

ICS 13.100
CCS C 60



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

GBZ/T 300.100-2018

Replacing GBZ/T 160.54-2007

**Determination of toxic substances in workplace air -- Part 100:
Furfural and dimethoxymethane
(English Translation)**

Issued on: July 16, 2018

Implemented on: July 1, 2019

Issued by: National Health and Family Planning Commission

Table of Contents

Foreword

1 Scope

2 Normative references

3 Basic information on furfural and dimethoxymethane

4 Solution absorption of furfural - aniline spectrophotometry

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

5.1 Principle

5.2 Instruments

5.3 Reagents

5.4 Sample collection, transportation and storage

5.5 Analysis steps

5.6 Calculation

5.7 Description

Foreword

This part is the 100th 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 part is divided into GBZ/T 160.54-2007 "Determination of aliphatic aldehydes in workplace air toxic substances", separately for this part, instead of the aniline spectrophotometric method of furfural in Chapter 7 of GBZ /160.54-2007, the following major modifications were made.

-- modified the standard name;

- Added solvent desorption-gas chromatography of dimethoxymethane;

- Increase the basic information of the object to be tested;

- Improved air sampling and expression of standard series concentrations;
- Added sample blank requirements and method performance indicators.

The main drafting unit and main drafters in this section.

-- Solution absorption of furfural - aniline spectrophotometry the main drafting unit. Shaanxi Provincial Center for Disease Control and Prevention.

Main drafters. Lu Qingsheng, Xu Fangli.

Solvent desorption-gas chromatography of dimethoxymethane Main drafting units. Longgang District Center for Disease Control and Prevention, Shenzhen, Guangdong Province, Guangdong Provincial Occupational Disease Prevention and Treatment Institute, Shenzhen City, Guangdong Province Prevention and Control Center, Sichuan Provincial Center for Disease Control and Prevention.

Main drafters. Liu Qu, Cai Zhibin, Zhang Ying, Liu Li, Li Shuiming, Wu Banghua, Chen Wei, Du Hongfeng.

The previous versions of the standards replaced by this section are.

--GBZ/T 160.54-2004;

--GBZ/T 160.54-2007 Chapter 7.

Determination of toxic substances in workplace air Part 100. Furfural and dimethoxymethane

1 Scope

This part of GBZ/T 300 specifies the solution absorption of furfural in the air of workplaces - aniline spectrophotometry and dimethoxymethane Solvent desorption-gas chromatography.

This section applies to the detection of concentrations of furfural and dimethoxymethane 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

3 Basic information on furfural and dimethoxymethane

The basic information of furfural and dimethoxymethane is shown in Table 1.

Table 1 Basic information of furfural and dimethoxymethane

Chemical material

Chemical Abstracts

(CAS number)

Molecular formula relative molecular mass Furfural (alpha-furfural, Furfural) 98-01-1
 C_4H_3OCHO 96.09 Dimethoxymethane (Methylal, Dimethoxymethane) 109-87-5 $CH_2(OCH_3)_2$ 76.10

4.1 Principle

Vapor state in the air and haze furfural are collected in a porous glass plate absorption tube containing oxalic acid-disodium hydrogen phosphate solution, in the presence of acetic acid, the red color was generated by the action of aniline, and the absorbance was measured by a spectrophotometer at a wavelength of 530 nm to carry out quantitative analysis.

4.2 Instrument

4.2.1

Porous glass plate absorber tube.

4.2.2

Air sampler, flow range from 0L/min to 1L/min.

4.2.3

with a colorimetric tube, 10mL.

4.2.4

Spectrophotometer with 1 cm cuvette.

4.3 Reagents

4.3.1

The experimental water is distilled water, and the reagent is analytically pure.

4.3.2

Absorbent solution (oxalic acid-disodium hydrogen phosphate solution). 25 g/L oxalic acid solution and 50 g/L disodium hydrogen phosphate solution are mixed in equal volume.

4.3.3

Color developer. Dilute 15.0 mL of aniline (new distillation) to 100.0 mL with glacial acetic acid.

4.3.4

Sodium chloride.

4.3.5

Standard solution. Add the absorption liquid to the volumetric flask. After weighing accurately, add a certain amount of redissolved furfural, and then weigh accurately.

Absorb the liquid to the scale, calculate the concentration of the solution from the difference between the two weighings, which is the standard stock solution. Dilute to 5.0 µg/mL with absorbent before use.

Furfural standard solution. Or formulated with a nationally recognized 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, use a porous glass plate absorption tube containing 10.0 mL of absorption liquid, and collect at a flow rate of 500 mL/min for ≥ 15 min.

Air sample. Immediately after sampling, the inlet and outlet of the absorption tube are closed and transported and stored in a clean container. The sample should be measured within 24 hours.

4.4.3

Sample blank. At the sampling point, open the inlet and outlet of the absorption tube of the porous glass plate containing 10.0 mL of absorption liquid, and immediately close it.

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. After washing the inner wall of the inlet pipe 3 times with the sample solution in the absorption tube, take 1.0 mL of the sample solution in a plug colorimetric tube.