

Ammonia – Direct Nesslerization Method

Version 9 / Jun 2023

Applications and Industries

Drinking water, clean surface water, good-quality nitrified wastewater effluent, seawater

References

APHA Standard Methods, 18th ed., Method 4500-NH₃ C - 1988
ASTM D 1426-08, Ammonia Nitrogen in Water, Test Method A

Chemistry

In a strongly alkaline solution, ammonia reacts with Nessler's Reagent (K₂HgI₄) to produce a yellow-colored complex in direct proportion to the ammonia concentration. Results are expressed in ppm (mg/L) ammonia-nitrogen (NH₃-N).

Storage Requirements

Products should be stored in the dark and at room temperature. CHEMetrics, VACUettes, and Vacu-vials ampoules can be refrigerated to extend shelf life.

Shelf Life

When stored in the dark and at room temperature:

Visual colorimetric:

CHEMetrics and VACUettes refills: at least 5 months (can be extended by 18 months if stored under refrigeration)

Stabilizer Solutions, color comparators: at least 1 year

Instrumental colorimetric:

Vacu-vials kits: at least 2 months (can be extended by 18 months if ampoules are stored under refrigeration)

Available Analysis Systems

Visual colorimetric: CHEMetrics®, VACUettes®

Instrumental colorimetric: Vacu-vials®

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.

These products contain mercury and must be disposed according to local, state and federal laws.

Interference Information

- This chemistry measures soluble ammonia (NH₃, NH₄⁺), but not ammonia attached to large organic molecules.
- Chloramines (formed by the reaction of ammonia with free chlorine) may read positively with these tests but are not measured quantitatively. Chloramines will continue to develop color with the test reagents beyond the color development time specified in the kit instructions.
- Residual free chlorine may interfere with this chemistry by giving low test results or by forming a black precipitate.
- High levels of calcium and magnesium may cause the reagent to precipitate. This interference is minimized by addition of Rochelle salt solution (Stabilizer Solution A-1500 or A-1501) to the samples. Addition of extra Stabilizer Solution allows for the analysis of natural seawater and some synthetic seawaters. Other synthetic seawaters may cause the reagent to precipitate, causing erroneous results.
- Some water samples may require a preliminary distillation to remove interferences. If distillation is not an option, dilution of the sample prior to analysis may help to minimize many interferences.
- Hydrazine at low levels will cause a slight positive interference, and at higher levels will form an orange or yellow precipitate.
- Glycine up to 1000 ppm does not interfere significantly but causes a negative interference at higher concentrations.
- Morpholine up to at least 10 ppm does not interfere.
- Monoethanolamine up to at least 30 ppm does not interfere.
- MDEA at up to 100 ppm does not read positively but does cause the reagent to precipitate.
- DEHA at up to 3 ppm does not interfere.
- Alcohols are not known to interfere. Specifically, methanol up to at least 1% does not interfere.
- Aldehydes and ketones may cause false positive results.
- Iron causes a false positive interference.
- Copper up to at least 3 ppm does not interfere.

Interference Information (continued)

- Sulfide is a positive interference and may cause off-color test results.
- Chloride at concentrations up to approximately 2% will not interfere.
- Carbohydrazide interferes positively and may cause off-color development and cloudiness in the test ampoule.
- Nitrite at up to approximately 200 ppm as NO₂-N does not interfere.
- Alkalinity in the form of bicarbonate or carbonate is tolerated up to 1500 ppm CaCO₃, and in the form of hydroxide is tolerated up to 10,000 ppm CaCO₃.
- Sample pHs above 1.5 are well tolerated. Results obtained with samples with lower pHs will be biased low.
- 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.

Accuracy Statement

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

CHEMetrics and VACUettes kits: ± 1 color standard increment

Vacu-vials kit K-1503:

- ≤ 0.13 ppm at 0 ppm
- ± 0.15 ppm at 0.50 ppm
- ± 0.35 ppm at 1.75 ppm
- ± 0.53 ppm at 5.25 ppm

Vacu-vials kit K-1523:

- ≤ 0.8 ppm at 0 ppm
- ± 0.5 ppm at 1.5 ppm
- ± 0.7 ppm at 3.5 ppm
- ± 1.6 ppm at 10.5 ppm