



Standard Test Method for Potassium in Water by Atomic Absorption Spectrophotometry¹

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1. Scope

1.1 This test method covers the determination of low amounts of potassium in waters² having low solids content. The applicable range of this test method is 0.20 to 4.0 mg/L when using the 766.5-nm resonance line. The range may be extended upward by dilution of an appropriate aliquot of sample or by using the less-sensitive 404.4-nm resonance line. Many workers have found that this test method is reliable for potassium levels to 0.02 mg/L, but use of this test method at this low level is dependent on the configuration of the aspirator and nebulizer systems available in the atomic absorption spectrophotometer as well as the skill of the analyst. The precision and bias data presented are insufficient to justify use of this test method in the 0.02-mg/L range.

1.2 This test method has been used successfully with spiked reagent water. It is the analyst's responsibility to ensure the validity of this test method to other low dissolved solids matrices.

1.3 *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.* For a specific precautionary statement, see Note 2.

2. Referenced Documents

2.1 ASTM Standards:

- D 1066 Practice for Sampling Steam³
- D 1129 Terminology Relating to Water³
- D 1192 Specification for Equipment for Sampling Water and Steam in Closed Conduits³
- D 1193 Specification for Reagent Water³
- D 3370 Practices for Sampling Water from Closed Conduits³

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 Platte, J. A., and Marcy, V. M., "A New Tool for the Water Chemist," *Industrial Water Engineering*, May 1965.

³ *Annual Book of ASTM Standards*, Vol 11.01.

3. Terminology

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

4. Summary of Test Method

4.1 Potassium is determined by flame atomic absorption spectrophotometry. The potassium content is determined by aspirating the low solids sample directly with no sample pretreatment.

5. Significance and Use

5.1 Potassium occurs in rocks in a form that is not easily solubilized; therefore, the potassium content of natural waters is usually low. Most natural waters contain less than 20 mg/L of potassium, but waters containing several hundred milligrams per litre are occasionally found. Potassium is essential to animal nutrition, but a concentration of 1000 to 2000 mg/L in stock water is regarded as the extreme limit permissible.

6. Interferences

6.1 In the analysis of low-solids water, interferences are usually negligible.

7. Apparatus

7.1 *Atomic Absorption Spectrophotometer* for use at 766.5 nm.

NOTE 1—The manufacturer's instructions should be followed for all instrumental parameters. Wavelengths other than 766.5 nm may be used only if they have been determined to be equally suitable.

7.2 *Potassium Hollow-Cathode Lamps*—Multielement hollow cathode lamps are available and also have been found satisfactory.

7.3 *Pressure-Reducing Valves*—The supplies of fuel and oxidant shall be maintained at pressures somewhat higher than the operating pressure of the instrument by using suitable valves.

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