MAYO CLINIC LABORATORIES

Test Definition: VLTBX

Volatile Screen, Chain of Custody, Blood

Overview

Useful For

Detection and quantitation of acetone, methanol, isopropanol, or ethanol in whole blood

Quantification of the concentration of ethanol in blood that correlates with the degree of intoxication

Evaluation of toxicity to the measured volatile substances

This test is **not intended for use** in employment-related testing.

Providing chain-of-custody for when the results of testing could be used in a court of law. Its purpose is to protect the rights of the individual contributing the specimen by demonstrating that it was always under the control of personnel involved with testing the specimen; this control implies that the opportunity for specimen tampering would be limited.

Additional Tests

Test Id	Reporting Name	Available Separately	Always Performed
COCH	Chain of Custody Processing	No	Yes

Testing Algorithm

This test includes analysis of methanol, ethanol, isopropanol, and acetone.

Method Name

Headspace Gas Chromatography Flame Ionization Detector (HSGC-FID)

NY State Available

Yes

Specimen

Specimen Type

Whole blood

Ordering Guidance

This test is for situations that require the chain-of-custody process. For testing **not** requiring chain of custody, order VLTB / Volatile Screen, Blood.

Specimen Required

Supplies: Chain-of-Custody Kit (T282)

Container/Tube: Chain-of-Custody Kit containing the specimen container seals and documentation required.
Preferred: Gray top (potassium oxalate/sodium fluoride)
Acceptable: Lavender top (EDTA) or green top (sodium heparin)
Specimen Volume: 2 mL
Collection Instructions:
1. **Do not use alcohol to clean arm.** Use alternative such as Betadine to cleanse arm before collecting any specimen for volatile testing.
2. Specimen must be sent in original tube. Collect specimen, seal, and submit with the associated documentation to satisfy the legal requirements for chain of custody testing.

Forms

Chain of Custody Request is included in the Chain-of-Custody Kit (T282)

Specimen Minimum Volume

0.5 mL or amount to fill 1 tube

Reject Due To

Gross hemolysis	OK
Gross lipemia	Reject
Gross icterus	OK

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Whole blood	Refrigerated (preferred)	14 days	
	Ambient	24 hours	
	Frozen	28 days	

Clinical & Interpretive

Clinical Information

Volatile substances in the blood include ethanol, methanol, isopropanol, and acetone. Acetone is generally elevated in metabolic conditions such as diabetic ketoacidosis. Methanol and isopropanol are highly toxic and result from exogenous ingestion.

Ethanol is one of the most widely abused legal substances in the United States. It is the active agent in beer, wine, vodka, whiskey, rum, and other liquors. Ethanol acts on cerebral function as a depressant similar to general anesthetics. This depression causes most of the typical symptoms such as impaired thought, clouded judgment, and changed behavior. As the level of alcohol increases, the degree of impairment progressively increases.

In most jurisdictions in the United States, the per se blood level for being under the influence of alcohol (ethanol) for purposes of driving a motor vehicle is 80 mg/dL (0.08%).

Chain of custody is required whenever the results of testing could be used in a court of law. Chain of custody is a record of the disposition of a specimen to document the individuals that collected it, handled it, and performed the analysis. When a specimen is submitted in this manner, analysis will be performed in such a way that it will withstand regular court scrutiny.

Reference Values

Methanol:
Not detected (Positive results are quantitated.)
Cutoff concentration: 10 mg/dL
Toxic concentration: > or =10 mg/dL

Ethanol:
Not detected (Positive results are quantitated.)
Cutoff concentration: 10 mg/dL
Toxic concentration: > or =400 mg/dL

Isopropanol:
Not detected (Positive results are quantitated.)
Cutoff concentration: 10 mg/dL
Toxic concentration: > or =10 mg/dL

Acetone:
Not detected (Positive results are quantitated.)
Cutoff concentration: 10 mg/dL
Toxic concentration: > or =10 mg/dL

Interpretation

Methanol:
The presence of methanol indicates exposure that may result in intoxication, central nervous system (CNS) depression, and metabolic acidosis. Ingestion of methanol can be fatal if patients do not receive immediate medical treatment.

Ethanol:
The presence of ethanol indicates exposure that may result in intoxication, CNS depression, and metabolic acidosis.

Isopropanol:
The presence of isopropanol indicates exposure that may result in intoxication and CNS depression. Ingestion of isopropanol can be fatal if patients do not receive immediate medical treatment.

Acetone:
The presence of acetone may indicate exposure to acetone; it is also a metabolite of isopropanol and may be detected during ketoacidosis.

Cautions

This test does not detect ethylene glycol.

Clinical Reference

1. Langman LJ, Bechtel LK, Holstege CP. Clinical toxicology. In: Rifai N, Chiu RWK, Young I, Burnham CD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023:chap 43
2. Mayfield J, Mihic SJ. Ethanol. In: Brunton LL, Knollmann BC. Goodman and Gilman's: The Pharmacological Basis of Therapeutics. 13th ed. McGraw-Hill Education; 2022:chap 27
3. Olson KR, Anderson IB, Benowitz NL, et al. Specific Poisons and Drugs: Diagnosis and Treatment. In: Poisoning and Drug Overdose. 8th ed. McGraw-Hill; 2022:section II

Performance

Method Description

Samples are analyzed and quantified by headspace gas chromatography with flame ionization detection.(Baselt RC. Disposition of Toxic Drugs and Chemicals in Man. 10th ed. Biomedical Publications; 2014:2211; Pinto M, Eusebio E, Monteiro C. Development and validation of an analytical method for volatiles with endogenous production in putrefaction and submersion situations. J Anal Toxicol. 2021;45(9):961-968. doi: 10.1093/jat/bkaa154)

PDF Report

No

Day(s) Performed

Monday through Saturday

Report Available

1 to 2 days

Specimen Retention Time

2 weeks

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Superior Drive

Fees & Codes

Fees

- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact Customer Service.

Test Classification

This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. It has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information

G0480

80320 (if appropriate for select payers)

Clinical Toxicology CPT Code Client Guidance

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
VLTBX	Volatile Screen, CoC, B	41266-8

Result ID	Test Result Name	Result LOINC® Value
36241	Volatile Scrn, B	41266-8
36242	Methanol, B	9334-4
36243	Ethanol, B	5640-8
36244	Acetone, B	9425-0
36245	Isopropanol, B	5667-1
36246	Chain of Custody	77202-0