

HJ

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

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Determination of volatile organic compounds and carbonyl compounds in cabin vehicles (English Translation)

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1 Application Scope

This Standard specifies the arrangement of the sampling points for measuring the volatile organic compounds and carbonyl compounds in crew cabin of motor vehicles, sampling environment condition and technical requirements, sampling method and equipment, corresponding measurement method and equipment, data processing, quality assurance etc.

This Standard is applicable to the sampling and measurement of volatile organic compounds and carbonyl compounds in cabin of vehicles in static state.

2 Normative References

This Standard cites the provisions of the following documents. For undated documents, the latest edition of the normative document referred to applies.

GB/T 15089 Classification of Power-driven Vehicles and Trailers

3 Terms and Definitions

For the purpose of this Standard, the following terms and definitions apply.

3.1 Vehicles of categories M1, M2, M3 and N

Adopt the definitions in GB/T 15089.

3.2 Volatile organic constituent

The volatile organic constituent in this Standard is the generic collective term for volatile compounds using adsorbents such as tenax, and separated by the gas chromatographic column with the polarity index less than 10, and the retention time is between that of N-hexane and n-hexadecane.

3.3 Aldehyde ketone constituent

Aldehyde ketone constituent in this Standard is the generic term for compounds which can be detected by using the method in Appendix C of this Standard, such as methanal, acetaldehyde, acetone, acrolein, propionaldehyde, crotonaldehyde, butanone, butyraldehyde, croton aldehyde, benzaldehyde, pentanal, toluyaldehyde, cyclohexanone, and hexanal.

4.1 Technical requirements of sampling

4.1.1

During sampling, the vehicles-to-be-tested shall be in static state under the environment condition specified in this Standard. The doors, windows, throttles of air inlet of crew cabin, engine and other equipment (e.g. air conditioner) shall be closed.

4.1.2

The sampling environment at where the vehicles-to-be-tested is located shall meet the following conditions.

4.2 Arrangement of the sampling points

4.2.2

The sampling point shall be at the same height as that of the breathing zone of the driver and passengers.

4.4.3 Sampling stage

In sampling stage, the sampling environment condition shall meet the requirements of 4.1.2 in this Standard.

4.5 Transportation and storage of samples

The opening of sampling tube shall be sealed with sealing cap; the sampling tube shall be wrapped with silver paper or aluminum foil, and stored and transported at low temperature ($< 4\text{ }^{\circ}\text{C}$). The storage time shall not exceed 30d.

5.1 Determination method for volatile organic constituents

The volatile organic constituents in air pollutants in cabin of vehicles shall be determined by thermal desorption/capillary gas chromatography/mass spectrometry, according to the requirements of Appendix B in this Standard.

5.2 Determination method for aldehyde ketone constituent

The aldehyde ketone constituent in air pollutants in cabin of vehicles shall be determined by solid-phase adsorption/high performance liquid chromatography, according to the requirements of Appendix B in this Standard.

6.1 Instrument requirements

Instruments shall meet the technical requirements of relevant national standards, and shall be timely verified and calibrated, passing metrological verification and within the validity period.

6.2 Air tightness check

The airtightness of sampling system shall be checked before sampling, air leakage is not allowed.

6.3 Sampling conduit

Sampling conduit shall be washed and replaced if necessary.

6.4 Flow calibration

The sampling flow of sampling system shall be calibrated with Grade 1 flowmeter (e.g. Grade 1 soap film flowmeter) before each sampling, under sampling loading condition.

6.5 On-site blank inspection

At least two sampling tubes shall be served as blank in each sampling, and shall be equally treated as other sampling tubes. As on-site blank during the sampling process, they shall be delivered to the laboratory together with other sampling tubes.

6.6 Parallel sample inspection

For parallel sampling (not less than two parallel samples), the relative deviation between measured value difference and the arithmetic mean value shall not exceed 20%.

6.8 Calibration of sampling volume

When calculating the concentration, the sampling volume shall be converted to the volume in the normal state according to the following formula.

6.9 Sampling record

Detailed field record shall be made on the conditions of the vehicle-to-be-tested, sampling date, time, location, quantity, atmospheric pressure, air temperature, relative humidity, air flow rate, and sampling person(s). The serial numbers of the sampling tubes shall be recorded and each sample shall be labeled to indicate the serial numbers of the point positions, sampling date and time, etc. Sampling record shall be delivered to the laboratory together with the samples. See Appendix D for the sampling record.

Appendix A (Normative)

Sampling Environmental Chamber

A.1 Technical requirements

A.1.1 The sampling environmental chamber shall be able to meet the sampling environment condition requirements specified in 4.1.2 of this Standard, within 0.5m from the outer surface of the vehicle-to-be-tested; and keep it throughout the sampling process.

A.1.2 Sampling environmental chamber shall have complete envelop enclosure; the internal surface of chamber body shall be low-release, low-permeability and low-adsorption material; material and facilities volatilizing pollutants which affect the background concentration value of environmental pollutant shall not be placed in the chamber. The chamber shall be large enough to contain the vehicle-to-be-tested and convenient for testing and sampling by the person(s).

A.1.5 The control accuracy of air conditioning system at 25°C shall be less than or equal to $\pm 1.0^{\circ}\text{C}$, and less than or equal to $\pm 10\%$ when the relative humidity is 50%. At least 2 temperature and humidity monitoring points shall be arranged in the chamber;

at least one of them shall be within 0.5m from the outer surface of the vehicle-to-be-tested.

A.1.6 For sampling environmental chamber, online monitoring facilities should be adopted to continuously monitor the environment condition in the chamber specified in

4.1.2 of this Standard. Online monitoring facilities shall have data storage function.