

Chromate (hexavalent) - Diphenylcarbazide Method

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Applications and Industries

Drinking water, surface and groundwater, domestic and industrial wastewater effluents

References

APHA Standard Methods, 23rd ed., Method 3500-Cr B - 2009
ASTM D 1687- 02, Chromium in Water, Test Method A

Chemistry

Hexavalent chromium reacts with diphenylcarbazide under acidic conditions to form a red-violet colored complex in direct proportion to the hexavalent chromium concentration. Results are expressed as ppm (mg/L) CrO₄.

Available Analysis Systems

Instrumental colorimetric: Vacu-Vials®

Visual colorimetric: CHEMetrics®

Storage Requirements

Products should be stored in the dark and at room temperature.

Shelf Life

When stored in the dark and at room temperature:

Instrumental colorimetric:

Vacu-vials kit: at least 1 year

Visual colorimetric:

CHEMetrics refill, color comparators, Acidifier Solution:
at least 1 year

Accuracy Statement

Statements of accuracy are based on laboratory tests performed under ideal testing conditions using standards of known concentration prepared in deionized water.

Vacu-vials kit:

≤0.05 ppm at 0 ppm
±0.06 ppm at 0.20 ppm
±0.18 ppm at 0.90 ppm
±0.26 ppm at 2.60 ppm

CHEMetrics kit: ± 1 color standard increment

Interference Information

- The reaction with diphenylcarbazide is nearly specific for hexavalent chromium (chromate).
- This chemistry does not measure trivalent chromium.
- Permanganate and other oxidizing agents may oxidize trivalent chromium in the sample to hexavalent, causing a false positive result.
- Sulfide, sulfite, and other reducing agents may reduce hexavalent chromium in the sample to trivalent, causing false low results.
- Samples should be analyzed immediately upon collection to minimize the reactions of oxidizing and reducing agents.
- Samples with extreme pH or that are highly buffered (including samples preserved to pH 9.3 – 9.7 according to APHA Standard Methods Method 3500-Cr B-2009) may require pH adjustment. After addition of A-2800 Acidifier Solution, the pH of the sample should be 1.8 – 2.0. Up to 8 drops of A-2800 Acidifier Solution may be added to 20 mL of sample to adjust the pH to fall within this range.
- Hexavalent molybdenum and mercury salts may react to form color with the reagent, but with much less sensitivity than does chromate.
- Nitrite, as well as vanadium and titanium, may produce low test results.
- Iron at greater than 1 ppm may produce a yellow color.
- Sample color or turbidity may make a color match difficult during visual colorimetric testing and may cause a false positive result with instrumental colorimetric tests. CHEMetrics' Sample Zeroing Accessory Pack can be used to correct for potential errors during instrumental analysis.

Safety Information

Safety Data Sheets (SDS) are available upon request and at www.chemetrics.com. Read SDS before using these products. Breaking the tip of an ampoule in air rather than water may cause the glass ampoule to shatter. Wear safety glasses and protective gloves.