

HJ

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

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Stationary Source Emission - Determination of Total Hydrocarbons, Methane and Nonmethane Hydrocarbons - Gas Chromatography (English Translation)

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1 Scope

This Standard specifies the gas chromatography method of determining total hydrocarbons, methane and nonmethane hydrocarbons in exhaust gas emitted from stationary sources.

This Standard is applicable to the determination of total hydrocarbons, methane and nonmethane hydrocarbons in organized emission of exhaust gas from stationary sources.

When the sample injection volume is 1.0 mL, the detection limits of total hydrocarbons and methane determined by this method are 0.06 mg/m³ (calculated by methane), and the lower limits are 0.24 mg/m³ (calculated by methane); the detection limit of nonmethane hydrocarbons is 0.07 mg/m³ (calculated by carbon), and the lower limit is 0.28 mg/m³ (calculated by carbon).

2 Normative References

This Standard quotes the following documents or clauses in the documents. In terms of references without a specified date, the valid version applies to this Standard.

GB/T 16157 The Determination of Particulates and Sampling Methods of Gaseous Pollutants Emitted from Exhaust Gas of Stationary Source

HJ 732 Emission from Stationary Sources - Sampling of Volatile Organic Compounds

- Bags Method

HJ/T 397 Technical Specifications for Emission Monitoring of Stationary Source

3 Terms and Definitions

The following terms and definitions are applicable to this Standard.

3.1 Total Hydrocarbons (THC)

Total hydrocarbons refer to the sum of gaseous organic compounds that respond on the hydrogen flame ionization detector of the gas chromatograph under the determination conditions specified in this Standard.

4 Method and Principle

Directly inject gas sample into a gas chromatograph equipped with a hydrogen flame ionization detector; respectively determine the content of total hydrocarbons and methane on the total hydrocarbon column and the methane column.

5 Reagents and Materials

Unless it is otherwise specified, analytically pure chemical reagents and distilled water that meet the national standards shall be used for analysis.

5.1 De-hydrocarbon air. content of total hydrocarbons (oxygen peak included) ≤ 0.40

mg/m³ (calculated by methane); or, determine on the methane column, no other peaks except the oxygen peak.

5.3 Nitrogen. purity $\geq 99.999\%$.

5.4 Hydrogen. purity $\geq 99.99\%$.

5.5 Air. use a purification tube for air purification.

6 Instruments and Equipment

6.1

Sampling container. all-glass syringe, with a volume not less than 100 mL; clean and dry it, then, save it for later use. The air bag material shall comply with the relevant stipulations of HJ 732; the volume shall be not less than 1 L; before use, use de- hydrocarbon air (5.1) to clean it for at least 3 times.

6.3

Sample storage box. with light-proof function.

6.4

Gas chromatograph. equipped with hydrogen flame ionization detector.

6.5

Sample injector. an injection valve with a 1 mL sample quantitative loop, or, a 1 mL gas-tight glass syringe.

6.6 Chromatographic column

6.7 Sample heating device. the sample can be placed in it and heated to not lower than 120 °C; the temperature control accuracy is ± 5 °C.

7.1.1 Collection with air bag

In accordance with Figure 1, connect the sampling device. The determination of the sampling location, sampling point, sampling frequency and sampling time of exhaust gas emitted from stationary sources, as well as the determination of exhaust parameters and the sampling operations shall comply with the relevant stipulations of

GB/T 16157, HJ/T 397 and HJ 732.

7.1.2 Collection with glass syringe

In accordance with Figure 2, connect the sampling device. The determination of the sampling location, sampling point, sampling frequency and sampling time of exhaust gas emitted from stationary sources, as well as the determination of exhaust parameters and the sampling operations shall comply with the relevant stipulations of

GB/T 16157 and HJ/T 397.

7.2 Transportation of Blank Sample

Bring the sampling container filled with de-hydrocarbon air (5.1) to the sampling site.

Send it back to the laboratory for analysis together with the samples collected in the same batch.

7.3 Sample Storage

The glass syringe for sample collection shall be handled with care to prevent it from being damaged. Maintain the needle tip downwards and place it in the sample storage box for storage and transportation.

8.2.1 Preparation of calibration series

Take a 100 mL glass syringe (beforehand, put in a piece of rigid polytetrafluoroethylene sheet) or a 1 L air bag as a container.

8.2.2 Draw a calibration curve

From low concentration to high concentration, respectively draw 1.0 mL of the calibration series (8.2.1); inject it into the gas chromatograph (6.4) to respectively determine total hydrocarbons and methane. Take the concentration of total hydrocarbons and methane ($\mu\text{mol/mol}$) as the x-coordinate; take the corresponding peak area as the y-coordinate; respectively a calibration curve of total hydrocarbons and methane.

8.2.3 Standard chromatogram

Under the reference conditions (8.1) of chromatographic analysis provided in this

8.3.1 Determination of total hydrocarbons and methane

Take 1.0 mL of the sample to be tested. In accordance with the same operating steps and analysis conditions as the calibration curve, determine the peak area of total hydrocarbons and methane in the sample.

8.3.2 Determination of oxygen peak area

Take 1.0 mL of the de-hydrocarbon air (5.1). In accordance with the same operating steps and analysis conditions as the calibration curve, determine the oxygen peak area on the total hydrocarbon column.

9.1 Result Calculation

The mass concentration of total hydrocarbons and methane in the sample shall be calculated in accordance with Formula (1).

9.2 Result Expression

When the determined result is less than 1 mg/m³, it shall be retained to two decimal places; when the determined result is greater than or equal to 1 mg/m³, 3 significant figures shall be retained.

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