equipment
- Microscopes
- All-round embedding materials, also for cold and warm investment and accessories
- Wet sanding paper and plastic bonded sanding discs
- Diamond suspensions, lubricants and fine polishing suspensions
- Polishing cloths
- Fastening systems and etchants
- Tools and accessories

Ask for our special brochures.

TUBE FURNACES ROT

with exchangeable tubes

T max. 1200 °C and 1300 °C



- Standard furnaces prepared for tubes with outer diameter of 60, 85 or 120 mm, can also be individually adapted to fit with customer's tube
- Heated lengths of 300 mm, 450 mm and 600 mm
- Designed for horizontal operation
- Furnace insulation of high quality fiber materials with low thermal mass
- Heating via heating wire mounted on ceramic support tubes, thus free and direct heat radiation to tube and sample, high temperature accuracy and long life of the heating elements
- High-quality furnace housing, partly with stainless steel cladding
- Powerful heating, fast heating rates
- Switching via solid state relay, very precise furnace control, wear-free, noiseless
- Switchgear and control system mounted in a compartment underneath the hot furnace zone, convenient operation of the controllers

Flexible all-round tube furnaces

Tube furnace series with 3 heated lengths for 3 different tube diameters and 2 temperatures. Tubes can be changed quickly and easily depending on the application. Special versions with zone control can also be realized.

Additional equipment

Tube furnaces can be adapted to the most varied conditions in the laboratory with optional additional equipment and accessories, depending on the intended use:

- Working tube made of ceramic or quartz glass available on request
- Controller with extended programming options
- Batch temperature measurement and control
- Adjustable over-temperature protection to protect furnace and goods according to EN 60519-2
- Programming and data-logging software and interfaces
- Special lengths and multi-zone versions available on request
- Flanges for inert gas and/or vacuum operation as well as manual and automatic gas feed systems
- Vacuum pumps and cooling devices

Technical data

Model	T max. [°C]	Heated length [mm]	Const. zone [mm]	Recommended tube dimensions [mm] O Ø x length*	External dimensions [mm] width x depth x height	Power [kW]	Voltage [V]
ROT 60/300/12	1200	300	100	≤ 60 x 750 / 800	630 x 450 x 630	3,0	230 1/N
ROT 60/450/12	1200	450	150	≤ 60 x 900 / 950	780 x 450 x 630	3,6	230 1/N
ROT 60/600/12	1200	600	200	≤ 60 x 1050 / 1100	930 x 450 x 630	3,6	230 1/N
ROT 85/300/12	1200	300	100	≤ 85 x 750 / 800	630 x 450 x 630	3,0	230 1/N
ROT 85/450/12	1200	450	150	≤ 85 x 900 / 950	780 x 450 x 630	3,6	230 1/N
ROT 85/600/12	1200	600	200	≤ 85 x 1050 / 1100	930 x 450 x 630	3,6	230 1/N
ROT 120/300/12	1200	300	100	≤ 120 x 750 / 800	630 x 450 x 630	5,0	400 3/N
ROT 120/450/12	1200	450	150	≤ 120 x 900 / 950	780 x 450 x 630	5,0	400 3/N
ROT 120/600/12	1200	600	200	≤ 120 x 1050 / 1100	930 x 450 x 630	7,5	400 3/N
ROT 60/300/13	1300	300	100	≤ 60 x 750 / 800	630 x 450 x 630	3,6	230 1/N
ROT 60/450/13	1300	450	150	≤ 60 x 900 / 950	780 x 450 x 630	3,6	230 1/N
ROT 60/600/13	1300	600	200	≤ 60 x 1050 / 1100	930 x 450 x 630	3,6	230 1/N
ROT 85/300/13	1300	300	100	≤ 85 x 750 / 800	630 x 450 x 630	3,6	230 1/N
ROT 85/450/13	1300	450	150	≤ 85 x 900 / 950	780 x 450 x 630	3,6	230 1/N
ROT 85/600/13	1300	600	200	≤ 85 x 1050 / 1100	930 x 450 x 630	3,6	230 1/N
ROT 120/300/13	1300	300	100	≤ 120 x 750 / 800	630 x 450 x 630	5,0	400 3/N
ROT 120/450/13	1300	450	150	≤ 120 x 900 / 950	780 x 450 x 630	5,0	400 3/N
ROT 120/600/13	1300	600	200	≤ 120 x 1050 / 1100	930 x 450 x 630	7,5	400 3/N

*Tube length for operation without/with flange

TUBE FURNACES ROS

with 1- and 3-zone heating

T max. 1200 °C

- Tube inside diameter from 20 mm to 105 mm
- Heated lengths from 250 mm to 900 mm
- Designed for horizontal operation
- Integrated work tube made of ceramic, delivery including two fiber plugs
- Protection grid for low temperatures on the tubular module
- Furnace insulation of high quality fiber materials with low thermal mass
- Strong furnace housing, partly with stainless steel cladding
- Powerful heating, fast heating rates
- Heating elements switched via solid state relay, particularly precise furnace control, wear-free, noiseless
- Switchgear and control system integrated in the housing, convenient operation of the controller, for vertical and universal furnaces in separate tabletop housing

Technical data : 1-zone models

Model	T max. [°C]	Tube-I Ø [mm]	Heated length [mm]	Const. zone [mm]	Tube dimensions [mm] I Ø x length	External dimensions [mm] width x depth x height	Power [kW]	Voltage [V]
ROS 20/250/12	1200	20	250	80	25 x 500	350 x 345 x 500	0,8	230 1/N
ROS 20/450/12	1200	20	450	130	25 x 650	500 x 345 x 500	0,9	230 1/N
ROS 40/250/12	1200	40	250	80	50 x 500	350 x 345 x 500	1,0	230 1/N
ROS 40/450/12	1200	40	450	150	50 x 650	500 x 345 x 500	1,2	230 1/N
ROS 40/600/12	1200	40	600	200	50 x 800	650 x 345 x 500	1,5	230 1/N
ROS 40/750/12	1200	40	750	250	50 x 950	800 x 345 x 500	2,0	230 1/N
ROS 40/900/12	1200	40	900	300	50 x 1100	950 x 345 x 500	2,4	230 1/N
ROS 50/250/12	1200	50	250	80	60 x 500	350 x 345 x 500	1,1	230 1/N
ROS 50/450/12	1200	50	450	150	60 x 650	500 x 345 x 500	1,2	230 1/N
ROS 50/600/12	1200	50	600	200	60 x 800	650 x 345 x 500	1,4	230 1/N
ROS 50/750/12	1200	50	750	250	60 x 950	800 x 345 x 500	2,2	230 1/N
ROS 50/900/12	1200	50	900	300	60 x 1100	950 x 345 x 500	3,0	230 1/N
ROS 75/250/12	1200	75	250	80	85 x 500	350 x 345 x 500	1,1	230 1/N
ROS 75/450/12	1200	75	450	150	85 x 650	500 x 345 x 500	1,6	230 1/N
ROS 75/600/12	1200	75	600	200	85 x 800	650 x 345 x 500	2,2	230 1/N
ROS 75/750/12	1200	75	750	250	85 x 950	800 x 345 x 500	2,6	230 1/N
ROS 75/900/12	1200	75	900	300	85 x 1100	950 x 345 x 500	3,3	230 1/N
ROS 105/250/12	1200	105	250	80	120 x 500	350 x 345 x 500	2,2	230 1/N
ROS 105/450/12	1200	105	450	150	120 x 650	500 x 345 x 500	2,5	230 1/N
ROS 105/600/12	1200	105	600	200	120 x 800	650 x 345 x 500	3,3	230 1/N
ROS 105/750/12	1200	105	750	250	120 x 950	800 x 345 x 500	3,5	230 1/N
ROS 105/900/12	1200	105	900	300	120 x 1100	950 x 345 x 500	3,6	230 1/N

Compact & individual

Very compact tube furnace models that can be used in a wide variety of applications and individually adapted to a wide range of tasks and installation sites.

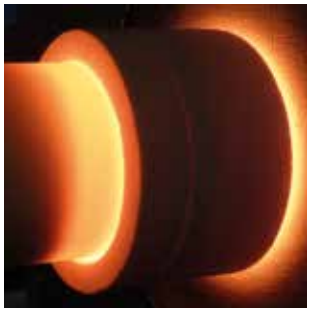
Additional equipment

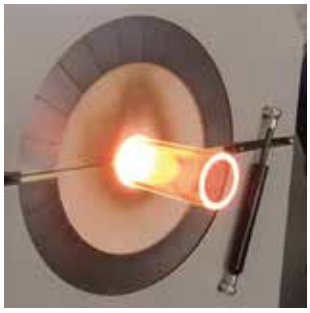
- Controller with extended programming options
- Batch temperature measurement and control
- Adjustable over-temperature protection to protect furnace and load according to EN 60519-2
- Programming and data-logging software and interfaces
- 3-zone version available
- Also available for vertical or swivel for universal operation
- Additional process tubes
- Flanges for inert gas and/or vacuum operation as well as manual and automatic gas feed systems
- Vacuum pumps and water chiller
- Also available as individual heating module with and without control or switchgear for integration into test racks or plants

Tube furnace on rails, for moving over the sample

Technical data : 3-zone models

Model	T max. [°C]	Tube-I Ø [mm]	Heated length [mm]	Const. zone [mm]	Tube dimensions [mm] I Ø x length	External dimensions [mm] width x depth x height	Power [kW]	Voltage [V]
ROS 40/600/12-3z	1200	40	600	300	50 x 800	650 x 345 x 500	1,5	230 1/N
ROS 40/750/12-3z	1200	40	750	375	50 x 950	800 x 345 x 500	2,0	230 1/N
ROS 40/900/12-3z	1200	40	900	450	50 x 1100	950 x 345 x 500	2,4	230 1/N
ROS 50/600/12-3z	1200	50	600	300	60 x 800	650 x 345 x 500	1,4	230 1/N
ROS 50/750/12-3z	1200	50	750	375	60 x 950	800 x 345 x 500	2,2	230 1/N
ROS 50/900/12-3z	1200	50	900	450	60 x 1100	950 x 345 x 500	3,0	230 1/N
ROS 75/600/12-3z	1200	75	600	300	85 x 800	650 x 345 x 500	2,2	230 1/N
ROS 75/750/12-3z	1200	75	750	375	85 x 950	800 x 345 x 500	2,6	230 1/N
ROS 75/900/12-3z	1200	75	900	450	85 x 1100	950 x 345 x 500	3,3	230 1/N
ROS 105/600/12-3z	1200	105	600	300	120 x 800	650 x 345 x 500	3,3	230 1/N
ROS 105/750/12-3z	1200	105	750	375	120 x 950	800 x 345 x 500	3,5	230 1/N
ROS 105/900/12-3z	1200	105	900	450	120 x 1100	950 x 345 x 500	3,6	230 1/N





SPLIT-TYPE TUBE FURNACES ROTK

hinged with exchangeable tubes

T max. 1200 °C and 1300 °C

- Standard furnaces prepared for tubes with outer diameter of 60, 85 or 120 mm, can also be individually adapted to fit with customer's tube
- Heated lengths of 300 mm, 450 mm and 600 mm
- Designed for horizontal operation
- Furnace insulation of high quality fiber materials with low thermal mass
- Heating via heating wire mounted on ceramic support tubes, thus free and direct heat radiation to tube and sample, high temperature accuracy and long life of the heating elements
- High-quality furnace housing, partly with stainless steel cladding
- Powerful heating, fast heating rates
- Switching via solid state relay, very precise furnace control, wear-free, noiseless
- Switchgear and control system mounted in separate table housing

Technical data

Model	T max. [°C]	Heated length [mm]	Const. zone [mm]	Recommended tube dimensions [mm] O Ø x length*	External dimensions [mm] width x depth x height	Power [kW]	Voltage [V]
ROTK 60/300/12	1200	300	100	≤ 60 x 750 / 800	450 x 500 x 470	3,0	230 1/N
ROTK 60/450/12	1200	450	150	≤ 60 x 900 / 950	600 x 500 x 470	3,6	230 1/N
ROTK 60/600/12	1200	600	200	≤ 60 x 1050 / 1100	750 x 525 x 495	3,6	230 1/N
ROTK 85/300/12	1200	300	100	≤ 85 x 750 / 800	450 x 500 x 470	3,0	230 1/N
ROTK 85/450/12	1200	450	150	≤ 85 x 900 / 950	600 x 500 x 470	3,6	230 1/N
ROTK 85/600/12	1200	600	200	≤ 85 x 1050 / 1100	750 x 525 x 495	3,6	230 1/N
ROTK 120/300/12	1200	300	100	≤ 120 x 750 / 800	450 x 500 x 470	5,0	400 3/N
ROTK 120/450/12	1200	450	150	≤ 120 x 900 / 950	600 x 500 x 470	5,0	400 3/N
ROTK 120/600/12	1200	600	200	≤ 120 x 1050 / 1100	750 x 525 x 495	7,5	400 3/N
ROTK 60/300/13	1300	300	100	≤ 60 x 750 / 800	450 x 500 x 470	3,6	230 1/N
ROTK 60/450/13	1300	450	150	≤ 60 x 900 / 950	600 x 500 x 470	3,6	230 1/N
ROTK 60/600/13	1300	600	200	≤ 60 x 1050 / 1100	750 x 525 x 495	3,6	230 1/N
ROTK 85/300/13	1300	300	100	≤ 85 x 750 / 800	450 x 500 x 470	3,6	230 1/N
ROTK 85/450/13	1300	450	150	≤ 85 x 900 / 950	600 x 500 x 470	3,6	230 1/N
ROTK 85/600/13	1300	600	200	≤ 85 x 1050 / 1100	750 x 525 x 495	3,6	230 1/N
ROTK 120/300/13	1300	300	100	≤ 120 x 750 / 800	450 x 500 x 470	5,0	400 3/N
ROTK 120/450/13	1300	450	150	≤ 120 x 900 / 950	600 x 500 x 470	5,0	400 3/N
ROTK 120/600/13	1300	600	200	≤ 120 x 1050 / 1100	750 x 525 x 495	7,5	400 3/N

*Tube length for operation without / with flange

Foldable, easy access to the tube

Split tube furnace series also with 3 heated lengths, 3 different tube diameters and 2 temperatures for horizontal operation. Tubes can be exchanged quickly and easily due to the hinged design. Furthermore, special versions with zone control can be realized.

Split tube furnace with 2 independent control zones for thermal transport

Additional equipment

Tube furnaces can be adapted to the most varied conditions in the laboratory with the optional additional equipment and accessories, depending on the intended use:

- Controller with extended programming options
- Batch temperature measurement and control
- Adjustable over-temperature protection to protect furnace and goods according to EN 60519-2
- Programming and data-logging software and interfaces
- Special lengths and multi-zone versions available on request
- Working tube made of ceramic or quartz glass available on request
- Flanges for inert gas and/or vacuum operation as well as manual and automatic gas feed systems
- Vacuum pumps and cooling devices

SPLIT-TYPE TUBE FURNACES ROK

module heated and hinged

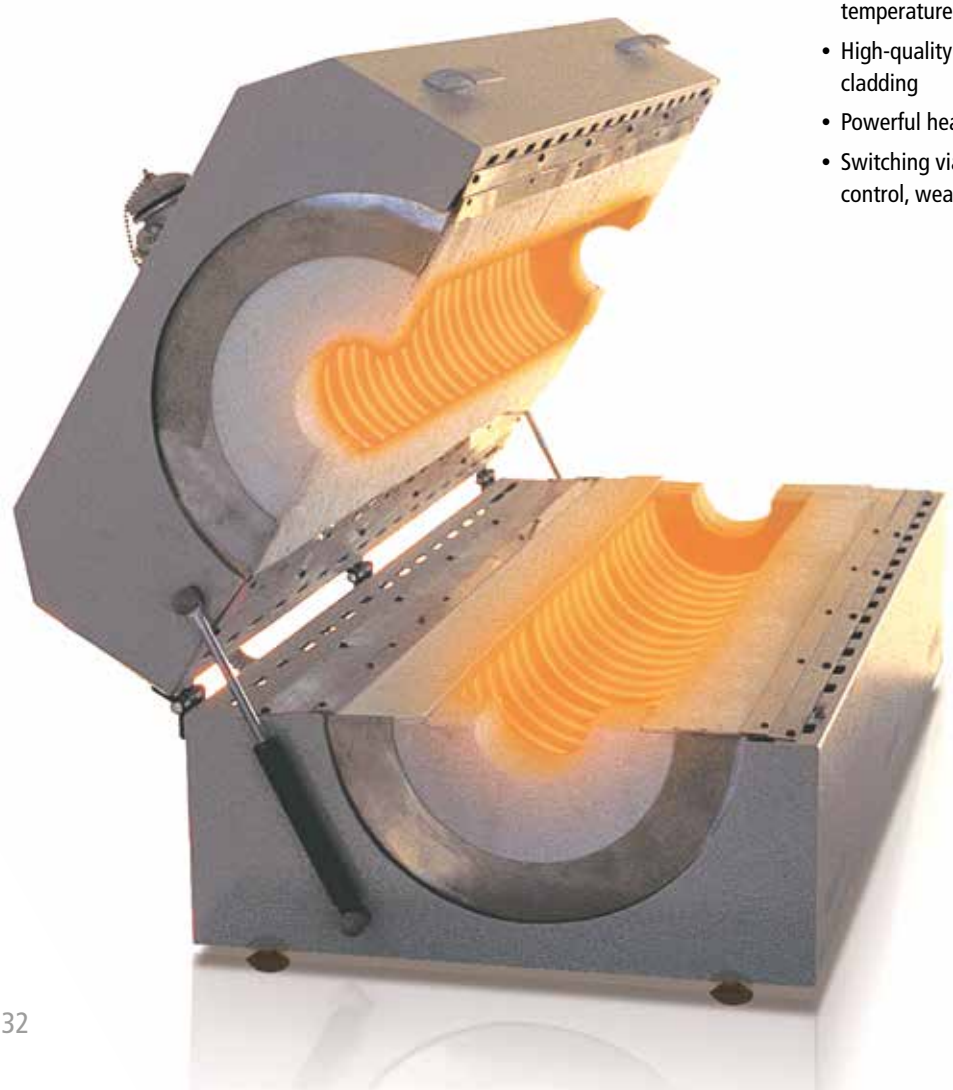
T max. 1100 °C

Hinged, vertical and horizontal

ROK models are hinged, module-heated and can be used vertically or horizontally.

Also with these models the tubes can be quickly exchanged due to the hinged design.

- Furnaces are prepared as standard for a maximum outside tube diameter of 70, 100, 130, 160, 200 and 250 mm, on request individual adapted tube diameters
- Heated lengths modularly expandable
- Designed for horizontal operation with furnace module on the switchgear housing or with rack and separate controller housing for vertical operation. On request for individual installation in test setups
- Module insulation made of high-quality fiber materials with low thermal mass
- Heating via wire embedded in fiber modules, thus direct heat radiation onto tube and sample as well as high temperature accuracy and long heating element life
- High-quality furnace housing, partly with stainless steel cladding
- Powerful heating, fast heating rates
- Switching via solid state relay, very precise furnace control, wear-free, noiseless



Additional equipment

Tube furnaces can be adapted to the most varied conditions in the laboratory with the optional additional equipment and accessories, depending on the intended use:

- Controller with extended programming options
- Batch temperature measurement and control
- Adjustable over-temperature protection to protect furnace and load according to EN 60519-2
- Programming and data-logging software and interfaces
- Multi-zone versions, also available with zone insulation
- Working tubes made of ceramic with two fiber plugs or quartz glass available on request
- Flanges for inert gas and/or vacuum operation as well as manual and automatic gas feed systems
- Vacuum pumps and cooling units

Technical data

Model	T max. [°C]	Heated length [mm]	Const. zone [mm]	Recommended tube dimensions [mm] O Ø x length	External dimensions [mm] width x depth x height	Power [kW]	Voltage [V]
ROK 70/250/11	1100	250	80	70 x 500	400 x 500 x 510	2,6	230 1/N
ROK 70/500/11	1100	500	160	70 x 750	650 x 500 x 510	3,0	230 1/N
ROK 100/250/11	1100	250	80	100 x 500	400 x 500 x 510	3,0	230 1/N
ROK 100/500/11	1100	500	160	100 x 750	650 x 500 x 510	4,5	400 3/N
ROK 150/250/11	1100	250	80	130 x 500	400 x 500 x 510	3,3	230 1/N
ROK 150/500/11	1100	500	160	130 x 750	650 x 500 x 510	5,0	400 3/N
ROK 200/250/11	1100	250	80	160 x 500	400 x 500 x 510	3,6	230 1/N
ROK 200/500/11	1100	500	160	160 x 750	650 x 500 x 510	6,0	400 3/N
ROK 250/400/11	1100	400	130	200 x 650	555 x 740 x 710	6,6	400 3/N
ROK 300/400/11	1100	400	130	250 x 650	555 x 860 x 810	9,8	400 3/N

HIGH-TEMPERATURE TUBE FURNACES ROC

with exchangeable tubes

T max. 1400 °C, 1500 °C and 1600 °C

- Tube diameter from 50 to 105 mm
- Heated lengths of 250 mm, 450 mm and 610 mm
- Designed for horizontal, vertical and universal operation
- Furnace insulation of high quality fiber materials with low thermal mass
- Furnaces are supplied with tube, can also be individually adapted to fit with customer's tube
- Heating via SiC heating elements, mounted parallel to the process tube, thus free and direct heat radiation to tube and sample, high temperature accuracy and long service life of the heating elements
- High-quality furnace housing, with stainless steel covers, integrated protection grid for low surface temperature on the tube module
- Very powerful heater for fast heating up
- Heating controlled via solid state relay, very precise furnace control, wear-free, noiseless
- Switchgear and control system for horizontal furnaces mounted in the lower part of the housing, for vertical and universal furnaces in a separate desktop housing for convenient operation of the controllers

Flexible all-round tube furnaces for the upper temperature range

Tube furnace series with heated lengths of 250, 450 and 610 mm and tube inner diameters of 50, 75 and 105 mm for maximum temperatures up to 1400 °C, 1500 °C and 1600 °C. The furnaces are supplied for horizontal, vertical or universal operation. The tubes can be changed quickly and easily depending on the application.

Additional equipment

Tube furnaces can be adapted to the most varied conditions in the laboratory with the optional additional equipment and accessories, depending on the intended use:

- Controller with extended programming options
- Batch temperature measurement and control
- Adjustable over-temperature protection to protect furnace and load according to EN 60519-2
- Programming and data-logging software and interfaces
- Working tubes made of ceramic with two fiber plugs or quartz glass available on request
- Flanges for inert gas and/or vacuum operation as well as manual and automatic gas feed systems
- Vacuum pumps and cooling units

Technical data

Model	T max. [°C]	Heated length [mm]	Const. zone [mm]	Recommended tube dimensions [mm] O Ø x length	Material	External dimensions [mm] width x depth x height	Power [kW]	Voltage [V]
ROC 50/250/14	1400	250	80	60 x 800	C 610	665 x 430 x 750	3,3	400 3/N
ROC 50/450/14	1400	450	150	60 x 1000	C 610	850 x 430 x 750	4,4	400 3/N
ROC 50/610/14	1400	610	200	60 x 1300	C 610	1150 x 430 x 750	5,0	400 3/N
ROC 75/450/14	1400	450	150	85 x 1000	C 610	850 x 430 x 750	6,1	400 3/N
ROC 75/610/14	1400	610	200	85 x 1300	C 610	1150 x 430 x 750	7,2	400 3/N
ROC 105/450/14	1400	450	150	120 x 1000	C 610	850 x 470 x 790	7,7	400 3/N
ROC 105/610/14	1400	610	200	120 x 1300	C 610	1150 x 470 x 790	8,3	400 3/N
ROC 50/250/15	1500	250	80	60 x 800	C 799	665 x 430 x 750	3,3	400 3/N
ROC 50/450/15	1500	450	150	60 x 1000	C 799	850 x 430 x 750	4,4	400 3/N
ROC 50/610/15	1500	610	200	60 x 1300	C 799	1150 x 430 x 750	5,5	400 3/N
ROC 75/450/15	1500	450	150	85 x 1000	C 799	850 x 430 x 750	6,6	400 3/N
ROC 75/610/15	1500	610	200	85 x 1300	C 799	1150 x 430 x 750	7,7	400 3/N
ROC 50/250/16	1600	250	80	60 x 800	C 799	665 x 430 x 750	4,4	400 3/N
ROC 50/450/16	1600	450	150	60 x 1000	C 799	850 x 430 x 750	6,1	400 3/N
ROC 50/610/16	1600	610	200	60 x 1300	C 799	1150 x 430 x 750	6,6	400 3/N
ROC 75/450/16	1600	450	150	85 x 1000	C 799	850 x 430 x 750	7,2	400 3/N
ROC 75/610/16	1600	610	200	85 x 1300	C 799	1150 x 430 x 750	8,3	400 3/N

HIGH-TEMPERATURE TUBE FURNACES ROHT

with exchangeable tubes

T max. 1700 °C and 1800 °C

- Tube diameter from 40 to 75 mm
- Heated lengths of 200 mm, 300 mm, 400 mm and 600 mm
- Designed for horizontal operation, vertical design on request realizable.
- Double-walled housing construction with forced rear ventilation, extremely low outside wall temperature
- Furnace insulation made of high-quality alumina material with very low thermal mass for rapid heating and cooling
- Very powerful heating via $MoSi_2$ heating elements, with free heat radiation onto the tube and sample, high temperature accuracy and long service life of the heating elements.
- Furnaces are supplied as tabletop models with a tube made of 99.7 % Al_2O_3 as standard
- High-quality furnace housing, partly with lateral stainless steel cladding
- State-of-the-art switching and control technology via thyristors in phase-angle operation for very precise, wear-free and noiseless furnace control
- Switch and control system for horizontal furnaces mounted in the lower housing area

Highest temperatures

Tube furnaces with $MoSi_2$ heating elements are designed for temperatures up to 1700 °C and 1800 °C. Tubes made of Alsint (C799) with inner diameters of 40, 50 and 75 mm are included in the scope of supply. Available in horizontal and vertical design. Horizontal furnaces can also be supplied with multiple zones.

Additional equipment

Tube furnaces can be adapted to the most varied conditions in the laboratory with the optional additional equipment and accessories, depending on the intended use:

- Controller with extended programming options
- Batch temperature measurement and control
- Adjustable over-temperature protection to protect furnace and load according to EN 60519-2
- Programming and data-logging software and interfaces
- Flanges for inert gas and/or vacuum operation as well as manual and automatic gas feed systems
- Vacuum pumps and cooling units

Technical data

Model	T max. [°C]	Heated length [mm]	Recom. tube dimensions [mm] O Ø x length	External dimensions [mm] width x depth x height	Power [kW]	Voltage [V]
ROHT 40/200/17	1700	200	50 x 600	460 x 530 x 830	3,3	400 3/N
ROHT 40/300/17	1700	300	50 x 700	460 x 560 x 830	4,4	400 3/N
ROHT 40/400/17	1700	400	50 x 800	460 x 660 x 830	5,3	400 3/N
ROHT 40/600/17	1700	600	50 x 1000	460 x 860 x 830	9,5	400 3/N
ROHT 50/200/17	1700	200	60 x 600	460 x 530 x 830	3,3	400 3/N
ROHT 50/300/17	1700	300	60 x 700	460 x 560 x 830	4,4	400 3/N
ROHT 50/400/17	1700	400	60 x 800	460 x 660 x 830	5,3	400 3/N
ROHT 50/600/17	1700	600	60 x 1000	460 x 860 x 830	9,5	400 3/N
ROHT 75/200/17	1700	200	85 x 600	460 x 530 x 830	3,3	400 3/N
ROHT 75/300/17	1700	300	85 x 700	460 x 560 x 830	4,4	400 3/N
ROHT 75/400/17	1700	400	85 x 800	460 x 660 x 830	5,3	400 3/N
ROHT 75/600/17	1700	600	85 x 1000	460 x 860 x 830	9,5	400 3/N
ROHT 40/200/18	1800	200	50 x 600	460 x 530 x 830	3,3	400 3/N
ROHT 40/300/18	1800	300	50 x 700	460 x 560 x 830	4,4	400 3/N
ROHT 40/400/18	1800	400	50 x 800	460 x 660 x 830	5,3	400 3/N
ROHT 40/600/18	1800	600	50 x 1000	460 x 860 x 830	9,5	400 3/N
ROHT 50/200/18	1800	200	60 x 600	460 x 530 x 830	3,3	400 3/N
ROHT 50/300/18	1800	300	60 x 700	460 x 560 x 830	4,4	400 3/N
ROHT 50/400/18	1800	400	60 x 800	460 x 660 x 830	5,3	400 3/N
ROHT 50/600/18	1800	600	60 x 1000	460 x 860 x 830	9,5	400 3/N
ROHT 75/200/18	1800	200	85 x 600	460 x 530 x 830	3,3	400 3/N
ROHT 75/300/18	1800	300	85 x 700	460 x 560 x 830	4,4	400 3/N
ROHT 75/400/18	1800	400	85 x 800	460 x 660 x 830	5,3	400 3/N
ROHT 75/600/18	1800	600	85 x 1000	460 x 860 x 830	9,5	400 3/N

ROTARY TUBE FURNACES D-ROK

Hinged and with rotating tube

T max. 1100 °C and 1500 °C

Turn, Tilt, Fold

D-ROK models are hinged rotary furnaces with adjustable rotation speed and inclination angle. Due to the hinged design, tubes can be changed quickly.

- Furnaces prepared for a maximum tube outside diameter of 50, 75 and 100 mm, individually adapted tube diameters are possible on request
- Heated lengths from 500 mm (400 mm for 1500 °C), can be extended in segments as required
- Can be used as batch or continuous furnace, rotation speed adjustable
- Designed for horizontal operation with adjustable inclination angle for continuous throughput processes
- Insulation made of high-quality fiber modules with integrated heating elements for direct heat radiation on tube and batch
- High-quality furnace housing with integrated switchgear and motion unit, mounted on the tiltable base frame
- Entire furnace unit on a base frame with castors, therefore easy to move
- Heating elements switched via solid state relay, for precise furnace control, wear-free, noiseless

Additional equipment

Rotary tube furnaces can be adapted to a wide range of conditions and processes with the optional additional equipment and accessories, depending on the intended application:

- Adjustable safety controller to protect furnace and load according to EN 60519-2
- Programming and data-logging software and interfaces
- Multi-zone versions
- Working tubes made of ceramic or quartz glass tubes with/ without reactor zone available on request
- Flanges for inert gas operation as well as manual and automatic gas feed systems
- Adjustable vibrator feeder unit and screw conveyor

Technical data

Model	T max. [°C]	Heated length [mm]	Tube dimensions [mm] O Ø x length	Tube material	Power [kW]	Voltage [V]
D-ROK 50/500/11	1100	500	50 x 1250	quartz glass, C 530, C 610	4,5	400 3/N
D-ROK 100/500/11	1100	500	100 x 1250	quartz glass, C 530, C 610	6,0	400 3/N
D-ROK 50/400/15	1500	400	50 x 1200	C 799	6,0	400 3/N
D-ROK 75/400/15	1500	400	75 x 1200	C 799	6,5	400 3/N

TUBE FURNACE ACCESSORIES

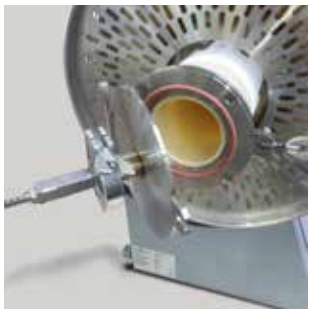
THERMCONCEPT supplies a wide range of accessories such as tubes, gas and vacuum flanges, gas feed systems, vacuum pumps, recirculating coolers, etc. to configure tube furnaces to customer-specific processes.

Working tubes & plugs

Depending on furnace type, application and temperature, working tubes are available as standard or optional with different diameters and lengths

- Ceramic C 530 Silimantin-60, porous up to max. 1200 °C
- Ceramic C 610 Pythagoras, gastight up to max. 1400 °C
- Ceramic C 799 Alsint-99.7, gastight up to max. 1800 °C
- Quartz glass up to max. 1100 °C

as well as ceramic plugs for closing and insulating the tube ends, with and without gas passage are available.



Gas flanges

Two screwed gas flanges with hose connection and pressure relief valve for simple applications with non-flammable protective gases in the lower temperature range.

Screw-lock - water-cooled gas vacuum flanges

Two water-cooled vacuum flanges with KF connections for individual connection of inert gas connection, pressure relief valve, vacuum pump, thermocouple feedthroughs, etc. Applicable for temperatures up to 1800 °C.

Quick-lock - water-cooled gas-vacuum flanges

Quick-lock with one flange with screw-on cover and one flange with swivel cover for easy and quick loading and unloading of the tube

Sluice function for Quick-lock flange

Specially adapted Quick-lock flanges for mounting on the outer wall of a glovebox, for easy and fast loading and unloading of the tube from the inside of the box.

Gas flushing system

Manual and automatic gas feed systems, adapted to the individual application, with flow-meter, valves and pressure reducer, regulated by the furnace control system.

Additionally available are

- Vacuum pumps, laboratory circulating coolers in compact design
- Flange supports, external tube insulation collars
- Loading and unloading tool

DRYING CABINETS KTL

with natural or forced air circulation

T max. 250 °C

Accurate and fast laboratory dryers

- Especially suitable for materials with high humidity, for demanding and accurate tests and drying processes in the low-temperature range
- High-quality and safe drying, heating and tempering of samples in laboratory and industrial applications
- Chamber volume 23 to 715 liters
- Temperature range from +10 °C above ambient to 250 °C
- Special air circulation within the chamber for homogeneous temperature distribution during the process
- Comfortable operation, precise temperature regulation and short temperature compensation times in the chamber after charging
- Standard version with microprocessor control, operating elements on the keypad, LCD display with process information
- KTL 20/02 - KTL 700/02 with thermal air circulation and smooth air flow e.g. for powder drying, noiseless operation

Additional equipment (depending on model)

- T max. 300 °C
- Door with window and interior lighting (model 60 and above)
- Cable port, door hinge left (except model 700), drip tray
- PT-100 batch thermocouple for sample temperature measurement
- Software for Windows, printer / PC connection
- HEPA filter in the supply air duct, outer housing made of stainless steel
- 1-, 3-, 9-point temperature measurement, 27-point measurement according to DIN 12880 and IQ/OQ validation including 9-point measurement

Technical data

Model	T max. [°C]	Inside dimensions [mm] width x depth x height	Volume [l]	External dimensions [mm] width x depth x height	Power [kW]	Voltage [V]	Weight [kg]
KTL 20/02	250	240 x 320 x 295	23	406 x 580 x 604	1,0	230 1/N	31
KTL 60/02	250	400 x 390 x 350	55	620 x 640 x 680	1,2	230 1/N	55
KTL 120/02	250	540 x 390 x 530	112	760 x 640 x 860	1,8	230 1/N	75
KTL 240/02	250	540 x 540 x 760	221	760 x 790 x 1090	1,8	230 1/n	100
KTL 400/02	250	540 x 540 x 1410	411	760 x 790 x 1910	3,6	400 3/N	150
KTL 700/02	250	940 x 540 x 1410	715	1160 x 790 x 1910	5,4	400 3/N	215
KTL 20/02/A	250	240 x 320 x 295	23	406 x 580 x 604	1,0	230 1/N	31
KTL 60/02/A	250	400 x 390 x 350	55	620 x 640 x 680	1,3	230 1/N	55
KTL 120/02/A	250	540 x 390 x 530	112	760 x 640 x 860	1,9	230 1/N	75
KTL 240/02/A	250	540 x 540 x 760	221	760 x 790 x 1090	1,9	230 1/N	100
KTL 400/02/A	250	540 x 540 x 1410	411	760 x 790 x 1910	3,7	400 3/N	150
KTL 700/02/A	250	940 x 540 x 1410	715	1160 x 790 x 1910	4,9	400 3/N	215

VACUUM DRYING CABINETS KTL-V

T max. 200 °C

Accurate and fast vacuum dryers

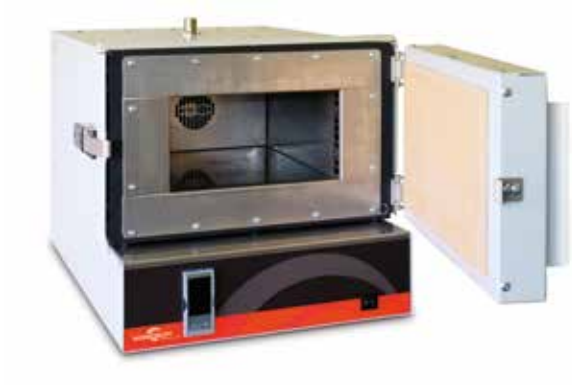
- Fast, gentle, ecological - laboratory dryers for highest claims
- Vacuum drying ovens are characterized by noiseless operation and fine sample heating, offer high-quality, safe heating and drying of samples up to constant weight
- Particularly suitable for drying of thermally unstable and oxidation-sensitive materials as well as for parts with complex design in vacuum
- Chamber volume 26 to 106 liters
- Temperature range from +5 °C above ambient to 200 °C
- Patented system with special air circulation within the chamber ensures homogeneous temperature distribution in all processes of drying, heating and sterilizing of materials
- Comfortable operation and precise temperature regulation
- Standard version with microprocessor control, operating elements on the keypad, LCD display with process information
- Wide range of additional equipment and accessories such as pump cabinets

Additional equipment

- PT-100 batch thermocouple for independent sample temperature measurement
- Inner chamber made of stainless steel
- Vacuum pump, vacuum controller and base cabinet for vacuum pump
- Interior lighting and interior socket
- Communication software for Windows, printer or PC connection
- 1-, 3-, 9-point temperature measurement, 27-point measurement according to DIN 12880 and IQ/OQ validation including 9-point measurement

Technical data

Model	T max. [°C]	Inside dimensions [mm] width x depth x height	Volume [l]	External dimensions [mm] width x depth x height	Power [kW]	Voltage [V]	Weight [kg]
KTL 20/02/V	200	340 x 260 x 300	26	560 x 490 x 700	1,0	230 1/N	65
KTL 60/02/V	200	400 x 320 x 430	55	620 x 550 x 830	1,2	230 1/N	98
KTL 120/02/V	200	540 x 410 x 480	106	760 x 640 x 880	1,8	230 1/N	130



AIR-CIRCULATION CHAMBER FURNACES KU

with horizontal air circulation

T max. 450 °C, 650 °C, 750 °C and 850 °C

High temperature accuracy within the med. temperature range

Air-circulation chamber furnaces for temperatures up to 850 °C achieve quickly and reliably a good temperature distribution due to the forced horizontal air circulation technology.

These models are particularly suitable for almost all non-flammable processes where high temperature accuracy is required, such as tempering, preheating, testing, ageing, preheating, drying, shrinking, baking, curing, bonding, de-binding, ...

- Robust housing constructions made of high-quality sheet steel
- Right hinged swing door
- Inner housing as air baffle made of heat-resistant stainless steel, with long service life, extremely durable and corrosion-resistant
- In the standard version with 2 pairs of insert strips for optional insert plates
- High-quality heating elements with long service life, mounted in the air flow for even and fast heat transfer
- Powerful horizontal air circulation ensures uniform temperature distribution up to +/- 5 K according to DIN 17052 or +/- 3 K for 750 °C models
- High-quality insulation for low energy consumption and low electricity costs
- Base frame included in standard scope of delivery
- KU 15/06/A as compact workbench furnace with air baffle, without slide-in option

Technical data

Model	T max. [°C]	Inside dimensions [mm] width x depth x height	Volume [l]	External dimensions* [mm] width x depth x height	Power [kW]	Voltage [V]	Weight [kg]
KU 40/04/A	450	300 x 400 x 300	35	570 x 1050 x 1270	3,2	400 3/N	115
KU 70/04/A	450	350 x 500 x 400	70	620 x 1150 x 1370	6,4	400 3/N	130
KU 140/04/A	450	450 x 600 x 500	135	720 x 1250 x 1470	9,6	400 3/N	205
KU 270/04/A	450	600 x 750 x 600	270	870 x 1450 x 1620	12,8	400 3/N	370
KU 540/04/A	450	750 x 900 x 800	540	1020 x 1600 x 1820	19,2	400 3/N	540
KU 800/04/A	450	800 x 1250 x 800	800	1050 x 1900 x 1820	24,0	400 3/N	850
KU 15/06/A	650	300 x 350 x 150	15	500 x 900 x 440	2,4	230 1/N	50
KU 40/06/A	650	300 x 400 x 300	35	580 x 1070 x 1270	4,0	400 3/N	125
KU 70/06/A	650	350 x 500 x 400	70	630 x 1170 x 1370	8,0	400 3/N	140
KU 140/06/A	650	450 x 600 x 500	135	730 x 1270 x 1470	12,0	400 3/N	220
KU 270/06/A	650	600 x 750 x 600	270	920 x 1570 x 1610	16,0	400 3/N	390
KU 540/06/A	650	750 x 900 x 800	540	1080 x 1620 x 1820	27,0	400 3/N	560
KU 800/06/A	650	800 x 1250 x 800	800	1180 x 1920 x 1820	35,0	400 3/N	895

*Width without switch cabinet (+ 260 mm), height incl. base frame; loading height: approx. 900 mm | Other sizes on request

Options

- Pneumatic lift door with hand switch or foot pedal
- Automatic supply and exhaust air flap control for furnace ventilation
- Automatic cooling system for forced cooling
- Bushings as access to the furnace chamber
- Protective gas boxes for applications under protective gas
- Charging trolleys
- Window
- Controller with recorder function, interfaces and software for data-logging
- Calibration of thermocouple and controller at different temperatures
- Customer-specific special designs

Air-circulation chamber furnace with gas box and charging stacker

Technical data

Model	T max. [°C]	Inside dimensions [mm] width x depth x height	Volume [l]	External dimensions* [mm] width x depth x height	Power [kW]	Voltage [V]	Weight [kg]
KU 40/07/A	750	300 x 400 x 300	35	680 x 1180 x 1430	5,2	400 3/N	290
KU 70/07/A	750	350 x 500 x 400	70	730 x 1280 x 1530	10,4	400 3/N	360
KU 140/07/A	750	450 x 600 x 500	135	810 x 1380 x 1650	14,0	400 3/N	580
KU 270/07/A	750	600 x 750 x 600	270	1040 x 1730 x 1800	21,0	400 3/N	770
KU 540/07/A	750	750 x 900 x 800	540	1190 x 1880 x 2010	28,0	400 3/N	920
KU 800/07/A	750	800 x 1250 x 800	800	1240 x 2180 x 2010	40,0	400 3/N	1105
KU 40/08/A	850	300 x 400 x 300	35	850 x 1360 x 1470	6,0	400 3/N	290
KU 70/08/A	850	350 x 500 x 400	70	900 x 1460 x 1570	9,0	400 3/N	360
KU 140/08/A	850	450 x 600 x 500	135	1000 x 1560 x 1670	15,0	400 3/N	580
KU 270/08/A	850	600 x 750 x 600	270	1150 x 1710 x 1770	20,0	400 3/N	770
KU 540/08/A	850	750 x 900 x 800	540	1330 x 1910 x 2125	30,0	400 3/N	970
KU 800/08/A	850	800 x 1250 x 800	800	1380 x 2260 x 2125	40,0	400 3/N	1340

*Width without switch cabinet (+ 260 mm), height incl. base frame; loading height: approx. 900 mm | Other sizes on request

FURNACES AND PLANTS FOR THE PRODUCTION

THERMCONCEPT supplies a comprehensive range of furnaces and systems for production in all major industrial sectors and applications. Ask for our special brochures.

Technical ceramics, glass, solar

- De-binding and drying furnaces 250 °C to 850 °C
- Combi-furnaces for de-binding and sintering in one furnace
- Firing and sintering furnaces 900 °C to 1400 °C
- High temperature sintering furnaces 1500 °C to 1800 °C
- Chamber and bogie hearth furnaces
- Hood and elevator furnaces
- Electrically or gas heated
- Normal or inert gas atmosphere
- Comprehensive standard range as well as tailor-made furnace concepts
- Adapted feeding systems
- Manually operated ovens up to fully automatic plant engineering
- Also in connection with exhaust air purification systems

3D printing and additive manufacturing

- Air-circulation chamber furnaces up to 850 °C
- Radiation-heated chamber and tube furnaces up to 1800 °C
- For melting out, hardening, tempering, drying, de-binding, annealing, hardening, sintering etc.
- Chamber furnaces for combined de-binding and sintering in one process

Plastics and composite materials

- Air-circulation chamber-, shaft- and bogie hearth-furnaces for temperatures from 60 °C to 850 °C
- Electrically heated or indirectly gas heated
- For curing, tempering, drying, preheating, vulcanizing etc.
- Even under vacuum in prep bags

Heat treatment of metals in industry and production

- Furnace systems are designed as chamber-, shaft-, bogie hearth- and hood-furnaces
- Comprehensive standard furnaces as well as tailor-made furnace systems
- Manually operated furnaces up to fully automated systems
- Electrically and gas-heated systems
- With powerful air-circulation technology up to 850 °C
- With radiant heating up to 1300 °C
- Retort furnaces for protective gas applications
- Salt- and warm-bath furnaces
- With integrated quenching devices

Melting and holding of non-ferrous metals

- Electrically and fuel heated ladling furnaces 1100 °C to 1300 °C for manual removal or for dosing systems
- Electrically and fuel heated tilting furnaces 1200 °C to 1300 °C with hydraulic tilting system for easy and safe pouring
- For lead, zinc, tin, brass, copper, Aluminium, bronze, ...
- Chamber or melt bath control

PROCESS CONTROL AND DATA-LOGGING

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

Heating element control

Contactors

- Proven switching frequencies, sufficient for many processes
- Robust and proven technology
- Cost effective and efficient solution

Solid state relays (SSR)

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

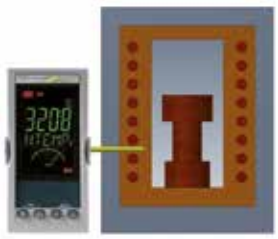
Thyristors (phase control)

- Extremely precise temperature control
- Wear-free and noiseless
- Quiet, constant mains load, no mains fluctuations, protection of the heating elements
- Power management via proportional power limitation possible
- Heating circuit monitoring with message of defective heating elements as option

Furnace temperature control

Ofenraumregelung

- Measurement at a mechanically protected position in the furnace chamber, which experience has shown to be a good average value for control

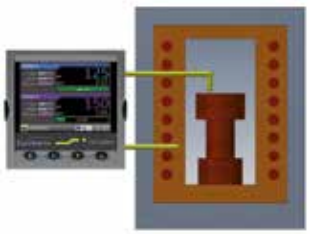


Furnace chamber control with charge measurement

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

Batch control (cascades)

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



Measurement technology

Thermocouples

- NiCr-Ni type N flexible sheath thermocouple up to 1200 °C
- NiCr-Ni type K flexible sheath thermocouple up to 1200 °C
- PtRh-Pt Type S thermocouple with ceramic protection tube up to 1600 °C
- PtPh-Pt Type B thermocouple with ceramic protection tube up to 1800 °C
- Thermo-wire for individual assembly for tests or batch temperature measurement

PROGRAM CONTROLLER

Eurotherm 3208/3216

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

Eurotherm 3508/3504

- 10 programs with a total of 500 segments freely programmable
- 7-day pre-selection timer
- Up to 5 event functions
- Interface RS 485 and Ethernet as well as iTools software as option
- Multi-zone control optional

Eurotherm 3216i/32h8i

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

Eurotherm Nanodac

- Suitable as program controller, controller/recorder combination, multi-zone controller or cascade controller
- Clear colour display
- Program controller with 100 programs, each with 25 segments, freely programmable
- 4 thermocouple inputs freely configurable
- USB connection for removable media, integrated flash memory
- Ethernet interface
- Incl. software for programming, control and documentation

Touch Panel TCP 400
PID controller with 4" touch panel

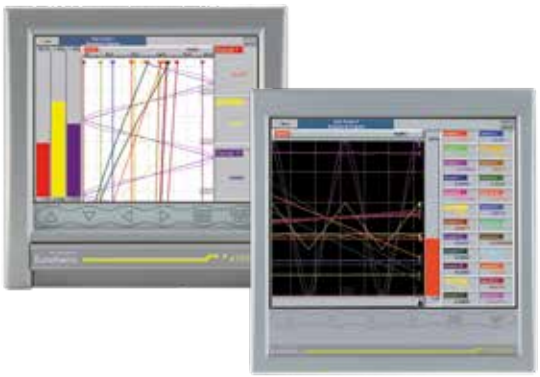
- 10 programs with 24 segments each
- Plain text display with program name
- Graphic program display
- Up to 5 event functions
- 20-day preselection timer
- Holdback for guaranteed warm-up time
- USB interface for data-logging of set and actual values
- Alarm messages in plain text
- Five languages selectable (D, GB, F, CZ, CN), other upon request

Optional

- Ethernet interface for Eurotherm iTools programming software, monitoring and documentation
- Multi-zone and batch control possible

PROCESS CONTROL

For the control of complex processes, program sequences, necessary safety and security measures, THERMCONCEPT PLC controllers such as the Siemens S7 or the Eurotherm EPLC 400-PLC are used. These are individually and especially designed for the respective application and optimized in close cooperation with the user.



Siemens PLC S7 control/operating interfaces

- Individually adjusted and programmed for furnace and process
- Customized, individual user interfaces as 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 program input via touch panel
- Clear colour display

Eurotherm EPLC 400-PLC

- Central EHMI panel Touch Panel in connection with Eurotherm 3000 Series Controllers
- CODESYS programming environment for PLC and PID control
- Data recording and visualization
- Program selection e.g. via barcode reader and QR code label
- UPS - for data buffering

Dokumentation

As proof of compliance with the heat treatment regulations and for quality assurance, the data-logging of all process relevant data plays an important role. For this THERMCONCEPT offers a number of possibilities.

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

Control and evaluation software

- Eurotherm iTools for professional process control and documentation of temperature-time profiles and batch data
- Several furnaces can be managed simultaneously
- Control from a central PC or over a network
- Great ease of use

PROCESS NORMS AND STANDARDS

International Aerospace Materials Standard AMS 2750 E

This standard covers requirements for temperature measurement in heat treatment plants of the aerospace industry and belongs to furnaces plants as well as their thermocouples, temperature controllers and displays. The documentation of heat treatment processes as well as regular system accuracy tests and temperature uniformity tests are important for quality assurance and thus ensure that components have been heat-treated in accordance with the applicable standards.

Here the heat treatment lines are divided into furnace classes (temperature distribution in the usable space) and instrumentation version (execution of pyrometry).

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Instrumentation

Version A: controller, display, control thermocouple, recorder, over-temperature protection with alarm as well as high & low temperature sensors and min. 1 batch thermocouple

Version B: controller, display, control thermocouple, recorder, over-temperature protection with alarm as well as min. 1 batch thermocouple

Version C: controller, display, control thermocouple, recorder, over-temperature protection with alarm and high & low temperature sensors

Version D: controller, display, control thermocouple, recorder, over-temperature protection with alarm

Version E: controller, display and control thermocouple

Temperature uniformity

Furnace class 1	+/- 3 °C	Furnace class 4	+/- 10 °C
Furnace class 2	+/- 6 °C	Furnace class 5	+/- 14 °C
Furnace class 3	+/- 8 °C	Furnace class 6	+/- 28 °C

International Automotive Industry Standard CQI-9

The CQI-9 is a self-assessment for the heat treatment of components in the automotive industry and was introduced by a working group of leading international automotive manufacturers and suppliers as well as the International Organization for Standardization (ISO) for continuous improvement, fault prevention and reduction of process deviations.

Relevant contents were taken from the AMS 2750 and adapted to the heat treatments in the automotive industry with regard to application, requirements, available furnace technology and test frequencies.

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PROFESSIONAL SERVICE

Success by consulting

Put your trust in the experience we have gained over the years in industrial furnace construction. We convert your special wishes into optimal solutions.

Your application is the center point

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

A test is what counts!

Do you first want to test your workpieces and samples under realistic conditions in a furnace? No problem. For the simulation of your heat treatment processes, you can use our test field.

Everything from one source

As a system provider, we do not only advise you on the selection of the suitable furnace line. You can also contact us, if automation, the use of supplementary auxiliary equipment, tools and systems is required.

Qualified employees in service

With our qualified employees we offer a wide range of professional services around the furnace plant, for your safety right from the start. Our service technicians are integrated into the production process at our head office and thus remain up-to-date with their knowledge at all times. They are specialists for

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

We are focused on the full support and maintenance of your furnace system.

Retrofit and standard adaptation

THERMCONCEPT furnace systems are known for their long service life. After many years of hard use, they are still far from being part of the old iron. We take care of your plants and make them fit for the future. Often considerable energy savings can be achieved with little effort. We modify your furnace system to be used also with additional applications and processes. Modern control systems increase ease of operation and extend the possibilities for process documentation.

FIT FOR FUTURE

What you can expect from us is a comprehensive package of professional services to keep your furnace equipment 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 as well as checking whether your plant complies with the applicable standards. The results are summarized in a test report. In addition, we will provide you with a profitability analysis. The results of this analysis are used for the necessary retrofit measures.

Preventive maintenance - Predictive repairs - Life-cycle costing

Unexpected plant downtimes cause annoyance and considerable consequential costs. We therefore offer you flexible maintenance contracts with regular inspections and a preventive and cost-effective replacement of critical spare parts. The maintenance assignments are comprehensively documented and analysed. This is the prerequisite for optimizing life cycle costs.

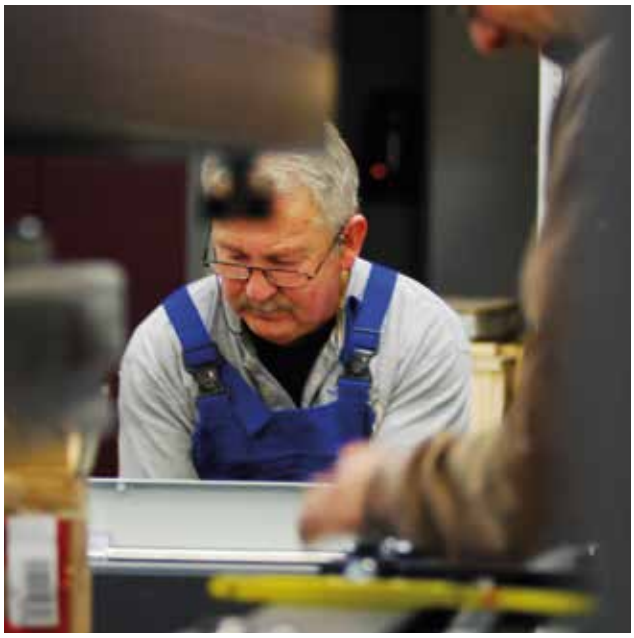
Spare and wear parts - Only the original is first choice

Spare and wear parts from THERMCONCEPT offer you:

- always original equipment quality
- are 100 % safe in use and fit perfectly
- maximum service lives
- 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 the online support we offer our customers a comprehensive economic service to support program improvements, troubleshooting, etc. Thus often costly visits by service technicians on site can be avoided.



WWW.THERMCONCEPT.COM

OUR PRODUCTRANGE

Technical Ceramics, New Materials

THERMCONCEPT furnaces are used for many applications in technical ceramics, semiconductor production, photovoltaics and bio-ceramics. We supply furnaces, e.g. for de-binding and sintering processes, for crystal growing, for thermal analysis. Our chamber furnaces, bogie hearth furnaces, elevator furnaces, hood furnaces and continuous furnaces are electrically-heated or gas-fired. The furnace technology is supplemented by catalytic and thermal exhaust air purification systems.

Metal, Industry, Production

Here you will find furnaces, plants, systems and accessories for a wide range of applications in the manufacturing and production of the metalworking industry as well as in tool and mould making. Almost all important heat treatment requirements can be met with our practical product range of standard and custom-made products.

Foundry

We supply electrically-heated and fuel-fired melting and holding furnaces for light and heavy metals. The furnace range includes bale-out furnaces and tilting crucible furnaces. For tempering and aging processes of aluminium and aluminium alloys a wide range of products from convection ovens to fully automatic tempering systems is available for the user.

THERMCONCEPT
powered by innovation

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