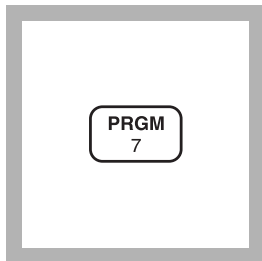


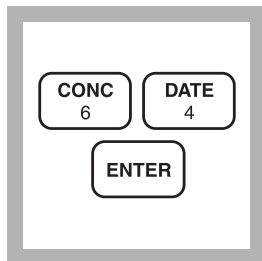
NITROGEN, AMMONIA (0 to 0.50 mg/L NH₃-N) For water, wastewater, seawater**Salicylate Method***

1. Enter the stored program number for ammonia nitrogen (NH₃-N).

Press: **PRGM**

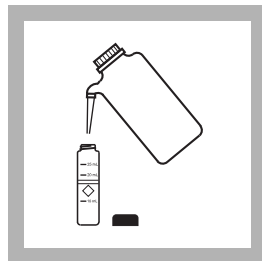
The display will show:

PRGM ?

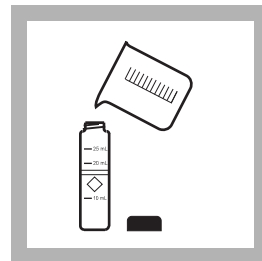


2. Press: **64 ENTER**
The display will show **mg/L, NH₃-N** and the **ZERO** icon.

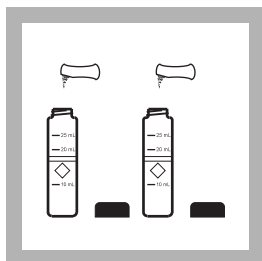
*Note: For alternate forms (NH₃, NH₄), press the **CONC** key.*



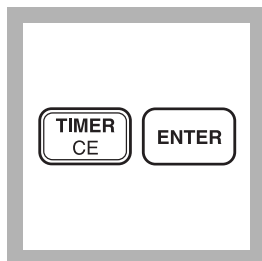
3. Fill a sample cell with 10 mL of deionized water (the blank).



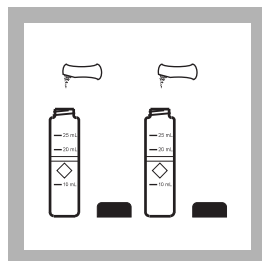
4. Fill a second sample cell with 10 mL of the sample.



5. Add the contents of one Ammonia Salicylate Reagent Powder Pillow to each sample cell. Cap both cells and shake to dissolve.

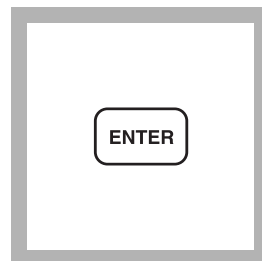


6. Press: **TIMER ENTER**
A three-minute reaction period will begin.



7. After the timer beeps add the contents of one Ammonia Cyanurate Reagent Powder Pillow to each sample cell. Cap the cells and shake to dissolve the reagent.

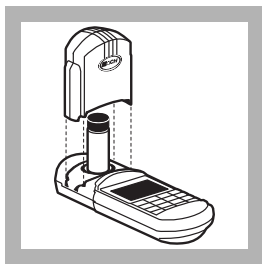
Note: A green color will develop if ammonia nitrogen is present.



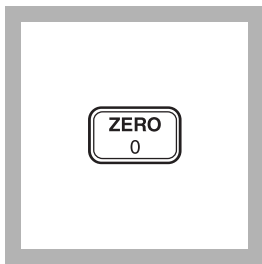
8. The display will show: **15:00 TIMER 2**
Press: **ENTER**
A 15-minute reaction period will begin.

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

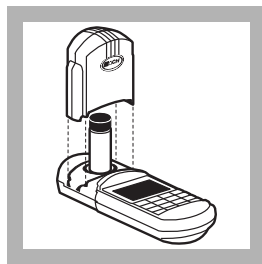
NITROGEN, AMMONIA, continued



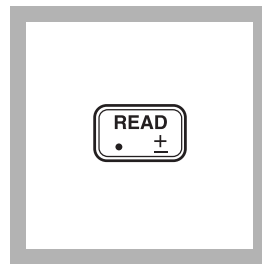
9. After the timer beeps, place the blank into the cell holder. Tightly cover the sample cell with the instrument cap.



10. Press: **ZERO**
The cursor will move to the right, then the display will show:
0.00 mg/L NH₃-N



11. Place the prepared sample into the cell holder. Tightly cover the sample cell with the instrument cap.



12. Press: **READ**
The cursor will move to the right, then the result in mg/L ammonia nitrogen will be displayed.

Note: Standard Adjust may be performed using a prepared standard (see Standard Adjust in Section 1).

Sampling and Storage

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

If chlorine is known to be present, the sample must be treated immediately with sodium thiosulfate. Add one drop of Sodium Thiosulfate Standard Solution, 0.1 N, for each 0.3 mg of chlorine present in a one liter sample.

To preserve the sample, adjust the pH to 2 or less with concentrated sulfuric acid (about 2 mL per liter). 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; see *Correction for Volume Additions*, in Section 1 for more detailed information.

Accuracy Check

Standard Additions Method

- a) Fill three 25-mL mixing cylinders with 20 mL of sample.
- b) Use the TenSette Pipet to add 0.1, 0.2, and 0.3 mL of Ammonium Nitrogen Standard, 10 mg/L as $\text{NH}_3\text{-N}$ to the three samples. Stopper the cylinders and mix well.
- c) Analyze a 10-mL portion of sample as described above. The ammonia nitrogen concentration should increase 0.05 mg/L for each 0.1 mL of standard added.
- d) If these increases do not occur, see *Standard Additions (Section 1)* for more information.

Standard Solution Method

Prepare a 0.40 mg/L ammonia nitrogen standard by diluting 4.00 mL of the Ammonia Nitrogen Standard Solution, 10 mg/L, to 100 mL with deionized water. Or, using the TenSette Pipet, prepare a 0.40 mg/L ammonia nitrogen standard by diluting 0.8 mL of a Ammonia Nitrogen Voluette Standard Solution, 50 mg/L as $\text{NH}_3\text{-N}$, to 100 mL with deionized water.

Method Performance

Precision

In a single laboratory using a standard solution of 0.40 mg/L ammonia nitrogen ($\text{NH}_3\text{-N}$) and two representative lots of reagent with the instrument, a single operator obtained a standard deviation of ± 0.02 mg/L ammonia nitrogen.

Estimated Detection Limit

The estimated detection limit for program 64 is 0.02 mg/L $\text{NH}_3\text{-N}$. For more information on the estimated detection limit, see *Section 1*.

NITROGEN, AMMONIA, continued

Interferences

Interfering Substances and Suggested Treatments.

Interfering Substance	Interference Level and Treatments
Calcium	Greater than 1000 mg/L as CaCO ₃
Glycine, hydrazine	Less common. Will cause intensified colors in the prepared sample.
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 using one of the Total Iron procedures.2. Prepare a deionized water sample containing the same iron concentration as the original sample. Run the procedure on this solution to determine the interference due to iron. Subtract this value from the result in Step 12 obtained on the original sample.
Magnesium	Greater than 6000 mg/L as CaCO ₃
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 flask.2. Add the contents of one Sulfide Inhibitor Reagent Powder Pillow. Swirl to mix.3. Filter the sample through a folded filter paper.4. Use the filtered solution in Step 3.
Turbidity, sample color	Turbidity and sample color will give erroneous high values. Samples with severe interferences require distillation. Albuminoid nitrogen samples also require distillation. Hach recommends the distillation procedure using the Hach General Purpose Distillation Set. See the Optional Apparatus list.

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.

NITROGEN, AMMONIA, continued

REQUIRED REAGENTS AND APPARATUS

Ammonia Nitrogen Reagent Set for 10-mL samples (100 tests)	Cat. No.	26680-00
Includes: (2) 26531-99, (2) 26532-99		

Description	Quantity Required		Unit	Cat. No.
	Per Test			
Ammonia Cyanurate Reagent Powder Pillows	2 pillows	100/pkg	26531-99	
Ammonia Salicylate Reagent Powder Pillows	2 pillows	100/pkg	26532-99	
Sample Cell, 10-20-25 mL, w/ cap	2	6/pkg	24019-06	

OPTIONAL REAGENTS

Ammonia Nitrogen Standard Solution, 10 mg/L as NH ₃ -N	500 mL	153-49
Ammonia Nitrogen, PourRite Ampules, 50 mg/L as NH ₃ -N, 2 mL	20/pkg	14791-20
Cylinder, graduated, mixing, 25 mL	each	20886-40
Sodium Hydroxide Standard Solution, 1.0 N	100 mL MDB	1045-32
Sodium Hydroxide Standard Solution, 5.0 N	50 mL SCDB	2450-26
Sodium Thiosulfate Standard Solution, 0.1 N	100 mL MDB	323-32
Sulfide Inhibitor Reagent Powder Pillows	100/pkg	2418-99
Sulfuric Acid, concentrated, ACS	500 mL	979-49
Sulfuric Acid Standard Solution, 1.0 N	100 mL MDB	1270-32
Water, deionized	4 L	272-56

OPTIONAL APPARATUS

Cylinder, graduated, polypropylene, 500 mL	each	1081-49
Distillation Heater and Support Apparatus, 115 V	each	22744-00
Distillation Heater and Support Apparatus, 230 V	each	22744-02
Distillation Set, General Purpose	each	22653-00
Filter Paper, folded, 12.5 cm	100	1894-57
Flask, Erlenmeyer, polypropylene, 500 mL	each	1082-49
Flask, volumetric, Class A, 100 mL	each	14574-42
Funnel, poly, 65 mm	each	1083-67
pH Meter, <i>sension</i> TM I, portable, with electrode	each	51700-10
Pipet Filler, safety bulb	each	14651-00
Pipet, TenSette, 0.1 to 1.0 mL	each	19700-01
Pipet Tips, for 19700-01 TenSette Pipet	50/pkg	21856-96
Pipet Tips, for 19700-01 TenSette Pipet	1000/pkg	21856-28
Pipet, volumetric, Class A, 2.0 mL	each	14515-36
PourRite Ampule Breaker Kit	each	24846-00
Thermometer, -20 to 110 °C	each	26357-02

For Technical Assistance, Price and Ordering

In the U.S.A.—Call 800-227-4224

Outside the U.S.A.—Contact the Hach office or distributor serving you.