Hydrazine

DOC316.53.01046

p-Dimethylaminobenzaldehyde Method[1]

Method 8141

4 to 600 µg/L N_2H_4 (spectrophotometers)

Reagent Solution

10 to 500 µg/L N_2H_4 (colorimeters)

Scope and application: For boiler water/feedwater.

[1] Adapted from ASTM Manual of Industrial Water, D1385-78, 376 (1979).

Test preparation

Instrument-specific information

Table 1 shows all of the instruments that have the program for this test. The table also shows sample cell and orientation requirements for reagent addition tests, such as powder pillow or bulk reagent tests.

To use the table, select an instrument, then read across to find the applicable information for this test.

Table 1 Instrument-specific information

Instrument	Sample cell orientation	Sample cell
DR6000 DR3800 DR2800 DR2700 DR1900	The fill line is to the right.	2495402 
DR5000 DR3900	The fill line is toward the user.	
DR900	The orientation mark is toward the user.	2401906 

Before starting

Analyze the samples immediately. The samples cannot be preserved for later analysis.
Install the instrument cap on the DR900 cell holder before ZERO or READ is pushed.
The sample temperature must be between 21 ± 4 °C (70 ± 7 °F) for accurate results.
The reagent that is used in this test is corrosive. Use protection for eyes and skin and be prepared to flush any spills with running water.
Review the Safety Data Sheets (MSDS/SDS) for the chemicals that are used. Use the recommended personal protective equipment.
Dispose of reacted solutions according to local, state and federal regulations. Refer to the Safety Data Sheets for disposal information for unused reagents. Refer to the environmental, health and safety staff for your facility and/or local regulatory agencies for further disposal information.

Items to collect

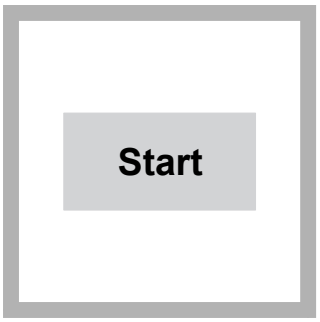
Description	Quantity
HydraVer 2 Reagent Solution	1 mL
Deionized water	10 mL
Graduated cylinder, 25-mL	1
Sample cells (For information about sample cells, adapters or light shields, refer to Instrument-specific information on page 1.)	2

Refer to Consumables and replacement items on page 4 for order information.

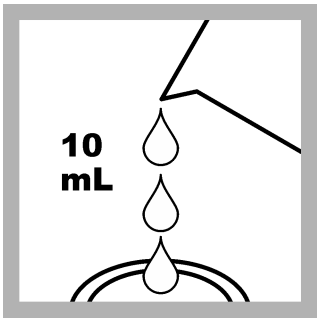
Sample collection

- Analyze the samples immediately. The samples cannot be preserved for later analysis.
- Collect samples in clean glass or plastic bottles with tight-fitting caps. Completely fill the bottle and immediately tighten the cap.
- Prevent agitation of the sample and exposure to air.

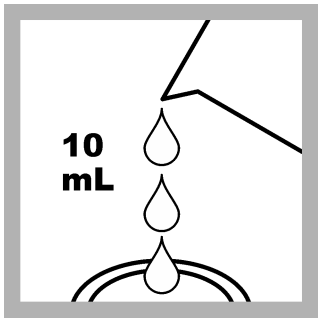
Test procedure



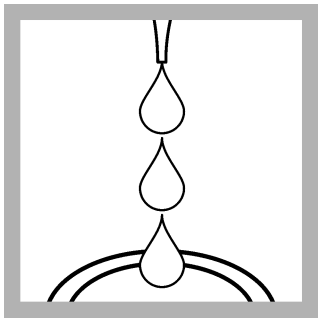
1. Start program **231 Hydrazine**. For information about sample cells, adapters or light shields, refer to Instrument-specific information on page 1.



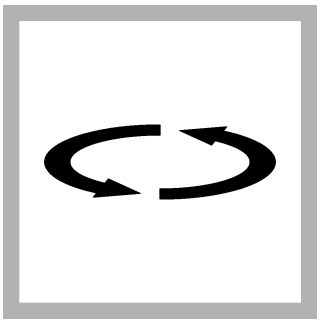
2. Prepare the blank: Use a graduated cylinder to pour 10 mL of deionized water into a sample cell.



3. Prepare the sample: Use a graduated cylinder to pour 10 mL of sample into a second sample cell.



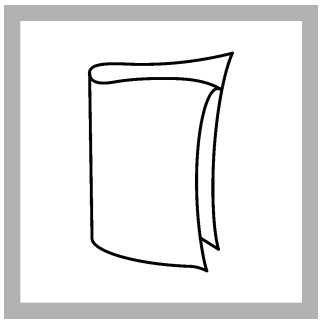
4. Add 0.5 mL of HydraVer 2 Hydrazine Reagent to each sample cell.
A yellow color shows if hydrazine is present in the sample. The blank may also show a light yellow color.



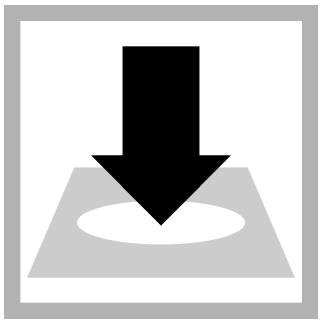
5. Swirl to mix.

6. Start the instrument timer. A 12-minute reaction time starts.

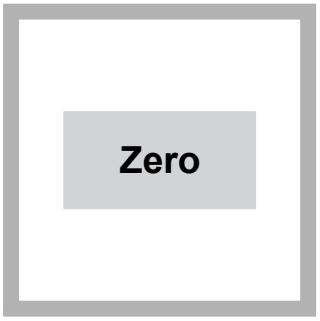
Complete the blank zero steps and insert the prepared sample during the reaction period.



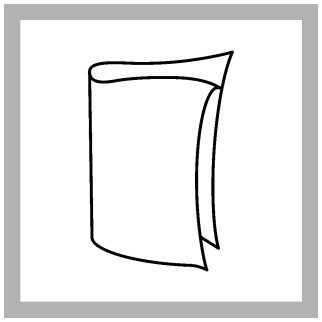
7. Clean the blank sample cell.



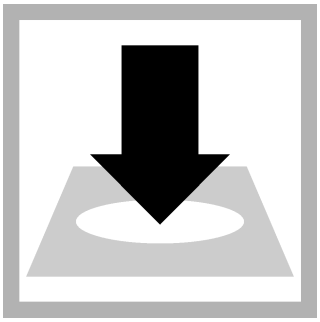
8. Insert the blank into the cell holder.



9. Push **ZERO**. The display shows 0 µg/L N_2H_4.



10. Clean the prepared sample cell.



11. Insert the prepared sample into the cell holder.

12. Immediately after the timer expires, push **READ**. Results show in µg/L N_2H_4.

Interferences

Interfering substance	Interference level
Ammonia	No interference up to 10 mg/L. May cause a positive interference of up to 20% at 20 mg/L.
Highly colored or turbid samples	Prepare a 1:1 mixture of deionized water and household bleach. Add one drop of this mixture to 25 mL of sample in a graduated mixing cylinder and invert to mix. This will destroy any hydrazine in the sample. Use this solution, instead of deionized water, to prepare the blank in the test procedure.
Morpholine	No interference up to 10 mg/L.

Accuracy check

Standard solution method

Use the standard solution method to validate the test procedure, the reagents and the instrument.

Items to collect:

- Hydrazine sulfate, reagent grade
- 1-L volumetric flask, Class A (2)
- 10-mL volumetric pipet, Class A and pipet filler
- Deionized water, oxygen-free

1. Prepare a 25-mg/L hydrazine stock solution as follows:
   a. Add 0.1016 g of hydrazine sulfate into a 1-L volumetric flask.
   b. Dilute to the mark with oxygen-free deionized water (heat water to boiling and cool). Mix well. Prepare the stock solution each day.
2. Prepare a 0.25-mg/L (250-µg/L) hydrazine standard solution as follows:
   a. Use a pipet to add 10.00 mL of the 25-mg/L hydrazine stock solution into a 1-L volumetric flask.
   b. Dilute to the mark with oxygen-free deionized water. Mix well. Prepare the standard solution immediately before use.
3. Use the test procedure to measure the concentration of the prepared standard solution.
4. Compare the expected result to the actual result.

   Note: *The factory calibration can be adjusted slightly with the standard calibration adjust option so that the instrument shows the expected value of the standard solution. The adjusted calibration is then used for all test results. This adjustment can increase the test accuracy when there are small variations in the reagents or instruments.*

Method performance

The method performance data that follows was derived from laboratory tests that were measured on a spectrophotometer during ideal test conditions. Users can get different results under different test conditions.

Program	Standard	Precision (95% confidence interval)	Sensitivity Concentration change per 0.010 Abs change
231	250 µg/L N_2H_4	247–253 µg/L N_2H_4	4 µg/L N_2H_4

Summary of method

Hydrazine in the sample reacts with the p-dimethylaminobenzaldehyde from the HydraVer 2 Reagent to form a yellow color which is proportional to the hydrazine concentration. The measurement wavelength is 455 nm for spectrophotometers or 420 nm for colorimeters.

Consumables and replacement items

Required reagents

Description	Quantity/test	Unit	Item no.
Water, deionized	varies	4 L	27256
HydraVer® 2 Hydrazine Reagent[1]	1 mL	100 mL MDB	179032

Required apparatus

Description	Quantity/test	Unit	Item no.
Cylinder, graduated, 25 mL	1	each	50840

Recommended standards

Description	Unit	Item no.
Hydrazine Sulfate, ACS	100 g	74226

Optional reagents and apparatus

Description	Unit	Item no.
Mixing cylinder, graduated, 25 mL	each	189640
Flask, volumetric, Class A, 1000 mL glass	each	1457453
Pipet, volumetric, Class A, 10 mL	each	1451538
Pipet filler, safety bulb	each	1465100

[1] HydraVer is a registered trademark of Hach Company.

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