



Standard Test Methods for Chemical Oxygen Demand (Dichromate Oxygen Demand) of Water¹

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

^{ε1} NOTE—Editorial corrections made throughout in June 2013.

1. Scope

1.1 These test methods cover the determination of the quantity of oxygen that certain impurities in water will consume, based on the reduction of a dichromate solution under specified conditions. The following test methods are included:

Test Method A – Macro COD by Reflux Digestion and Titration

Test Method B – Micro COD by Sealed Digestion and Spectrometry

1.2 These test methods are limited by the reagents employed to a maximum chemical oxygen demand (COD) of 800 mg/L. Samples with higher COD concentrations may be processed by appropriate dilution of the sample. Modified procedures in each test method (Section 15 for Test Method A and Section 24 for Test Method B) may be used for waters of low COD content (< 50 mg/L).

1.3 As a general rule, COD results are not accurate if the sample contains more than 1000 mg/L Cl⁻. Consequently, these test methods should not be applied to samples such as seawaters and brines unless the samples are pretreated as described in Appendix X1.

1.4 This test method was used successfully on a standard made up in reagent water. It is the user's responsibility to ensure the validity of these test methods for waters of untested matrices.

1.5 *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 Section 8, 15.6, and 24.5.

¹ These test methods are under the jurisdiction of ASTM Committee D19 on Water and are the direct responsibility of Subcommittee D19.06 on Methods for Analysis for Organic Substances in Water.

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2. Referenced Documents

2.1 ASTM Standards:²

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
D3223 Test Method for Total Mercury in Water
D3370 Practices for Sampling Water from Closed Conduits
D5905 Practice for the Preparation of Substitute Wastewater
E60 Practice for Analysis of Metals, Ores, and Related Materials by Spectrophotometry
E275 Practice for Describing and Measuring Performance of Ultraviolet and Visible Spectrophotometers

3. Terminology

3.1 *Definitions*—For definitions of other terms used in these test methods, refer to Terminology D1129.

3.2 The term “oxygen demand” (COD) in these test methods is defined in accordance with Terminology D1129 as follows:

3.2.1 *oxygen demand*—the amount of oxygen required under specified test conditions for the oxidation of water borne organic and inorganic matter.

4. Summary of Test Methods

4.1 Most organic and oxidizable inorganic substances present in water are oxidized by a standard potassium dichromate solution in 50 % sulfuric acid (vol/vol). The dichromate consumed (Test Method A) or tri-valent chromium produced (Test Method B) is determined for calculation of the COD value.

4.2 The oxidation of many otherwise refractory organics is facilitated by the use of silver sulfate that acts as a catalyst in the reaction.

² 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.