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AMERICAN SOCIETY FOR TESTING AND MATERIALS
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Standard Test Methods for Chromium in Water¹

This standard is issued under the fixed designation D 1687; 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. Consult the DoD Index of Specifications and Standards for the specific year of issue which has been adopted by the Department of Defense.

1. Scope

1.1 These test methods cover the determination of hexavalent and total chromium in water. Three test methods are included as follows:

	Concentration Range	Sections
Test Method A—Photometric Diphenyl-carbohydrazide	0.01 to 0.5 mg/L	7-15
Test Method B—Atomic Absorption, Direct	0.1 to 10 mg/L	16-24
Test Method C—Atomic Absorption, Graphite Furnace	5 to 100 μg/L	25-33

1.2 Test Method A is a photometric method that measures dissolved hexavalent chromium only. Test Methods B and C are atomic absorption methods that are generally applicable to the determination of dissolved or total recoverable chromium in water without regard to valence state.

1.3 Test Method A has been used successfully with reagent grade water Types I, II, and III, tap water, 10 % NaCl solution, treated water from a synthetic organic industrial plant that meets NPDES permit requirements, and EPA-extraction procedure leachate water, process water, lake water, effluent treatment, that is, lime neutralization and precipitation of spent pickle liquor and associated rinse water from stainless steel pickling. Test Method C has been used successfully with reagent water, stock scrubber water, lake water, filtered tap water, river water, well water, production plant water, and a condensate from a medium BTU coal gasification process. Matrices used, except for reagent water, are not available for Test Method B. It is the user's responsibility to ensure the validity of these test methods for waters of untested matrices.

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 and health practices and determine the applicability of regulatory limitations prior to use.* For specific hazard statements, see 4.2 and Note 5 and Note 6.

2. Referenced Documents

2.1 ASTM Standards:

- D 858 Test Methods for Manganese in Water²
- D 1066 Practice for Sampling Steam²
- D 1068 Test Methods for Iron in Water
- D 1129 Terminology Relating to Water²
- D 1192 Specification for Equipment for Sampling Water and Steam in Closed Conduits²
- D 1193 Specification for Reagent Water²
- D 1688 Test Methods for Copper in Water²
- D 1691 Test Methods for Zinc in Water²
- D 1886 Test Methods for Nickel in Water²
- D 3370 Practices for Sampling Water from Closed Conduits²
- D 3557 Test Methods for Cadmium in Water²
- D 3558 Test Methods for Cobalt in Water²
- D 3559 Test Methods for Lead in Water²
- D 4691 Practice for Measuring Elements in Water by Flame Atomic Absorption Spectrophotometry²
- D 4841 Practice for Estimation of Holding Time for Water Samples Containing Organic and Inorganic Constituents²
- E 60 Practice for Photometric and Spectrophotometric Methods for Chemical Analyses of Metals³
- E 275 Practice for Describing and Measuring Performance of Ultraviolet, Visible, and Near Infrared Spectrophotometers⁴

3. Terminology

3.1 *Definitions:* —For definitions of terms used in these test methods, refer to Terminology D 1129.

4. Significance and Use

4.1 Hexavalent chromium salts are used extensively in metal finishing and plating applications, in anodizing aluminum, and in the manufacture of paints, dyes, explosives, and ceramics. Trivalent chromium salts are used as mordants in textile dyeing, in the ceramic and glass industry, in the leather industry as a tanning agent, and in photography. Chromium may be present in wastewater from these industries and may also be discharged from chromate-treated cooling waters.

¹ These test methods are under the jurisdiction of ASTM Committee D-19 on Water and are the direct responsibility of Subcommittee D19.05 on Inorganic Constituents in Water.

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² Annual Book of ASTM Standards, Vol 11.01.

³ Annual Book of ASTM Standards, Vol 03.05.

⁴ Annual Book of ASTM Standards, Vol 03.06.