



Standard Test Method for Polychlorinated Biphenyls (PCBs) in Water ¹

This standard is issued under the fixed designation D 3534; 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.

ε¹ NOTE—Section 14 was added editorially in June 1995.

1. Scope

1.1 This test method covers the determination of certain polychlorinated biphenyls (PCBs) including: Aroclors² 1221, 1232, 1242, 1248, 1254, 1260, and 1016.

1.2 The detection limit is in the range from 0.1 to 0.5 µg/L for Aroclor 1254 and 1260 when analyzing 1 L of water using an electron capture detector. The detection limit is compound dependent and is also determined by instrumental sensitivity and interferences present. When using a microcoulometric or conductivity detector, the detection limit is approximately 1.0 µg/L.

1.3 Precision and bias statements reflect recovery of PCB products dosed into water samples. These statements may not apply to environmentally altered PCBs.

1.4 As the precision and bias statements given may apply only to waters used, it is the user's responsibility to ensure the validity of the test method for waters of untested matrices.

1.5 The values stated in SI units are to be regarded as the standard. The values given in parentheses are provided for information only.

1.6 *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 a specific hazard statement, see Note 2.

2. Referenced Documents

2.1 ASTM Standards:

D 1129 Terminology Relating to Water³

D 1193 Specification for Reagent Water³

D 3086 Test Method for Organochlorine Pesticides in Water⁴

D 3304 Method for Analysis of Environmental Materials

¹ This test method is under the jurisdiction of ASTM Committee D-19 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 Aroclor is a registered trademark of Monsanto Co. All Aroclor production was stopped in 1977. For alternate availability, see paragraph 8.4 of this test method.

³ Annual Book of ASTM Standards, Vol 11.01.

⁴ Annual Book of ASTM Standards, Vol 11.02.

for Polychlorinated Biphenyls⁵

D 3370 Practices for Sampling Water³

D 3694 Practices for Preparation of Sample Containers and for Preservation of Organic Constituents⁴

E 355 Practice for Gas Chromatography Terms and Relationships⁶

3. Terminology

3.1 *Definitions*—For definitions of terms used in this test method, refer to Terminology D 1129 and Practice E 355.

4. Summary of Test Method

4.1 Polychlorinated biphenyls are extracted by liquid-liquid extraction and are separated from interferences prior to gas chromatographic determination. Sulfuric acid partitioning or a combination of the standard Florisil⁷ column cleanup procedure and a silica gel microcolumn separation procedure (1,2,3)⁸ are employed. Identification is made from gas chromatographic patterns obtained through the use of two or more unlike columns. Detection and measurement is accomplished using an electron capture, microcoulometric, or electrolytic conductivity detector. Techniques for confirming qualitative identification are suggested. The detection limit is approximately 0.1 µg/L for the PCB mixtures (Aroclors) listed in 1.1 when analyzing 1 L of sample using an electron capture detector. When using a microcoulometric or conductivity detector, the detection limit is approximately 1.0 µg/L. Precision and accuracy statements reflect recovery of PCB products dosed into water samples. These statements do not apply to environmentally altered PCBs.

5. Significance and Use

5.1 The extensive and widespread use of PCBs has resulted in their presence in all parts of the environment. Like the organochlorine pesticides, the PCBs are very persistent. While they are generally less toxic than the organochlorine pesticides, they do have adverse effects on mammals, birds, fish, and other

⁵ Annual Book of ASTM Standards, Vol 10.03.

⁶ Annual Book of ASTM Standards, Vol 14.02.

⁷ Florisil, a trademark of and available from Floridin Co., Three Penn Center, Pittsburgh, PA 15235, has been found satisfactory for this purpose.

⁸ The boldface numbers in parentheses refer to the list of references at the end of this test method.