

PS ANALYTICAL

News Update 002

ON-LINE MERCURY DETERMINATIONS

P S Analytical has recently installed a system for on-line determinations of mercury in liquid samples. The system is fully computer controlled and can be completely customised to suit the particular needs of individual laboratories.

The 10.223 (Figure 1) consists of a stream selection manifold, a pump, a discrete sampling valve, an atomic fluorescence spectrometer (the Merlin), and an IBM compatible computer with a Process Analysis software package.

In this application four different liquid streams can be sampled sequentially. This number can be expanded to sixteen for different applications. The stream selection valve chooses the stream, then the pump delivers the sample or standard to the sampling valve. A fixed volume of sample is introduced into the digestion manifold. All of the mercury species are converted to the +2 oxidation state using the bromate/bromide digestion procedure, although different chemistries can be used. To deal with particular on-site situations, chemistries have been developed for a range of sample types, particularly relating to chlor/alkali plants. After digestion the mercury is reduced to the gaseous phase with tin (II) chloride. The gaseous mercury is separated from the liquid stream in a gas/liquid separator, then delivered to the detector after passing through a perma pure drying tube. The detector returns a transient peak. Figure 2 shows a diagram of the system.



Figure 1

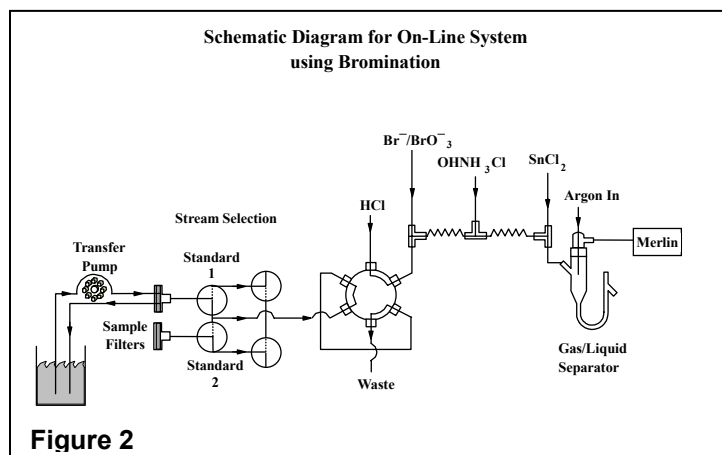


Figure 2



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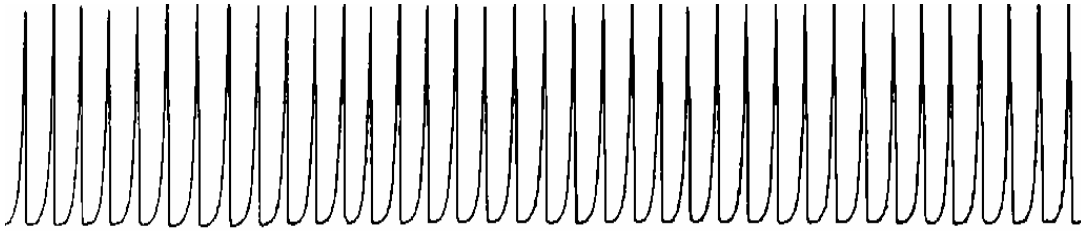


Figure 3

Reagent consumption has been kept deliberately low, with flows of just 0.3 ml/min. This allows the instrument to operate unattended for up to 1 week. Using PSA's Control and Data Management software, automatic calibration and analysis sequences can be programmed by the user to suit their needs. For example, the instrument can be programmed to automatically calibrate itself, then specified a certain number of samples analyse standards to check that the calibration is still valid. If the calibration curve is not valid, the instrument can be programmed to automatically re-calibrate and then continue the analysis. All liquid streams are flow checked. If any have stopped then the instrument can be automatically shut down and an alarm sounded. A Digital to Analogue converter can be used to connect the instrument to a process control computer to continuously provide updated information.

Using the Merlin atomic fluorescence detector ensures excellent sensitivity, with detection limits as low as 1 ppb. Figure 3 shows the superb reproducibility of the system.

The 10.223 has a wide application area. It is currently being used for effluent analysis, but can be used for many applications where on-line mercury determinations in liquid samples are needed. PSA expect to extend the technology and methodologies to on-line arsenic and selenium determinations. P S Analytical are committed to providing innovative solutions to customer's problems. Both the instrumentation and the on-line chemistries can be tailored by PSA's expert team to provide the most efficient and cost effective solution for each individual application.

On-line mercury in gas analyser - the Sir Galahad

P S Analytical combined unique technologies to create the Sir Galahad mercury in gas analyser. Atomic fluorescence detection and gold amalgam trapping are at the heart of a system which can determine levels of mercury in gases at down to 10 picograms in realistic timescales.

On-line and off-line monitoring can be carried out. On-line applications include monitoring the performance of mercury removal systems in natural gas processing plants to protect vital components from mercury exposure. Using the remote analysis module, samples can be collected from other sites on specially designed traps and brought to the Sir Galahad for analysis. Urban environment monitoring and stack emission analysis are two applications which use this method.

For on-line or off-line applications the Sir Galahad provides fast, accurate and reliable results. For full details on the Sir Galahad mercury in gas analyser please contact P S Analytical or their authorised distributor.



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