



# Standard Terminology Relating to Lead in Buildings<sup>1</sup>

This standard is issued under the fixed designation E 1605; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reappraisal.

<sup>ε1</sup> NOTE—Editorial changes made throughout in March 2004.

## 1. Scope

1.1 This terminology standard covers definitions for the following:

1.1.1 Terms that are commonly used in the field of management of lead hazards in facilities;

1.1.2 Architectural terms, particularly those associated with older wood-frame buildings; and,

1.1.3 Specialized terms that may be encountered by users in reports and notices that are generated during lead hazard management activities.

1.2 This terminology standard is supplementary to Terminology E 631.

1.3 Definitions adopted or derived from other documents include the following:

1.3.1 Some of the definitions in this Standard are adopted as exact copies from other sources. The source is briefly identified at the right margin following the definition and fully identified in Section 2.

1.3.2 Some of the definitions in this terminology standard are adapted from other sources. Changes in these definitions were made only to clarify the meaning, to incorporate related terms that also are defined in this terminology standard, or to ensure that the revised definition is consistent with those for related terms. The source is briefly identified with the words “adapted” at the right margin following the definition, and is fully identified in Section 2.

1.4 Terms within the definitions that are shown in boldface are defined in this terminology standard.

1.5 This terminology standard excludes the following:

1.5.1 Terms with a common dictionary meaning, except in cases where there is a specialized definition within the field of lead hazard management.

1.5.2 Terms that are used only in individual ASTM standards in which they are defined adequately, whether formally or by the context in which they appear.

## 2. Referenced Documents

2.1 *ASTM Standards*:<sup>2</sup>

C 186 Test Method for Heat of Hydration of Hydraulic Cement

C 859 Terminology Relating to Nuclear Materials

D 16 Terminology for Paint, Related Coatings, Materials, and Applications

D 123 Terminology Relating to Textiles

D 661 Test Method for Evaluating Degree of Cracking of Exterior Paints

D 772 Test Method for Evaluating Degree of Flaking (Scaling) of Exterior Paints

D 907 Terminology of Adhesives

D 2864 Terminology Relating to Electrical Insulating Liquids and Gases

D 4214 Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films

D 4538 Terminology Relating to Protective Coating and Lining Work for Power Generation Facilities

E 7 Terminology Relating to Metallography

E 131 Terminology Relating to Molecular Spectroscopy

E 135 Terminology Relating to Analytical Chemistry for Metals, Ores, and Related Materials

E 344 Terminology Relating to Thermometry and Hydrometry

E 456 Terminology Relating to Quality and Statistics

E 631 Terminology of Building Constructions

E 856 Definitions of Terms and Abbreviations Relating to Physical and Chemical Characteristics of Refuse-Derived Fuel

E 1187 Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal

E 1227 Terminology Relating to Chemical Analysis of Metals

E 1553 Practice for Collection of Airborne Particulate Lead

<sup>1</sup> This terminology 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.

Current edition approved Dec. 1, 2003. Published January 2004. Originally approved in 1994. Last previous edition approved in 2002 as E 1605 – 02.

<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

During Abatement and Construction Activities<sup>3</sup>

E 1613 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

E 1644 Practice for Hot Plate Digestion of Dust Wipe Samples for the Determination of Lead

E 1728 Practice for Field Collection of Settled Dust Samples Using Wipe Sampling Methods for Subsequent Lead Determination

E 1777 Guide for Prioritization of Data Needs for Pavement Management

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

E 1796 Guide for Selection and Use of Liquid Coating Encapsulation Products for Leaded Paint in Buildings

E 1908 Guide for Sample Selection of Debris Waste from a Building Renovation or Lead Abatement Project for Toxicity Characteristic Leaching Procedure (TCLP) Testing for Leachable Lead (Pb)

E 1914 Practice For Use of Terms Relating To the Development and Evaluation of Methods For Chemical Analysis

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

E 2052 Guide for Evaluation, Management, and Control of Lead Hazards in Facilities

E 2239 Practice for Record Keeping and Record Preservation for LEad Hazard Activities

E 2255 Practice for Conducting Visual Assessments for Lead Hazards in Buildings

E 2271 Practice for Clearance Examinations Following Lead Hazard Reduction Activities in Single-Family Dwellings and Child-Occupied Facilities

F 141 Terminology Relating to Resilient Floor Coverings

F 221 Terminology Relating to Carbon Paper and Inked Ribbon Products and Images Made Therefrom

F 1156 Terminology Relating to Product Counterfeit Protection Systems<sup>3</sup>

G 40 Terminology Relating to Wear and Erosion

IEEE/ASTM SI-10 Standard for Use of the International System of Units (SI), the Modernized Metric System

2.2 *Code of Federal Regulations*<sup>4</sup>:

40 CFR 261 Identification and Listing of Hazardous Waste

40 CFR 745.223 Lead-Based Paint Poisoning Prevention in Certain Residential Structures-Definitions

2.3 *ISO Standards*:<sup>5</sup>

ISO 9000–2000 Quality Management Systems -- Fundamentals and Vocabulary

<sup>3</sup> Withdrawn.

<sup>4</sup> Available from Office of the Federal Register, National Archives Records Administration, Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20401.

<sup>5</sup> Available from International Organization for Standardization (ISO), 1 rue de Varembe, Case postale 56, CH-1211, Geneva 20, Switzerland.

### 3. Significance and Use

3.1 The purpose of this terminology standard is to help users understand and apply the large number of specialized terms used in connection with the management of lead hazards by providing a single, comprehensive, and consistent terminology.

3.1.1 This terminology standard includes some terms that may be encountered, but whose use is discouraged. They are included for clarification and in order to provide the user with preferred existing alternate terms.

3.1.2 Architectural terms for individual building components are included to promote consistency of usage and to help ensure that sampling locations are recorded with sufficient accuracy to allow independent confirmation of lead measurements, if necessary.

3.2 A discussion is attached to certain definitions to help make the definition clear or to show how the term and its definition are related to other terms.

3.3 Terms and definitions in this terminology standard are based upon laws, regulations, and practices in the United States.

3.3.1 Some of the definitions in this terminology standard are adopted verbatim or are adapted from definitions that are formally stated or implied in laws and regulations. They are not intended to replace the latter definitions. The user is responsible for understanding legal definitions and for ensuring that the legal obligations that are encompassed by them are fully satisfied.

3.3.2 Users in other countries should refer to applicable national, regional, and local laws, regulations, and practices.

### 4. Terminology

**abatement**, *n*—for lead hazard activities, any set of measures designed to permanently eliminate paint lead hazards.

DISCUSSION—Abatement includes: (1) removal of paint and dust, the installation of a permanent enclosure or encapsulation system over lead-based paint, the replacement of painted surfaces or components, or the removal of permanent covering of soil, and (2) preparation, clean-up, disposal, and clearance examination activities associated with such measures.

**abrasion resistance (coatings)**—ability of a coating to resist being worn away and to maintain its original appearance, integrity, and structure when subjected to rubbing, scraping, or wear.

**accessible surface**—interior or exterior surface (usually up to 5 ft (1.5 m) from floor or ground) that is accessible for a young child to mouth or chew. See also **chewable surface**.

**accreditation**, *n*—Official authorization, approval, or recognition accorded an individual or organization based upon specific qualifications. **(E 631)**

**accuracy**, *n*—the closeness of the agreement between the result of a measurement and a true value of the quantity that is being measured. (Adapted from draft ISO VIM, International Vocabulary of Basic and General Terms)

**action level**, *n*—a level of a contaminant in a medium at or above which activities to control the level are initiated.

DISCUSSION—The action level may be a maximum allowable level, as in the definition of lead-containing paint. In other cases, it is defined as below a maximum allowable level, and used as a warning to prevent the

latter from being exceeded. An example is the action level in the OSHA lead standard.

**administrative controls**—Administrative measures that are used to control occupational exposures to hazards.

DISCUSSION—The most commonly-used administrative controls are job assignments and job rotations that are designed to limit the duration of worker exposure. Another administrative control is purchase control to ensure the use of materials and equipment which produce the least amount of hazard.

**administrative removal**—(*of workers*), temporary removal of workers from a job site prior to blood-lead levels reaching values requiring medical removal.

**analyte**, *n*—chemical or element that is the subject of the testing or measurement in a sampling and analytical procedure, e.g. lead in paint.

**anodic stripping voltammetry**—an electroanalytical technique in which a metal (such as lead) in a solution is deposited (by reduction) on an electrode, then stripped from it (by oxidation). The peak electrical current is measured during stripping, and is proportional to the original metal concentration.

DISCUSSION—Commercial equipment is available to perform this method in the field as well as in fixed laboratories.

**Apparent Lead Concentration (ALC)**—The x-ray fluorescence (XRF) reading or average of more than one reading on a painted surface, not corrected for the substrate.

DISCUSSION—This value was used in a now-obsolete method of correcting XRF readings for substrate effect, and has been replaced by use of the Performance Characteristic Sheet.

**atomic absorption**—absorption of radiant energy by ground-state atoms.

DISCUSSION—Substances when dispersed as an atomic vapor will absorb characteristic radiations identical to those that the same substances can emit. This property is the basis for analysis by atomic absorption spectroscopy. **(D 2864)**

**baluster (picket)**, *n*—one of a series of closely-spaced upright members that support the handrail in a railing system. **(E 631)**

**bare soil**, *n*—soil or sand not covered by grass, sod, other live ground covers, wood chips, gravel, artificial turf, or similar covering. **(E 2255)**

**baseboard**, *n*—a molding covering the juncture of a wall and the adjoining floor.

**batch**—a group of field or quality control samples that are processed together using the same reagents and equipment. **(E 1553)**

**bias**, *n*—systematic error of the indication of a measuring instrument. **(E 456)**

**biological monitoring**—analysis of a person's blood or urine, or both, to determine the level of lead contamination in the body.

**blank sample**—unexposed specimen of the *medium* used in testing, such as a wipe or a filter, which is analyzed with other samples to determine whether samples are either (1) contaminated before collection (for example, in the field, or at the testing site), or are (2) contaminated after collection

(for example, during transportation to the laboratory or in the laboratory), or both. Also called a *media blank*, or a *dummy specimen*.

**blood-lead level (blood level)**—concentration of lead in the blood, 1  $\mu\text{mole/L} = 20.72 \mu\text{g/mL}$ .

DISCUSSION—Blood lead levels are associated with the risk and severity of toxic effects.

**calibration curve**—graphical or mathematical representation of a relation between a measured parameter and a property of the standard for the substance under consideration. **(C 859)**

**calibration standard**—solutions of known **analyte** concentration used to calibrate instruments. **(E 1613)**

**certification**—the process of testing and evaluating against certain specifications the competence of a person, organization, or other entity in performing a function or service, usually for a specified period of time. (HUD Guidelines)

**certified reference material (CRM)**—a reference material accompanied by a certificate, one or more of whose property values are certified by a procedure that establishes its traceability to an accurate realization of the unit in which the property values are expressed. **(E 1644)**

**chalking**, *n*—formation on a pigmented coating of a friable powder evolved from the film itself at or just beneath the surface. **(D 4214)**

**checking (coatings)**, *n*—phenomenon manifested in paint films by slight breaks in the film that do not penetrate to the underlying surface.

DISCUSSION—The break should be called a crack if the underlying surface is visible. Where precision is necessary in evaluating a paint film, checking may be described as visible (as seen by the naked eye) or as microscopic (as observed under a magnification of ten diameters).

**chewable surface**—surface easily accessible to children (usually up to five feet from the floor or ground), and likely to be chewed-on, such as window sills, balusters, and handrails. See **accessible surface**.

**child-occupied facility**—a facility constructed prior to 1978 that is visited regularly by the same child, six years of age or under, at least two different days within any week, for at least three hours per visit, six hours per week, and 60 hours per year. (40 CFR 745.223, adapted)

**chipping resistance (coatings)**—ability of a coating or layers of coatings to resist removal, usually in small pieces, resulting from impact by hard objects or from wear during service. **(D 16)**

**cleanup**, *n*—wet-sweeping, HEPA-vacuuming, and washing down of surfaces within the work area at the end of each day.

**clearance examination**, *n*—a process conducted after a lead hazard reduction activity, or other building maintenance and modification activities, to determine that no lead hazards remain in the area examined. **(E 2271)**

**clearance level**, *n*—the amount of lead in samples collected during a clearance examination that is not to be equaled or exceeded so that a residential dwelling or child-occupied facility may be classified as adequately clean and safe for re-occupancy, as promulgated by authorities having jurisdiction. **(E2271)**

**coating, n**—a liquid or semiliquid, including but not limited to paint, varnish, or shellac, that dries or cures to form a protective or decorative finish after being applied as a thin layer. (C 168)

**Code of Federal Regulations (CFR)**—basic component of the *Federal Register* publication system. The CFR is a codification of the regulations of the various Federal agencies.

**common area, n**—a portion of a building that is generally accessible to all occupants. Such an area may include, but is not limited to, hallways, stairways, laundry and recreational rooms, playgrounds, community centers, garages, and boundary fences. (40 CFR 745.223)

**competence, n**—demonstrated ability to apply knowledge and skills. (ISO 9000–2000 and E 2239)

**component, n**—a building element using industrial products that are manufactured as independent units capable of being joined with other elements.

DISCUSSION—For lead hazard assessment, a component of a building is normally identified by form, function, and location and may include exterior walls, interior room (type) walls, an interior windowsill in a bathroom, and so forth. (E 631)

**component (of the waste)**—each of those different and distinguishable materials that comprise the waste. (E 1908)

**component replacement (building)**—an abatement method in which painted components with leaded paint are removed with minimal disturbance of the paint, and replaced with new components.

**concentration, n**—quantity of substance in a unit quantity of sample.

DISCUSSION—Lead in environmental media is expressed in SI units of mass concentration, for example,  $\mu\text{g}$  (micrograms) lead/g material, or in terms of loading, for example,  $\mu\text{g}$  lead/cm<sup>2</sup> of area (micrograms per square centimetre). Although the non-SI unit of micrograms per square foot is found in regulatory clearance testing of lead dust, its use is deprecated. (To convert from  $\mu\text{g}$  lead/ft<sup>2</sup> to  $\mu\text{g}$  lead/cm<sup>2</sup>, divide by 929.11.)

**conformity, n**—fulfillment of a requirement. (ISO 9000–2000 and E2239)

**containment, n**—a physical barrier used to limit the spread of leaded dust and debris from a designated work area.

**continuing calibration blank**—a solution containing no analyte which is used to verify blank response and freedom from carryover. (E 1613)

**continuing calibration verification**—a solution (or set of solutions) of known analyte concentration used to verify freedom from excessive instrumental drift; the concentration is to cover the range of a linear calibration curve. (adapted from E 1613)

**coring**—method of collecting soil or paint samples that ensures that materials at each depth are collected proportionately, usually with a hollow cylindrical extraction device. (E 1727)

**cracking (coatings), n**—phenomenon manifested in paint films by a break extending through to the surface painted.

DISCUSSION—Where this is difficult to determine, the break should be called a crack only if the underlying surface is visible. The use of a magnification of 10 diameters is recommended in cases where it is difficult to differentiate between cracking and checking. (D 661)

**data collection objective**—a statement explaining the reasons that certain data is needed, the questions it is expected to answer, and the decisions that will be made on the basis of the data, that is used in developing sampling and analytical plans.

**delamination, n**—(1) the separation of one coating from another coat within a coating system, or from the substrate. (D 4538) (2) the separation of layers in a laminated material such as plywood because of failure of the adhesive. (D 907)

**deleading**—deprecated term. Use **lead-based paint hazard abatement**.

**detection limit**—the lowest level of an analyte that can be detected by an instrument or an analytical method.

DISCUSSION—There are different kinds of detection limits and it is important to know which one is being discussed.

**instrumental detection limit**—the lowest concentration at which the instrumentation can distinguish analyte content from the background generated by a minimal matrix. (E 1613)

DISCUSSION—The IDL is the limit of performance of the analytical instrument and is given in units of mass per unit volume.

**method detection limit**—the minimum concentration of an analyte that, in a given matrix and with a specific method, has a 99 % probability of being identified, qualitatively or quantitatively measured, and reported to be greater than zero concentration. (E 1613)

DISCUSSION—(1) The method detection limit is different for each matrix, and is given in units that are specific to the matrix. (2) The method detection limit is always greater than or equal to the instrument detection limit.

**deteriorated paint**—paint or other coating that is cracking, flaking, chipping, peeling, or otherwise damaged or delaminating from the substrate of a building component.

**digestate**—an acidified aqueous solution produced by digestion.

**digestion**—a high temperature sample preparation process that solubilizes targeted analytes that may be present in the sample, and results in an acidified aqueous solution called the digestate. (E 1913)

DISCUSSION—Digestion normally entails the use of a hot plate or microwave oven for subjecting the acidified sample solution to high temperatures. Digestion is a type of **extraction**.

**direct-reading XRF**—see **XRF direct-reading analyzer**.

**discipline, n**—one of the specific types or categories of lead-based paint activities defined in applicable Federal, state, or local regulations for which individuals may receive training from accredited training programs and become certified. (40 CFR 745.223, adapted)

**dust wipe**—See **wipe**.

**dwelling unit**—unit providing complete independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking, and sanitation. (E 631)

**EBL**—elevated blood level.



**elevated blood level (EBL)**—lead content in blood that exceeds the safe level established by regulation/local jurisdiction.

**encapsulation, *n***—the application of an encapsulant. An encapsulant or encapsulation product is a substance that forms a barrier between lead-based paint and the environment using a liquid-applied coating (with or without reinforcement materials) or an adhesively bonded covering material.

(40 CFR 745.223, adapted)

DISCUSSION—An encapsulant is intended to have a life expectancy of at least 20 years. Wallpaper and contact paper are not considered to be encapsulants.

DISCUSSION—Encapsulation is one of the four principal abatement methods.

**enclosure, *n***—the use of rigid, durable construction materials that are mechanically fastened to the substrate in order to act as a dust-tight barrier between lead-based paint and the environment.

(40 CFR 745.223, adapted)

DISCUSSION—Enclosure is one of the four principal abatement methods.

**engineering controls**—measures other than respiratory protection or administrative controls that are implemented at the work site to contain, control, and/or otherwise reduce exposure to lead-contaminated dust and debris, usually in the occupational health setting. The measures include process and product substitution, isolation, and ventilation. (HUD Guidelines, OSHA)

**evaluation, *n***—for lead hazards, a general term to include risk (hazard) assessment, visual assessment, clearance examination, paint inspection and the results of testing for lead.

(E 2239)

**ex situ**—a term used to describe work performed after removal to another location or away from a facility.

**extraction, *n***—the dissolution of target analytes from a solid matrix into a liquid form.

(E 1979)

DISCUSSION—Digestion is an example of an extraction process. Other extraction processes are ultrasonic extraction (PS 87) and leaching (for example, the **toxicity characteristic leaching procedure**).

**facility, *n***—a physical setting used to serve a specific purpose.

DISCUSSION—As used in lead hazard management activities, a facility may be a part of a building, a whole building, or a group of buildings with or without surrounding property, or a non-building setting such as a playground.

**field blank**—blank sample prepared at the field sampling location.

**field operation laboratory**—a laboratory that uses portable technology to provide analytical services in the field near the sampling site.

**fixed-site laboratory**—a laboratory that is located in improved real estate such as a building or similar structure.

**flaking (scaling), *n***—phenomenon manifested in paint films by the actual detachment of pieces of the film itself either from its substrate or from paint previously applied.

DISCUSSION—Flaking (scaling) is generally preceded by cracking or checking or blistering, and is the result of loss of adhesion, usually due

to stress-strain factors coming into play.

(D 772)

**friction surface, *n***—an interior or exterior surface that is subject to abrasion or friction, including, but not limited to, certain surfaces of windows, floors, and stairs.

E 2255

**glazing, *n***—material installed in a window sash, ventilator, or panel such as glass or plastic.

(E 631)

**hazardous waste**—liquid or solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics is capable of: (a) causing, or significantly contributing to an increase in mortality or to an increase in serious irreversible, or incapacitating reversible, illness; or (b) posing a substantial present or potential hazard to human health or to the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

**heat gun**—blower-equipped apparatus that emits heat with sufficient intensity to soften dried paint to permit scraping from the surface.

**HEPA filter**—see **high-efficiency particulate air filter**.

**high-efficiency particulate air (HEPA) filter**—filter capable of separating out particles of 0.3 μm or greater from a body of air at 99.97 % efficiency or greater. See also.

**impact surface, *n***—an interior or exterior surface that is subject to damage by repeated sudden force, such as certain parts of doorframes.

(E2255)

**industrial hygienist**—person certified by the American Board of Industrial Hygiene, or an industrial hygienist in training, or a person with equivalent education or experience or both.

**initial calibration blank**—a solution containing no analyte that is used for initial calibration and zeroing of the instrument response.

DISCUSSION—An initial calibration blank is an **instrumental QC standard**.

(E 1613)

**initial calibration verification**—a solution (or set of solutions) of known analyte concentration used to verify calibration standard levels; the concentration of analyte is to be near the mid-range of the working range of the linear curve that is made from a stock solution having a different manufacturer or manufactured lot identification than the calibration standards.

(E 1613)

**in situ**—a term used to describe work performed in place or at a facility.

**instrumental QC standard**—a solution (or set of solutions) of known analyte concentration that provides information on measurement performance during the instrumental analysis portion of the overall analyte measurement process

(E 1613)

DISCUSSION—instrumental QC standards include **initial calibration blanks**, **initial calibration verifications**, **continuing calibration blanks**, **continuing calibration verifications**, and **interference check standards**.

**interference check standard, *n***—a solution (or set of solutions) of known **analyte** concentration used to verify an accurate analyte response in the presence of possible spectral interferences from other analytes that may be present in samples.

(E 1613)

**interim controls**—a set of measures designed to temporarily

reduce human exposure or likely exposure to lead-based paint hazards, including specialized cleaning, repairs, maintenance, painting, temporary containment, ongoing monitoring of lead-based paint hazards or potential hazards, and the establishment and operation of management and resident education programs. (40 CFR 745.223)

**K-radiation**, *n*—characteristic X-rays produced by an atom or ion when a vacancy in the K-shell is filled by one of the outer electrons. (E 135)

**lead-based paint activities**—in the case of target housing and child-occupied facilities, inspection, risk assessment, and abatement. (40 CFR 745.223)

**lead-based paint inspection**, *n*—a surface-by-surface investigation to determine whether lead-based paint is present. E 2255

**lead exposure**—subjection to the presence of a lead hazard that could result in ingestion or inhalation of lead-containing substances.

DISCUSSION—Typical exposure sources are LBP chips, dust, and contaminated soil; and occupational atmospheres as during LBP removal operations.

**lead-free (deprecated)**—term used to describe a dwelling that contains no **lead-based paint**, lead-contaminated dust, or lead-contaminated soil. Use of this term is discouraged because **leaded paint** may be present, and there is normally a small amount of lead in any paint, dust, and soil.

**lead hazard activities**, *n*—procedures, measures, and actions including **abatement**, **clearance examination**, control, inspection, maintenance, management, quality systems, reduction, and risk assessment pertaining to lead hazards in buildings and associated grounds. (E 2239)

**lead hazard assessment**—investigation of an assessed unit conducted to determine and report the location, type, severity of lead hazards which are accessible to children. (E 2115)

**lead hazard control**—activities intended to control exposures to lead hazards and actual or potential sources of lead hazard, including **abatement** and in-place management.

**lead hazard management**—activities intended to characterize the presence of lead hazards and actual or potential sources of lead hazards in a defined facility or group of facilities, develop a specific plan to control and eliminate lead hazards based on these findings, and implement a program based on this plan. (adapted from E 2052)

**lead hazard reduction**, *n*—any activity that results in a lessening of the number or extent, or both, of lead hazards. (E2271)

**lead hazard screen**—a limited risk assessment activity that involves limited paint and dust sampling as described in applicable Federal, state, or local regulations. (40 CFR 745.223)

**lead paint (deprecated)**—a term that is sometimes used as an alternative to **lead-based paint**. Use of this term is discouraged because it is unclear what level of lead it refers to.

**lead poisoning**—toxic condition caused by excessive exposure to lead.

DISCUSSION—In early stages most people are asymptomatic. However, some indicators of lead poisoning, particularly in children, are

loss of interest in play, excessive sleeping, loss of recently-acquired skills, lack of energy, and headaches.

**lead positive/negative**—qualitative (not quantitative) judgment of lead content that determines abatement action measures.

DISCUSSION—The HUD guidelines consider >1.0 mg/cm<sup>2</sup> by XRF, or >0.5 % by weight, (quantitative measures) as abatement action levels.

**lead screen (deprecated)**—a term sometimes used for **lead hazard screen**. Its use is discouraged because there are several alternatives in use, and this one is particularly unclear.

**lead-based paint inspection**, *n*—a surface-by-surface investigation to determine the presence of lead-based paint including a report explaining the results of the investigation. (E 2255)

**leaded paint**—paint or other coatings containing lead compounds. See **lead-containing paint**.

**leaded paint characterization**—a procedure for determining the presence of lead in painted surfaces that are expected to be disturbed by planned work. (E 2052)

**leaded soil**, *n*—bare soil containing lead compounds at potentially hazardous concentrations.

**L-radiation**, *n*—characteristic X-rays produced by an atom or ion when a vacancy in the L-shell is filled by one of the outer electrons. (E 135)

**maintenance**, *n*—work performed to keep facilities in good condition. (E 2052)

**mass concentration**—the mass of a specified component or phase, per unit mass or unit volume of total. (G 40)

DISCUSSION—Common examples in lead work are lead levels in paint or soil expressed in percent by mass or in parts per million.

**mass loading**—lead concentration in units of mass per unit area.

DISCUSSION—Common examples in lead work are lead levels in paint expressed as milligrams per square centimeter, or lead levels in surface dust expressed as micrograms per square metre (or square foot).

**matrix**—the type of material such as dust, paint, or soil, in which lead in a sample is contained.

**matrix effect**—a change in an instrument reading of an analyte level caused by materials in the matrix other than the analyte.

**MD**—State of Maryland.

**mean (value)**—the arithmetic mean, unless stated to be the geometric mean.

**medical removal (of workers)**—temporary removal of workers from a job site due to elevated blood-lead levels as defined in HUD interim guidelines. Compare **administrative removal**.

**measurement**, *n*—act of quantifying a property or dimension. (D 123)

**microgram**,  $\mu\text{g}$ , *n*—one millionth of a gram.

DISCUSSION—453.59 g in a pound; 28 349 525  $\mu\text{g}$  in 1 oz. (IEEE/ASTM SI-10)

**molding**, *n*—a piece of trim, typically wood, milled with a decorative shape or profile.

**monitoring**, *n*—surveillance to determine (1) whether known or suspected leaded paint is deteriorating; (2) that lead hazard control methods remain effective; (3) whether structural problems threaten the integrity of lead hazard controls; and (4) whether dust lead levels will remain below applicable standards. Monitoring includes both visual assessments and **reevaluations**. **(based on HUD Guidelines)**

**multi-family dwelling**, *n*—a structure that contains more than one separate residential unit, which is used or occupied, or is intended to be used or occupied, in whole or in part, as the home or residence of one or more persons. **(40**

**CFR 745.223)**

**National Lead Laboratory Accreditation Program (NLLAP)**—a program mandated by Title X, Section 405b in which EPA confers recognition of a laboratory’s ability to meet strict quality system requirements in a program conducted by accrediting bodies within a memorandum of understanding with EPA.

**DISCUSSION**—40 CFR 745.227 requires that lead samples collected pursuant to EPA work practice standards be analyzed at a recognized laboratory. Recognition is granted for each matrix, so some laboratories may not be recognized for all three of dust, soil, and lead.

**needle gun**—a power tool that removes paint by the impact of a set of thin metal rods.

**non-spiked sample**—a portion of a homogenized sample that was targeted for the addition of analyte but is not fortified with all the target analytes before sample preparation.

**DISCUSSION**—Analysis results for this sample are used to correct for native analyte levels in spiked samples and spiked duplicate samples.

**nonconformity**, *n*—nonfulfillment of a requirement. **(ISO 9000–2000 and E 2239)**

**objective evidence**, *n*—data supporting the existence or verity of something.

**DISCUSSION**—Objective evidence may be obtained through observation, test, or other means. **(ISO 9000–2000 and E2239)**

**observation**, *n*—a judgement that is based on what one sees while conducting lead hazard activities and that is substantiated by **objective evidence**. **(E 2239)**

**paint-lead hazard**, *n*—a source of adverse effects on human health due to the presence of lead in deteriorated paint on all building surfaces or lead in paint on chewable surfaces, friction surfaces resulting in dust lead levels of adjacent horizontal surfaces above regulatory dust-lead values, or impacted surfaces.

**painted debris**, *n*—for **clearance examination**, pieces of construction waste completely or partially coated with paint. **(E 2271)**

**painting history**, *n*—A record of all paint layers that have been applied to a building **component** as determined by either documentation or professional judgement.

**patch test**—a test to determine whether a proposed liquid encapsulant is suitable for a particular surface or use that is performed by applying a small area of it to the surface, letting it cure, and testing it for adhesion.

**DISCUSSION**—the ASTM guide for performing patch tests is E 1796.

**Permissible Exposure Limit**—an occupational exposure

limit, such as for lead, that is established and enforced by the U.S. Occupational Safety and Health Administration.

**personal air samples**—an air sample that is collected within the personal breathing zone of a worker; a personal air sample is to be distinguished from an area sample.

**(Based on E 1553)**

**NOTE 1**—the personal breathing zone is a hemispherical zone with a radius of approximately 150 and 225 mm centered at the nose.

**personal protective equipment**—equipment for protecting the eyes, face, head, and/or extremities of workers from hazards, including protective clothing, respiratory devices, and protective shields. **(Based on HUD Guidelines, OSHA)**

**NOTE 2**—PPE should be used only where feasible engineering controls, administrative controls, and work practice controls have been applied and have failed to reduce the hazard.

**precision**—a characteristic manifested by agreement among the individual measurement results for a given quantity that is being measured. **(Adapted from E 1914)**

**procedure**, *n*—specified way to carry out an activity or process. **(ISO 9000–2000 and E 2239)**

**DISCUSSION**—In many cases, procedures are documented (e.g. quality system procedures). When a procedure is documented, the term “written procedure” or “documented procedure” is frequently used. A written or documented procedure usually contains the purposes and scope of an activity; what shall be done and by whom; when, where, and how it shall be done; what materials, equipment, and how many documents shall be used; and how it shall be controlled and recorded.

**professional judgement**, *n*—the process of formulating a decision based on evaluating data, information, observations, or a combination of the three, using the professional’s training and experience, and made in light of common industry practice.

**DISCUSSION**—For **clearance examinations**, decisions consider where dust wipe and soil samples should be taken. The decisions take into account the type of lead hazard reduction activity conducted prior to the clearance examination and the visual observations made of the clearance area.

**quality system**—the organizational structure, responsibilities, procedures, activities, capabilities, and resources that together aim to ensure that services satisfy date requirements. **(Generalized from E 1187.)**

**quantitation limit**—an instrumental measurement value that is used to provide a concentration limit for confidently reporting quantitative analysis data for a give analytical method. **(E 1613)**

**DISCUSSION**—There are different quantitation limits, as for detection limits, and it is important to know which is being discussed.

**random sample**, *n*—a sample selected from a population using **random sampling**. **(E 2271)**

**random sampling**—technique for selecting a sample of *n* elements from a population of elements in such a way that each combination of *n* elements has the same probability of being selected. **(C 859)**

**range**, *n*—the region between the limits within which a quantity can be measured, which is expressed by stating the



lower and upper limits (adapted from E 344).

**reading**, *n*—numerical value obtained from a digital display or indicated on a scale or dial of an apparatus or instrument. (E 1227)

**read-through**, *n*—an effect observed on thin surfaces coated with leaded paint on the far side that falsely increases an XRF measurement on the near side.

**reagent**—a chemical used to react with another chemical, often to confirm or deny the presence of the second chemical. (F 1156)

**recognized laboratory**—a laboratory recognized under the **National Lead Laboratory Accreditation Program**.

**record**, *n*—a document stating results achieved or providing evidence of activities. (E 2239)

**reevaluation**—a visual evaluation/risk assessment that is performed according to a Standard Reevaluation Schedule. (HUD Guidelines)

**reference material**—a material of known composition where the lead level is certified by the manufacturer. (E 1741)

**remodel**, *v*—to replace or improve a building or its parts. (E 631)

**repair**, *v*—to replace or correct damaged or faulty components or subsystems of a building to maintain operating capability (E 631)

**reporting limit**, *n*—the lowest level of an **analyte** in a sample that an individual laboratory can confidently report for a particular **matrix**.

**representative sample**—sample of a universe or whole (for example, waste sample pile, lagoon, ground water, or waste stream), selected in a random sampling process, which represents the total properties in the universe or whole.

**requirement**, *n*—need or expectation that is generally implied or obligatory. (ISO 9000–2000 and E 2239)

**residential dwelling**—(1) a detached single family **dwelling unit**, including attached structures such as porches and stoops; or (2) a single family dwelling unit in a structure that contains more than one separate residential dwelling unit, which is used or occupied, or intended to be used or occupied, in whole or in part, as the home or residence of one or more persons. (40 CFR 745.223)

**risk assessment**—(1) an on-site investigation to determine the existence, nature, severity, and location of lead-based paint hazards, and (2) the provision of a report by the individual or firm conducting the risk assessment, explaining the results of the investigation and options for reducing lead-based paint hazards. (40 CFR 745.223)

**risk assessment screen (deprecated)**—alternative form of **lead hazard screen**. Use of this term is discouraged in order to minimize confusion.

**risk assessor, certified**—an individual who has been trained by an accredited training program and certified under applicable Federal, state, or local regulations to conduct risk assessments or abatement clearance testing (40 CFR 745.223, adapted)

**risk screen (deprecated)**—alternative term for **lead hazard screen**. Use of this term is discouraged in order to minimize confusion.

**room equivalent**, *n*—an identifiable partitioned-interior area of a building that is not usually considered as a room, such as a hallway, stairway, lobby or vestibule. (E 2271)

**sample**, *n*—a portion of material taken from a larger quantity for the purpose of estimating properties or composition of the larger quantity.

**sample of the waste**, *n*—for waste sampling of building materials, a collection of the **components of the waste** assembled in proportion to their contribution to the total volume of the waste. (E 1908)

**sampling location**, *n*—a specific area within a **sampling site** that is subjected to sample collection. (E 1728)

DISCUSSION—Multiple sampling locations are commonly designated for a single **sampling site**.

**sampling site**, *n*—a local place that contains the sampling locations. (E 2271)

DISCUSSION—A sampling site is generally limited to an area that is easily covered by walking, for example, an apartment building or single-family residence.

**sampling template (dust)**, *n*—a tool used to isolate a known area of a surface for dust wipe sampling.

**sash**, *n*—single frame in a door or window that holds one or more lites (panes) of glass. See **window sash**.

*scaling*—see **flaking**.

*SEL*—see **substrate equivalent lead concentration**.

*shoot*—see **XRF-shoot**.

*small quantity*—see **hazardous-waste small quantity generator**.

**sodium rhodizonate method**—for *lead detection*, use of a dilute solution of sodium rhodizonate to spot test a painted surface qualitatively for the presence of lead.

**sodium sulfide method**—for *lead detection*, use of a dilute solution of sodium sulfide to spot test a painted surface qualitatively for the presence of lead.

*specimen*—See **test specimen**.

*spectrum analyzer XRF*—see **XRF spectrum analyzer**.

**spot test**, *n*—the application of reagent solution to a dry paint film sample, paint chip, paint powder, or painted surface and the subsequent observation for the presence or absence of the characteristic color change. (E 1753)

**spot test kit**, *n*—equipment (for example, a cutting tool, adsorbent applicators, if necessary) and chemicals (for example, sulfide or rhodizonate spot test reagents and any extraction solutions needed) assembled for use during spot testing for lead. (E 1753)

**standard deviation (in statistics)**—a measure of the precision of the readings, the average deviation of the deviations from the mean value.

DISCUSSION—The smaller the standard deviation, the more precise the analysis, and the less variation there is when an analysis is repeated. The standard deviation is calculated by first obtaining the mean (arithmetic average) of all of the readings. A formula is then used to calculate how much the values vary from the mean (standard deviation = the square root of the arithmetic average of the squares of the deviations from the mean). Many hand calculators have an automatic standard deviation function.

*storage*—see **hazardous-waste storage**.



**substandard dwelling**—dwelling or residence that does not meet minimum local housing codes, or is unsafe because of violation of fire, safety, or health codes.

**substrate**—unfinished building-material surface to which finishes are applied. Examples include wood, plaster, drywall, masonry, and metal.

*substrate effect*—see **XRF substrate effect**.

**substrate equivalent lead concentration (SEL)**—average of at least three XRF analyzer readings on a surface from which the coating has been removed.

**test, n**—critical examination of the quality, composition, or properties of a material, usually involving standardized test procedures.

**test specimen**—portion of a test unit needed to obtain a single test determination.

*DISCUSSION*—When used for a physical test, this is sometimes called *test piece*. For a chemical test, it is sometimes called *test portion* or *test sample*. For optical and other tests, it is also sometimes called *test sample*. In interlaboratory evaluation of test methods and other statistical procedures, it is best to reserve the word **sample** for the whole amount of material involved and not the individual test specimens, pieces, or portions being tested. **(E 456)**

**toxicity characteristic leaching procedure (TCLP)**—a mild laboratory extraction procedure designed to determine the mobility of organic and inorganic constituents present in liquid, solid, and multiphasic wastes.

*DISCUSSION*—The Environmental Protection Agency TCLP procedure is provided in 40 CFR 261, Appendix II.

**traceability, n**—ability to trace the history, application, or location of that which is under consideration. **(ISO 9000–2000 and E 2239)**

*treatment*—see **hazardous-waste treatment**.

**TSD facility**—facility for treatment, storage, or disposal of hazardous waste.

**TSP**—tri-sodium phosphate.

*unit*—see **dwelling unit**.

*verification*—see **calibrate**.

**visual inspection for clearance testing**—the visual examination of a residential dwelling or a child-occupied facility following an abatement to determine whether or not the abatement has been successfully completed. **(40 CFR 745.223)**

**visual inspection for risk assessment**—the visual examination of a residential dwelling or a child-occupied facility to determine the existence of deteriorated lead-based paint or other potential sources of lead-based paint hazards. **(40 CFR 745.223)**

**waste, n**—for waste sampling of building materials, material

resulting from a demolition, renovation, or lead hazard control project that is or will be directed for disposal. **(E 1908)**

**waste stream, n**—the total flow of waste from a demolition, renovation, or lead abatement project. Also may be defined by locally-applied law or regulation. **(E 1908)**

**wet scraping, n**—removal of leaded paint by hand scraping while keeping the surface wetted to minimize the generation of dust.

**window sash**—assembly of one or more lites (or panes) of glazing, encompassed by surrounding edge members, which when operable, slides in the plane of the window. **(E 631)**

**window stool**—flat, horizontal molding fitted over the sill, on the window interior, between jambs, that comes in contact with the bottom rail of the (lower) operating sash and the window sill.

**XRF sample site**—specific spot on a surface being tested for lead concentration by portable or laboratory XRF equipment.

**XRF direct-reading analyzer**—an analyzer that provides the operator with a display of a lead concentration calculated from the lead “K” x-ray intensity. Compare **XRF spectrum analyzer**.

**XRF reading cycle-XRF direct-reading analyzers**—calculate the lead “K” x-ray intensity in a specific time interval (10 to 30 s) that is fixed by the manufacturer and related to the age of the source. The calculated result in this time interval is a *reading cycle*.

*DISCUSSION*—In order to determine a concentration of lead (ALC or SEL) the displayed results of a *minimum of three* single reading cycles must be averaged. The difference between the lowest and highest readings from at least three reading cycles must be less than 1.7 mg/cm<sup>2</sup>.

**XRF analyzer**—instrument that determines lead concentration, using the principle of X-ray fluorescence.

*DISCUSSION*—For coatings, the concentration normally is expressed in milligrams per square centimetre (mg/cm<sup>2</sup>).

**XRF-shoot, v**—to obtain the results of an XRF single reading cycle.

**XRF spectrum analyzer**—type of XRF analyzer that provides the operator with a plot of the energy and intensity of both “k” and “L” x-rays, as well as a calculated concentration of lead. Compare **XRF direct-reading analyzer**.

**XRF substrate effect**—return of backscattered radiation from paint, substrate, or underlying material to the XRF analyzer.

*DISCUSSION*—This radiation when counted as lead x-rays by an XRF contributes to SEL or bias. The inspector may have to compensate for this effect when using direct-reading XRF analyzers.

*This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM International Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.*

*This standard is copyrighted by ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or [service@astm.org](mailto:service@astm.org) (e-mail); or through the ASTM website ([www.astm.org](http://www.astm.org)).*