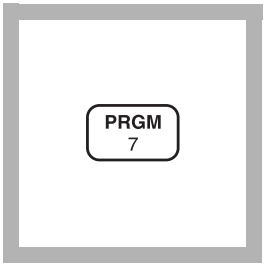
HYDRAZINE (0 to 500 µg/L)

p-Dimethylaminobenzaldehyde Method*

Using Reagent Solution



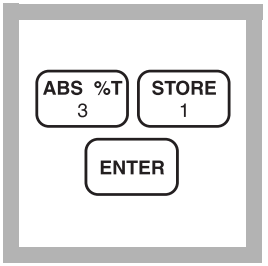
1. Enter the stored program number for hydrazine (N_2H_4).

Press: **PRGM**

The display will show:

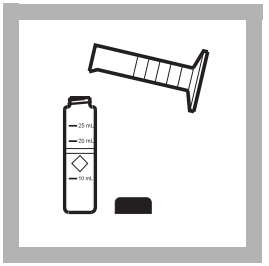
PRGM ?

Note: *Samples must be analyzed immediately and cannot be preserved for later analysis.*

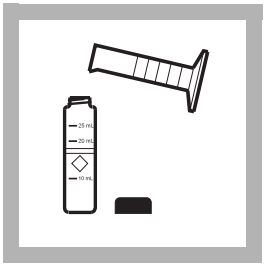


2. Press: **31 ENTER**

The display will show **µg/L, N2H4** and the **ZERO** icon**.**

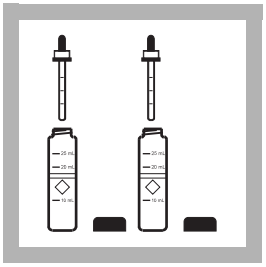


3. Pour 10.0 mL of deionized water into a sample cell (the blank) using a graduated cylinder.

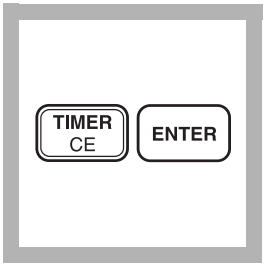


4. Pour 10.0 mL of sample into a second sample cell (the sample) using a graduated cylinder.

Note: *The sample temperature should be 21 ± 4 °C (70 ± 7 °F).*



5. Add 0.5 mL of HydraVer 2 Hydrazine Reagent to each sample cell. Cap. Invert to mix.



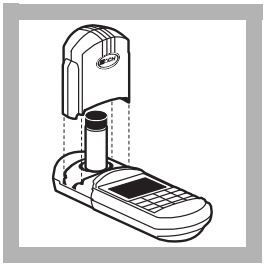
6. Press:

TIMER ENTER

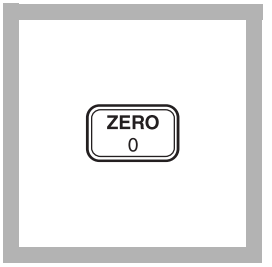
A 12-minute reaction period will begin.

Note: *Complete Steps 7-9 within 3 minutes.*

Note: *A yellow color will form if hydrazine is present. The blank will be a faint yellow color due to the HydraVer 2 reagent.*



7. Immediately after the timer beeps, place the blank into the cell holder. Tightly cover the sample cell with the instrument cap.

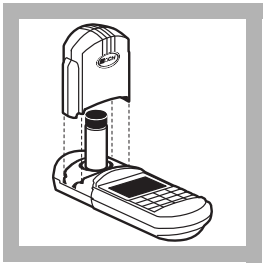


8. Press: **ZERO**

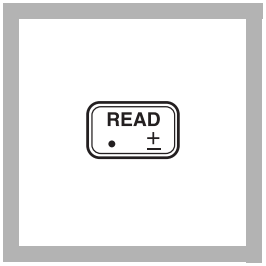
The cursor will move to the right, then the display will show:

0 µg/L N2H4

* Adapted from ASTM Manual of Industrial Water, D1385-78, 376 (1979)



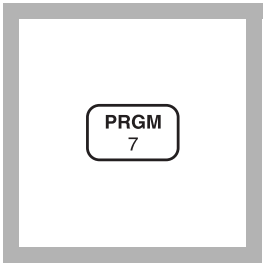
9. Place the prepared sample into the cell holder. Tightly cover the sample cell with the instrument cap.



10. Press: **READ**

The cursor will move to the right, then the result in µg/L hydrazine will be displayed.

Using AccuVac Ampuls



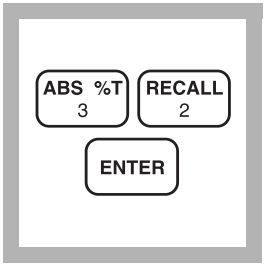
1. Enter the stored program number for hydrazine (N_2H_4)-AccuVac Ampuls.

Press: **PRGM**

The display will show:

PRGM ?

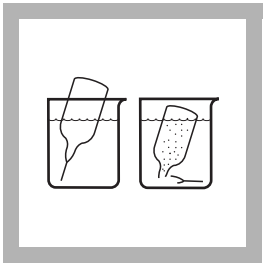
Note: *Samples must be analyzed immediately and cannot be preserved for later analysis.*



2. Press: **32 ENTER**

The display will show **µg/L, N2H4** and the **ZERO** icon.

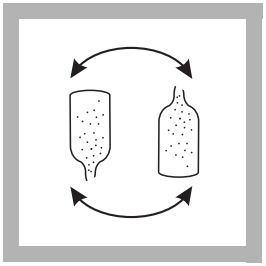
3. Collect at least 40 mL of sample in a 50-mL beaker. Pour at least 40 mL of deionized water into a second 50-mL beaker.



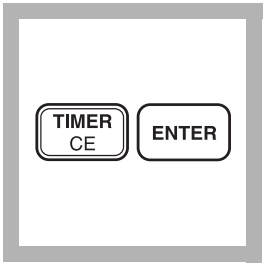
4. Fill a Hydrazine AccuVac Ampul with sample. Fill a second Hydrazine AccuVac Ampul with deionized water (the blank).

Note: *Keep the tip immersed while the ampul fills completely.*

Note: *The sample temperature should be 21 ± 4 °C (70 ± 7 °F).*



5. Quickly invert the ampul several times to mix. Wipe off any liquid or fingerprints.



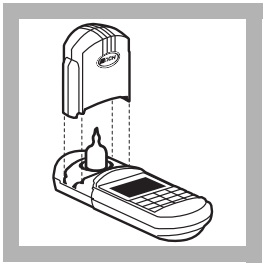
6. Press:

TIMER ENTER

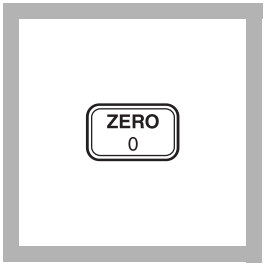
A 12-minute reaction period will begin.

Note: *Complete Steps 7-9 during this period.*

Note: *A yellow color will develop if hydrazine is present. The blank will be a faint yellow color due to the reagent.*



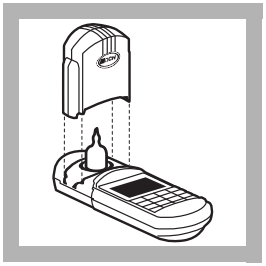
7. Insert the blank into the cell holder. Tightly cover the sample cell with the instrument cap.



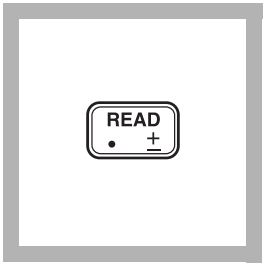
8. Press: **ZERO**

The cursor will move to the right, then the display will show:

0 µg/L N2H4



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



10. Immediately after the timer beeps, press **READ.**

The cursor will move to the right, then the result in µg/L hydrazine will be displayed.

Sampling and Storage

Collect samples in glass or plastic containers. Fill the containers completely and cap them tightly. Avoid excessive agitation or exposure to air. Samples must be analyzed immediately after collection and cannot be preserved for later analysis.

Accuracy Check

Standard Solution Method

To assure the accuracy of the test, prepare the following solutions:

a) Prepare a 25 mg/L hydrazine stock solution by dissolving 0.1016 g of hydrazine sulfate in 1000 mL of oxygen-free deionized water. Use Class A glassware. Prepare this stock solution daily.

b) Prepare a 100 µg/L hydrazine working solution by diluting 4.00 mL of the 25 mg/L stock solution to 1000 mL with deionized oxygen-free water. Prepare just before analysis.

c) Use the working solution in place of the sample in Step 4. The result should be 100 µg/L hydrazine.

Method Performance

Precision

In a single laboratory using a standard solution of 250 µg/L hydrazine (N_2H_4) and two representative lots of reagent with the instrument, a single operator obtained a standard deviation of ±9 µg/L hydrazine.

In a single laboratory using a standard solution of 250 µg/L hydrazine (N_2H_4) and two lots of AccuVac Ampuls with the instrument, a single operator obtained a standard deviation of ±3 µg/L hydrazine.

Estimated Detection Limit

The estimated detection limit for program 31 is 16 µg/L N_2H_4, and the estimated detection limit for program 32 is 10 µg/L N_2H_4. For more information on the estimated detection limit, see *Section 1*.

Interferences

For highly colored or turbid samples, prepare a blank by oxidizing the hydrazine in a portion of the sample. This can be accomplished with a
1:1 mixture of deionized water and household bleach. Add two drops of this mixture to 40 mL of sample contained in a graduated mixing cylinder and invert to mix. Use this solution in Step 3, in place of deionized water, to prepare the blank.

Ammonia has no effects up to 10 mg/L ammonia. At 20 mg/L, a

positive interference occurs.

Morpholine does not interfere up to 10 mg/L.

Summary of Method

Hydrazine reacts with the p-dimethylaminobenzaldehyde from the HydraVer 2 Reagent to form a yellow color which is proportional to the hydrazine concentration.

REQUIRED REAGENTS (Using Reagent Solution)

Description	Quantity Required Per Test	Unit	Cat. No.
HydraVer 2 Hydrazine Reagent	1 mL	100 mL MDB	1790-32
Water, deionized	10 mL	4 L	272-56

REQUIRED APPARATUS (Using Reagent Solution)

Cylinder, graduated, 25 mL	1	each	508-40
Sample Cells, 10-, 20- and 25 mL, w/ caps	2	6/pkg	24019-06

REQUIRED REAGENTS (Using AccuVac Ampuls)

Hydrazine Reagent AccuVac Ampul	2	25/pkg	25240-25
Water, deionized	10 mL	4 L	272-56

REQUIRED APPARATUS (Using AccuVac Ampuls)

Beaker, 50 mL	2	each	500-41H

OPTIONAL REAGENTS

Hydrazine Sulfate, ACS		100 g	742-26

OPTIONAL APPARATUS

AccuVac Snapper Kit		each	24052-00
Balance, Analytical, 115 V, 0.1 mg		each	28014-01
Balance, Analytical, 220 V, 0.1 mg		each	28014-02
Cylinder, graduated, mixing, 25 mL		each	1896-40
Flask, volumetric, 100 mL, Class A		each	14574-42
Flask, volumetric, 1000 mL, Class A		each	14574-53
Pipet, serological, 1 mL		each	9190-02
Pipet, TenSette, 0.1 to 1.0 mL		each	19700-01
Pipet Tips, for 19700-01 TenSette Pipet		50/pkg	21856-96
Pipet, volumetric, Class A, 1.00 mL		each	14515-35
Pipet, volumetric, Class A, 4.00 mL		each	14515-04
Pipet Filler, safety bulb		each	14651-00
Thermometer, –20 to 110 °C, non-mercury		each	26357-02
Weighing Boat, 67/46 mm, 8.9 cm sq.		500/pkg	21790-00