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An American National Standard

Standard Guide for Analysis of Clandestine Drug Laboratory Evidence[1]

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1. Scope

1.1 This standard is intended to be used in conjunction with the general requirements for the analysis of seized drugs (Practices E2326, E2327, E2329, and E2549; Guides E2548 and E2329). This standard provides guidance on the chemical analysis of items and samples related to suspected clandestine drug laboratories. This standard provides general guidance for the analysis of clandestine drug laboratory evidence and is not a substitute for detailed and validated laboratory policies and technical procedures.

1.2 *This standard cannot replace knowledge, skills, or abilities acquired through education, training, and experience (see Practice E2326) and is to be used in conjunction with professional judgment by individuals with such discipline-specific knowledge, skills, and abilities.*

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

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:*[2]

D6161 Terminology Used for Microfiltration, Ultrafiltration, Nanofiltration, and Reverse Osmosis Membrane Processes

E1605 Terminology Relating to Lead in Buildings

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

E2363 Terminology Relating to Process Analytical Technology in the Pharmaceutical Industry

E2548 Guide for Sampling Seized Drugs for Qualitative and Quantitative Analysis

E2549 Practice for Validation of Seized-Drug Analytical Methods

F2725 Guide for European Union's Registration, Evaluation, and Authorization of Chemicals (REACH) Supply Chain Information Exchange

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *capacity, n*—the amount of finished product that could be produced, either in one batch or over a defined period of time, and given a set list of variables. **SWGDRUG**[3]

3.1.2 *catalyst, n*—a substance whose presence initiates or changes the rate of a chemical reaction, but does not itself enter into the reaction. **D6161**

3.1.3 *finished product, n*—a manufactured product ready for use. **SWGDRUG**[3]

3.1.4 *intermediate, n*—substance that is manufactured for and consumed in or used for chemical processing to be transformed into another substance. **F2725**

3.1.5 *reagent, n*—a chemical used to react with another chemical, often to confirm or deny the presence of the second chemical. **E1605**

3.1.6 *yield, expected, n*—the quantity of material or the percentage of theoretical yield anticipated at any appropriate phase of production based on previous laboratory, pilot scale, or manufacturing data. **E2363**

3.1.7 *yield, theoretical, n*—the quantity that would be produced at any appropriate phase of production based upon the quantity of material to be used, in the absence of any loss or error in actual production. **E2363**

[1] This guide is under the jurisdiction of ASTM Committee E30 on Forensic Sciences and is the direct responsibility of Subcommittee E30.01 on Criminalistics.

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

[3] Available from the Scientific Working Group for the Analysis of Seized Drugs, http://www.swgdrug.org.

4. Significance and Use

4.1 An analyst should be knowledgeable, through established laboratory training, of clandestine drug laboratory synthetic routes and the techniques used in the analysis of related samples. This acquired knowledge of clandestine drug laboratory samples assists the analyst in choosing the best analytical scheme to identify reagents, precursors, intermediates, and final products.

4.2 The qualitative and quantitative analyses of clandestine drug laboratory evidence can require different approaches relative to routine seized drug analyses. Analysts shall understand the limitations of the procedures used in their qualitative and quantitative analyses. These include such factors as method selectivity, uncertainty, and the basis for inferences from a sample(s) to a population.

4.3 Laboratory management shall ensure that clandestine drug laboratory synthesis and analysis training be provided through relevant procedures, literature, and practical experience. Practical experience typically includes production, sampling and analysis of clandestine drug laboratory training samples.

4.4 Laboratory management shall ensure that chemical safety and hygiene plans address and mitigate hazards associated with clandestine drug laboratory evidence.

4.5 It does not address scene attendance or scene processing.

4.6 Laboratory management shall consider customer/local requirements which influence the application of these recommendations.

5. Safety

5.1 Many items seized at clandestine drug laboratories could be inherently hazardous. These could include items of unknown composition and chemicals that have not been fully characterized and whose specific hazards are not known. Therefore, exercise caution as routine safety protocols could be insufficient.

5.2 The following are required in addition to the routine laboratory safety program in place for the analysis of seized drugs (see Practice E2327):

5.2.1 Safety procedures and the use of safety and protective equipment for all staff responsible for handling items;

5.2.2 Protective breathing equipment;

5.2.3 Listings of the relevant hazards (for example, SDS) associated with components commonly found at clandestine drug laboratory sites and knowing what they mean; and

5.2.4 Accident prevention, emergency response procedures, and incident reporting protocols.

5.3 The handling, analysis, and storage of items seized from clandestine drug laboratories require additional procedures, facilities and equipment (see Practice E2327). Examples are:

5.3.1 Specialized ventilation equipment (for example, fume hoods) to prevent exposure to harmful fumes and vapors;

5.3.2 Provision of personal protective equipment such as safety glasses, chemical resistant gloves, laboratory coats, respirators, face masks, and air monitors;

5.3.3 Maintenance of a clean, uncluttered workspace;

5.3.4 Specialized emergency equipment stations;

5.3.5 Chemical disposal, destruction facilities, and procedures; and

5.3.6 Specialized evidence receipt, storage and disposal requirements designed to mitigate expected dangers (for example, limited sample size, proper packaging of reactive materials, use of absorbents, properly ventilated storage).

5.4 Analysts shall be aware of the hazards associated with clandestine drug laboratories samples. Examples are:

5.4.1 Extracting from strong acids and bases (for example, hydriodic acid, sodium hydroxide);

5.4.2 Handling fuming acids and bases (for example, hydrochloric acid, ammonia);

5.4.3 Poisonous gases (for example, phosphine, chlorine, hydrogen sulfide) and their potential release from evidence during analysis;

5.4.4 Poisonous, carcinogenic, and mutagenic materials (for example, mercuric chloride, chloroform, potassium cyanide);

5.4.5 Reactive and air sensitive materials (for example, white phosphorus, lithium);

5.4.6 Potential testing incompatibilities (for example, phosphorus with Raman, color test reagents with cyanide salts, exothermic reactions);

5.4.7 Radioactive materials (for example, thorium); and

5.4.8 Volatile and flammable solvents (for example, acetone, diethyl ether, methylated solvents).

6. Sample Section for Analysis

6.1 The primary purpose of analysis is to prove or disprove allegations of clandestine drug syntheses. Accordingly, analysts must select items which relate to the manufacturing process.

6.2 While not all-encompassing, sample selection can be based on the observations, case scenario, and preliminary field test results of the on-scene personnel.

6.3 Items should be selected for analysis (either at the scene or from items submitted to the laboratory), based on jurisdictional requirements, and which are likely to contain:

6.3.1 Finished product,

6.3.2 Intermediates,

6.3.3 Precursors,

6.3.4 Key reagents, and

6.3.5 Reaction mixtures.

6.4 The following types of items can be analyzed as they could assist in determining the chemical reaction(s) undertaken and the scope of the clandestine drug laboratory:

6.4.1 Materials that appear to be waste;

6.4.2 Unlabeled materials that appear to be contaminated solvents, acids, or bases; and

6.4.3 Samples from contaminated equipment.

6.5 Analysis is not required on all items, particularly if collected from sealed and labeled containers that are readily obtained from local retail stores and are sold from reputable manufacturers/distributors. These include:

6.5.1 Solvents (for example, toluene, mineral spirits),

6.5.2 Acids (for example, hydrochloric acid, sulfuric acid),