



Standard Test Method for Sulfide Ion in Water¹

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1. Scope*

1.1 This test method uses an ion-selective electrode to determine sulfide ion in water. The test method is applicable in the range from 0.04 to 4000 mg/L of sulfide.

1.2 Precision data presented in this test method were obtained using reagent water only. It is the user's responsibility to ensure the validity of this test method for untested types of water.

1.3 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* Sulfide samples, when acidified, can release highly toxic hydrogen sulfide gas. For a specific precautionary statement, see 7.5.

2. Referenced Documents

2.1 *ASTM Standards:*²

D1129 Terminology Relating to Water

D1193 Specification for Reagent Water

D2777 Practice for Determination of Precision and Bias of Applicable Test Methods of Committee D19 on Water

D3370 Practices for Sampling Water from Closed Conduits

D4127 Terminology Used with Ion-Selective Electrodes

D5810 Guide for Spiking into Aqueous Samples

D5847 Practice for Writing Quality Control Specifications for Standard Test Methods for Water Analysis

¹ This test method is under the jurisdiction of ASTM Committee D19 on Water and are the direct responsibility of Subcommittee D19.05 on Inorganic Constituents in Water.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

3. Terminology

3.1 *Definitions:*

3.1.1 For definitions of terms used in this test method, refer to Terminology D1129.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 For definitions of terms specific to this test method, refer to Terminology D4127.

4. Summary of Test Method

4.1 Sulfide ion is measured potentiometrically using a sulfide ion-selective electrode in conjunction with a double-junction sleeve type reference electrode. Potentials are read using a pH meter having an expanded millivolt scale capable of being read to the nearest 0.1 mV, or a specific ion meter having a direct concentration scale for sulfide ion.

4.2 Samples are treated prior to analysis with sulfide anti-oxidant buffer (SAOB). This buffer fixes the solution pH at a highly alkaline level and contains ascorbic acid to retard air oxidation of sulfide ion in solution. This ensures that the sulfide present occurs chiefly as S^{2-} ion rather than as complexed HS^{1-} or H_2S that are present at lower pH values.

5. Significance and Use

5.1 Sulfide ion is found in ground waters and wastewater, causing odor and corrosion problems. If acidified, these waters can release hydrogen sulfide, which is extremely toxic even at low levels. This test method provides a means for interference-free measurement of free sulfide ion.

NOTE 1—Sulfide forms complexes with hydrogen ions (HS^{1-} and H_2S). In addition, sulfide ion forms soluble complexes with elemental sulfur (S_2^{2-} , S_3^{2-} , S_4^{2-} , etc.), tin, antimony, and arsenic ions.

6. Apparatus

6.1 *pH Meter*, with expanded millivolt scale, or a specific ion meter having a direct concentration scale for sulfide ion.

6.2 *Sulfide Ion-Selective Electrode*.

6.3 *Reference Electrode*, double-junction sleeve type with 1.0 M potassium nitrate solution, pH adjusted to 13.5 with 1.0 M sodium hydroxide in the outer sleeve.