

PSA

Millennium Merlin

AUTOMATED MERCURY ANALYSIS
with the accuracy of atomic fluorescence



ISO 13506
EPA 7474

EPA 1631

EPA 245.7

The Millennium Merlin System



GETTING DOWN TO 0.1 PPT

With AFS, PSA integrated vapour generation techniques to develop the Millennium Merlin system, which provides unsurpassed accuracy and precision, with a wide linear dynamic range, and detection levels down to 0.1 ppt for real samples.

Designed for routine use, the Millennium Merlin system provides the full range of facilities required by researchers and method development chemists.

The Millennium Merlin system offers standard modules that can be configured to meet current legislation:

- EPA Methods 1631, 245.7, 245.1 and 7474; and,
- ISO(CEN) 13506 standard.

PSA's Millennium windows software controls the Millennium range of instruments allowing discrete data capture and integration into user networks and formats.

GALAHAD GOLD PRE-CONCENTRATOR

To conform to US EPA Method 1631, PSA has configured its 10.035 instrument with the Galahad Gold pre-concentrator. The mercury from samples is first concentrated on gold foil in the amalgamation module. The mercury is then re-vaporised into the AFS detector. Detection levels are systematically lower using this approach. The amalgamation module can be removed readily to allow the instrument to operate as a standard AFS instrument.

COUPLING FOR MERCURY SPECIATION

The Millennium Merlin can easily be coupled to chromatographic techniques, such as high-performance liquid chromatography (HPLC) and ion chromatography

(IC), to provide measurements of individual mercury species in a sample. The species, which are separated on the chromatographic column, are then mixed with tin (II) chloride reagent to evolve mercury [Hg(0)] for measurement in the AFS detector.

PSA has available accessories to enable users to assemble their mercury-speciation systems quickly. Also, a simple software package evaluates the chromatograms produced. In addition, the Millennium Merlin can be linked to commercially available systems of the user's choice.

MERCURY IN GASES

To measure mercury in gaseous matrices, PSA's Amasil trapping technology can be combined with the Millennium Merlin system. The Galahad Gold pre-concentrator allows samples collected on the Amasil traps to be measured using the Millennium Merlin system. The PSA M035S100 module calibrates the instrument prior to measuring the samples collected on the gold traps.



Front loading cassettes with customised tubing extends tube life



Perma Pure cassette continuously removes moisture

ANALYTICAL EXPERTISE

There's something magical about the Merlin system for the measurement of mercury in the environment . . . P S Analytical's expertise in every essential stage of the analytical process – from sampling through to data presentation and interpretation of results enables us to provide complete solutions to sampling problems.

Since 1983 experts at P S Analytical have worked at the cutting edge of environmental monitoring, with a focus on automated low-level mercury analysis. The development of the innovative Merlin system, combining atomic fluorescence spectrometry (AFS) with vapour generation (VG) was the first step on a path which has led PSA to the forefront of technology.

PSA continues to invest in its research programme to provide total solutions to the marketplace. Systems provide the ability to carry out mercury speciation as well as offering total mercury determination. The Millennium Merlin system utilises the most sensitive technique for detecting mercury thereby offering unrivalled sensitivity and performance.

PSA has successfully installed systems in process applications world-wide and provides back-up for units operating in often hostile or explosive environments 24 hours-a-day, 7 days-a-week.

MEETING THE DEMANDS

As industrialisation spreads around the world, Governments and their Regulatory Bodies are introducing ever more stringent guidelines to protect people and the environment from the menace of mercury – long recognised as toxic to humans, harmful to the environment and extremely troublesome to process plants due to its corrosive nature. As a result, analysts need to achieve the ever greater sensitivity that Millennium Merlin provides.

PSA's experts are working closely with Standards Bodies and Regulatory Agencies to develop instrumentation conforming to and often exceeding current worldwide requirements.



Gas liquid separators, - reliable tested products with minimal, if any foaming.



New valve concept to conserve reagents

USER BENEFITS

Atomic fluorescence detector

- Sensitivity better than 0.1 ppt with linearity up to 10 ppm
- Enables reliable detection of mercury in even the most complex samples
- Minimal carryover – no need to sort samples before analysis

Integrated system

- Performance optimised
- Easy to use
- Easy access to components
- Small footprint saves bench space

Full computer control

- Unattended operation and shut down
- Simple to select method required
- Saves time and money

Perma Pure dryer

- Improves precision
- No regular changing of chemical desiccant

BEST ANALYTICAL OPTION

Because of the low levels of mercury present in areas of the environment, direct measurement using analytical techniques, such as atomic absorption, inductively coupled plasma (optical emission and mass spectrometry), are not always sensitive enough to provide accurate analysis at very low levels.

PSA has shown that AFS out performs other techniques for measuring mercury due to its

linearity over many orders of magnitude. The Millennium Merlin system can detect mercury in widely varying sample concentrations, from 0.1 part per trillion (ppt) to more than 10 parts per million (ppm) without the need for instrument adjustment and without interference through carryover from one sample to another. In addition, the Millennium Merlin offers speedy analysis – with an analysis rate of over 80 samples-an-hour.


PSA

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And, If your problem is listed below,
we already have the solution...!

MATRICES

Water
Drinking
River
Estuarine
Sea
Rain
Waste

Sediments
Sludge
Soil

Blood
Breath
Dental amalgam
Fish
Urine

Acids
Air
Alkalis
Coal
Condensates
Crude oil
Fly ash
Hydrogen
Metals
Naphtha
Natural gas
Oxidants
Reductants
Salts
Stack gas
Syn gas
Trade effluents

INDUSTRIES

Agriculture
Analytical science
Atomic energy
Chloralkali
Contract laboratories
Dental analysis
Environmental
Food
Gas
Marine
Metals
Natural gas
Oceanography
Oil
Petrochemical
Photography
Process engineering
Research institutes
Universities
Utilities
Water services
Water treatment

...if not, PSA can be relied upon to find it!

Research on other applications continues. If you have a problem
in an area that is not shown above – then call us for advice.



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