TOXICOLOGY
LABORATORY
DIVISION

Scope of Analysis
Drug Investigation and Liquor and Cannabis Board (LCB) Submissions

The Request for Analysis Forms for these case types can be found on the Toxicology Laboratory website here: https://wsp.wa.gov/crime/toxlab-resources.

Testing Protocols

All **Drug Investigation** case submissions will have volatiles testing, cannabinoids analysis and a general drug screen, unless the Request for Analysis Form indicates only alcohol and/or cannabinoids are suspected. **LCB** case submissions are limited to volatiles and/or cannabinoids analysis. Testing protocols are shown the flow chart below.

Volatiles

HSGC analysis for acetone, ethanol, isopropanol, methanol

→ LCB OR Drug Investigation with request for volatiles analysis only

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Cannabinoids

LC-MSMS analysis for carboxy-THC, THC

→ LCB OR Drug Investigation with request for volatiles/ cannabinoids only

Test Report Issued

↓

General Drug Screen
(See APPENDIX A for analytes/test methods)

↓

Confirmation Testing

(See APPENDIX A for analytes/test methods)

→ **Test Report Issued**

General Drug Screen/Confirmation Analysis

Routine testing for **Drug Investigation** case submissions will include volatiles analysis and a general drug screen to include analytes/drug classes listed in APPENDIX A, utilizing test methods listed in the Drug Screening section of APPENDIX A. Case circumstances may dictate additional screening or targeted analyses. Confirmation test methods and analytes are listed in APPENDIX A. Standard operating procedures (SOPs) for additional test methods which may be utilized in Drug Investigation testing are available on the Toxicology Laboratory website here: https://wsp.wa.gov/crime/toxlab-resources.

Reporting Results

Should the confirmation test results for an analyte be less than the lower limit of quantitation (LOQ) for the test method, results appear on the Test Report as "none detected."

For urine specimens, quantitative results are reported for volatiles analysis. Results for urine drug analysis are reported as "positive."

Measurement uncertainty for quantitative blood ethanol and THC results is included on the Test Report. Measurement uncertainty for other analytes is available on the Toxicology Laboratory website.

If analytes not included in APPENDIX A are presumptively identified in a drug screen, but no confirmation test performed for those analytes, presumptive results are not included on the Test Report. A comment may appear on the Test Report to indicate comprehensive confirmation testing was not performed.

When criteria for reporting are not met for cannabinoids analysis, and no results are able to be reported for an analyte due to interference, a comment will appear on the Test Report.

For testing performed by an external laboratory, the Test Report will reference the report issued by the external laboratory.

Test Method Instrumentation Key

GC-MS – Gas Chromatography – Mass Spectrometry

GC-MS/NPD – Gas Chromatography/Nitrogen Phosphorus Detection

HSGC – Headspace Gas Chromatography

HSGC-MS – Headspace Gas Chromatography – Mass Spectrometry

LC-MS – Liquid Chromatography – Mass Spectrometry

LC-MS/MS – Liquid Chromatography – Tandem Mass Spectrometry

LC-TOF-MS – Liquid Chromatography – Time of Flight – Mass Spectrometry

Limitations

- Insufficient sample volume:

If a low amount of available specimen volume prevents analyses that would otherwise be performed, a comment noting insufficient sample volume will appear on the Test Report.

- Sample quality:

If testing is performed, but the laboratory is unable to obtain a result due to poor sample quality, a comment noting this will appear on the Test Report.

- Drug specificity/isomers:
  - The Laboratory's test methods test only for free (unconjugated) opioid analytes in all matrices.
  - The Laboratory's test methods do not differentiate between *d*-amphetamine/*l*-amphetamine or *d*-methamphetamine/*l*-methamphetamine. Test methods were validated using (±) amines certified reference materials. Reported results are based upon comparison to (±) amines certified reference materials.
  - The Laboratory's cannabinoid test method validations utilize delta-9 THC and delta-9-carboxy-THC certified reference materials. The presence of other cannabinoids (e.g., isomers, analogs) has the potential to interfere with the identification/confirmation of delta-9-THC, as shown in validation studies. All criteria for acceptance must be met to report qualitative or quantitative results. Reported results are based upon comparison to delta-9 THC and delta-9-carboxy-THC certified reference materials.
- Testing capability:

Biochemical testing (e.g., glucose, insulin, vitamin D) is not performed by the Laboratory. There are analytes for which the Toxicology Laboratory and an approved external subcontractor laboratory do not have the capability to routinely detect or confirm. Please contact the Laboratory for questions regarding specialized testing.

APPENDIX A – Screening/Confirmation Method Analytes and Reporting Limits

Volatiles Analysis by HSGC

- acetone – limit of quantitation (LOQ)/reporting limit of 10 mg/dL
- ethanol – limit of quantitation (LOQ)/reporting limit of 0.010 g/100 mL
- isopropanol – LOQ/reporting limit of 10 mg/dL
- methanol – LOQ/reporting limit of 10 mg/dL

HSGC analysis may also detect inhalant compounds (e.g., difluoroethane, sevoflurane). If an inhalant compound is detected by HSGC, qualitative confirmation analysis is performed using HSGC-MS.

Drug Screening

LC-MS/MS Cannabinoids Screen

- carboxy-THC – qualitative reporting limit of 5.0 ng/mL
- THC – qualitative reporting limit of 1.0 ng/mL

LC-MS/MS Fentanyl Screen

- fentanyl – qualitative reporting limit of 0.50 ng/mL

LC-TOF-MS Drug Screen

Except for cannabinoids, the LC-TOF-MS screen database includes those compounds listed in APPENDIX A. The LC-TOF-MS screen also includes other analytes which are outside the Laboratory's current scope of confirmation analysis.

GC-MS/NPD Drug Screen

The GC-MS/NPD screen is capable of detecting select compounds listed in APPENDIX A. The Gc-MS/NPD screen may also detect other analytes which are outside the Laboratory's current scope of confirmation analysis.

Confirmation Testing

NOTE: The GC-MS/NPD test method listed above as a screening method may also be used as a confirmatory test for qualitative reporting for select compounds (e.g. cocaine, cocaethylene).

Amines Confirmation by LC-MS/MS

- amphetamine (*d/l*) – LOQ/reporting limit of 0.010 mg/L
- MDA – LOQ/reporting limit of 0.010 mg/L
- MDMA – LOQ/reporting limit of 0.010 mg/L
- methamphetamine (*d/l*) – LOQ/reporting limit of 0.010 mg/L

Benzodiazepines Confirmation LC-MS/MS

- 7-aminoclonazepam – LOQ/reporting limit of 5.0 ng/mL
- 7-aminoflunitrazepam – qualitative reporting limit of 5.0 ng/mL
- α-hydroxyalprazolam – LOQ/reporting limit of 5.0 ng/mL
- alprazolam – LOQ/reporting limit of 5.0 ng/mL
- chlordiazepoxide – LOQ/reporting limit of 0.010 mg/L
- clonazepam – LOQ/reporting limit of 0.010 mg/L
- desalkylflurazepam – LOQ/reporting limit of 5.0 ng/mL
- diazepam – LOQ/reporting limit of 0.010 mg/L
- estazolam – LOQ/reporting limit of 5.0 ng/mL
- etizolam – LOQ/reporting limit of 5.0 ng/mL
- flunitrazepam – LOQ/reporting limit of 5.0 ng/mL
- flurazepam – LOQ/reporting limit of 5.0 ng/mL
- lorazepam – LOQ/reporting limit of 5.0 ng/mL
- midazolam – LOQ/reporting limit of 5.0 ng/mL
- nordiazepam – LOQ/reporting limit of 0.010 mg/L
- oxazepam – LOQ/reporting limit of 0.010 mg/L
- temazepam – LOQ/reporting limit of 0.010 mg/L
- zopiclone – qualitative reporting limit of 5.0 ng/mL

Cannabinoids Confirmation LC-MS/MS

- carboxy-THC – LOQ/reporting limit of 5.0 ng/mL
- THC – LOQ/reporting limit of 1.0 ng/mL

Cocaine Metabolite Confirmation by GC-MS

- benzoylecgonine – LOQ/reporting limit of 0.010 mg/L

Designer Benzodiazepines by LC-MS/MS

- 7-aminonimetazepam – qualitative reporting limit of 5.0 ng/mL
- 7-aminonitrazepam – qualitative reporting limit of 5.0 ng/mL
- bromazolam – qualitative reporting limit of 5.0 ng/mL
- clobazam – qualitative reporting limit of 5.0 ng/mL
- clonazolam – qualitative reporting limit of 5.0 ng/mL

- clotiazepam – qualitative reporting limit of 5.0 ng/mL
- delorazepam – qualitative reporting limit of 5.0 ng/mL
- demoxepam – qualitative reporting limit of 5.0 ng/mL
- deschloroetizolam – qualitative reporting limit of 5.0 ng/mL
- desmethylflunitrazepam – qualitative reporting limit of 5.0 ng/mL
- diclazepam – qualitative reporting limit of 5.0 ng/mL
- flualprazolam – qualitative reporting limit of 5.0 ng/mL
- flubromazepam – qualitative reporting limit of 5.0 ng/mL
- flubromazolam – qualitative reporting limit of 5.0 ng/mL
- flunitrazolam – qualitative reporting limit of 5.0 ng/mL
- lormetazepam – qualitative reporting limit of 5.0 ng/mL
- meclonazepam – qualitative reporting limit of 5.0 ng/mL
- methylclonazepam – qualitative reporting limit of 5.0 ng/mL
- N-desmethylclobazam – qualitative reporting limit of 5.0 ng/mL
- nifoxipam – qualitative reporting limit of 5.0 ng/mL
- nimetazepam – qualitative reporting limit of 5.0 ng/mL
- nitrazepam – qualitative reporting limit of 5.0 ng/mL
- nitrazolam – qualitative reporting limit of 5.0 ng/mL
- phenazepam – qualitative reporting limit of 5.0 ng/mL
- pyrazolam – qualitative reporting limit of 5.0 ng/mL

Fentanyl Confirmation LC-MS/MS

- fentanyl – LOQ/reporting limit of 0.50 ng/mL
- norfentanyl – qualitative reporting limit of 0.50 ng/mL

Methadone Confirmation LC-MS

- methadone – LOQ/reporting limit of 0.010 mg/L

Opiates Confirmation LC-MS/MS

- 6-acetylmorphine (free) – LOQ/reporting limit of 2.0 ng/mL
- codeine (free) – LOQ/reporting limit of 0.010 mg/L
- hydrocodone (free) – LOQ/reporting limit of 0.010 mg/L
- hydromorphone (free) – LOQ/reporting limit of 2.0 ng/mL
- morphine (free) – LOQ/reporting limit of 0.010 mg/L

- oxycodone (free) – LOQ/reporting limit of 0.010 mg/L
- oxymorphone (free) – LOQ/reporting limit of 0.010 mg/L

Pregabalin and Gabapentin Confirmation LC-MS/MS

- gabapentin – LOQ/reporting limit of 1.0 mg/L
- pregabalin – LOQ/reporting limit of 1.0 mg/L

Trazodone Confirmation LC-MS

- trazodone – LOQ/reporting limit of 0.050 mg/L

Laboratory manuals and test method standard operating procedures (SOPs) are available on the Toxicology Laboratory website here: https://wsp.wa.gov/crime/toxlab-resources.

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