

ASB Standard 121, First Edition  
2020

**Standard for the Analytical Scope and Sensitivity of  
Forensic Toxicological Testing of Urine in Drug-  
Facilitated Crime Investigations**



# Standard for the Analytical Scope and Sensitivity of Forensic Toxicological Testing of Urine in Drug-Facilitated Crime Investigations

ASB Approved Xxxxxx 2020

ANSI Approved Xxxxxxx 2020



Academy Standards Board  
410 North 21<sup>st</sup> Street  
Colorado Springs, CO 80904

This document may be downloaded for free at: [www.asbstandardsboard.org](http://www.asbstandardsboard.org)

*This document is provided by the AAFS Standards Board for free. You are permitted to print and download the document and extracts from the document for your own use, provided that:*

- *you do not modify this document or its related graphics in any way;*
- *you do not use any illustrations or any graphics separately from any accompanying text; and,*
- *you include an acknowledgement alongside the copied material noting the AAFS Standards Board as the copyright holder and publisher.*

*You expressly agree not to reproduce, duplicate, copy, sell, resell, or exploit for any commercial purposes, this document or any portion of it. You may create a hyperlink to [www.asbstandardsboard.org](http://www.asbstandardsboard.org) to allow persons to download their individual, free copy of this document. Your hyperlink must not portray AAFS, the AAFS Standards Board, this document, our agents, associates and affiliates in an offensive manner, or be misleading or false. You may not use our trademarks as part of your link without our written agreement for you to do so.*

*The AAFS Standards Board retains the sole right to submit this document to any other forum for any purpose.*

*Certain commercial entities, equipment or materials may be identified in this document to describe a procedure or concept adequately. Such identification is not intended to imply recommendations or endorsement by the AAFS or the AAFS Standards Board, nor is it intended to imply that the entities, materials, or equipment are necessarily the best available for the purpose.*

*This document is copyrighted © by the AAFS Standards Board, LLC. 2019 All rights are reserved.  
410 North 21st Street, Colorado Springs, CO 80904, [www.asbstandardsboard.org](http://www.asbstandardsboard.org).*

## Foreword

Drug-facilitated crimes (DFC) are a public health and safety concern and specialized toxicological testing is a critical part of these investigations. Urine is typically the specimen of choice as it may extend the window of drug detection up to 120 hours (5 days) after the alleged incident. This document promotes standardization of the analytical scope and sensitivity of forensic toxicological testing of urine in DFC cases. This document is adapted from the Society of Forensic Toxicologists (SOFT) document entitled *Recommended Minimum Performance Limits for Common DFC Drugs and Metabolites in Urine Samples*. These requirements were developed based on the current prevalence and availability of drugs in the United States. For example, flunitrazepam (Rohypnol) was excluded because of its relative unavailability in the United States.

This document was revised, prepared, and finalized as a standard by the Toxicology Consensus Body of the AAFS Standards Board. The draft of this standard was developed by the Toxicology Subcommittee of the Organization of Scientific Area Committees (OSAC) for Forensic Science.

The AAFS Standards Board (ASB) is an ANSI-accredited Standards Developing Organization with the purpose of providing accessible, high quality science-based consensus forensic standards. The ASB is a wholly owned subsidiary of the American Academy of Forensic Sciences (AAFS), established in 2015 and accredited by the American National Standards Institute (ANSI) in 2016. The ASB consists of Consensus Bodies (CB), which are open to all materially interested and affected individuals, companies, and organizations; a Board of Directors; and Staff.

The following applies to all ASB documents:

the term '**shall**' indicates that a provision is mandatory, and can be audited for compliance

the term '**should**' indicates that a provision is not mandatory, but recommended as good practice.

All hyperlinks and web addresses shown in this document are current as of the publication date of this standard.

**Keywords:** *drug-facilitated crimes; scope of testing; analytical sensitivity; forensic toxicology*

**Table of Contents** *(to be updated when document is final)*

1 Scope.....

2 Normative References .....

3 Terms and Definitions .....

4 Requirements .....

Table 1 – Required Minimum Analytical Scope and Sensitivity for Testing of Urine in Drug-Facilitated Crime Investigations.....

Annex A (informative) Bibliography .....

DRAFT

# Standard for the Analytical Scope and Sensitivity of Forensic Toxicological Testing of Urine in Drug-Facilitated Crime Investigations

## 1 Scope

This document delineates the minimum requirements for target analytes and analytical sensitivity for the forensic toxicological testing of urine specimens collected from alleged victims of drug-facilitated crimes (DFC). This document does not cover the analysis of blood and other evidence that may be collected in DFC cases.

## 2 Normative References

There are no normative reference documents. Annex A, Bibliography, contains informative references.

## 3 Terms and Definitions

For purposes of this document, the following definitions apply.

### 3.1

#### **analytical scope**

A selection of drugs, drug metabolites, and other chemicals covered in an analytical testing scheme.

### 3.2

#### **analytical sensitivity**

The lowest amount of an analyte that can be reliably measured in a specimen by a laboratory test; may be a decision point, a limit of detection, or a lower limit of quantitation.

### 3.3

#### **decision point**

An administratively defined cutoff or concentration that is at or above the method's limit of detection or limit of quantitation and is used to discriminate between positive and negative results.

### 3.4

#### **drug-facilitated crime**

##### **DFC**

When an individual is victimized while mentally or physically incapacitated due to the effects of ethanol and/or other drugs.

### 3.5

#### **limit of detection**

An estimate of the lowest concentration of an analyte in a sample that can be reliably differentiated from blank matrix and identified by the analytical method.

### 3.6

#### **lower limit of quantitation**

An estimate of the lowest concentration of an analyte in a sample that can be reliably measured with acceptable bias and precision.

#### **4 Requirements for Forensic Toxicological Testing of Urine Specimens in Investigations of Drug-Facilitated Crime**

**4.1** A urine specimen collected from an alleged victim of DFC within 120 hours of the incident shall be tested. Case-specific circumstances may warrant testing of specimens collected past 120 hours.

**4.2** Toxicological testing of urine specimens collected from alleged victims of DFCs shall include, at a minimum, the compounds listed in Table 1. Analytical sensitivity shall meet or exceed (be lower than) the concentrations listed in Table 1. The table reflects total concentrations, which may be achieved via hydrolysis or direct analysis of conjugated compounds.

**4.3** Laboratories shall meet the required analytical scope and sensitivity by testing internally, externally, or a combination of both.

**4.4** Laboratories shall have a written strategy for addressing case specific circumstances that may not be addressed by the minimum requirements, including:

- when additional specimens (e.g., blood, hair, or biological stains) are received for toxicological testing;
- utilization of a reference laboratory for the testing of analytes.

**4.5** Laboratories shall consider other potentially impairing substances based on factors such as regional drug trends and case histories.

**Table 1—Required Minimum Analytical Scope and Sensitivity for Testing of Urine in Drug-Facilitated Crime Investigations<sup>1</sup>**

Analyte	Concentration
<b>High-Dose Sedatives</b>	
Ethanol (alcohol) <sup>2</sup>	0.01 g/dL
Gamma hydroxybutyrate (GHB) <sup>3</sup>	10 µg/mL
<b>Antidepressants</b>	
Amitriptyline	10 ng/mL
Chlorophenylpiperazine (Trazodone metabolite)	10 ng/mL
Desipramine	10 ng/mL
Imipramine	10 ng/mL
Nortriptyline	10 ng/mL
<b>Antihistamines</b>	
Brompheniramine	10 ng/mL
Chlorpheniramine	10 ng/mL
Diphenhydramine	10 ng/mL
Doxylamine	10 ng/mL
Norchlorcyclizine	10 ng/mL
<b>Barbiturates</b>	
Butalbital	100 ng/mL
Phenobarbital	100 ng/mL
<b>Benzodiazepines</b>	
α-hydroxyalprazolam	5 ng/mL
7-aminoclonazepam	5 ng/mL
Lorazepam	5 ng/mL
Nordiazepam	10 ng/mL
Oxazepam	10 ng/mL
Temazepam	10 ng/mL
<b>Cannabinoids</b>	
Carboxy-tetrahydrocannabinol (THC-COOH)	10 ng/mL

Analyte	Concentration
<b>CNS Stimulants</b>	
Amphetamine	25 ng/mL
Methamphetamine	25 ng/mL
Methylenedioxyamphetamine (MDA)	25 ng/mL
Methylenedioxymethamphetamine (MDMA)	25 ng/mL
Benzoylcegonine	50 ng/mL
<b>Miscellaneous</b>	
Cyclobenzaprine	10 ng/mL
Methorphan	10 ng/mL
Norketamine	10 ng/mL
Zolpidem carboxylic acid	10 ng/mL
Zopiclone	10 ng/mL
Carisoprodol	100 ng/mL
Meprobamate	100 ng/mL
<b>Opioids</b>	
Fentanyl	1 ng/mL
Norfentanyl	1 ng/mL
Codeine	10 ng/mL
Hydrocodone	10 ng/mL
Hydromorphone	10 ng/mL
Morphine	10 ng/mL
Oxycodone	10 ng/mL
Oxymorphone	10 ng/mL
Tramadol	10 ng/mL

<sup>1</sup> All are total drug concentrations; <sup>2</sup> If more than 24 hours has passed between the alleged incident and urine collection, testing is not required; <sup>3</sup> If more than 12 hours has passed between the alleged incident and urine collection, testing is not required.

## Annex A (informative)

### Bibliography

The following bibliography is not intended to be an all-inclusive list, review, or endorsement of literature on this topic. The goal of the bibliography is to provide examples of publications addressed in the standard.

- 1] Anderson, L.J. Flynn, A. and Pilgrim, J.L. "A Global Epidemiological Perspective on the Toxicology of Drug-Facilitated Sexual Assault: A Systematic Review." *Journal of Forensic Legal Medicine*, 2017, Volume 47, pp. 46-54.
- 2] LeBeau, M.A. and Montgomery, M.A. "Challenges of Drug-Facilitated Sexual Assault." *Forensic Science Review*, 2010, Volume 22, Number 1, pp. 2-6.
- 3] LeBeau, M.A. "Laboratory Management of Drug-Facilitated Sexual Assault Cases." *Forensic Science Review*, 2010, Volume 22, Number 1, pp. 114-119.
- 4] Society of Forensic Toxicologists (SOFT). *Fact Sheet Drug-Facilitated Sexual Assaults*<sup>a</sup>.
- 5] Society of Forensic Toxicologists (SOFT). *Recommended Minimum Performance Limits for Common DFC Drugs and Metabolites in Urine Samples*<sup>b</sup>.
- 6] United Nations Office on Drugs and Crime (UNODC). *Guidelines (for the forensic analysis of drugs facilitating sexual assault and other criminal acts*. December 2011<sup>c</sup>.

---

<sup>a</sup> Available from: [http://www.soft-tox.org/files/DFSA\\_Fact\\_Sheet.pdf](http://www.soft-tox.org/files/DFSA_Fact_Sheet.pdf). Accessed 19 August 2019

<sup>b</sup> Available from: [http://www.SOFT-Tox.org/files/MinPerLimits\\_DFC2017.pdf](http://www.SOFT-Tox.org/files/MinPerLimits_DFC2017.pdf)

<sup>c</sup> Available from: [https://www.unodc.org/documents/scientific/forensic\\_analysis\\_of\\_drugs\\_facilitating\\_sexual\\_assault\\_and\\_other\\_criminal\\_acts.pdf](https://www.unodc.org/documents/scientific/forensic_analysis_of_drugs_facilitating_sexual_assault_and_other_criminal_acts.pdf).

DRAFT



Academy Standards Board  
410 North 21st Street  
Colorado Springs, CO 80904

[www.asbstandardsboard.org](http://www.asbstandardsboard.org)