Designation: E2329 – 14

Standard Practice for Identification of Seized Drugs[1]

This standard is issued under the fixed designation E2329; 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 describes minimum criteria for the qualitative analysis (identification) of seized drugs.

1.2 Listed are a number of analytical techniques for the identification of seized drugs. These techniques are grouped on the basis of their discriminating power. Analytical schemes based on these groupings are described.

1.3 Additional information is found in Guides E1968, E1969, E2125, and E2548 and Practices E2326, E2327, E2549, and E2764.

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

1.5 *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 and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

E1968 Guide for Microcrystal Testing in Forensic Analysis of Cocaine

E1969 Guide for Microcrystal Testing in Forensic Analysis of Methamphetamine and Amphetamine

E2125 Guide for Microcrystal Testing in Forensic Analysis of Phencyclidine and Its Analogues

E2326 Practice for Education and Training of Seized-Drug Analysts

E2327 Practice for Quality Assurance of Laboratories Performing Seized-Drug Analysis

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

2.2 *Other Document:*

SWGDRUG Scientific Working Group for the Analysis of Seized Drugs—Recommendations for: Education and Training, Quality Assurance, Methods of Analysis[3]

3. Terminology

3.1 *Definitions*—Terms that may assist in interpreting this practice are found in the SWGDRUG glossary.[3]

4. Significance and Use

4.1 These are minimum requirements applicable to the identification of seized drugs.

4.1.1 As these are minimum requirements, it should be recognized that they may not be sufficient for the identification of all drugs in all circumstances. Within these requirements, it is up to the individual laboratory's management to determine which combination of analytical techniques best satisfies the requirements of its jurisdiction.

4.2 Correct identification of a drug or chemical depends on the use of an analytical scheme based on validated methods (see Practice E2549) and the competence of the analyst. It is expected that in the absence of unforeseen error, an appropriate analytical scheme effectively results in no uncertainty in reported identifications (see Practice E2764).

4.3 This practice requires the use of multiple uncorrelated techniques. It does not discourage the use of any particular method within an analytical scheme. Unique requirements in different jurisdictions may dictate the actual practices followed by a particular laboratory.

5. Categories of Analytical Techniques

5.1 For the purpose of this practice, techniques for the analysis of drug samples are classified into three categories (see Table 1) based on their maximum potential discriminating power. However, the classification of a technique may be

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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 (SWGDRUG), http://www.swgdrug.org.

TABLE 1 Categories of Analytical Techniques

Category A	Category B	Category C
Infrared Spectroscopy	Capillary Electrophoresis	Color Tests
Mass Spectrometry	Gas Chromatography	Fluorescence Spectroscopy
Nuclear Magnetic Resonance Spectroscopy	Ion Mobility Spectrometry	Immunoassay
Raman Spectroscopy	Liquid Chromatography	Melting Point
X-Ray Diffractometry	Microcrystalline Tests	Ultraviolet Spectroscopy
	Pharmaceutical Identifiers	
	Thin Layer Chromatography	
	Cannabis Only: Macroscopic Examination	
	Microscopic Examination	

lower, if the sample, analyte, or mode of operation diminishes its discriminating power.

5.1.1 Examples of diminished discriminating power may include:

5.1.1.1 An infrared spectroscopy technique applied to a mixture which produces a combined spectrum, and

5.1.1.2 A mass spectrometry technique which only produces molecular weight information.

6. Identification Criteria

6.1 This practice requires that the following minimum criteria be utilized when making analytical identifications:

6.1.1 When a validated Category A technique is incorporated into an analytical scheme, at least one other technique (from either Category A, B, or C) shall be used.

6.1.2 When a Category A technique is not used, at least three different validated techniques shall be employed. Two of the three techniques shall be based on uncorrelated techniques from Category B.

6.1.2.1 For cannabis, macroscopic and microscopic examinations will be considered as uncorrelated techniques from Category B when observations include documented details of botanical features. Laboratories shall define the acceptance criteria for these features for each examination.

6.1.2.2 For exhibits of cannabis that lack sufficient observable macroscopic and microscopic botanical detail (for example, extracts or residues), Δ^9-tetrahydrocannabinol (THC) or other cannabinoids shall be identified utilizing the principles set forth in 6.1.1 and 6.1.2.

6.1.3 Identification of botanical material may be made utilizing morphological characteristics (Category B) alone provided sufficient botanical features appropriate for identification are observed. Such examinations shall be made by analysts competent in botanical identifications. In this context botanical competence applies to those examiners recognized as professional botanists or those assessed to be competent by such. Identifications of chemical components contained in botanicals (mescaline, opiates, psilocin, etc.) should rely on principles of chemical identification set forth in 6.1.1 and 6.1.2.

6.1.4 All Category A and botanical identifications shall have data that are reviewable. Where a Category A technique is not used, the requirements for reviewable data applies to Category B techniques. Examples of reviewable data are:

6.1.4.1 Printed spectra, chromatograms and photographs, and digital images or photocopies (color where appropriate) of thin layer chromatography (TLC) plates;

6.1.4.2 Contemporaneous documented peer review, as well as photographs and digital images, for microcrystalline tests;

6.1.4.3 Recording of detailed descriptions or digital images of morphological characteristics for cannabis and botanical materials (only); and

6.1.4.4 Reference to published data for pharmaceutical identifiers.

6.1.5 For the use of any method to be considered of value, test results shall be considered "positive" (for instance, it must meet the acceptance criteria defined in the method validation operating protocol). When possible, data from a test result should be compared to data generated from a reference material which has been analyzed under the same analytical conditions (see Practice E2327). While "negative" test results provide useful information for ruling out the presence of a particular drug or drug class, these results have little value toward establishing the forensic identification of a drug.

6.1.6 The laboratory shall employ quality assurance measures to ensure the results correspond to the exhibit. Examples of quality assurance measures are:

6.1.6.1 The use of two separate samplings,

6.1.6.2 Sample identification procedures such as bar-coding and witness checks, and

6.1.6.3 Good laboratory practices (for example, positive and negative controls, one sample opened at a time, procedural blanks).

6.1.7 In cases where hyphenated techniques are used (for example, gas chromatography-mass spectrometry, liquid chromatography-diode array ultraviolet spectrophotometry), they will be considered as separate techniques provided that the results from each are used.

6.1.8 The chosen analytical scheme shall demonstrate the identity of the specific drug present and shall preclude a false positive identification and minimize false negatives. Where a scheme has limitations, this shall be reflected in the final interpretation (see Practice E2764).

7. Keywords

7.1 identification; qualitative analysis; seized drugs