



Designation: D4861 – 23

Standard Practice for Sampling and Selection of Analytical Techniques for Pesticides and Polychlorinated Biphenyls in Air¹

This standard is issued under the fixed designation D4861; 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 practice covers the sampling of air for a variety of common pesticides and polychlorinated biphenyls (PCBs) and provides guidance on the selection of appropriate analytical measurement methods. Other compounds such as polychlorinated dibenzodioxins/furans, polybrominated biphenyls, polybrominated diphenyl ethers, polycyclic aromatic hydrocarbons, and polychlorinated naphthalenes may be efficiently collected from air by this practice, but guidance on their analytical determination is not covered by this practice.

1.2 The sampling and analysis of PCBs in air can be more complicated than sampling PCBs in solid media (for example, soils, building materials) or liquids (for example, transformer fluids). PCBs in solid or liquid material are typically analyzed using Aroclor² distillation groups in chromatograms. In contrast, recent research has shown that analysis of PCBs in air samples by GC-ECD has also been found to exhibit potential uncertainties due to changes in the PCB patterns, differences in responses in distillation groups, peak co-elutions and differences in response factors within a homolog group (1, 2).³ As such it is recommended that PCBs in air not be quantified using AroclorTM distillation groups. In addition, it is recommended that analysis of PCBs in air be done using GC-MS rather than GC-ECD. Any mention, to outdated practices for “Aroclor” and GC-ECD analysis of PCBs herein are retained solely for historical perspective.

1.3 A complete listing of pesticides and other semivolatile organic chemicals for which this practice has been tested is shown in Table 1.

1.4 This practice is based on the collection of chemicals from air onto polyurethane foam (PUF) or a combination of PUF and granular sorbent (for example, diphenyl oxide, styrene-divinylbenzene), or a granular sorbent alone.

1.5 This practice is applicable to multicomponent atmospheres, 0.001 $\mu\text{g}/\text{m}^3$ to 50 $\mu\text{g}/\text{m}^3$ concentrations, and 4 h to 24 h sampling periods. The limit of detection will depend on the nature of the analyte and the length of the sampling period.

1.6 The analytical method(s) recommended will depend on the specific chemical(s) sought, the concentration level, and the degree of specificity required.

1.7 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use. For specific hazards statements, see 10.24 and A1.1.*

1.9 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 *ASTM Standards:*⁴

D1193 Specification for Reagent Water

D1356 Terminology Relating to Sampling and Analysis of Atmospheres

D3686 Practice for Sampling Atmospheres to Collect Organic Compound Vapors (Activated Charcoal Tube Adsorption Method)

D3687 Test Method for Analysis of Organic Compound Vapors Collected by the Activated Charcoal Tube Adsorption Method

D4185 Test Method for Measurement of Metals in Workplace Atmospheres by Flame Atomic Absorption Spectrophotometry

¹ This practice is under the jurisdiction of ASTM Committee D22 on Air Quality and is the direct responsibility of Subcommittee D22.05 on Indoor Air.

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² A trade name formerly used by Monsanto Corporation, Creve Coeur, MO.

³ The boldface numbers in parentheses refer to the list of references at the end of this standard.

⁴ 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.