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Standard Practice for Field Collection of Organic Compounds from Surfaces Using Wipe Sampling[1]

This standard is issued under the fixed designation D6661; 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 addresses sampling of organic compounds ~~(i.e.,~~ (that is, PCBs, dioxins, many pesticides and similar compounds) from smooth nonporous surfaces using a solvent-wetted wipe sampling method. Samples are collected in a manner that permits the solvent extraction of the organic compound(s) of interest from the wipes and subsequent determination using a laboratory analysis technique such as gas chromatography with a suitable detector. This practice is, however, unsuitable for the collection of volatile organic compounds.

1.2 This practice should only be used to collect samples for the determination of organic compound(s) on a loading basis ~~(e.g.,~~ (for example, mass per unit area). It cannot be used to collect samples for the determination of organic compounds on a concentration basis ~~(e.g.,~~ (for example, mass per unit mass).

1.3 This wipe sampling practice is not recommended for collecting samples of organic compounds from rough or porous surfaces such as upholstery, carpeting, brick, rough concrete, ceiling tiles, and bare wood. It is also not intended for the collection of dust samples (see ~~Practice~~Guide E1278) or sampling to ~~estimating~~estimate human exposure to contaminated surfaces.

1.4 To ensure valid conclusions are reached, a sufficient number of samples must be obtained as directed by a sampling design (the number and location of samples including quality control samples) and a quality assurance/quality control plan. This practice does not address the sampling designs used to achieve the data quality objectives (see Practice D5792).

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

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~~ safety, health, and ~~health~~environmental practices and determine the applicability of regulatory limitations prior to use.*

1.7 *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:*[2]

D4687 Guide for General Planning of Waste Sampling

D5681 Terminology for Waste and Waste Management

D5792 Practice for Generation of Environmental Data Related to Waste Management Activities: Development of Data Quality Objectives

E1278 Guide for Radioactive Pathway Methodology for Release of Sites Following Decommissioning (Withdrawn 2005)[3]

3. Terminology

3.1 *Definitions*—For definitions of terms used in this practice, refer to Terminology D5681.

3.2 *Definitions of Terms Specific to This Standard:*

[1] This practice is under the jurisdiction of ASTM Committee D34 on Waste Management and is the direct responsibility of Subcommittee D34.01.02 on Sampling Techniques.

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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] The last approved version of this historical standard is referenced on www.astm.org.

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3.2.1 *wipe, n*—sorbent material ~~(e.g., (~~for example, cotton gauze) that is rubbed on a surface to collect a sample for chemical analysis.

4. Summary of Practice

4.1 A wipe sample is collected from a smooth, nonporous surface with a solvent-wetted wipe following a specified pattern of wiping to ensure complete coverage of an area of specified dimensions. The wipe is then extracted and analyzed to detect and quantify (at least semiquantitatively) the presence of organic compounds on surfaces.

5. Significance and Use

5.1 Wipe sampling is typically used by persons involved in hazardous waste site investigations to characterize the areal extent and the level of contamination on walls, floors, equipment, etc. Wipe sampling is also used to determine compliance with regulations.

5.2 There are many factors that contribute to variation in sampling results during wipe ~~sampling including,~~sampling, including the use of different pressures applied to the wipe, different kinds of wipes, different wiping patterns, the texture of the surface being wiped, and perhaps even the duration of wiping. The significance of this practice is that it standardizes wiping procedures to reduce sampling variability in the collection of samples from smooth, nonporous surfaces such as metal, glass, painted or sealed surfaces, tile, etc., in and around ~~buildings,~~buildings and from pipes, tanks, decontaminated equipment, etc.

6. Sampling Equipment and Supplies

6.1 *Sample Containers*—Airtight amber glass sample containers with PTFE-lined caps such as 40-mL volatile organic analysis vials are recommended. Larger 125-mL ~~wide mouth~~ wide-mouth bottles may also be used, which ~~eliminate~~eliminates the need for forceps to place or remove wipes from the sample container. To minimize solvent handling in the field, wipes may be wetted with solvent in the laboratory and shipped to the field in the sample container.

6.2 *Wipes*—Cotton gauze ~~pads 7.6-cm square~~pads, 7.6 cm^2 ~~are to be used.~~ , are usually used, though other types of wipes are acceptable. Sterile surgical gauze pads are typically used without precleaning, however, samples of the pads should be analyzed or otherwise determined to be free of the target compounds and substances that could interfere with the analytical method. If necessary, pads should be precleaned by solvent extraction in a laboratory prior to field use.

6.3 *Solvent*—A ~~high purity~~ high-purity solvent (one which is free of contaminants that might interfere with analysis), capable of solublizing the target organic compound and compatible with the surface being wiped, should be used. For collecting PCBs and most pesticides ~~(e.g., (~~for example, chlordane, chlorpyrifos and ~~malathion)~~malathion), isooctane is an effective solvent. For carbamates or known polar pesticides, isopropanol is more effective. Some guidance on solvent selection (Table 1) was generated by the EPA[4] using thin layer chromatography (TLC) saturation pads (essentially a heavy filter paper) which generally ~~performs~~perform similarly to cotton gauze pads. Hexane is another commonly used solvent to consider for PCB sampling. Some effective solvents, such as acetone, are not the most desirable because interfering compounds from some surfaces can also be recovered.[4] The analytical laboratory should be able to assist in selecting a proper wiping solvent compatible with the surface to be sampled and with the analytical procedures.

6.4 *Disposable Gloves*—Powderless gloves which protect the sampler's hands from the solvent and do not contribute any possibly interfering contaminants should be used. A new pair of gloves should be used for each wipe.

TABLE 1 Contaminant Recovery Data Using Common Solvents and TLC Pads[4]

Compound	Solvent	Percent Recovery
Chlordane	Acetone	71
	Isooctane	54
Chlorpyrifos	Acetone	72
	Isooctane	56
Malathion	Dichloromethane	81
	Isooctane	80
Diazinon	Isooctane	70
Aroclor 1260	Isooctane	80
	Acetone	76
Bendiocarb	Acetone	85
	Isopropanol	84
Propoxur	Isopropanol	96
	Acetone	90

[4] Carr, B. L. and Hill, D. F., *Sampling of Common Pesticides and PCBs from Inert Surfaces*, EPA 330/1-90-001, National Enforcement Investigations Center, Denver, CO, 1989.