

# MDL Nota AP 023

## ISO Method 17852 MDL Study Using a CETAC QuickTrace™ M-8000 CVAFS Mercury Analyzer

### PROCEDURE

The MDL study was performed using the CETAC QuickTrace™ M-8000 Cold Vapor Atomic Fluorescence Spectrometry Mercury Analyzer. Calibration standards concentrations were 5.0, 10.0, 25.0, 50.0, and 100.0 ng/L. Standards were prepared from a 1000 ng/L mercury standard which was prepared from serial dilutions of 1000 mg/L mercury standard. The final volume was 25 mL and they were prepared in 50 mL polypropylene tubes. Potassium bromate / potassium bromide solution was prepared by diluting purchased, and pre-cleaned 1 N Br / 1 N BrO<sub>3</sub> solution with 90 mL of double distilled HCl to make a 0.1 N bromine monochloride (BrCl) solution. All calibration standards were matrix-matched, using 2.5 mL of 1:1 hydrochloric acid, 0.5 mL of 0.1 N BrCl solution, and 0.25 mL of 10% (w/v) L-ascorbic acid and deionized (DI) water, according to performance based ISO Method 17852, Water quality - Determination of mercury – Method using atomic fluorescence spectrometry (AFS). The calibration was analyzed beginning with two calibration blanks and then proceeded with the lowest concentration standard to the highest concentration standard.

MDL standard concentrations were 1.0 ng/L and 0.5 ng/L. Replicate concentrations were prepared from a 100 ng/L mercury standard in 50 mL polypropylene tubes. Standard replicates were prepared with 2.5 mL of 1:1 hydrochloric acid, 0.5 mL of 0.1 N BrCl solution, 0.25 mL of 10% (w/v) L-ascorbic acid, and DI water for a final volume of 25.75 mL.

Seven replicates of each MDL standard were analyzed using peak height. Sample uptake time was 37 seconds at 100% pump rate, utilizing approximately 6 mL of sample with 68 seconds of rinse time, for a total analysis time of 105 seconds per sample. The integration mode was set to peak height utilizing 4 replicates at 1.0 seconds per replicate.

### RESULTS

Calculated MDL concentrations are based on a 99% uncertainty according to 40 CFR Appendix B to Part 136, "Definition and Procedure for the Determination of the Method

Detection Limit," Revision 1.11.



**MDL Study Coastal Seawater EPA 245.7 Ultra-Trace 40**  
CFR Ch.1 (7-1-91) Part. 136, App B

Run 1 @ 1.0 ng/L	Run 2 @ 0.25 ng/L
1.44	0.92 1.37
1.01 1.40	0.99 1.45
0.94 1.45	0.97
1.42	0.96

0.03309 = Run 1 STDEV  
0.001095 = STDEV<sup>2</sup>

0.02992 = Run 2 STDEV  
0.000895 = STDEV<sup>2</sup>

1.223 = F ratio

0.0019905 Sum STDEV<sup>2</sup> (Run 1 and 2)  
0.0009952 Sum STDEV<sup>2</sup> / 2 ((Run 1 and 2) / 2)  
0.0315474 STDEV Pooled 0.085

= MDL