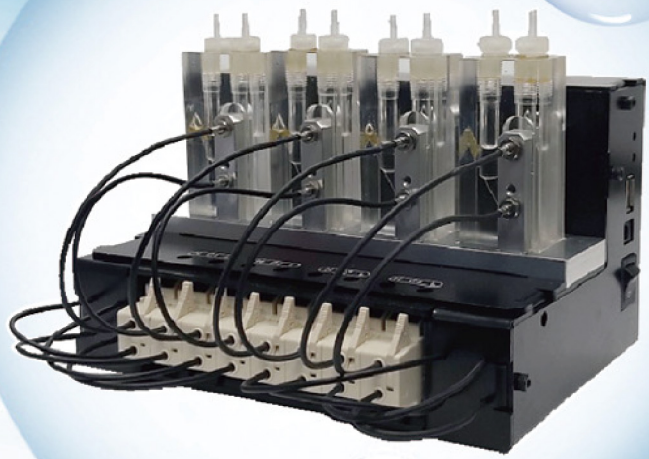
Biological Respirometric System

- Aerobic / Anaerobic Respirometer -

Model l BRS-110, BRS-200, BRS-800

What is the respirometer?

A respirometer is a device used to measure the rate of respiration of living organisms including microorganisms by measuring their rates of consumption of oxygen or production of biomethane or biohydrogen. Generally since the rate of respiration is very slow, the respirometer should be sensitive and accurate.

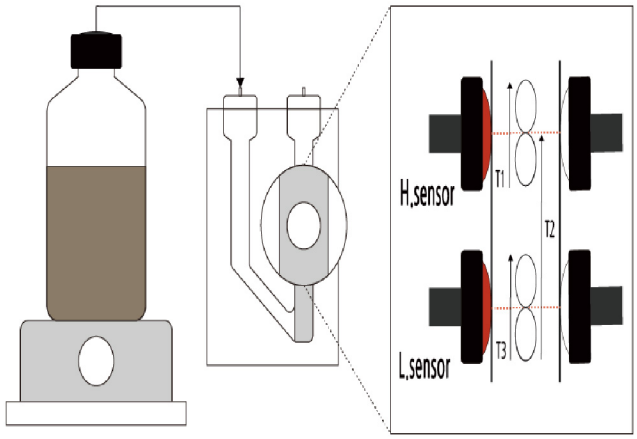


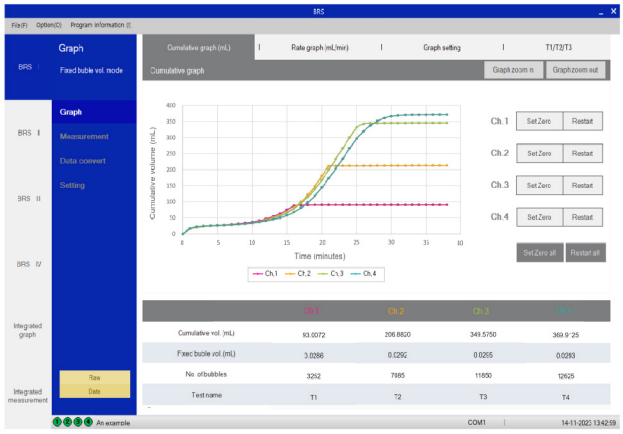
Theory

- The gas that is finely generated from a reactor will turn into a bubble shape in a BRS cell which is filled with oil.
- Cumulative volume of gas generated is measured in two ways.

  1) calculating the total amount of gas by fixing the bubble volume and multiplying by the number of bubbles. (BRS-110, BRS-200 and BRS-800)

  2) calculating the total amount of gas by adding the volumes of each generated bubble, which is calculated using the time (T1, T2) taken by each bubble to pass through low and high sensor. (BRS-110 and BRS-200)





Korea patent

10-1244713(Respirometer)

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Features

- The device can be used for both aerobic and anaerobic operations for wastewater studies.
- The device can be also used for biogas production, biomethane potential (BMP) analysis, or green energy studies (CO_2, CH_4, H_2 and N_2).
- Up to four devices can be connected to a common computer, supporting up to 16~32 channels.
- The device uses temperature-based calibration to ensure accurate gas measurement.
- After measurements, the time interval of gas production/consumption volume data can be changed by changing Cumulative Time in Data Convert.
- An incubator or a water bath having magnetic stir plate can be used to maintain water temperature (0~50℃).
- Measuring resolution (bubble volume) is very small (0.03 mL for BRS-110 and BRS-800, 0.15 mL for BRS-200).
- Bioreactors having volumes of 125, 250, 500, 1000 mL (BRS-100 and BRS-800), and 2~10 L (BRS-200) can be used.

	BRS-110	BRS-200	BRS-800
No. of channels	4 channels (expandable 16 channels in a computer)	4 channels (expandable 16 channels in a computer)	8 channels (expandable 32 channels in a computer)
Flow rate	0~1 mL/min	1~5 mL/min	0~0.2 mL/min
Measuring resolution	Approx.0.03 mL	Approx.0.15 mL	Approx.0.03 mL
Measuring interval	1 sec~10 hours(changeable)		
Gases	O_2 (OUR), CO_2, CH_4, H_2, and N_2		
Calibration error	≤ 1%		
Data output	USB		
Power input	DC 12V, 3.5A		
Weight	1.5 kg	1.9 kg	1.7 kg
Size	190(W)*130(D)*110(H), mm	200(W)*140(D)*120(H), mm	200(W)*140(D)*120(H), mm
Temperature	0~50℃		
Humidity	≤ 95%		
Material	Aluminum and acrylic		

Installations : Qatar University, Penn State University, KAIST, UNIST, Korea Institute of Energy Research, Kwangwoon University, Korea Institute of Ceramic Engineering and Technology, Pusan National University, Gyeongsang National University, etc.

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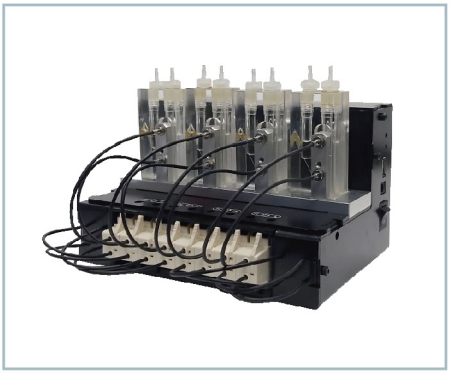
BRS-110, BRS-200, BRS-800, Accessories

BRS-110

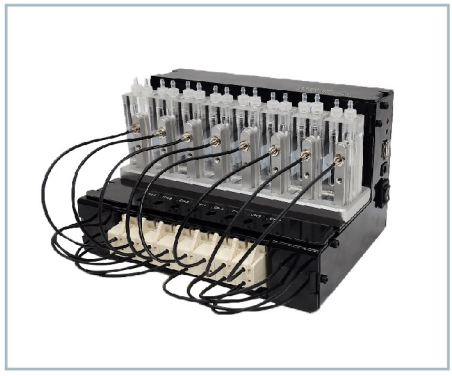


- measurable flow rate
  0~1 mL/min

BRS-200

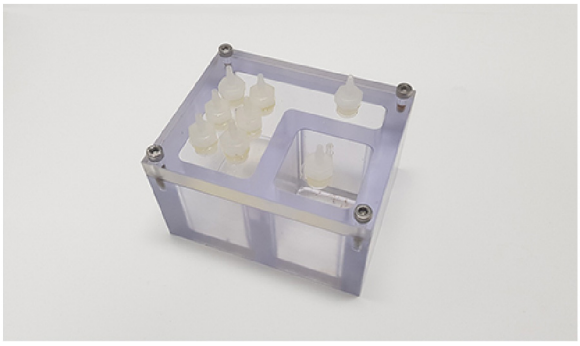
- measurable flow rate
  1~5 mL/min

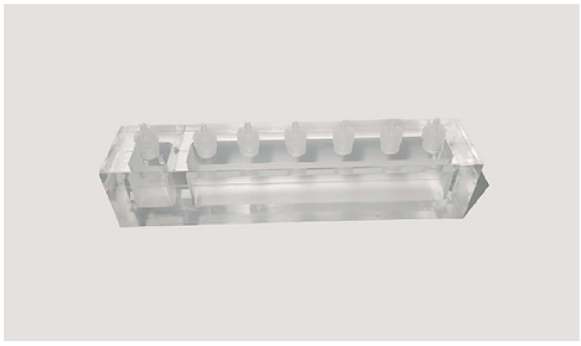
BRS-800



- measurable flow rate
  0~0.02 mL/min

Pure O_2 supply unit





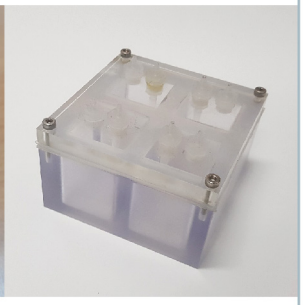
- Supplying pure oxygen to the reaction vessel during an oxygen consumption experiment

Flow measuring cell

BRS-110 BRS-200

- generated biogas is emitted in the form of bubbles as it passes through the oil filled in the measuring cell

CO_2 trap



Internal CO_2trap External CO_2trap

- remove CO_2

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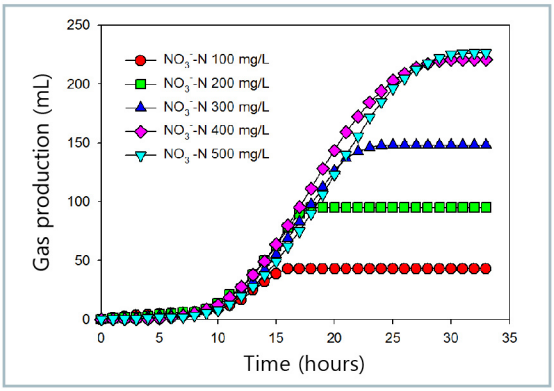
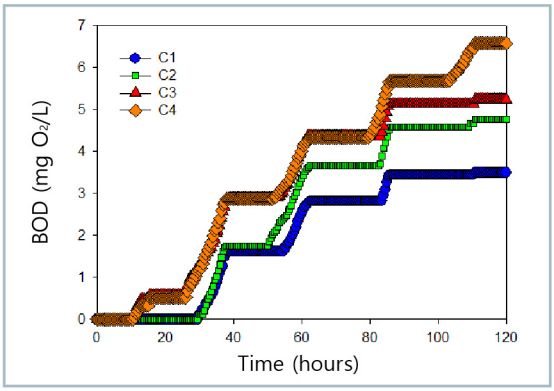
Applications

- Measurement of oxygen consumption
- Oxygen uptake rate (OUR)
- Toxicity screening
- Biodegradation test
- Treatability assessment
- Laboratory respiration studies
- Soil and compost respiration
- Biogas production
- Repiration of plants/animals
- BMP test
- Biochemical hydrogen potential
- Green energy studies

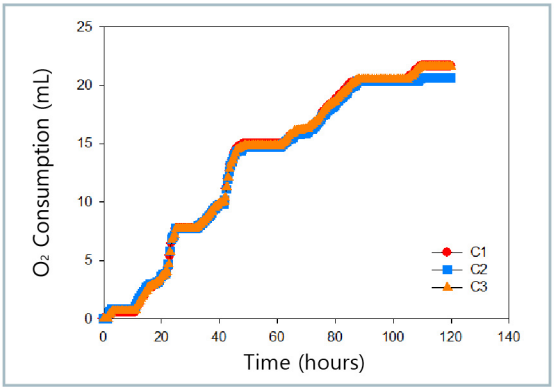
Denitrification



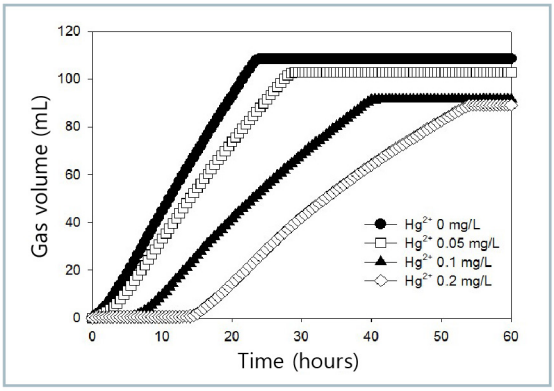
Biochemical oxygen demand (BOD)



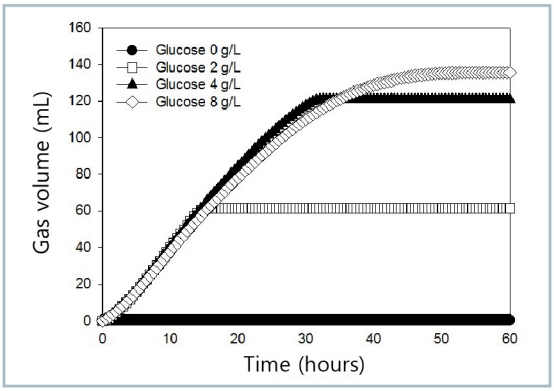
O_2 consumption



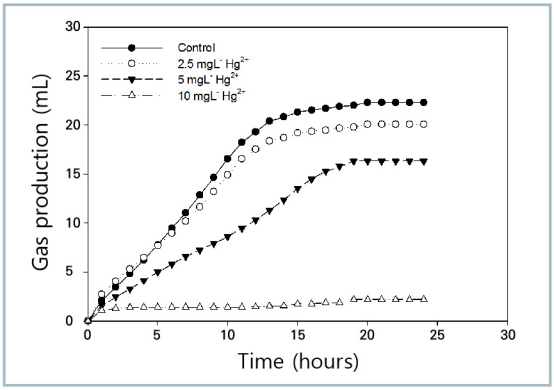
Toxicity test with sporeforming bacteria



Hydrogen gas production



Toxicity test with algae



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