

BAROXYMETER

Rapid Toxicity Detection of Waste Water

The Baroxymeter is a portable respirometer for the detection of toxicity in waste water. It measures the respiration (oxygen consumption) of bacteria when mixed with a sample of liquid. If the sample is toxic, respiration is inhibited and this inhibition is quantified and displayed by the instrument. Typically, a 0-20% respiration inhibition denotes a non-toxic sample, a 20-40% respiration inhibition denotes a suspect sample and a >40% respiration inhibition indicates a toxic sample.



The Baroxymeter is designed for semi-quantitative toxicity analysis of waste water and can give results within 10-30 minutes depending on the application. It is **rapid, robust, portable, simple** to use and **flexible** to operate. It can be programmed and customised for a range of applications and it is particularly suitable for testing in remote locations. In laboratory trials the Baroxymeter was highly effective in detecting toxicity from a variety of substances (Table 1).

Table 1: Toxicity detected by the Baroxymeter

Substance	Concentration
Dimethoate (garden insecticide)	230mg/l*
8-Hydroxyquinoline (fungicide)	1 mg/ml*
Bronopol (antimicrobial agent)	55 mg/l**
Copper	560 mg/l**
Mercury	15 mg/l**
Zinc	43 mg/l**
Silver, colloidal	9 mg/l**
Chromium	625 mg/l**
Nickel	155 mg/l**
3,5-Dichlorophenol	10 mg/l**
2,4-Dichlorophenol	31 mg/l**
4-Nitrophenol	42 mg/l**
Formaldehyde	16 mg/l**

*limit of detection **EC₅₀ (The Baroxymeter has been evaluated by the Environment Agency)



Comparative trials of the Baroxymeter with a routine laboratory-based respirometer (Strathkelvin Instruments) have been performed with BIFFA, a UK waste treatment and disposal company that handles a variety of potentially toxic industrial wastes. These trials indicate that the Baroxymeter can perform rapid, on-the-spot toxicity tests with results comparable to standard laboratory-based methods (Table 2). In addition, the Baroxymeter has proved useful in determining a suitable dilution for toxic waste water.

Table 2: Baroxymeter vs Strathkelvin respirometer. Comparative toxicity testing results; location: BIFFA

Sample	Dilution	Respiration inhibition (%) BAROXYMETER	Result (BAROXYMETER)	Result (STRATHKELVIN)
B 22231	0	9	PASS	PASS
B 22232	0	15	PASS	PASS
B 22237	0	100	TOXIC	TOXIC
B 22237	1:10	0	PASS	PASS
B 22247	0	110	TOXIC	TOXIC
B 22247	1:10	22	PASS	PASS
B 22246	0	0	PASS	PASS
B 22039	0	71.5	TOXIC	TOXIC
B 22039	1:10	4	PASS	PASS
B 22202	0	14	PASS	PASS
B 22191	0	73.8	TOXIC	TOXIC
B 22191	1:10	0	PASS	PASS
B 22097	0	93.7	TOXIC	TOXIC
B 22097	1:10	0	PASS	PASS
B 22080	0	0	PASS	PASS

The Baroxymeter is a valuable tool for organisations concerned with treatment and disposal of waste water, such as:

- Water Companies
- Waste Treatment Companies
- Waste Producers (pharmaceutical, chemical, food and agricultural companies)
- Government Agencies

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