



Standard Test Method for Determination of Dissolved Inorganic Anions in Aqueous Matrices Using Capillary Ion Electrophoresis and Chromate Electrolyte¹

This standard is issued under the fixed designation D6508; 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 the inorganic anions fluoride, bromide, chloride, nitrite, nitrate, ortho-phosphate, and sulfate in drinking water, wastewater, and other aqueous matrices using capillary ion electrophoresis (CIE) with indirect UV detection. See [Figs. 1-6](#).

1.2 The test method uses a chromate-based electrolyte and indirect UV detection at 254 nm. It is applicable for the determination of inorganic anions in the range of 0.1 to 50 mg/L except for fluoride whose range is 0.1 to 25 mg/L.

1.3 It is the responsibility of the user to ensure the validity of this test method for other anion concentrations and untested aqueous matrices.

NOTE 1—The highest accepted anion concentration submitted for precision and bias extend the anion concentration range for the following anions: Chloride to 93 mg/L, Sulfate to 90 mg/L, Nitrate to 72 mg/L, and ortho-phosphate to 58 mg/L.

1.4 The values stated in SI units are to be regarded as standard. The values given in parentheses are mathematical conversions to inch-pound units that are provided for information only and are not considered standard.

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.* For specific hazard statements, see Section 9.

2. Referenced Documents

2.1 ASTM Standards:²

[D1066 Practice for Sampling Steam](#)

¹ This test method is under the jurisdiction of ASTM Committee [D19](#) on Water and is 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.

[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](#)
[D3856 Guide for Management Systems in Laboratories Engaged in Analysis of Water](#)
[D5810 Guide for Spiking into Aqueous Samples](#)
[D5847 Practice for Writing Quality Control Specifications for Standard Test Methods for Water Analysis](#)
[D5905 Practice for the Preparation of Substitute Wastewater](#)
[F488 Test Method for On-Site Screening of Heterotrophic Bacteria in Water \(Withdrawn 2005\)](#)³

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in this standard, refer to Terminology [D1129](#).

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *capillary ion electrophoresis, n*—an electrophoretic technique in which a UV-absorbing electrolyte is placed in a 50 μm to 75 μm fused-silica capillary.

3.2.1.1 *Discussion*—Voltage is applied across the capillary causing electrolyte and anions to migrate towards the anode and through the capillary's UV detector window. Anions are separated based upon the differential rates of migration in the electrical field. Anion detection and quantitation are based upon the principles of indirect UV detection.

3.2.2 *electrolyte, n*—a combination of a UV-absorbing salt and an electroosmotic-flow modifier placed inside the capillary, used as a carrier for the analytes, and for detection and quantitation.

3.2.2.1 *Discussion*—The UV-absorbing portion of the salt must be anionic and have an electrophoretic mobility similar to the analyte anions of interest.

3.2.3 *electroosmotic flow (EOF), n*—the direction and velocity of electrolyte-solution flow within the capillary under an

³ The last approved version of this historical standard is referenced on www.astm.org.

*A Summary of Changes section appears at the end of this standard