METHOD #: 213.2 Approved for NPDES and SDWA (Issued 1978)

TITLE: Cadmium (AA, Furnace Technique)

ANALYTE: CAS # Cd Cadmium 7440-43-9

INSTRUMENTATION: AA

STORET No.

	01027
Dissolved	01025
Suspended	01026

Optimum Concentration Range: 0.5-10 μg/L
Detection Limit: 0.1 μg/L

1.0 Preparation of Standard Solution

1.1 Stock solution: Prepare as described under "direct aspiration method".
1.2 Ammonium Phosphate solution (40%): Dissolve 40 grams of ammonium phosphate, $(NH_4)2HPO_4$ (analytical reagent grade) in deionized distilled water and dilute to 100 mL.
1.3 Prepare dilutions of the stock cadmium solution to be used as calibration standards at the time of analysis. To each 100 mL of standard and sample alike add 2.0 mL of the ammonium phosphate solution. The calibration standards should be prepared to contain 0.5% (v/v) HNO_3.

2.0 Sample Preservation

2.1 For sample handling and preservation, see part 4.1 of the Atomic Absorption Methods section of this manual.

3.0 Sample Preparation

3.1 Prepare as described under "direct aspiration method". Sample solutions for analysis should contain 0.5% (v/v) HNO_3.

4.0 Instrument Parameters (General)

4.1 Drying Time and Temp: 30 sec-125°C.
4.2 Ashing Time and Temp: 30 sec-500°C.
4.3 Atomizing Time and Temp: 10 sec-1900°C.
4.4 Purge Gas Atmosphere: Argon
4.5 Wavelength: 228.8 nm
4.6 Other operating parameters should be set as specified by the particular instrument manufacturer.

5.0 Analysis Procedure

5.1 For the analysis procedure and the calculation, see "Furnace Procedure" part 9.3 of the Atomic Absorption Methods section of this manual.

6.0 Notes

6.1 The above concentration values and instrument conditions are for a Perkin-Elmer HGA- 2100, based on the use of a 20 μL injection, continuous flow purge gas and non-pyrolytic graphite. Smaller size furnace devices or those employing faster rates of atomization can be operated using lower atomization temperatures for shorter time periods than the above recommended settings.

6.2 The use of background correction is recommended.

6.3 Contamination from the work area is critical in cadmium analysis. Use of pipet tips which are free of cadmium is of particular importance. (See part 5.2.9 of the Atomic Absorption Methods section of this manual.)

6.4 For every sample matrix analyzed, verification is necessary to determine that method of standard addition is not required (see part 5.2.1 of the Atomic Absorption Methods section of this manual).

6.5 If method of standard addition is required, follow the procedure given earlier in part 8.5 of the Atomic Absorption Methods section of this manual.

6.6 For quality control requirements and optional recommendations for use in drinking water analyses, see part 10 of the Atomic Absorption Methods section of this manual.

6.7 Data to be entered into STORET must be reported as μg/L.

7.0 Precision and Accuracy

7.1 In a single laboratory (EMSL), using Cincinnati, Ohio tap water spiked at concentrations of 2.5, 5.0 and 10.0 μg Cd/L the standard deviations were ± 0.10, ± 0.16 and ± 0.33, respectively. Recoveries at these levels were 96%, 99% and 98%, respectively.