



Standard Test Method for Organochlorine Pesticides In Water¹

This standard is issued under the fixed designation D 3086; 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. Consult the DoD Index of Specifications and Standards for the specific year of issue which has been adopted by the Department of Defense.

1. Scope

1.1 This test method covers the gas chromatographic determination of various organochlorine pesticides, including some pesticidal degradation products and related compounds in water and waste water. Such compounds are composed of carbon, hydrogen, and chlorine, but may also contain oxygen, sulfur, phosphorus, nitrogen, or other halogens.

1.2 The following compounds may be determined individually by this test method: aldrin, α -BHC, β -BHC, δ -BHC, γ -BHC(lindane), captan, α -chlordane, γ -chlordane, chlordane, DDD, DDE, DDT, dichloran, dieldrin, endosulfan, endrin, HBH, HCP, heptachlor, heptachlor epoxide, isodrin, methoxychlor, mirex, and PCNB. Multicomponent mixtures, toxaphene, technical chlordane, and others may also be determined (Note 1). The fluorinated compound trifluralin may also be determined when using an electron-capture detector. This test method may be used for the determination of many other organochlorine pesticides. However, the analyst should demonstrate that it is in fact applicable to the specific compound or compounds of interest before applying it to sample analysis.

NOTE 1—For chemical names of the pesticides see Appendix X1.

1.3 The test method sensitivity limit ranges from 1 ng/L to 10 ng/L for single-component pesticides and 50 ng/L to 1000 ng/L for multicomponent pesticides when analyzing 1 L of drinking water or low-organic background surface water.

1.4 When organochlorine pesticides exist as complex mixtures, the individual compounds may be difficult to distinguish. High, low, or otherwise unreliable results may be obtained through misidentification or one compound obscuring another of lesser concentration, or both. Provisions incorporated in this method are intended to minimize the effects of such interferences.

1.5 This test method has been interlaboratory tested for natural waters (river, estuarine, lake). The analyst should recognize that bias precision reported in 15.1 and 16.1 may not apply to other waters.

1.6 The values stated in SI units are to be regarded as the standard. The values stated in inch-pound units are given in parentheses and are provided for information only.

1.7 *This standard does not purport to address all of the safety problems 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 9.10.*

2. Referenced Documents

2.1 ASTM Standards:

D 1129 Terminology Relating to Water²

D 1192 Specification for Equipment for Sampling Water and Steam²

D 1193 Specification for Reagent Water²

D 3370 Practices for Sampling Water²

D 3534 Test Method for Polychlorinated Biphenyls (PCBs) in Water³

D 3694 Practices for Preparation of Sample Containers and for Preservation of Organic Constituents³

E 260 Practice for Packed Column Gas Chromatography⁴

E 355 Practice for Gas Chromatography Terms and Relationships⁴

3. Terminology

3.1 Definitions:

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

4. Summary of Method

4.1 This test method offers several analytical alternatives, dependent on the analyst's assessment of the nature and extent of interferences and the complexity of the pesticide mixtures found. It is recommended for use only by experienced residue chemists or under the close supervision of such qualified persons. Specifically, the procedure describes the use of an effective co-solvent for efficient sample extraction and provides, through use of column and thin-layer chromatography, methods for the elimination of nonpesticide interferences and the preseparation of pesticide mixtures. Identification is made by selective gas chromatographic separations through the use of two or more unlike columns. Detection and measurement is accomplished by electron-capture and microcoulometric or electrolytic conductivity gas chromatography. Results are reported in nanograms per litre without correction for recovery data, but such data is to be

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 Annual Book of ASTM Standards, Vol 11.01.

³ Annual Book of ASTM Standards, Vol 11.02.

⁴ Annual Book of ASTM Standards, Vol 14.01.