

BOD measurements Respiration *measurement*

Biological Oxygen Demand

BOD measurement according to EN 1899-1 and EN 1899-2 and for self-checks

Biological Oxygen Demand (BOD) is an important parameter in water resource management. BOD is a parameter used to measure the quality of water and treatment results in wastewater. In addition, BOD analysis potential is used in the planning and design wastewater treatment facilities.

In routine use BOD determination is used to check the wastewater in the inflow and discharge of wastewater treatment plants. Depending on the measurement site and type of wastewater the BOD value can lie between a few mg/l and several thousand mg/l. Several methods are available for carrying out the measurement.

WTW offers various measuring systems for these methods.

In “**dilution BOD**” the oxygen content of a sample is measured with an oxygen sensor before and after an incubation period of 5 days. The difference between the measurements is the BOD₅ value; this is the **official EPA method**.

In “**BOD self-checks**” with the respirometer the reduction in oxygen causes a definite pressure difference which can be measured by a pressure sensor. This method is very easy to carry out and is a practical method.

Also both methods are very different, the measurements correlate for discharge analysis in municipal wastewater treatment facilities. Both methods requires the samples to be kept at 68 °F (20 °C) for 5 days. WTW offers a wide range of temperature controlled incubators.

Depletion/Respiration

In the course of growing environmental consciousness, microbiological degradability tests have become increasingly important. These can be, for example, soil surveys from waste sites or environmental impact surveys for new chemical substances. The necessary respiration measurements for anaerobic or aerobic degradation can be easily carried out using the OxiTop®-C systems with excellent analysis. WTW offers a wide range of application specific packages with appropriate sample vessels.

User reports and application reports on this topic can be obtained from the WTW homepage (www.wtw.com).

BOD/Depletion/Respiration



Oxi 197i



inoLab® BSB/BOD 740
with StirrOx® G

“Dilution BOD”

according to EN 1899-1/EN 1899-2; official EPA method

- with inoLab® BSB/BOD 740

see p. 64

with easy-to-use analysis program, with PC control.

- with ProfiLine Oxi 197i

see p. 65

Recommended electrode: self-stirring oxygen sensor StirrOx® G



OxiTop® Control



OxiTop® IS 12

“BOD self-check measurement”

worldwide approved method according to the self-check regulations

- OxiTop®

see p. 68

Simple routine measurement, mercury-free pressure measurement

- OxiTop® Control

see p. 69

Routine, standard and special measurement, with automatic sample management

Depletion/Respiration

OxiTop® Control OC 110 for special measurements

see p. 70/74

- Respiration
- Biogas determination
- Soil respiration
- Biodegradability



Biogas
determination



Soil respiration

Accessories/Incubators

Upgrading and general Accessories

see p. 72

Incubators/Thermostat Cabinets

see p. 78

BOD measurements

measurement

"Dilution BOD"

according to DIN EN 1899-1 and DIN EN 1899-2; official EPA method

With inoLab® BSB/BOD 740

flexible and powerful

This laboratory oxygen meter has been specially developed for BOD_n measurements. BOD measurements are determined by regulation EN 1899-1 and is **EPA approved**. You can store up to 7 of your own routines for frequently occurring dilution ratios. A maximum of 30 measuring samples each with 18 dilutions allow the management of up to 540 diluted samples. The inoLab® BSB/BOD 740 can also be used as a conventional high-end oxygen meter (*For technical data such as inoLab® Oxi 740 refer to page 33*). Additional memory and editing options are available when operated using the MultiLab® pilot. The entire measurement and sample management can thus be easily handled via PC.

In combination with StirrOx® G with its automatic start/stop function the inoLab® BSB/BOD 740 is the ideal measuring system for routine oxygen measurement in the BOD₅ determination according to DIN EN 1899-1 and DIN EN 1899-2.

Simple sample management

Automatic BOD calculation

EPA approved

Special features:

- BOD/depletion
- Determination of the biochemical oxygen demand according to DIN EN 1899-1
- Determination of oxygen depletion according to DIN 38 414 P6
- Up to 5 samples for dilution water
- Up to 30 measuring samples
- Up to 18 dilutions per measuring sample
- Up to 7 routines can be stored
- Adjustable incubation time, 5 ... 30 days

Additional features when using the MultiLab® pilot:

- Management of an arbitrary number of samples
- Max. of 32 dilutions per measuring sample
- Max. of 32 dilution waters (blank solutions)
- Adjustable incubation period, 1 to 32 days
- Allocation of names for dilution waters, samples, diluted samples and routines (max. of 255 characters per name)
- Warning indication for BOD values that are too high or too low
- Calculations by mouse click
- Automatic protocols



IP 43



GETLUS

3 Year Warranty

“Dilution BOD”

With ProfiLine Oxi 197i

Laboratory oxygen meter ProfiLine Oxi 197i with self-stirring oxygen sensor StirrOx® G.

Technical Data see page 34

- EPA approved method
- Accurate
- Battery and line power operation



IP 66
IP 67

CE

cETLus

3 Year Warranty

StirrOx® G

Self-stirring oxygen sensor – simultaneous stirring and measurement

- Single-handed operation for series measurements
- Constant flow for high reproducibility
- Immediately ready for measuring – no polarization period required
- Extremely low self-consumption of oxygen – only 0.008 $\mu\text{g h}^{-1}$ (mg/l)⁻¹
- Zero-current free – no zero point calibration necessary
- With calibration and storage vessel OxiCal®-ST as standard
- Membrane life – Up to 6 months
- Temperature compensation with 2 built-in sensors
- Membrane leakage monitoring – damaged membranes are indicated



Ordering Information

BOD measurement		Order No.
inoLab® BSB/BOD 740P	High-end oxygen/BOD meter including terminal with built-in printer, active multifunction box, with self-stirring oxygen sensor StirrOx® G, wide range power pack and accessories	1H31-0114
ProfiLine Oxi 197i	ProfiLine oxygen meter, extremely robust, hose-water proof (IP 66), RS 232 digital output, operation from mains supply or rechargeable batteries, with wide-range power supply with connection for self-stirring oxygen sensor StirrOx® G and CellOx® 325	3B30-010
StirrOx® G	Self-stirring oxygen sensor for oxygen determination in Karlsruhe bottles, with OxiCal®-ST calibration and storage vessel and accessory case with spare parts and maintenance supplies	201 425

For information visit www.WTW.com for a customer care center near you or inside US: call WTW 800 645 5999.



“BOD self-check measurement” / Respiration/ Biogas Determination

With OxiTop® and OxiTop® Control

Mercury-free measurement

Biochemical oxygen demand BOD determination is still one of the most important parameters in water resource management. It can be used to evaluate the impact of biodegradable substances in waters and wastewater. With its OxiTop® systems, WTW offers a unique, modular and mercury-free instrument system. It is not only suitable for BOD determination, but also for measuring biodegradability and depletion.

The advantages of OxiTop® and OxiTop® Control: simple operation, improved controllability and non-toxicity, and measuring ranges of up to 400 000 mg/l BOD (with OxiTop® Control OC 110). As the measured pressure is automatically converted the values can be directly read as mg/l BOD.

- Undiluted samples
- AutoTemp function for delayed start of cold samples
- Non-volatile memory of measured values

Application Range

	OxiTop®	OxiTop® Control OC 100	OxiTop® 110
Application	BOD routine	BOD routine, BOD standard	BOD routine, standard and BOD special, Respiration/Dilution, Soil respiration, Biodegradability, Biogas determination
BOD range	0 – 4,000 mg/l	0 – 4,000 mg/l	0 – 400,000 mg/l
Measured value memory	5 days	0.5 h – 99 days	0.5 h – 99 days
Pressure mode	—	—	Pressure p 500 – 1.350 hPa
Sample volume	Fixed	Fixed	Definable

OxiTop® Complete Sets for 6 or 12 Measuring Vessels

The complete packages have been assembled so that they contain everything necessary to carry out the measurements. The make up of each package depends on the application and varies by number of vessels, controllers and utensils for sample preparation.

Special stirring platforms were developed in order to maintain a constant temperature and guarantee optimum oxygen distribution in the sample. These stirrer platforms have space for either 6 or 12 standard bottles or 6 large vessels for special applications.

Applicable systems

- **BOD**
OxiTop® IS 6 / IS 12
OxiTop® Control 6/12
- **Soil respiration**
OxiTop® Control B6M / B6
- **OECD / aerobic applications**
OxiTop® Control A6 / A12
OxiTop® Control S6 / S12
- **Biogas determination**
OxiTop® Control AN 6 / AN 12
- **Microbial applications**
OxiTop® Control AN 6 / AN 12
OxiTop® Control A6 / A12

Composition of complete packages



Accessories	OxiTop®		OxiTop® Control			
	IS 6 / IS 12	6 / 12	B6 / B6M / B6M 2.5	A6 / A12	S6 / S12	AN6 / AN12
Vessel with measuring head connection	Amber bottle, 510 ml with rubber sleeve	Amber bottle, 510 ml with rubber sleeve	Duran bottle 500 ml / 1,0 l vessel / 2.5 l vessel; with adapter	1000 ml vessel/ 250 ml vessel with adapter	Amber bottle, 510 ml with rubber sleeve	1000 ml vessel/ 250 ml vessel
Number	6 / 12	6 / 12	6 / 6 / 6	6 / 12	6 / 12	6 / 12
Measuring heads	OxiTop®	OxiTop®-C	OxiTop®-C	OxiTop®-C	OxiTop®-C	OxiTop®-C
Stirrer	IS 6/IS 12	IS 6/IS 12	—	IS 6-Var/IS 12	IS 6/IS 12	IS 6-Var/IS 12
Controller	—	OC 100	OC 110	OC 110	OC 110	OC 110
Software + Cable	—	—	●	●	●	●
CO ₂ absorbent	●	●	●	●	●	●
Nitrification inhibitor	●	●	—	●	●	●
Overflow measuring flask	164 / 432 ml	164 / 432 ml	—	—	—	—
Stirrer bars	6/12	6/12	—	6/12	6/12	6/12
Stirrer bar remover	●	●	—	●	●	●
Blocks of chart paper	●	●	—	—	—	—

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BOD self-check measurement

- High-precision
- 5-day automatic storage of measured values
- Mobile
- Extendable

Technical Data

	OxiTop® measuring head
Measuring principle	Manometric with pressure sensor
Quantity measured	BOD _n
Measuring range	0 ... 40 digits (display units) equals 0 ... 40 / 80 / 200 / 400 / 800 / 2000 / 4000 mg/L BOD
Display accuracy	±1 digit (± 3.55 hPa)
Operating range	500 - 1100 hPa
Memory	For BOD ₅ : 1 per day
Ambient temperature	Storage: -13 ... 149 °F (-25 ... +65 °C) Operations: 41 ... 122 °F (+5 ... +50 °C)
Dimensions	H: 2.7 in (69 mm), Ø 2.8 in (70 mm)

OxiTop® IS 6, IS 12

Complete packages for 6 or 12 simultaneous measurements

Measurement using OxiTop® is based on pressure measurement in a closed system: microorganisms in the sample consume the oxygen and form CO₂. This is absorbed by NaOH, creating a vacuum which can be read directly as a measured value in mg/l BOD.

The used sample volume regulates the amount of oxygen available for a complete BOD. Measurement ranges of up to 4,000 mg/l can be measured using different volumes.

The OxiTop® heads (green and yellow for differentiation of inflow/outflow) have an **AutoTemp function**: if the sample temperature is too cold, the start of measurement is automatically delayed (by at least 1 hour) until a constant temperature has been reached.

Apart from the **automatic** storage of 5 measured values (1 value per day), further measured values can be read at all times during or after the period of 5 days, which permits the tracking of check values or measurements over longer periods.



CE UL CUL 1 Year Warranty

OxiTop® IS 12

Ordering Information

		Order No.
OxiTop® IS 6	Complete package, ready for use, for 6 simultaneous measurements, with IS 6 Inductive Stirring System, for mains operation 230 V / 50/60 Hz and 6 OxiTop® measuring systems, including accessories	208 210
OxiTop® IS 12-6	Complete package, ready for use, for 6 simultaneous measurements (extendable to 12 simultaneous measurements), with IS 12 Inductive Stirring System, for mains operation 230 V / 50/60 Hz and 6 OxiTop® measuring systems, including accessories	208 212
OxiTop® IS 12	Complete package, ready for use, for 12 simultaneous measurements, with IS 12 Inductive Stirring System, for mains operation 230 V / 50/60 Hz and 12 OxiTop® measuring systems, including accessories	208 211

Note: versions for 120 VAC/60 Hz see brochure "Product Details"

BOD self-check measurement – for a larger number of samples with simple sample management

OxiTop® Control 6, OxiTop® Control 12



OxiTop® Control 12

- Controller-driven
- Simultaneous measurement of up to 100 samples
- Statistical evaluation
- Automatic sample ID
- Worldwide approved method

Complete package for 6 or 12 simultaneous measurements

OxiTop® Control is the logical further development of the successful OxiTop® system using software-controlled functions and infrared interface to communicate with a handy controller, the OC 100. This system enables the simultaneous and grouped start, management, storage and tracking of 100 measuring heads via the controller and tracked on a large display with graphic evaluation. Data can be transferred to the PC for evaluation and documentation via the **AK-540/B** cable (order no. 902 842) and the communication program **Achat OC** (order no. 208 990).

Controller OC 110 in combination with the OxiTop® Control S6 / S12 is ideal for users with other applications apart from BOD (see page 76).

Check sampling progress!

The data can be called up at any time, even during sampling, thus enabling checking of the samples for errors. The display of the progress curve allows immediate detection of irregularities and interferences, such as a BOD value set too high for the volume used or undesired nitrification. Corrections can thus be made at an early stage.



The Controller OC 100 and OC 110



common features

- Simultaneous sample management with option of grouping up to 100 OxiTop®-C measuring heads.
- Data call-up of one parallel sample with statistical evaluation and as individual data.
- Automatic calculation and graphical display of BOD value.
- Data transfer even through glass doors.
- Protocol and documentation of data via Achat OC communication program in combination with a PC
- GLP and AQS with inspection intervals for calibration with the OxiTop® PM calibration tablets
 (see page 73: Accessories)

IP54 CE UL CUL 1 Year Warranty

OxiTop® OC 100

Application Range/Technical Data

	OxiTop® Control OC 100	OxiTop® Control OC 110
BOD routine	Individual samples up to 4,000 mg/l	Individual samples up to 4,000 mg/l
BOD standard	Parallel samples with statistical evaluation up to 4,000 mg/l	Parallel samples with statistical evaluation up to 4,000 mg/l
BOD special	—	Freely definable volumes, 0.5 h – 99 days, up to 400,000 mg/l BOD
Soil respiration	—	freely definable volume determination
OECD / Aerobic applications	—	freely definable volume determination
Biogas determination	—	Pressure p 500 - 1350 hPa 10 intermediate values
Data sets per measurement	180 ... 360 (depending on duration)	
Measurement period	0.5 h ... 99 days	
Power supply	3 mignon (AA); alkaline 1.5 V	
Interface	IR (infrared); RS 232 for communication with PC	
Ambient temperature	Storage: -13 °F ... 149 °F (-25 °C ... +65 °C), Operations: 41 °F ... 104 °F (+5 °C ... +40 °C)	
Dimensions	1.7 x 3.9 x 7.9 in (45 x 100 x 200 mm) (H x W x D)	
Weight	Approx. 390 g	

For applications also refer to p. 74 - 77 Respiration/Depletion measurement

OxiTop®-C Measuring Head



- Instead of the display and keys, the OxiTop®-C measuring head has an infrared interface with which it communicates with Controller OC 100 or OC 110. By “pointing” the controller at an OxiTop®-C measuring head it can be identified and started, data can be called up or deleted and sampling progress can be displayed.
- Each measuring head has its own identification number; this means that manual identification of samples is no longer necessary, even for parallel samples. In addition, statistical evaluations can be easily performed for parallel samples.
- The OxiTop®-C measuring heads have an AutoTemp function for delaying the start of samples which are too cold by up to 4 hours. This mode can be deactivated for BOD standard.
- The measuring heads can store up to 360 data sets. Data are automatically stored in the corresponding interval according to the interval period set (0.5 h to 99 days).
- The built-in pressure sensor can register differences in pressure ranging from 500 to 1,350 hPa.

Technical Data

	OxiTop®-C measuring head
Measuring principle	Manometric with pressure sensor
Measurement of	BOD _n
Pressure range	500 - 1350 hPa
Accuracy	±1 % of value ±1 hPa
Resolution	1 hPa (corresponds to 0.7% of BOD _n measuring range)
Power supply	lithium batteries (280 mAh), 2 x CR2430
Ambient temperature	Storage: -13 ... 149 °F (-25 ... +65 °C) Operation: 41 ... 122 °F (+5 ... +50 °C)
Dimensions	H: 2.8 in (70 mm), Ø 2.8 in (70 mm)

Ordering Information

	Order No.
OxiTop® Control 6 Complete package, ready for use, for 6 simultaneous measurements, with Controller OC 100 and IS 6 Inductive Stirring System, for mains operation 230 V / 50/60 Hz and 6 OxiTop®-C measuring systems, including 6 sample bottles, 6 rubber sleeves, 6 stirrer bars and other accessories	208 201
OxiTop® Control 12 Complete package, ready for use, for 12 simultaneous measurements, with Controller OC 100 and IS 12 Inductive Stirring System, for mains operation 230 V / 50/60 Hz and 12 OxiTop®-C measuring systems, including 12 sample bottles, 12 rubber sleeves, 12 stirrer bars and other accessories	208 204
OxiTop® Control S6/S12 Complete package with Controller OC110 and software	see page 76

Note: versions for 120 VAC/60 Hz see brochure “Product Details”

BOD measurement System Extensions and general Accessories

OxiTop® Measuring Heads and SETs for Retrofitting



In order to meet the growing demand and the extension of potential applications, OxiTop® and OxiTop®-C systems are also available as individual items in different combinations, such as:

- Individual measuring heads OxiTop®/OxiTop®-C
- A set of two OxiTop® heads (yellow and green).
- Upgrade sets for a further 6 positions with 6 heads each and flasks, sleeves and stirring bars, as well as the stirring platform.

Please refer to the brochure "Product Details" for a precise listing of all available components.



Stirrers for BOD measurement

Technical Data

	IS 6	IS 12	IS 6-Var
No. of stirring positions	6	12	6
Stirrer speed	Program-controlled 180 ... 450 min ⁻¹		
Ambient temperature	Storage: -13 °F ... 149 °F (-25 °C ... +65 °C) Operation: 41 °F ... 104 °F (+5 °C ... +40 °C)		
Dimensions (H x W x D in mm)	67 x 265 x 181	67 x 350 x 266	67 x 265 x 181

Stirrers IS 6 and IS 12 have been specially developed for BOD measurement with the OxiTop® system. Software-controlled speed regulation prevents the magnetic stirrer bar from getting caught or wobbling.

The speed is selected so that an optimal gas exchange with the sample takes place. The stirrer is maintenance-free and non-wearing as it contains no moving parts.

The IS 6-Var model has been specially developed for use with large measuring vessels and has space for 6 measuring vessels. Its outer dimensions are identical to those of the IS 12.



BOD measurement

General Accessories

BOD measurement

Testing Aids for the OxiTop® system for Quality Control

Two testing aids are available for monitoring measurement and checking system leakage, which can be called up during a corresponding time interval using the AQA function in the controller.

- **OxiTop® PM**

These calibration tablets simulate a complete BOD and perform quantitative monitoring of measurement (approx. 308 mg/l, batch-dependent) as well as checks for leakage over the entire period.

- **OxiTop® PT**

This testing aid performs a “quick” check for under-pressure and leakage. The OxiTop® contains the pressure table required for the individual place of installation. OxiTop®-C automatically includes these values.

Additional Accessories

- **Storage racks**

For safe storage of OxiTop® measuring systems and OxiTop®-C measuring heads, for 6 measuring heads each.



- **Marking rings**

For identification of BOD bottles for OxiTop® instruments.

- **Overflow measuring flasks in different standard sizes for OxiTop®**

Apart from the supplied 164 ml and 432 ml overflow measuring flasks contained in the standard scope of supply, the following sizes are also available: 22.7 ml, 43.5 ml, 97 ml, 250 ml, 365 ml.

Ordering Information for accessories and spare parts see brochure “Product Details”.

Depletion



Depletion/Respiration with OxiTop® Control OC 110

The investigation and monitoring of biological cleaning treatment processes are becoming more and more important with respect to the environmental requirements such as wastewater treatment, soil remediation and waste treatment.

Biological tests are often in the foreground as well as the usual physical-chemical measuring methods. In order to determine the biodegradability of foodstuffs, pollutants, harmful substances or waste substances and the microbial activity so-called respiration (depletion) measurements are often carried out. In these measurements the respiration of the organisms is determined under defined conditions as the oxygen uptake or release of carbon dioxide.

Measurements are carried out via closed systems using the OxiTop®-C in combination with the OC 110 controller. Depending on the field of use, specially adapted measuring vessels, which are all equipped with the necessary connection thread and some of which are autoclavable, come into operation. For this task there are various complete packages available which come equipped with all required utensils.

For the incubation of larger measuring vessels, WTW offers the TS 1006-i thermostat cabinet as well as the IS 6-VAR stirrer platform, which has been specially designed for vessels with large base diameter.

	Applications and Procedures	Measuring
Soil respiration	Soil analysis/biodegradability of pollutants: laboratory method according to DIN 19 737	Aerobic using CO ₂ absorption, quantitative CO ₂ determination possible
Biodegradability	Determination according to OECD 301 F / DIN EN 29 408 / ISO 9408	Aerobic using CO ₂ absorption
Biogas determination	Determination of anaerobic degradation processes	Anaerobic, determination of CO ₂ + Methane
Microbiology	Growth and stress investigations: determination of the respiration rate	Aerobic, warning pressure possible

Determination of soil respiration

Laboratory method for determining the microbial soil respiration according to DIN 19 737.

OxiTop® Control B6 / BM6

Soil respiration measurements are used for forecasting, surveying and checking remediation work, for biodegradability measurements of substances (pesticides, fungicides, fertilizers, etc.) as well as for carrying out toxicity tests.

This determination is possible with the OxiTop® Control System and special, practically-tested measuring vessels in a very accurate, simple and favorably-priced way.

The expenditure for personnel and apparatus is considerably reduced when compared with conventional methods.



Example of application using MG/... measuring vessels

- Simple and precise
- Cost-efficient
- Optimum measuring vessels for subsequent quantitative determination of CO₂



Example of application using PF/45... sample vessels

Soil respiration measurements can be carried out in 2 different types of vessel.

For actively respiring soils with strong CO₂ development the MG 1.0 measuring vessel is recommended: its large opening (approx. 3.9 in / 100 mm dia.) means that it can be easily used with large-volume CO₂ absorber vessels for afterwards quantitative CO₂ determination.

Ordering Information

Model	Complete soil respiration package	Order No.
OxiTop® Control BM6	Package for soil respiration (aerobic) with 6 MG 1.0 measuring vessels, 1000 ml, with stopper adapters for OxiTop®-C	208 232
OxiTop® Control B6	Package for soil respiration (aerobic) with 6 PF 45/500 sample vessels, 500 ml, Duran and 6 OxiTop® AD/SK adapters, autoclavable	208 230

Determination of biodegradability

Laboratory procedures for determination of biodegradability according to DIN EN 29 408 / ISO 9408 / OECD 301 F

OxiTop® Control A6 / A12 and S6 / S12



The determination of the biodegradability should be checked before “new” chemicals are used for the first time, not only for environmental reasons but also to minimize disposal charges.

The sample and a blank are stirred at a constant temperature for 28 days in closed bottles.

The CO₂ produced is removed from the gas space by means of an absorber so that the resulting negative pressure is a measure of the biodegradability.

The continuous recording of the values in the OxiTop®-C means that the required documentation can be guaranteed in an optimal manner.

The measuring bottles and adapters can be autoclaved at 249.8 °F (121 °C).

Ordering Information

Model	Complete OECD packages	Order No.
OxiTop® Control A6	Package for aerobic applications with 6 x 1000 ml measuring units	208 220
OxiTop® Control A12	Package for aerobic applications with 12 x 250 ml measuring units	208 222
OxiTop® Control S6	Package for aerobic applications with 6 x 510 ml measuring units	208 196
OxiTop® Control S12	Package for aerobic applications with 12 x 510 ml measuring units	208 198
Note: versions for 115 VAC/50/60 Hz see brochure “Product Details”		

Biogas determination

Determination of anaerobic degradation processes: biogas determination

OxiTop® Control AN6 / AN12



Anaerobic degradation processes take place in the absence of oxygen. In order to be able to fill the gas space above the sample with inert gas the measuring bottle has a septum sealed nozzle. When anaerobic degradation has taken place the dissolved CO₂ can be driven off and then removed from the gas space by means of a CO₂ absorber. The resulting pressure difference is proportional to the CO₂ concentration, the remaining overpressure is proportional to the methane concentration.

The degradation process can be comfortably followed in the "pressure" operating mode.

Determination of the Respiration Rate

Microbiological growth and stress investigations: determination of the respiration rate (aerobic/anaerobic measuring operation)



OxiTop® Control AN6 / AN12 and A6 / A12

The use of special measuring bottles with a septum sealed nozzle allows the interference-free addition of substrates and solutions.

Pressure alterations could indicate a reduction in oxygen concentration, for

example, which could make the addition of oxygen or air necessary (possibly other gases as well).

It is possible to set a "warning pressure" or a pressure limit so that the operator can carry out manipulations on the system.

The momentary pressure can be stored so that the manipulation is fully documented. The recording of measured values (max. 10 values) permits long-term measurement.

Ordering Information

Model	Complete packages for microbiology	Order No.
OxiTop® Control AN6	Package for aerobic or anaerobic applications with 6 x 1000 ml measuring units	208 225
OxiTop® Control AN12	Package for aerobic or anaerobic applications with 12 x 250 ml measuring units	208 227
Complete packages for aerobic measurements		
OxiTop® Control A6	Package for aerobic applications with 6 x 1000 ml measuring units	208 220
OxiTop® Control A12	Package for aerobic applications with 12 x 250 ml measuring units	208 222
Note: versions for 115 VAC/50/60 Hz see brochure "Product Details"		

BOD Incubators measurement

OxiTop® Box

- Compact
- Precise
- Uniform temperature distribution

CE 18 Months Warranty



Example of an application:
 OxiTop® Box with OxiTop® Control 12

Thermostat box with forced air circulation for 68 °F (tolerance 67.1 - 68.9 °F / 20 ±0.5 °C)

OxiTop® Box is a benchtop model with hinged clear-view cover which can accommodate a maximum of either 12 OxiTop® simultaneous measurements or 20 Karlsruhe bottles.

The chamber is equipped with a connection for an IS 6 or IS 12 stirrer.

A special compartment is provided for thermostating 6 methylene blue samples.

The box is made of non-corrosive materials and the compressor is CFC-free.

A cross-flow fan ensures uniform temperature distribution.

The box has an automatic defrosting system with condensate evaporation.

Technical Data

Temperature control	68 °F (tolerance 67.1 - 68.9 °F) (20 °C ±0.5 °C)
Ambient temperature	Storage: -13 ... +122 °F (25 °C ... +50 °C) Operation: +50 ... 89.6 °F (+10 °C ... +32 °C)
Power consumption	200 W
Dimensions (H x W x D)	14.76 x 16.73 x 23.62 in (375 x 425 x 600 mm)
Weight	Approx. 30 kg

Ordering Information

BOD thermostat boxes		Order No.
OxiTop® Box	BOD OxiTop® Box, thermostat box with temperature-controlled forced ventilation for 230 V 50 Hz mains supply	208 432
Note: versions for 115 V / 60 Hz see brochure "Product Details"		

Thermostat Cabinets



- Versatile
- Powerful
- Inexpensive

To incubate samples at a constant, desired temperature during the reaction period, a thermostat cabinet is necessary. WTW offers thermostat cabinets in various sizes with a variably adjustable temperature range of 50 °F - 104 °F (10 °C - 40 °C) and a power supply of 230 V/50 Hz. Temperature accuracy lies at ±1 °C deviation from the set temperature.

As the samples must be additionally stirred the thermostat cabinets are fitted with internal sockets to provide the stirrers with electricity. 2 – 4 shelves are available, according to the thermostat cabinet size, thus enabling simultaneous thermostating of up to 48 standard BOD samples, or equipping with 4 IS 12 or IS 6-Var stirrer platforms.

The largest model TS 1006-i is especially suited for special applications, as the compartment height between the 4 shelves leaves enough space for 1.5 l vessels or flasks with side nozzles.

The sizes TS 606/2-i aTS 606/4-i are available with transparent insulating glass doors and especially suited for use in combination with the OxiTop® Control system, as data can be called up through the closed glass door. This has the advantage that temperature fluctuations caused by opening the door can be avoided.

Technical Data

	TS 606/2-i	TS 606/3-i	TS 606/4-i	TS 1006-i
Shelves	2	3	4	4 widely spaced
Number of samples	2 x 12 BOD Standard	3 x 12 BOD Standard	4 x 12 BOD Standard	4 x 12 BOD Standard 4 x 6 special vessels
Glass door	Optional	—	Optional	—
Temp. control range	50 °F ... 104 °F (+10 °C ... +40 °C) ±1 K; Adjustment interval: 1 °C			
Ambient temperature	Operation: 50 °F ... 89.6 °F (+10 °C ... +32 °C) (Climate class SN); Storage: -13 °F ... 149 °F (-25 °C ... +65 °C)			
Gross contents	180 l	260 l	360 l	500 l
Dimensions outside: (H x B x D in mm) inside:	850 x 602 x 600 734 x 513 x 433	1215 x 602 x 600 1047 x 513 x 433	1589 x 602 x 600 1418 x 513 x 433	1515 x 755 x 715 1338 x 646 x 516
Weight	37 kg	45 kg	50 kg	72 kg

Ordering Information

BOD thermostat cabinets – only available for 230 V/50 Hz		Order No.
TS 606/2-i	Thermostat cabinet for 2 BOD OxiTop® systems	208 380
TS 606/3-i	Thermostat cabinet for 3 BOD OxiTop® systems	208 382
TS 606/4-i	Thermostat cabinet for 4 BOD OxiTop® systems	208 383
TS 1006-i	Thermostat cabinet for 4 BOD OxiTop® systems	208 385
Other thermostat cabinet see brochure "Product Details"		