



## Standard Test Method for Bromide Ion in Water<sup>1</sup>

This standard is issued under the fixed designation D 1246; 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. A superscript epsilon ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

*This standard has been approved for use by agencies of the Department of Defense.*

### 1. Scope

1.1 This test method is applicable to the measurement of bromide ion in water, ground water, and drinking water.

1.2 Samples containing 0.5 mg/L to 1000 mg/L of bromide may be analyzed by this test method. The concentration range may be extended by the dilution of an appropriate aliquot.

1.3 The precision and bias statements were determined on natural and ground waters. It is the responsibility of the analyst to assure the validity of this test method for untested matrices.

1.4 A titrimetric and two colorimetric test methods for iodide and bromide were discontinued. Refer to Appendix X1 for historical information.

1.5 *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.*

### 2. Referenced Documents

#### 2.1 ASTM Standards:

D 1066 Practice for Sampling Steam <sup>2</sup>

D 1129 Terminology Relating to Water <sup>2</sup>

D 1193 Specification for Reagent Water <sup>2</sup>

D 2777 Practice for Determination of Precision and Bias of Applicable Methods of Committee D-19 on Water <sup>2</sup>

D 3370 Practices for Sampling Water from Closed Conduits <sup>2</sup>

D 4127 Terminology Used with Ion-Selective Electrodes <sup>2</sup>

### 3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminologies D 1129 and D 4127.

### 4. Summary of Test Method

4.1 Bromide ion is measured potentiometrically using a bromide ion-selective electrode in conjunction with a single-

junction, sleeve-type reference electrode. Potentials are read on a pH meter having an expanded millivolt scale capable of being read to the nearest 0.1 mV, or a selective ion meter having a direct concentration scale for bromide. For less precise work, a pH meter having a millivolt scale capable of being read to the nearest 1.0 mV is adequate, however, no supporting data are available.

4.2 The electrodes are calibrated in known bromide solutions and the concentrations of unknowns are determined in solutions with the same background. In most cases, addition of an ionic strength adjustor to both standards and samples is sufficient to maintain constant background ionic strength. For samples above 0.1 M in ionic strength, prepare standard solutions similar to the sample composition.

### 5. Significance and Use

5.1 By analysis for bromide in water, wastewater, and brackish waters, it is possible to evaluate the origin of the water, its potential as a source of bromide, and its condition with regard to pollution.

### 6. Interferences

6.1 Strongly reducing solutions and solutions containing ions which form insoluble silver salts may coat the electrode membrane. These may be removed by polishing the membrane surface. Sulfide ion and cyanide ion both poison the electrode, and should be removed (see Section 11).

6.2 Halide ions form complexes with some metals. Since the electrode responds only to free bromide ions, the presence of any complexing agents lowers the measured concentrations. Concentrations of free metal ions causing a 10 % error of a bromide concentration of 8.1 mg/L are bismuth <sup>+3</sup>, 80 mg/L; cadmium <sup>+2</sup>, 100 mg/L; lead <sup>+2</sup>, 1600 mg/L; tin <sup>+2</sup>, 2400 mg/L; and thallium <sup>+3</sup>, 4 mg/L.

6.3 Chloride ion and hydroxide ion do not interfere when present in the concentrations of up to 400 and 30 000 times the bromide concentration, respectively. There will be no interference from ammonia when present in concentrations twice that of bromide, nor from thiosulfate 20 times as concentrated as bromide. Iodide is an interference at a concentration ratio as low as  $2 \times 10^{-4}$ . Mercury should be absent from samples.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D-19 on Water and is the direct responsibility of Subcommittee D19.05 on Inorganic Constituents in Water.

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<sup>2</sup> *Annual Book of ASTM Standards*, Vol 11.01.