



Standard Test Method for NITRATE ION IN WATER¹

This standard is issued under the fixed designation D 992; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval.

This method has been approved for use by agencies of the Department of Defense and for listing in the DoD Index of Specifications and Standards.

1. Scope and Application

1.1 This method² covers the determination of nitrate ion in water.

1.2 Samples containing 1 to 50 mg/liter of nitrate, as NO_3 , may be analyzed by this method. The concentration range may be extended by dilution of an appropriate aliquot.

2. Summary of Method

2.1 Nitrate ion reacts with brucine in strong sulfuric acid solution to develop a yellow color. The color does not follow the Beer - Lambert relationship. However, a plot of absorbance versus concentration produces a smooth curve. It is necessary to develop a series of standards simultaneously with the samples. The color is measured at 410 nm.

2.2 The rate of color development varies directly with the temperature and the intensity varies inversely with the temperature.

3. Definitions

3.1 For definitions of terms used in this method refer to ASTM Definitions D 1129, Terms Relating to Water.³

4. Interferences

4.1 Strong oxidizing or reducing agents interfere. Oxidizing agents may be determined with orthotolidine. Chlorine interference up to 5 mg/liter may be eliminated by the addition of sodium arsenite.

4.2 High content of organic matter may interfere by increasing the absorbance readings at 410 nm and also because of the possible charring effects from the concentrated sulfuric acid (H_2SO_4). This can be minimized by pretreatment with aluminum hydroxide and specially treated activated carbon.

4.3 Nitrite interference up to 7 mg/liter is eliminated by the sulfanilic acid in the brucine reagent solution.

4.4 Table 1 shows the amount of various other substances commonly found in water that can be present without causing interference in this test.

5. Apparatus

5.1 *Photometer*—A spectrophotometer or filter photometer suitable for measurements at 410 nm with a light path of 1 to 5 cm. Photometers and photometric practice described in this method shall conform to ASTM Recommended Practice E 60, Photometric Methods for the Chemical Analysis of Metals⁴; spectrophotometers shall conform to ASTM Recommended Practice E 275, for Describing and Measuring Performance of Spectrophotometers.⁵

6. Reagents and Materials

6.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the

¹ This method is under the jurisdiction of ASTM Committee D-19 on Water.

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² A method similar to this appears in *Standard Methods for the Examination of Water and Wastewater*, 12th edition, American Public Health Association.

³ 1983 *Annual Book of ASTM Standards*, Vol 11.01.

⁴ 1982 *Annual Book of ASTM Standards*, Part 12.

⁵ 1983 *Annual Book of ASTM Standards*, Vol 14.01.

⁶ "Reagent Chemicals, American Chemical Society Specifications," Am. Chemical Soc., Washington, D.C. For suggestions on the testing of reagents not listed by the American Chemical Society, see "Reagent Chemicals and Standards," by Joseph Rosin, D. Van Nostrand Co., Inc., New York, N.Y., and the "United States Pharmacopeia."