

memmert

Performance data



Waterbath

WTB

Waterbath WTB

INTUITIVE, INNOVATIVE AND INTELLIGENT - THE NEW WTB

The intelligently designed temperature control bath has been an indispensable part of the Memmert product portfolio for 50 years. In 2020, the new waterbath generation WTB was introduced with a comfortable design, modern facelift and intuitive touchscreen control. Of course, the new WTB also excels in terms of safety and regulation.

The temperature is controlled via an extremely fast-reacting silicone heating element in conjunction with a high-precision, digital temperature sensor on the bathtub. These innovative features guarantee a high level of control accuracy during the entire program runtime.

To make it easier for you to choose this high-quality branded product, please refer to the following pages of detailed information on the impressive performance of the WTB product series.

Specifications for measuring the performance data¹

Device specification: WTB waterbath with flat lid

Ambient conditions in the test room: temperature $22\text{ }^{\circ}\text{C} \pm 3\text{K}$, humidity $40\% \text{ rh} \pm 10\% \text{ rh}$

Measuring equipment: PT100 in 4-wire technology, at least 1/5 DIN B

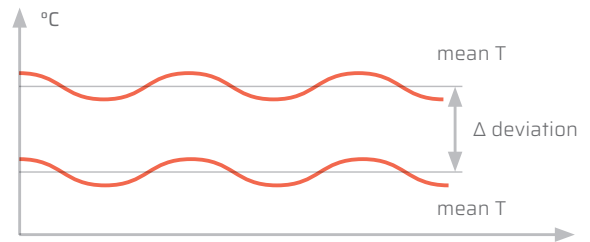
Measurements: spatial temperature deviation, temporal temperature fluctuation, heat emission, heating-up time, achievable display temperature without lid, duration of maximum emptying



Spatial temperature deviation

OBJECT OF MEASUREMENT

In a Memmert waterbath, the spatial homogeneity of the temperature, in the entire usable space of the tub, is reliably kept within the tolerance range. The values for the spatial temperature deviation are derived from the difference between the mean values of the two measuring points with the largest and smallest measured temperature.



MEASUREMENT SETUP

9 Point measurement with Pt100 measuring sensors which are distributed in the interior of the tub based on DIN 12876 1: 2001-12, as well as the standard Memmert WTB. Measurement on devices with flat lids.

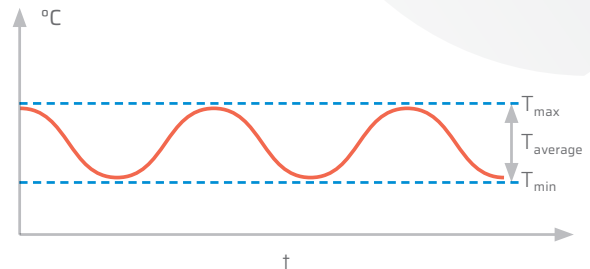
Measuring points	6	11	15	24	35	50
37°C	0,1	0,1	0,1	0,1	0,1	0,1
45°C	0,1	0,1	0,1	0,1	0,1	0,1
70°C	0,1	0,1	0,1	0,1	0,2	0,2
90°C	0,2	0,1	0,2	0,1	0,2	0,4
100°C	0,2	0,2	0,2	0,2	0,3	0,3

Temperature deviation in [± K]

Temporal temperature fluctuation

OBJECT OF MEASUREMENT

The highest possible temporal stability of the temperature is an important parameter for the performance of a Memmert waterbath WTB. The values for the temporal temperature fluctuation results from the greatest deviation from the mean value of all measured values within the measurement period.



MEASUREMENT SETUP

9 Point measurement with Pt100 measuring sensors which are distributed in the interior of the tub based on DIN 12876 1: 2001-12, as well as the standard Memmert WTB. Measurement on devices with flat lids.

Measuring points	6	11	15	24	35	50
37°C	0,1	0,1	0,1	0,1	0,2	0,1
45°C	0,1	0,1	0,1	0,1	0,1	0,2
70°C	0,2	0,1	0,2	0,1	0,3	0,2
90°C	0,2	0,2	0,2	0,2	0,3	0,3
100°C	0,2	0,2	0,2	0,2	0,3	0,2

Temperature deviation in [± K]

Heat emission / Energy consumption

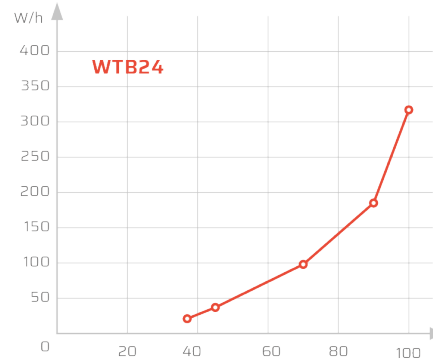
OBJECT OF MEASUREMENT

The heat output, of a Waterbath, to the environment corresponds to the necessary electrical power for operation in a steady state in order to maintain a constant actual value.

MEASUREMENT SETUP

The device's power plug is connected to an energy meter. The calculation is carried out using the following formula:

$$\frac{\text{Supplied energy (W)}}{\text{Measuring time (h)}} = \frac{W}{h}$$



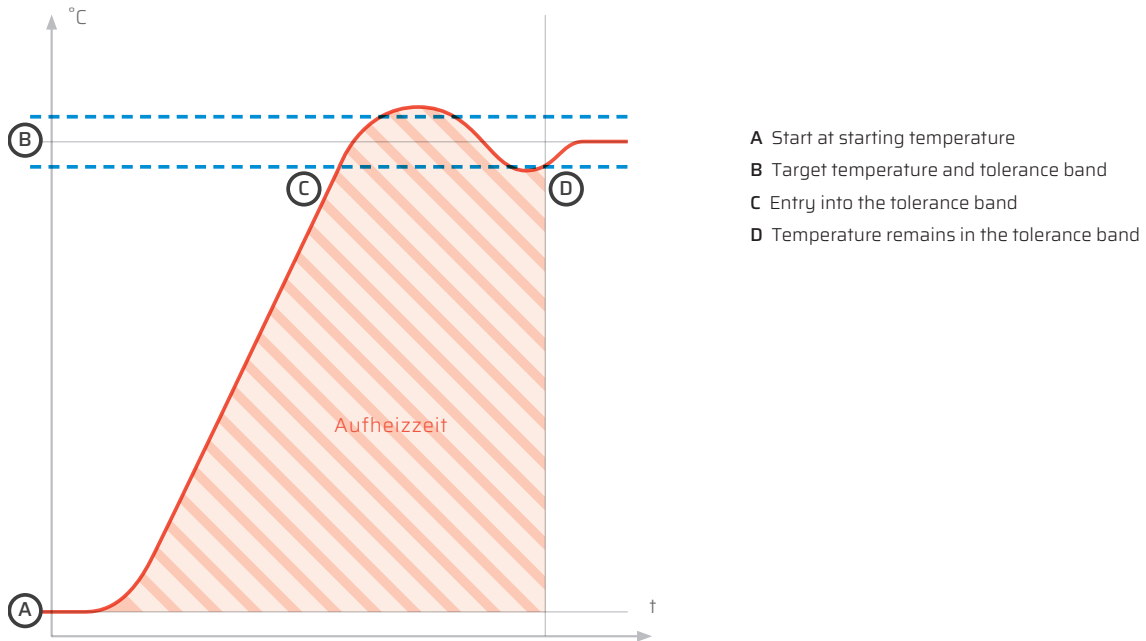
Measuring points	6	11	15	24	35	50
37 °C	10	13	17	21	33	35
45 °C	20	22	35	37	55	59
70 °C	59	62	97	98	162	174
90 °C	106	111	166	185	282	311
100 °C	225	456	540	317	422	510

Specifications in watts [W]

Heating-up time

OBJECT OF MEASUREMENT

The heating-up time is the duration until the measured actual value exceeds the tolerance band (blue dotted line) around the temperature setpoint permanently.



MEASUREMENT SETUP

9 Point measurement with Pt100 measuring sensors which are distributed in the interior of the tub based on DIN 12876 1: 2001-12, as well as the standard Memmert WT.B. Measurement on devices with flat lids.

Measuring points	6	11	15	24	35	50
20°C → 37°C	10	14	17	23	22	31
20°C → 45°C	14	20	24	37	31	45
20°C → 70°C	27	39	45	71	62	88
20°C → 90°C	40	58	67	104	89	125
20°C → 100°C	50	65	89	123	108	150

Specifications in minutes [min]

Achievable display temperature without cover

OBJECT OF MEASUREMENT

Due to the constant evaporation of the bath fluid at temperatures close to the boiling point, thermal energy escapes from the waterbath. To keep the thermal energy in the waterbath, Memmert offers flat and sloping lids. When operated with the lid closed, the Memmert waterbath reliably regulates the temperature control medium in reaching its boiling point.

When operating without a cover, part of the stored data escapes due to fundamental physical laws of heat energy into the environment. The size of the water surface has an effect on the maximum achievable temperature value. The following measured values provide information about the real achievable temperature values at a set value of 100 °C in operation without a lid.

MEASUREMENT SETUP

1 point measurement with Pt100 measuring sensors, positioned in the middle of the tub based on DIN 128761: 2001-12, as well as the standard Memmert WTB.

Measurement of the real actual temperature without lid at a set value of 100 °C.

Measuring points	6	11	15	24	35	50
115V-device	92	92	84	82,5	74	75
230V-device	92	92	84	82,5	82	83,5

Specifications in degree Celsius [°C]

Duration of maximum emptying

OBJECT OF MEASUREMENT

The design of the process concept of the WTB series aims full functionality and thus makes every day work easier for the user. The large drain outlet ensures that the waterbath is emptied quickly. Additionally, the tap is positioned at the lowest point of the tub to guarantee complete drainage. The maximum emptying time indicates the duration needed for the waterbath to be completely emptied using the drain outlet.

MEASUREMENT SETUP

The waterbath is filled to the maximum level. The time is then measured until the entire water has been expelled. The drain outlet opens fully.

Measuring points	6	11	15	24	35	50
Maximum emptying	02:12	03:11	03:50	05:20	05:56	08:10

Specifications in minutes: seconds [mm:ss]

Applied test standards and guidelines

Directive, standard	Titel	Use
DIN 12876 1:2001-12	Electrical laboratory equipment - laboratory thermostats and laboratory baths - Part 1: Terms and classifications	Establishing exams for the usability
Company standard	Waterbath WTB series	Internal test and measurement specifications of the company Memmert GmbH + Co. KG

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- 1 5.2 The performance data in this document were determined using standard series devices. Performance data from an individual device validation can deviate from these.
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We reserve the right to make technical changes in the interest of further development and progress.

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