

MODERNWATER

Trace Metals

Trace metal monitoring technologies for
field, laboratory and industry



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Modern Water is expert in the design, development and provision of analytical instruments for monitoring trace metals in water, soil, food and industrial process streams. Our systems use solid state electrodes to perform voltammetry for the analysis of metals in solution.

Our trace metal product range includes the portable PDV6000*ultra* and the two on-line, continuous systems: the OVA5000 and OVA7000. Our technology is robust and reliable, can be operated by technicians anywhere in the world and is relatively low maintenance. The portable, laboratory and online systems have a worldwide reputation for quality, reliability and ease of use, enabling customers to monitor pollutant levels, optimise their processes, minimise damage to the environment and protect the health of employees and communities at large.



Trace Metal Monitoring with PDV6000ultra

PDV6000ultra Portable Laboratory Monitor

The PDV6000ultra is an ideal tool for site monitoring and laboratory use, offering an enhanced measurement range and VAS software for real time visualisation of analytical results. Ten standard methods can be stored in the handset for stand-alone use and an unlimited number when used in conjunction with a laptop or PC. The PDV is supplied complete with one set of electrodes, VAS software and a water tight carrying case. Results from the PDV are directly comparable to those obtained from AA and ICP methods.

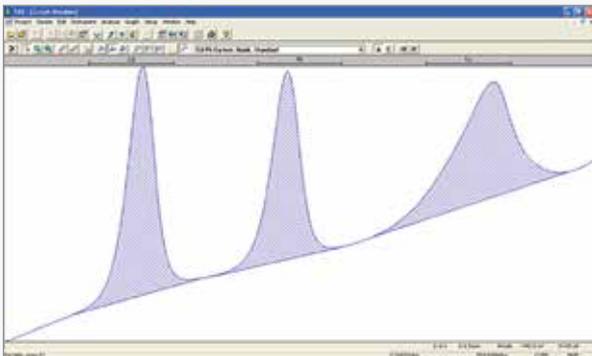
SV LabCell Accessory

The SV LabCell extends the capabilities of the PDV6000ultra and provides lower levels of detection and greater flexibility in analytical methodology. The SV LabCell, which uses bismuth-film electrodes, is designed to replace certain methods traditionally based on mercury film. It enables analysis of molybdenum and uranium and it also provides better detection limits for cobalt, chromium and nickel.



The PDV6000ultra with standard cell

PDV6000*ultra*



The PDV6000*ultra* and VAS Software

The PDV6000*ultra* is supplied with the VAS software package, which provides intuitive operation and is compatible with Windows 7, Vista, XP and 2000. VAS enables storage and manipulation of Voltammograms, operating data and analysis. Using VAS, voltammetric and electrode conditioning parameters are fully programmable and all data is automatically saved. Reports for laboratory records can be printed or exported to spreadsheet readable files. Operating parameters can be uploaded into the PDV6000*ultra* for field use.

PDV product features

- Portable, enabling easy monitoring in remote locations
- Multiple metal analysis when using VAS
- AC or rechargeable battery for onsite use
- Pre-treating with acid and/or external UV can eliminate interferences
- Solid-state robust electrodes and stand provided
- Results stored on PC when using VAS
- Detection limits below 1ppb, depending on sample
- Report generation capability using VAS
- Precision $\pm 5\%$ at 100ppb levels
- Quick and accurate results, allowing defensible real-time decision to be made on-site
- Low running costs and maintenance
- VAS enables automatic data save, print facility for all traces, reports and analytical data, and accurate trouble-shooting via email or Skype



24/7 Online Monitoring with our OVA Systems

The OVA is a fully automated on-line metal monitor, developed as a modular system, to provide continuous or intermittent monitoring of metals in process streams, effluent discharges, river and potable water. The OVA is based on internationally recognised voltammetry (ASV and CSV) technology, which provides quick

and accurate determination of metals at the micrograms per litre level, directly comparable with laboratory analysis using AAS or ICP.

The OVA provides real-time monitoring of several concurrent sample streams, configured to individual customer requirements. Sample pre-treatment may include digestion for elimination of potential interferences, although ASV is not directly affected by sodium, calcium, magnesium, chloride or other salts often present in industrial samples.

Detection parameters - specified metals, sampling regime, detection limits and 'alert' systems, are installed and configured to individual site requirements and can be easily modified to cope with different combinations of metals. Sampling can be programmed to be taken at specified times, on demand or when triggered by an external event. Integration of the OVA in a plant control system allows users full control over the metal content of their process streams, ensuring regulatory compliance for any discharges.



OVA Systems

Ability to react to unexpected events and protect reputation

Should the level of metals in process streams or waste rise unexpectedly, the OVA enables operators to take immediate preventative action and modify their process accordingly and efficiently. These short events would often be missed by laboratory monitoring regimes and only be recognised on final discharge.

Improves treatment efficiency and lowers operating costs

Chemicals are often used to remove metals from process effluent and wastewater. As operators may have limited knowledge of the actual metal concentrations present, these chemicals are often added in excess to ensure regulatory compliance.

Monitoring the metal concentrations using an OVA allows operators to use the optimum amount of chemicals, significantly reducing their costs. The OVA is compatible with most plant control systems, enabling fully automated control of wastewater and effluent treatment, control of buffer capacity and discharge procedures.

Reagents

Modern Water provides a range of standards, electrolytes and other reagents used in the routine operation of both PDV6000*ultra* and the OVA range. The use of these high purity reagents ensures longevity of the electrodes and reliability of the analysis and is an essential part of the equipment warranty.

Our reagents are manufactured under ISO 9001:2008 quality systems and controlled prior to release.



Working with the OVA7000 and OVA5000

The OVA7000

The OVA7000 has a built in PC, which can be controlled either by the top-box touch-screen accessory, a separate VGA screen and keyboard or by a laptop connected via Wi-Fi or LAN. This external control prevents unauthorised users from making any changes. It is housed in a modular cabinet made of durable, light-weight plastic which enables the user to separate the reagent cabinet from the main body of the unit, for easier transportation and installation.

The OVA7000 can run on a lower power 12V DC (or standard 90 – 260V AC) making it the ideal solution for remote locations.

The OVA7000 Dual Cell

The OVA7000 Dual Cell is designed to extend the range of detectable metals in a single unit. It has two analytical cells and each can be fitted with a different electrode, whilst sharing one pre-treatment unit.

Voltammetry methods often require different electrodes in order to optimise the detection of a specific metal. By having this single unit with two electrode sets the Dual Cell allows combinations of metals that would previously have required two separate instruments.

The OVA5000

OVA5000 has a built in PC with an industrial specification keyboard and integrated monitor. It also has a built in DVD drive for ease of storing and backing up results. The extra durable and secure metal cabinet has lockable doors, making the OVA5000 the ideal trace metal monitoring solution where security is an issue.

A range of telemetry options, including 4-20 mA analogue, RS232/485 and LAN allow the OVA5000 to integrate into existing processing systems with ease.

OVA5000 and OVA7000



OVA7000

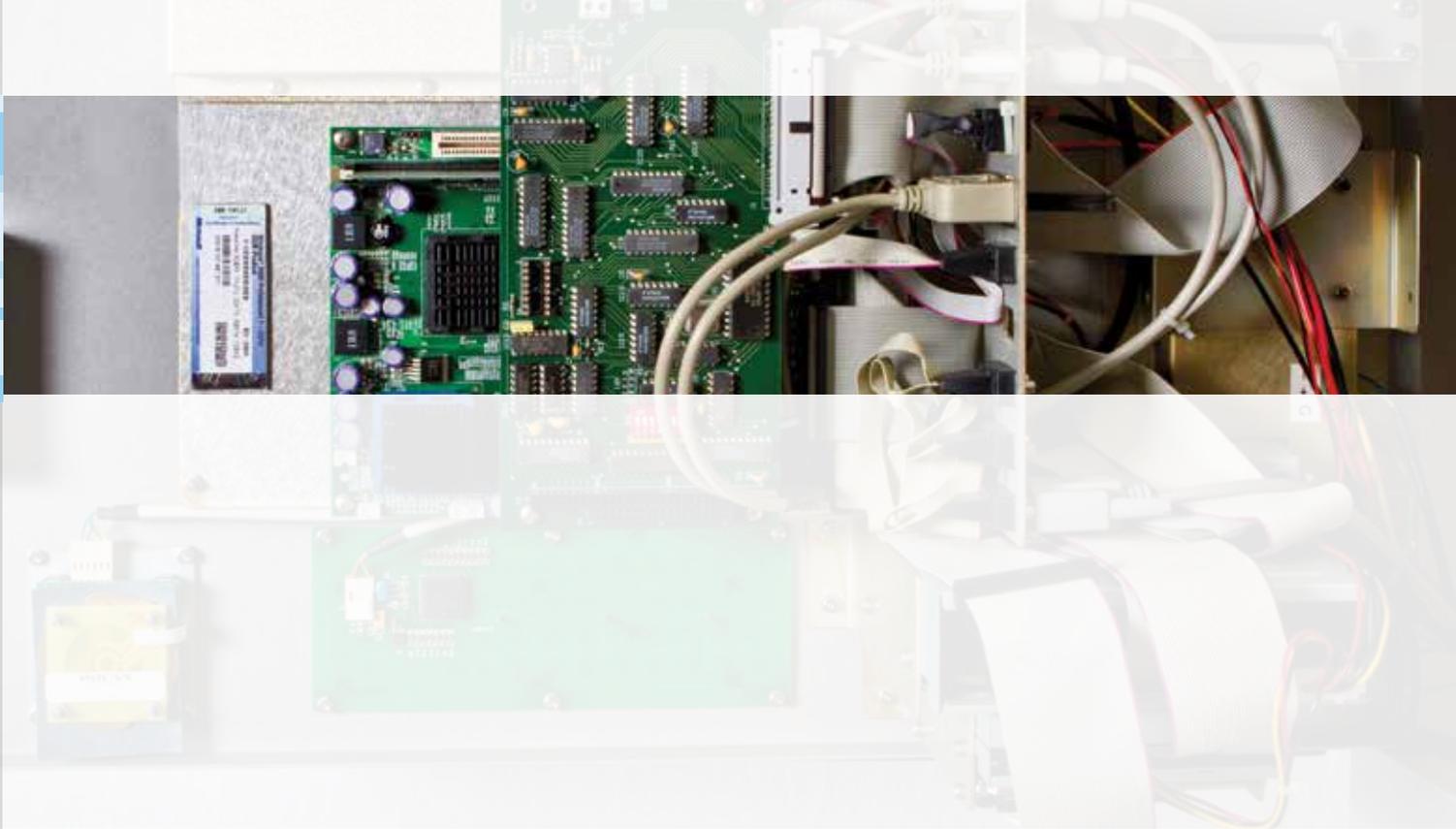
OVA product features

- Market leading customer support service and user training via Modern Water
- 24 hour monitoring of three to six sample streams (depending on sample type)
- Pre-treatment options of acid/UV digest to eliminate interferences and allow total and dissolved concentrations to be monitored
- Connection to process control room allows automatic plant control like dosing, flow diversion or plant shut-off
- Results stored on solid-state internal memory
- Programmable alarm outputs for out-of-range samples or system faults
- Solid electrodes – no hazardous mercury drop electrodes
- Multi-element analysis configurations available
- Single-cell or Dual-cell option available on the 7000 model

Applications notes and research references

Modern Water maintains working methods, research papers and case studies describing the use of voltammetry for metal monitoring in a variety of applications:

- Lead smelting and recycling
- River water treatment plant
- Drinking water
- Mine process water and leachate
- Power plant scrubber water
- Municipal incineration wastewater
- Automobile manufacturing effluent
- Copper, lead, zinc smelting
- Manufacturing effluent in the electronics industry
- Contaminated land/ground water remediation



International Technical Support

Routine maintenance is essential to ensure high levels of performance, however our OVAs and the PDV have been designed to allow owners/operators to carry out basic maintenance such as cleaning and calibration themselves.

Modern Water also provides annual, international service and technical support contracts for instruments including:

- Access to a dedicated technical support hotline
- Quarterly on-site maintenance visits
- One free emergency call out in the first 12 months
- Free software upgrades
- Free application notes tailored to your application.

Modern Water is experienced at identifying how metal monitoring systems can benefit your operations and be effectively integrated into your process control systems.

We will analyse samples and study your current process so that components which might interfere with the analysis are removed during sample pre-treatment. All samples are analysed by our regional Technical Support teams and a detailed report prepared including analytical results and instrument configuration. Once we can provide an effective solution which is both accurate and cost effective, a detailed instrument specification and quotation will be provided.

Next steps:

1. Contact us on +44 (0) 1483 696 000
2. Send a sample to your regional Technical Support unit together with supporting documentation and specification of needs
3. We will prepare a report and an outline of the OVA specification
4. Agreement on technical and commercial terms, purchase or lease
5. Confirmation of order and possible pre-shipment of PDV6000*ultra* if required
6. Confirmation of delivery and installation of OVA

Limits of Detection

Typical limits of detection for PDV and OVA monitors

METAL	METAL NAME	PDV (PORTABLE ANALYSER)	OVA (ON-LINE ANALYSER)
Ag	Silver	0.5 µg/l	5 µg/l
As(III)	Arsenic (III)	0.5 µg/l	0.2 µg/l
As(total)	Arsenic	0.5 µg/l	2 µg/l
Au	Gold	2 µg/l	5 µg/l
Bi	Bismuth	2 µg/l	--
Cd	Cadmium	0.5 µg/l	0.5 µg/l
Co	Cobalt	10 µg/l (1*)	10 µg/l
Cr(VI)	Chromium (VI)	5 µg/l (1*)	10 µg/l
Cr(total)	Chromium	1 µg/l	10 µg/l
Cu	Copper	0.5 µg/l	1 µg/l
Fe	Iron	5 µg/l	10 µg/l
Hg	Mercury	0.1 µg/l	0.5 µg/l
Mn	Manganese	2 µg/l	10 µg/l
Mo	Molybdenum	1 µg/l*	1 µg/l
Ni	Nickel	5 µg/l	2 µg/l
Pb	Lead	0.5 µg/l	1 µg/l
Pd	Palladium	5 µg/l	5 µg/l
Sb(III)	Antimony (III)	5 µg/l	5 µg/l
Se(IV)	Selenium (IV)	5 µg/l	10 µg/l
Sn	Tin	5 µg/l	5 µg/l
Te	Tellurium	10 µg/l	10 µg/l
Tl	Thallium	2 µg/l	0.5 µg/l
U	Uranium	1 µg/l*	5 µg/l
Zn	Zinc	0.5 µg/l	10 µg/l

Limits vary with sample type. Typical clean water values are shown.
* using the LabCell method.

Methods are available for the determination of metals from USEPA,
NIOSH, ASTM, DIN, AOAC.



OVA SPECIFICATIONS

Working Electrode	Glassy carbon, used with a variety of films, or solid gold
Counter Electrode	Platinum
Reference Electrode	Ag/AgCl in KCl
Cell Material	Acrylic and PTFE
Cell Stirrer	Adjustable speed stirrer
Cell Volume	10 ml nominal
Drain	Pumped to waste
CE Compliant	YES
Voltammetry Range	-2V to +2V
Sensitivity	1nA
Analysis methods available	Anodic stripping, Cathodic stripping
Waveforms available	Linear sweep, square wave and differential pulse
Calibration	Standard comparison
Result Output	Voltammetry curves, element concentration(s), historical data
Variation (% CV)*	5 to 10%
Operating Software	Windows OS

OVA5000 SPECIFICATIONS

Power Supply	110 or 220V AC 150VA
Computer	Industrial PC Pentium
Keyboard	Waterproof with industrial mouse
Display	12.1" colour LCD
Disk drive	DVD
Communications	1 x Ethernet (LAN), 2 x USB, 2 x serial, 1 x parallel
Outputs	4-20 mA RS232, LAN, 12V alarm, local alarm sounder
Application Software	LabView OVA5000
Dimensions	1650mm x 700mm x 350mm (H x W x D)
Mass	85kg OVA 5000 135kg (shipping weight)
Modular	YES

Specifications

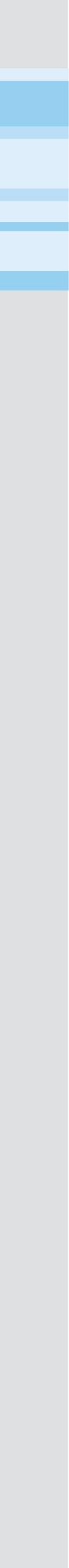
OVA7000 SPECIFICATIONS

Power Supply	90 - 260V AC, 12V DC
Operating Temp	5°C - 60°C
Humidity	5% - 95% non-condensing
IP Rating	IP 65
Communications	LAN Modbus TCP/IP, wireless, USB
Outputs	RS232, LAN, 12V alarm, (4-20 mA optional)
Dimensions	1400mm (analytical compartment 700mm, reagent compartment 700mm) x 482mm x 400mm (H x W x D)
Mass	22kg (analyser) 6kg (reagents)
Application Software	LabView OVA7000

PDV6000^{ultra} SPECIFICATIONS

Power Supply	AC, 110 - 240V or DC 8 - 12V or 4 x AA batteries
Dimensions PDV6000 ^{ultra}	14.2" (360mm) x 10.6" (270mm) x 6.1" (155mm) (L x W x D)
Dimensions SV LabCell	8.7" (220mm) x 6.3" (160mm) x 6.3" (160mm) (L x W x D) Drain tank, solid-state electrodes and stand provided
Working Electrode Std. Cell	Glassy carbon, used with a variety of films, or solid gold
Working Electrode SV LabCell	Glassy carbon with bismuth film
Counter Electrode	Platinum
Reference Electrode	Ag/AgCl in KCl
Cell Material	Acrylic and PTFE
Cell Stirrer	DC magnetic motor and magnetically coupled stirrer
Display	LCD graphic screen
CE Compliant	YES
Operating Software	Windows OS, VAS, internal firmware
Communications	Serial RS232 (USB adaptor provided)
Keypad	5 button keypad
Metal Menus	Up to 10 programmable menus in stand-alone mode
Analysis Methods Available	Anodic stripping, Cathodic stripping
Waveforms Available	Linear sweep, square wave and differential pulse
Voltammetry Range	-3.0V to +3.0V
Sensitivity	2 nA
Variation (%CV)*	5 to 10%
Outputs	CSV file, VAS file
Result Output	Voltammetry curves, element concentration(s), historical data
Calibration	Standard comparison or standard addition
Packing	Sturdy water-proof carry case

*All values are dependent upon the metal(s) being analysed and the nature of the sample.



To find out how we can help you please contact us on:
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