Nitrate Vacu-vials® Kit

K-6973: 0 - 1.50 ppm N (Prog. # 123)
K-6983: 0 - 15 ppm N (Prog. # 124)

Instrument Set-up

For CHEMetrics photometers, follow the **Setup and Measurement Procedures** in the operator's manual. For spectrophotometers, follow the manufacturer's instructions to set the wavelength to **520 nm** and to zero the instrument using the ZERO ampoule supplied.

Sample Temperature

Sample temperatures that deviate significantly from 20°C (68°F) may introduce test result bias.

Test Procedure

1. **K-6973:** Fill the reaction tube (screw cap tube) to the **15 mL** mark with the sample to be tested (fig. 1).

   K-6983: Using the syringe provided, dispense **1.5 mL** of the sample to be tested into the empty reaction tube (screw cap tube), then dilute to the 15 mL mark with distilled water.

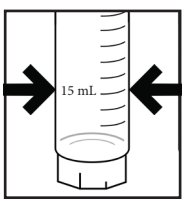

Figure 1

2. Add **10 drops** of S-6902 buffer solution to the reaction tube (fig. 2).
3. Add a **level** scoop of S-6904 Zinc to the reaction tube (fig. 3).
4. Cap the reaction tube and shake it vigorously for exactly **2 minutes**.

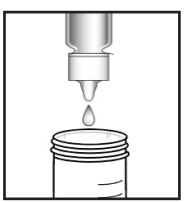
Figure 2

5. Add **10 drops** of S-7004 acidifier solution to the empty 25 mL sample cup.
6. Pour the treated sample from the reaction tube into the sample cup, being careful not to transfer any solid material to the sample cup.

   Note: A small amount of solids in the sample cup will not affect test results. Set tube aside, it is no longer needed.

7. Place the Vacu-vial ampoule, tip first, into the sample cup. Snap the tip. The ampoule will fill leaving a bubble for mixing (fig. 4).
8. To mix the ampoule, invert it several times, allowing the bubble to travel from end to end.
9. Dry the ampoule. Wait **8 minutes** for color development.


Figure 3

10. Insert the Vacu-vial ampoule into the photometer, flat end first, and obtain a reading in ppm (mg/Liter) nitrate-nitrogen (NO_3-N).

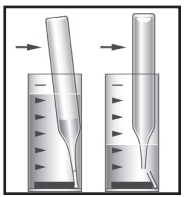
Figure 4

   NOTE: If using a spectrophotometer that is not pre-calibrated for CHEMetrics products or the V-2000 then use the **equation below** or the **Concentration Calculator** on the website. If instrument response is > 2 absorbance (abs), dilute sample and retest.

K-6973: ppm N = 0.65 (abs) + 0.01
K-6983: ppm N = 6.5(abs) + 0.1

NOTE: To convert to ppm nitrate (NO_3), multiply test result by 4.4.

Test Method

The Nitrate Vacu-vials®[1] test kit employs the zinc reduction method.[2,3,4,5] In an acidic solution, nitrite diazotizes with the primary aromatic amine N-(1-naphthyl)ethylenediamine dihydrochloride (NED) and then couples with sulfanilic acid to produce a highly colored azo dye. The resulting pink color is proportional to the nitrite concentration in the sample.

1. Vacu-vials is a registered trademark of AquaPhoenix Scientific, LLC U.S. Patent No. 3,634,038
2. APHA Standard Methods, 23rd ed., Method 4500-NO_3- E - 2016
3. ASTM D 3867 - 09, Nitrite-Nitrate in Water, Test Method B
4. EPA Methods for Chemical Analysis of Water and Wastes, Method 353.3 (1983)
5. Nelson J. L., Kurtz, L. T., and R. H. Bray Rapid Determination of Nitrates and Nitrites. Analytical Chem., V26, p 1081-2 (1954)

Safety Information

Read SDS before performing this test procedure. Wear safety glasses and protective gloves.

Nov. 26, Rev. 2