Nitrite

DOC316.53.01075

Ferrous Sulfate Method[1]

Method 8153

2 to 250 mg/L NO_2^- (spectrophotometers)

Powder Pillows

2 to 150 mg/L NO_2^- (colorimeters)

Scope and application: For cooling systems.

[1] Adapted from McAlpine, R. and Soule, B., Qualitative Chemical Analysis, New York, 476, 575 (1933).

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
DR 6000 DR 3800 DR 2800 DR 2700 DR 1900	The fill line is to the right.	2495402 
DR 5000 DR 3900	The fill line is toward the user.	
DR 900	The orientation mark is toward the user.	2401906 

Before starting

Install the instrument cap on the DR 900 cell holder before ZERO or READ is pushed.
For the best results, measure the reagent blank value for each new lot of reagent. Replace the sample with deionized water in the test procedure to determine the reagent blank value. Subtract the reagent blank value from the sample results automatically with the reagent blank adjust option.
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
NitriVer® 2 Nitrite Reagent Powder Pillows, 10-mL	1
Deionized water	varies

Items to collect (continued)

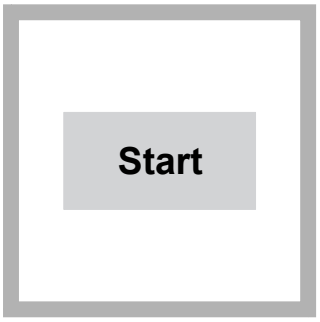
Description	Quantity
Stopper, Neoprene, solid #1	2
Sample cells (For information about sample cells, adapters or light shields, refer to Instrument-specific information on page 1.)	2

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

Sample collection and storage

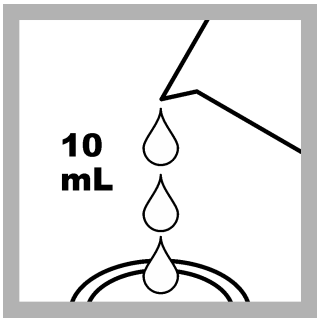
- Collect samples in clean glass or plastic bottles.
- To preserve samples for later analysis, keep the samples at or below 6 °C (43 °F) for up to 48 hours.
- Let the sample temperature increase to room temperature before analysis.

Powder pillow procedure

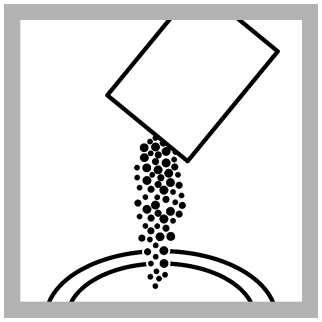


1. Start program **373 N, Nitrite HR PP**. For information about sample cells, adapters or light shields, refer to Instrument-specific information on page 1.

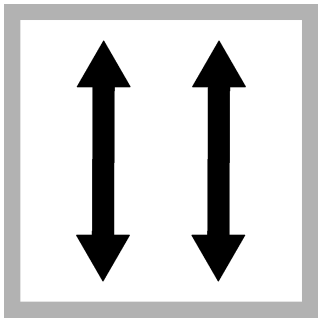
Note: *Although the program name can be different between instruments, the program number does not change.*



2. Prepare the sample: Fill a sample cell with 10 mL of sample.



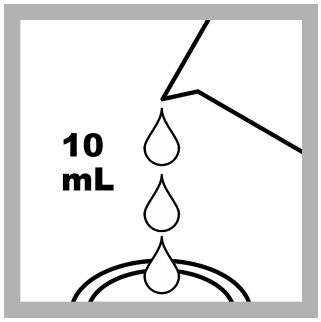
3. Add the contents of one NitriVer 2 Nitrite Reagent Powder Pillow. A greenish-brown color starts to show if nitrite is present in the sample.



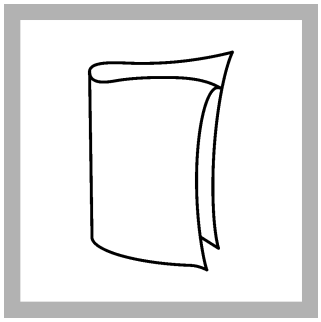
4. Put the stopper on the sample cell. Shake to dissolve the reagent.

5. Start the instrument timer. A 10-minute reaction time starts.

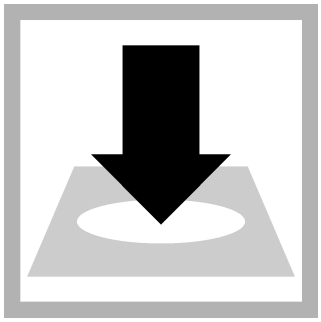
To prevent low results, leave the sample cell on a flat surface. **Do not move or disturb the sample cell during the reaction period.**



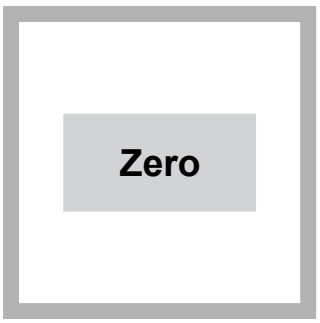
6. Prepare the blank: Fill a second sample cell with 10 mL of sample.



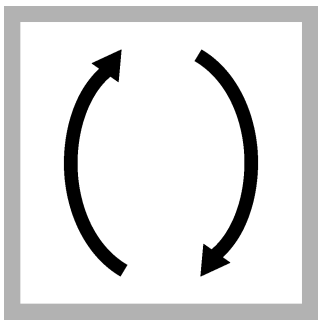
7. Clean the blank sample cell.



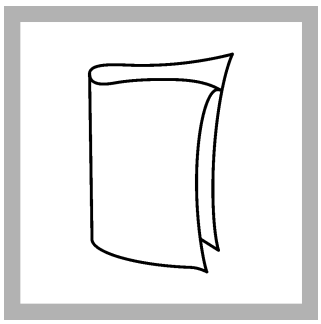
8. Insert the blank into the cell holder.



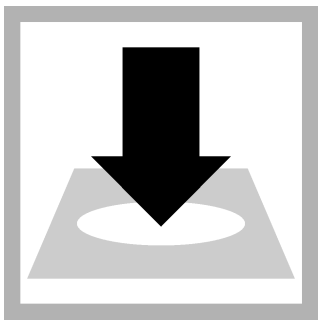
9. Push **ZERO**. The display shows 0 mg/L NO_2^-.



10. After the timer expires, gently invert the prepared sample two times. Excessive mixing causes low results.



11. Clean the prepared sample cell.



12. Insert the prepared sample into the cell holder.

13. Push **READ**. Results show in mg/L NO_2^-.

Interferences

This test does not measure nitrates nor is it applicable to glycol-based samples. Dilute glycol-based samples and use a Low Range Nitrite procedure (e.g. the diazotization method).

Accuracy check

Standard solution method

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

Items to collect:

- 200-mg/L NO_2^- standard solution (Nitrite standard solutions are difficult to prepare. Use the instructions in Standard Methods for the Examination of Water and Wastewater, Method 4500—NO_2-B)

1. Use the test procedure to measure the concentration of the standard solution.
2. Compare the expected result to the actual result.

   Note: *The factory calibration can be adjusted slightly with the standard 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 slight 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
373	200 mg/L NO_2^-	191–209 mg/L NO_2^-	1.4 mg/L NO_2^-

Summary of method

This method uses ferrous sulfate in an acidic medium to reduce nitrite to nitrous oxide. Ferrous ions combine with the nitrous oxide to form a greenish-brown complex in direct proportion to the nitrite present. The measurement wavelength is 585 nm for spectrophotometers or 560 nm for colorimeters.

Consumables and replacement items

Required reagents

Description	Quantity/test	Unit	Item no.
NitriVer®[1] 2 Nitrite Reagent Powder Pillow, 10-mL	1	100/pkg	2107569

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

Required apparatus

Description	Quantity/test	Unit	Item no.
Stopper, Neoprene, solid, size #1	2	12/pkg	1480801

Optional reagents and apparatus

Description	Unit	Item no.
Balance, analytical, 80 g x 0.1 mg 100–240 VAC	each	2936701
Standard Methods Book, most current edition	each	2270800
Water, deionized	4 L	27256
Sodium Nitrite, ACS	454 g	245201

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