Standard Practice for Quality Assurance of Forensic Science Service Providers Performing Chemistry Analysis

Chemistry/Instrumental Analysis Scientific Area Committee (SAC)
Organization of Scientific Area Committees (OSAC) for Forensic Science

OSAC Proposed Standard

Standard Practice for Quality Assurance of Forensic Science Service Providers Performing Chemistry Analysis

Prepared by
A task group of OSAC's Chemistry/Instrumental Analysis SAC
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Disclaimer:

This document has been developed by a task group of the Chemistry/Instrumental Analysis SAC of the Organization of Scientific Area Committees (OSAC) for Forensic Science through a consensus process and *proposed* for further development through a Standard Developing Organization (SDO). This document is being made available so that the forensic science community and interested parties can consider the recommendations of the OSAC pertaining to applicable forensic science practices. The document was developed with input from experts in a broad array of forensic science disciplines as well as scientific research, measurement science, statistics, law, and policy.

This document has not been published by a SDO. Its contents are subject to change during the standards development process. All interested groups or individuals are strongly encouraged to submit comments on this proposed document during the open comment period administered by ASTM International, Committee E30 on Forensic Science.

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Ballot Action: **New standard for consideration**

Rationale: **This document was developed at the request of the OSAC Chemistry/Instrumental SAC. A chemistry SAC subcommittee was established that consisted of each of the six forensic chemistry disciplines. All forensic chemistry disciplines and the resource committees provided comments and all were adjudicated. The document was approved to be further developed by ASTM. The intent of this practice is to establish an overarching quality assurance document that applies to all providers performing forensic chemistry analyses. Each discipline could then either add an annex to the document or develop their own standard that describes specific requirements unique to that discipline.**

Designation: Exxxx-xx

Standard Practice for Quality Assurance of Forensic Science Service Providers Performing Forensic Chemistry Analyses

This standard is issued under the fixed designation Exxx; 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 discusses procedures for quality assurance of forensic science service providers performing forensic chemistry analyses. This practice provides a framework of quality in the processing of evidence, including: maintaining a quality management system; personnel duties, qualifications, training, education and professional development; facility considerations; evidence handling; analytical procedures; instrument and equipment performance; chemicals and reagents; casework documentation and reporting; proficiency and competency testing; method validation and verification; audits; deficiency of analysis; and documentation requirements.

1.2. This practice cannot replace knowledge, skills, or abilities acquired through appropriate education, training, and experience (see E2917), and is to be used in conjunction with professional judgment by individuals with such discipline-specific knowledge, skills, and abilities.
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1.3 *The 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.*

1.4 *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:*

E620 Practice for Reporting Opinions of Scientific or Technical Experts
E1459 Guide for Physical Evidence Labeling and Related Documentation
E1492 Practice for Receiving, Documenting, Storing, and Retrieving Evidence in a Forensic Science Forensic science service provider
E1732 Terminology Relating to Forensic Science
E2917 Practice for Forensic Science Practitioner Training, Continuing Education and Professional Development Programs

2.2 *Other Documents:*

ISO/IEC 17020 Conformity assessment – Requirements for the operation of various types of bodies performing inspection
ISO/IEC 17025 General Requirements for the Competence of Testing and Calibration Laboratories
ISO Guide 30 Reference Materials - Selected Terms and Definitions
ISO 17034 General Requirements for the Competence of Reference Material Producers
ISO 17043 Conformity assessment – General requirements for proficiency testing

3. Terminology

3.1 Terms that can assist in interpreting this standard are found in Terminology E1732.

3.2 ***Definitions of Terms specific to this standard:***

3.2.1 *blank, n*—a control where a specified component(s) is not present.
3.2.1.1 Discussion – Blanks with various designations can be specified, such as system blank, process blank, method blank, reagent blank, solvent blank, etc. Certain blanks may also serve as a negative control.

3.2.2 *certified reference material, n*—reference material (RM) characterized by a metrologically valid procedure for one or more specified properties, accompanied by an RM certificate that provides the value of the specified property, its associated uncertainty, and a statement of metrological traceability. ISO Guide 30

3.2.3 *forensic science practitioner, n*—an individual who (*1*) applies scientific or technical practices to the recognition, collection, analysis, or interpretation of evidence for criminal and civil law or regulatory issues; and (*2*) issues test results, provides reports, or provides interpretations, conclusions, or opinions through testimony with respect to such evidence **(1)**.

3.2.4 *forensic science service provider, n*—a forensic science agency or forensic science practitioner providing forensic science services **(1)**.

3.2.5 *negative control, n*—a material of established origin that is used to confirm that the procedure does not produce an unintended result.

3.2.6 *positive control, n*—a material of established origin that is used to confirm that the procedure will produce the expected result.

3.2.7 *reference material, n*—material, sufficiently homogeneous and stable with respect to one or more specific properties, which has been established to be fit for its intended use in a measurement process. ISO Guide 30

3.2.8 *standardized method, n*—a method published by a recognized international, regional, or national standard development organization (SDO).

4. Significance and Use

4.1 These are minimum standards of quality assurance applicable to forensic science service providers performing forensic chemistry analysis on evidence.

4.2 This practice is to be used by forensic science practitioners performing chemical evidence analysis and promoted/supported by forensic science service provider management.

5. Quality Management System

5.1 It is the goal of a forensic science service provider's evidence analysis program to provide customers with high quality analyses that produce reliable and accurate results.

5.2 A documented quality management system shall be established and maintained.

5.2.1 Personnel responsible for the quality management system shall be clearly designated and have direct access to the highest level of management.

5.2.2 The quality management system shall cover all procedures and reports associated with analysis.

5.2.3 The quality management system shall conform to an international standard, such as ISO/IEC 17025 or 17020.

6. Personnel

6.1 Documented job descriptions shall be established and maintained. Job descriptions for all personnel shall include responsibilities, duties, and required skills.

6.2 Designated key personnel and responsibilities shall be established and maintained. An individual (however named) can be responsible for more than one of the following duties:

6.2.1 *Director*—A designated person who is responsible for the overall operation and administration of the forensic science service provider, including the employment of personnel and assuring compliance with applicable regulations.

6.2.2 *Quality Assurance Manager*—A designated person who is responsible for maintaining the quality management system (including an annual review of the program) and who ensures conformance with the program.

6.2.3 *Technical Support Personnel* —A person who performs basic forensic science service provider duties (e.g., calibration checks, making solutions, glassware washing, etc.), but does not analyze evidence.

6.2.4 *Technician*—A person who analyzes evidence, but does not issue reports of analytical results or interpretations.

6.2.5 *Forensic Science Practitioner*—A designated person who may be authorized to:

6.2.5.1 Examine and analyze materials, or direct such examinations to be performed; and

6.2.5.2 Interpret data, issue reports for court or investigative purposes, and conduct technical review of reports.

6.2.6 *Technical Leader*—A designated person who has the overall responsibility and authority for the technical operations associated with evidence analyses. Technical operations include: maintaining protocols; developing analytical methodology; conducting method validation; and performing technical review of reports.

6.3 *Qualifications/Education, at a minimum:*

6.3.1 Technical Support Personnel shall:

6.3.1.1 Have education, skills, and abilities commensurate with their responsibilities; and

6.3.1.2 Have on-the-job training specific to the responsibilities of their position.

6.3.2 Technicians shall:

6.3.2.1 Have education, skills, and abilities commensurate with their responsibilities; and

6.3.2.2 Have formal training specific to evidence handling and analysis aspects of their duties including:
(1) Successful and documented completion of written or oral examinations, and
(2) Successful and documented completion of competency testing, and
(3) Successful and documented completion of a moot/mock court exercise.

6.3.3 Forensic science practitioners shall:

6.3.3.1 Meet all the requirements of a technician (6.3.2),

6.3.3.2 Have at least a bachelor's degree or equivalent (generally, a four-year postsecondary degree) in a natural or physical science. The individual shall have successfully completed lecture and laboratory classes in general, organic, and analytical chemistry (however named),

6.3.3.3 Conform to E2917 Practice for forensic science practitioner training, continuing education, and professional development programs.

6.3.4 Technical Leaders shall:

6.3.4.1 Meet all the requirements of a forensic science practitioner (6.3.3),

6.3.4.2 Have a minimum of three (3) years of experience as a qualified forensic science practitioner, in the specific discipline, performing independent evidence analyses.

6.4 Forensic science service providers shall have and follow a documented training, continuing education and professional development program.

7. Physical Plant (2)

7.1 Forensic science service providers shall provide:

7.1.1 Adequate safety and security for personnel and operations;

7.1.2 Facilities that meet required health and safety building codes;

7.1.3 Suitable space to perform required analytical functions and prevent contamination;

7.1.3.1 Separate areas/space should be available for processing evidence to prevent incidental contamination.

7.1.3.2 Environmental and procedural controls shall be in place to prevent incidental contamination. Appropriate controls shall be defined by the standard documents or forensic science service provider protocols associated with the methods used.

7.1.4 Engineering devices (e.g., chemical fume hoods, safety showers, etc.) to protect personnel from chemical hazards;

7.1.5 Facilities to ensure safe and secure storage of evidence, standards and records; and

7.1.6 Storage to prevent contamination of chemicals and reagents.

8. Evidence Control

8.1 Forensic science service providers shall follow a documented control system to ensure the integrity of evidence.

8.2 *Evidence labelling and Related Documentation*—See Guide E1459 for evidence labelling and related documentation.

8.3 *Receiving, Documenting, Storing and Retrieving Evidence*—See Practice E1492 for receiving, documenting, storing, and retrieving evidence.

8.4 *Integrity of Evidence*—Evidence shall be properly secured and sealed. Appropriate storage conditions shall ensure that, insofar as possible, the composition of evidentiary material is not altered. All items shall be safeguarded against loss, deterioration or contamination. Any alteration of the evidence (e.g., repackaging) shall be documented.

8.5 *Disposition of Evidence*—Records shall be kept regarding the disposition of all items of evidence.

9. Analytical Procedures

9.1 *Analytical Procedures:*

9.1.1 Forensic science service providers shall follow documented and validated analytical procedures.

9.1.1.1 The technical leader or other designated individual shall be responsible for evaluation and authorization of the analytical procedures used by the forensic science service provider, including reviews of method validations and verifications. All evaluations and authorizations shall be documented and retained.

9.1.1.2 A chemical/material identification, quantification or comparison shall be based on specific characteristics defined in the validated method, and decisions on the type/source of the material should be based on decision-thresholds.

9.1.1.3 A measure of the probative value of chemical/material identifications or comparisons shall be evaluated and reported.

9.1.1.4 Forensic science service providers shall have in place protocols for the sampling of evidence.

9.1.2 Standardized methods shall be used, if available.

9.1.2.1 The use of non-standard methods shall be validated and approved by the technical leader or other designated individual according to forensic science service provider policy.

9.1.3 Work practices shall be established to prevent contamination of evidence during analysis.

9.1.3.1 The processing of trace/residue samples should be separated in space from bulk evidence submissions to prevent incidental contamination. If space does not allow for this, then the processing of bulk and trace/residue samples shall be separated by time with thorough cleaning between processing steps.

9.1.3.2 Forensic science practitioners shall take measures to be assured that identifications are correct (e.g., excluding contamination, instrument carryover, etc.) and relate to the right submission.

9.1.4 Forensic science service providers shall follow documented procedures for the evaluation and acceptance of data based on the method utilized.

9.1.5 Forensic science service providers shall monitor analytical processes using appropriate blanks, positive and negative controls and reference materials.

9.1.5.1 Negative controls shall be run concurrently with evidence to demonstrate that the sampling devices, chemicals, instruments and extraction processes do not result in contamination of the evidence.

9.1.5.2 The forensic science service provider shall have a procedure for routinely testing the reliability of the analytical processes with known reference materials (positive control). This can be done concurrently with each analysis or on a predefined schedule.

9.1.6 Reference materials and associated data shall be used to demonstrate the reliability of test results. A positive test result shall meet the acceptance criteria defined in the method validation and operating protocol. In descending order of preference, the acceptance criteria should be based on:

9.1.6.1 Comparison to data obtained from a suitable reference material analyzed under the same analytical conditions (i.e., instrument, instrumental methods, and stationary phase) as the test/case sample. If reference material data is collected on a different instrument than the test/case sample, it shall be demonstrated that both instruments produce comparable data. The reference material may be analyzed:

(1) Contemporaneously with test/case sample (e.g., same sequence/batch):
(2) As part of routine quality control (e.g., daily check solutions); or
(3) At a previous date (e.g., method validation, internal reference collection).

9.1.6.2 Comparisons to external reference data may be used where a reference material is unavailable. External reference data shall be assessed and demonstrated to be fit for purpose. Factors include:

(1) Origin of the data,
(2) Validation of the data,
(3) Peer review of the data, and
(4) Comparability of analytical conditions.

9.1.6.3 When neither reference materials nor external reference data are available, structural elucidation techniques, when applicable by discipline, may be employed providing that analyses are made only by forensic science practitioners, as defined by the forensic science service provider, that are competent in structural elucidation interpretation.

9.2 *Assessment of Reference Materials:*

9.2.1 Forensic science service providers shall have a process for assessing that reference materials are fit for purpose.

9.2.1.1 Assessments are not required for reference materials obtained from a provider accredited under ISO/IEC 17034.

9.2.1.2 The assessment and purpose (e.g., qualitative or quantitative) of a reference material shall be documented. The documentation shall include: identity; source; assigned unique identifier; date and name of the individual who performed the assessment; and verification test data.

9.2.1.3 To be fit for purpose, reference materials shall meet the minimum specification defined in the forensic science service provider's validated method.

9.2.1.4 The assessment shall be performed on each lot of reference materials.

9.2.1.5 The assessment shall be completed prior to casework analysis.

9.2.2 Reference materials shall only be used for the purpose defined by the forensic science service provider. For example, a reference material may be deemed suitable for qualitative but not quantitative determinations.

9.2.2.1 Fit for purpose for qualitative work requires an assessment of chemical identity.

9.2.2.1.1 Examples of verification of chemical identity by analysis include:

(1) Analysis and comparison of the results to peer-reviewed published data;
(2) Data produced by an accredited forensic science service provider;
(3) Data produced from a previously verified reference material; or

(4) Evaluation of data from in-house structural elucidation analysis of the material.

9.2.2.2 Fit for purpose for quantitative work requires traceability an assessment of purity or concentration, or both, as appropriate to the application and its associated uncertainty of measurement in addition to 9.2.3.

9.2.2.2.1 Examples of verification of purity by analysis utilizing validated methods include:

(1) Quantitative nuclear magnetic resonance spectroscopy;
(2) Quantitative ultraviolet-visible spectroscopy; or
(3) Comparison to previously verified material.

9.2.2.2.2 For quantitative determinations, different sources of reference material should be used for calibration and quality control. Where this is not feasible, two different lots of the same source may be used or lastly a single source of reference material can be subdivided and each part assigned a specific purpose.

9.2.2.3 Certified reference materials are not required, and are not typically available for many chemicals.

9.2.3 The specifications in 9.2 can be described in a certificate, statement of analysis, data sheet or label supplied with the material or can be determined by in-house analysis or reference to published literature.

9.2.4 The forensic science service provider shall assess the veracity of the information supplied with a reference material even if the material meets the definition of a certified reference material.

9.2.5 Reference materials shall have an expiration date.

9.2.6.1 If the material is not supplied with an expiration date, one should be assigned at the first assessment (9.2.1).

9.2.6.2 If the expiration date passes before the material is fully used, then the material can be re-assessed and the expiration date extended. The forensic science service provider protocol for extending expiration dates shall be documented and include analysis of the material.

10. Instrument/Equipment Performance

For the purpose of this standard, instruments are defined as devices that generate analytical data (e.g., GC-MS, IR, NMR, balance, etc.). Equipment is defined as tools, such as fume hoods, ovens, vortexers, etc.

10.1 *Instrument* - A performance check of each instrument shall be conducted prior to being initially used for casework. This performance check shall be documented and include:

10.1.1 Analysis and comparison of known materials to include expected analytes, in order to demonstrate its suitability for intended use.

10.1.2 Comparison of data created to that of comparable published data.

10.2 *Instrument Performance*—Instruments shall be routinely optimized and monitored to ensure that proper performance is maintained.

10.2.1 Define and document acceptance criteria for monitoring instrument performance.

10.2.2 Monitoring shall include, at a minimum, the use reference materials, test mixtures and blanks when applicable.

10.2.3 Instrument performance monitoring shall be documented and retained.

10.2.4 The manufacturer's operation manual and other relevant documentation for each instrument should be readily available.

10.3 *Equipment*—Only suitable and properly working equipment shall be used in the course of analyses.

10.3.1 Equipment performance parameters should be routinely monitored and documented when applicable.

10.3.2 The manufacturer's operation manual and other relevant documentation for each piece of equipment should be readily accessible.

11. Chemicals and Reagents

11.1 Chemicals and reagents used in forensic chemistry analysis shall be at least ACS reagent grade.

11.2 There shall be documented procedures for the formulation of all chemical reagents produced.

11.2.1 Documentation for reagents prepared shall include identity, concentration (when appropriate), date of preparation, identity of the individual preparing the reagents, storage conditions (if appropriate), and the expiration date.

11.3 The efficacy of all reagents shall be checked prior to or concurrent with their use in casework. Results of these tests shall be documented.

11.4 The received and opened date(s) shall be recorded for chemicals and reagents, where relevant to testing results.

11.5 Chemical and reagent containers shall be labeled as to their contents.

12. Casework Documentation, Report Writing and Review

12.1 *Casework Documentation:*

12.1.1 Documentation shall contain sufficient information and clarity to allow another properly trained forensic science practitioner the ability to evaluate the notes, interpret data and verify whether the original conclusion is accurate.

12.1.2 Evidence handling documentation shall establish chain-of-custody.

12.1.3 Case related communications shall be maintained.

12.1.4 Analytical documentation shall include observations, methodology, blanks, controls, test results, and supporting documentation. Examples of supporting documentation are instrumental data, sequence files or run logs, charts, graphs, and spectra generated during analysis.

12.1.4.1 Document any deviations from required analytical procedures (see 9.1.1).

12.1.5 Casework documentation shall be retained according to the forensic science service provider's policy or jurisdictional regulations or laws.

12.2 *Case Review:*

12.2.1 Forensic science service providers shall have a documented policy establishing protocols for who authorizes reported conclusions.

12.2.2 Where practicable, reviewers should not be privy to analysts' conclusions when conducting reviews.

12.2.3 Forensic science service providers shall have a documented procedure for resolving instances where forensic science practitioner and reviewer disagree.

12.2.4 Identified deficiencies shall be resolved in accordance with Section 16.

12.3 *Report Writing:*

12.3.1 Reports shall include the elements as described in E620 and ISO/IEC 17025.

12.3.2 Reports issued by the forensic science service provider shall be accurate, clear, objective, and meet the requirements of the jurisdictions served.

13. Competency and Proficiency Testing

13.1 Forensic science service providers shall establish a documented competency testing and proficiency testing program. Forensic science service providers shall have documented protocols for evaluating and monitoring the competency (see E2917) and continuing proficiency of its forensic science practitioners.

13.2 *Competency Testing:*

13.2.1 Forensic science service providers shall test the competency of their technicians and forensic science practitioners prior to assigning them independent casework responsibilities.

13.2.2 Competency test samples should be representative of the forensic science service provider's normal casework.

13.2.3 Methodology utilized to perform competency tests shall be the same as those normally practiced when analyzing evidence.

13.3 *Proficiency Testing:*

13.3.1 Forensic science service providers shall participate in proficiency testing in order to evaluate the continuing capability and performance of their procedures and persons engaged in testing.

13.3.1.1 Performance shall be evaluated against pre-established criteria.

13.3.1.2 Each person engaged in testing proficiency samples shall not be privy to the known composition.

13.3.1.3 Each person engaged in testing activities related to evidence analysis shall successfully participate in at least one internal or external proficiency test per calendar year that addresses the specific forensic chemistry discipline or category of testing for which they are authorized.

13.3.1.4 When available, each forensic science service provider engaged in testing activities related to evidence analysis shall participate in at least one external proficiency test each calendar year that addresses the specific forensic chemistry discipline or category of testing. Whenever feasible, ISO/IEC 17043 accredited test providers should be used.

13.3.2 Proficiency test samples should be representative of the forensic science service provider's normal casework.

13.3.3 Methodology utilized to perform proficiency tests shall be the same as those normally used when analyzing evidence.

14. Method Validation and Verification

14.1 Method validation is required to demonstrate that methods are suitable for their intended purpose.

14.2 Forensic Science Service Providers adopting methods validated elsewhere shall verify the validity and reliability of those methods used in their environment, with their instrumentation, equipment, reagents and chemicals, and forensic science practitioners prior to use.

14.3 New methods developed for characterization, identification, and comparison of chemicals shall be based on accepted scientific principles. The Forensic Science Service Provider shall perform validation studies to establish both the technique's validity and reliability prior to use in casework.

14.3.1 Minimum acceptance criteria shall be established for method performance and be described along with means for demonstrating compliance.

14.4 Validation and verifications shall address specificity, reproducibility, and limitations of the technique.

14.4.1 Validations and verifications involving quantitative analysis shall also address limits of detections, lower limit of quantitation, linearity, and uncertainty of the measurement process.

14.5 Validation and verifications shall be approved by the technical leader or other designated personnel prior to use in casework.

14.6 Validation and verification documentation shall be maintained.

15. Forensic Science Service Provider Audits

15.1 Internal audits of the forensic science service provider's operations shall be conducted at least once a year. Record keeping shall satisfy the requirements of ISO/IEC 17025.

16. Nonconforming work

16.1 In the course of examining evidence, forensic science service providers can expect to encounter some operations or results that do not conform in some manner. Examples of nonconforming work include: an erroneous analytical result or interpretation; or any unapproved deviation from an established policy or procedure in an analysis. Nonconforming work shall satisfy the requirements of ISO/IEC 17025.

NOTE —It should be recognized that to be effective, the definition for "nonconforming work" must be relatively broad. As such, nonconforming work can have markedly different degrees of seriousness. For example, a misidentification of a compound or mixture would be very serious and perhaps require that either the methodology or the forensic science practitioner be removed from casework pending appropriate remedial action, as determined by the forensic science service provider. However, other nonconforming work could be more clerical in nature, requiring a simple correction without any suspension of methodology or reassignment of personnel. Thus, it can be advantageous to identify the differing levels of seriousness for nonconforming work and make the action required commensurate with the seriousness.

17. Summary of Required Documentation

17.1 In addition to casework documentation, forensic science service providers shall maintain records on the following topics:

17.1.1 Test methods/procedures for evidence analysis,

17.1.2 Reference materials,

17.1.3 Preparation and checks of reagents,

17.1.4 Evidence handling protocols,

17.1.5 Equipment calibration and maintenance,

17.1.6 Equipment inventory (for example, manufacturer, model, serial number, acquisition date),

17.1.7 Competency and proficiency testing,

17.1.8 Personnel training and qualification,

17.1.9 Quality assurance protocols and audits,

17.1.10 Health, safety, and security protocols,

17.1.11 Validation and verification data and results, and

17.1.12 Statistics and probability (including uncertainty, population inferences, etc.)

18. Keywords

18.1 forensic science service provider; quality assurance; analytical procedures; evidence analysis; method validation and verification; audits.

19. References

(1) National Commission on Forensic Science, *Defining Forensic Science and Related Terms*, May 2016, available from: https://www.justice.gov/archives/ncfs/file/786571/download.

(2) *Forensic Science Laboratories: Handbook for Facility Planning, Design, Construction, and Relocation,* June 2013, available from: https://tsapps.nist.gov/publication/get_pdf.cfm?pub_id=913987

ANNEX

A. Quality Assurance Practices Specific to Seized-Drug Analysis

A1. Scope

A1.1 See Practice E2327 for quality assurance of forensic science service providers performing seized-drug analysis.

A2. Referenced Documents

A2.1 *ASTM Standards:*

E2326 Practice for Education and Training of Seized-Drug Analysts
E2327 Practice for Quality Assurance of Laboratories Performing Seized-Drug Analysis
E2329 Practice for Identification of Seized Drugs
E2548 Guide for Sampling Seized Drugs for Qualitative and Quantitative Analysis
E2549 Practice for Validation of Seized-Drug Analytical Methods
E2764 Practice for Uncertainty Assessment in the Context of Seized-Drug Analysis
E2882 Standard Guide for Analysis of Clandestine Drug Laboratory Evidence

A2.2 *Other Documents:*

Scientific Working Group for the Analysis of Seized Drugs Recommendations for: Education and Training, Quality Assurance, Methods of Analysis (http://www.swgdrug.org)

A5. Quality Management System

A5.2 The quality management system shall cover all procedures and reports associated with seized-drug analysis.

A6. Personnel

A6.4.1 See Practice E2326 for education and training of seized-drug analysts.

A9. Analytical Procedures

A9.1.1 See E2329 and E2882 for analytical procedures specific to seized-drug analysis.

A9.1.1.4 See Guide E2548 for sampling seized-drugs for qualitative and quantitative analysis.

A14. Method Validation and Verification

A14.1 See Practice E2549 for validation of seized-drug analytical methods.

A18. Summary of Required Documentation

A17.1.12 See Practice E2764 for documenting statistics and probability.

A19. Keywords

A19.1 seized-drug analysis.

B. Quality Assurance Practices Specific to Analysis of Ignitable Liquid and Ignitable Liquid Residues

B2. Referenced Documents

B2.1 *ASTM Standards:*

E1618 Test Method for Ignitable Liquid Residues in Extracts from Fire Debris Samples by Gas Chromatography-Mass Spectrometry
E2451 Practice for Preserving Ignitable Liquids and Ignitable Liquid Residue Extracts from Fire Debris Samples

B8. Evidence Control

B8.1 See Practice E2451 for preserving ignitable liquids and ignitable liquid residue extracts from fire debris samples.

B9. Analytical Procedures

B9.1.1 See E1618 test method for ignitable liquid residues in extracts from fire debris samples by gas chromatography-mass spectrometry.

B9.1.3.1 The processing of questioned debris samples should be separated in space from other ignitable liquids to prevent incidental contamination. If space does not allow for this, then the processing of liquids and debris shall be separated by time. Exercise the same caution with samples suspected to contain large amounts of ignitable liquids.

B9.1.5.1 An appropriate blank (e.g., solvent or headspace) shall be analyzed prior to each evidence sample injection.

B9.2 *Assessment of Reference Materials:*

B9.2.2.1.1 For reference ignitable liquids the identity and/or classification of the reference material shall be verified by analysis. Examples of verification include comparison of the data to:
*(1) P*eer reviewed published data and databases (e.g. ILRC); or
(2) Data produced from a previously verified reference material or ignitable liquid.

B9.2.2.2.1 Verification and classification of reference ignitable liquids shall be performed on each new lot prior to use in casework by:
(1) gas chromatography-mass spectrometry;
(2) visual pattern recognition; and,
(3) comparison to previously authenticated ignitable liquids or peer reviewed published data (e.g. ILRC).

B9.2.4 Reference ignitable liquids should be classified for use in casework.

B10. Instrument/Equipment Performance

B10.1.1 Analysis and comparison of known ignitable liquids to include expected analytes, in order to demonstrate its suitability for intended use.

B10.1.2 Comparison of data created through the use of extracted ion chromatography, including all associated software and macros, to that of comparable published data.

B11. Chemicals and Reagents

B11.6 Prior to the use of an adsorbent material in casework, each adsorbent lot shall be tested for efficacy and contamination.

B11.6.1 The efficacy shall be tested by analysis of a broad range ignitable liquid that is extracted and analyzed by the method(s) used in casework.

B11.6.2 Contamination shall be tested by extracting and analyzing the adsorbent material in the absence of an ignitable liquid by the method(s) used in casework.

B11.6.3 All efficacy documentation shall be retained according to forensic science service provider policy.

B12. Casework Documentation, Report Writing and Review

B12.1.5 Original electronic data or copies shall be maintained.

B19. Keywords

B19.1 Ignitable liquid analysis.

ANNEX

C. Quality Assurance Practices Specific to Toxicology

C2. Referenced Documents

C2.2 *Other Documents: ANSI/AAFS Standards Board (ASB) Standards:*

ASB 017 Standard Practices for Measurement Traceability in Forensic Toxicology
ASB 036 Standard Practices for Method Validation in Forensic Toxicology
ASB 037 Guidelines for Opinions and Testimony in Forensic Toxicology

C5. Quality Management System

C5.2 The quality management system shall cover all procedures and reports associated with toxicology analysis.

C19. Keywords

C19.1 Toxicology analysis.