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**NATIONAL OCCUPATIONAL HEALTH STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GBZ/T 300.116-2018

**Determination of toxic substances in workplace air -- Part 116:
P-toluene sulfonic acid
(English Translation)**

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Table of Contents

Foreword
1 Scope
2 Normative references
4.1 Principle
4.2 Instrument
4.3 Reagents
4.4 Sample collection, transportation and storage
4.5 Analysis steps
4.6 Calculation
4.7 Description

Foreword

This part is the 116th part of GBZ/T 300 "Measurement of Toxic Substances in Workplace Air".

This part is drafted in accordance with the rules given in GB/T 1.1-2009.

This section is mainly drafted by. Sichuan Provincial Center for Disease Control and Prevention, Shandong Institute of Occupational Health and Occupational Disease Prevention, Sichuan University Huaxi Fourth Hospital, Chengdu Municipal Center for Disease Control and Prevention.

1 Scope

This part of GBZ/T 300 specifies solvent elution-high performance liquid chromatography for the determination of p-toluenesulfonic acid in the workplace air.

This section applies to the detection of the concentration of p-toluenesulfonic acid in the aerosol state and vapor state in the workplace air.

2 Normative references

The following documents are indispensable for the application of this document. For dated references, only the dated version applies to this document.

For undated references, the latest edition (including all amendments) applies to this document.

GBZ 159 Sampling specification for monitoring of hazardous substances in the workplace
air GBZ/T 210.4 Guide to the development of occupational health standards - Part 4.
Methods for the determination of chemical substances in the workplace air Basic
information on 3 p-toluenesulfonic acid See Table 1 for basic information on
p-toluenesulfonic acid.

Table 1 Basic information of p-toluenesulfonic acid

Chemical material

Chemical Abstracts

(CAS number)

Molecular formula relative molecular mass p-Toluenesulfonic acid (p-Toluene sulfonic acid)
104-15-4 $\text{CH}_3\text{C}_6\text{H}_4\text{SO}_3\text{H}$ 172.2 Solvent elution of 4-p-toluenesulfonic acid-high
performance liquid chromatography

4.1 Principle

The aerosol state and vapor state of p-toluenesulfonic acid in air are collected by
impregnated ultrafine glass fiber filter paper, eluted with isopropanol solution, and then
passed through C18.

Liquid chromatography column separation, UV detector detection, qualitative retention time,
peak height or peak area quantification.

4.2 Instrument

4.2.1

Impregnated filter paper. The ultrafine glass fiber filter paper is immersed in the immersion
liquid (4.3.2) for 10 min, taken out and drained, and baked at $60^\circ\text{C} \sim 80^\circ\text{C}$ Dry, sealed
and stored.

4.2.2

Large sampling clamp, the filter material diameter is 37mm or 40mm.

4.2.3

Small sampling clamp, the filter material diameter is 25mm.

4.2.4

Air sampler, flow rate range is 0L/min $\sim$ 2L/min and 0L/min $\sim$ 5L/min.

4.2.5

Solvent desorption bottle, 10 mL.

4.2.6

Needle filter, organic phase, 0.45 μm .

4.2.7

High performance liquid chromatograph with UV detector or diode array detector, measuring wavelength 222nm; instrument operation reference conditions.

a) Column. 250mm x 4.6mm x 5 μm , C18;

b) Column temperature. 30 ° C;

c) mobile phase. acetonitrile. tetrabutylammonium hydrogen sulfate solution (4.3.6) = 20.80 (volume ratio);

d) Mobile phase flow. 1.0 mL/min.

4.3 Reagents

4.3.1

The experimental water is ultrapure water, and the reagents are analytically pure except those indicated.

4.3.2

Impregnation solution. 0.8 g of sodium hydroxide is dissolved in water, 1 mL of glycerol is added, and water is added to 100 mL.

4.3.3

Desorbent, 2% (volume fraction) isopropanol (premium pure) solution.

4.3.4

Ammonia solution, 0.5 mol/L.

4.3.5

Acetonitrile, chromatographically pure.

4.3.6

tetrabutylammonium hydrogen sulfate solution, 0.005mol/L. 1.70g of tetrabutylammonium hydrogen sulfate dissolved in about 900mL of water, adjusted with ammonia solution After the pH is about 4.5 (indicated by the acidity meter), dilute to 1000 mL.

4.3.7

Standard solution. accurately weigh a certain amount of p-toluenesulfonic acid, dissolve it in the desorption solution, quantitatively transfer it into a volumetric flask, and make up the volume.

It is a standard stock solution. Dilute to 1000.0 $\mu\text{g/mL}$ p-toluenesulfonic acid standard

solution with desorbent and store at room temperature for 2 months. Or use the country to recognize Formulated in a standard solution.

4.4 Sample collection, transportation and storage

4.4.1

On-site sampling shall be performed in accordance with GBZ 159.

4.4.2

Short-time sampling. At the sampling point, a large sampling clamp containing impregnated filter paper was used to collect a 15 minute air sample at a flow rate of 2.0 L/min.

4.4.3

Long-term sampling. At the sampling point, use a small sampling clamp with impregnated filter paper to collect air samples from 2h to 8h at a flow rate of 1.0L/min.

4.4.4

After sampling, open the sampling clamp, take out the immersion filter paper, fold the dust face inward, put it into the solvent desorption bottle, and put it in the clean container.

Lose and save. The sample can be stored for 7 days at room temperature.

4.4.5

Sample blank. At the sampling point, open the sampling clamp with the impregnated filter paper, immediately remove the impregnated filter paper and put it into the solvent desorption bottle.

It is then transported, stored and measured with the sample. Not less than 2 sample blanks per batch.

4.5 Analysis steps

4.5.1

Sample treatment. Add 5.0 mL of desorbed solution to the solvent desorption bottle containing the impregnated filter paper, and ultrasonically elute for 10 min. Sample solution the needle filter is filtered for measurement.

4.5.2

Preparation of standard curve. Take 4 to 7 volumetric flasks and dilute the standard solution with desorbent solution to a concentration of 0.0 μ g/mL to 1000.0 μ g/mL.

Range of p-toluenesulfonic acid standard series; adjust the HPLC to the best measurement state according to the operating conditions of the instrument, and inject the sample 10.0 μ L, respectively, to determine the peak height or peak area of each concentration of the standard series. Measure the peak height or peak area to the corresponding concentration