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IO cells

An easy-to-operate field instrument for checking ballast water

- Fast & simple measurement of living cells in water
- Direct measurement without preparation

10cells

An instrument for the measurement of living algae cells in a water sample

Ballast water is essential for the stability and manoeuvrability of ships cruising the seas. Marine plants, algae, animals, and microbes cross the oceans in the ships' ballast water. Discharged at the port of destination, these organisms are released into a different environment. Here they act as invaders which can seriously disrupt the indigenous ecology with negative consequences for the economy.

Regulations regarding ballast water discharge were implemented by the International Maritime Organisation (IMO) in September 2017 (IMO Regulation D-2). The US Coast Guard issued similar ballast water discharge regulations in 2012 (33 CFR Part 151, Subparts C and D). According to both sets of regulations, all ships operating in international waters must install a certified ballast water treatment system. Within the size class of organisms from 10 µm up to 50 µm, the D-2 standard and USCG regulation require vessels to discharge less than 10 living organisms per ml.

Verifying compliance with these standards requires suitable and practical instrumentation. The challenge lies in detecting a very low number of organisms in a large volume of water.

The largest amount of biomass (> 80%) in ballast water consists of phytoplankton – especially microalgae. Therefore, algae are an ideal parameter for ballast water quality control. An algae measurement will serve as an indirect test of a representative sample and is accepted by the IMO as an indicative analysis of ballast water.

bbe Moldaenke GmbH is a leading manufacturer of algae measuring devices. With decades of experience in this field, bbe is proud to introduce the development of the ultrasensitive 10cells method. The bbe 10cells is a light-weight field instrument for the quantification of living cells in ballast water before and after any ballast water treatment.

An instrument for …

- the measurement of living algae cells
- compliance with IMO D-2 regulations
- measurements without chemical pre-treatment
- quick indicative analysis
- deployment on ships, in harbors
- mobile and easy use in the field or in the lab

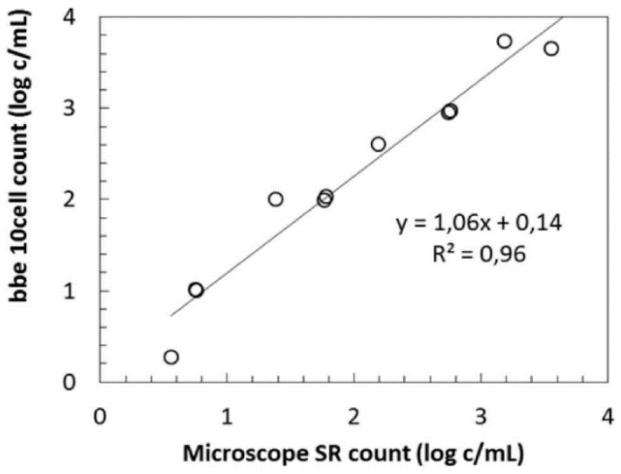
Filter strip with sample water is analysed within just a few seconds

The 10cells comes in a robust case, perfect for the onboard operations

10 cells

Suitable measures such as ballast water treatment have to reduce the biomass in the transported water. The acceptable threshold is 10 cells/ml or less. The verification of the measures requires suitable and practical instrumentation.

The 10cells method has been verified by comparison measurements with different laboratory methods, for example by the independent **BWMS-certifier NIOZ**:



This graph shows the clear relationship between the microscopic count and the 10cells measurement (culture: Thalassiosira weissflogii)

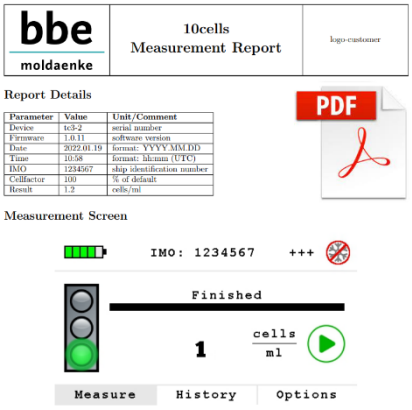
The measurement is based on the natural fluorescence of algal cells. This fluorescence reflects the functionality and the health of the algal cell. With this method, a modified PAM* excitation, a remarkable resolution of 1 living cell per ml could be achieved, which allows the compliance with the IMO D-2 standard of 10 cells/ml to be reliably determined.

After the quick filtration of a 10 ml volume with a syringe the measurement of the algae on the filter takes less than one minute. No further sample preparation is needed. Simply turn it on, put the sample in, start the measurement and read the result. A traffic light clearly indicates compliance or non-compliance. The instrument is designed for harsh conditions on board or in the field.

* PAM = pulse amplified modulation

Features

- most sensitive device on the market
- detection limit of 1 living cell/ml
- measuring time less than 2 minutes
- robust and easy handling
- 4.3" TFT screen
- mobile use - powered with internal batteries
- NOW! With PDF report printing incl. own logo



PDF report and screenshot of results

Accessories for the preparation of the measurement

IO cells

- Tested on a ballast water analysis cruise (Meteor cruise M116/2)
- Linear over a large concentration range
- Verified by microscopy
- Best equipment for the size range between 10 µm and 50 µm
- Used by BWMS industry for treatment optimisation
- Used for BWMS compliance certifications
- Tested by port authorities

Specifications

DESCRIPTION	VALUE
Measurands	living algae cells/ml
Measuring range	1 – 20,000 cells/ml
Resolution	1 cell/ml
Weight	2.5 kg
Dimensions (H x W x D)	25.8 x 24.3 x 11.7 cm
Power supply	110/240 V – 50/60 Hz, internal rechargeable batteries
Protection class	IP20
Interface	USB
Storage temperature	5 – 55 °C
Environmental temperature	5 – 35 °C
Data capacity	> 5 Mio. Data sets
Power supply	Lithium rechargeable batteries
Battery life	> 300 measure cycles per charge

The bbe 10 cells was verified in June 2015 on board the research vessel "Meteor" during a voyage through the North Atlantic.

Do you have any questions? Please contact us!

Your local representative

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