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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Test Method for Strontium in Water¹

This standard is issued under the fixed designation D 3920; 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 (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method covers the determination of dissolved and total recoverable strontium in water and wastewater by atomic absorption spectroscopy.

1.2 The test method is applicable in the range from 0.1 to 1 mg/L of strontium. The range may be extended by dilution of the original sample.

1.3 Round-robin data were obtained in natural and reagent water matrices. It is the user's responsibility to ensure the validity of the test method for waters of untested matrices.

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.* Specific precautionary statements are given in Note 4 and Note 5.

2. Referenced Documents

2.1 ASTM Standards:

D 1129 Terminology Relating to Water²

D 1193 Specification for Reagent Water²

D 3370 Practices for Sampling Water from Closed Conduits²

D 4691 Practice for Measuring Elements in Water by Flame Atomic Absorption Spectrophotometry²

D 4841 Practice for Estimation of Holding Time for Water Samples Containing Organic and Inorganic Constituents²

3. Terminology

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

3.2 Definition of Term Specific to This Standard:

3.2.1 *total recoverable strontium*—an arbitrary analytical term relating to the forms of strontium that are determinable by the digestion procedure described in this test method.

4. Summary of Test Method

4.1 Strontium is determined by atomic absorption spectrophotometry. The sample is aspirated into an air-acetylene flame

following the addition of lanthanum chloride/potassium chloride solution. Samples containing particulate matter that may clog the aspirator capillary or burner, thus producing inaccurate results, are filtered through a 0.45-μm membrane filter prior to testing.

5. Significance and Use

5.1 Although most potable supplies contain little strontium, some well waters in the midwestern part of the United States have levels as high as 39 mg/L.³

5.2 This test method affords a reliable means of accurately determining strontium and correcting calcium results obtained by the methods cited in 6.2.

6. Interferences

6.1 Chemical interference caused by silicon, aluminum, and phosphate is controlled by adding lanthanum chloride. Potassium chloride is added to suppress the ionization of strontium.

NOTE 1—A nitrous oxide-acetylene flame has been used successfully by some to remove chemical interferences.

6.2 Strontium chemically resembles calcium and causes a positive error in gravimetric and titrimetric methods for calcium determination.

7. Apparatus

7.1 *Atomic Absorption Spectrophotometer* for use at 460.7 nm. A general guide for the use of flame atomic absorption applications is given in Practice D 4691.

NOTE 2—The manufacturer's instructions should be followed for setting instrumental parameters.

7.2 Strontium Hollow-Cathode Lamp.

8. Reagents and Materials

8.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society,

¹ 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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² *Annual Book of ASTM Standards*, Vol 11.01.

³ *Standard Method for the Examination of Water and Wastewater*, 14th Ed. American Public Health Assn., Washington, DC 20005.