





Digestion Systems



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TURBOTHERM + KJELDATHERM

TURBOTHERM - Infrared Rapid Digestion System



The Models

The TURBOTHERM can be used for many applications. The option of using 5 different insert racks allows the instrument to accept tubes of 100, 250, 400 and 800 ml. There is even the possibility of using the TURBOTHERM as a multifunctional, programmable heater for inorganic acid digestions.

Exhaust manifold

The acid vapours generated during the digestion are effectively removed via the exhaust manifold by either using a water jet pump or the TURBOSOG-suction washer (see page 8). This provides the maximum possible safety in the laboratory as no acid vapours escape from the unit.

Configuration

All rapid digestion systems consist of a TURBOTHERM base unit, two-tier console, insert rack with tubes, exhaust manifold with drip tray, water jet pump and 1.5 m of isoversinic-tubing.

Order No. 12-0083	Type TT625	Description TURBOTHERM unit with electronic time temperature controller, complete 6-place, for tubes 250 ml
12-0091	TT625M	As model TT625 but with manual control
12-0086	TT125	TURBOTHERM unit with electronic time temperature
12-0094	TT125M	controller, complete 12-place, for tubes 250 ml As model TT125 but with manual control
12-0084	TT440	TURBOTHERM unit with electronic time temperature controller, complete 4-place, for tubes 400 ml
12-0092	TT440M	As model TT440 but with manual control
12-0085	TT480	TURBOTHERM unit with electronic time temperature
12-0093	TT480M	controller, complete 4-place, for tubes 800 ml As model TT480 but with manual control
12-0087	TT100	TURBOTHERM unit with electronic time temperature controller, complete 12-place, for tubes 100 ml
12-0095	TT100M	As model TT100 but with manual control

The rapid digestion units can be easily adapted to be used with various digestion tubes. In order to ensure this flexibility, all insert racks can be ordered separately with the corresponding exhaust manifolds.

Technical data see page 11

Construction

The TURBOTHERM is a versatile infrared rapid digestion system capable of handling a wide range of samples in today's modern laboratory. The digestion time is considerably reduced due to the extremely short heating up and cooling down periods. The instrument accepts tubes from 100 up to 800 ml, making the TURBOTHERM a very versatile system. The insert rack, exhaust manifold and drip tray can be inserted on the two-tier console which reduces bench space and makes handling easier.

TURBOTHERM with electronic timer and power control

■ By using the modern electronic-control up to 9 different programs can be entered. Each program has up to 9 variable heating levels and time settings. The current status is permanently displayed with manual override possible at any time.

TURBOTHERM with manual control

■ This model is the alternative for a low budget. The power selection is done manually using an energy controller.

Two-tier console

The two-tier console has the advantage of holding the insert rack as well as the exhaust manifold. This feature makes the operation safe and simple as well as saving valuable bench-space.







KJELDATHERM - Block Digestion Units



Precise Digestion Systems

The comprehensive product range of Kjeldahl models made by C. Gerhardt includes the compact KJELDATHERM block digestion systems for simultaneous multiple Kjeldahl digestions in 100 ml, 250 ml, and 400 ml tubes. Precise temperature control permits the conditions for the digestions to be optimized thus providing reproducible results.

All digestion blocks consist of the following components:

- Digestion block made of aluminum with holes for digestion tubes. Energy efficient heating and insulation to retain heat within the block.
- Insert rack made of aluminum with integrated heat shield and window provide easy and safe observation of the samples.
- Exhaust system with heat insulated handles, integrated glass exhaust manifold and water jet pump. Exhaust system and digestion tubes can be easily and safely handled separately.
- Two-tier console mounted directly on the block. The insert rack as well as the exhaust manifold can be stored safely above the block during the cooling down periods. This has a positive impact on the safe operation of the KJELDATHERM and at the same time, saves bench space.

- KJELDATHERM digestion tubes depending on the system used: KMT (100ml), KTG (250ml) or BS (400ml).
- Excess temperature protection as well as an excess current switch for safety.
- Electronic temperature controller **TR** for all manual systems.
- Programmable temperature-time controller TZ for all automatic systems with lift.

KJELDALIFT

■ In the digestion systems with the KJELDALIFT the two tier console is equipped with a lift for moving the insert rack plus manifold in and out of the block.

Recommended accessory

■ Scrubber unit TURBOSOG see page 8

KJELDATHERM Automatic

When using the automatic digestion systems the lifting and lowering of the insert rack and manifold is done by a lift. Working with the temperature-time controller TZ ensures the fully automated process after programming the temperature-time steps (see page 8). All automatic KJELDATHERM systems (KBL systems) are equipped with the TZ controller.

	Order No. 12-0059	Type KBL8S	Description KJELDATHERM Digestion system, with 8 digestion tubes 250 ml and lift
	12-0065	KBL8S-BS	KJELDATHERM Digestion system, with 8 digestion tubes 400 ml and lift, suited especially for samples prone to excessive foaming
	12-0076	KBL20S-BS	KJELDATHERM Digestion system, with 20 digestion tubes 400 ml and lift, suited especially for samples prone to excessive foaming
page 11	12-0069	KBL12S	KJELDATHERM Digestion system, with 12 digestion tubes 100 ml and lift
Technical data see page	12-0071	KBL20S	KJELDATHERM Digestion system, with 20 digestion tubes 250 ml and lift
Technical	12-0080	KBL40S	KJELDATHERM Digestion system, with 40 digestion tubes 100 ml and lift



KJELDATHERM Manual

The user has to lift and lower the insert racks by hand.
All manual KJELDATHERM systems (**KB** systems) are equipped with the **TR** controller* (see page 8).

	Order No.	Туре	Description
	12-0058	KB8S	KJELDATHERM Digestion system,
			with 8 digestion tubes 250 ml
	12-0064	KB8S-BS	KJELDATHERM Digestion system,
			with 8 digestion tubes 400 ml,
			suited especially for samples prone
			to excessive foaming
	12-0075	KB20S-BS	KJELDATHERM Digestion system,
Ξ			with 20 digestion tubes 400 ml,
page			suited especially for samples prone
bd			to excessive foaming
see	12-0068	KB12S	KJELDATHERM Digestion system,
₽ E			with 12 digestion tubes 100 ml
9	12-0070	KB20S	KJELDATHERM Digestion system,
<u>.</u>			with 20 digestion tubes 250 ml
Technical data see	12-0079	KB40S	KJELDATHERM Digestion system,
Ē			with 40 digestion tubes 100 ml

^{*} Manual KJELDATHERM systems with **TZ** controller are available on request.



4

Trace Metal and COD-Digestion Systems



SMA

Trace Metal

Block system for the digestion with aqua regia to determine the acidsoluble metals in sludge, sediments and soils.

COD

Chemical Oxygen Demand

Digestion block system for the determination of the Chemical Oxygen Demand of water. The required heating up phase of the samples to around 148 °C is reached in less than 10 minutes.

C. Gerhardt offers SMA- and COD-units in two options: Sophisticated, automatic units with lift and easy, manual units.

Automatic Systems

When using the automatic systems the handling of the heavy insert rack and manifold is done with the help of the lift-motor. Equipped with water condensers and motor-driven lifting device with insert racks for sample tubes and condensers. For a fully automated process controlling the cooling water supply and suction as well as temperature-time programming the system is equipped with the **TZ** time-temperature-controller (see page 8)!

- The automatic lift system can separate or connect all the digestion tubes and reflux water condensers in just one step
- All digestion tubes can be lifted together with the insert rack
- The installation is very simple as the supply of cooling water is organized with just one central supply and discharge
- The instrument is designed to allow for the cooling down of the samples in the insert rack outside the hot block thus offering safer handling and a significant reduction of the cooling down-phase

Manual Systems

Lifting and lowering of the insert rack has to be done by the user in all these systems. The controller **TR** is included in the standard configuration (see page 8).

SMA Automatic Systems

- KJELDATHERM digestion block KB made of aluminum with holes for tubes SMG
- Time-temperature controller TZ
- Insert rack EB-A made of aluminum with two insulated handles
- Two tier console EBL-C with built-in motor for the vertical movement of the samples and water condensers.
- Insert rack EB-K for condenser fitting the two tier console EBL-C and the water condensers SMK with KS 40
- CSB/SMA-Sample tubes SMG, 250 ml with KS 40
- CSB/SMA-Water condenser SMK with KS 40
- Absorption traps
- PVC exhaust manifold
- Water jet pumps

Order No	. Туре	Description
12-0062	SMA8A	Automatic trace metal digestion
		system, 8-place, complete
		incl. TZ controller
12-0074	SMA20A	Automatic trace metal digestion
		system, 20-place, complete

incl. TZ controller

Recommended accessory

■ Scrubber unit Turbosog see page 8

COD Automatic Systems

- KJELDATHERM digestion block KB made of aluminum with holes for tubes SMG
- Time-temperature controller **TZ**
- Insert rack EB-A made of aluminum with two insulated handles
- Two tier console EBL-C with built-in motor for the vertical movement of the samples and water condensers.
- Insert rack EB-K for condenser fitting the two tier console EBL-C and the water condensers SMK with KS 40
- COD/SMA-Sample tubes SMG, 250 ml with KS 40COD/SMA-Water condenser SMK with KS 40

Order No	. Туре	Description
12-0061	CSB8A	Automatic COD-digestion system
		8-place, complete
		incl. TZ controller
12-0073	CSB20A	Automatic COD-digestion system
		20-place, complete

incl. TZ controller

SMA Manual Systems

The alternative for labs with low sample throughput.
The manual trace metal digestion units offer the same features as the automatic SMA-model, however, they don't have the two tier console EBL. Also included is a controller, this time a TR.



Order No. Type 12-0063 SMA8M

er No. Type Description

Manual trace metal digestion system, 8-place, complete incl. **TR** controller

Recommended accessory

■ Scrubber unit TURBOSOG see page 8

COD Manual Systems

- KJELDATHERM digestion block KB made of aluminum with holes for tubes SMG
- Temperature-controller **TR**
- Insert rack EB-M made of aluminum with two insulated handles
- COD sample tubes SMG8, 250 ml with NS29
- COD air condenser SML, 750 mm length, with NS 29



Order No. Type 12-0060 CSB8M Description

Manual COD-digestion system,

8-place, complete incl. **TR 12-0072** CSB20M Manual COD-digestion system,

20-place, complete incl. **TR**

Recommended Accessories

(not included in the standard configuration):

12-0266 ST-SML

PP-Rack for 10 air condensers with drip tray

12-0267 ST-SML

PP-Rack for 12 air condensers

with drip tray

Technical data see page

Controller Units and Scrubber Units

TZ Control Unit

TZ is a temperature-time controller which can be programmed for the automated operation of the KJELDATHERM, COD and SMA digestion systems. The control unit can be mounted on the side of the digestion system.

Up to 9 different programs can be defined and stored. Each program offers the possibility of up to 9 different temperature-time steps. This feature ensures optimal control of the heating up phase, the digestion phase, as well as the cooling. The fume scrubber TURBOSOG can also be turned on and off automatically. With cooling water control, an external pressure valve (optional) can monitor and control the flow of cooling water for the COD and Trace Metal Systems.

- 9 programs with 9 program steps
- Programmable temperature range (room temperature up to 430 °C)
- Accuracy < 0,5 % in the upper temperature range
- Suction is turned on automatically when the previously defined block temperature is passed - thus greater safety when working with acid fumes
- Automatic controls of fume suction and cooling water flow
- Optical and acoustic messages

Order No. Type	Description
12-0011 TZ	TZ-Controller, 230 V
12-0268 TLS	Rack for TZ- and TR-Controller
12-0012 WTZ	Cooling water valve

TR-Controller

Electronic temperature controller, mounted on the side of the system.

- Digital display
- Temperature range Rt up to 430 °C,
- Accuracy < 1,0 % in the upper temperature range

Order No. Type	Description		
12-0010 TR	Temperature controller		
12-0268 TLS	Rack for TZ- and TR-controller		

Gerhard

TURBOSOG

The TURBOSOG centrifugal scrubber condenses and neutralizes aggressive acid fumes. The TURBOSOG works in two steps, separating and washing out acid fumes. The removal of the fumes is very efficient with extremely low running costs. Little service is required as no activated carbon filters are used in the system. TURBOSOG can be connected to all Gerhardt digestion units with suction.

Order No.	Туре	Description
12-0057	TUR/K	TURBOSOG - Scrubber

Additional cooling unit for TURBOSOG

Additional condensate bottle for a more efficient separation of condensate when doing water digestions with KJELDATHERM or TURBOTHERM digestion units. The system can be easily cleaned, has screw caps with snap lids and cooling water control. The unit is attached at the side of the TURBOSOG and connected to the water supply. Thus upgrades of existing units are done without problems.

Order No.	Туре	Description	
12-0361	ZKE	Additional cooling unit complete, incl. v	vate

ter control







Decomposition and Digestion Instrument

Determination of Cyanide

Digestion instrument, which has been especially developed for the decomposition of water and soil samples for the determination of cyanide resp. for the total cyanide determination as well as for other determinations.

The integrated magnetic stirrer allows simultaneous heating and stirring of the 4 heating places.

Features

- Thanks to the IR heating system, a fast and even heating up of the instrument is made possible
- Gas flow counter located at the side
- Up to four samples can be digested simultaneously
- Steckmatic connection makes handling of compressed air resp. inlet tubinas easv
- Four sample tubes can be handled easily and simultaneously by using an insert rack
- Connection to in-house compressed air resp. nitrogen tubing is possible, thus economic and safe flow of gas
- Use of inert materials



The basic system is the TURBOTHERM infrared digestion unit (see page 2 - 3). The decomposition instrument can be used for further digestions when special accessories are added. It consists of:

TURBOTHERM base unit, insert rack, energy console with controller for the gas inlet and the cooling water distribution, tubing, drip tray, set of glass consisting of: digestion tube, reflux condenser, absorption trap, and dropping funnel.

Cyanide Automatic TT4CAR

■ TT4CAR is equipped with a modern controller. Thus, up to 9 different programs can be defined

Order No. Type Description

12-0090 TT4CAR TURBOTHERM digestion unit for cyanide, automatic

Cyanide Manual TT4CMR

■ TT4CMR with manual power setting using the energy controller

Order No. Type Description

12-0098 TT4CMR TURBOTHERM digestion unit for cyanide, manual

Technical data see page 11

Cyanide without magnetic stirrer

The Cyanide digestion units are also available without magnetic stirrer. Please contact us to get more informations.

Consumables

When replacing consumables or spares, please make sure, that you buy only original parts from C. Gerhardt. This is the only way we can guarantee a trouble-free analytical process with precise and reliable results.

Catalyst-Tablets

Tin with 1000 tablets

Order No. Type	Description
12-0326 ST	$3.5 \text{ g K}_2 \text{SO}_4 + 0.0035 \text{ g Se}$
12-0328 CX	$5.0 \text{ g K}_2^2 \text{SO}_4 + 0.5 \text{ g CuSO}_4 \times 5 \text{ s}$

12-0329 CT $5.0 \text{ g K}_2\text{SO}_4 + 0.15 \text{ g CuSO}_4 \times 5\text{H}_2\text{O} + 0.15 \text{ g TiO}_2$

12-0336 C $5.0 \text{ g K}_2\text{SO}_4 + 0.1 \text{ g CuSO}_4 \text{ x } 5\text{H}_2\text{O}$



Antifoam-tablets

Tin with 1000 tablets

Order No. Type Description

12-0332 AS Antifoam tablets, 0.97 $Na_2SO_4 + 0.03$ g silicone anti foam

Digestion Tubes

Order No.	Туре	Description	for type
12-0301	KTG	Digestion tube macro, 250 ml	TT625, TT125, KB(L)8S, KB(L)20S
12-0304	KMT	Digestion tube micro, 100 ml	TT100, KB(L)40S, KB(L)12S
12-0305	KMT/E	Digestion tube micro, 100 ml with constriction	TT100, KB(L)40S, KB(L)12S
12-0306	KTG/E	Digestion tube macro, 250 ml with constriction	TT625, TT125, KB(L)8S, KB(L)20S
12-0308	BS400	Special tube 400 ml, diminished	KB(L)8S-BS, KB(L)2OS-BS
12-0321	SMG	Digestion tube, 250 ml with KS 40	CSB8A + M, $CSB20A + M$,
			SMA8A + M, SMA20A
12-0315	SMG 8	Digestion tube, 250 ml with NS 29	CSB8M, CSB20M
12-0310	KDD400	Digestion tube, 400 ml	TT440
12-0311	KDD800	Jumbo-digestion tube, 800 ml	TT480
12-0286	AGC	Digestion tube for Cyanide-system, 800 ml with NS 45	TT4CAR, TT4CMR
12-0309	KTG-DU	KTG-Dummy, 130 mm long	TT625, TT125, KB(L)8S, KB(L)20S

More accessories and information available on request!

Digestion and Distillation from one Source

The perfect combination for our KJELDATHERM program is the distillation range VAPODEST. All models are suitable for the distillation of Kjeldahl digestion solutions and for other steam distillation procedures. The VAPODEST product range is available in various levels of automation, from the VAPODEST 10s semi-automatic distillation system to the VAPODEST 50s distillation and titration system with carousel auto sampler.

Further product information is available from our product brochure VAPODEST or from the C. Gerhardt representative in your country.



Technical Data

Туре	TT625 / TT625M	TT125 / TT125M	TT440 / TT440M	TT480 / TT480M	TT100 / TT100M
Order No.	12-0083 / 12-0091	12-0086 / 12-0094	12-0084 / 12-0092	12-0085 / 12-0093	12-0087 / 12-0095
Nominal voltage*	230 V AC	230 V AC	230 V AC	230 V AC	230 V AC
Frequency	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz
Nominal wattage	1500 W	1500 W	1500 W	1500 W	1500 W
Weight	21 kg	22,5 kg	22,5 kg	21,5 kg	22,5 kg
Dimensions (W x D x H)	525 x 450 x 740 mm	525 x 450 x 740 mm	525 x 450 x 740 mm	525 x 450 x 740 mm	525 x 450 x 740 mm
Temperature max.	ca. 650 °C	ca. 650 °C	ca. 650 °C	ca. 650 °C	ca. 650 °C
Heating places	6	12	4	4	12
Size of tube	250 ml	250 ml	400 ml	800 ml	100 ml
Туре	KB8S	KB8S-BS	KB12S	KB20S	KB20S-BS
Order No.	12-0058	12-0064	12-0068	12-0070	12-0075
Nominal voltage*	230 V AC	230 V AC	230 V AC	230 V AC	230 V AC
Frequency	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 HZ
Nominal wattage	1000 W	1000 W	1000 W	2200 W	2200 W
Weight	16 kg	16 kg	16 kg	26 kg	26 kg
Dimensions (W x D x H)	415 x 415 x 650 mm	415 x 415 x 650 mm	415 x 415 x 650 mm	415 x 530 x 650 mm	415 x 530 x 650 mm
,				430 °C	
Temperature max.	430 °C	430 °C	430 °C		430 °C
Heating places	8	8	12	20	20
Size of tube	250 ml	400 ml	100 ml	250 ml	400 ml
Туре	KBL8S	KBL8S-BS	KBL12S	KBL20S	KBL20S-BS
Order No.	12-0059	12-0065	12-0069	12-0071	12-0076
Nominal voltage*	230 V AC	230 V AC	230 V AC	230 V AC	230 V AC
Frequency	50-60 HZ	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz
Nominal wattage	1160 W	1160 W	1160 W	2360 W	2360 W
Weight	29 kg	29 kg	29 kg	39 kg	39 kg
Dimensions (W x D x H)	460 x 415 x 740 mm	460 x 415 x 740 mm	460 x 415 x 740 mm	460 x 530 x 740 mm	460 x 530 x 740 mm
Temperature max.	430 °C	430 °C	430 °C	430 °C	430 °C
Heating places	8	8	12	20	20
Size of tube	250 ml	400 ml	100 ml	250 ml	400 ml
Туре	KB40S	KBL40S	SMA8A	SMA20A	SMA8M
Type Order No.	KB40S 12-0079	KBL40S 12-0080	SMA8A 12-0062	SMA20A 12-0074	SMA8M 12-0063
Order No.					
Order No. Nominal voltage*	12-0079 230 V AC	12-0080 230 V AC	12-0062 230 V AC	12-0074 230 V AC	12-0063 230 V AC
Order No. Nominal voltage* Frequency	12-0079 230 V AC 50-60 Hz	12-0080 230 V AC 50-60 Hz	12-0062 230 V AC 50-60 Hz	12-0074	12-0063 230 V AC 50-60 Hz
Order No. Nominal voltage* Frequency Nominal wattage	12-0079 230 V AC 50-60 Hz 2200 W	12-0080 230 V AC 50-60 Hz 2360 W	12-0062 230 V AC 50-60 Hz 1160 W	12-0074 230 V AC 50-60 Hz 2360 W	12-0063 230 V AC 50-60 Hz 1000 W
Order No. Nominal voltage* Frequency Nominal wattage Weight	12-0079 230 V AC 50-60 Hz 2200 W 26 kg	12-0080 230 V AC 50-60 Hz 2360 W 39 kg	12-0062 230 V AC 50-60 Hz 1160 W 32 kg	12-0074 230 V AC 50-60 Hz 2360 W 46 kg	12-0063 230 V AC 50-60 Hz 1000 W 29 kg
Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H)	12-0079 230 V AC 50-60 Hz 2200 W 26 kg 415 x 530 x 650 mm	12-0080 230 V AC 50-60 Hz 2360 W 39 kg 460 x 530 x 740 mm	12-0062 230 V AC 50-60 Hz 1160 W 32 kg 470 x 415 x 1000 mm	12-0074 230 V AC 50-60 Hz 2360 W 46 kg 470 x 530 x 1000 mm	12-0063 230 V AC 50-60 Hz 1000 W 29 kg 415 x 415 x 1000 mm
Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max.	12-0079 230 V AC 50-60 Hz 2200 W 26 kg 415 x 530 x 650 mm 430 °C	12-0080 230 V AC 50-60 Hz 2360 W 39 kg 460 x 530 x 740 mm 430 °C	12-0062 230 V AC 50-60 Hz 1160 W 32 kg 470 x 415 x 1000 mm 430 °C	12-0074 230 V AC 50-60 Hz 2360 W 46 kg 470 x 530 x 1000 mm 430 °C	12-0063 230 V AC 50-60 Hz 1000 W 29 kg 415 x 415 x 1000 mm 430 °C
Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places	12-0079 230 V AC 50-60 Hz 2200 W 26 kg 415 x 530 x 650 mm 430 °C 40	12-0080 230 V AC 50-60 Hz 2360 W 39 kg 460 x 530 x 740 mm 430 °C 40	12-0062 230 V AC 50-60 Hz 1160 W 32 kg 470 x 415 x 1000 mm 430 °C	12-0074 230 V AC 50-60 Hz 2360 W 46 kg 470 x 530 x 1000 mm 430 °C 20	12-0063 230 V AC 50-60 Hz 1000 W 29 kg 415 x 415 x 1000 mm 430 °C
Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places Size of tube	12-0079 230 V AC 50-60 Hz 2200 W 26 kg 415 x 530 x 650 mm 430 °C 40	12-0080 230 V AC 50-60 Hz 2360 W 39 kg 460 x 530 x 740 mm 430 °C 40	12-0062 230 V AC 50-60 Hz 1160 W 32 kg 470 x 415 x 1000 mm 430 °C 8 250 ml	12-0074 230 V AC 50-60 Hz 2360 W 46 kg 470 x 530 x 1000 mm 430 °C 20 250 ml	12-0063 230 V AC 50-60 Hz 1000 W 29 kg 415 x 415 x 1000 mm 430 °C 8 250 ml
Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places Size of tube	12-0079 230 V AC 50-60 Hz 2200 W 26 kg 415 x 530 x 650 mm 430 °C 40 100 ml CSB8A	12-0080 230 V AC 50-60 Hz 2360 W 39 kg 460 x 530 x 740 mm 430 °C 40 100 ml CSB20A	12-0062 230 V AC 50-60 Hz 1160 W 32 kg 470 x 415 x 1000 mm 430 °C 8 250 ml	12-0074 230 V AC 50-60 Hz 2360 W 46 kg 470 x 530 x 1000 mm 430 °C 20 250 ml CSB20M	12-0063 230 V AC 50-60 Hz 1000 W 29 kg 415 x 415 x 1000 mm 430 °C 8 250 ml TT4CAR
Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places Size of tube Type Order No.	12-0079 230 V AC 50-60 Hz 2200 W 26 kg 415 x 530 x 650 mm 430 °C 40 100 ml CSB8A 12-0061	12-0080 230 V AC 50-60 Hz 2360 W 39 kg 460 x 530 x 740 mm 430 °C 40 100 ml CSB20A 12-0073	12-0062 230 V AC 50-60 Hz 1160 W 32 kg 470 x 415 x 1000 mm 430 °C 8 250 ml CSB8M 12-0060	12-0074 230 V AC 50-60 Hz 2360 W 46 kg 470 x 530 x 1000 mm 430 °C 20 250 ml CSB20M 12-0072	12-0063 230 V AC 50-60 Hz 1000 W 29 kg 415 x 415 x 1000 mm 430 °C 8 250 ml TT4CAR 12-0090
Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places Size of tube Type Order No. Nominal voltage*	12-0079 230 V AC 50-60 Hz 2200 W 26 kg 415 x 530 x 650 mm 430 °C 40 100 ml CSB8A 12-0061 230 V AC	12-0080 230 V AC 50-60 Hz 2360 W 39 kg 460 x 530 x 740 mm 430 °C 40 100 ml CSB20A 12-0073 230 V AC	12-0062 230 V AC 50-60 Hz 1160 W 32 kg 470 x 415 x 1000 mm 430 °C 8 250 ml CSB8M 12-0060 230 V AC	12-0074 230 V AC 50-60 Hz 2360 W 46 kg 470 x 530 x 1000 mm 430 °C 20 250 ml CSB20M 12-0072 230 V AC	12-0063 230 V AC 50-60 Hz 1000 W 29 kg 415 x 415 x 1000 mm 430 °C 8 250 ml TT4CAR 12-0090 230 V AC
Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places Size of tube Type Order No. Nominal voltage* Frequency	12-0079 230 V AC 50-60 Hz 2200 W 26 kg 415 x 530 x 650 mm 430 °C 40 100 ml CSB8A 12-0061 230 V AC 50-60 Hz	12-0080 230 V AC 50-60 Hz 2360 W 39 kg 460 x 530 x 740 mm 430 °C 40 100 ml CSB20A 12-0073 230 V AC 50-60 Hz	12-0062 230 V AC 50-60 Hz 1160 W 32 kg 470 x 415 x 1000 mm 430 °C 8 250 ml CSB8M 12-0060 230 V AC 50-60 HZ	12-0074 230 V AC 50-60 Hz 2360 W 46 kg 470 x 530 x 1000 mm 430 °C 20 250 ml CSB20M 12-0072 230 V AC 50-60 Hz	12-0063 230 V AC 50-60 Hz 1000 W 29 kg 415 x 415 x 1000 mm 430 °C 8 250 ml TT4CAR 12-0090 230 V AC 50-60 Hz
Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places Size of tube Type Order No. Nominal voltage* Frequency Nominal wattage	12-0079 230 V AC 50-60 Hz 2200 W 26 kg 415 x 530 x 650 mm 430 °C 40 100 ml CSB8A 12-0061 230 V AC 50-60 Hz 1160 W	12-0080 230 V AC 50-60 Hz 2360 W 39 kg 460 x 530 x 740 mm 430 °C 40 100 ml CSB20A 12-0073 230 V AC 50-60 Hz 2360 W	12-0062 230 V AC 50-60 Hz 1160 W 32 kg 470 x 415 x 1000 mm 430 °C 8 250 ml CSB8M 12-0060 230 V AC 50-60 HZ 1000 W	12-0074 230 V AC 50-60 Hz 2360 W 46 kg 470 x 530 x 1000 mm 430 °C 20 250 ml CSB20M 12-0072 230 V AC 50-60 Hz 2200 W	12-0063 230 V AC 50-60 Hz 1000 W 29 kg 415 x 415 x 1000 mm 430 °C 8 250 ml TT4CAR 12-0090 230 V AC 50-60 Hz 1514 W
Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places Size of tube Type Order No. Nominal voltage* Frequency Nominal wattage Weight	12-0079 230 V AC 50-60 Hz 2200 W 26 kg 415 x 530 x 650 mm 430 °C 40 100 ml CSB8A 12-0061 230 V AC 50-60 Hz 1160 W 31 kg	12-0080 230 V AC 50-60 Hz 2360 W 39 kg 460 x 530 x 740 mm 430 °C 40 100 ml CSB20A 12-0073 230 V AC 50-60 Hz 2360 W 45 kg	12-0062 230 V AC 50-60 Hz 1160 W 32 kg 470 x 415 x 1000 mm 430 °C 8 250 ml CSB8M 12-0060 230 V AC 50-60 HZ 1000 W 15 kg	12-0074 230 V AC 50-60 Hz 2360 W 46 kg 470 x 530 x 1000 mm 430 °C 20 250 ml CSB20M 12-0072 230 V AC 50-60 Hz 2200 W 24 kg	12-0063 230 V AC 50-60 Hz 1000 W 29 kg 415 x 415 x 1000 mm 430 °C 8 250 ml TT4CAR 12-0090 230 V AC 50-60 Hz 1514 W 40 kg
Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places Size of tube Type Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H)	12-0079 230 V AC 50-60 Hz 2200 W 26 kg 415 x 530 x 650 mm 430 °C 40 100 ml CSB8A 12-0061 230 V AC 50-60 Hz 1160 W 31 kg 470 x 415 x 800 mm	12-0080 230 V AC 50-60 Hz 2360 W 39 kg 460 x 530 x 740 mm 430 °C 40 100 ml CSB20A 12-0073 230 V AC 50-60 Hz 2360 W 45 kg 470 x 530 x 800 mm	12-0062 230 V AC 50-60 Hz 1160 W 32 kg 470 x 415 x 1000 mm 430 °C 8 250 ml CSB8M 12-0060 230 V AC 50-60 HZ 1000 W 15 kg 415 x 415 x 1150 mm	12-0074 230 V AC 50-60 Hz 2360 W 46 kg 470 x 530 x 1000 mm 430 °C 20 250 ml CSB20M 12-0072 230 V AC 50-60 Hz 2200 W 24 kg 415 x 530 x 1150 mm	12-0063 230 V AC 50-60 Hz 1000 W 29 kg 415 x 415 x 1000 mm 430 °C 8 250 ml TT4CAR 12-0090 230 V AC 50-60 Hz 1514 W 40 kg 570 x 450 x 740 mm
Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places Size of tube Type Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max.	12-0079 230 V AC 50-60 Hz 2200 W 26 kg 415 x 530 x 650 mm 430 °C 40 100 ml CSB8A 12-0061 230 V AC 50-60 Hz 1160 W 31 kg 470 x 415 x 800 mm 430 °C	12-0080 230 V AC 50-60 Hz 2360 W 39 kg 460 x 530 x 740 mm 430 °C 40 100 ml CSB20A 12-0073 230 V AC 50-60 Hz 2360 W 45 kg 470 x 530 x 800 mm 430 °C	12-0062 230 V AC 50-60 Hz 1160 W 32 kg 470 x 415 x 1000 mm 430 °C 8 250 ml CSB8M 12-0060 230 V AC 50-60 HZ 1000 W 15 kg 415 x 415 x 1150 mm 430 °C	12-0074 230 V AC 50-60 Hz 2360 W 46 kg 470 x 530 x 1000 mm 430 °C 20 250 ml CSB20M 12-0072 230 V AC 50-60 Hz 2200 W 24 kg 415 x 530 x 1150 mm 430 °C	12-0063 230 V AC 50-60 Hz 1000 W 29 kg 415 x 415 x 1000 mm 430 °C 8 250 ml TT4CAR 12-0090 230 V AC 50-60 Hz 1514 W 40 kg 570 x 450 x 740 mm ca. 650 °C
Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places Size of tube Type Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places	12-0079 230 V AC 50-60 Hz 2200 W 26 kg 415 x 530 x 650 mm 430 °C 40 100 ml CSB8A 12-0061 230 V AC 50-60 Hz 1160 W 31 kg 470 x 415 x 800 mm 430 °C 8	12-0080 230 V AC 50-60 Hz 2360 W 39 kg 460 x 530 x 740 mm 430 °C 40 100 ml CSB20A 12-0073 230 V AC 50-60 Hz 2360 W 45 kg 470 x 530 x 800 mm 430 °C 20	12-0062 230 V AC 50-60 Hz 1160 W 32 kg 470 x 415 x 1000 mm 430 °C 8 250 ml CSB8M 12-0060 230 V AC 50-60 HZ 1000 W 15 kg 415 x 415 x 1150 mm 430 °C 8	12-0074 230 V AC 50-60 Hz 2360 W 46 kg 470 x 530 x 1000 mm 430 °C 20 250 ml CSB20M 12-0072 230 V AC 50-60 Hz 2200 W 24 kg 415 x 530 x 1150 mm 430 °C 20	12-0063 230 V AC 50-60 Hz 1000 W 29 kg 415 x 415 x 1000 mm 430 °C 8 250 ml TT4CAR 12-0090 230 V AC 50-60 Hz 1514 W 40 kg 570 x 450 x 740 mm ca. 650 °C 4
Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places Size of tube Type Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max.	12-0079 230 V AC 50-60 Hz 2200 W 26 kg 415 x 530 x 650 mm 430 °C 40 100 ml CSB8A 12-0061 230 V AC 50-60 Hz 1160 W 31 kg 470 x 415 x 800 mm 430 °C 8 250 ml	12-0080 230 V AC 50-60 Hz 2360 W 39 kg 460 x 530 x 740 mm 430 °C 40 100 ml CSB20A 12-0073 230 V AC 50-60 Hz 2360 W 45 kg 470 x 530 x 800 mm 430 °C 20 250 ml	12-0062 230 V AC 50-60 Hz 1160 W 32 kg 470 x 415 x 1000 mm 430 °C 8 250 ml CSB8M 12-0060 230 V AC 50-60 HZ 1000 W 15 kg 415 x 415 x 1150 mm 430 °C 8 250 ml	12-0074 230 V AC 50-60 Hz 2360 W 46 kg 470 x 530 x 1000 mm 430 °C 20 250 ml CSB20M 12-0072 230 V AC 50-60 Hz 2200 W 24 kg 415 x 530 x 1150 mm 430 °C 20 250 ml	12-0063 230 V AC 50-60 Hz 1000 W 29 kg 415 x 415 x 1000 mm 430 °C 8 250 ml TT4CAR 12-0090 230 V AC 50-60 Hz 1514 W 40 kg 570 x 450 x 740 mm ca. 650 °C
Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places Size of tube Type Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places Size of tube Type	12-0079 230 V AC 50-60 Hz 2200 W 26 kg 415 x 530 x 650 mm 430 °C 40 100 ml CSB8A 12-0061 230 V AC 50-60 Hz 1160 W 31 kg 470 x 415 x 800 mm 430 °C 8	12-0080 230 V AC 50-60 Hz 2360 W 39 kg 460 x 530 x 740 mm 430 °C 40 100 ml CSB20A 12-0073 230 V AC 50-60 Hz 2360 W 45 kg 470 x 530 x 800 mm 430 °C 20	12-0062 230 V AC 50-60 Hz 1160 W 32 kg 470 x 415 x 1000 mm 430 °C 8 250 ml CSB8M 12-0060 230 V AC 50-60 HZ 1000 W 15 kg 415 x 415 x 1150 mm 430 °C 8	12-0074 230 V AC 50-60 Hz 2360 W 46 kg 470 x 530 x 1000 mm 430 °C 20 250 ml CSB20M 12-0072 230 V AC 50-60 Hz 2200 W 24 kg 415 x 530 x 1150 mm 430 °C 20	12-0063 230 V AC 50-60 Hz 1000 W 29 kg 415 x 415 x 1000 mm 430 °C 8 250 ml TT4CAR 12-0090 230 V AC 50-60 Hz 1514 W 40 kg 570 x 450 x 740 mm ca. 650 °C 4
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Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places Size of tube Type Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places Size of tube Type	12-0079 230 V AC 50-60 Hz 2200 W 26 kg 415 x 530 x 650 mm 430 °C 40 100 ml CSB8A 12-0061 230 V AC 50-60 Hz 1160 W 31 kg 470 x 415 x 800 mm 430 °C 8 250 ml TT4CMR	12-0080 230 V AC 50-60 Hz 2360 W 39 kg 460 x 530 x 740 mm 430 °C 40 100 ml CSB20A 12-0073 230 V AC 50-60 Hz 2360 W 45 kg 470 x 530 x 800 mm 430 °C 20 250 ml TUR/K	12-0062 230 V AC 50-60 Hz 1160 W 32 kg 470 x 415 x 1000 mm 430 °C 8 250 ml CSB8M 12-0060 230 V AC 50-60 HZ 1000 W 15 kg 415 x 415 x 1150 mm 430 °C 8 250 ml TR	12-0074 230 V AC 50-60 Hz 2360 W 46 kg 470 x 530 x 1000 mm 430 °C 20 250 ml CSB20M 12-0072 230 V AC 50-60 Hz 2200 W 24 kg 415 x 530 x 1150 mm 430 °C 20 250 ml TZ	12-0063 230 V AC 50-60 Hz 1000 W 29 kg 415 x 415 x 1000 mm 430 °C 8 250 ml TT4CAR 12-0090 230 V AC 50-60 Hz 1514 W 40 kg 570 x 450 x 740 mm ca. 650 °C 4
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Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places Size of tube Type Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places Size of tube Type Order No. Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places Size of tube Type Order No. Nominal voltage*	12-0079 230 V AC 50-60 Hz 2200 W 26 kg 415 x 530 x 650 mm 430 °C 40 100 ml CSB8A 12-0061 230 V AC 50-60 Hz 1160 W 31 kg 470 x 415 x 800 mm 430 °C 8 250 ml TT4CMR 12-0098 230 V AC	12-0080 230 V AC 50-60 Hz 2360 W 39 kg 460 x 530 x 740 mm 430 °C 40 100 ml CSB20A 12-0073 230 V AC 50-60 Hz 2360 W 45 kg 470 x 530 x 800 mm 430 °C 20 250 ml TUR/K 12-0057 230 V AC	12-0062 230 V AC 50-60 Hz 1160 W 32 kg 470 x 415 x 1000 mm 430 °C 8 250 ml CSB8M 12-0060 230 V AC 50-60 HZ 1000 W 15 kg 415 x 415 x 1150 mm 430 °C 8 250 ml TR 12-0010 230 V AC	12-0074 230 V AC 50-60 Hz 2360 W 46 kg 470 x 530 x 1000 mm 430 °C 20 250 ml CSB20M 12-0072 230 V AC 50-60 Hz 2200 W 24 kg 415 x 530 x 1150 mm 430 °C 20 250 ml TZ 12-0011 230 V AC	12-0063 230 V AC 50-60 Hz 1000 W 29 kg 415 x 415 x 1000 mm 430 °C 8 250 ml TT4CAR 12-0090 230 V AC 50-60 Hz 1514 W 40 kg 570 x 450 x 740 mm ca. 650 °C 4
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Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places Size of tube Type Order No. Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H) Temperature max. Heating places Size of tube Type Order No. Nominal voltage* Frequency Nominal wattage Weight Type Order No. Nominal voltage* Frequency Nominal voltage* Frequency Nominal wattage Weight Dimensions (W x D x H)	12-0079 230 V AC 50-60 Hz 2200 W 26 kg 415 x 530 x 650 mm 430 °C 40 100 ml CSB8A 12-0061 230 V AC 50-60 Hz 1160 W 31 kg 470 x 415 x 800 mm 430 °C 8 250 ml TT4CMR 12-0098 230 V AC 50-60 Hz 1514 W 40 kg 570 x 450 x 740 mm	12-0080 230 V AC 50-60 Hz 2360 W 39 kg 460 x 530 x 740 mm 430 °C 40 100 ml CSB20A 12-0073 230 V AC 50-60 Hz 2360 W 45 kg 470 x 530 x 800 mm 430 °C 20 250 ml TUR/K 12-0057 230 V AC 50 Hz 218 W 19 kg	12-0062 230 V AC 50-60 Hz 1160 W 32 kg 470 x 415 x 1000 mm 430 °C 8 250 ml CSB8M 12-0060 230 V AC 50-60 HZ 1000 W 15 kg 415 x 415 x 1150 mm 430 °C 8 250 ml TR 12-0010 230 V AC 50-60 Hz - 1,4 kg 85 x 150 x 155 mm	12-0074 230 V AC 50-60 Hz 2360 W 46 kg 470 x 530 x 1000 mm 430 °C 20 250 ml CSB20M 12-0072 230 V AC 50-60 Hz 2200 W 24 kg 415 x 530 x 1150 mm 430 °C 20 250 ml TZ 12-0011 230 V AC 50-60 Hz - 2,3 kg 85 x 240 x 255 mm	12-0063 230 V AC 50-60 Hz 1000 W 29 kg 415 x 415 x 1000 mm 430 °C 8 250 ml TT4CAR 12-0090 230 V AC 50-60 Hz 1514 W 40 kg 570 x 450 x 740 mm ca. 650 °C 4

* Other voltages on request

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Technical details correct as from 02/2010

Later modifications possible.