



Standard Test Methods for Arsenic in Water¹

This standard is issued under the fixed designation D 2972; 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 These test methods² cover the photometric and atomic absorption determination of arsenic in most waters and wastewaters. Three test methods are given as follows:

	Concentration Range	Sections
Test Method A—Silver Diethyldithiocarbamate Colorimetric	5 to 250 µg/L	7 to 15
Test Method B—Atomic Absorption, Hydride Generation	1 to 20 µg/L	16 to 24
Test Method C—Atomic Absorption, Graphite Furnace	5 to 100 µg/L	25 to 33

1.2 The analyst should direct attention to the precision and bias statements for each test method. It is the user's responsibility to ensure the validity of these test methods for waters of untested 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 specific hazard statements, see Note 1 and Note 6.

2. Referenced Documents

2.1 ASTM Standards:

- D 1129 Terminology Relating to Water³
- D 1193 Specification for Reagent Water³
- D 2777 Practice for Determination of Precision and Bias of Applicable Methods of Committee D19 on Water³
- D 3370 Practices for Sampling Water from Closed Conduits³
- D 3919 Practice for Measuring Trace Elements in Water by Graphite Furnace Atomic Absorption Spectrophotometry³
- D 4841 Practice for Estimation of Holding Time for Water

¹ These test methods are under the jurisdiction of ASTM Committee D19 on Water and are the direct responsibility of Subcommittee D19.05 on Inorganic Constituents in Water.

Current edition approved Jan. 10, 2003. Published January 2003. Originally approved in 1993. Last previous edition approved in 1997 as D 2972 – 97.

² Similar to that appearing in *Standard Methods for the Examination of Water and Wastewater*, 12th edition, APHA, Inc., New York, NY, 1965, and identical with that in Brown, Eugene, Skougstad, M. W., and Fishman, M. J., "Methods for Collection and Analysis of Water Samples for Dissolved Minerals and Gases," *Techniques of Water-Resources Investigations of the U.S. Geological Survey*, Book 5, Chapter , 1970 p. 46.

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

Samples Containing Organic and Inorganic Constituents³
D 5810 Guide for Spiking into Aqueous Samples³
D 5847 Practice for the Writing Quality Control Specifications for Standard Test Methods for Water Analysis³
E 60 Practice for Photometric and Spectrophotometric Methods for Chemical Analysis of Metals⁴
E 275 Practice for Describing and Measuring Performance of Ultraviolet, Visible, and Near Infrared Spectrophotometers⁵

3. Terminology

3.1 Definitions of Term Specific to This Standard:

3.1.1 For definitions of terms used in these test methods refer to Terminology D 1129.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *total recoverable arsenic*—an arbitrary analytical term relating to the forms of arsenic that are determinable by the digestion method which is included in the procedure. Some organic-arsenic compounds, such as phenylarsonic acid, disodium methane arsonate, and dimethylarsonic acid, are not recovered completely during the digestion step.

4. Significance and Use

4.1 Herbicides, insecticides, and many industrial effluents contain arsenic and are potential sources of water pollution. Arsenic is significant because of its adverse physiological effects on humans.

5. Purity of Reagents

5.1 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, where such specifications are available.⁶ Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

⁴ *Annual Book of ASTM Standards*, Vol 03.05.

⁵ *Annual Book of ASTM Standards*, Vol 03.06.

⁶ *Reagent Chemicals, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmaceutical Convention, Inc. (USPC), Rockville, MD.

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