



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

This standard is issued under the fixed designation D 1252; 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 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.

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 and Note 3 and Note 9.

2. Referenced Documents

2.1 ASTM Standards:

D 1129 Terminology Relating to Water²

¹ These test methods are under the jurisdiction of ASTM Committee D-19 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 *Annual Book of ASTM Standards*, Vol 11.01.

D 1192 Specification for Equipment for Sampling Water and Steam in Closed Conduits²

D 1193 Specification for Reagent Water²

D 3223 Test Method for Total Mercury in Water

D 3370 Practices for Sampling Water from Closed Conduits²

D 3856 Guide for Good Laboratory Practices in Laboratories Engaged in Sampling and Analysis of Water²

D 4210 Practice for Intralaboratory Quality Control Procedures and a Discussion on Reporting Low-Level Data²

D 5905 Practice for the Preparation of Substitute Wastewater²

E 60 Practice for Photometric and Spectrophotometric Methods for Chemical Analysis 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 other terms used in these test methods, refer to Terminology D 1129.

3.2 The term “oxygen demand” (COD) in these test methods is defined in accordance with Terminology D 1129 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 standard potassium dichromate solution in 50 % (vol/vol) sulfuric acid. 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.

³ *Annual Book of ASTM Standards*, Vol 03.05.

⁴ *Annual Book of ASTM Standards*, Vol 03.06.