

HJ

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

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**Solid waste. Determination of volatile organic compounds.
Headspace-gas chromatography method**

固体废物 挥发性有机物的测定 顶空-气相色谱法

(English Translation)

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Foreword

To implement the Environmental Protection Law of the People's Republic of China and the Law of the People's Republic of China on the Prevention and Control of Environmental Pollution by Solid Waste this standard is formulated to protect the environment, protect human health, and regulate the determination of volatile organic compounds in solid waste.

This standard specifies headspace-gas chromatography for the determination of volatile organic compounds in solid waste.

This standard is the first release.

Appendix A of this standard is a normative appendix, and Appendix B is an informative appendix.

This standard was formulated by the Science and Technology Standards Department of the Ministry of Environmental Protection.

This standard is mainly drafted by. Anshan Environmental Monitoring Center Station.

This standard is verified by. Liaoning Provincial Environmental Monitoring Experimental Center, Shenyang Environmental Monitoring Center Station, Dalian Environmental Monitoring Center, Harbin Environmental Monitoring Center Station, Fushun Environmental

Monitoring Center Station and Liaoyang Environmental Monitoring Station.

This standard was approved by the Ministry of Environmental Protection on October 22, 2015.

This standard has been implemented since December 1, 2015.

This standard is explained by the Ministry of Environmental Protection.

1 Determination of volatile organic compounds in solid waste - Headspace - gas chromatography

Warning. The reagents and standard solutions used in the test are volatile toxic compounds. The preparation process should be in the fume hood.

Carry out the operation; wear protective equipment as required to avoid contact with skin and clothing.

1 Scope of application this standard specifies headspace-gas chromatography for the determination of volatile organic compounds in solid waste.

This standard applies to the determination of 37 volatile organic compounds in solid waste and solid waste leachate. Other volatility If the machine is verified, it is also applicable to this standard.

When the amount of solid waste sample is 2 g, the detection limit of 37 target methods is 0.003 mg/kg ~ 0.04 mg/kg.

The lower limit is 0.02 mg/kg ~ 0.2 mg/kg. Method detection limit for 37 targets when the volume of solid waste leachate is 10 ml the measurement limit is from 0.6 µg/L to 10.2 µg/L, and the lower limit of measurement is from 2.4 µg/L to 40.8 µg/L. See Appendix A for details.

2 Normative references

The contents of this standard refer to the following documents or their terms. For undated references, the valid version is appropriate.

Used in this standard.

HJ/T 20 Technical Specifications for Sampling and Sample Preparation of Industrial Solid Waste HJ/T 298 Hazardous Waste Identification Technical Specification HJ/T 299 solid waste leaching toxicity leaching method sulfuric acid nitric acid method HJ/T 300 solid waste leaching toxicity leaching method acetic acid buffer solution method

3 Principle of the method

At a certain temperature, the volatile organic compounds in the sample in the headspace bottle volatilize into the liquid space, generating vapor pressure, in the gas and liquid.

After the solid three-phase reaches the thermodynamic equilibrium, the volatile organic compounds in the gas phase are separated by gas chromatography and detected by flame ionization.

Detection. Characterize by retention time and quantify by external standard method.

4 Reagents and materials

4.1

Experimental water. double distilled water or water prepared by ultrapure water meter. A blank test is required before use to confirm There is no interference peak in the retention time interval of the standard.

4.2

Methanol (CH_3OH). pesticide residue level or equivalent. Confirm by the blank test within the retention time interval of the target no interference peaks appear.

4.3

Sodium chloride (NaCl). excellent grade pure.

Burn in a muffle furnace (or box furnace) at 400°C for 4 h, place in a desiccator and cool to room temperature, transfer to the ground glass Store in a glass bottle.

4.4

Phosphoric acid (H_3PO_4). excellent grade pure.

4.5 Saturated sodium chloride solution

Measure 500 ml of experimental water (4.1), add a few drops of phosphoric acid (4.4) to adjust $\text{pH} \leq 2$, add 180 g of sodium chloride (4.3), Dissolve and mix. Store at 4°C for 6 months.

4.6 Standard stock solution. $\rho = 1\,000\text{ mg/L} \sim 5\,000\text{ mg/L}$.

2 can directly purchase certified standard solution, can also be prepared with standard materials.

4.7 Standard use solution. $\rho = 10\text{ mg/L} \sim 100\text{ mg/L}$.

The standard use solution of the target is stored in a compact bottle with a shelf life of one month or prepared according to the manufacturer's instructions.

4.8 Quartz sand. analytically pure. 20 mesh ~ 50 mesh.

Before use, it is necessary to pass the test to confirm that the concentration of the target compound or target compound is lower than the method detection limit.

4.9 Carrier gas. High-purity nitrogen ($\geq 99.999\%$), deoxidized by deoxidizer and dehydrated by molecular sieve.

4.10 Gas. High purity hydrogen ($\geq 99.999\%$), dehydrated by molecular sieve.

4.11 Gas-assisted gas. air, dehydrated by silica gel and deactivated by activated carbon.

Note 1: All the above standard solutions are treated with methanol as the solvent. The standard solution after preparation or unsealing should be placed in a compact bottle, and protected from light under 4 °C.

The storage period is generally 30 days. Recover to room temperature and mix before use.

5 Instruments and equipment

5.1

Gas Chromatograph. with capillary column split/splitless inlet, programmable temperature, flame ionization detector (FID).

5.2

Column. Quartz capillary column, 1. 60 m x 0.25 mm, film thickness 1.4 m (6% nitrile propyl, 94% dimethyl Other polysiloxane columns can also be used. Column 2. 30 m x 0.32 mm, film thickness 0.25 m (poly Ethylene glycol 20 M), other equivalent capillary columns can also be used.

5.3

Automatic Headspace Sampler. Headspace Bottle (22 ml), Gasket (Teflon/Siloxane), Cap (Spiral Cover or One) the gland used for the second time).

5.4

Reciprocating Oscillator. The oscillation frequency is 150 times/min, which can fix the headspace bottle.

5.5

Balance. Accuracy is 0.01 g.

5.6

Sampling bottle. 60 ml or.200 ml threaded brown wide-mouth glass bottle with Teflon-silica liner screw cap.