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Standard Terminology Relating to Forensic Science¹

This standard is issued under the fixed designation E1732; 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 is a compilation of terms and corresponding definitions used in the forensic sciences. Legal or scientific terms that are generally understood or defined adequately in other readily available sources may not be included.

1.2 A definition is a single sentence with additional information included in a *Discussion*. It is reviewed every five years, and the year of last review or revision is appended.

1.3 Definitions identical to those published by another standards organization or ASTM committee are identified with the abbreviation of the name of the organization or the identifying document and ASTM committee; for example, ASME is the American Society of Mechanical Engineering.²

1.4 Definitions of terms specific to a particular field are identified with an abbreviation.³

2. Referenced Documents

2.1 ASTM Standards:⁴

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E456 Terminology Relating to Quality and Statistics

E1187 Terminology Relating to Conformity Assessment

(Withdrawn 2006)⁵

E1301 Guide for Proficiency Testing by Interlaboratory Comparisons (Withdrawn 2012)⁵

E1402 Guide for Sampling Design

E2161 Terminology Relating to Performance Validation in Thermal Analysis

2.2 ISO Standards:⁶

ISO 3534:1993 (E/F) Statistics—Vocabulary and Symbols
Part 1: Probability and General Statistical Terms

Part 2: Statistical Quality Control

ISO 9000:2005 (E) Standard Quality Management Systems—Fundamentals and Vocabulary

ISO Guide 2 General Terms and Their Definitions Relating to Standardizing Activities

ISO Guide 30 Terms and Definitions Used in Connection with Reference Materials

ISO Guide 35 Reference Materials—General and Statistical Principles for Certification

ISO GUM Guide to the Expression of Uncertainty in Measurement (GUM)

2.3 Other Sources:

EURACHEM *The Fitness for Purpose of Analytical Methods*, EURACHEM Working Group, English Edition

IAAI *Glossary Glossary of Terms Related to Chemical and Instrumental Analysis of Fire Debris*, IAAI Forensic Science Committee⁷

IUPAC *Terminology IUPAC Compendium of Chemical Terminology*, Second Edition, 1997

3. Significance and Use

3.1 These terms have particular application to the forensic sciences. In addition, a hierarchy of sources of definitions were used in the development of this terminology. The hierarchy is as follows: *Websters New Collegiate 7th Dictionary*; technical dictionaries; and the *Compilation of ASTM Standard Definitions*.⁸ The subcommittee developed a suitable definition after all of the sources in the hierarchy were found wanting.

4. Terminology

4.1 Definitions:

accelerant, *n*—any material used to initiate or promote the spread of a fire. The most common accelerants are flammable or combustible liquids. Whether a substance is an

¹ This terminology is under the jurisdiction of ASTM Committee E30 on Forensic Sciences and is the direct responsibility of Subcommittee E30.92 on Terminology.

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² Any definition that is unsourced has been developed by ASTM Subcommittee E30.92.

³ Abbreviations are as follows: CRIM = criminalistics, QD = questioned documents, ENGR = engineering, TOX = toxicology, PB = pathology/biology, ANTH = anthropology, and ODEN = odontology.

⁴ 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.

⁵ The last approved version of this historical standard is referenced on www.astm.org.

⁶ Available from International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, CP 56, CH-1211 Geneva 20, Switzerland, <http://www.iso.org>.

⁷ Available from the International Association of Arson Investigators, Inc. (IAAI), 2111 Baldwin Avenue, Suite 203, Crofton, MD 21114, <http://firearson.com>.

⁸ ASTM Committee on Terminology, *Compilation of ASTM Standard Definitions*, 7th ed., Philadelphia, PA: ASTM, 1990.

accelerant depends not on its chemical structure but on its use.

IAAI Glossary

accuracy, *n*—the closeness of agreement between a test result and the accepted reference value. **E177**

DISCUSSION—(1) In practice, the accepted reference value is substituted for the true value.

(2) The term "accuracy," when applied to a set of test or measurement results, involves a combination of random components and a common systematic error or bias component.

(3) Accuracy refers to a combination of trueness and precision.

ISO 3534:1993(E/F)

associative evidence, *n*—that evidence which tends to link a person, place, or thing with another person, place, or thing.

calibration, *n*—the set of operations that establishes, under specified conditions, the relationship between values indicated by a measuring instrument or measuring system or values represented by a material, and the corresponding known values of measurement.

DISCUSSION—This definition was originally defined in Terminology **E1187**, a standard discontinued by ASTM.

chain of custody, *n*—procedures and documents that account for the possession of a sample by tracking its handling and storage from its point of collection to its final disposition.

class, *n*—a group, set or kind marked by common attributes or a common attribute. **Webster's Unabridged Dictionary**⁹

class characteristic(s), *n*—the attribute(s) that establish membership in a class.

classification, *n*—the systematic arrangement of persons or objects into categories (groups or classes) based on shared traits or characteristics. **Osterburg and Ward**,¹⁰ p. 835

comparison sample, *n*—*fire debris*, (1) a sample of material collected from a fire scene which is, to the best of the investigator's knowledge, identical in every respect to a sample suspected of containing ignitable substance, but which does not contain ignitable substance; (2) a sample of suspected ignitable substance submitted for the purpose of comparing with any ignitable substance separated from a debris sample.

control, *n*—material of established origin that is used to evaluate the performance of a test or comparison.

criminalistics, *n*—a branch of forensic science concerned with the examination and interpretation of physical evidence, for the purpose of aiding forensic investigation.

exemplar, *n*—a specimen of physical evidence of known origin. **Osterburg and Ward**,¹⁰ p. 837

expanded uncertainty (U), *n*—quantity defining an interval about a result of a measurement that may be expected to

encompass a large fraction of the distribution of values that could reasonably be attributed to the measurand.

DISCUSSION—(1) The fraction may be regarded as the coverage probability or level of confidence of the interval.

(2) To associate a specific level of confidence with the interval defined by the expanded uncertainty requires explicit or implicit assumptions regarding the probability distribution characterized by the measurement result and its combined standard uncertainty. The level of confidence that may be attributed to this interval can be known only to the extent to which such assumptions can be justified.

(3) An expanded uncertainty *U* is calculated from a combined standard uncertainty *u_c* and coverage factor *k* using:

$$U = k \times u_c$$

ISO GUM, EURACHEM

false positive, *n*—a test result that states that a drug is present when, in fact, such a drug is not present in an amount greater than a threshold or designated cut-off concentration.

known, *n*—of established origin associated with the matter under investigation.

limit of detection, *n*—the lowest content that can be measured with reasonable statistical certainty.

EURACHEM

population, *n*—the totality of items or units of material under consideration.

DISCUSSION—The word "items" may be interpreted in the sense of measurements, or possible measurements, of a single characteristic, or occasionally for multiple characteristics, on all items or units of material being considered. The word "totality" may refer to items not available for inclusion in samples as well as those which are available.

E456

procedure, *n*—specified way to carry out an activity or a process.

DISCUSSION—(1) Procedures can be documented or not.

(2) When a procedure is documented, the term "written procedure" or "documented procedure" is frequently used. The document that contains a procedure can be called a "procedure document."

ISO 9000:2005(E)

proficiency testing, *n*—*laboratory*, determination of laboratory testing performance by means of interlaboratory test comparisons. **E1301**

qualitative analysis, *n*—chemical, analysis in which substances are identified or classified on the basis of their chemical or physical properties, such as chemical reactivity, solubility, molecular weight, melting point, radiative properties (emission, absorption), mass spectra, nuclear half-life, etc. (See also **quantitative analysis**.)

IUPAC Terminology

quality assurance, *n*—all the planned and systematic activities implemented within the quality system, and demonstrated as needed, to provide adequate confidence that an entity will fulfill requirements for quality. **ISO Guide 2**

quantitation limit, *n*—the minimum amount that can be quantitated with acceptable accuracy and precision. **E2161**

⁹ Webster's Unabridged Dictionary, 1967, s.v. "class."

¹⁰ Osterburg J.W., and Ward, R.H., *Criminal Investigation: A Method for Reconstructing the Past*, Anderson Pub. Co.: Cincinnati, OH: 1992.