ANSI/ASB Standard 120, First Edition
2021

Standard for the Analytical Scope and Sensitivity of Forensic Toxicological Testing of Blood in Impaired Driving Investigations

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ASB Approved September 2020

ANSI Approved August 2021

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Foreword

Impaired driving is a public health and safety concern, and toxicological testing is a critical part of these investigations. This document promotes standardization of the analytical scope and sensitivity of forensic toxicological testing of blood in investigations of alleged impaired driving. This document is adapted from the work of the National Safety Council's Alcohol, Drug, and Impairment Division. These requirements were developed based on laboratory surveys, epidemiological data, drug-use patterns, and analytical capabilities of laboratories conducting analyses of specimens collected from drivers suspected of being impaired. Specific legal requirements may require deviations from this standard practice.

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.

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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: *impaired driving; scope of testing; analytical sensitivity; forensic toxicology*

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1 Scope

This document delineates the minimum requirements for target analytes and analytical sensitivity for the forensic toxicological testing of blood specimens collected from drivers suspected of being impaired. This document does not cover the analysis of breath, oral fluid, urine, or other specimen types collected in impaired driving investigations.

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
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.

3.5
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 Blood Specimens in Impaired Driving Investigations

4.1 The minimum requirements for the scope and analytical sensitivities of forensic toxicological testing of blood specimens in impaired driving investigations is outlined in Table 1.

4.1.1 The table has been adapted from the work of the National Safety Council's Alcohol, Drug, and Impairment Division.

4.1.2 The listed concentrations are not intended to correlate to impairment or *per se* limits.

4.1.3 If a compound does not need to be accounted for in the screen, it is indicated by "N/A".

4.1.4 The list is not inclusive of all drugs that may be relevant in an impaired driving investigation. Laboratories should consider other potentially impairing substances based on factors such as regional drug trends and case histories.

4.1.5 The blood confirmation concentrations listed are based on free drug concentrations.

4.2 While it is preferred that testing includes all compounds listed in Table 1, based on customer requests, the scope of testing may be limited as follows.

4.2.1 Ethanol: Testing may be limited to ethanol.

4.2.2 Other Drugs: All compounds listed in Table 1, except for ethanol.

4.2.3 Ethanol and Other drugs: All compounds listed in Table 1.

4.3 The laboratory shall determine the appropriate analytical instrumentation to be utilized for both the screening of case samples and the confirmation of presumptive-positive analytes of interest.

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

4.5 Laboratory procedures shall address the specimens to be tested when multiple specimens are submitted.

Table 1—Required Minimum Analytical Scope and Sensitivity for Testing of Blood in Impaired Driving Investigations

Compound	Blood Screen[a]	Blood Confirmation
Ethanol (g/dL)		
Ethanol	0.01	0.01
Cannabinoids (ng/mL)		
THC	N/A	1
Carboxy-THC	10	5
11-OH-THC	N/A	1
CNS Stimulants (ng/mL)		
Amphetamine	20	20
Methamphetamine	20	20
MDA	25	20
MDMA	25	20
Cocaine	N/A	10
Cocaethylene	N/A	10
Benzoylecgonine	50	50
CNS Depressants (ng/mL)		
Carisoprodol	1000	1000
Meprobamate	N/A	1000
Zolpidem	10	10
Low Dose Benzodiazepines		
Alprazolam	10	10
Clonazepam	15	10
7-aminoclonazepam	N/A	10
Lorazepam	15	10
High Dose Benzodiazepines		
Diazepam	50	20
Nordiazepam	50	20
Oxazepam	50	20
Temazepam	50	20
Narcotic Analgesics (ng/mL)		
Morphine	10	10
Codeine	10	10
6-acetylmorphine	N/A	5
Hydrocodone	10	10
Oxycodone	10	10
Methadone	50	20
Fentanyl	1	0.5
Buprenorphine	1	0.5
Norbuprenorphine	N/A	0.5
Tramadol	100	50
o-desmethyltramadol	N/A	50

[a] Screen concentrations are based on immunoassay technology. When using non-immunoassay targeted analysis for screening (e.g., chromatography based), the concentrations listed under confirmation shall be utilized. N/A applies to all screening techniques.

Annex A
(informative)

Bibliography

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