

# The Fish Toximeter

Continuous video analysis of fish behaviour for toxicity detection

The bbe Fish Toximeter observes fish under the influence of a "sample" water stream. It is a sensitive instrument for the detection of toxic compounds in water bodies such as rivers, water treatment plants intakes and sewers. The instrument is based on a development of the Extended Dynamic Daphnia Test (EDDT), a proven method used widely in Europe and other parts of the world.

Continuous biological monitoring with the bbe Fish Toximeter enables rapid detection of toxic substances in water and provides an online real-time early warning system. The relative magnitude and presence of the toxic substances is recorded by the instrument to enable further analysis. This unique instrument thus enables supervision and control of water sources in order to detect, record and respond rapidly to incidents of toxic pollution and contamination.

The Fish Toximeter is well-suited to the detection of wilful or accidental damage to water systems such as the drinking water supply. The bbe Fish Toximeter is capable of long-term monitoring during the "strategic" evaluation of water quality.



**Toxic Index:** an index of detection parameters



**bbe Fish Toximeter:** for detection of a wide range of toxins

## Online evaluation

Live video camera images are recorded by a digital camera and analysed online by an integrated PC accessible via a touchscreen built into the front panel.

The behaviour of the fish is examined and analysed for sudden changes and a number of combined parameters, the so-called "toxic index", are calculated continuously allowing statements regarding the changes in water quality superior to other methods.

The continuous visual analysis of

movement enables rapid assessment of the fish's behaviour and health. Toxicity computations and assessments are based on measurements of the following surrogate parameters.

### Measurands

- speed (velocity and distribution)
- swimming height
- fractal dimension (angle, curviness)
- distance and grouping
- growth
- number of fish

## The bbe software

The integrated software recognises significant changes in the behavioural data of the fish obtained from the observations and recording of the fish's movements. Toxic events are clearly indicated as "alarms". A statistical approach enables alarm recognition even under difficult real-world conditions such as "noise" or slow drift in the measured curve(s). The sensitivity of the alarm can be pre-defined or easily adjusted based on the specific application. The bbe software is an approved system and already in use with other online toxicity assessment systems.

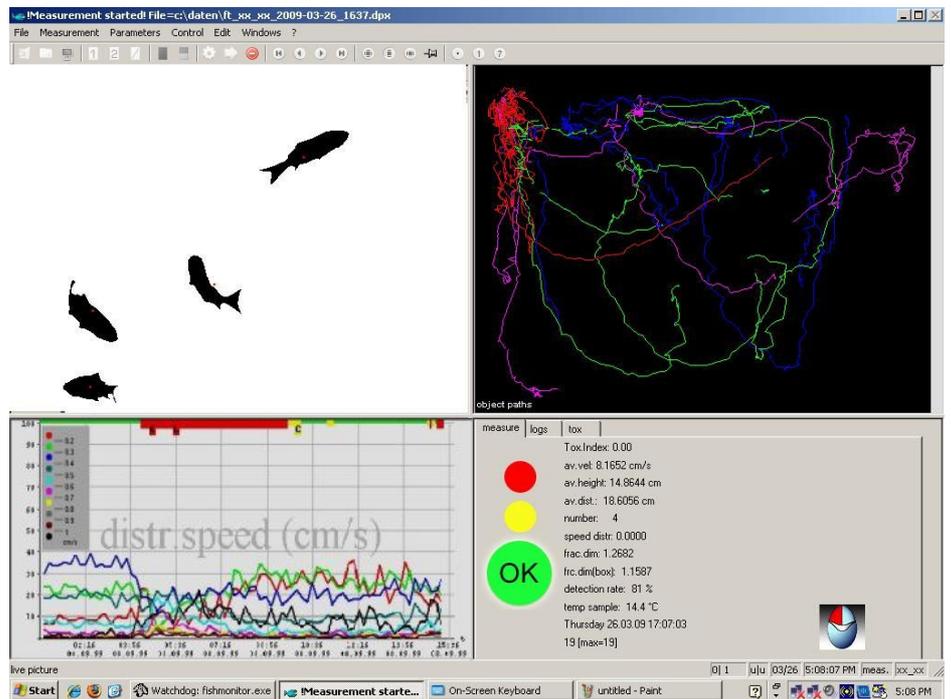


Aquarium and camera chamber

## Easy to operate

The bbe software contains all the components necessary to operate the toximeter under Windows. The 17" touchscreen PC provides a graphic display of the measured results with live, offline viewing and an intuitive user interface. Fish tanks, tubes, connectors are easily accessible for low maintenance.

## Your local representative...



Screenshot of bbe Fish Toximeter software

## Technical Data

Housing	carbon fibre with glass aquarium LED illumination
Aquarium	27 litres
Weight	50 Kg
Size (H x W X D)	1000 x 780 x 660 mm
Power supply	110/230 V @50/60 Hz
Power input	400 Watt
Recommended temperature	5 - 35° C
Turbidity	< 40 FTU
Flow rate	50 - 150 l/h
Protection class	IP54
Outputs	2 x 24V/1A contacts
Interfaces	LAN, USB, FireWire
Maintenance interval	> 14 days
Number of fish	6 - 8
Size of fish	4 - 6 cm
Recommended species	tiger barb, or other (local) fish depending on water temperature at site
PC	17" touchscreen, Windows XP Professional
Optional features	dechlorination system, remote operation audio/visual alarm indicator
Optional interfaces	RS232, MODBUS, 2 x 4-20mA