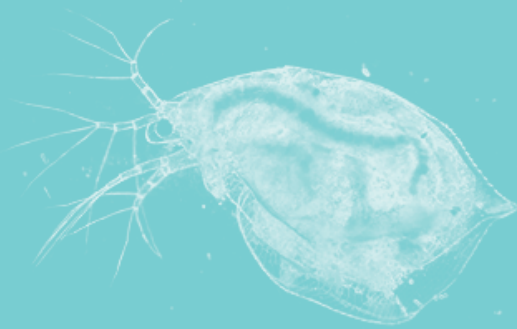


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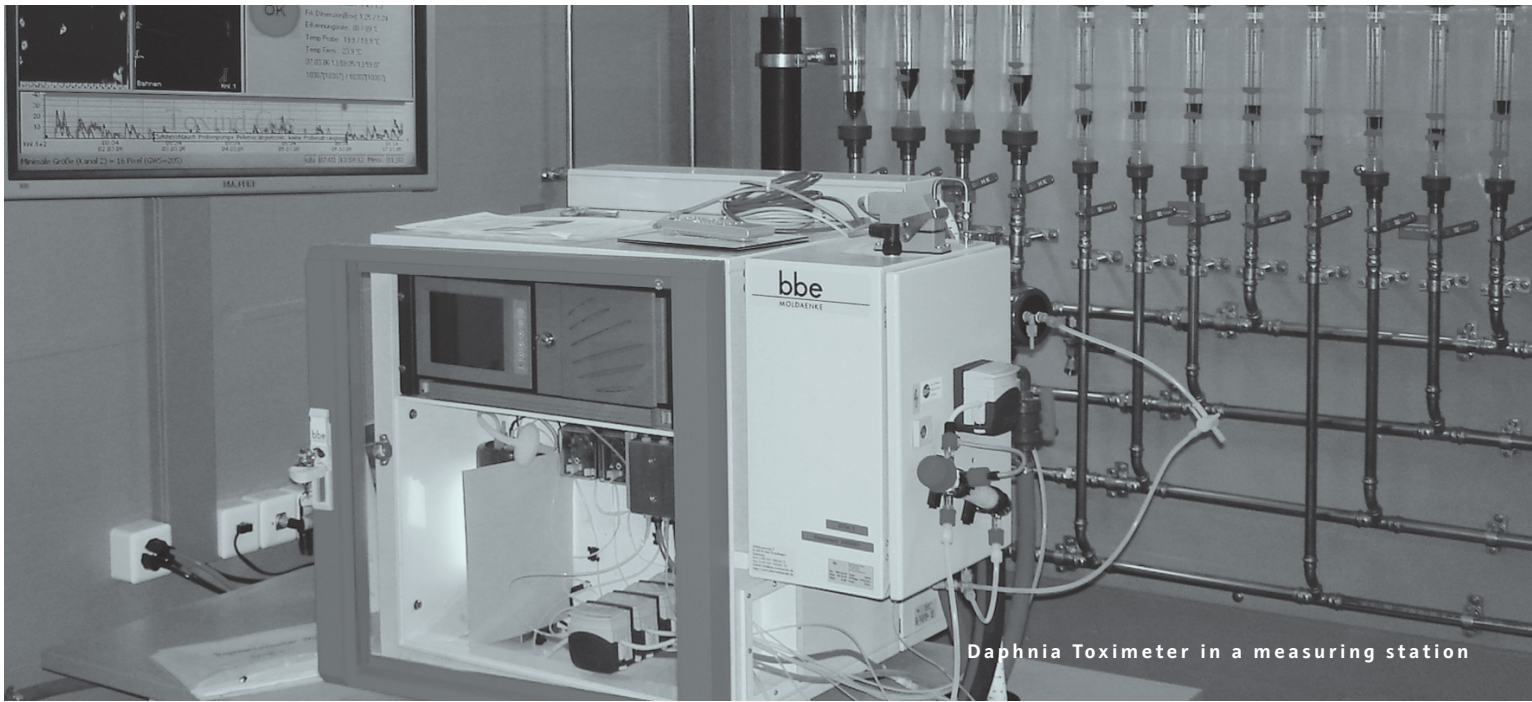


Daphnia Toximeter



**A powerful instrument
for water toxicity assessment**

continuous visual analysis of daphnia behaviour



The bbe Daphnia Toximeter observes daphnia online

Daphnia are established test organisms to indicate water quality. The bbe Daphnia Toximeter observes daphnia under the influence of a constantly running sample water. bbe developed the 24/7 sensitive method to detect hazardous compounds in water from rivers (source-water protection), plants, distribution systems and production drains to preserve human health and to monitor water. The instrument is also designed as an early warning system to rapidly detect the entire range of dissolved toxic compounds including pesticides, neurotoxins and warfare agents. Thus it is well suited to detect wilful (terrorist attacks) or negligent incidents (spills, accidents). The bbe Daphnia Toximeter can also be used for long-term monitoring for the “strategic” evaluation of water quality and as a valuable tool in hazard management. The bbe Daphnia Toximeter has been deployed worldwide now for over 10 years.

Mobility and Agility of daphnia



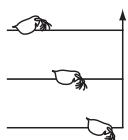
Speed: average velocity and distribution



Fractal dimensions: curviness and angle



Distance and grouping



Swimming height



Daphnia growth

Shading: time index and distribution

Measurements

The method of image analysis enables a series of measurement methods and plausibility tests to assess the daphnia behaviour using different criteria.

Speed measurements:

- average speed
- speed distribution

Behaviour observation:

- swimming height
- fractal dimension - measurements for turns and circling movements, curviness

Growth observation:

- determination of daphnia size

Location:

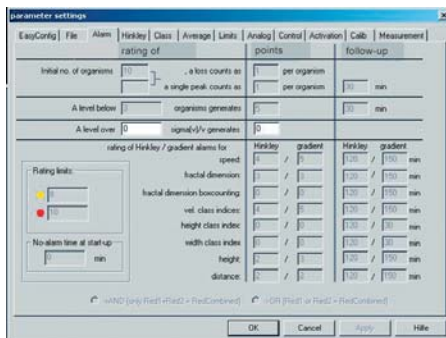
- no. of daphnia
- distribution in chamber

Get to know your waters by rapid in situ profiles

Toxicity Index

The concept of the toxicity index is based on the evaluation of certain measurands, such as swim speed or height, and changes in these measurands.

Only if more than 2 of the measurands simultaneously show unusual results within a fixed period of time does the Daphnia Toximeter trigger an alarm. Due to a dynamic alarm threshold an increase in daphnia size (growth) does not affect the alarm.



Weighting of the toxic alarm

Operation

Sample water (0.5-2 l/h) continuously runs through the measuring chamber containing the daphnia. The live images obtained using a CCD-camera are evaluated online with an integrated PC in order to analyse changes in behaviour. If this change is statistically significant, an alarm is triggered.

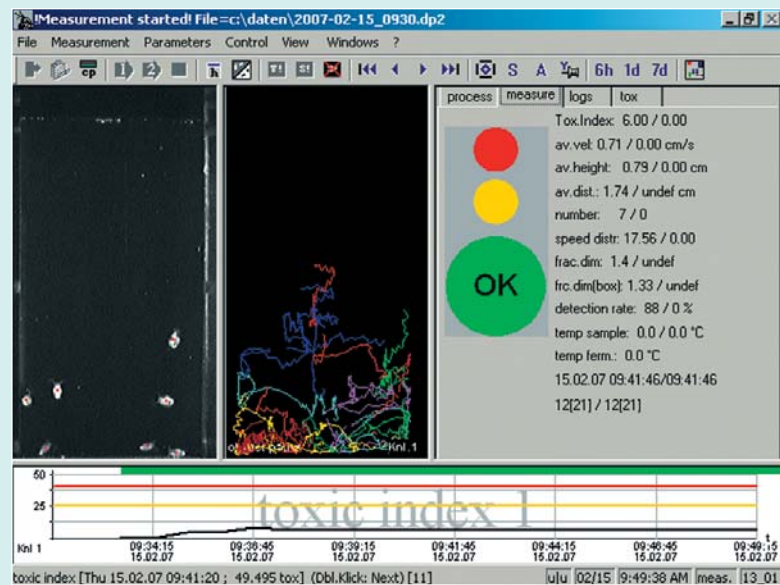
Depending on the physical properties of the water flow, the incoming water may be subject to sample preparation. The bbe WaterConditioner filters the sample to remove suspended matters, heats the sample to an appropriate temperature to remove dissolved air, and has a high-pressure "back flush" option for sample water with high turbidity.

Remote access software enables direct control of the Daphnia Toximeter via remote PC and telephone lines. Readout, operational check and parameter adjustment can be performed by the user or by bbe as part of our support service.

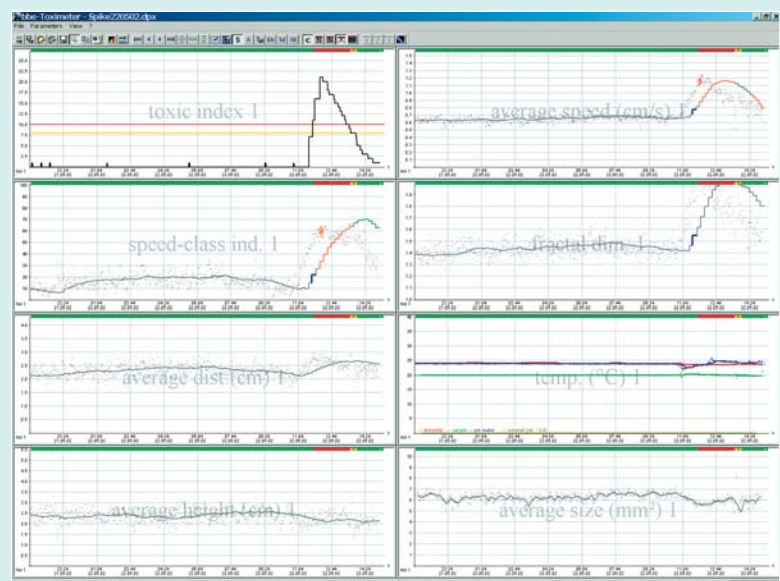
Software

The bbe alarm software is used to record and analyse the data. The most important features are...

- determination of different behavioural patterns
- alarm analysis
- saving of data and parameters
- graphic display of all measurement values
- online display in LAN
- calibration of the instrument
- parameterisation of the measurements
- data export to Excel or text files
- print function



Live picture and trace image screen



Graphic display for data evaluation



Applications

- drinking water supply
- dam monitoring
- waterway analysis and assessment
- general environmental monitoring
- intake assessment
- toxicological evaluation
- limnological work
- research and education



Toximeter with conditioner unit

Features

- 1- or 2-chamber systems with up to 10 daphnia each
- integrated algae fermenter (constant supply) for daphnia feeding
- compact housing: IP54 security protection class
- separate compartment for flow-through cell and electrical components



- integrated PC with keyboard, touch pad and monitor
- WinXP, with graphic display, live pictures and intuitive user guidance and CD-RW
- alarm evaluation by the approved software provided by bbe Moldaenke
- elimination of disturbing air bubbles
- hardware diagnosis

Specifications

Daphnia Toximeter

Measurement procedure	video image analysis
Housing material	varnished steel plate
Weight	60 kg*
Dimensions	(H x W x D) 620 x 620 x 600 mm*
Protection class	IP54
Mains supply	110/240 V 50/60 Hz
Power consumption	600 W
Sample temperature	0 - 30 °C
Water requirement	60 l/h
Maintenance interval	≥ 7 days
Sample inflow	free inflow/tube pump
PC system software	OS Windows XP Prof.
Outputs	modem, LAN, analog output 4-20 mA (2 X), relay output (2 X), RS232

* without WaterConditioner

Subject to alteration!

Your local bbe dealer...

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