

EASYCHEM TOX On-Line

DISCRETE ANALYZER FOR THE COMBINED MEASUREMENT OF ACUTE TOXICITY AND CHEMICAL PARAMETERS IN WATER

As a result of years of intensive research and development activities, Easychem TOX on-line is an original direct reading multi-parametric analyzer based on discrete analysis technology, for fully automated toxicity measurements of water samples using live cultures of luminescent bacteria, combined with the quantitative measurement of chemical parameters applying standard spectrophotometric / fluorimetric methods.



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EASYCHEM TOX on-line is a discrete automated platform equipped with color touchscreen LCD and housed in an industrial cabinet, comprising two refrigerated compartments, one for bacteria and the other for reagents, calibrants and controls. A mechanical arm for aspiration, transferring and dispensing of reagents and samples and a thermostated reaction plate with 80 positions are incorporated with a luminometer, a spectrophotometer and/or a fluorometer, integrated with an automated cuvette washing station.

ON-LINE TOXICITY MEASUREMENTS WITH LUMINESCENT BACTERIA

In order to enable an extended time of use of rehydrated cultures by up to ten days, proprietary bioluminescent bacteria were selected, grown, stabilized and lyophilized according to standard methods. Thus, for the required period, the microorganisms preserve a measurable bioluminescence signal and an unaltered sensitivity to different types of reference compounds defined in ISO standards, such as zinc sulfate, potassium dichromate and 3,5-dichlorophenol. The system is programmed to manage three bacterial vials in succession, thus enabling up to one month of unattended operation.

FULLY AUTOMATED FOR UNATTENDED TOXICITY MONITORING

Timing and frequency of analytical cycles, limits and parameters of quality controls are programmable by the operator and managed automatically. The continuous measurement of blanks and samples at pre-defined time intervals of about 40 seconds, results in the generation of inhibition kinetics, which allow to achieve, from the very beginning of the analysis, preliminary information on the level of sample contamination. Following a toxicity alert, the system is able to react immediately by automatically replicating samples and performing control checks to confirm identified toxicity, significantly reducing the occurrence of false positives.



MULTIPARAMETRIC ON-LINE ANALYSIS OF CHEMICAL PARAMETERS

With regard to the spectrophotometric analysis, the on-line analyzer can be configured to automatically measure up to 10 chemical parameters (15 without toxicity), using standard methods and including complex procedures such as the determination of total phosphorus and/or total cyanides, which are performed by means of multichannel external pretreatment modules, complete with a filtration system.

SEVERAL DATA INTERFACE AVAILABLE AS STANDARD

EASYCHEM TOX on-line provides local data storage via serial RS-232 with separate analog outputs 4-20 mA, remote data storage on a web server and data transmission via ftp, http and SMS. An immediate alert service is available in case of detected non compliances. Finally, the management software allows the integration of different instrumentation, thus realizing a truly integrated monitoring station, combining chemical and toxicological on-line control of water samples.

DIRECT READ: MORE SIMPLICITY & SECURITY

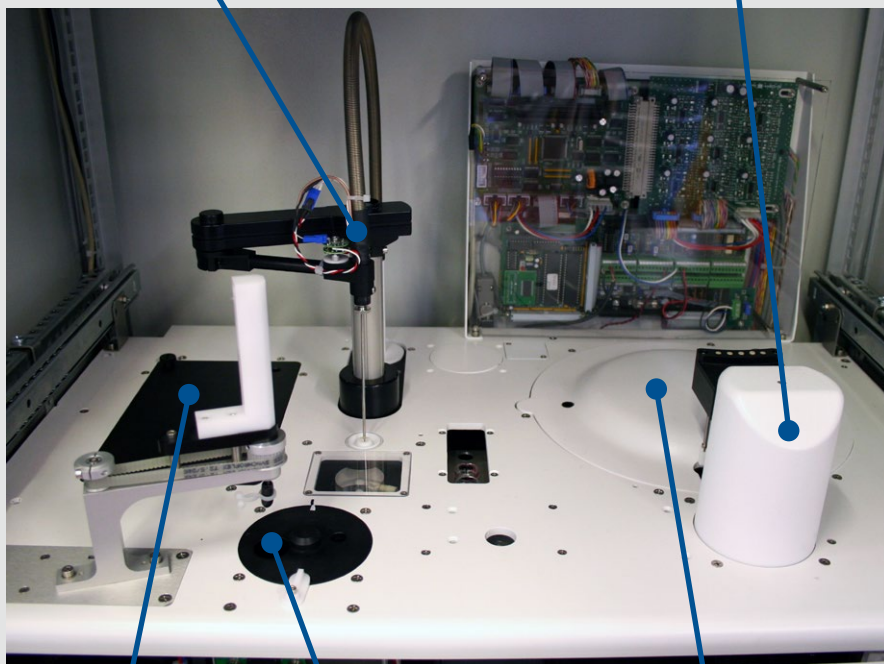
Easychem TOX on-line utilizes direct read luminometer utilizing a true discrete, direct read measurement system and reusable, high purity synthetic optical cuvette system eliminating compromised sample measurement.

SMARTWASH: ELIMINATE CARRYOVER DURING SAMPLING

- Level sensor makes probe washing easy, with a standard 2 mm immersion depth
- Probe cleaned after every liquid contact - prevents cross contamination and carryover
- Potential contaminants go the way they need to flow – out of the sample probe!
- Three stage process: clean the inside of the probe, clean the washing well, then clean the outside

Micro pipettor-dilutor

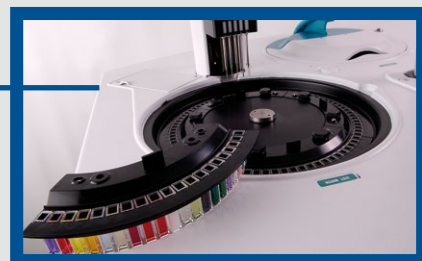
Washing station Smartwash



On-board reagents (up to 36 reagents)



Refrigerated compartment for 3 vials of Lyophilized Bacteria



Long-life cuvettes with integrated vials

SAMPLE LOADING

- Five separated sample inputs, to be connected to external sample pretreatment units according to the required tests and water sample matrix to be measured (homogenizer, 25 microns filtration, 0.2 microns filtration, UV/HT digester, distillator)

CUVETTE QUALITY ASSURANCE SYSTEM: ELIMINATE CARRYOVER DURING ANALYSIS

- Automated cleaning eliminates carryover in the cuvette
- Optical integrity of each cuvette quantitatively verified before each use
- Provides an infinite number of reaction vessels for analysis
- Economical: long lasting cuvettes
- Environmentally friendly: minimize hazardous waste and solid wastes
- No operator intervention required!

LUMINOMETER

- High resolution, digital photon counter
- Low dark current

COMPUTER CONTROLLED MICROPIPETTOR

- Accurate and precise dispensing of all liquids
- Automatic probe washing between each sampling cycle
- Microlitre reagent and sample consumption
- Liquid level sensor provides warnings for low reagent and sample levels

USER FRIENDLY SMARTSTART SOFTWARE



The Easychem TOX on-line operating software runs under Windows XP or Windows Vista. Its bright graphical user interface simplifies routine work and offers the operator a concise guide through the operating functions.

Sample analysis

- Up to 10 different dilutions programmable per sample.
- Up to 4 different dilutions programmable per test.
- All measurements of blanks and samples at the different dilutions performed in duplicate.
- Real time calculation of all parameters required by UNI EN ISO 11348-3 - Determination of the inhibitory effect of water samples on the light emission of *Vibrio fischeri* (Luminescent bacteria test) - Part 3: Method using freeze-dried bacteria.
- Inhibition of light emission at 5, 15 and 30 minutes.
- Deviation from mean of blank duplicates.
- Deviation from mean of parallel determinations of sample inhibition values.
- Stability of blank curves.
- Graph showing kinetic curves representing light emission measurements of blank and samples every 30 - 40 seconds. All measurements values enclosed in a table.
- Graph showing kinetic curves representing mean light emission measurements of blank and sample duplicates every 30 - 40 seconds. All mean measurements values enclosed in a table.
- Graph showing kinetic curves representing mean light emission inhibition measurements of sample duplicates every 30 - 40 seconds. All mean light emission inhibition measurement values enclosed in a table.

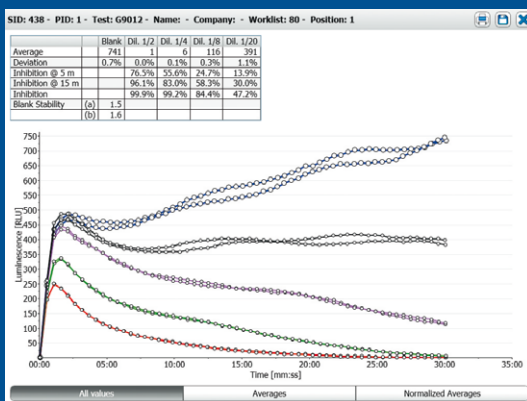


Fig.1. Example of a sample analysis performed at four different dilutions (1/2, 1/4, 1/8, 1/20)

Control analysis

- The analyzer is programmed to perform inhibition test of any of the three positive controls required by UNI EN ISO 11348-3, 2.2 ppm zinc (II), 3.4 ppm 3,5-dichlorophenol and 18.7 ppm chromium (VI).
- All measurements of blanks and controls at the required concentration performed in duplicate.

MONITOR SCREEN

- Real-time presentation of sample and reagent status
- Dynamic monitoring of test execution
- Analyzer temperature control, START, STOP, and PAUSE functions

METHODOLOGY PROGRAMMING

- All method parameters are completely user programmable
- All settings are user programmable
- User defined instrument factors
- User selectable dilution ratio
- User selectable samples re-run option
- Tests calculation models are user selectable

GRAPH SCREEN

- Display of test reaction curves
- Display of positive controls

DIAGNOSTIC SOFTWARE

- Each instrument part can be singularly tested
- Remote diagnostic capability

MORE FEATURES

- Multilanguage files (user programmable)
- Bi-directional communication compliant with LIMS standard
- Traceability and lot management

READY TO USE REAGENTS

- Developed specifically for the EASYCHEM analyzers
- A full range of reagents for Environmental analysis
- Complete range adapted to all parameters
- Save time
- Save money
- Simple
- Ready to use



We have created Selection, a full range biological assay and reagents dedicated to Easychem discrete analyzers.

Developed, tested and validated by our application laboratory, they will guarantee a perfect stability and reproducibility of your analyses.

Easy to use, they are supplied liquid or lyophilized, in specific bottles directly positionable Easychem.

Thus, this ready solution greatly simplifies the preparation of your analysis, facilitates the use and storage of reagents. It also secures yours analyzes with reagents adapted

REAGENTS FOR ACUTE TOXICITY

- Rehydration buffer
- Reagent A (bacteria)
- Acute test buffer
- Control Zn (II)
- Control DCP
- Control Cr (VI)



MAIN PARAMETERS

Acute Toxicity Test

Acute toxicity test evaluates the effects on living organisms, generated by toxic substances contained in the sample, thus providing an early warning. The most common toxicants, among the thousands that can be present in the samples, are the following :

- BIOTOXINS
- HEAVY METALS
- HERBICIDES
- OIL CONTAMINANTS
- PCBs
- PESTICIDES
- POLYCYCLIC AROMATIC HYDROCARBONS (PAHS)
- ...

Chemical Parameters

Basic methods

- ALKALINITY
- ALUMINUM
- AMMONIA (COLORIMETRIC)
- AMMONIA (FLUORIMETRIC)
- BORON
- CADMIUM DISSOLVED
- CALCIUM
- CHLORIDE
- CHLORINE
- CHLORINE TOTAL & FREE
- CHROMIUM 6+
- COD (UV DIRECT READING)
- COLOR
- COPPER
- CYANIDE INDEX
- ETHYLENE GLICOL
- HARDNESS
- HYDRAZINE
- IRON TOTAL DISSOLVED
- LEAD DISSOLVED
- MANGANESE
- MERCURY
- MONOCHLORAMMINE
- NICKEL
- NITRATE (HYDRAZINE REDUCTION)
- NITRITE
- PHENOL INDEX
- PHOSPHATE
- SILICATES
- SULFATE
- SULFIDE
- ZINC

Methods requiring sample digestion

- CADMIUM TOTAL
- CHROMIUM TOTAL
- COPPER TOTAL
- IRON TOTAL
- LEAD TOTAL
- MANGANESE TOTAL
- NICKEL TOTAL
- NITROGEN TOTAL
- PHOSPHORUS TOTAL
- ZINC TOTAL

Methods requiring distillation and/or special digestion

- CYANIDE FREE
- CYANIDE TOTAL
- PHENOL VOLATILE

TECHNICAL SPECIFICATIONS

DESCRIPTION	Fully automated, direct read, on-line Discrete analyzer
LUMINOMETER	Photomultiplier tube
PHOTOMETER	Multi-wavelength optics, dual beam, direct reading
MEASUREMENT TYPE	Cyclic
MEASURING INTERVAL	Programmable
TOXICITY KIT	Freezed dried luminescent bacteria, assay buffers and positive controls
COLORIMETRIC KITS	industrially prepared and certified after production
MEASURING TIME	15 minutes (toxicity), chemical parameters according to the specific methods
ON-BOARD REAGENTS	up to 36 reagents can be loaded into the refrigerated compartment in n.2 removable racks with n.16 positions each (20 ml containers) and n.4 extra position for 50 ml containers
ANALOG OUTPUTS	n.8 4-20 mA, expandable, RS-232, optional GSM/GPRS
INPUT SIGNALS	n.8 digital inputs, expandable and configurable
OUTPUTS AND ALARMS	n.8 digital outputs, expandable and configurable, potential free contacts
SAMPLE DELIVERY	n.5 sample wells with overflow updated by internal pumps
SAMPLE TEMPERATURE	8 - 35 °C
REAGENTS AND SOLUTIONS REPLACEMENT	typical 4 weeks
PROTECTION	IP55
HARDWARE	Industrial microcontroller, PC panel with touchscreen graphic display
POWER SUPPLY	24 Vdc, external power supply included; 45 W (mean)
WEIGHT	100 Kg without reagents
DIMENSION	160 (H) x 80 (W) x 50 (D) cm
ANALYZERS RANGE	THE AMS SYSTEA DISCRETE ACUTE TOXICITY RANGE  Easychem TOX for Laboratory (30-min acute toxicity) Up to 45 tests/hour  Easychem TOX On-Line
	NEW: You can order consumables and accessories on our new webshop: www.webshop.ams-systea.com 