

Nitrogen, Ammonia

Method 8155 Powder Pillows

Salicylate Method¹
(0.01 to 0.50 mg/L NH₃-N)

Scope and Application: For water, wastewater, and seawater

¹ Adapted from *Clin. Chim. Acta.*, 14, 403 (1966)



Test Preparation

Collect the following items:

| | Quantity |
|------------------------------------|----------|
| Ammonia Cyanurate Reagent pillows | 2 |
| Ammonia Salicylate Reagent pillows | 2 |
| Sample Cells, 1-inch square, 10-mL | 2 |

Note: Reorder information for consumables and replacement items is on page 5.

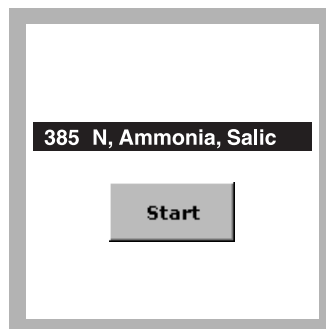
Note: A green color will develop if ammonia nitrogen is present.

Powder Pillows

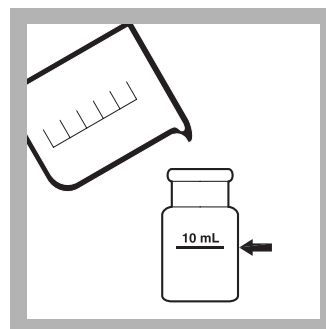
Method 8155



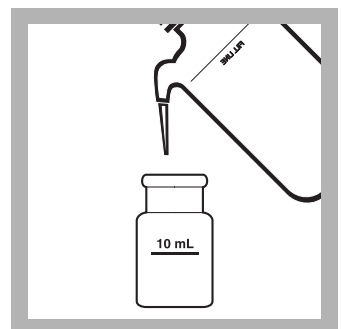
1. Press
STORED PROGRAMS.



1. Select the test.

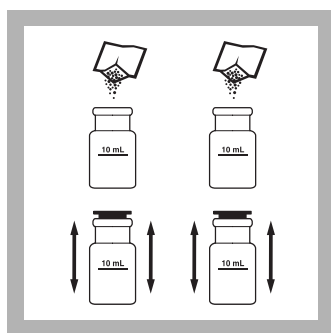


2. Prepared Sample:
Fill a square sample cell to the 10-mL mark with sample.



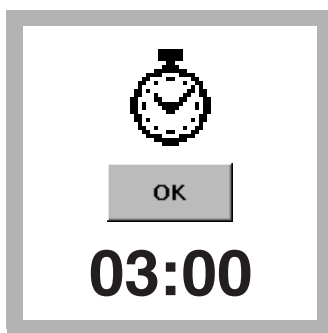
3. Blank Preparation:
Fill a second square sample cell to the 10-mL mark with deionized water.

Nitrogen, Ammonia (0.01 to 0.50 mg/L NH₃-N)

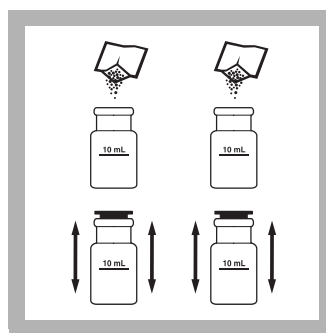


4. Add the contents of one Ammonia Salicylate Powder Pillow to each cell.

Stopper and shake to dissolve.

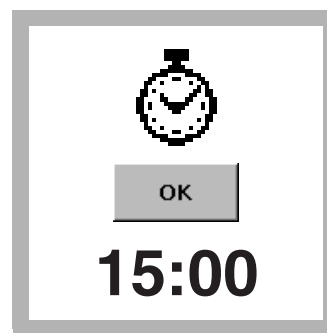


5. Press **TIMER>OK**. A three-minute reaction period will begin.



6. When the timer expires, add the contents of one Ammonia Cyanurate Reagent Powder Pillow to each cell.

Stopper and shake to dissolve.

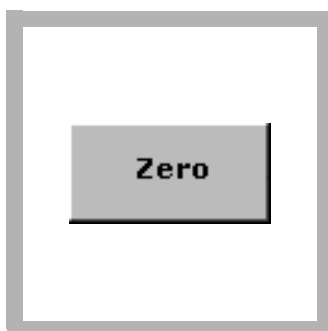


7. Press **TIMER>OK**. A 15-minute reaction period will begin.

A green color will develop if ammonia-nitrogen is present.



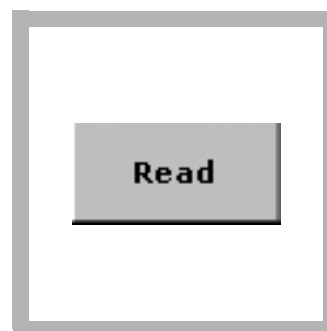
8. When the timer expires, insert the blank into the cell holder with the fill line facing right.



9. Press **ZERO**. The display will show: 0.00 mg/L NH₃-N



10. Wipe the sample and insert it into the cell holder with the fill line facing right.



11. Press **READ**. Results are in mg/L NH₃-N.

Interferences

Table 1 Interfering Substances and Levels

| Interfering Substance | Interference Levels and Treatments |
|-----------------------|---|
| Calcium | Greater than 1000 mg/L as CaCO ₃ |
| Iron | All levels. Correct for iron interference as follows: <ol style="list-style-type: none"> 1. Determine the amount of iron present in the sample by following one of the Iron, Total, procedures. 2. Add the same iron concentration to the ammonia-free water in step 3. The interference will be successfully blanked out. |
| Magnesium | Greater than 6000 mg/L as CaCO ₃ |
| Monochloramine | Monochloramine present in chloraminated drinking water interferes directly at all levels, giving high results. Use Method 10200, Free Ammonia and Monochloramine, to determine free ammonia in these sample matrices. |
| Nitrate | Greater than 100 mg/L as NO ₃ ⁻ -N |
| Nitrite | Greater than 12 mg/L as NO ₂ ⁻ -N |
| Phosphate | Greater than 100 mg/L as PO ₄ ³⁻ -P |
| Sulfate | Greater than 300 mg/L as SO ₄ ²⁻ |
| Sulfide | Sulfide will intensify the color. Eliminate sulfide interference as follows: <ol style="list-style-type: none"> 1. Measure about 350 mL of sample in a 500-mL Erlenmeyer flask¹. 2. Add the contents of one Sulfide Inhibitor Reagent¹ Powder Pillow. Swirl to mix. 3. Filter the sample through a Folded Filter Paper¹ and Filter Funnel¹. 4. Use the filtered solution in step 3. |
| Other Substances | Less common interferences such as hydrazine and glycine will cause intensified colors in the prepared sample. Turbidity and color will give erroneous high values. Samples with severe interferences require distillation. Use the distillation procedure with the General Purpose Distillation Set. |

¹ See [Optional Reagents and Apparatus](#) on page 5.

Sample Collection, Storage, and Preservation

Collect samples in clean plastic or glass bottles. Most reliable results are obtained when samples are analyzed as soon as possible after collection.

Adjust the pH to 2 or less with concentrated (about 2 mL per liter) Sulfuric Acid. Store samples at 4 °C or less. Samples preserved in this manner can be stored up to 28 days. Just before testing the stored sample, warm to room temperature and neutralize with 5.0 N Sodium Hydroxide Standard Solution. Correct the test result for volume additions.

Accuracy Check

1. After reading test results, leave the sample cell (unspiked sample) in the instrument.
2. Press **OPTIONS>MORE**. Press **STANDARD ADDITIONS**. A summary of the standard additions procedure will appear.
3. Press **OK** to accept the default values for standard concentration, sample volume, and spike volumes. Press **EDIT** to change these values. After values are accepted, the unspiked sample reading will appear in the top row. See the user manual for more information.

4. Open an Ammonia Nitrogen Standard Solution, 10-mg/L as NH₃-N.
5. Prepare three sample spikes. Fill three mixing cylinders with 25 mL of sample. Use the TenSette® Pipet to add 0.2 mL, 0.4 mL, and 0.6 mL of standard, respectively to the cylinders and mix each thoroughly.
6. Analyze each sample spike as described in the procedure above, starting with the 0.2 mL sample spike. Accept each standard additions reading by pressing **READ**. Each addition should reflect approximately 100% recovery.
7. After completing the sequence, press **GRAPH** to view the best-fit line through the standard additions data points, accounting for matrix interferences. Press **IDEAL LINE** to view relationships between the sample spikes and the "Ideal Line" of 100% recovery.

Standard Solution Method

Prepare a 0.40 mg/L ammonia nitrogen standard as follows:

1. Diluting 4.00 mL of the Ammonia Nitrogen Standard Solution, 10-mg/L, to 100 mL with deionized water. Or, use the TenSette® Pipet to prepare a 0.40 mg/L ammonia nitrogen standard by diluting 0.8 mL of an Ammonia Nitrogen Voluette® Standard Solution, 50-mg/L as NH₃-N, to 100 mL with deionized water.
2. To adjust the calibration curve using the reading obtained with the standard solution, press **OPTIONS>MORE** on the current program menu. Press **STANDARD ADJUST**.
3. Press **ON**. Press **ADJUST** to accept the displayed concentration. If an alternate concentration is used, press the number in the box to enter the actual concentration, then press **OK**. Press **ADJUST**.

Summary of Method

Ammonia compounds combine with chlorine to form monochloramine. Monochloramine reacts with salicylate to form 5-aminosalicylate. The 5-aminosalicylate is oxidized in the presence of a sodium nitroprusside catalyst to form a blue-colored compound. The blue color is masked by the yellow color from the excess reagent present to give a final green-colored solution. Test results are measured at 655 nm.

Consumables and Replacement Items

Required Reagents

| Description | Quantity/Test | Unit | Cat. No. |
|---|---------------|---------|----------|
| Ammonia Nitrogen Reagent Set for 10-mL samples (100 tests), includes: | — | — | 26680-00 |
| Includes: | | | |
| (2) Ammonia Cyanurate Reagent Powder Pillows | 2 | 100/pkg | 26531-99 |
| (2) Ammonia Salicylate Reagent Powder Pillows | 2 | 100/pkg | 26532-99 |

Required Apparatus

| Description | Quantity/Test | Unit | Cat. No. |
|--|---------------|-------|----------|
| Sample Cells, 1-inch square, 10-mL, matched pair | 2 | 2/pkg | 24954-02 |

Recommended Standards and Apparatus

| Description | Unit | Cat. No. |
|---|----------|----------|
| Nitrogen, Ammonia Standard Solution, 10-mg/L NH ₃ -N | 500 mL | 153-49 |
| Nitrogen, Ammonia Standard Solution, 2-mL PourRite® Ampule, 50-mg/L NH ₃ -N | 20/pkg | 14791-20 |
| Wastewater, Effluent Inorganics, for NH ₃ -N, NO ₃ -N, PO ₄ , COD, SO ₄ , TOC | 500 mL | 28332-49 |
| Pipet, TenSette® 0.1 - 1.0 mL | each | 19700-01 |
| Pipet Tips, for TenSette Pipet 19700-01 | 50/pkg | 21856-96 |
| Pipet Tips, for TenSette Pipet 19700-01 | 1000/pkg | 21856-28 |
| Flask, volumetric, Class A, 100 mL | each | 14574-42 |
| Pipet, volumetric, Class A, 4.00 mL | each | 14515-04 |
| Pipet Filler, safety bulb | each | 14651-00 |
| Water, deionized | 4 L | 272-56 |

Optional Reagents and Apparatus

| Description | Cat. No. |
|---|----------|
| Cylinder, mixing | 20886-40 |
| Distillation Set | 22653-00 |
| Erlenmeyer Flask | 505-49 |
| Filter Funnel | 1083-67 |
| Filter Paper | 1894-57 |
| Sodium Hydroxide Standard Solution, 5.0 N | 2450-26 |
| Sulfide Inhibitor Reagent Powder Pillow | 2418-99 |
| Sulfuric Acid | 979-49 |



FOR TECHNICAL ASSISTANCE, PRICE INFORMATION AND ORDERING:

In the U.S.A. – Call toll-free 800-227-4224
Outside the U.S.A. – Contact the HACH office or distributor serving you.
On the Worldwide Web – www.hach.com; E-mail – techhelp@hach.com

HACH COMPANY
WORLD HEADQUARTERS
Telephone: (970) 669-3050
FAX: (970) 669-2932
