



Standard Test Methods for Nickel in Water¹

This standard is issued under the fixed designation D 1886; 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^{2, 3, 4} cover the atomic absorption determination of nickel in water and wastewaters. Three test methods are given as follows:

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

1.2 Test Methods A, B, and C have been used successfully with reagent grade water and natural waters. Evaluation of Test Method C was also made in condensate from a medium Btu coal gasification process. It is the user'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 hazards statements, see Note 4, 11.7.1, 21.9, 23.7, and 23.10.

1.4 Two former colorimetric test methods were discontinued. Refer to Appendix X1 for historical information.

2. Referenced Documents

2.1 ASTM Standards:

- D 858 Test Methods for Manganese in Water⁵
- D 1066 Practice for Sampling Steam⁵

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 Chilton, J. M., "Simultaneous Colorimetric Determination of Copper, Cobalt, and Nickel as Diethyldithiocarbamates," *Analytical Chemistry*, Vol 25, 1953, pp. 1274–1275.

³ Platte, J. A., and Marcy, V. M., "A New Tool for the Water Chemist," *Industrial Water Engineering*, May 1965.

⁴ Brown, E., 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. 115.

⁵ *Annual Book of ASTM Standards*, Vol 11.01.

- D 1068 Test Methods for Iron in Water⁵
- D 1129 Terminology Relating to Water⁵
- D 1192 Specification for Equipment for Sampling Water and Steam in Closed Conduits⁵
- D 1193 Specification for Reagent Water⁵
- D 1687 Test Methods for Chromium in Water⁵
- D 1688 Test Methods for Copper in Water⁵
- D 1691 Test Methods for Zinc in Water⁵
- D 2777 Practice for Determination of Precision and Bias of Applicable Methods of Committee D-19 on Water⁵
- D 3370 Practices for Sampling Water from Closed Conduits⁵
- D 3557 Test Methods for Cadmium in Water⁵
- D 3558 Test Methods for Cobalt in Water
- D 3559 Test Methods for Lead in Water⁵
- D 3919 Practice for Measuring Trace Elements in Water by Graphite Furnace Atomic Absorption Spectrophotometry⁵
- D 4841 Practice for Estimation of Holding Time for Water Samples Containing Organic and Inorganic Constituents⁵
- D 5810 Guide for Spiking into Aqueous Samples⁵
- D 5847 Practice for Writing Quality Control Specifications for Standard Test Methods for Water Analysis⁶

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 nickel*—an arbitrary analytical term relating to the recoverable forms of nickel that are determinable by the digestion method that is included in these test methods.

4. Significance and Use

4.1 Elemental constituents in potable water, receiving water, and wastewater need to be identified for support of effective pollution control programs. Test Methods A, B, and C provide the techniques necessary to make such measurements.

4.2 Nickel is considered to be relatively nontoxic to man and a limit for nickel is not included in the EPA National

⁶ *Annual Book of ASTM Standards*, Vol 11.02.

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

