



Standard Test Methods for Cobalt in Water¹

This standard is issued under the fixed designation D 3558; 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.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope*

1.1 These test methods cover the determination of dissolved and total recoverable cobalt in water and wastewater² by atomic absorption spectrophotometry. Three test methods are included as follows:

	Concentration Range	Sections
Test Method A—Atomic Absorption, Direct	0.1 to 10 mg/L	7 to 16
Test Method B—Atomic Absorption, Chelation-Extraction	10 to 1000 μ g/L	17 to 26
Test Method C—Atomic Absorption, Graphite Furnace	5 to 100 μ g/L	27 to 36

1.2 Test Method A has been used successfully with reagent water, potable water, river water, and wastewater. Test Method B has been used successfully with reagent water, potable water, river water, sea water and brine. Test Method C was successfully evaluated in reagent water, artificial seawater, river water, tap water, and a synthetic brine. It is the analyst's responsibility to ensure the validity of these test methods for other 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 11.7.1, 21.10, and 23.10.

2. Referenced Documents

2.1 ASTM Standards:

- D 858 Test Methods for Manganese in Water³
- D 1066 Practice for Sampling Steam³
- D 1068 Test Methods for Iron in Water³
- D 1129 Terminology Relating to Water³
- D 1193 Specification for Reagent Water³
- D 1687 Test Methods for Chromium in Water³

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.

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² Platte, J. A., and March, V. M., "A New Tool for the Water Chemist," *Industrial Water Engineering*, May 1965.

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

- D 1688 Test Methods for Copper in Water³
- D 1691 Test Methods for Zinc in Water³
- D 1886 Test Methods for Nickel in 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 3557 Test Methods for Cadmium in Water³
- D 3559 Test Methods for Lead in Water³
- 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 Samples Containing Organic and Inorganic Constituents³
- D 5810 Guide for Spiking into Aqueous Samples³
- D 5847 Practice for Writing Quality Control Specifications for Standard Test Methods for Water Analysis⁴

3. Terminology

3.1 Definitions:

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 cobalt*—an arbitrary analytical term relating to the recoverable forms of cobalt that are determinable by the digestion method which is included in the procedure.

4. Significance and Use

4.1 Most waters rarely contain more than trace concentrations of cobalt from natural sources. Although trace amounts of cobalt seem to be essential to the nutrition of some animals, large amounts have pronounced toxic effects on both plant and animal life.

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

⁴ *Annual Book of ASTM Standards*, Vol 11.02.

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

