Designation: E1729 – 16

Standard Practice for Field Collection of Dried Paint Samples for Subsequent Lead Determination[1]

This standard is issued under the fixed designation E1729; 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 collection of samples of dried paint and other coatings from buildings.

1.2 This practice is used to collect samples for subsequent determination of lead on an area basis (milligrams of lead per area sampled) or concentration basis (milligrams of lead per gram of dried paint collected or mass percent of lead in the paint sample collected).

1.3 This practice does not address the sampling design criteria (that is, sampling plan that includes the number and location of samples) that are used for risk assessment and other lead hazard activities.

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

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

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 and health practices and determine the applicability of regulatory limitations prior to use.* A specific warning statement is given in 7.4.1.1.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D4840 Guide for Sample Chain-of-Custody Procedures

D7659 Guide for Strategies for Surface Sampling of Metals and Metalloids for Worker Protection

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

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for the Determination of Lead in Paint, Settled Dust, Soil and Air Particulate by Field-Portable Electroanalysis (Withdrawn 2010)[3]

E2239 Practice for Record Keeping and Record Preservation for Lead Hazard Activities

3. Terminology

3.1 *Definitions*—For definitions of terms not appearing here, see Terminology E1605.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *paint collection tray*—any clean, dry, lead-free container for use in catching paint scrapings.

3.2.1.1 *Discussion*—This practice describes the use of letter-size white paper for making a funnel type collection tray. However, other types of collection trays can be utilized.

4. Summary of Practice

4.1 Dried paint samples are collected from areas of known dimensions using heat gun, cold-scraping, or coring methods.

5. Significance and Use

5.1 Although this practice is intended for the collection of dried paint samples in and around buildings for the subsequent determination of lead content, this practice may also be used to collect paint samples from other structures for lead analysis.[4]

5.2 The variability associated with the sampling of dried paint is generally considered to be far higher than the variability associated with the analyses of the paint specimens. Therefore, it is essential that sample collection be properly controlled to produce representative and meaningful samples.

5.3 These samples are collected in a manner that will permit subsequent digestion and determination of lead using laboratory analysis techniques such as Inductively Coupled Plasma

[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 Lead Hazards Associated with Buildings.

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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.

[4] *Guidelines for the Evaluation and Control of Lead-Based Hazards in Housing*, U.S. Department of HUD, Washington, DC, June 1995.

Atomic Emission Spectrometry (ICP-AES) and Flame Atomic Absorption Spectrometry (FAAS) (see Test Method E1613), or using field analysis techniques such as anodic stripping voltammetry (see Test Method E2051).

6. Materials and Equipment

6.1 *Resealable Rigid Walled Containers,* for use as paint collection containers.

6.1.1 Screw-top plastic centrifuge tubes are an example of a suitable, resealable, rigid-walled container.

6.1.2 Resealable plastic bags are not suitable for holding and transporting dried paint samples due to potential losses of paint chips during laboratory handling for test specimen preparation.

6.2 *Steel or Plastic Measuring Ruler*—Use metric-only rulers with millimetre and centimetre divisions (see Note 1).

NOTE 1—Since the unit used to report the amount of lead in dried paint samples is generally milligram per square centimetre, use of non-metric measuring tools at the sampling site where paint collection is being performed should be avoided.

6.3 *Sampling Templates (Optional)*—Minimum inside dimensions of 2.5 by 2.5 cm (1 in.^{2}), reusable aluminum or steel template of accurately known dimensions (see Notes 1 and 2).

NOTE 2—Templates should be thin (less than 3 mm), and be capable of lying flat on a flat surface.

6.4 *Cloths,* for use in cleaning sampling equipment and the surface from which a sample is to be collected.

6.5 *White Paper (Letter-Size) for Making Paper Funnels,* for use in making paint collection trays to capture dried paint scrapings.

6.6 *Masking and Duct Tape.*

6.7 *Indelible (Permanent) Marking Pen.*

6.8 *Personal Safety Gear*—Items such as safety glasses or goggles, half-mask respirators fitted with organic vapor/HEPA filters, and a fire extinguisher (see Note 3).

NOTE 3—Use of respirators and fire extinguisher are recommended for collection of dried paint using the heat-gun method.

6.9 *Cutting and Scraping Tools:*

6.9.1 Sharp-edged razor knife,

6.9.2 Single-edged safety razor blades,

6.9.3 Pocket knife with locking blade,

6.9.4 Rigid blade paint scrapper with extra blades,

6.9.5 Flexible putty knife,

6.9.6 Chisels, a variety of wood and cold chisels,

6.9.7 Hammer, and

6.9.8 Sharp-edged coring tool, minimum diameter of 2.5 cm, with a bottle brush for cleaning.

6.10 *Electrical Heat Gun With Extension Cords and Power Source.*

6.11 *Flashlight or Other Lighting Equipment.*

6.12 *Plastic Gloves,* powderless.

6.13 *Trash Bags.*

6.14 *Water,* clean, for use in cleaning sampling equipment and the surface from which a sample is to be collected.

7. Procedure

7.1 *General Comments:*

7.1.1 The ease of collecting dried paint samples is dependent on the condition of the paint and the type of substrate. Sample collection is more difficult on some substrates than others. In general, collection of dried paint from brick, concrete, and wood is more difficult than sampling from plaster, drywall, and metal.

7.1.2 Cutting tools used for collecting dried paint from one sampling location may not be effective at other locations. Thus, on-site access to a variety of paint collection tools is required to collect samples from a range of different substrates.

7.1.3 Paint surfaces within and adjacent to sampling locations should be cleaned with a damp cloth to remove dirt and dust prior to collecting a sample.

7.1.4 Sample collection requires four major steps: *(1)* marking the collection area, *(2)* setting up a paint collection tray, *(3)* removing the paint, and *(4)* transferring the collected sample to the paint collection container. Each of these steps is described as follows:

7.2 *Marking the Collection Area* (See Note 4):

NOTE 4—If a coring tool removal procedure is to be used, go to 7.3.

7.2.1 *Template-Assisted Marking Procedure*—Clean a template and a razor knife or equivalent cutting tool with a damp cloth. Carefully place the clean sampling template on the paint surface at the sampling location. While manually holding the template firmly in place, mark an outline of the area using an indelible marking pen or score (cut into the paint) an outline of the area to be sampled by pulling the clean razor knife or equivalent cutting tool along the inside edge of the template. Remove the template and carefully retrace the scored outline with the cutting tool, cutting down to the substrate. Clean the template and cutting tool with a damp cloth.

7.2.2 *Freehand Marking Procedure*—Clean a template and a razor knife or equivalent cutting tool with a damp cloth. Using the clean ruler, carefully draw an outline of a rectangular sampling area on the painted surface at the sampling location with an indelible marking pen. Determine the dimensions of the length and width of the outlined area to the nearest millimetre. Score an outline of the sampling location by pulling a razor knife or equivalent cutting tool along the marked outline. Make a second pass along the marked outline with the cutting tool, cutting down to the substrate. Clean the ruler and cutting tool with a damp cloth

7.3 *Setting Up a Paint Collection Tray* (See 3.2.1):

7.3.1 Use a sheet of clean, letter-size white paper for making a paper funnel for paint sample collection.

7.3.1.1 In cases where the sampling location is too small to accommodate a funnel made with a sheet of the letter-size paper, cut the paper to an appropriate smaller size.

7.3.2 *For Vertical Surfaces*—Center a piece of tape along one of the long edges of a clean sheet of white paper. The tape should be slightly shorter than the paper and placed so that sufficient adhesive is available to firmly stick the paper to the painted surface (see Note 5). Stick the paper directly below the location to be sampled with the taped edge closest to the scored location. Pull the two lower corners of the paper together and

overlap slightly to form a funnel. Use a piece of tape to secure the lower corners together. Fold the bottom of the newly made funnel up and use a piece of tape to permanently close off the funnel bottom. Be sure no sticky tape surfaces are exposed on the inside of the closed bottom funnel. Tap the funnel to check that it will not come undone or come off the surface if jarred during paint removal activities.

NOTE 5—Either masking or duct tape can be successfully used in most locations. However, for extremely dirty surfaces, the area where the tape is to contact the painted surface may have to be cleaned to achieve good adhesion. Use of a wet cloth followed by a dry paper towel can generally produce a sufficiently clean surface.

7.3.3 *For Horizontal Surfaces (Painted Surfaces Facing Up)*—Tape a clean sheet of white paper directly adjacent to the location to be sampled and make a closed bottom funnel in the same manner as described in 7.3.2.

7.3.4 *For Overhead Horizontal Surfaces (Painted Surfaces Facing Down)*—Make a closed bottom funnel in the same manner as described in 7.3.2. Affix the funnel to the painted surface so that it is directly under the location to be sampled or attach the funnel it to a ladder or similar support structure beneath the sample location.

7.4 *Removing the Paint*—Clean all sampling tools with a damp cloth as appropriate. Remove paint using the heat-gun method in 7.4.1, the cold scraping method in 7.4.2, or the coring method in 7.4.3. See Appendix X1 for information on choosing a method. Don plastic gloves as appropriate.

7.4.1 *Heat-Gun Method*

7.4.1.1 **Warning—**Use of a heat gun on painted surfaces causes release of organic vapors. Thus, this method shall not be performed in areas occupied by persons not protected with appropriate respiratory protection.

7.4.1.2 *Procedure*—Using a heat gun, gently heat the scored paint surface until the paint just starts to soften and blister. Do not overheat the paint. If the paint is scorched or discolored during heating, then too much heat has been applied and a new location must be selected and marked. Using a clean, rigid blade paint scraper or chisel, dig into one edge of the scored area and scrape the paint off (Note 6). Intermittent use of the heat gun during scraping will ease paint removal. Carefully scrape away all the paint within the marked area down to the substrate and ensure that all the scraped paint lands in, or is pushed into, the paint collection tray. Minimize inclusion of substrate material (see Note 6). Clean all sampling tools with a damp cloth. Dispose of any gloves used after completing collection of each sample.

NOTE 6—Removal of substrate must be minimized during paint collection and complete collection of the paint from the substrate must be maximized. Under ideal conditions, the collected dried sample will have no substrate and, after collection, the sampling location will be completely free of paint. When it is not possible to obtain a dried paint sample free of substrate material, such as brick and concrete, include the minimum amount needed to completely remove the paint from the substrate. On wood substrates, scrape in the direction of the wood grain, not against it, to minimize inclusion of substrate in the collected sample.

7.4.2 *Cold-Scraping Method*—Using the appropriate clean cutting tool for a particular substrate or condition of the painted surface and sample location, begin removing the paint from the substrate. If possible, peel the paint from the substrate by sliding the blade along the score and underneath the paint. If problems are encountered in removing the paint sample, use a scraping tool, safety razor blade, or other equivalent tool to aid in paint removal (Note 6). Carefully scrape away all the paint within the marked area down to the substrate and ensure that all the scraped paint lands in, or is pushed into, the paint collection tray. Clean all sampling tools with a damp cloth. Dispose of any gloves used after completing collection of each sample.

7.4.3 *Coring Method*—Place a piece of masking tape over the sampling location (see Notes 7 and 8). Place the coring tool against the taped area and cut down into the paint down to the substrate using a circular motion (Note 6). Tip the coring tool slightly to one side to help break the paint sample core from the location. Carefully retract the coring tool. If the paint sample is lodged inside the coring tool, push it into the paint collection tray using an appropriate clean tool such as a stiff plastic rod. If the paint sample remains on the location scored by the coring tool, use an appropriate cutting tool to carefully scrape away all the paint within the cored area down to the substrate and ensure that all the scraped paint lands in, or is pushed into, the paint collection tray. Clean all sampling tools with a damp cloth. Dispose of any gloves used after completing the collection of each sample.

NOTE 7—The tape is used to hold the paint surface together during coring. It aids in avoiding breakup of the paint outside of the cored area and reduces breakup of the collected sample.

NOTE 8—Use of masking tape on the painted surface to be sampled is inappropriate if it is intended to extract lead by ultrasonic extraction (UE) of the specimen after it has been manually ground.

7.4.4 *Cleaning Paint Collection Tools:*

7.4.4.1 Clean the coring tool with a bottle brush and damp cloth.

7.4.4.2 Clean all other cutting tools used during paint collection with a damp cloth.

7.5 *Transferring the Collected Sample to the Paint Collection Container:*

7.5.1 Remove the paint collection tray from the sampling location, taking care to avoid sample spillage. Carefully tap all the collected paint into the paint collection container. Seal the paint collection container.

7.5.1.1 Dispose of paint sampling trays made of paper in a trash bag.

7.5.1.2 If a reusable paint collection tray is used, clean it thoroughly with a damp cloth and allow it to dry completely before re-using it at a new sampling location.

7.6 *Labeling Container*—Label the rigid walled container with sufficient information to uniquely identify the sample. Record the dimensions of the sampled surface, including measuring units. For the coring method, accurately measure and record the diameter of the inside of the coring tool, including measuring units.

8. Record Keeping

8.1 Records shall be maintained in accordance with Practice E2239, and shall include a copy of the field collection report and, if needed, chain of custody according to Guide D4840.

9. Report

9.1 Field data related to sample collection shall be documented in a sample log form or field notebook (see Note 9), or electronically according to Guide D7659.

NOTE 9—Field notebooks are useful for recording field data even when preprinted sample data forms are used.

9.2 At a minimum, the field collection report shall include the following information:

9.2.1 Project or client name, address, and city/state location.

9.2.2 General sampling site description.

9.2.3 The name of the person collecting the samples.

9.2.4 For each sample collected, record on the sample container and in the field documentation:

9.2.4.1 A unique sample identifier,

9.2.4.2 Dimensions of the area sampled, in centimetres,

9.2.4.3 The calculated area sampled, in square centimetres,

9.2.4.4 the specific protocol used,

9.2.4.5 Date of collection, and

9.2.4.6 The sampling location.

10. Keywords

10.1 coring; lead; paint; sample collection; scraping

APPENDIX

(Nonmandatory Information)

X1. THREE PAINT REMOVAL METHODS

X1.1 There are three general methods for removing the paint: heat-gun method; cold-scraping method; and the coring method. Each of the methods has its own advantages and disadvantages as listed below:

X1.1.1 *Heat-Gun Method:*

X1.1.1.1 *Advantages:*

(a) Can be used on a wider variety of surfaces than the coring method,

(b) Can be easier to perform than the cold-scraping method, and

(c) Both lead area content and lead concentration determinations can be performed on a collected sample.

X1.1.1.2 *Disadvantages:*

(a) Can be more time consuming and difficult to perform than the coring method,

(b) Requires the use of a respirator to protect workers from organic-based fumes generated during heating of dried paint,

(c) Cannot be used in occupied areas due to fume generation,

(d) Requires presence of a fire extinguisher, and

(e) Requires electric power to operate.

NOTE X1.1—The use of fire-, flame-, and torch-based equipment for softening paint is not recommended due to the likely generation of high levels of organic-based fumes during heating.

X1.1.2 *Cold-Scraping Method:*

X1.1.2.1 *Advantages:*

(a) Can be used on a wider variety of surfaces than the coring method, and

(b) Both lead area content and lead concentration determinations can be performed on a collected sample.

X1.1.2.2 *Disadvantages:*

(a) Can be more time-consuming and difficult to perform than either the heat-gun method or coring method.

X1.1.3 *Coring Method:*

X1.1.3.1 *Advantages:*

(a) Can be easier to perform than either the heat-gun method or the cold-scraping method on some surfaces, and

(b) Can generate consistent and uniform collection areas from multiple surfaces.

X1.1.3.2 *Disadvantages:*

(a) Cannot be effectively used on some surfaces,

(b) Cutting tools typically require constant sharpening or replacement, and

(c) Only lead area content determinations can be performed on collected sample. Lead concentrations cannot be performed due to the inclusion of tape into the sample.