



Designation: D1976 – 18

Standard Test Method for Elements in Water by Inductively-Coupled Plasma Atomic Emission Spectroscopy¹

This standard is issued under the fixed designation D1976; 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, total-recoverable, or total elements in drinking water, ground water, surface water, domestic, commercial or industrial wastewaters,^{2,3} within the following concentration ranges:

1.2 It is the user's responsibility to ensure the validity of the test method for waters of untested matrices.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* For specific hazard statements, see **Note 2** and Section 9.

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*⁴

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.

Current edition approved July 1, 2018. Published July 2018. Originally approved in 1991. Last previous edition approved in 2012 as D1976 – 12. DOI: 10.1520/D1976-18.

² The detailed report of EPA Method Study 27, Method 200.7 is available from the National Technical Information Service, 5285 Port Royal Road, Springfield, VA. A summary of the project is available from the U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, OH, <http://www.epa.gov>.

³ Fishman, M. J. and Friedman, L., "Methods for Determination of Inorganic Substances in Water and Fluvial Sediments," *U.S. Geological Survey Techniques of Water-Resources Investigations*, Book 5, Chapter D1066, Open File Report 85-495, 1985, p. 659–671.

⁴ 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
D4841 Practice for Estimation of Holding Time for Water Samples Containing Organic and Inorganic Constituents
D5673 Test Method for Elements in Water by Inductively Coupled Plasma—Mass Spectrometry
D5744 Test Method for Laboratory Weathering of Solid Materials Using a Humidity Cell
D5810 Guide for Spiking into Aqueous Samples
D5847 Practice for Writing Quality Control Specifications for Standard Test Methods for Water Analysis
D6234 Test Method for Shake Extraction of Mining Waste by the Synthetic Precipitation Leaching Procedure
D8006 Guide for Sampling and Analysis of Residential and Commercial Water Supply Wells in Areas of Exploration and Production (E&P) Operations
E1915 Test Methods for Analysis of Metal Bearing Ores and Related Materials for Carbon, Sulfur, and Acid-Base Characteristics
E2242 Test Method for Column Percolation Extraction of Mine Rock by the Meteoric Water Mobility Procedure

2.2 *USEPA Standards:*²

Method 200.7 Determination of Metals and Trace Elements in Water and Wastes by Inductively Coupled Plasma-Atomic Emission Spectrometry

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 *calibration blank, n*—a volume of water containing the same acid matrix as the calibration standards (see **11.1**).

3.2.2 *calibration standards, n*—a series of known standard solutions used by the analyst for calibration of the instrument (preparation of the analytical curve) (see **8.9**).

3.2.3 *instrumental detection limit, n*—the concentration equivalent to a signal, due to the analyte, that is equal to three

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