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INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GA/T 842-2009

Examination methods for ethanol concentration in blood

血液酒精含量的检验方法

(English Translation)

Issued on: January 1, 1970 **Implemented on: May 1, 2019**

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Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This standard replaces GA/T 842-2009 "Test method for blood alcohol content". Compared with GA/T 842-2009, the main technical changes are as follows.

-Added "normative references" (see Chapter 2);

-Revised the requirements for "reagents" (see Chapter 5, Chapter 5 of the 2009 edition);

-Deleted the content of "n-propanol" (see Chapter 5 of the 2009 edition);

-Added requirements for "analytical balances" (see Chapter 6);

-Deleted "PTFE film" (see Chapter 6 of the 2009 edition);

-Revised the requirements for "sample preparation" (see 7.1.1, 7.1.1 of the 2009 edition);

-The requirements of "Reference Conditions for Headspace Sample Analysis" have been modified (see 7.1.2.2, 7.1.2.2 of the 2009 edition);

-Deleted the content of "headspace manual injection" (see 7.1.2.3.2 of the 2009 version);

-Revised the requirements for "sample preparation" (see 7.2.1, 7.2.1 of 2009 edition);

-The requirements for "quantification" have been modified (see 7.2.3.2, 7.2.3.2 of the 2009

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edition);

-Revised the requirements for "quantitative results" (see 8.2.2, 2009 version 8.2.2);

-The name of "Determination Limit" has been modified (see 8.2.3, 8.2.3 of the 2009 edition);

-Removed Appendix A (see Appendix A of the 2009 edition);

-Removed Appendix B (see Appendix B of the 2009 edition).

This standard was proposed by Tianjin Public Security Traffic Management Bureau.

This standard is under the jurisdiction of the National Road Traffic Management Standardization Technical Committee.

1 Scope

This standard specifies the headspace gas chromatography test method for blood alcohol content.

This standard applies to the qualitative and quantitative analysis of alcohol in the blood of persons during road traffic law enforcement activities.

2 Normative references

The following documents are essential for the application of this document. For dated references, only the dated version applies to this document.

For undated references, the latest version (including all amendments) applies to this document.

GB/T 6682-2008 Analytical laboratory water specifications and test methods GB 19522 Threshold and test of blood and breath alcohol content of vehicle driver GA/T 122 Toxicology Glossary

3 Terms and definitions

The terms and definitions defined in GB 19522 and GA/T 122 apply to this document.

4 Principle

This method uses the volatile nature of alcohol (hereinafter referred to as ethanol), uses tert-butanol as an internal standard, and uses a headspace gas chromatography flame ionization detector.

Detection; comparison with ethanol standards in parallel, qualitative by retention time or relative retention time, internal standard method using ethanol the peak area ratio was

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quantified.

5 Reagents

Unless otherwise specified, the reagents used in this standard are chromatographically pure. The test water is secondary water (see GB/T 6682-2008).

a) ethanol;

b) tert-butanol;

c) Ethanol standard working solution. Precisely pipette or weigh an appropriate amount of absolute ethanol standard, and prepare 1000 mg/100 mL ethanol stock with water.

Liquid, sealed, refrigerated storage, the use period is 6 months. Dilute the ethanol stock solution by multiples with water to make a series of concentrations used in the test Standard working solution of ethanol, the use period is 3 months;

d) tert-butanol internal standard working solution. accurately absorb or weigh the appropriate amount of tert-butanol standard, and prepare 4 mg/100 mL tert-butanol internal standard with water the working solution is sealed and stored under refrigeration for a period of 3 months.

6 Equipment

The headspace gas chromatography test method should have the following equipment.

a) Gas chromatograph. equipped with hydrogen flame ionization detector (FID);

b) headspace autosampler;

c) Analytical balance. Sensitivity 0.1mg;

d) precision pipettes;

e) sample vials;

f) silicone rubber pads;

g) aluminum caps;

h) Sealing pliers.

7.1.1.1 Case sample preparation

Take 0.10 mL of whole blood to be tested and 0.50 mL of tert-butanol internal standard working solution into a sample bottle, cover with a silicone rubber pad, and seal aluminum with sealing forceps.

Cap, mix well, to be tested.

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7.1.1.2 Preparation of blank samples and added samples

Take 1 mg/100 mL ethanol standard working solution 0.10 mL and tert-butanol internal standard working solution 0.50 mL into the sample bottle as the detection limit Add samples, and take another 0.10 mL of blank whole blood and 0.50 mL of tert-butanol internal standard working solution into the sample bottle as a blank sample. As per 7.1.1.1 Method operation, parallel control analysis with case samples.

7.1.2.1 Reference conditions for gas chromatography detection

The reference conditions for gas chromatography detection are shown in Table 1. It can be adjusted according to the actual situation of different brands of instruments and different samples.

Table 1 Reference conditions for gas chromatography detection

reference

condition

Column 1)

Column temperature

Carrier gas flow rate mL/min Detector Detector temperature Inlet temperature DB-ALC1 (30 m x 0.32 mm x 1.8 μm) hair Thin column or equivalent column Flame off Sub-test Tester (FID) 250.200 DB-ALC2 (30 m x 0.32 mm x 1.2μm) hair Thin column or equivalent column PLOT-Q (30 m x 0.53 mm x 20.00 μm) hair Thin column or equivalent column 5 rbowax 20 M/Carbopack (80 ~ 120 Mesh) 2 m x 2 mm packed column or equivalent column 70 20 ~ 40

7.1.2.2 Reference Conditions for Headspace Sample Analysis Reference Conditions for Headspace Autosampler

a) Heating box temperature. 65 °C;

1) DB-ALC1 and DB-ALC2 are suitable examples of commercially available products. This information is given for the convenience of the users of this standard and does not imply that Approved.

b) Loop temperature. 105 °C;

c) Transmission line temperature. 110 °C;

d) Heating equilibration time of sample bottle. 10.00 min;

e) Sample bottle pressurization time. 0.10 min;

f) Filling time of the loop. 0.10 min;

g) Loop equilibrium time. 0.05 min;

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