

HJ

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

HJ 734-2014

**Stationary source emission - Determination of volatile organic
compounds - Sorbent adsorption and thermal desorption gas
chromatography mass spectrometry method**

固定污染源废气 挥发性有机物的测定 固相吸附-热脱附/气相色谱-

(English Translation)

Issued on: December 31, 2014

Implemented on: February 1, 2015

Issued by: Ministry of Environmental Protection Foreword

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1 Scope of application

This Standard specifies sorbent adsorption and thermal desorption gas chromatography mass spectrometry method of determination of 24 volatile organic compounds in stationary source emission.

This Standard is applicable to the determination of 24 volatile organic compounds in stationary source emission. 24 volatile organic compounds include. acetone, isopropanol, hexane, ethyl acetate, benzene, hexamethyldisiloxane, 3-pentanone, heptane, toluene, cyclopentanone, ethyl lactate, butyl acetate, PGEA, ethyl benzene, p-xylene / m-xylene, 2-heptanone, styrene, o-xylene, anisole, benzaldehyde, 1-decene, 2-nonanone, 1-dodecene.

This method can also be used after other volatile organic compounds have been verified.

When the sampling volume is 300 ml, the detection limit of the method in this

Standard is 0.001~0.01mg/m³; the lower limit of determination is

0.004~0.04mg/m³. See Annex A for the details.

2 Normative references

The provisions in following documents become the provisions of this Standard through reference in this Standard. For undated references, the latest edition of the referenced document applies.

HJ 639, Water quality - Determination of volatile organic compounds - Purge and trap/gas chromatography-mass spectrometer

5.2 Internal standard solution

$\rho=2000\mu\text{g/ml}$ or $2500\mu\text{g/ml}$, commercially available certified internal standard solution (for analysis of volatile organic compounds).

5.3 BFB

$\rho=50\mu\text{g/ml}$.

For GC-MS performance inspection. Take an appropriate amount of chromatographically-pure BFB and prepare it in a certain volume of methanol (5.1).

5.4 Standard substance

The standard substance of volatile organic compounds can use gas standard or liquid standard.

5.4.1 Gas standard

Standards for gas stored in high-pressure tanks must comply with national standards or standards certified by international authorities and be used within the validity period. It is recommended to use dynamic dilution method for standard gas dilution.

5.4.2 Liquid standard stock solution

$\rho=1000\mu\text{g/ml}$.

Purchase chromatographically-pure target compounds. Take a certain volume and use methanol (5.1) to dilute and prepare $1000\mu\text{g/ml}$ standard stock solution.

Commercially available certified mixed standard solutions can also be purchased. The concentration is $2000\mu\text{g/ml}$.

5.5 Substitute standard solution

$\rho=2000\mu\text{g/ml}$ or $2500\mu\text{g/ml}$, commercially available certified substitute standard solution (for analysis of volatile organic compounds). The chromatographically-pure deuterium in the target compound can also be prepared with methanol (5.1).

5.6 Adsorbents

Tenax GR (specific surface area is $35\text{m}^2/\text{g}$), Carbopack B (specific surface area is $100\text{m}^2/\text{g}$), Carbopack C (specific surface area is

$10\text{m}^2/\text{g}$), Carboxen 1000 (specific surface area is $1200\text{m}^2/\text{g}$), or other equivalent adsorbents such as domestic GDX-502 (specific surface area is

$170\text{m}^2/\text{g}$), GDX-201 (specific surface area is $510\text{m}^2/\text{g}$), GDX-101 (specific surface area is $330\text{m}^2/\text{g}$). The particle size of commonly used adsorbents is generally 60~80 mesh.

5.7 Adsorption tube

stainless steel material; inner diameter is 5mm.

Combination 1 adsorption tube. built-in Tenax GR, Carbopack B; lengths are 30 mm and 25mm respectively.

6.7 Flow calibrator

be able to accurately measure the flow rate at 5~500ml/min;

flow accuracy is 2%; electronic mass flow meter shall be used.

6.8

Semiconductor refrigeration dehumidification device or ice bath small impact moisture collector. for semiconductor refrigerator (current is 3A, voltage is 12V, maximum temperature difference is 60°C), the material of the gas path in the dehumidifier is made of stainless steel and PTFE tube; dehumidification components are designed as replaceable components; when the sample gas flow is $< 3\text{L/min}$, the inlet sample gas temperature is $< 60^\circ\text{C}$ (when it is the two- way series connection, it is $< 120^\circ\text{C}$), the outlet sample gas temperature is

$1.5\sim 4.0^\circ\text{C}$.

6.9 Micro syringe

1.0, 5.0, 10.0, 25.0, 50.0, 100, 250 and 500 μl .

6.10

Commonly used instruments and equipment in general laboratories.

7.1 Pre-investigation and pre-monitoring

Before testing the exhaust of volatile organic compounds in stationary source, it shall pre-investigate the pollution source information, including company name, raw materials, intermediates, products, by-products, production process, position of sampling hole of exhaust cylinder, total organic carbon (or non-methane total hydrocarbon) emission concentration, as well as common organic pollutants listed in industry emission standards.

Use the combination 3 adsorption tube for sampling of pre-monitoring sample collection. It can use thermal desorption gas chromatography mass spectrometry method analysis. It can also use sampling tank sampling gas chromatography-mass spectrometry analysis. Use pre-monitoring to determine the components of volatile organic compounds in the exhaust gas of each stationary source.

7.2 Preparation of adsorption sampling tube

Immediately use sealing cap to seal both ends of the aged adsorption sampling tube. Store in an airtight sealed bag or box. The sealed bag or sealed box is stored in a box containing activated carbon or in a desiccator. Store at 4°C. If necessary, before sampling, in the aged adsorption tube, add a certain amount of substitute standard (usually the middle concentration of the calibration curve).

For loading method, see 8.2.2.

7.3.1 Adsorption tube sampling

Figure 1 -- Exhaust gas sampling system

7.3.2 Air bag-adsorption tube sampling

Refer to HJ 732 for air bag sampling of volatile organic compounds in exhaust gas from stationary source. Air bag adopts 3-liter Tedlar bag. Gather about 2 liters of gas. Connect the air bag to the adsorption sampling tube within 8 hours.

Use the sample collection device (6.6) to gather at least 150ml of gas at a flow rate of 50ml/min.

7.4 Full program blank sampling

Bring the sealed adsorption sampling tube to the sampling site. At the same time, the same sample adsorption tube opens the cap to contact the site ambient air. During sampling, the full program blank adsorption tube closes the sealing cap. At the end of sampling, the same