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HJ

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

HJ 1067-2019

**Water quality--Determination of benzene and its
analogies--Headspace / gas chromatography**

水质 苯系物的测定 顶空气相色谱法

(English Translation)

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Foreword

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 Control", protect the ecology the environment, to protect human health, standardize the determination method of benzene series in water, and formulate this standard.

This standard specifies headspace/gas chromatography for the determination of benzenes in surface water, groundwater, domestic sewage and industrial wastewater.

Compared with "Gas Chromatography for the Determination of Benzene in Water" (GB/T 11890-1989), the main differences between this standard are as follows.

under.

- The name was changed to "Determination of benzene in water by headspace/gas chromatography";

- Increased groundwater and domestic sewage in the scope of application;

- Deleted liquid-liquid extraction related content;

- Added normative references;

- Added description of method principle;

- Change the packed column for analysis to a capillary column and use a fully automatic headspace sampler instead of a manual headspace sampler;

- Change the single-point calibration to the working curve calibration;
- Added chapters on quality assurance and quality control;
- Added chapter on waste disposal and precautions.

Since the implementation of this standard, the former National Environmental Protection Agency approved "Water Quality Benzene Series" on December 25, 1989.

Gas Chromatography (GB/T 11890-1989) in the corresponding environmental quality standards and pollutant emissions (control) Implementation stopped during the implementation of the standard.

Appendix A of this standard is a normative appendix, and Appendix B and Appendix C are informative appendixes.

This standard is formulated by the Department of Eco-Environmental Monitoring, Laws and Standards Department of the Ministry of Ecology and Environment.

This standard was drafted. China Shipbuilding Industry Corporation 718 Research Institute.

This standard is verified by. Hebei Province Environmental Monitoring Center Station, Shijiazhuang City Environmental Monitoring Station, Anyang City Environmental Monitoring Station, Baoding Environmental Monitoring Station, China Shipbuilding Chemicals Testing Center and Beijing Huaxue North Testing Technology Co., Ltd.

This standard was approved by the Ministry of Ecology and Environment on December 24, 2019.

This standard will be implemented from March 24, 2020.

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

1 Determination of benzene compounds in water quality

Headspace/gas chromatography

Warning. The solvents and standard samples used in the experiment are toxic and harmful compounds, their solution preparation and sample preparation process it should be carried out in a fume hood, and protective equipment should be worn during operation to avoid contact with skin and clothing.

1 Scope

This standard specifies headspace/gas chromatography for the determination of benzenes in water.

This standard applies to benzene, toluene, ethylbenzene, p-xylene, methane in surface water, groundwater, domestic sewage and industrial wastewater.

Determination of xylene, o-xylene, cumene and styrene.

When the sampling volume is 10.0 ml, the detection limit of this standard for the determination of benzene in water is 2 µg/L to 3 µg/L the lower limit is set to 8 µg/L to 12 µg/L. See Appendix A for details.

2 Normative references

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

HJ 494 Water Quality Sampling Technical Guide HJ 91.1 Technical Specifications for Sewage Monitoring HJ/T 91 Technical specifications for surface water and sewage monitoring HJ/T 164 Technical Specifications for Groundwater Environmental Monitoring

3 Method principle

Place the sample in a closed headspace bottle. Under a certain temperature and pressure, the volatile components in the sample in the headspace bottle are transferred to the liquid.

The upper space volatilizes and generates vapor pressure. The thermodynamic equilibrium is reached in the two phases of gas and liquid. Within a certain concentration range, the benzene series the concentration in the gas phase is proportional to the concentration in the water phase. Quantitative extraction of gas phase was separated by gas chromatography and hydrogen flame ionization Detector detection. Qualitative according to retention time, quantified by external standard method of working curve.

4 Reagents and materials

Unless otherwise specified, analytical purification reagents that meet national standards are used. Experimental water is double distilled water or water prepared by pure water equipment, it needs to go through a blank test before use to confirm that it does not contain the target compound and no interference chromatographic peaks appeared during the retention time interval.

4.1

Methanol (CH₃OH). chromatographically pure.

4.2

Hydrochloric acid. ρ (HCl) = 1.19 g/ml, excellent purity.

4.3

Sodium chloride (NaCl). excellent grade pure.

Before use, burn at 500 ° C to 550 ° C for 2 hours, cool to room temperature, and store in a

desiccator for later use.

4.4

Ascorbic acid (C₆H₈O₆).

24.5 Hydrochloric acid solution. 1 1.

4.6

Standard stock solution. rho~1.00 mg/ml, the solvent is methanol.

Commercially available certified standard solutions, sealed and refrigerated at 4 ° C or lower in the dark, or stored in accordance with product instructions. Should be restored before use Mix to room temperature.

4.7

Standard use solution. rho~100 µg/ml.

Accurately transfer 1.00 ml of standard stock solution (4.6) and make up to 10 ml with water. Provisional use.

4.8

Carrier gas. High-purity nitrogen with a purity of >=99.999%.

4.9

Combustion gas. high-purity hydrogen, purity >=99.999%.

4.10

Gas-assisting gas. air, dehydrated by silica gel, and activated carbon to remove organic matter.

5 Instruments and equipment

5.1

Sampling bottle. 40 ml brown screw-top glass bottle with silicone rubber-teflon liner screw cap.

5.2

Gas chromatograph. with split/splitless inlet and hydrogen flame ionization detector (FID).

5.3

Column I. Specifications are 30 m (column length) x 0.32 mm (inner diameter) x 0.5 µm (film thickness), 100% polyethylene glycol Stationary capillary columns, or other equivalent capillary columns.