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

GBZ/T 300.161-2018

**Determination of toxic substances in workplace air -- Part 161:
Tribromomethane**

工作场所空气有毒物质测定 第161部分：三溴甲烷

(English Translation)

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Foreword

This part is part 161 of GBZ/T 300 "Determination 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: Jiangsu Provincial Center for Disease Control and Prevention, Nanjing Center for Disease Control and Prevention, Jiangsu Province, Safety Production Science Research Institute, Nanjing Gulou District Center for Disease Control and Prevention.

1 Scope

This part of GBZ/T 300 specifies solvent desorption-gas chromatography for the determination of tribromomethane in the workplace air.

This section applies to the determination of the concentration of tribromomethane 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

3 Basic information on tribromomethane

See Table 1 for basic information on tribromomethane.

Table 1 Basic information of tribromomethane

Chemical material

Chemical Abstracts

(CAS number)

Molecular formula relative molecular mass Tribromomethane (Tribromomethane) 75-25-2
CHBr₃ 252.7

4.1 Principle

The tribromomethane in the air is collected by an activated carbon tube, and the carbon disulfide is desorbed and injected, separated by a chromatographic column, and the hydrogen flame ionization detector is inspected.

Measured, characterized by retention time, peak area or peak height.

4.2 Instrument

4.2.1

Activated carbon tube, solvent desorption type, containing 100 mg/50 mg activated carbon.

4.2.2

Air sampler, flow 0 mL/min ~ 500 mL/min.

4.2.3

Solvent desorption bottle, 2 mL.

4.2.4

Microinjector, 10 µL, 1 µL.

4.2.5

Gas chromatograph, hydrogen flame ionization detector.

Instrument operation reference conditions.

a) Column. 30 m x 0.32 mm x 0.25 µm, FFAP;

- b) Column temperature. initial temperature 60 °C, hold for 1 min, increase to 135 °C at 20 °C/min for 5 min;
- c) vaporization chamber temperature. 220 °C;
- d) detector temperature. 250 °C;
- e) no splitting;
- f) Carrier gas (nitrogen) flow. 3.0 mL/min.

4.3 Reagents

4.3.1

Tribromomethane. chromatographically pure.

4.3.2

Carbon disulfide, chromatographic identification without interference peaks.

4.3.3

Standard solution. Add a small amount of carbon disulfide in a 5 mL volumetric flask, weigh or measure a certain amount of tribromomethane (at 20 ° C, three the methyl bromide density of 2.89 g/mL was added to a volumetric flask, diluted with carbon disulfide to the mark; the concentration of this solution was calculated as a standard stock 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, open both ends of the activated carbon tube and collect 15 minutes of air sample at a flow rate of 200 mL/min.

4.4.3

Long-time sampling. At the sampling point, open both ends of the activated carbon tube and collect the air sample for 2h~8h at a flow rate of 50 mL/min.

4.4.4

Individual sampling. At the sampling point, open both ends of the activated carbon tube, and wear it on the upper part of the chest of the sampled object. The air inlet is as close as possible to the breathing.

Take a 2h~8h air sample at a flow rate of 50 mL/min.

4.4.5

Sample blank. Bring the activated carbon tube to the sampling point, except that the air sampler is not connected to the air sample, the rest of the operation is the same as the sample.

Not less than 2 sample blanks per batch.

4.4.6

Immediately after sampling, the ends of the activated carbon tube are closed and transported and stored in a clean container. The sample can be stored for 7 days at room temperature.

4.5 Analysis steps

4.5.1

Sample treatment. Pour the activated carbon from the front and back sections into the solvent desorption bottle, add 1.0 mL of carbon disulfide, and close.

After that, shake it from time to time and desorb for 30 min. Shake well and desorb the solution for measurement.

4.5.2

Preparation and determination of the standard series. Prepare at least 4 concentrations from 0 g/mL to 150 g/mL with dilute carbon disulfide standard solution.

The standard series of tribromomethane. Refer to the operating conditions of the instrument, adjust the gas chromatograph to the optimal measurement conditions, and inject 1.0 μL , respectively.

Standard series, repeated 3 times for each concentration. Draw a standard for the concentration of tribromomethane ($\mu\text{g/mL}$) based on the measured peak area or peak height mean Curve or calculate regression equations.

4.5.3

Sample determination. Determine the peak area or peak of the sample by measuring the sample and sample blank desorption solution using the operating conditions of the standard series.

After the high value, the concentration of tribromomethane ($\mu\text{g/mL}$) was obtained from a standard curve or a regression equation. If the concentration of tribromomethane in the desorbent exceeds the measurement range, it can be determined by diluting with carbon disulfide and multiplied by the dilution factor when calculating.