Nitrate - Cadmium Reduction Method

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Applications and Industries

Industrial wastewater influent and effluent, industrial process waters, boiler water, cooling water, surface and ground water, potable water.
NOT applicable for analysis of seawater.

References

APHA Standard Methods, 23rd ed., Method 4500-NO_3^- E - 2016
ASTM D 3867-09, Nitrate-Nitrite in Water, Test Method B.
USEPA Methods for Chemical Analysis of Water and Wastes, Method 353.3 (1983).

Chemistry

Nitrate is reduced to nitrite with cadmium. In an acidic solution, the nitrite diazotizes with a primary aromatic amine and then couples with another organic molecule to produce a highly colored azo dye. The resulting pink-orange color is proportional to the nitrate concentration. Results are expressed as ppm (mg/L) NO_3-N or NO_3. To convert results from ppm NO_3-N to ppm NO_3, multiply by 4.43.

Available Analysis Systems

Visual colorimetric: CHEMets®, HR CHEMets®
Instrumental colorimetric: Vacu-vials®

Storage Requirements

Products should be stored in the dark at room temperature.

Shelf Life

When stored in the dark and at room temperature:
Visual colorimetric:
CHEMets® refills, color comparators: at least 1 year
Instrumental colorimetric:
Vacu-vials® kits: at least 1 year

Safety Information

Safety Data Sheets (SDS) are available upon request and at www.sdsfetch.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.

Interference Information

- These sample constituents will decrease the efficiency of the cadmium reduction step, causing low test results:
  Iron, copper and other metals
  oil and grease
  high levels of chloride
  high levels of chlorine and other halogens
  sample turbidity
  Interferences from some metals may be minimized by treatment of the sample with EDTA solution. Turbid samples can be filtered prior to analysis.
- Nitrite interferes by reading positively with the test and by decreasing the efficiency of the cadmium reduction step. Test results will be biased high when nitrite is present at detectable levels.
- Alkalinity up to 1500 ppm $CaCO_3$ is tolerated.
- Thiosulfate causes low test results.
- Some fertilizers may produce a pale orange color with the reagent.
- Sample pH should be between 5 and 9 for most efficient cadmium reduction.
- Low test results are obtained with seawater.

Accuracy Statement

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

Visual colorimetric:
CHEMets® kits: ± 1 color standard increment

Instrumental colorimetric
Vacu-vials® kit, K-6903:
≤ 0.12 ppm at 0 ppm NO_3-N
± 0.12 ppm at 0.40 ppm NO_3-N
± 0.33 ppm at 1.10 ppm NO_3-N
Vacu-vials® kit, K-6923:
≤ 0.60 ppm at 0 ppm NO_3-N
± 0.60 ppm at 2.00 ppm NO_3-N
± 1.65 ppm at 5.50 ppm NO_3-N
Vacu-vials® kit, K-6933:
≤ 3.8 ppm at 0 ppm NO_3
± 3.8 ppm at 12.5 ppm NO_3
± 11.3 ppm at 37.5 ppm NO_3