



Parameter

Ammonia

Sample Type

Waste Water

Introduction

The ammonia nitrogen in wastewater is determined by direct measurement with the Orion 95-12 gas-sensing electrode on the Orion Star meter. The method requires no titration and has no turbidity or color interferences. Pre-distillation of the sample may be required for EPA reporting purposes. Refer to Part 4500-NH₃ B in Standard Methods or ASTM D1426 Appendix X1 for sample distillation procedures.

References

1. Method 4500-NH₃ D, E. Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. APHA, AWWA, & WEF, Washington, D.C. www.standardmethods.org
2. D1426-98,03 (B). Annual Book of ASTM Standards, Section 11, Water and Environmental Technology, Volume 11.01. ASTM International, West Conshohocken, PA. www.astm.org

Result Statistics

# Trials	Average	%CV
5	15.2 ppm	3.9

Recommended Equipment

Star benchtop pH/ISE meter (Orion 1115000); Ammonia electrode (Orion 9512BNWP); ATC probe (Orion 927007MD); Stirrer (Orion 096019).

Required Solutions

Ammonia Standards, 100 ppm and 1000ppm as N (Orion 951207 and 951007); pH Adjusting ISA (Orion 951211); Filling Solution (Orion 951202); deionized water (DI).

Solutions Preparation

Prepare a 10 ppm standard by 1:10 dilution of 100 ppm standard with DI water. Prepare a 50 ppm standard by 1:2 dilution of 100 ppm standard with DI water as a mid-range cal check standard.

Meter Setup

Connect the electrode, ATC, and stirrer onto the meter. Set measurement mode to ISE. In Setup mode, set resolution to 3, units to mg/L, range to high, blank correction to off and read type to continuous. If all steps were followed correctly the meter display will show three digits in the top line and "ISE: mg/L" to the right of the top line.

Electrode Setup

See the electrode manual for assembly and preparation of the electrode.

Electrode Performance Check

Check slope at least daily according to the electrode manual. Drift may be checked by comparing a 1-minute to a 2-minute reading. Results should agree with desired criteria. See troubleshooting section of manual if slope or drift problems.

Electrode Storage, Soaking, and Rinsing

See electrode manual for storage 1) between measurements, 2) overnight, and 3) for long periods of time. Between measurements, rinse the electrode with DI water and blot probe dry.

Sample Preservation

Analyze within 24 hours or acidify to pH <2 with sulfuric acid and store at 4°C for up to 28 days. Refer to references for details.

Sample Preparation

Distill sample if required. For precise measurements, allow all the standards and the samples to reach the same temperature before analysis. Measure 50 mL (distilled) sample into a beaker. Just prior to analysis, add 1 mL ISA to 50 mL sample. The sample will turn blue, indicating the pH is between 11 – 14. If not, add concentrated sodium hydroxide solution dropwise until blue color is achieved. Analyze immediately to avoid loss of ammonia from the alkaline solution.

Calibration

Perform a two point calibration at 10 and 100 ppm. Prepare standards as indicated in sample prep section and perform direct calibration. The electrode slope will be displayed and should be between -54 and -60mV/decade. Analyze a mid-range standard to verify the calibration.

Analysis

Rinse electrode, ATC probe, and stirrer with DI water, blot dry and place in the prepared sample. Turn on the stirrer. The concentration value will be displayed, when a stable reading is achieved. If sample concentration does not fall between the two calibration standards, either prepare two other standards which bracket the expected concentration or dilute the sample, if the sample concentration is higher than the calibration standards.

Quality Control (QC)

Recommended QC procedures include: calibration and calibration verification, initial demonstration of laboratory capability and method detection limit determination, laboratory control samples (LCS), method blanks, matrix spikes (MS), sample duplicates, and independent reference materials. See references above for details.