



2020 SWGDRUG UPDATE

Sandra E. Rodriguez-Cruz, Ph.D., ABC-F

SWGDRUG Secretariat

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SWGDRUG



Mission:

To *improve the quality* of the forensic examination of seized drugs and to *respond to the needs* of the forensic community by supporting the development of internationally accepted *minimum standards*, identifying *best practices* within the international community, and *providing resources* to help laboratories meet these standards.

SWGDRUG Recommendations

Version 8.0 June 13, 2019

PART I – A Code of Professional Practice for Drug Analysts

PART II – Education and Training

PART III – Methods of Analysis:

- A – Sampling Seized Drugs
- B – Analytical Scheme for Identification of Drugs or Chemicals (*NEW*)
- C – Clandestine Laboratory Evidence
- D – Analogue and Structural Class Determinations

PART IV – Quality Assurance:

- A – General Practices (*in revision – Public Comments*)
- B – Validation of Analytical Methods (*in revision*)
- C – Uncertainty

Annex A – SWGDRUG Glossary of Terms and Definitions

PART IIIB - Identification

Minimum standards for identification

Two different tests:

- Cat. A and Cat. A, B or C

Three different tests: *(2 must be Cat. B)*

- 3 Cat. B
- 2 Cat. B and Cat. C

Minimum standard may not be sufficient for identification of all substances in all jurisdictions

PART IIIB - Identification

Categorization of Techniques:

- Cat. A – Highest selectivity via structural information
- Cat. B – High selectivity
- Cat. C – Corroboration tests

Highlights:

- Emphasis on the result, not the technique.
- *It is not only the act of using a technique; it is the properties of the result obtained*
- Are you answering the question at issue (jurisdiction)?

PART IIIB - Identification

<p>Category A</p> <p>(Selectivity through Structural Information)</p>	Infrared Spectroscopy
	Mass Spectrometry
	Nuclear Magnetic Resonance Spectroscopy
	Raman Spectroscopy
	X-ray Diffractometry ¹
<p>Category B</p> <p>(Selectivity through Chemical and Physical Characteristics)</p>	Capillary Electrophoresis
	Gas Chromatography
	Ion Mobility Spectrometry
	Liquid Chromatography
	Microcrystalline Tests
	Supercritical Fluid Chromatography
	Thin Layer Chromatography
	Ultraviolet/Visible Spectroscopy ²
	Macroscopic Examination (Cannabis only)
	Microscopic Examination (Cannabis only)
<p>Category C</p> <p>(Selectivity through General or Class Information)</p>	Color Tests
	Fluorescence Spectroscopy
	Immunoassay
	Melting Point
	Pharmaceutical Identifiers ³

Supplemental Documents

- **SD-1:** A Code of Professional Practice for Drug Analysts
- **SD-2:** Validation of Analytical Methods (*in revision*)
- **SD-3:** Examples of Measurement Uncertainty for Weight Determinations
- **SD-4:** Examples of Measurement Uncertainty for Purity Determinations
- **SD-5:** Reporting Examples (*in revision – Public Comments*)
- **SD-6:** Examples of Measurement Uncertainty for Extrapolations of Net Weight and Unit Count
- **SD-7:** *Construction of an Analytical Scheme (NEW)*

Supplemental Document SD-7

New Supplemental Document:

- Examples of analytical schemes
- Demonstrate combination of techniques to:
 - Build schemes that are fit for purpose
 - Obtain selectivity required for jurisdiction
 - Overcome individual technique/method limitations

Analytical Scheme Examples:

Question #1: Does the sample contain heroin?

Scheme Selected #1: GC-MS (Category B + A)

Category	Technique	Result	Assessment
B	GC	Retention time (t_R) of analyte peak is consistent with heroin reference material	Information provides Category B selectivity and the result is consistent with heroin
A	MS (EI)	Spectrum of analyte is consistent with heroin reference material	Information provides Category A selectivity and the result is consistent with heroin

Discussion: Each technique achieves the level of selectivity required and the positive test results corroborate each other. The scheme of GC (Category B) and MS (Category A) provides a scientifically supported conclusion to the question asked and, therefore, is fit for purpose.

Conclusion: The sample contains heroin.

Analytical Scheme Examples:

Question #8: Does the pharmaceutical preparation contain a controlled substance?

Scheme Selected #8A: Pharmaceutical identifier (Category C) + GC-FID (Category B) + TLC (Category B)

Category	Technique	Result	Assessment
C	Pharmaceutical identifier	Appearance consistent with a pharmaceutical-grade amphetamine sulfate tablet	Information provides Category C selectivity and indicates amphetamine sulfate tablet
B	GC-FID	t_R of analyte peak is consistent with amphetamine reference material	Information provides Category B selectivity and the result is consistent with amphetamine
B	TLC	R_f of analyte is consistent with amphetamine reference material	Information provides Category B selectivity and the result is consistent with amphetamine

Discussion: Each technique achieves the level of selectivity required of its category and the positive test results corroborate each other. The scheme of pharmaceutical identifiers (Category C), GC-FID (Category B), and TLC (Category B) provides a scientifically supported conclusion to the question asked and, therefore, is fit for purpose.

Conclusion: The sample contains a controlled substance identified as amphetamine.

Resources: Spectral Libraries

MS Library

- **Version 3.6** (October 19, 2019)
- All spectra collected using EI-MS systems (> 2800)
- Several formats (NIST, Agilent Tech., JCAMP, Shimadzu, Thermo)
- Contributions from practitioners
- **Curated by NIST**

IR Library

- **Version 2.1** (August 27, 2019)
- All spectra collected using FTIR-ATR system (> 560)
- DEA Special Testing and Research Lab
- Several formats (Omnicon, Opus, Perkin Elmer, Shimadzu, Agilent, JCAMP)

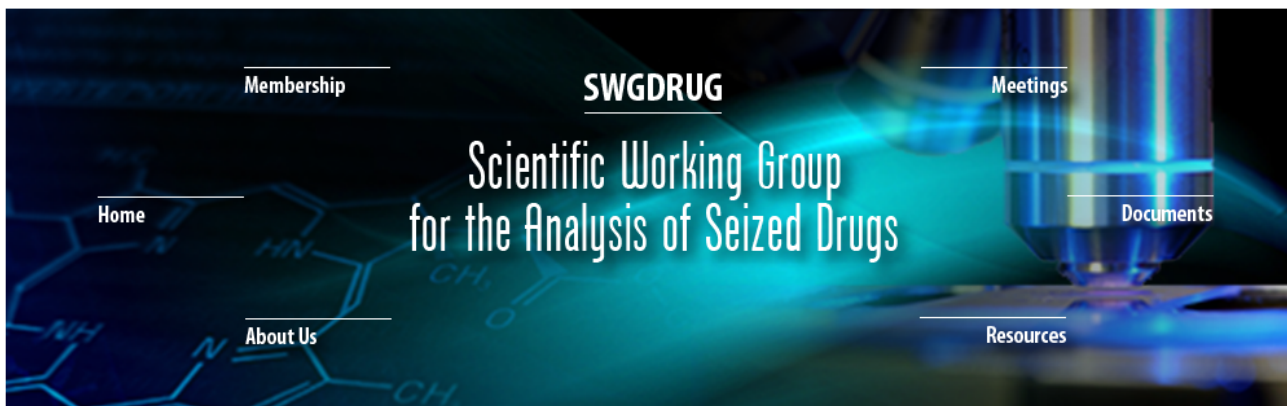
Resources: Monographs

- **Over 460 monographs**
- Most produced by DEA Special Testing & Research Laboratory
- Using structurally confirmed RMs
- Intended for the verification of acquired RMs

Collaborators:

- Forensic Drug Review
- The Center for Forensic Science Research and Education

www.SWGDRUG.org



Google Custom Search



Welcome to the Scientific Working Group for the Analysis of Seized Drugs (SWGDRUG) Website

What's New:

- 1) [SWGDRUG Recommendations](#) Version 8.0 was approved on June 13, 2019.
- 2) For examples of constructing an Analytical Scheme, refer to [SD-7](#) (approved June 2019) for Part III B - Methods of Analysis/Analytical Scheme for Identification of Drugs or Chemicals
- 3) [Drug Monographs](#) (being updated regularly), please note the table is now sortable and includes two new columns.
- 4) Searchable Mass Spectral Library [Version 3.6](#) (dated October 19, 2019).
- 5) Searchable Infrared Library [Version 2.1](#) (dated August 27, 2019).
- 6) Check out the 2017 and 2018 annual [SWGDRUG Bulletins](#).
- 7) To keep up with the latest updates (including new monographs, libraries, etc.) from SWGDRUG, follow us on Twitter [Follow @swgdrug](#) or email us at swgdrugupdate@gmail.com and ask to be added to our mailing list.



On-going Developments

Public Comment Period

- 60 Days
- February – April 2020
- Revised documents:
 - PART IVA – Quality Assurance / General Practices
 - SD-5 – Reporting Examples
- Comments review – June 2020 meeting

In Revision: PART IVB and SD-2

PART IVB – Validation of Analytical Methods

- Validation criteria & definitions:
 - **Selectivity, reliability** (repeatability/reproducibility), and **accuracy**
 - **Qualitative uncertainty** (sensitivity, specificity, false positives, false negatives)
- Validation documentation (incl. retrospective validation)

SD-2 – Method Validation Examples

- **General purpose GC-MS method**
- **IR method**
- **Color test**

SWGDRUG Future Directions

SWGDRUG meetings:

- Core committee (national & international)
- DEA – financial support

Provide resources:

- Recommendations and supplemental documents
- Libraries and monographs

Dissemination:

- www.swgdrug.org

Will continue to support the development of internationally accepted minimum standards for the analysis of seized drugs

SWGDRUG Core Committee

DEA – Scott R. Oulton (Chair)

SAFS – Christian C. Matchett (Vice-Chair)

DEA & AAFS – Dr. Sandra E. Rodriguez-Cruz

MAFS – Karen S. Bowen

MAAFS – Juli Cruciotti

NEAFS – Tiffany A. Ribadeneyra

NWAFS & CAC – Dr. Sandra B. Sachs

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Educator – Dr. Eric Person (California State University)

Educator – Dr. Ruth W. Smith (Michigan State University)



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Thank You!



www.swgdrug.org

swgdrug@hotmail.com