

# 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 <sub>2</sub> absorption, quantitative CO <sub>2</sub> determination possible |
| Biodegradability     | Determination according to OECD 301 F / DIN EN 29 408 / ISO 9408                        | Aerobic using CO <sub>2</sub> absorption  |
| Biogas determination | Determination of anaerobic degradation processes  | Anaerobic, determination of CO <sub>2</sub> + 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.

- Simple and precise
- Cost-efficient
- Optimum measuring vessels for subsequent quantitative determination of CO<sub>2</sub>



Example of application using MG/... measuring vessels



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 CO<sub>2</sub> 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 CO<sub>2</sub> absorber vessels for afterwards quantitative CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> can be driven off and then removed from the gas space by means of a CO<sub>2</sub> absorber. The resulting pressure difference is proportional to the CO<sub>2</sub> 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   |
| <b>Complete packages for aerobic measurements</b>                  |  |           |
| 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" |  |           |

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