



Designation: E 1728 – 02

Standard Practice for Collection of Settled Dust Samples Using Wipe Sampling Methods for Subsequent Lead Determination¹

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1. Scope

1.1 This practice covers the collection of settled dust on surfaces using the wipe sampling method. These samples are collected in a manner that will permit subsequent extraction and determination of lead using laboratory analysis techniques such as atomic spectrometry or electroanalysis.

1.2 This practice does not address the sampling design criteria (that is, sampling plan which includes the number and location of samples) that are used for clearance, lead hazard evaluation, risk assessment, and other purposes. To provide for valid conclusions, sufficient numbers of samples should be obtained as directed by a sampling plan.

1.3 This practice contains notes that are explanatory and are not part of the mandatory requirements of this practice.

1.4 The values stated in SI units are to be regarded as the standard.

1.5 *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.*

2. Referenced Documents

2.1 ASTM Standards:

D 4840 Guide for Sampling Chain-of-Custody Procedures²
E 1605 Terminology Relating to Mitigation and Control of Lead Hazards²

E 1613 Test Method for Determination of Lead by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES), Flame Atomic Absorption Spectrometry (FAAS), and Graphite Furnace Atomic Absorption Spectrometry (GFAAS) Techniques²

E 1644 Practice for Hot Plate Extraction of Dust Wipe Samples for Determination of Lead²

E 1792 Specification for Wipe Sampling Materials for Lead in Surface Dust²

E 1979 Practice for Ultrasonic Extraction of Paint, Dust, Soil, and Air Samples for Subsequent Determination of Lead²

E 2051 Practice for the Determination of Lead in Paint, Settled Dust, Soil, and Air Particulate by Field-Portable Electroanalysis²

2.2 Federal Regulations:

40 CFR 745.63, U.S. Environmental Protection Agency (EPA) “403 Rule”: Federal Register, Vol 66(4), 5 Jan. 2001, p. 1206³

3. Terminology

3.1 For definitions of terms not listed here, see Terminology E 1605.

3.2 Definitions:

3.2.1 *batch, n*—a group of field or quality control (QC) samples that are collected or processed together at the same time using the same reagents and equipment.

3.2.2 *sampling location, n*—a specific area within a sampling site that is subjected to sample collection.

3.2.2.1 *Discussion*—Multiple sampling locations are commonly designated for a single sampling site (see 3.2.3).

3.2.3 *sampling site, n*—a local geographic area that contains the sampling locations (see 3.2.2).

3.2.3.1 *Discussion*—A sampling site is generally limited to an area that is easily covered by walking.

3.2.4 *wipe, n*—a disposable towellette that is moistened with a wetting agent. **E 1792**

3.2.4.1 *Discussion*—These towellettes are used to collect a sample of settled dust on a surface for subsequent lead analysis.

3.3 Definitions of Terms Specific to This Standard:

3.3.1 *field blank, n*—a wipe (see 3.2.4) that is exposed to the same handling as field samples except that no sample is collected (no surface is actually wiped).

3.3.1.1 *Discussion*—Analysis results from field blanks provide information on the analyte background level in the wipe combined with the potential contamination experienced by samples collected within the batch (see 3.2.1) resulting from handling.

¹ This practice is under the jurisdiction of ASTM Committee E06 on Performance of Buildings and is the direct responsibility of Subcommittee E06.23 on Control and Mitigation of Lead Hazards.

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² *Annual Book of ASTM Standards*, Vol 04.11.

³ Available from United States Environmental Protection Agency (EPA), Ariel Rios Bldg., 1200 Pennsylvania Ave., NW, Washington, DC 20460, www.epa.org.

4. Summary of Practice

4.1 Wipe samples of settled dust are collected on surfaces from areas of known dimensions with wipes meeting Specification E 1792, using a specified pattern of wiping.

4.2 The collected wipes are then ready for subsequent sample preparation and analysis by procedures such as Practices E 1644, Practice E 1979, Practice E 2051, and Test Method E 1613.

5. Significance and Use

5.1 This practice is intended for the collection of settled dust samples in and around buildings and related structures for the subsequent determination of lead content in a manner consistent with that described in the HUD Guidelines⁴ and 40 CFR 745.63 (EPA 403 Rule). The practice is meant for use in the collection of settled dust samples that are of interest in clearance, hazard assessment, risk assessment, and other purposes.

5.2 Use of different pressures applied to the sampled surface along with the use of different wiping patterns contribute to collection variability. Thus, the sampling result can vary between operators performing collection from identical surfaces as a result of collection variables. Collection for any group of sampling locations at a given sampling site is best when limited to a single operator.

5.3 This practice is recommended for the collection of settled dust samples from hard, relatively smooth nonporous surfaces. This practice is less effective for collecting settled dust samples from surfaces with substantial texture such as rough concrete, brickwork, textured ceilings, and soft fibrous surfaces such as upholstery and carpeting.

6. Apparatus and Materials

6.1 *Sampling Templates*—One or more of the following: A 30 by 30 cm (approximately 1 ft²) reusable aluminum or plastic, or disposable cardboard or plastic template, (full-square, rectangular, square “U-shaped,” rectangular “U-shaped,” and “L-shaped”) or templates of alternative areas having accurately known dimensions (see Notes 1 and 2).

NOTE 1—For most surfaces, it is recommended to collect settled dust from a minimum of a 100 cm² area to provide sufficient material for laboratory analysis.⁵ However, areas larger than 30 by 30 cm may be appropriate for surfaces having little or no visible settled dust and a smaller sampling area may be appropriate for surfaces with very high levels of visible settled dust.

NOTE 2—Templates should be capable of lying flat on a surface.

6.2 *Wipes*, meeting the specifications of Specification E 1792; see 3.2.4 for definition.

6.3 *Sample Containers*, resealable, rigid-walled, 50-mL minimum volume.

NOTE 3—Screw-top plastic centrifuge tubes are an example of a

suitable rigid-walled sample container.

NOTE 4—Use of a resealable plastic bag for holding and transporting the settled dust wipe sample is not recommended due to the potential losses of settled dust within the plastic bag during transportation and laboratory handling. Quantitative removal and processing of the settled dust wipe sample by the laboratory is significantly improved through the use of resealable rigid-walled containers.

6.4 *Measuring Tool*, tape or ruler, capable of measuring to the nearest ± 1 mm.

6.5 *Plastic Gloves*, powderless

6.6 *Cleaning Cloths*, for cleaning of templates and other equipment.

NOTE 5—Wipes used for dust sampling (see 6.2) can be used for cleaning templates and other sampling equipment, but other cleaning cloths or wipes not meeting the specifications of Specification E 1792 may be suitable for this purpose.

6.7 *Adhesive Tape*, suitable for securing the template(s) to the surface(s) to be sampled, and for demarcating sampling areas where templates cannot be used.

NOTE 6—Duct or masking tape, for example, function well for these purposes.

6.8 *Disposable Shoe Covers*, optional.

7. Procedure

7.1 Use one of the following two procedures for collecting settled dust samples from each sampling location. For wide, flat locations, use the template-assisted sampling procedure (see 7.1.1). For small locations (for example, a window sill or door jamb), use the confined-area sampling procedure (see 7.1.2).

NOTE 7—Lead contamination problems during field sampling can be severe and may affect settled dust analysis results. Contamination can be minimized through frequent changing of gloves, use of shoe covers (see 6.8), and regular cleaning of sampling equipment with cleaning cloths (see 6.6). Use of disposable shoe covers between different buildings and removal of them prior to entering vehicles can be helpful to minimize inadvertent transfer of settled dust from one location to another.

7.1.1 *Template-Assisted Sampling Procedure:*

7.1.1.1 Don a pair of clean, powderless, plastic gloves (see 6.5 and Note 7).

7.1.1.2 Carefully place a clean template on the surface to be sampled in a manner that minimizes disturbance of settled dust at the sampling location. Tape the outside edge of the template to prevent the template from moving during sample collection.

7.1.1.3 Obtain a packaged wipe (see 6.2) and, if there is a possibility for the package to be contaminated with dust, clean the package with a cleaning cloth (see 6.6).

7.1.1.4 Remove the wipe from its package, and inspect the wipe to ensure that it is fully wetted and not contaminated with fungus, dust or other material. Discard the wipe if it is found to be too dry or contaminated, or both.

7.1.1.5 Using an open flat hand with the fingers together, place the wipe on the surface to be sampled. Wipe the selected surface area, side to side, in an overlapping “S” pattern while applying pressure to the fingertips (see Fig. 1). Wipe the surface so that the entire selected surface area is covered. Perform the wiping procedure using the fingers and not the palm of the hand. The front leading edge of the wipe shall always be pushed forward.

⁴ *Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing*, U.S. Department of Housing and Urban Development (HUD), Washington, DC, 1995.

⁵ Sussell, A., Hart, C., Wild, D., and Ashley, K., “An Evaluation of Worker Lead Exposures and Cleaning Effectiveness During Removal of Deteriorated Lead-Based Paint,” *Applied Occupational and Environmental Hygiene*, Vol 14, 1999, pp. 177–185.