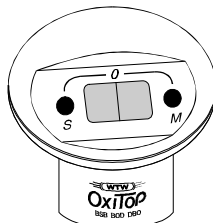


Operation of the Single Measuring System

OxiTop®



Measuring principle

BOD measurement with the OxiTop® measuring system is based on pressure measurement (difference measurement). The measuring is made by pressure measurement via **piezoresistive electronic pressure sensors**.

With the following functions, the OxiTop® measuring system minimizes the measuring work and is especially suited to the courses of the respirometric BOD measurement:

- **AUTO TEMP function:**
Control of the **temperature adjustment** and **automatic start** of the measurement (1 hour after starting the OxiTop® measuring system at the earliest, after 3 hours at the latest). It is not necessary to temper the samples to exactly 20°C before starting OxiTop®. Samples between 15°C and 20°C can be started immediately as BOD measurement will not begin until a stable 20°C is reached. This is controlled by the "AutoTemp" feature.
- **Data logging**
Automatic measurement with daily storage of measured value for 5 days: facilitates measurement without supervising, e. g. over the weekend.
- **Current value**
Indication of measured value (0 - 40 digits) corresponds to the digits of the previous WTW BOD instruments. Conversion of mbar to digits is stored in the instrument, i. e. evaluation of the measured values remains unchanged.
- **Measuring range reserve**
from 40 to 50 digits - for overranging without reset by opening the bottle.

BOD₅ determination

Normally municipal wastewater does not contain toxic or impeding substances. There are enough nutrient salts and suitable microorganisms. Under these conditions the **BOD₅ determination** with the OxiTop® measuring system is possible **in the undiluted sample**

Required instruments and accessories

- OxiTop® measuring system
- Inductive stirring system
- Incubator thermostatic box (temperature 20°C ± 1K)
- Sample bottles brown (nominal volume 510 ml)
- Stirring rods
- Stirring rod remover
- suitable overflow measuring beakers
- Rubber quivers
- Sodium hydroxide tablets

Selection of sample volume

Estimate the BOD₅ value to be expected for the wastewater sample:
Expected BOD₅ value » 80 % of the COD value

Look for corresponding measuring range in the following chart and gather correct values for sample volume and factor.

Sample volume (ml)	Measuring range (mg/l)	Factor
432	0 - 40	1
365	0 - 80	2
250	0 - 200	5
164	0 - 400	10
97	0 - 800	20
43.5	0 - 2000	50

Sample preparation

See following WTW application reports:

- WTW Application report 895230: "BOD measurement in household wastewater"
- WTW Application report 895231: "BOD measurement in organically heavily contaminated wastewater"
- WTW Application report 895232: "BOD measurement with presence of impeding or toxic substances"

Measurement

Information: To measure the sample volume, usually overflow measuring beakers or measuring cylinders are used.

Choose the volume according to the measured value expected. Too large measuring ranges will lead to inaccurate results. To estimate the measured value you can reckon with approx. 80% of the CBS value.

- **Sample preparation and filling of the measuring bottles** compare following instruction: DIN 38409 part 52: "Measurement of the oxygen consumption" as well as WTW applications-reports see chapter "Sample preparation and measurement".
- **Rinse** measuring bottle with **sample**. Empty thoroughly.
- **Exactly measure** the required oxygen-saturated (thoroughly homogenized) **quantity of the sample** according to information.
- Put the **magnetic stirring rod** into the bottle.
- Insert a **rubber quiver** in the neck of the bottle.
- Put **2 sodium hydroxide tablets** into the rubber quiver with a tweezers. (Caution: The tablets must never come into the sample!)
- Screw OxiTop® directly on sample bottle (tightly close).



Start measurement:

Press S and M simultaneously. (2 seconds) until the display shows 00.



2 sec



Display: Stored values are deleted.

- Keep the measuring bottle with the OxiTop put on for **5 days at 20°C** (e.g. in an incubator).

After

the meas. temperature has been reached (after 1 hour at the earliest, after 3 hours at the latest;

AutoTemp function), the OxiTop automatically starts the measurement of the oxygen consumption.

- During the 5 days the sample is continuously stirred. The OxiTop **automatically stores one value every 24 hours** for 5 days. To have the current value shown press the M key.



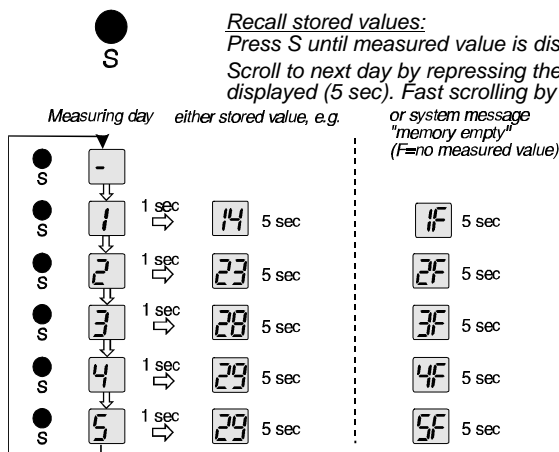
Display current measured value:

Press M until measured value is displayed (1 second).



e.g.

- **Readout of the stored values after the 5 days have passed.**



- Convert the displayed measured value (digits) into the BOD value with the following table (Digits x Factor = BOD₅ in mg/l):

Sample volume (ml)	Measuring range (mg/l)	Factor
432	0 - 40	1
365	0 - 80	2
250	0 - 200	5
164	0 - 400	10
97	0 - 800	20
43.5	0 - 2000	50

Disturbances

- **Measured value remains below measuring range: the display shows zero or too low a value.**
The measuring equipment is not water-tight.
 Check rubber quiver, screw top and bottle. Insufficient sample pretreatment or preservation. The temperature of the sample had not sufficiently been adjusted (< 15°C).
- **Measuring range exceeded.**
 The measuring range chosen is too small. With very high values (> 2000 mg/l) we recommend to predilute the sample.
 Nitrification inhibitor (allylthiourea) is missing or lacking.
 Errors due to procedure have not been mentioned.

System messages

	Memory empty (F=measured value of day 1 is missing)		Value remains below measuring range < 0 Digit
	Change batteries (approx. every 3 years)		Value exceeds measuring range > 50 Digit

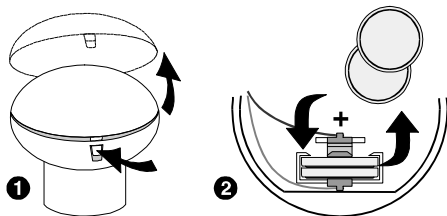
Cleaning of sample bottles

- **Do not use disinfectants!** (Disinfectants will kill the required microorganisms!)
- Remove **gross contaminations** mechanically, e.g. with a **brush**.
- Rinse the bottles with **clear water** or with **water of the next sample**. (After using detergents rinse thoroughly! Detergent residues may disturb the BOD₅ determination!)

Cleaning of the OxiTop® Single Measuring System

- Do not use alcohol or acetone!
- Clean with a soft cloth and aqueous soap solution

Battery replacement (approx. every 3 years)



- 1 - Push in spring catch.
- Open upper lid.
- 2 - Remove batteries.
- Put in new batteries, pay attention to polarity! (e.g. WTW-Modell **Batt/Oxitop®**, Order No. 209 012).
- Place upper lid with tap on locking pin (lower lid). Attention! Do not squeeze cable connection.
- Close upper lid (make the hook click).

Disposal note: Please dispose of the lithium batteries at a battery collection point.

Information



Never use sealing grease or other lubricants for your OxiTop® instruments. Some of these products contain solvents which cause severe damages on the plastic housings. The tightness of the BOD bottles is completely sufficient without grease. Rough contaminations and particles on the contact surfaces of the rubber quiver and the OxiTop® must always be wiped off. WTW grants no guarantee for damages caused by sealing grease.

Labelling:

To label the bottles clearly, WTW offers a marking set (6 marking rings with numbers, which can be put on the neck of the bottle):

Model **MARK-6** (6 pcs) Order No. 209 013

Check of the measuring system:

On request WTW offer special test instruments for test control.

Further literature: WTW BOD handbook DIN 38409T51 DIN 38409T52

Technical data

Measuring principle	Respirometric (manometric)	Power consumption	Max. 25 mA (during measurement)
Display	2-digit 7-segment LED, 10 mm	Protection class	3 IEC 1010
		Protection system	IP 54 IEC 529
Measured parameter	Digits	EMC Emissions	EN 50081-1, FCC Class A
		Immunity	EN 50082-2, NAMUR recommend.
Measuring range	0 ... 40 digits (+10 digits for overranging)	Climate class	2, VDI/VDE 3540
		Ambient temperature	Storage: -25°C ... +65°C Operation: +20°C ± 1K
Admissible measuring temperature	20°C ± 1 K	Test mark	CE
Admissible sample temp.	15-20°C (when being filled)	Dimensions	H: 69 mm, \varnothing 70 mm
Power supply	Lithium batteries (260 mAh), 2 x type CR 2430 (3V)	Weight	Approx. 85 g