Ovens and Forced Convection Furnaces up to 850 °C

Drying processes or heat treatments at low temperatures benefit from forced air-circulation. The results are a better heat transfer and optimization of temperature uniformity. The Nabertherm ovens also impress with an attractive design made of a high-quality stainless steel housing.

The following equipment applies to all furnaces in this chapter:

- Dual shell ventilated housing made of textured stainless steel sheets for low surface temperature and high stability
- Solid state relays provide for lownoise operation
- Exclusive use of insulation materials without categorization according to EC Regulation No 1272/2008 (CLP). This explicitly means that alumino silicate wool, also known as “refractory ceramic fiber” (RCF), which is classified and possibly carcinogenic, is not used.
- Defined application within the constraints of the operating instructions
- Controller with intuitive touch operation
- NTLog Basic for Nabertherm controller: recording of process data with USB-flash drive
- Freeware NTEdit for convenient program input via Excel™ for Windows™ on the PC
- Freeware NTGraph for evaluation and documention of firings using Excel™ for Windows™ on the PC
- MyNabertherm App for online monitoring of the firing on mobile devices for free download
- As additional equipment: Process control and documentation via VCD software package for monitoring, documentation and control

Furnace Group	Model	Page
Ovens up to 300 °C	TR	42
Chamber ovens up to 260 °C	KTR	44
Forced convection chamber furnaces up to 850 °C	NAT	46
Forced convection chamber furnaces up to 675 liter	NA	48
Ovens with safety technology	TR .. LS	50
Forced convection chamber furnaces up to 500 liter with safety technology	NA .. LS	51

Ovens up to 300 °C

With their maximum working temperature of up to 300 °C and forced air circulation, the ovens achieve a very good temperature uniformity. They can be used for various applications such as e.g. drying, sterilizing or warm storing. Short delivery times from stock are ensured for standard models.

Oven TR 240

Oven TR 450

Standard Equipment

- Tmax 300 °C
- Working temperature range: + 20 °C above room temperature up to 300 °C
- Ovens TR 60 - TR 420 designed as tabletop models
- Ovens TR 450 - TR 1050 designed as floor standing models
- Horizontal forced air circulation results in temperature uniformity according to DIN 17052-1 better than +/– 5 °C in the empty oven (with closed exhaust air flap) see page 77
- Stainless steel furnace housing, material no. 1.4016 (DIN)
- Stainless steel chamber, alloy 304 (AISI)/(DIN material no. 1.4301), rust-resistant and easy to clean
- Charging in multiple layers possible using removeable grids (number of removeable grids included, see table to the right)
- Large, wide-opening swing door, hinged on the right with quick release for models TR 60 - TR 240 and TR 450
- Double swing door with quick release for models TR 420, TR 800 and TR 1050
- Ovens TR 800 and TR 1050 equipped with transport castors
- Infinitely adjustable exhaust at the rear wall with operation from the front
- PID microprocessor control with self-diagnosis system
- Controller R7, alternative programmable controllers see page 84

Additional Equipment

- Over-temperature limiter with adjustable cutout temperature as temperature limiter to protect the furnace and load
- Fan speed of the air circulation fan can be reduced infinitely
- Window for charge observing
- Further removeable grids with rails
- Side inlet
- Electrical rotary device with Tmax 200 °C (associated sample holder will be individually adapted to the charge)
- Exhaust air duct DN 80
- Transport castors for models TR 240 - TR 450
- Upgrading available to meet the quality requirements of AMS2750G or FDA

Oven TR 420

Oven TR 1050 with double door

Model	Tmax	Inner dimensions in mm			Volume	Outer dimensions[1] in mm			Max. connected	Electrical	Weight	Minutes	Grids	Grids	Max.
	in °C	w	d	h	in l	W	D	H	load in kW	connection*	in kg	to Tmax[2]	included	max.	total load[3]
TR 60	300	450	390	350	60	700	665	720	3.3	1-phase	90	25	1	4	120
TR 120	300	650	390	500	120	900	665	870	3.3	1-phase	120	45	2	7	150
TR 240	300	750	550	600	240	1000	840	970	3.3	1-phase	165	60	2	8	150
TR 420	300	1300	550	600	420	1550	910	990	6.7	3-phase	250	60	2	8	200
TR 450	300	750	550	1100	450	1000	840	1470	6.7	3-phase	235	60	3	15	180
TR 800	300	1200	680	1000	800	1470	1170	1520	6.7	3-phase	360	80	3	10	250
TR 1050	300	1200	680	1400	1050	1470	1170	1920	10.0	3-phase	450	80	4	14	250

[1]External dimensions vary when furnace is equipped with additional equipment. Dimensions on request
[2]In the empty and closed oven, connected to 230 V 1/N/PE resp. 400 V 3/N/PE
[3]Max load per layer 30 kg

*Please see page 84 for more information about supply voltage

Oven TR 60 with observation window

Extricable metal grids to load the oven in different layers

Electrical rotating device (in this case with tailored platform for PARR autoclave containers)

Chamber Ovens up to 260 °C

The chamber ovens of the KTR range can be used for complex drying processes and heat treatment of charges to an application temperature of 260 °C. The high-performance air circulation enables optimum temperature uniformity throughout the work space. A wide range of accessories allow the chamber ovens to be modified to meet specific process requirements.

Chamber oven KTR 6125

Standard Equipment

- Tmax 260 °C
- Electrically heated (via a heating register with integrated chrome steel heating elements) or gas-fired (direct or indirect gas-fired including injection of the hot air into the intake duct)
- Temperature uniformity up to +/– 3 °C according to DIN 17052-1 (for design wihout track cutouts) see page 77
- High-quality mineral wool insulation provides for outer temperatures of < 25 °C above room temperature
- High air exchange for fast drying processes
- Double-wing door for furnaces KTR 2300 and larger
- Over-temperature limiter with adjustable cutout temperature as temperature limiter to protect the oven and load
- Controller with touch operation B500 (5 prgrams with each 4 segments), alternative controllers see page 84

Chamber oven KTR 1500 with charging cart

Additional Equipment

- Direct or indirect gas-fired
- Base frame to charge the oven via a charging forklift
- Additional Door in the back for charging from both sides or to use the oven as lock between two rooms
- Fan system for faster cooling with manual or motorized control of the exhaust flaps
- Programmed opening and closing of exhaust air flaps
- Air circulation with speed control, recommendable for processes with light or sensitive charge
- Observation window and furnace chamber lighting
- Design for clean room heat treatment processes
- Rotating systems e. g. for tempering processes
- All KTR-models are also available with Tmax 300 °C
- Process control and documentation via VCD software package or Nabertherm Control Center (NCC) for monitoring, documentation and control see page 86/89

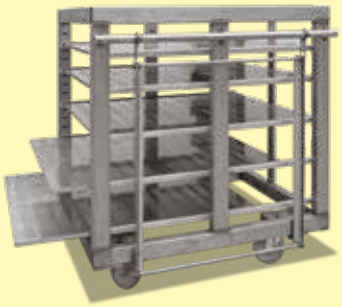
Chamber oven KTR 6250 with double doors in the front and in the back as well as guide-in tracks for use as sluice oven

Model	Tmax	Inner dimensions in mm			Volume	Outer dimensions[2] in mm			Heating power	Electrical
	°C	w	d	h	in l	W	D	H	in kW[1]	connection*
KTR 1000	260	1000	1000	1000	1000	1820	1430	1890	18	3-phase
KTR 1500	260	1000	1000	1500	1500	1820	1430	2390	18	3-phase
KTR 2000	260	1100	1500	1200	2000	1920	1930	2090	18	3-phase
KTR 2300	260	1250	1250	1500	2300	2120	1680	2460	27	3-phase
KTR 3100	260	1250	1250	2000	3100	2120	1680	2960	27	3-phase
KTR 3400	260	1500	1500	1500	3400	2370	1930	2460	45	3-phase
KTR 4500	260	1500	1500	2000	4500	2370	1930	2960	45	3-phase
KTR 4600	260	1750	1750	1500	4600	2620	2175	2480	45	3-phase
KTR 6000	260	2000	2000	1500	6000	2870	2430	2460	54	3-phase
KTR 6125	260	1750	1750	2000	6125	2620	2175	2980	45	3-phase
KTR 6250	260	1250	2500	2000	6250	2120	3035	2960	54	3-phase
KTR 8000	260	2000	2000	2000	8000	2870	2430	2960	54	3-phase
KTR 9000	260	1500	3000	2000	9000	2490	3870	2920	72	3-phase
KTR 12300	260	1750	3500	2000	12300	2620	4350	2980	90	3-phase
KTR 13250	260	1250	5000	2000	13250	2120	6170	2960	108	3-phase
KTR 16000	260	2000	4000	2000	16000	2870	4850	2960	108	3-phase
KTR 21300	260	2650	3550	2300	21300	3600	4195	3380	108	3-phase
KTR 22500	260	2000	4500	2500	22500	3140	5400	3500	108	3-phase

[1]Depending on furnace design connected load might be higher
[2]External dimensions vary when furnace is equipped with additional equipment. Dimensions on request.

*Please see page 84 for more information about supply voltage

Drive-in ramp



Charging cart with pull-out trays

Pull-out shelves, running on rolls

Forced Convection Chamber Furnaces – Tabletop Design
electrically heated

These forced convection chamber furnaces are characterized by their good temperature uniformity. Due to the compact tabletop design, this series is very well suited for installation in laboratories or rooms with limited space.

Applications include preheating of components for shrink-fit processes, heat treatment of metals in air such as aging, stress relieving, soft annealing or tempering, and heat treatment of glass.

Forced convection chamber furnace NAT 15/85 with base frame as additional equipment

Standard Equipment

- Tmax 650 °C or 850 °C
- Horizontal air circulation with optimum distribution through stainless steel baffles
- Integrated control unit
- Swing door hinged on the right side, door opening temperatures up to 400 °C
- Temperature uniformity up to +/− 6 °C according to DIN 17052-1 (model NAT 15/65 up to +/− 5 °C) see page 77
- Optimum air distribution enabled by high flow speeds
- Air inlet in the rear wall of the furnace
- Adjustable exhaust port in the furnace ceiling (not for model NAT 15/65)
- 15 mm port in the furnace ceiling (not for model NAT 15/65)
- Controller with touch operation B500/B510 (5 programs with 4 segments each), controls description see page 84

Forced convection chamber furnace NAT 30/65

Additional Equipment (not for NAT 15/65)

- Base frame
- Charging racks for loading on several levels
- Equipment package with batch control and process control and documentation via VCD software package

Forced convection chamber furnace NAT 30/85

Forced convection chamber furnace NAT 50/85

Model	Tmax	Inner dimensions in mm			Volume	Outer dimensions[1] in mm			Heating power	Electrical	Weight	Heat-up time[3] to Tmax
	°C	w	d	h	in l	W	D	H	in kW[2]	connection*	in kg	in minutes
NAT 15/65	650	295	340	170	15	470	790	460	2.8	1-phase	60	35
NAT 30/65	650	320	320	300	30	810	620	620	3.0	1-phase	90	80
NAT 60/65	650	400	400	400	60	890	700	720	3.0	1-phase	110	100
NAT 15/85	850	320	320	150	15	690	880	570	3.0	1-phase	85	190
NAT 30/85	850	320	320	300	30	690	880	720	3.0	1-phase	100	230
NAT 50/85	850	400	320	400	50	770	880	820	4.5	3-phase	130	230

[1]External dimensions vary when furnace is equipped with additional equipment. Dimensions on request.
[2]Depending on furnace design connected load might be higher
[3]Approx. information in empty furnace

*Please see page 84 for more information about supply voltage

Adjustable exhaust port in the furnace ceiling

Forced convection chamber furnace NAT 15/85

Interior made of stainless steel sheet 1.4828

Forced Convection Chamber Furnaces up to 675 Liter
electrically heated

The very good temperature uniformity of these chamber furnace with air circulation provides for ideal process conditiones for annealing, curing, solution annealing, artificial ageing, sintering of PTFE, preheating, or soft annealing and brazing. The forced convection chamber furnaces are equipped with a suitable annealing box for soft annealing of copper or tempering of titanium, and also for annealing of steel under non-flammable process gases. The modular forced convection chamber furnace design allows for adaptation to specific process requirements with appropriate accessories.

Forced convection chamber furnace NA 120/65

Standard Equipment

- Tmax 450 °C, 650 °C, or 850 °C
- Horizontal air circulation with optimum distribution through stainless steel baffles
- Swing door hinged on the right side
- Base frame included in the delivery
- Temperature uniformity up to +/– 4 °C according to DIN 17052-1 see page 77
- Optimum air distribution enabled by high flow speeds
- One frame sheet and rails for two additional trays included in the scope of delivery
- Controller with touch operation B500 (5 programs with 4 segments each), controls description see page 84

Additional Equipment for Models up to 450 °C

- Air inlet and exhaust air flaps when used for drying
- Controlled cooling via controlled flap and fan
- Additional frame sheet
- Gas supply boxes for different charging methods
- Gas feed fittings
- Charge control with documentation of the charge thermocouple
- Signal tower
- Charging systems

Forced convection chamber furnace NA 250/85

Further Additional Equipment for Models up to 850 °C

- Optimization of the temperature uniformity up to +/– 3 °C according to DIN 17052-1 see page 77
- Measuring frames and thermocouples for TUS measurements charge or comparative measurements
- Version according to AMS2750G or CQI-9
- Manual lift door for forced convection chamber furnace NA 120/65 and NA 120/85
- Pneumatic lift door from forced convection chamber furnace NA 250/65 upwards
- Manual roller conveyor in furnace chamber for high charge weights

Forced convection chamber furnace NA 250/45

Forced convection chamber furnace NA 120/45 with fresh-air cooling as additional equipment

Model	Tmax	Inner dimensions in mm			Volume	Outer dimensions[1] in mm			Heating power	Electrical	Weight	Heat-up time[3] to Tmax	Cool-down time[3] from Tmax to 150 °C in minutes	
	°C	w	d	h	in l	W	D	H	in kW[2]	connection*	in kg	in minutes	Flaps[4]	Fan cooling[4]
NA 120/45	450	450	600	450	120	1250	1550	1550	9.0	3-phase	460	60	240	30
NA 250/45	450	600	750	600	250	1350	1650	1680	12.0	3-phase	590	60	120	30
NA 500/45	450	750	1000	750	500	1550	1900	1820	18.0	3-phase	750	60	240	30
NA 60/65	650	350	500	350	60	930	1310	1450	9.0	3-phase	350	90	180	45
NA 120/65	650	450	600	450	120	1030	1410	1550	12.0	3-phase	400	90	240	60
NA 250/65	650	600	750	600	250	1250	1700	1750	20.0	3-phase	750	90	480	60
NA 500/65	650	750	1000	750	500	1400	1950	1900	27.0	3-phase	1000	90	600	90
NA 60/85	850	350	500	350	60	790	1330	1440	9.0	3-phase	315	150	900	120
NA 120/85	850	450	600	450	120	890	1420	1540	12.0	3-phase	390	150	900	120
NA 250/85	850	600	750	600	250	1120	1690	1810	20.0	3-phase	840	180	900	180
NA 500/85	850	750	1000	750	500	1270	1940	1960	30.0	3-phase	1150	180	900	210
NA 675/85	850	750	1200	750	675	1270	2190	1960	30.0	3-phase	1350	210	900	210

[1]External dimensions vary when furnace is equipped with additional equipment. Dimensions on request.
[2]Depending on furnace design connected load might be higher
[3]Approx. information in empty furnace
[4]Additional equipment

*Please see page 84 for more information about supply voltage

Port for thermocouple

Tray

Roller conveyor in furnace chamber

Ovens with Safety Technology
for charges containing solvents according to EN 1539

Ovens in the TR .. LS range with safety equipment based on EN 1539 Type A are suitable for drying charges containing solvents. With their compact design, these ovens can be easily integrated into a laboratory or production process. Exhaust gases escape through an outlet on the back of the oven and can then be extracted or treated.

Oven TR 120 LS with safety technology according to EN 1539 for charges containing solvents

Standard Equipment

- Furnace technology based on ovens see page 42
- For a description of the safety technology refer to models NA ../45 LS
- Tmax 260 °C
- Temperature uniformity ±8 K according to DIN 17052-1 in empty work space see page 77
- Controller with touch operation B510 (5 programs with 4 segments each), controls description see page 84

Additional Equipment

Refer to additional equipment for ovens on page 42

Model	Tmax	Inner dimensions in mm			Volume	Outer dimensions[3] in mm			Ma. connected load	Electrical	Weight	Minutes	Grids	Grids	Total load
	°C	w	d	h	in l	W	D	H	kW[2]	connection*	in kg	to Tmax[4]	incl.	max.	max.[1]
TR 60 LS	260	450	380	350	60	700	820	710	5.7	3-phase	100	20	1	4	96
TR 120 LS	260	650	380	500	120	900	820	870	6.7	3-phase	120	22	2	7	140
TR 240 LS	260	750	540	600	240	1000	990	970	6.7	3-phase	180	32	2	8	170
TR 450 LS	260	750	540	1100	450	1000	990	1470	13.3	3-phase	250	36	3	15	250

[1]Maximum load per level 30 kg
[2]Connected load is higher with EN 1539 as additional equipment
[3]External dimensions vary when furnace is equipped with additional equipment. Dimensions on request.
[4]In empty, closed furnace when connected to 230 V 1/N/PE or 400 V 3/N/PE

*Please see page 84 for more information about supply voltage

Extricable metal grids to load the oven in different layers

Oven TR 60 S with rotary mechanism

Electrical rotating device (in this case with tailored platform for PARR autoclave containers)

Forced Convection Chamber Furnaces up to 500 Liter with Safety Technology
for charges containing solvents according to EN 1539

Due to their very good temperature uniformity, these chamber furnaces with air circulation are especially suitable for processes such as drying paints or components with residues of flammable cleaning agents or the evaporation of solvents bound in the components.

Forced convection chamber furnace NA 120/45 LS

Standard Equipment

- Design based on forced convection chamber furnaces see page 48
- High-powered heating to maintain the required air exchange rates
- Powerful exhaust air fan to ensure underpressure in the furnace
- Defined and monitored air circulation and exhaust air
- Visual and audible malfunction signals
- Over-temperature limiter with manual reset as over-temperature protection for the furnace and the charge
- Controller with touch operation P570 (50 programs with each 40 segments), controls description see page 84

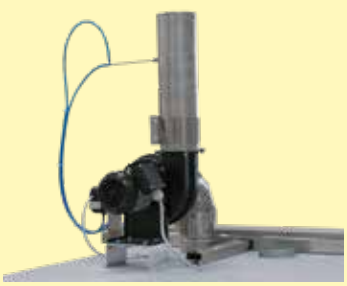
Additional Equipment

- EN 1539 with reduced exhaust air flow rate to 25 % after the main evaporation time to save energy
- EN 1539 with temporary switching off for processes in which no flammable substances are released

Model	Tmax	Inner dimensions in mm			Volume	Outer dimensions[1] in mm			Heating power	Exhaust air flow rate	Maximum volume of solvent in g at temperature:				
	in °C	w	d	h	in l	W	D	H	in kW[2]	in m³/h	75 °C	150 °C	250 °C	350 °C	450 °C
NA 120/45 LS	450	450	600	450	120	1250	1550	1950	18	100 - 120	51	20	9	5	4
NA 250/45 LS	450	600	750	600	250	1350	1650	2080	24	100 - 120	93	36	17	9	7
NA 500/45 LS	450	750	1000	750	500	1550	1900	2220	24	100 - 120	104	42	21	12	9

[1]External dimensions vary when furnace is equipped with additional equipment. Dimensions on request.
[2]Depending on the furnace design, connected load might be higher

Sluice furnace N 560/26HACLS with safety package, loading from the front and unloading from the back



Fresh-air opening and powerful exhaust air fan installed on the furnace

Interior with metal shelf, thermocouples and pressure monitoring