

Contract Lab Eliminates Sample Prep and Improves Productivity with the Direct Mercury Analysis



Customer ACZ is a full service environmental testing laboratory based in Steamboat Springs, Colorado, USA, performing analytical testing for clients worldwide.



Challenge Perform environmental mercury testing capabilities on solid and liquid matrices in a fast pace contract lab accurately, efficiently while keeping the cost per sample manageable.

Solution The DMA-80 was able to eliminate the sample prep step increasing efficiency and reducing operating costs with the elimination of reagents and waste disposal costs.

Instrument Selection

We needed a robust instrument with a history of use in a routine environment – both in terms of hardware and also in the quality and reproducibility of its consumables. Because Milestone has the most experience with this technology, and the Milestone system was used in the development of the EPA method 7473 for direct mercury analysis, we had confidence that they could fulfill our needs. A key aspect was the quality and consistency of the combustion tubes - crucial to performance in a direct mercury analyzer. When we evaluated the Milestone DMA-80 in our lab in 2009, it performed extremely well right from the start, requiring very little set up and optimization. We believe that Milestone's extensive experience in this technology enabled them to develop their system over time to be more robust, reliable and user friendly than their competitor's offerings. The decision to purchase the DMA-80 was an easy one and the unit has been performing extremely well ever since.

Implementation

Before implementing the DMA-80, our primary method for analyzing mercury in solid matrices was EPA 7471A with CVAA. We typically receive 20-40 solid samples/week - primarily soil/sediment, but also sludge, fish tissue, animal, plants and filters. The main driver for switching to direct mercury analysis with EPA 7473 was to improve productivity by eliminating the



sample prep step. We also hoped to lower method detection limits. In fact with the DMA-80 we achieved a 40x reduction in our method detection limit. Our typical MDL for mercury (dry weight basis) using EPA 7471A is 40ppb. With the DMA-80 and EPA 7473 it is <1ppb. This is very advantageous for clients performing environmental assessments, since the ability to quantify at a lower level is a big advantage when making environmental decisions. Where it was rare to get measurable hits via 7471A, it is rare to not get a measurable hit using the DMA-80 and EPA 7473. The improved sensitivity of our mercury analysis using the DMA-80 is also a great help in securing new testing contracts for ACZ.

We have approval for use of the DMA-80 with EPA7473 through NELAC with Utah being our primary accreditation authority. We also have primary accreditation through Arizona, and secondary accreditation through several state agencies throughout the US. These are all in regards to RCRA permitting.

Benefits of the DMA-80

The DMA-80 has increased our overall productivity and marketability of mercury in solids analysis by lowering the detection limit and eliminating the sample prep step. The removal of sample prep not only increased our efficiency and eliminated reagent cost, but also helped us meet our environmental responsibilities. With the DMA-80 we are able to embrace the EPA's Green Chemistry program by reducing our generation of hazardous waste. Unused, expired standards are the only waste we create using this technology. Not having to utilize toxic reagents or prepare samples and standards in excess of that needed for analysis reduces waste generation and costs related to hazardous waste disposal.

Comparing time savings to CVAA and EPA 7471A, the operator hours required just to weigh out samples and transfer to the

water bath, is comparable to the total hours necessary to perform the complete analysis via DMA-80 and EPA 7473. Clearly, the labor savings alone enables the DMA-80 to pay for itself very quickly. And although we don't have a service contract, Milestone has been very helpful working through issues and giving us advice regarding sample analysis whenever needed. We have found their technical support staff professional and quick to respond to questions.

Expanding Direct Mercury Analysis

We are currently analyzing raw solid samples with the DMA-80. We want to further develop our capabilities by analyzing solid extracts (i.e. from EPA 3051, TCLP and SPLP methods) and also develop a method to analyze standard water samples. Although currently there is no accredited NELAC method utilizing this technology for water analysis, we believe this will be available in the near future with the push towards Green Chemistry technologies.

In conclusion, the DMA-80 has greatly increased our efficiency and productivity in the analysis of mercury in solids, lowered costs through elimination of reagents, and greatly reduced the generation of hazardous waste. It has significantly lowered our method detection limits and helped ACZ to secure new testing contracts.

About Milestone

With over 50 patents and more than 18,000 instruments installed in laboratories around the world, Milestone has been widely recognized as the global leader in metals prep technology for the past 26 years. Committed to providing safe, reliable and flexible platforms to enhance your lab's productivity, customers worldwide look to Milestone for their metals digestion, organic extractions, mercury analysis and clean chemistry processing needs.

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