

Sulfate Vacu-vials® Kit

K-9203: 0 - 100.0 ppm (Prog. # 174)

Instrument Set-up

The following method revisions are required: Method Rev. 20 (V-2000) and Software Ver. 2.72/Program Ver. 2.09C (V-3000).

For CHEMetrics photometers, follow the **Setup and Measurement Procedures** in the operator's manual. For spectrophotometers, follow the manufacturer's specifications to set the wavelength to 420 nm and to zero the instrument using the ZERO ampoule supplied.

Different instrument platforms vary widely in their ability to measure turbidity. Since this method is a turbidimetric determination, the calibration equation is for reference only. It is strongly recommended that sulfate standards be run to validate the calibration equation or to generate an instrument specific calibration.

Sample Pretreatment

If the sample is turbid, it must be filtered prior to performing this test procedure.

Test Procedure

1. Fill the sample cup to the 20 mL mark with the sample to be tested (fig. 1).

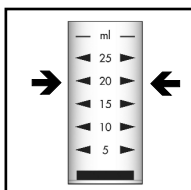


Figure 1

2. Add 7 drops of S-9200 Acidifier Solution (fig. 2). Stir to mix the contents of the cup.

NOTE: The appearance of bubbles on the side and bottom of the sample cup is an indication of extremely high alkalinity levels, (>2000 ppm as CaCO₃). Under these conditions stir the sample for approximately 1 minute to allow this gas to be dispersed.

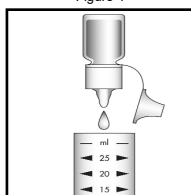


Figure 2

3. Add 1 scoop of S-9202 Activator Powder to the sample. Stir for **10 seconds**.

NOTE: It is not critical that all of the crystals dissolve. However, it is important to remove any excess crystals from the sample cup before running another test.

4. Place the Vacu-vial ampoule, tip first, into the sample cup. Snap the tip. The ampoule will fill leaving a bubble for mixing (fig. 3).

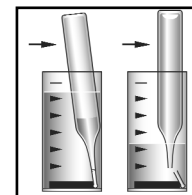


Figure 3

5. To mix the ampoule, invert it several times, allowing the bubble to travel from end to end.

6. Dry the ampoule. Obtain a test result **1 minute** after snapping tip.

7. Insert the Vacu-vial ampoule into the photometer, flat end first, and obtain a reading in ppm (mg/Liter) sulfate (SO₄).

NOTE: If using a spectrophotometer that is not pre-calibrated for CHEMetrics products and an instrument specific calibration has not been generated as recommended, then use the equation below or the Concentration Calculator on the website.

$$\text{ppm} = 251.9(\text{abs})^3 - 377.7(\text{abs})^2 + 274.4(\text{abs}) + 3.1$$

Test Method

The Sulfate Vacu-vials®¹ test kit employs the turbidimetric method.^{2,3,4} Sulfate ion reacts with barium chloride in an acidic solution to form a suspension of barium sulfate crystals of uniform size. The resulting turbidity is proportional to the sulfate concentration of the sample.

1. Vacu-vials is a registered trademark of AquaPhoenix Scientific, LLC U.S. Patent No. 3,634,038.

2. APHA Standard Methods, 15th ed., Method 426 C (1980).

3. EPA Methods for Chemical Analysis of Water and Wastes, Method 375.4 (1983).

4. ASTM D 516 - 07, Sulfate Ion in Water.

Safety Information

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



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