Hardening, Tempering, Quenching...

Furnaces, systems and accessories for

- Hardening
- Tempering
- Annealing
- Quenching
- Solution Annealing
- Forging
- Preheating
- Drying
- Ageing

THERMCONCEPT

THERMCONCEPT

Bench Type Furnaces KM 10/13 – KM 30/13
Chamber Furnaces KM 50/13 – KM 90/13

T max 1300 °C

- Double lined housing with rear ventilation > Very low outer casing temperature
- Outer casing side walls and door made of stainless steel > Corrosion resistant
- Lintel of the door also made of stainless steel
- Downwards moving door
- Stainless steel charging support on the door frame
- Exhaust pipe in rear wall
- Base included in standard supply (from model KM 50/13)
- Multilayer insulation (fire bricks and rear insulation) > Low heat loss, very low energy consumption, low operating costs
- High quality heating elements, securely fixed on tubes
- Heated from 3-sides (left, right and bottom) > Excellent temperature uniformity in the chamber
- Heating elements wound on ceramic tubes (from model KM 50/13) > Free heat radiation into the chamber, low energy consumption, longer service life for heating elements
- Bottom heating elements covered by silicon carbide plates > High mechanical strength, protection for bottom heating elements
- Furnaces offer sufficient power > Short heating-up times
- Door safety switch

Technical Data

Model	T max [°C]	Inside dimensions [mm] width x depth x height	Volume [l]	Outside 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	2,5	230 1/N	75
KM 15/13	1300	250 x 250 x 200	13	500 x 700 x 700	3,6	230 1/N	85
KM 20/13	1300	250 x 350 x 200	18	500 x 700 x 700	6,0	400 3/N	85
KM 30/13	1300	250 x 500 x 200	25	500 x 850 x 700	7,0	400 3/N	95
KM 50/13	1300	350 x 500 x 250	44	1000 x 1300 x 1400	13	400 3/N	250
KM 70/13	1300	350 x 750 x 250	66	1000 x 1400 x 1400	20	400 3/N	330
KM 90/13	1300	350 x 1000 x 250	88	1000 x 2000 x 1400	22	400 3/N	500

KM 50/13 – KM 90/13: Charging height: 900 mm

Chamber Furnaces KM 105/13 – KM 1400/13

T max 1280 °C

- Rugged furnace housing made of construction steel, frame welded with steel profiles, covered by metal sheet profiles
- Double lined housing with rear ventilation > Very low outer casing temperature
- Vertical lifting door, from Model KM 680/13 incl. hydraulic drive
- Door collar made from strong refractory concrete > Resistant to mechanical damages
- Exhaust pipe in rear wall
- Base included in standard supply
- Multilayer insulation (fire bricks and rear insulation) > Low heat loss, very low energy consumption, low operating costs
- Heated from 3-sides (left, right and bottom) > Excellent temperature uniformity in the chamber
- High quality heating elements > Long service life
- Side heating elements wound on ceramic tubes > Free heat radiation into the chamber, low energy consumption, longer service life for heating elements
- Bottom heating elements covered by silicon carbide plates > High mechanical strength, protection for bottom heating elements
- Furnaces offer sufficient power > Short heating-up time
- Door safety switch

Options:

- Charging plate: Extra protection for the furnace bottom
- Silicon carbide protective tiles: Protect the side heating elements against mechanical damage
- Lift door: With hydraulic drive, operated by foot or hand switch
- Cooling fan: Provides forced cooling of the batch
- Inert gas connection and sealing: Prepares furnace for semi-gastight operation
- **Furnaces also available with protective gas retort**

Technical Data

Model	T max [°C]	Inside dimensions [mm] width x depth x height	Volume [l]	Outside dimensions [mm] width x depth x height	Power [kW]	Voltage [V]	Weight [kg]
KM 105/13	1280	500 x 600 x 350	105	1300 x 1900 x 1350	21	400 3/N	660
KM 130/13	1280	500 x 750 x 350	130	1300 x 2000 x 1500	21	400 3/N	750
KM 180/13	1280	550 x 800 x 400	180	1350 x 2000 x 1950	29	400 3/N	830
KM 225/13	1280	600 x 750 x 500	225	1400 x 2050 x 2150	29	400 3/N	920
KM 350/13	1280	700 x 1100 x 450	350	1500 x 2400 x 2150	50	400 3/N	1100
KM 540/13	1280	600 x 1500 x 600	540	1500 x 3000 x 2450	50	400 3/N	1540
KM 680/13	1280	900 x 1500 x 500	680	2200 x 2450 x 2600	70	400 3/N	1620
KM 1000/13	1280	900 x 1800 x 600	970	2100 x 2850 x 2750	70	400 3/N	1980
KM 1400/13	1280	1100 x 2100 x 600	1400	2300 x 3200 x 2750	95	400 3/N	2500

Charging height: 900 mm · Other sizes on request

Air-Circulation Bench Type Furnace KU 15/06/A
Air-Circulation Chamber Furnaces KU 40/04/A KU 540/08/A

T max 450 °C, 650 °C and 850 °C

- Air-Circulation Chamber Furnaces up to 850 °C, mainly used for annealing, tempering, ageing, pre-heating, drying, shrinking, baking, testing
- Rugged case construction made of high-grade steel sheets
- Swinging door hinged on the right
- Inner liner of heat-resistant stainless steel > Long service life, extremely resilient, corrosion resistant
- 2 sheet-metal trays included as standard (KU 15/06/A without trays, for 850 °C models sheet-metal trays as option)
- High-grade heating elements with long service life
- Heated from several sides, strong horizontal air-circulation > Excellent temperature uniformity up to +/- 3 K in accordance with DIN 17052
- High-grade insulation > Low energy consumption, low operating costs
- Base included in standard supply (KU 15/06/A as bench-type furnace without base)

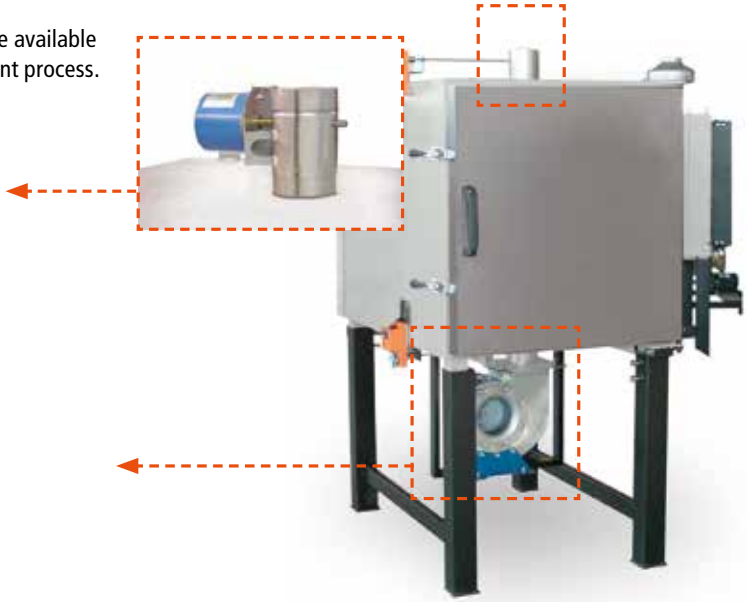
Technical Data

Model	T max [°C]	Inside dimensions [mm] width x depth x height	Volume [l]	Outside dimensions* [mm] width x depth x height	Power [kW]	Voltage [V]	Weight [kg]
KU 40/04/A	450	300 x 400 x 300	35	540 x 1050 x 1270	3,2	230 1/N	115
KU 70/04/A	450	350 x 500 x 400	70	590 x 1150 x 1370	6,4	400 3/N	130
KU 140/04/A	450	450 x 600 x 500	135	690 x 1250 x 1470	9,6	400 3/N	205
KU 270/04/A	450	600 x 750 x 600	270	840 x 1450 x 1620	12,8	400 3/N	370
KU 540/04/A	450	750 x 900 x 800	540	990 x 1600 x 1820	19,2	400 3/N	540
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	540 x 1050 x 1270	4,0	400 3/N	125
KU 70/06/A	650	350 x 500 x 400	70	590 x 1150 x 1370	8,0	400 3/N	140
KU 140/06/A	650	450 x 600 x 500	135	690 x 1250 x 1470	12,0	400 3/N	220
KU 270/06/A	650	600 x 750 x 600	270	840 x 1450 x 1620	16,0	400 3/N	390
KU 540/06/A	650	750 x 900 x 800	540	990 x 1600 x 1820	24,0	400 3/N	560
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	10,0	400 3/N	360
KU 140/08/A	850	450 x 600 x 500	135	1000 x 1560 x 1670	14,0	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	1300 x 1860 x 1970	30,0	400 3/N	920

* Width without control panel (+ 260 mm), height incl. frame; Charging height: approx. 900 mm

Options:

Air circulation furnaces are used for many different applications. The available options meet the specific requirements for the desired heat treatment process. We also supply all furnaces in customized dimensions on request.



Automatic exhaust flap control

Enables exhaust flap to be operated via controller

Air extraction

Ensures fast venting of the furnace chamber

Cooling fan

For flushing and for forced cooling of the batch

Inert gas connection and sealing

Prepares furnace for semi-gastight operation

Furnace operation with inert gas retort

Annealing and tempering under inert gas, cooling under inert gas, superb results, bright surfaces almost without oxidation

Lift door

With pneumatic drive, operated by foot or hand switch

Charging supports

Charging wagon, shown here with a stainless-steel rack, for safe and convenient charging

THERMCONCEPT

Air-Circulation Pit-type Furnaces SM 30/04/A – SM 500/06/A

T max 450 °C and 650 °C

- Designed like air-circulation chamber furnaces, but charged from the top
- Vertical air circulation > Excellent temperature uniformity up to +/- 3 K in accordance with DIN 17052
- Rugged case construction made of high-grade steel sheets
- Inner liner of heat-resistant stainless steel > Long service life, extremely resilient
- Heating elements with long service life
- Hand operated hoist available (optional extra)

Warmbath Furnaces SWB 20/05 – SWB 400/05

Working temperature 150 – 500 °C

- Warmbath furnaces are used for the following applications:
  – Tempering without risk of cracks, precision hardness and toughness
  – Martempering for crack-sensitive parts
  – Austempering with optimal toughness
  – Intermediate annealing during spark eroding
  – Nitro-blacking
- Baths filled with neutral salt, ensuring fast, intensive transfer of heat
- Salt is reusable, practically unlimited working life
- Excellent temperature uniformity up to +/- 2 K in accordance with DIN 17052 in the bath
- Heated by immersion heaters
- Temperature control via bath temperature
- Charging basket included as standard
- Hand operated hoist available (optional extra)

Technical Data

Model	T max [°C]	Inside dimensions [mm] width x depth x height	Volume [l]	Outside dimensions* [mm] width x depth x height	Power [kW]	Voltage [V]	Weight [kg]
SM 30/04/A	450	300 x 300 x 400	30	590 x 645 x 980	2,4	230 1/N	85
SM 60/04/A	450	350 x 350 x 500	60	640 x 695 x 1085	3,2	230 1/N	110
SM 120/04/A	450	450 x 450 x 600	120	780 x 795 x 1190	6,4	400 3/N	175
SM 250/04/A	450	600 x 600 x 750	250	930 x 935 x 1425	12,0	400 3/N	320
SM 500/04/A	450	750 x 750 x 900	500	1080 x 1085 x 1580	18,0	400 3/N	375
SM 30/06/A	650	300 x 300 x 400	30	600 x 690 x 1030	3,2	230 1/N	130
SM 60/06/A	650	350 x 350 x 500	60	640 x 750 x 1130	6,0	400 3/N	140
SM 120/06/A	650	450 x 450 x 600	120	780 x 850 x 1260	9,0	400 3/N	220
SM 250/06/A	650	600 x 600 x 750	250	930 x 990 x 1480	18,0	400 3/N	395
SM 500/06/A	650	750 x 750 x 900	500	1080 x 1140 x 1630	27,0	400 3/N	555
SWB 20/05	500	300 x 210 x 460	20	610 x 580 x 920	2,6	230 1/N	110
SWB 30/05	500	300 x 210 x 580	30	610 x 580 x 920	3,2	230 1/N	140
SWB 70/05	500	400 x 300 x 680	70	750 x 680 x 980	7,5	400 3/N	240
SWB 200/05	500	540 x 520 x 880	200	900 x 900 x 1200	18,0	400 3/N	660
SWB 400/05	500	730 x 720 x 980	400	1100 x 1100 x 1300	24,0	400 3/N	1150

* Outside dimensions without control panel and charging hoist

Process control and documentation

State-of-the-art control technology is fitted as standard in THERMCONCEPT furnaces. Microprocessor controllers ensure precise furnace regulation of both simple and complex processes. The program controllers are extremely user-friendly.

The control system can be extended as required. Software packages for managing the controller and for evaluating the processes are available, as is visualisation software.
On request, we can install Siemens S7 control systems featuring Siemens touch panels as user interface.

In addition to our proven standard systems, we also design control panels according to customer wishes, in compliance with special plant standards and equipment regulations.

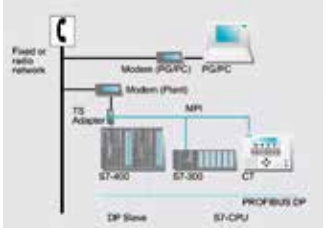
Program Controllers

Process documentation

Various printer options available

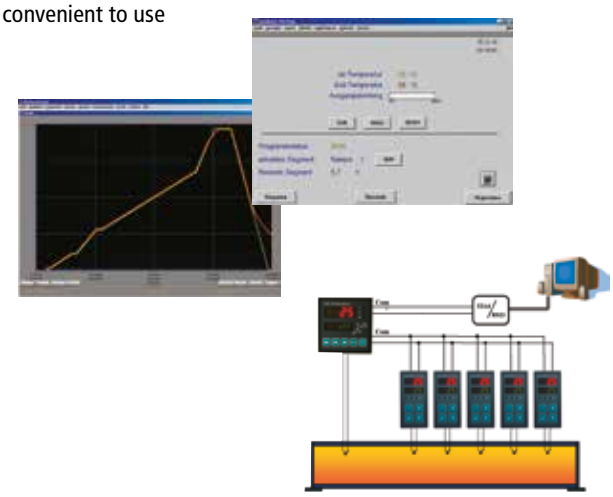
Siemens S7 control and operating touch panels

For professional process control and documentation



THERMcontrol software for analysis and control

- Management of several furnaces simultaneously
- Furnace control from a central PC
- Sensing of temperature / temperature-time profile in accordance with DIN ISO 9000 ff.
- Documentation of batch data
- Very convenient to use



Control panel technology

- Contactor control systems up to thyristor control
- Multi-zone control
- Automatic flap control systems
- Remote maintenance system

Compact Hardening System HS 1

for small to medium-sized workpieces, tools and dies

The HS 1 hardening system is used for pre-heating, annealing and tempering, hardening under inert gas, semi-vacuum hardening, oil hardening, austempering, carburizing and nitriding, ageing and brazing.

Basis for this compact hardening system is the HS 1 combitable

- Stable combitable with shelf underneath for tools and accessories.
- Integrated quenching grid for air-hardening steels or hot carburizing boxes, with fan for forced air cooling as option.
- Heating hearth is assembled above the quenching grid for pre-heating parts for subsequent forging, welding, flame hardening, brazing etc. Heat reflective bricks included as standard.
- Integrated quenching tanks incl. cover for water (stainless steel) and oil, incl. charging baskets and draining support. With heating element and thermostat for heating the water and/or oil bath.

The HS 1 combitable can be combined with a suitable hardening and tempering furnace.

Illustration of various processes:

Charging of the furnace with a workpiece. The workpiece is placed directly into the furnace or put into a carburizing box or onto the gas grid-system for charging.

Air hardening:

After heating, the workpiece can be placed onto the quenching grid for air-hardening. The fan provides forced air cooling.

Oil hardening:

Oil hardening can be performed in the oil bath provided at the side of the combitable. The hot workpiece is placed into the charging basket and lowered into the bath, then cleaned in the water bath. The water bath is also suitable for hardening unalloyed steels.

Case hardening and direct hardening:

The workpiece is packed together with granulate into a box for carburizing at 900 °C for several hours. Then the box is taken out of the furnace and set down on the quenching grid. After the cover has been removed, the workpiece is taken out and quenched in the oil bath.

Technical Data of the HS 1 combitable

Model	Dimensions of table [mm] width x depth x height	Dimensions of tanks [mm] width x depth x height	Volume of tanks [l]	Power [kW]	Voltage [V]	Weight [kg]
HS 1	1400 x 600 x 900	270 x 600 x 500	ca. 50-60	3,0	230 1/N	150

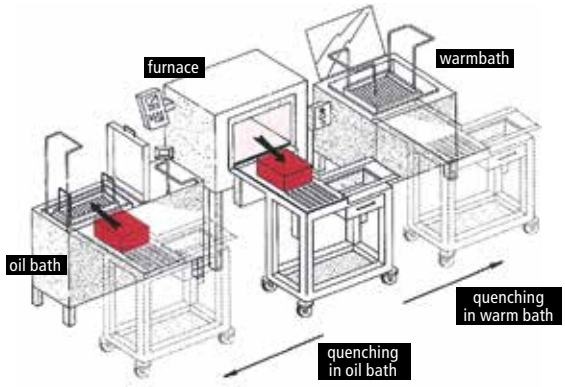
Forced air cooling fan (as option): 120 Watt, 230 V 1/N

Modular Hardening System HS 2

for medium-sized and large workpieces, tools, moulds and other parts

The HS 2 hardening system consists of single components in modular design and can therefore be used in a wide variety of heat treatment processes, such as air-hardening, quenching in oil or water, martempering or hardening under inert gas. The system can be round off with cleaning tanks and components for post-hardening, tempering and annealing processes.

You can choose components to meet your particular requirements. The HS 2 hardening system can be enlarged at any time. All components have been proven in practice over many years, are reliable in operation and guarantee safe processes.



Hardening furnaces – The basis

- The hardening furnace forms the basis for all combinations and is designed for a maximum working temperature of 1280 °C.
- Suitable for all important heat treatment solutions
- Rugged case construction, proven in practice

CW41 Charging wagon - For air hardening

- Offers safe and convenient loading and unloading of the furnace with larger workpieces or carburizing boxes up to 150 kg in weight
- The hot workpiece is placed onto the quenching grid for air hardening
- Optional fan provides forced air cooling

WO 200 Combi-Bath - For oil or water quenching

- Combines oil tank (200 l) and water tank (125 l)
- Separate heating system provides for best working temperatures of 40-60 °C (oil bath) and approx. 70 °C (water bath)
- Water bath can be also used to clean the workpieces

Cleaning-Baths – For rinsing and cleaning workpieces

- Double-lined housing, inner stainless steel tank
- Water capacity ranging from 50 to 200 l
- Heating elements incl. thermostat for water temperature of approx. 70 °C for fast cleaning

Air-circulation furnaces – For tempering and annealing

- Suitable for tempering and annealing processes for normalizing
- A wide variety of proven and reliable furnaces
- Excellent temperature uniformity for the whole temperature range up to 850 °C
- Available in semi-gastight version and for operation with gas-tight retort, e.g. for bright annealing under inert gas

Special heat treatment methods

In addition to the HS 1 and HS 2 hardening systems, THERMCONCEPT also delivers specially developed hardening accessories that has been proven in practical use over many years. Our accessories are specially designed to complement the various components of the hardening systems, thus enabling inert gas hardening or oxidation-free hardening that is easy in handling and economical in operation. Please contact us for practical advice in selecting the most useful components and how they are handled in practice.

Diamond Block System –

Oxidation-free hardening up to 1300 °C

- Specially suitable for all types of high-speed steel and high-alloy chrome steels
- Multiple use of the carbonaceous block, ensures protective atmosphere
- Oxidation or decarburization of the component is almost completely eliminated
- Easy to operate, superb results, high product quality
- Can be used in all chamber furnaces

Gas Grid System –

Hardening and cooling under inert gas up to 1200 °C

- Enables bright annealing with subsequent gas quenching
- No loss of time during heat-up due to use of ultra-thin foil containers
- Can be used with forming gas, nitrogen and inert gases such as argon and helium
- Very low gas consumption due to small container volumes
- Also available with optional thermocouple for continuous measurement of the temperature inside the container

Hardening Box System –

Hardening, carburizing, nitriding up to 1100 °C

- All hardening boxes match the inside dimensions of the annealing furnaces
- By using a neutral annealing compound, virtually oxidation-free hardening is possible
- Also available with gas connection for inert gas hardening or as atmosphere box with hinged lid that stays in the furnace
- Easy handling, reliable process

Annealing Retort System –

Bright annealing up to 850 °C / Tempering under inert gas

- Annealing and tempering under inert gas for almost oxidation-free workpieces
- Rapid cooling of workpieces under inert gas possible, also outside the furnace, thus enabling fast working cycles
- Gas-tight welded annealing retort supplied for all sizes of standard air-circulation furnaces
- Quick and easy assembly/disassembly of the retort , furnance can be operated also without retort at any time.

Inert gas operation in semi-gastight air-circulation furnaces

- Special version of air-circulation furnaces with gas-tight welded inner liner, inert gas inlet and outlet, furnace door sealed with heat resistant silicon
- Suitable for operation with inert gases such as nitrogen, forming gas, argon, helium etc.
- Inert gas supply during operation results in overpressure in the chamber atmosphere, whereby oxygen is forced out, thus preventing oxygen entering from outside. A 100% gas-tight seal cannot be guaranteed
- Simple and cost-efficient solution with excellent reproducible results

Do-it-yourself hardening is easier than you think…

And highly cost-efficient. The first step is to buy a hardening furnace. Further components and systems can be added step by step. We also provide assistance and advice in all matters relating to hardening:

- We supply the accessories you need for hardening
- Our Test Centre is available to you for heat treatment tests
- You get expert telephone advice quickly and professionally, if required

Accessories and tools

At THERMCONCEPT you will find a comprehensive range of hardening accessories and tools that have been well proven in practice:

- Hardening foils, envelopes and containers for oxidation-free annealing of steels up to 1200 °C
- Thermochemically stable hardening oils for tank temperatures of 50 – 150 °C
- Materials for cleaning, degreasing and corrosion protection
- Carburizing granulate, nitriding powder and neutral annealing compound

We also supply:

- Inert gas retorts and hardening boxes
- Baskets and furnace grids
- Charging wagons
- Hand tools and heat-resisting gloves
- Charging tools such as shovels, draw hooks and charging plates
- Hardness testers
- Blacking plants

Ask for our special brochures!

Test Centre

Our Test Centre has all the equipment needed for hardening. You are cordially invited to use the Centre's facilities!

- Subject our products to intensive testing under real conditions
- Become familiar with the hardening process – it's easier than you think. We organize individual training courses and seminars to suit your needs.
- Do you want to test which annealing process is best for your workpiece? No problem! We carry out hardness tests in accordance with your requirements, and provide professional documentation of the results.

Our expert staff are there to help you in every way they can.

Hardening Guide

A Guide packed with knowledge, tips and tricks for hardening steel, with a wealth of details on choosing and shaping steels! You learn everything you need to know, as well as the background to the various heat treatment methods such as carburizing, nitriding, nitro-carburizing etc. The written material is supplemented with a host of drawings, worksheets and tables.

Our product range

THERMCONCEPT is your partner for heat treatment applications.
We supply an extensive range of

- electrically and
- gas-heated

chamber, pit-type, bogie hearth and salt bath furnaces for the industry, for temperature ranges from 50 °C to 1300 °C.

Ask for our special brochures!

Proven technology:

For the production of our furnaces only the best materials from world-renowned suppliers are used. This ensures maximum efficiency, reliable operation and a long service life.

Cutting-edge design:

The furnaces are planned and produced in strict accordance with economic considerations. Direct contact with users enables us to design furnaces that are practical to use. Our aim is to deliver crucial technical and financial benefits.

Wide range of standard furnaces:

Many applications can be achieved with our extensive range of standard furnaces. The advantages are: proven, fully-developed models, excellent value for money and quick delivery times.

Customer-specific solutions:

Of course, we also supply customised furnaces specially designed to meet your specific requirements. In close consultation with you, we create a furnace system which meets your challenging tasks both reliably and economically.

Professional service:

With our skilled workforce we are able to provide you from the outset with a wide range of professional services relating to all furnaces matters.

THERMCONCEPT

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PM 2 / 04.07 Subject to technical changes