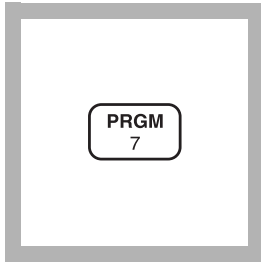


Salicylate Method*

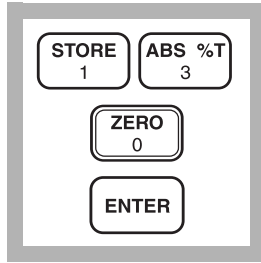


1. Enter the stored program number for ammonia nitrogen (NH₃-N).

Press: **PRGM**

The display will show:

PRGM ?

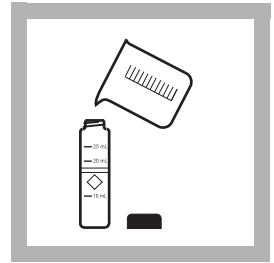


2. Press: **130 ENTER**
The display will show **mg/L, NH₃-N** and the **ZERO** icon.

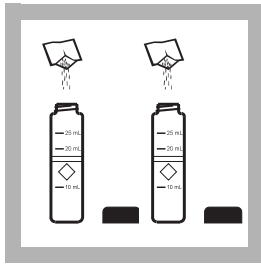
*Note: For alternate forms (NH₃, NH₄), press the **CONC** key.*



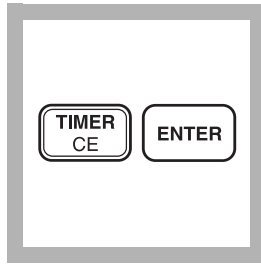
3. Fill a sample cell with 10 mL of deionized water (the blank).



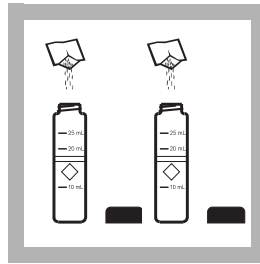
4. Fill a second sample cell with 10 mL of the sample.



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

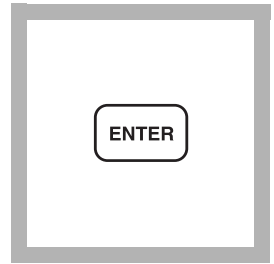


6. Press:
TIMER ENTER
A 3-minute reaction period will begin.



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.

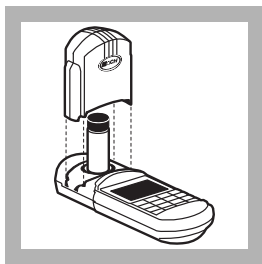
Note: A green color will develop if ammonia nitrogen is present.



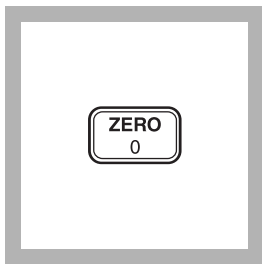
8. The display will show:
15:00 TIMER 2
Press: **ENTER**
A 15-minute reaction period will begin.

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

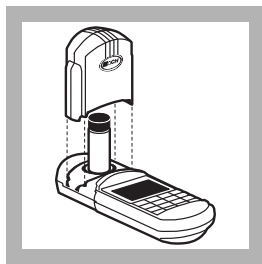
NITROGEN, AMMONIA, continued



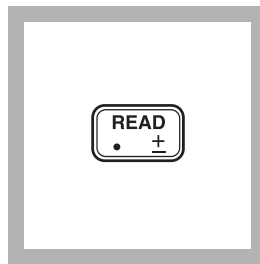
9. After the timer beeps, place the blank into the cell holder. Tightly cover the sample cell with the instrument cap.



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.

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.

Accuracy Check

Standard Additions Method

1. Fill three sample cells with 10 mL of sample.
2. Use the TenSette Pipet to add 0.1, 0.2 and 0.3 mL of Ammonium Nitrogen Standard, 10 mg/L as NH₃-N to the three samples. Stopper the cells and mix well.

NITROGEN, AMMONIA, continued

3. Analyze each spiked sample as described above. The ammonia nitrogen concentration should increase by 0.10 mg/L for each 0.1 mL of standard added.
4. If these increases do not occur, refer to Standard Additions in a DR/800-series Procedures manual for more information.

Standard Solution Method

Prepare a 0.50 mg/L ammonia nitrogen standard solution as follows:

1. Dilute 5.00 mL of the Ammonia Nitrogen Standard Solution, 10 mg/L, to 100 mL with deionized water. Or, use the TenSette Pipet to prepare a 0.50 mg/L ammonia nitrogen standard by diluting 1.0 mL of an Ammonia Nitrogen Voluette Standard Solution, 50 mg/L as $\text{NH}_3\text{-N}$, to 100 mL with deionized water.
2. Use the prepared 0.50 mg/L ammonia nitrogen standard solution in place of the sample in step 4 of the test procedure.

Method Performance

Precision

In a single laboratory using a standard solution of 1.00 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 ± 0.08 mg/L ammonia nitrogen.

Estimated Detection Limit

The estimated detection limit for Method 8155 is 0.02 mg/L $\text{NH}_3\text{-N}$. For more information on the estimated detection limit, see *Section 1* of a DR/800-series *Procedure Manual*.

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.

NITROGEN, AMMONIA, continued

Interfering Substance	Interference Level and Treatments
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 4 of the test procedure.
Turbidity, sample color	Turbidity and sample color will give erroneous high values. Samples with severe interferences require distillation. Albuminoid nitrogen samples also require distillation. Refer to Optional Apparatus for distillation equipment.

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.

Instrument Setup

The following procedure will add program 130 to a DR/850 or DR/890 instrument.

1. Turn on the instrument by pressing the **ON** key.
2. Press the **SETUP** key.
3. Press the **DOWN** arrow key until the prompt line shows **USER**.
4. Press the **ENTER** key.

NITROGEN, AMMONIA, continued

5. Enter “8138”, followed by **ENTER**.

Note: The arrow keys can be used to scroll and review or change numbers at any time.

6. Refer to the following table and enter the number from the “Enter” column that corresponds to line number 1 on the display. Press **ENTER**. Repeat for lines 2–56 on the display.

Line Number	Enter	Line Number	Enter
1	130	29	0
2	42	30	78
3	74	31	72
4	0	32	52
5	0	33	0
6	0	34	0
7	0	35	63
8	0	36	155
9	0	37	165
10	0	38	227
11	0	39	63
12	63	40	164
13	45	41	221
14	158	42	47
15	131	43	0
16	0	44	110
17	0	45	128
18	0	46	0
19	0	47	20
20	78	48	0
21	72	49	180
22	51	50	3
23	45	51	132
24	78	52	0
25	78	53	0
26	72	54	23
27	51	55	0
28	0	56	255

NITROGEN, AMMONIA, continued

REQUIRED REAGENTS AND APPARATUS

Description	Qty/Test	Unit	Cat. No.
Ammonia Nitrogen Reagent Set, for 10-mL samples (100 tests)			2668000
Includes:			
(2) Ammonia Cyanurate Reagent Powder Pillows ...2 pillows.....	100/pkg.....		2653199
(2) Ammonia Salicylate Reagent Powder Pillows....2 pillows.....	100/pkg.....		2653299
Sample Cell, 10-20-25 mL, w/ cap.....	2	6/pkg.....	2401906

OPTIONAL REAGENTS

Ammonia Nitrogen Standard Solution, 10 mg/L as NH ₃ -N.....	500 mL.....		15349
Ammonia Nitrogen, PourRite Ampules, 50 mg/L as NH ₃ -N, 2 mL	20/pkg.....		1479120
Sodium Hydroxide Standard Solution, 5.0 N	50 mL SCDB.....		245026
Sodium Thiosulfate Standard Solution, 0.1 N	100 mL MDB.....		32332
Sulfide Inhibitor Reagent Powder Pillows.....	100/pkg.....		241899
Sulfuric Acid, concentrated, ACS.....	500 mL.....		97949
Water, deionized.....	4 L.....		27256

OPTIONAL APPARATUS

Distillation Heater and Support Apparatus, 115 V	each.....		2274400
Distillation Heater and Support Apparatus, 230 V	each.....		2274402
Distillation Set, General Purpose.....	each.....		2265300
Filter Paper, folded, 12.5 cm.....	100.....		189457
Flask, volumetric, Class A, 100 mL	each.....		1457442
Funnel, poly, 65 mm	each.....		108367
Pipet, TenSette, 0.1 to 1.0 mL.....	each.....		1970001
Pipet Tips, for 1970001 TenSette Pipet	50/pkg.....		2185696
Pipet Tips, for 1970001 TenSette Pipet	1000/pkg.....		2185628
Pipet, volumetric, Class A, 5.0 mL.....	each.....		1451537
Pipet Filler, safety bulb	each.....		1465100
PourRite Ampule Breaker Kit.....	each.....		2484600

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.



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