



Standard Guide for Analysis of Clandestine Drug Laboratory Evidence¹

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1. Scope

1.1 This guide 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 guide provides guidance on the chemical analysis of items and samples related to suspected clandestine drug laboratories. It does not address scene attendance or scene processing. This document provides general guidance for the analysis of clandestine laboratory evidence and is not a substitute for detailed and validated laboratory policies and technical procedures.

1.2 This guide does not replace knowledge, skill, ability, experience, education, or training and should be used in conjunction with professional judgment.

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:

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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.

3.1.1 *capacity*—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. **SWGDRUG³**

3.1.2 *catalyst*—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*—a manufactured product ready for use. **SWGDRUG³**

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

3.1.5 *reagent*—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*—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*—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**

4. Significance and Use

4.1 An understanding of clandestine laboratory synthetic routes and the techniques used in the analysis of related samples is considered to be fundamental to the interpretation and reporting of results. This understanding assures that results and conclusions from methods are reliable and analytical schemes are fit for purpose.

4.2 The qualitative and quantitative analyses of clandestine 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 laboratory synthesis and analysis training be provided through

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

relevant procedures, literature, and practical experience. Practical experience typically includes production, sampling and analysis of clandestine laboratory training samples.

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

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

5. Safety

5.1 This guide 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 guide to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

5.2 Many items seized at clandestine laboratories may be intrinsically dangerous. These may include items of unknown composition and chemicals that have not been fully characterized and whose specific hazards are not known. Therefore, caution must be exercised and routine safety protocols may not be sufficient.

5.3 The following are required in addition to the routine laboratory safety program in place for the analysis of seized drugs (see Practice [E2327](#), Health and Safety):

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

5.3.2 Protective breathing equipment;

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

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

5.4 The handling, analysis, and storage of items seized from clandestine laboratories require additional procedures, facilities and equipment (see Practice [E2327](#), Physical Plant). Examples are:

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

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

5.4.3 Maintenance of a clean, uncluttered workspace;

5.4.4 Specialized emergency equipment stations;

5.4.5 Chemical disposal and destruction facilities and procedures; and

5.4.6 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).

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

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

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

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

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

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

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

5.5.7 Radioactive materials (for example, thorium); and

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

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 Not all items seized at a clandestine laboratory site may need to be analyzed. It is recommended that information be shared between the analyst and on-scene personnel to aid in sample selection.

6.3 Items should be selected for analysis, 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 Some of the following types of items may be analyzed as they can assist in determining the chemical reaction(s) undertaken and the scope of the clandestine 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 Items that are readily obtained from local retail stores and are sold from reputable manufacturers/distributors may not need to be analyzed, particularly if collected from sealed and labeled containers. These include:

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

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

6.5.3 Bases (for example, sodium hydroxide, ammonia water).

7. Analysis

7.1 Substances whose presence are reported or contribute to formulating reported conclusions shall be identified with an adequate analytical scheme.

7.2 Where possible, the identification of organic compounds shall follow the guidelines for the analysis of seized drugs (see Practice [E2329](#)).

7.3 The discriminating power of analytical techniques for the identification of inorganic materials depends on the particular analyte. In each case the analytical scheme shall: