

## Sulfate - Turbidimetric Method

Version 8 / May 2023

### Applications and Industries

Drinking and surface waters, seawater, domestic and industrial wastewater

### References

APHA Standard Methods, 15th ed., Method 426 C (1980)  
EPA Methods for Chemical Analysis of Water and Wastes, Method 375.4 (1983)  
ASTM D 516-07, Sulfate Ion in Water

### Chemistry

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. Results are expressed as ppm (mg/L) SO<sub>4</sub>.

### Available Analysis Systems

*Instrumental colorimetric:* Vacu-vials®

### Storage Requirements

Products should be stored in the dark and at room temperature.

### Shelf Life

*When stored in the dark and at room temperature:*  
Vacu-vials kit: at least 1 year

### Safety Information

Safety Data Sheets (SDS) are available upon request and at [www.chemetrics.com](http://www.chemetrics.com). Read SDS before using these products. Breaking the tip of an ampoule in air rather than water may cause the glass ampoule to shatter. Wear safety glasses and protective gloves.

### Interference Information

- Color and suspended matter interfere with the photometric measurement. Pre-filtration of the sample prior to analysis may be necessary to minimize these interferences. Filtration may not remove all turbidity, therefore, a sample blank, from which barium chloride has been omitted, may be prepared.
- To minimize interferences from up to 2000 ppm carbonate and other forms of alkalinity, an acidifier solution is added to the sample prior to analysis.
- Silica at up to 1000 mg/L does not interfere.
- Chloride at levels greater than 5000 ppm has the potential to cause low test results. However, the test kit can be used to analyze seawater since the sulfate levels in seawater typically require a substantial dilution prior to analysis, and the resultant chloride concentration in the diluted sample is not sufficient to cause interferences.
- Samples containing appreciable amounts of organic material, polymers, or aluminum may not satisfactorily precipitate barium sulfate.
- Polyphosphates and some phosphonates, even at low levels, inhibit barium sulfate formation, causing low test results.

### Accuracy Statement

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

*Statements of accuracy are based on laboratory tests performed under ideal testing conditions using standards of known concentration prepared in deionized water.*

*Accuracy with V-2000 and V-3000:*

- ≤ 7.5 ppm at 0 ppm
- ± 7.5 ppm at 25.0 ppm
- ± 15.0 ppm at 50.0 ppm
- ± 15.0 ppm at 75.0 ppm