

MODERNWATER

MicroTrace™

Advanced trace metal monitoring technologies for  
field, laboratory and industry



MODERNWATER

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Modern Water is expert in the design, development and application 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 MicroTrace PDV and the two on-line, continuous systems: the OVA7100 and OVA7100 Dual Cell. 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 MicroTrace PDV

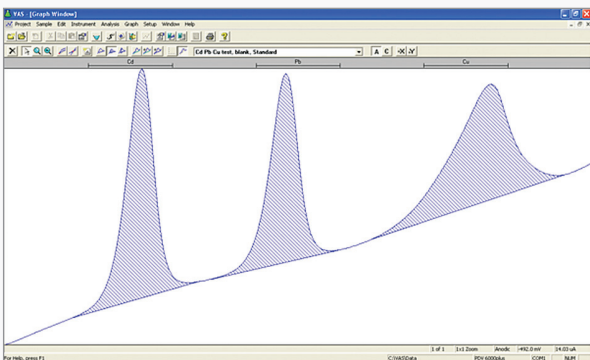
### MicroTrace PDV Portable Laboratory Monitor

The MicroTrace PDV 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.



*The MicroTrace PDV with standard cell*

# MicroTrace PDV



## The MicroTrace PDV and VAS Software

The MicroTrace PDV is supplied with the VAS software package, which provides intuitive operation and is compatible with Windows 7 and Windows 10. 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 MicroTrace PDV 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 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 Microtrace 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.

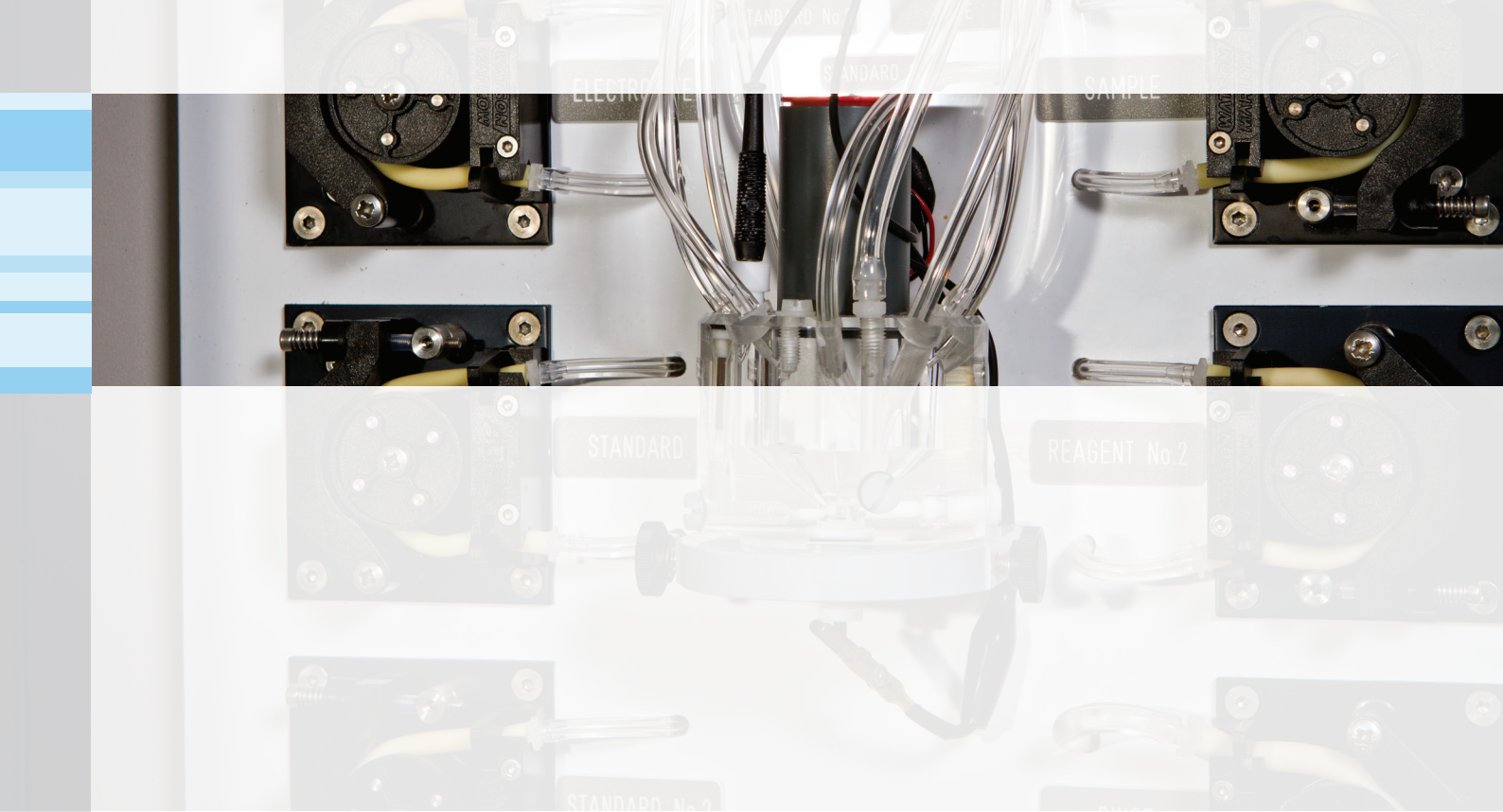
## Improves treatment efficiency and lowers operating costs

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 MicroTrace PDV 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.



## Working with the OVA7100 Dual Cell and OVA7100

### The OVA7100

The OVA7100 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 OVA7100 can run on a lower power 12V DC (or standard 90 – 265 V AC) making it the ideal solution for remote locations.

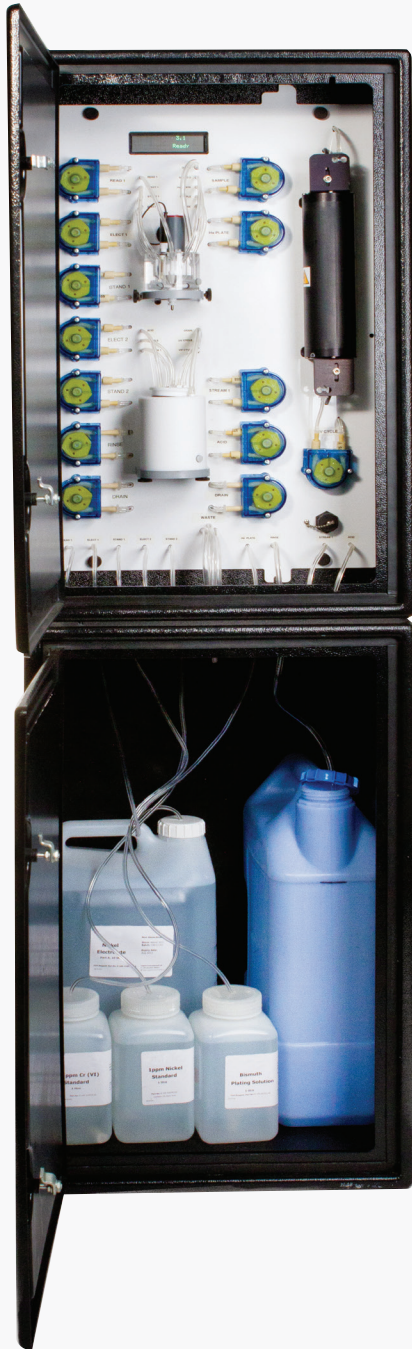
### The OVA7100 Dual Cell

The OVA7100 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.



# OVA7100 Dual Cell and OVA7100



OVA7100

## OVA product features

- Can be configured to monitor 23 different metals
- Very low detection levels (down to 0.1 µg/L\*)
- High levels of accuracy and repeatability – Excellent Correlation with Laboratory Methods (AAS, ICP-MS)
- 24-hour monitoring at high frequency can identify and isolate events that daily average sampling may miss
- Short analysis times allow identification of events as they occur – laboratory analysis typically identifies an event only after it occurred
- Single cell unit can measure up to six metals. Dual cell unit can measure up to 10 different metals
- Programmable alarm and outputs for out-of-range samples or system faults.
- Remote access and data communication with many different secure communication options available including wireless
- Easy connection to process control room allows integration into automated plant control systems (dosing, flow diversion).
- Pre-treatment options available to eliminate interferences and allow total and dissolved concentrations to be monitored
- Solid electrodes-no hazardous mercury drop electrodes
- Automated testing of pump operation and reagent/ sample supply
- Standard addition or multiple point calibration curves
- Multiple language interface options - including traditional and simplified Chinese
- Online technical support (requires internet connection)

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



## Applications

Regulations for heavy metal effluent limits are becoming stricter as regulatory agencies and industry realize their potential environmental and health impact. Modern Water's MicroTrace monitoring products are used in numerous industries to ensure regulatory compliance, reduce chemical consumption, improve production yields and product quality; and help companies achieve their environmental stewardship goals.

Modern Water's MicroTrace products have a proven track of effectively detecting the presence of harmful trace metals at very low detection levels in a wide array of applications including:

- River water monitoring for hazardous metals such as arsenic, mercury, lead and cadmium.
- Drinking water protection
- Municipal incineration wastewater
- Mining and minerals tailings
- Power plant scrubber water
- Mine process water and leachate
- Automobile and aerospace manufacturing effluent
- Copper lead and zinc smelting
- Battery production and recycling
- Land/Ground Water Remediation
- Semiconductor effluent
- Protection of agricultural water supplies

**Modern Water's team of applications engineers and global technical centers can assist you in the qualification of your application.**



# 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                | 2 µg/l                 |
| As(III)   | Arsenic (III)  | 0.5 µg/l                | 1.5 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                | 0.3 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       | 10 µg/l                 | 10 µg/l                |
| Cu        | Copper         | 0.5 µg/l                | 0.5 µg/l               |
| Fe        | Iron           | 5 µg/l                  | 10 µg/l                |
| Hg        | Mercury        | 0.1 µg/l                | 0.1 µg/l               |
| Mn        | Manganese      | 2 µg/l                  | 10 µg/l                |
| Mo        | Molybdenum     | 1 µg/l*                 | 1 µg/l                 |
| Ni        | Nickel         | 5 µg/l                  | 7 µg/l                 |
| Pb        | Lead           | 0.5 µg/l                | 0.7 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.

Instrument performance is only one factor in detection limits, which will vary with the application. Environmental contamination, reagent purity and other factors also affect detection limits at low levels.

The values given above are typical, assuming relatively clean samples such as drinking or natural waters. Dirty or industrial waters may have higher detection limits.

The OVA7100 is often capable of lower detection limits under certain conditions. Please contact Modern Water if lower detection limits are required.



### 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 10 OS   |

### OVA7100 & OVA7100 DUAL CELL SPECIFICATIONS

|                      |  |
|----------------------|--|
| Power Supply         | 90 - 265V AC, 12V DC   |
| Operating Temp       | 5°C - 60°C   |
| Humidity             | 5% - 95% non-condensing  |
| IP Rating            | IP 65  |
| Communications       | LAN Modbus TCP/IP, WIFI, USB   |
| Outputs              | RS232 or RS485   |
| Dimensions           | 1400mm (analytical compartment 700mm, reagent compartment 700mm) x 482mm (Dual Cell 715mm) x 400mm (H x W x D) |
| Mass                 | 22kg (analyser) 6kg (reagents) approx. 46kg (Dual Cell)  |
| Application Software | LabView OVA7000  |

# Specifications

## MICROTRACE PDV SPECIFICATIONS

|                              |   |
|------------------------------|---|
| Power Supply                 | AC, 110 - 240V or DC 8 - 12V or 4 x AA batteries  |
| Dimensions MicroTrace PDV    | 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)<br>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               | USB connector   |
| 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            | +/-2V   |
| 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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