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

HJ 583-2010

Replacing GB/T 14677-1993

**Ambient air. Determination of benzene and its analogies using
sorbent adsorption thermal desorption and gas
chromatography**

环境空气 苯系物的测定 固体吸附热脱附-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	
4.2 Column	
4.3 Thermal desorption device	
4.4 Aging device	
4.5 Sample collection device	
4.6 Sampling tube	
5 Samples	
5.1 Preparation of sampling tube	
5.2 Sample Collection	
5.3 Sample storage	
5.4 Collection of blank samples on site	
6 Analysis steps	
6.1 Instrument selection	
6.2 Recommended analysis conditions	
6.3 Calibration	
6.4 Determination	
6.5 Blank test	
7 Calculation and representation of results	
7.2 Results representation	
8 Precision and accuracy	
8.1 Precision	
8.2 Accuracy	
9 Quality Assurance and Quality Control	

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 the Prevention and Control of Air

Pollution, protect the environment and protect people the body is healthy, and the method for determining the determination of benzene in the air is formulated.

This standard specifies the determination of benzene, toluene, ethylbenzene, o-xylene, m-xylene, p-xylene, isopropyl in ambient air and indoor air.

Solid adsorption/thermal desorption of benzene and styrene - gas chromatography.

This standard is a revision of the "Gas Chromatography for the Determination of Air Quality of Toluene, Xylene and Styrene" (GB/T 14677-93).

This standard was first published in 1993. The original standard drafting unit was Shenyang Environmental Science Research Institute. This is the first revision. This repair the main contents of the subscription are as follows.

- Revise the standard name to "Determination of Benzene in Ambient Air by Solid Adsorption/Thermal Desorption - Gas Chromatography";
- The target component is increased from five to eight;
- modifying the standard solution matrix from carbon disulfide to methanol;
- Added secondary desorption capillary column analysis method;
- Added quality assurance and quality control provisions.

As of the date of implementation of this standard, the national environmental protection standard "Air" approved and issued by the former National Environmental Protection Agency on September 18, 1993 Determination of mass of toluene, xylene and styrene by gas chromatography (GB/T 14677-93) is abolished.

Appendix A to Appendix C of this standard are informative annexes.

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

This standard is mainly drafted by. Dalian Environmental Monitoring Center.

This standard is verified by. Anshan Environmental Monitoring Center Station, Jinzhou Environmental Monitoring Center Station, Shenyang Environmental Monitoring Center Station, Liaoning Provincial Environmental Monitoring Experimental Center and Yingkou Environmental Monitoring Center Station.

This standard was approved by the Ministry of Environmental Protection on September 20, 2010.

This standard has been implemented since December 1, 2010.

This standard is explained by the Ministry of Environmental Protection.

Determination of benzene in ambient air Solid adsorption/thermal desorption-gas

chromatography

1 Scope of application

This standard specifies solid adsorption/thermal desorption-gas chromatography for the determination of benzene in air.

This standard applies to ambient air and indoor air benzene, toluene, ethylbenzene, o-xylene, m-xylene, p-xylene, cumene and Determination of styrene. This standard is also applicable to the determination of benzene series in low concentration exhaust gas at normal temperature.

Method for benzene, toluene, ethylbenzene, o-xylene, m-xylene, p-xylene, cumene and styrene when the sampling volume is 1 L the detection limit and the lower limit of measurement are shown in Table 1.

Table 1 Method detection limit and lower limit of measurement

Unit. mg/m³

Component	capillary column method	packed column method	detection limit	detection limit	lower limit
Benzene	5.0x10 ⁻⁴	2.0x10 ⁻³	5.0x10 ⁻⁴	2.0x10 ⁻³	1.0x10 ⁻³
Toluene	5.0x10 ⁻⁴	2.0x10 ⁻³	1.0x10 ⁻³	4.0x10 ⁻³	1.0x10 ⁻³
Ethylbenzene	5.0x10 ⁻⁴	2.0x10 ⁻³	1.0x10 ⁻³	4.0x10 ⁻³	1.0x10 ⁻³
Paraxylene	5.0x10 ⁻⁴	2.0x10 ⁻³	1.0x10 ⁻³	4.0x10 ⁻³	1.0x10 ⁻³
M-xylene	5.0x10 ⁻⁴	2.0x10 ⁻³	1.0x10 ⁻³	4.0x10 ⁻³	1.0x10 ⁻³
O-xylene	5.0x10 ⁻⁴	2.0x10 ⁻³	1.0x10 ⁻³	4.0x10 ⁻³	1.0x10 ⁻³
Cumene	5.0x10 ⁻⁴	2.0x10 ⁻³	1.0x10 ⁻³	4.0x10 ⁻³	1.0x10 ⁻³
Styrene	5.0x10 ⁻⁴	2.0x10 ⁻³	1.0x10 ⁻³	4.0x10 ⁻³	1.0x10 ⁻³

2 Principle of the method

Enriching ambient air or benzene in indoor air at room temperature with a packed tube of poly 2,6-diphenyl-p-phenylene ether (Tenax) the sample tube is connected to the thermal desorber, and after heating, the adsorbed component is introduced into a gas chromatograph with a hydrogen flame ionization detector (FID).

analysis.

3 Reagents and materials

Analytical purification reagents that meet national standards were used for analysis unless otherwise stated.

3.1

Methanol. chromatographically pure.

3.2

Standard stock solution. Take appropriate amount of chromatographically pure benzene, toluene, ethylbenzene, o-xylene, m-xylene, p-xylene, cumene and phenylethyl the alkene is formulated in a volume of methanol (3.1). A certified standard solution can also be used.

3.3

Carrier gas. nitrogen, purity 99.999%, purified with a purification tube.

3.4

Combustion gas. hydrogen, purity 99.99%.

3.5

Gas. Air, cleaned with a clean tube.

4 Instruments and equipment

4.1

Gas Chromatograph. equipped with FID detector.

4.2 Column

4.2.1

Packed column. made of hard glass or stainless steel, 2 m long, inner diameter 3 to 4 mm, filled with 2.5% phthalic acid diterpene Chromsorb G·DMCS (80-100 mesh) of ester (DNP) and 2.5% bentonite-34 (bentane). See the preparation method of packed column Appendix A.

4.2.2

Capillary column. The fixing solution is polyethylene glycol (PEG-20M), 30 m x 0.32 mm, film thickness 1.00 μm or equivalent capillary column.

4.3 Thermal desorption device

It has a first-level desorption or secondary desorption function, and can be purchased by professional manufacturers or by themselves. The thermal desorption unit can continuously adjust the temperature, the highest the temperature can reach 300 ° C, and the temperature can be kept constant when the temperature reaches the set value. After the sampling tube is mounted on the thermal desorber, both ends of the sampling tube and the entire system is not leaking. The temperature of the transmission line connected to the gas chromatograph should be maintained above 100 ° C.

Thermal desorbers with freeze focus are also suitable for this standard.