



Designation: E1728 – 16

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

This standard is issued under the fixed designation E1728; 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 reappraisal. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reappraisal.

1. Scope

1.1 This practice covers the collection of settled lead-containing 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. For collection of settled dust samples for determination of lead and other metals, use Practice D6966.

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 standard. No other units of measurement are included in this 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:*²

D4840 Guide for Sample Chain-of-Custody Procedures

D6966 Practice for Collection of Settled Dust Samples Using Wipe Sampling Methods for Subsequent Determination of Metals

¹ This practice is under the jurisdiction of ASTM Committee D22 on Air Quality and is the direct responsibility of Subcommittee D22.12 on Sampling and Analysis, of Lead, for Exposure and Risk Assessment.

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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.

E1605 Terminology Relating to Lead in Buildings

E1613 Test Method for Determination of Lead by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES), Flame Atomic Absorption Spectrometry (FAAS), or Graphite Furnace Atomic Absorption Spectrometry (GFAAS) Techniques

E1644 Practice for Hot Plate Digestion of Dust Wipe Samples for the Determination of Lead

E1792 Specification for Wipe Sampling Materials for Lead in Surface Dust

E1979 Practice for Ultrasonic Extraction of Paint, Dust, Soil, and Air Samples for Subsequent Determination of Lead

E2051 Practice for the Determination of Lead in Paint, Settled Dust, Soil and Air Particulate by Field-Portable Electroanalysis (Withdrawn 2010)³

2.2 *Federal Regulations:*⁴

40 CFR 745.63 U.S. Environmental Protection Agency Federal Register, Vol 66, No. 4, 5 Jan. 2001, p. 1206

3. Terminology

3.1 For definitions of terms not listed here, see Terminology E1605.

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

⁴ Available from United States Environmental Protection Agency (EPA), William Jefferson Clinton Bldg., 1200 Pennsylvania Ave., NW, Washington, DC 20460, http://www.epa.org.

3.2.4 *wipe, n*—a disposable towellette that is moistened with a wetting agent. **E1792**

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.

4. Summary of Practice

4.1 Wipe samples of settled dust are collected on surfaces from areas of known dimensions with wipes meeting Specification **E1792**, using a specified pattern of wiping.

4.2 The collected wipes are then ready for subsequent sample preparation and analysis by procedures such as Practice **E1644**, Practice **E1979**, Practice **E2051**, and Test Method **E1613**.

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 Guidelines⁵ and 40 CFR 745.63. 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**).

⁵ *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.

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.⁶ 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 **E1792**; 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 **E1792** 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.

⁶ 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.