Designation: ~~E1645 – 20~~ E1645 – 20a

Standard Practice for Preparation of Dried Paint Samples by Hotplate or Microwave Digestion for Subsequent Lead Analysis[1]

This standard is issued under the fixed designation E1645; 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 sample preparation procedures for paint samples that are collected during the assessment, management or control of lead hazards.

1.2 This practice describes the digestion procedures using a hot plate or microwave oven or apparatus for paint samples that are to be analyzed for lead content.

1.3 This practice covers the general considerations for quantitative sample extraction for total recoverable lead in dried paint samples (either bulk paint or paint powder) using hot plate or microwave heating techniques, or both.

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

1.5 This practice is based on NIOSH Methods 7082 and 7105, and on an EPA standard operating procedure for lead in paint.

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

1.7 *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 warning statements, see 6.1.2, 6.1.2.1, 6.1.2.2, 6.3.2.4, 7.2.1, and 7.2.2.

1.8 *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]

D1129 Terminology Relating to Water
D1193 Specification for Reagent Water
D1356 Terminology Relating to Sampling and Analysis of Atmospheres
E288 Specification for Laboratory Glass Volumetric Flasks

[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.

Current edition approved ~~Sept. 1, 2020~~Nov. 1, 2020. Published ~~October 2020~~December 2020. Originally approved in 1994. Last previous edition approved in ~~2016~~2020 as ~~E1645 – 16.~~E1645 – 20. DOI: ~~10.1520/E1645-20.~~10.1520/E1645-20A.

[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.

E969 Specification for Glass Volumetric (Transfer) Pipets
E1605 Terminology Relating to Lead in Buildings
E1729 Practice for Field Collection of Dried Paint Samples for Subsequent Lead Determination

2.2 *ISO Documents:*[3]
ISO Guide 30 Reference materials — Selected terms and definitions
ISO 1042 Laboratory glassware — One-mark volumetric flasks
ISO 8655 Piston-operated volumetric apparatus — Part 1: Terminology, general requirements and user recommendations

2.3 *Other Documents:*
NTIS No. PB92–114172 Standard Operating Procedures for Lead in Paint by Hotplate- or Microwave-based Acid Digestions and Atomic Absorption or Inductively Coupled Plasma Emission Spectrometry[4]
NMAM 7082 and 7105 NIOSH Manual of Analytical Methods, 4th ed.[5]

3. Terminology

3.1 *Definitions*—For definitions of terms relating to the preparation of dried paint samples that are not given here, refer to Terminologies D1129, D1356, or E1605.

3.1.1 *batch, n*—a group of field or quality control samples that are processed together using the same reagents and equipment.

3.1.2 *digestate, n*—an acidified aqueous solution that results from digestion of the sample.

3.1.3 *digestion, n*—the sample preparation process that solubilizes (extracts) targeted analytes present in the sample, and results in an acidified aqueous solution called the digestate.

3.1.4 *extraction, n*—the dissolution of target analytes from a solid matrix into a liquid form. During sample digestion, target analytes are extracted (solubilized) into an acid solution.

3.1.5 *method blank, n*—a sample, devoid of analyte, that is analyzed to determine its contribution to the total blank (background) reading.

3.1.6 *non-spiked sample, n*—a sample, devoid of analyte, that is targeted for addition of analyte but is not fortified with all target analytes prior to sample preparation.

3.1.6.1 *Discussion*—
Analysis results for this sample are used to correct for background levels in the blank medium that is used for spiked and spiked duplicate samples.

3.1.7 *reagent blank, n*—a digestate that reflects the maximum treatment given any one sample within a batch of samples, except that it has no sample placed initially into the digestion vessel. (The same reagents and processing conditions that are applied to field samples within a batch are also applied to the reagent blank.)

3.1.7.1 *Discussion*—
Analysis results from this sample provide information on the level of potential contamination resulting from only laboratory sources that are experienced by samples processed within the batch.

3.1.8 *reference material (certified reference material) (CRM), n*—reference material accompanied by a certificate, one or more of whose property values are certified by a procedure which establishes its traceability to an accurate realization of the unit in which the property values are expressed; each certified value is accomplished by an uncertainty at a stated level of confidence. **ISO Guide 30**

3.1.9 *sample set, n*—a group of samples (one or more).

[3] Available from International Organization for Standardization (ISO), ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, http://www.iso.org.
[4] U.S. EPA, Research Triangle Park, NC (1991). Available from National Technical Information Service (NTIS), 5301 Shawnee Rd., Alexandria, VA 22312, http://www.ntis.gov.
[5] P.M. Eller, and M.E. Cassinelli, Eds., National Institute for Occupational Safety & Health, Cincinnati, OH (1994). Available from NIOSH Publications, 1150 Tusculum Ave, Cincinnati, OH 45226, Mail Stop C14, http://www.cdc.gov/niosh.