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**HJ**

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

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Replacing GB 4919-1985

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**Water quality. Determination of nitrobenzene-compounds by  
gas chromatography**

水质 硝基苯类化合物的测定 气相色谱法

**(English Translation)**

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## Table of Contents

|                                                   |  |
|---------------------------------------------------|--|
| Foreword                                          |  |
| 1 Scope of application                            |  |
| 2 Principle of the method                         |  |
| 3 Reagents and materials                          |  |
| 4 Instruments and equipment                       |  |
| 5 Samples                                         |  |
| 5.1 Sample collection and preservation            |  |
| 5.2 Preparation of samples                        |  |
| 6 Analysis steps                                  |  |
| 6.1 Chromatographic Analysis Reference Conditions |  |
| 6.2 Calibration                                   |  |
| 6.3 Determination                                 |  |
| 6.4 Blank test                                    |  |
| 7 Calculation and representation of results       |  |
| 7.1 Calculation of results                        |  |
| 7.2 Results representation                        |  |
| 8 Precision and accuracy                          |  |
| 8.1 Precision                                     |  |
| 8.2 Accuracy                                      |  |
| 9 Quality Assurance and Quality Control           |  |
| 9.1 Qualitative analysis                          |  |
| 9.2 Blank test                                    |  |
| 9.4 Intermediate concentration test               |  |
| 9.5 Matrix addition                               |  |

### Foreword

To protect the environment and protect the human body in order to implement the Environmental Protection Law of the People's Republic of China and the Law of the People's Republic of China on Water Pollution Prevention and Control this standard is formulated for the determination of nitrobenzene compounds in industrial wastewater and domestic sewage.

This standard specifies gas chromatography for the determination of nitrobenzene compounds in industrial wastewater and domestic sewage.

This standard is a revision of the "Gas Chromatography for the Determination of Total Nitro Compounds in Industrial Wastewater" (GB 4919-85).

This standard was first published in 1985. The original standard drafting unit was the Fifth Design Institute of the Ministry of Weapons Industry and the State-owned Qingyang Chemical Plant. This time is First revision. The main contents of the revision are as follows.

- Amend the standard name to "Gas Chromatography for the Determination of Water Nitrobenzene Compounds";
- replacing the packed column with a capillary column;
- changed the extraction solvent and dosage;
- modified the quantitative method of nitrobenzene compounds;
- Modified the method for determination of 2,4,6-trinitrobenzoic acid;
- Added quality assurance and quality control provisions.

From the date of implementation of this standard, the national environmental protection standard "Industry" approved and issued by the former State Environmental Protection Administration on August 1, 1985 Determination of Total Nitro Compounds in Wastewater Gas Chromatography (GB 4919-85) is abolished.

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. Qingdao Environmental Monitoring Center Station.

This standard is verified by. Jinan Environmental Protection Monitoring Station, Zibo Environmental Monitoring Station, Weifang Environmental Monitoring Center Station, Qingdao Institute of Technology College of Environmental and Municipal Engineering, Agricultural Products Supervision and Inspection Center of the Ministry of Agriculture (Qingdao).

This standard was approved by the Ministry of Environmental Protection on October 21, 2010.

This standard has been implemented since January 1, 2011.

This standard is explained by the Ministry of Environmental Protection.

Water quality - Determination of nitrobenzene compounds - Gas chromatography

## 1 Scope of application

This standard specifies the gas chromatography of nitrobenzene compounds in water.

This standard applies to the determination of nitrobenzene compounds in industrial wastewater and domestic sewage.

When the sample volume is 500 ml, the detection limit, lower limit of determination and upper limit of determination of the method are shown in Table 1.

Table 1 Method detection limit and upper limit and lower limit unit. mg/L

| Compound name              | detection limit | determination lower limit | upper limit |
|----------------------------|-----------------|---------------------------|-------------|
| Nitrobenzene               | 0.002           | 0.008                     | 2.8         |
| O-nitrotoluene             | 0.002           | 0.008                     | 2.4         |
| m-Nitrotoluene             | 0.002           | 0.008                     | 2.4         |
| p-Nitrotoluene             | 0.002           | 0.008                     | 2.0         |
| 2,4-Dinitrotoluene         | 0.002           | 0.008                     | 2.8         |
| 2,6-dinitrotoluene         | 0.002           | 0.008                     | 2.0         |
| 2,4,6-trinitrotoluene      | 0.003           | 0.012                     | 2.0         |
| 1,3,5-trinitrobenzene      | 0.003           | 0.012                     | 2.4         |
| 2,4,6-trinitrobenzoic acid | 0.003           | 0.012                     | 2.0         |

## 2 Principle of the method

The nitrobenzene compound in water is extracted with dichloromethane, and the extract is dehydrated and concentrated, and then subjected to a gas chromatography hydrogen flame ionization detector.

The measurement was carried out.

2,4,6-trinitrobenzoic acid is highly water-soluble and is converted to 1,3,5-trinitrobenzene upon heating. Therefore, after extracting dichloromethane the aqueous phase was heated and the 2,4,6-trinitrobenzoic acid was separately determined by extraction with dichloromethane.

## 3 Reagents and materials

Analytical purification reagents conforming to national standards were used for the analysis, and the experimental water was freshly prepared distilled water unless otherwise stated.

### 3.1

Concentrated sulfuric acid (H<sub>2</sub>SO<sub>4</sub>).  $\rho = 1.84$  g/ml.

### 3.2

Dichloromethane (CH<sub>2</sub>Cl<sub>2</sub>). Pure by liquid chromatography.

### 3.3

Ethyl acetate (C<sub>4</sub>H<sub>8</sub>O<sub>2</sub>). pure by liquid chromatography.

### 3.4

anhydrous sodium sulfate ( $\text{Na}_2\text{SO}_4$ ).

Before use, burn in a 350 ° C muffle furnace for 4 h, cool to room temperature, and place in a glass bottle for use.

### 3.5

nitrobenzene compound standard solution.  $\rho = 1.00 \text{ mg/ml}$ .

Store at 4 ° C in the dark. Commercially available certified standards can be used.

3.6 2,4,6-trinitrobenzoic acid. powdered solid particles, purity > 98.5%.

3.7 2,4,6-trinitrobenzoic acid standard solution.  $\rho = 1.00 \text{ mg/ml}$ .

Dissolve with ethyl acetate (3.3) during use, prepare a standard solution of  $\rho = 1.00 \text{ mg/ml}$ , and store at 4°C in the dark.

effective.

### 3.8

Carrier gas. nitrogen, purity  $\geq 99.99\%$  (volume fraction).

### 3.9

Combustion gas. hydrogen, purity  $\geq 99.99\%$  (volume fraction).

### 3.10

Gas. Air.

## 4 Instruments and equipment

### 4.1

Gas chromatograph. with hydrogen flame ionization detector.

### 4.2

Column. quartz capillary column, 30 m x 0.32 mm (inside diameter) x 0.25  $\mu\text{m}$  (film thickness), the stationary phase is 5% phenyl-95% A Polysiloxane. Or other equivalent capillary column.

### 4.3

Rotary evaporator.

### 4.4

Nitrogen blowing instrument.