

METHOD #: 218.2 Approved for NPDES and SDWA (Issued 1978)

TITLE: Chromium (AA, Furnace Technique)

ANALYTE: CAS # Cr Chromium 7440-47-3

INSTRUMENTATION: AA

STORET No. 01034
Dissolved 01030
Suspended 01031

Optimum Concentration Range: 5-100 $\mu\text{g/L}$
Detection Limit: 1 $\mu\text{g/L}$

1.0 Preparation of Standard Solution

- 1.1 Stock solution: Prepare as described under "direct aspiration method".
- 1.2 Calcium Nitrate Solution: Dissolve 11.8 grams of calcium nitrate, $\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$ (analytical reagent grade) in deionized distilled water and dilute to 100 mL. 1 mL = 20 mg Ca.
- 1.3 Prepare dilutions of the stock chromium solution to be used as calibration standards at the time of analysis. The calibration standards should be prepared to contain 0.5% (v/v) HNO_3 . To each 100 mL of standard and sample alike, add 1 mL of 30% H_2O_2 and 1 mL of the calcium nitrate solution.

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-1000°C.
- 4.3 Atomizing Time and Temp: 10 sec-2700°C.
- 4.4 Purge Gas Atmosphere: Argon
- 4.5 Wavelength: 357.9 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.
- 6.2 Hydrogen peroxide is added to the acidified solution to convert all chromium to the trivalent state. Calcium is added to a level above 200 mg/L where its suppressive effect becomes constant up to 1000 mg/L.
- 6.3 Background correction may be required if the sample contains high dissolved solids.
- 6.4 Nitrogen should not be used as a purge gas because of possible CN band interference.
- 6.5 Pipet tips have been reported to be a possible source of contamination (See part 5.2.9 of the Atomic Absorption Methods section of this manual.)
- 6.6 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).
- 6.7 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.
- 6.8 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.
- 6.9 Data to be entered into STORET must be reported as $\mu\text{g/L}$.

7.0 Precision and Accuracy

- 7.1 In a single laboratory (EMSL), using Cincinnati, Ohio tap water spiked at concentrations of 19, 48, and 77 $\mu\text{g Cr/L}$, the standard deviations were ± 0.1 , ± 0.2 , and ± 0.8 , respectively. Recoveries at these levels were 97%, 101%, and 102%, respectively.