

BM-T Multi-purpose Respirometer



Introducing the BM-T series of respirometers - setting a new benchmark in wastewater process analysis, diagnosis, troubleshooting and optimization:

- . Standard and advanced calculation options
- . Easy of use
- . Simplicity of setup and operation
- . Small footprint
- . Easily transportable
- . Very low maintenance

With their unique design and operating concept, the BM-T series instruments extend the benefits of respirometry analysis to wastewater treatment plant optimization and wastewater pollution monitoring.

A KEY INSTRUMENT FOR CRITICAL APPLICATIONS: THE DESIGN, CONTROL AND PROTECTION OF WASTEWATER TREATMENT PROCESSES

In addition to routine respirometry analyses, BMT includes an advanced range of automated methods, including:

OUR Static & Cyclic Mode

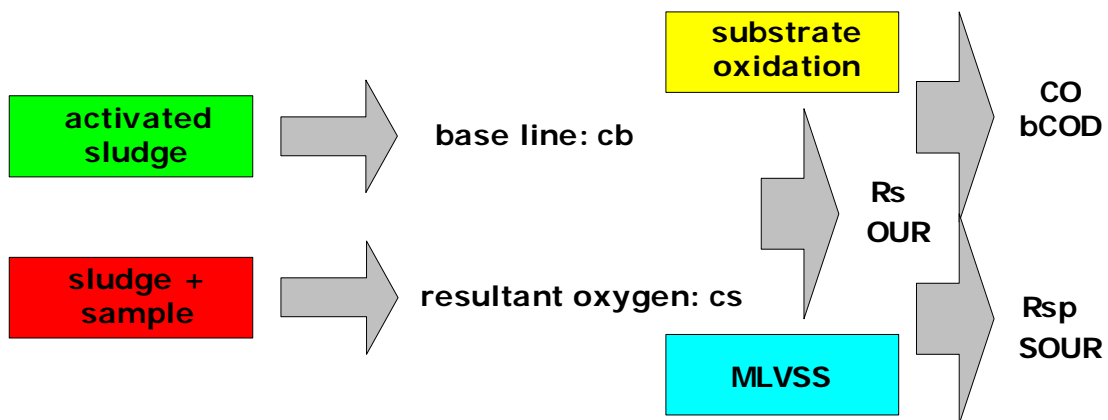
OUR (mg/l.h) Oxygen Uptake Rate from the Mixed-Liquor.
 SOUR (mg/g.h) Specific Oxygen Uptake Rate.

R Dynamic Mode

Rs (mg/l.h) Respiration Rate.
 Rsp (mg/g.h) Specific Respiration Rate.
 CO (mg/l) Consumed oxygen (BOD_{st})
 bCOD (mg/l) Biodegradable fractions of COD.

PRINCIPLES OF OPERATION

Operation is based on a closed batch circuit in which the oxygen measurements of activated sludge and combined samples are continuously monitored in a unique, optimally designed reactor vessel.

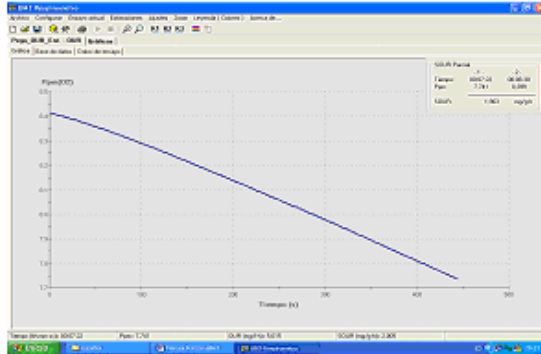


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OPERATION MODES

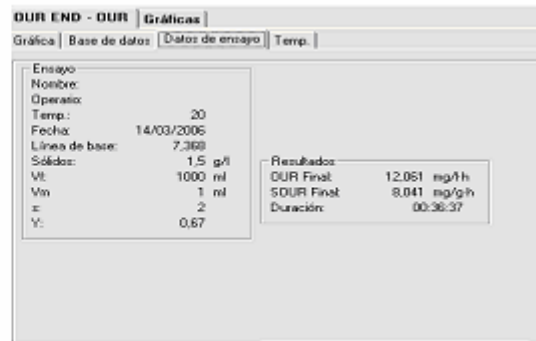
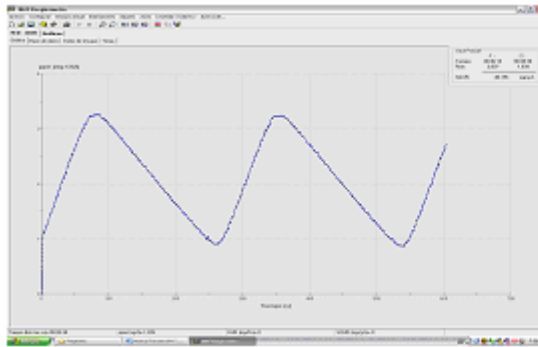
Static

From a mixed-liquor of the aeration tank it is determined the OUR & SOUR within the time and section we have selected in the corresponding respirogram.



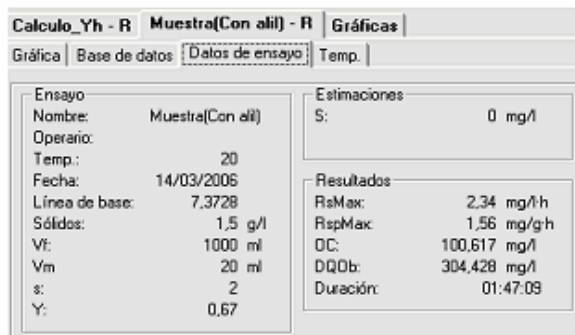
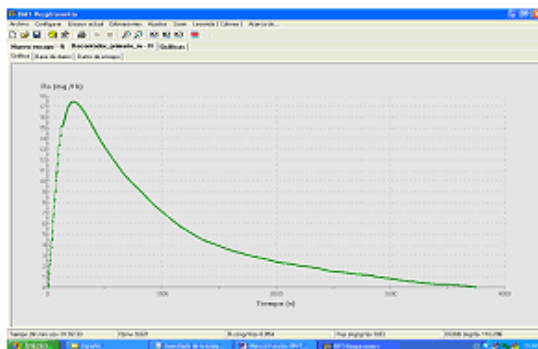
Cyclic

On this mode, the analyzer performs a respirogram within a programmed DO threshold and determines the corresponding OUR & SOUR in base of the continuous sequentially executed measurements.



Dynamic

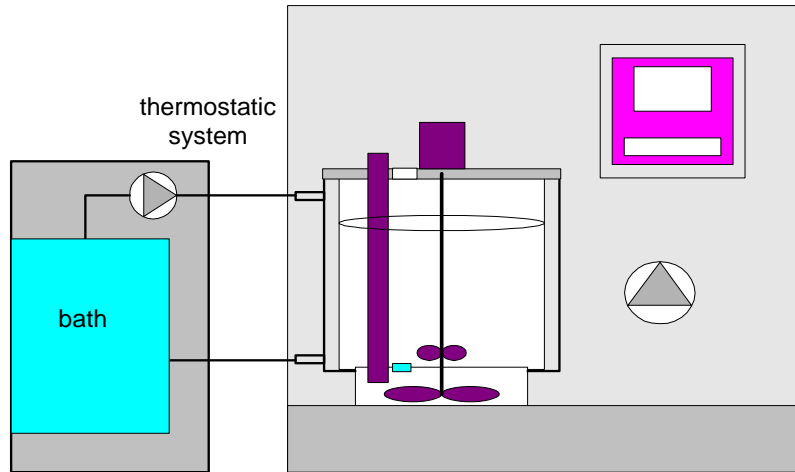
Its based on a closed circuit batch mode in which it is fixed a DO base line from an endogenous respiration activated sludge and then added a certain amount of sample to be analyzed. In the respirogram, continuous measurements of Rs are showed permitting the simultaneous and continuous determination of CO and BCOD. In this way we can track the values evolution along the time as an actual window of the substrate oxidation from activated sludge.



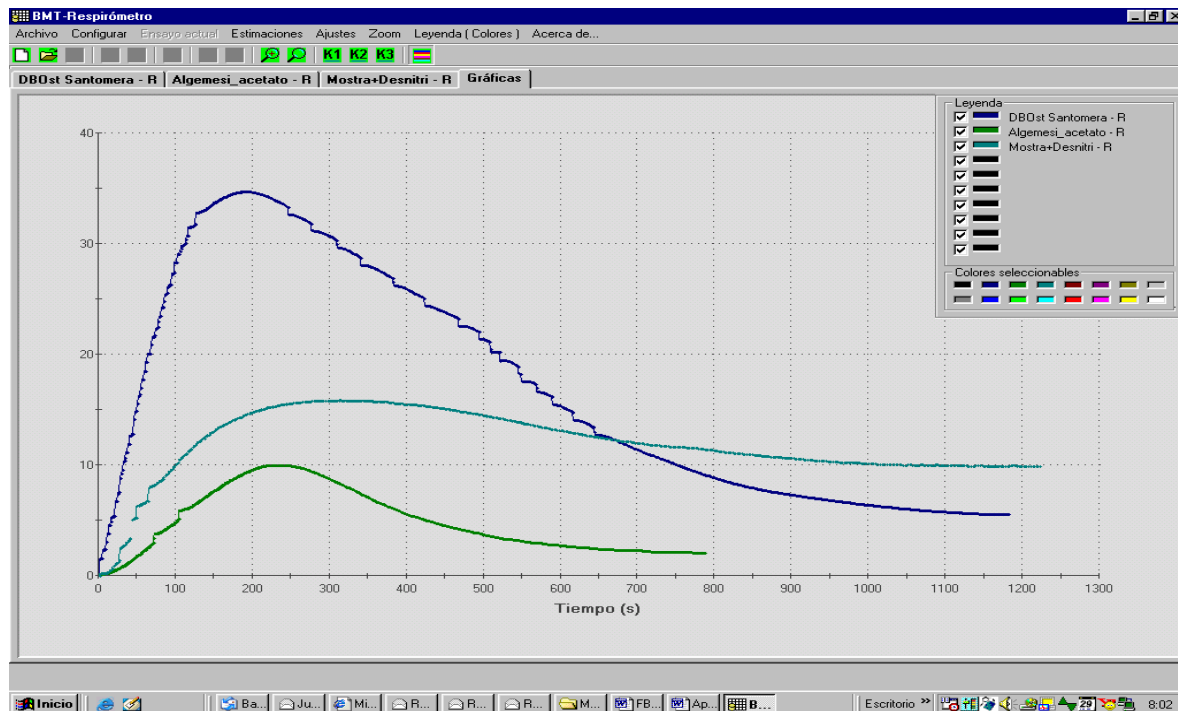
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THERMOSTATIC SYSTEM

For many assays, the importance of the temperature requires the use of a thermostatic unit to be adapted to the reactor vessel. For that reason, the vessel is then provided with a thermostatic camera, around the reactor, which can be connected to a thermostatic bath.



DIFFERENT COLOUR OVERLAYS FOR DIRECT COMPARISON



SURCIS

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WASTE WATER TREATMENT APPLICATIONS

The BM-T series provides an extended range of analysis applications for quantifying actual activated sludge activity:

CO

The R mode feature continuously integrates oxygen demand during sample degradation analysis.

bCOD: rbCOD & sbCOD

From CO calculation the program makes a simultaneous determination of biodegradable COD fractions.

Toxicity

Actual biological activity inhibition rates can be calculated for the microorganisms in the activated sludge.

Biological activity

Periodical tracking of the Rsp from a standard compound and slope analysis.

F/M

Relationship between the actual organic loading rate and total biomass of microorganisms.

SRT

Fast calculation of the optimal sludge retention time (sludge age) and its relationship with F/M

Biodegradability

Biodegradable character of the sample referred to the actual activated sludge activity and COD.

Nitrification

Rn (Nitrification Capacity) and **AUR** (Specific Nitrification Rate) determination.

Specific toxicity for nitrification

Isolates potential toxicity influences to the microorganisms responsible for the nitrification process.

Denitrification - SOUR/NUR (Nitrate Uptake Rate)

Ratio for sludge activity related to Denitrification process.

Denitrification - CO/N-NO_{3d}

Ratio to calculate the actual carbonaceous material for Denitrification

Energy optimization

Permits calculation and control of the energy consumption utilized in the reactor or aeration tank according to normal loading rate.

Biokinetic parameters

Biomass kinetics in any process type.

Support to Simulation Programs

For key parameters: bCOD, rbCOD, sbCOD, AUR, Kinetics, ...



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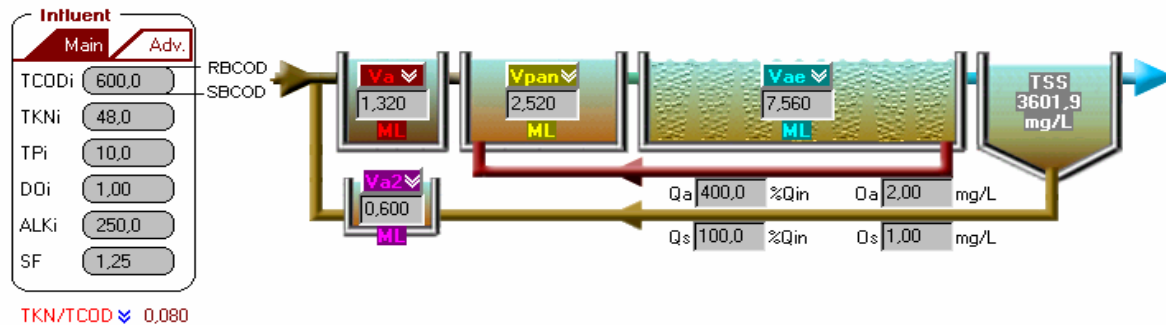
COMPOST, LEACHES APPLICATIONS

Another type of BM-T application are the ones related with compost and leaches for DRI and SOUR.max measurement and total oxygen demand.

DESIGNS, STUDIES AND R&D

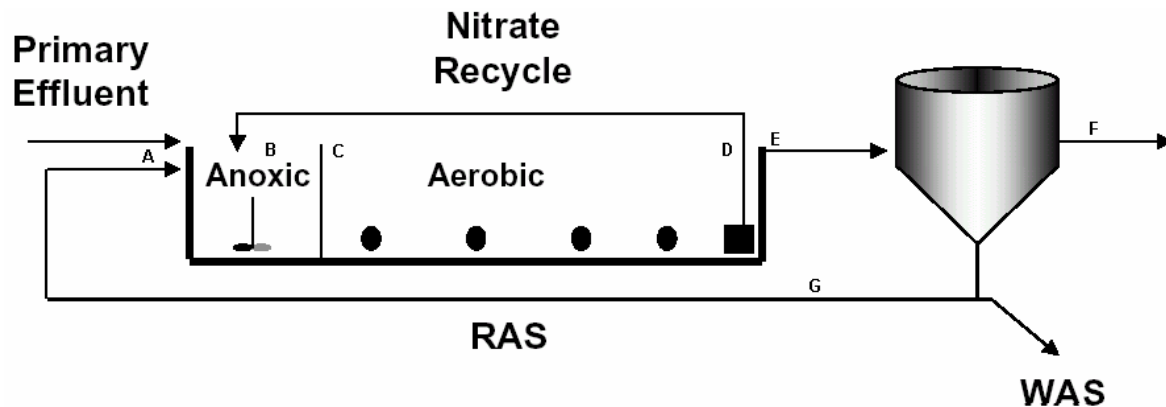
The open character and flexibility of the system allows an endless source of material towards designs, studies, researches and developments.

SUPPORT FOR SIMULATION PROGRAMS



INTEGRATION IN CONTROL SYSTEMS

The BM-T could be easily integrated with custom wastewater treatment control and research applications for collection of bCOD, SRT, F/M, Suspended Solids, Turbidity, pH, Dissolved Oxygen data etc.



Control Points for Respirometry :

A: CO, bCOD, rbCOD, F/M, Toxicity, , TCOD, TSS, TKN, NH₄-N, NO₃-N, ...

B: SOUR/NUR, NO₃-N, pH, ...

C: CO, F/M, bCOD/N/P, AUR, SOUR, TCOD, NH₄-N, pH, ...

D: SOUR, MLSS, ...

E: bCOD, TSS, ...

F: bCOD, TCOD, TSS, TKN, NH₄-N, NO₃-N, ...

G: SOUR, MLSS, ...



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OPERATION FEATURES

Common operational features

- Individual assay configuration.
- Programmable VSS value.
- Temperature control and display.
- Sample overlays for direct comparison.
- Selective partial parameters and calculations on preselected diagram tracks.
- Zoom on the selected diagram section.
- Graphical and tabular data.
- Automatic files generation as normal BM program or Excel.
- Programmable data collection rate.
- Open assays in which operator could add other components to the current reaction and analyze their respiration effects in the mixture.
- Short and long term assays.
- Automatic temperature control.

Dynamic mode specific features

- Programmable sensibility as regard to liquor residence time in the reaction cámara.
- Programmable sample and sludge volumes.
- Extremely high sensibility
- Results calculation by extrapolation mode.
- Automatic accumulated consumed oxygen measurements (CO)
- Automatic maximum values of R_s and R_{sp} .
- Automatic partial and total BCOD calculations.

Static mode specific features

- Partial OUR & SOUR from different oxygen levels.
- Dynamic sequential OUR determinations along the time.

Cyclic mode specific features

- Programmable DO set-points in order to fix the respirogram working threshold.
- Sequential OUR & SOUR determinations.
- No limit time in the assay.

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