Designation: D 4129 – 98 (Reapproved 2003)

An American National Standard

Standard Test Method for Total and Organic Carbon in Water by High Temperature Oxidation and by Coulometric Detection[1]

This standard is issued under the fixed designation D 4129; 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.

1. Scope

1.1 This test method covers the determination of total and organic carbon in water and waste water, including brackish waters and brines in the range from 2 to 20 000 mg/L. This test method has the advantages of a wide range of concentration which may be determined without sample dilution and the provision for boat or capillary introduction of samples containing sediments and particulate matter where syringe injection is inappropriate.

1.2 This procedure is applicable only to that carbonaceous matter in the sample that can be introduced into the reaction zone. When syringe injection is used to introduce samples into the combustion zone, the syringe needle opening size limits the maximum size of particles that can be present in samples. Sludge and sediment samples must be homogenized prior to sampling with a micropipetor or other appropriate sampler and ladle introduction into the combustion zone is required.

1.3 The precision and bias information reported in this test method was obtained in collaborative testing that included waters of the following types: distilled, deionized, potable, natural, brine, municipal and industrial waste, and water derived from oil shale retorting. Since the precision and bias information reported may not apply to waters of all matrices, it is the user's responsibility to ensure the validity of this test method on samples of other 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 precautionary statements, see 9.1 and 10.2.1.

2. Referenced Documents

2.1 *ASTM Standards:* [2]

D 513 Test Methods for Total and Dissolved Carbon Dioxide in Water
D 1129 Terminology Relating to Water
D 1193 Specification for Reagent Water
D 3370 Practices for Sampling Water from Closed Conduits
D 3856 Guide for Good Laboratory Practices in Laboratories Engaged in the Sampling and Analysis of Water
D 4210 Practice for Interlaboratory Quality Control Procedures and a Discussion on Reporting Low-Level Data[3]
D 5789 Practice for Writing Quality Control Specifications for Standard Test Methods for Organic Constituents[3]

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminology D 1129.

4. Summary of Test Method

4.1 The sample is homogenized or diluted, or both, as necessary. If the sample does not contain suspended particles or high-salt level a 0.200-mL portion is injected into the reaction zone. For samples containing solids or high salt levels, portions are placed in combustion boats containing tungsten trioxide (WO_3) or quartz capillaries and introduced into the reaction zone using a ladle. In the reaction zone the heat, oxidation catalyst and oxygen atmosphere convert carbonaceous matter to carbon dioxide (CO_2). The oxygen gas stream sweeps the gaseous reaction products through a series of scrubbers for potentially interfering gases and then to the absorption/titration cell. The CO_2 is determined by automatic coulometric titration. Calibration by testing known carbon content standards is not required, however, standards are analyzed periodically to confirm proper operation.

4.2 Carbon dioxide is liberated from carbonates as well as from organic matter under the reaction conditions. Organic carbon is determined by difference between the total carbon and the inorganic carbon determined separately or by acidifying a portion of the sample to a pH of 2 or less and sparging with carbon dioxide-free gas to remove carbonates, bicarbonates, and dissolved carbon dioxide prior to total carbon determination. To determine organic carbon by difference the inorganic carbon is determined by acid release of carbon

[1] This test method is under the jurisdiction of ASTM Committee D19 on Water and is the direct responsibility of Subcommittee D19.06 on Methods for Analysis for Organic Substances in Water.

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[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.

[3] Withdrawn.

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