

**INDUSTRY STANDARD OF THE  
PEOPLE'S REPUBLIC OF CHINA**

**HJ 951-2018**

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**Solid waste - Determination of semivolatile organic compounds  
- Gas chromatography mass spectrometry**

固体废物半挥发性有机物的测定气相色谱-质谱法

**(English Translation)**

**Issued on: July 29, 2018**

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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 to protect the environment, protect human health, and regulate the determination of semi-volatile organic compounds in solid waste and its leachate.

standard.

This standard specifies gas chromatography-mass spectrometry for the determination of semi-volatile organic compounds in solid waste and its leachate.

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

This standard is the first release.

This standard is formulated by the Environmental Monitoring Department and the Science and Technology Standards Department.

This standard was drafted. Henan Environmental Monitoring Center.

This standard is verified by. Xinxiang City Environmental Protection Monitoring Station, Henan Environmental Science Research Institute, Henan Entry-Exit Inspection Technical Center of the Epidemic Bureau, Environmental Monitoring Station of Kaifeng City, Institute of Hydrogeology and Environmental Geology of Chinese Academy of Geological Sciences and Environment of Henan Province Monitoring center.

This standard is approved by the Ministry of Ecology and Environment on July 29, 2018.

This standard has been implemented since December 1, 2018.

This standard is explained by the Ministry of Ecology and Environment.

1 Determination of semi-volatile organic matter in solid waste - Gas chromatography - mass spectrometry Warning. The organic solvents and reference materials used in the experiment are toxic and hazardous substances, standard solution preparation and sample preparation.

The process should be carried out in a fume hood; protective equipment should be worn as required to avoid direct contact with skin and clothing.

## 1 Scope of application

This standard specifies gas chromatography-mass spectrometry for the determination of semi-volatile organic compounds in solid waste and its leachate.

This standard applies to chlorinated hydrocarbons, phthalates, nitrosamines, ethers, halogens in solid waste and its leachate.

Ethers, ketones, anilines, pyridines, quinolines, nitroaromatics, phenols including nitrophenols, organochlorine pesticides, Screening and quantitative analysis of 64 semi-volatile organic compounds such as polycyclic aromatic hydrocarbons.

When the solid waste (ash) sample is 10 g and the volume is 1.0 ml, 64 kinds of semi-volatile organic compounds the detection limit was 0.04~0.4 mg/kg, and the lower limit of determination was 0.16~1.6 mg/kg. When solid waste (biochemical sludge) is sampled when the volume is 2 g and the volume is 1.0 ml, the detection limit of 64 semi-volatile organic compounds is 0.3~1 mg/kg.

The limit is 1.2~4 mg/kg.

When the solid waste leachate has a sample volume of 100 ml and a constant volume of 10.0 ml, 64 semi-volatile organic compounds the detection limit of the method was 0.1~0.8 mg/L, and the lower limit of determination was 0.4~3.2 mg/L.

The detection limits and lower limit of determination of solid waste and its leachate are detailed in Appendix A.

## 2 Normative references

This standard refers to the following documents or their terms. For undated references, the valid version applies to this standard.

HJ 765 solid waste organic matter extraction microwave extraction HJ 782 solid waste organic matter extraction pressurized fluid extraction HJ 834 Determination of semi-volatile organic matter in soils and sediments - Gas chromatography - mass spectrometry 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

The semi-volatile organic compounds in the solid waste and the leachate are separated, purified, concentrated, and made up to a volume by gas chromatography.

Mass spectrometry detection. According to the mass spectrum, retention time, fragment ion mass-to-charge ratio and its abundance qualitative, the internal standard method is used for quantification.

### 4 Reagents and materials

Unless otherwise stated, analytically pure reagents that meet national standards were used for the analysis. The experimental water is freshly prepared pure water or 2 distilled water.

#### 4.1

Acetone ( $C_3H_6O$ ). pesticide residue level.

#### 4.2

Dichloromethane ( $CH_2Cl_2$ ). pesticide residue grade.

#### 4.3

Ethyl acetate ( $C_4H_8O_2$ ). pesticide residue grade.

#### 4.4

Cyclohexane ( $C_6H_{12}$ ). pesticide residue grade.

#### 4.5

Dichloromethane-acetone mixed solvent. 1 1.

Mix with dichloromethane (4.2) and acetone (4.1) in a 1.1 volume ratio.

#### 4.6

Gel Permeation Chromatography Mobile Phase.

Mix with 1.1 volume ratio with ethyl acetate (4.3) and cyclohexane (4.4), or prepare other solvents according to the instrument manual.

system.

#### 4.7

Nitric acid.  $\rho$  ( $\text{HNO}_3$ ) = 1.42 g/ml, excellent grade pure.

#### 4.8

Nitric acid solution. 1 1.

It was prepared by mixing nitric acid (4.7) and water in a 1.1 volume ratio.

#### 4.9

Sodium chloride ( $\text{NaCl}$ ). excellent grade.

It was placed in a muffle furnace and baked at 400 ° C for 4 h. After cooling, it was sealed in a glass bottle with a stopper and placed in a desiccator for storage.

#### 4.10

Standard stock solution of semi-volatile organic compounds.  $\rho$ =1000~5000 mg/L.

Commercially available certified standard solutions can be purchased directly.

#### 4.11

Standard use solution for semi-volatile organic compounds.  $\rho$ =200~500 mg/L.

Dilute the semi-volatile organic standard stock solution (4.10) with a dichloromethane-acetone mixed solvent (4.5), and Mix well.

#### 4.12

Internal standard stock solution.  $\rho$ =5000 mg/L.

1,4-Dichlorobenzene-d<sub>4</sub>, naphthalene-d<sub>8</sub>, ?-d<sub>10</sub>, phenanthrene-d<sub>10</sub>, ?-d<sub>12</sub> and ?-d<sub>12</sub> were selected as internal standards. Can be purchased directly for sale Certified standard solution. Other semi-volatile organic compounds with similar properties may also be used as internal standards.

#### 4.13

Internal standard use solution.  $\rho$ =200~500 mg/L.

The internal standard stock solution (4.12) was diluted with a dichloromethane-acetone mixed solvent (4.5) and mixed.

#### 4.14

Standard stock solution for substitutes.  $\rho$ =1000~5000 mg/L.

Phenol-d<sub>6</sub>, 2-fluorophenol, 2,4,6-tribromophenol, nitrobenzene-d<sub>5</sub>, 2-fluorobiphenyl, 4,4'-terphenyl-d<sub>14</sub> were used as the substitute Substance. Commercially available certified standard solutions can be purchased directly.