Designation: D 6160 – 98 (Reapproved 2003)$^{\epsilon 1}$

An American National Standard

Standard Test Method for Determination of Polychlorinated Biphenyls (PCBs) in Waste Materials by Gas Chromatography[1]

This standard is issued under the fixed designation D 6160; 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.

ϵ[1] NOTE—Warning notes were editorially moved into the standard text in August 2003.

1. Scope

1.1 This test method[2] is a two-tiered analytical approach to PCB screening and quantitation of liquid and solid wastes, such as oils, sludges, aqueous solutions, and other waste matrices.

1.2 Tier I is designed to screen samples rapidly for the presence of PCBs.

1.3 Tier II is used to determine the concentration of PCBs, typically in the range of from 2 to 50 mg/kg. PCB concentrations greater than 50 mg/kg are determined through analysis of sample dilutions.

1.4 This is a pattern recognition approach, which does *not* take into account individual congeners that might occur, such as in reaction by-products. This test method describes the use of Aroclors[3] 1016, 1221, 1232, 1242, 1248, 1254, 1260, 1262, and 1268, as reference standards, but others could also be included. Aroclors 1016 and 1242 have similar capillary gas chromatography (GC) patterns. Interferences or weathering are especially problematic with Aroclors 1016, 1232, and 1242 and may make distinction between the three difficult.

1.5 This test method provides sample clean up and instrumental conditions necessary for the determination of Aroclors. Gas chromatography (GC) using capillary column separation technique and electron capture detector (ECD) are described. Other detectors, such as atomic emission detector (AED) and mass spectrometry (MS), may be used if sufficient performance (for example, sensitivity) is demonstrated. Further details about the use of GC and ECD are provided in Practices E 355, E 697, and E 1510.

1.6 Quantitative results are reported on the dry weights of waste samples.

1.7 Quantification limits will vary depending on the type of waste stream being analyzed.

1.8 *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 regulator limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

D 4059 Test Method for Analysis of Polychlorinated Biphenyls in Insulating Liquids by Gas Chromatography[4]

E 203 Test Method for Water Using Karl Fischer Titration[5]

E 288 Specification for Laboratory Glass Volumetric Flasks[6]

E 355 Practice for Gas Chromatography Terms and Relationships[7]

E 697 Practice for Use of Electron-capture Detectors in Gas Chromatography[7]

E 969 Specification for Glass Volumetric (Transfer) Pipet[6]

E 1510 Practice for Installing Fused Silica Open Tubular Capillary Columns in Gas Chromatography[7]

2.2 *U.S. EPA Standards:*

Method 608 Organochlorine Pesticides and PCBs[8]

Method 680 Determination of Pesticides and PCBs in Water and Soil/Sediment by Gas Chromatography/Mass Spectrometry[9]

Method 3620 Florisil Column Clean-Up[10]

[1] This test method is under the jurisdiction of ASTM Committee D02 on Petroleum Products and Lubricants and is the direct responsibility of Subcommittee D02.04 on Hydrocarbon Analysis.

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[2] This test method is based largely on EPA 8080 (and the proposed modification for the use of capillary columns, EPA 8081) and EPA Report 600/4–81–045 by Bellar, T. and J. Lichtenberg, reported in 1981. The report is titled,“ The Determination of Polychlorinated Biphenyls in Transformer Fluid and Waste Oils” and provides significant support to the protocol below.

[3] Aroclor Standards may be purchased as 1000 µg/mL in *iso*octane. Aroclor is a registered trademark of Monsanto.

[4] *ASTM Annual Book of Standards*, Vol 10.03.

[5] *ASTM Annual Book of Standards*, Vol 15.05.

[6] *ASTM Annual Book of Standards*, Vol 14.04.

[7] *Annual Book of ASTM Standards*, Vol 03.06.

[8] EPA Report 600/4/82–057, Environmental Monitoring and Support Laboratory, Cincinnati, OH.

[9] Alford-Stevens, Ann, et al, Physical and Chemical Methods Branch, Environmental Monitoring and Support Laboratory Office of Research and Development, USEPA, Cincinnati, OH.

[10] U.S. EPA, “Test Methods for Evaluating Solid Waste,” *Physical/Chemical Methods*, SW-846.

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