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

GBZ/T 300.162-2018

**Determination of toxic substances in workplace air -- Part 162:
Benzoquinone**

工作场所空气有毒物质测定 第162部分:苯醌

(English Translation)

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Foreword

This part is the 162th 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. Shandong Institute of Occupational Health and Occupational Disease Prevention and Control, China Center for Disease Control and Prevention, Occupational Health and Toxic Control Institute, Jiangsu Provincial Center for Disease Control and Prevention, Hebei Provincial Center for Disease Control and Prevention, Beijing Labor Protection Science Research Institute, Liaoning Province Center for Disease Control and Prevention, Jinan City Center for Disease Control and Prevention.

1 Scope

This part of GBZ/T 300 specifies solvent desorption-high performance liquid chromatography for the determination of phenylhydrazine in the workplace air.

This section applies to the determination of the concentration of vaporous phenylhydrazine 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 about benzoquinone

The basic information of benzoquinone is shown in Table 1.

Table 1 Basic information of benzoquinone

Chemical material

Chemical Abstracts

(CAS number)

Molecular formula relative molecular mass Benzoquinone 106-51-4 C₆H₄O₂ 108.10

4.1 Principle

The vapor phase of phenylhydrazine in the air is collected by a silicone tube, desorbed with 2,4-dinitrophenylhydrazine acetonitrile solution, and benzoquinone and 2,4-dinitrophenylhydrazine at room temperature.

It can react quickly to form pale yellow 2,4-dinitrophenylhydrazine, which is separated by high performance liquid chromatography C18 column and detected by UV detector.

Qualitative, peak height or peak area quantified.

4.2 Instrument

4.2.1

Silicone tube. solvent desorption type, containing.200mg/100mg silica gel.

4.2.2

Air sampler. flow rate 0mL/min ~ 1000mL/min.

4.2.3

Solvent desorption bottle. 5mL.

4.2.4

Microinjector. 10 μ L, 50 μ L.

4.2.5

Electronic balance. one in 100,000.

4.2.6

High performance liquid chromatography, UV detector.

Instrument operation reference conditions.

- a) Column. C18 column, 4.6 mm x 250 mm x 5 μ m;
- b) mobile phase. acetonitrile/water = 65/35 (volume ratio);
- c) detection wavelength. 390 nm;
- d) Flow rate. 1.0 mL/min;
- e) Injection volume. 20 μ L.

4.3 Reagent materials

4.3.1

The test water is double distilled water.

4.3.2

Acetonitrile (chromatographically pure), chromatographic identification of interference-free peaks.

4.3.3 2,4-Dinitrophenylhydrazine (liquid chromatography pure).

4.3.4

Phosphoric acid, 85% (volume fraction), analytically pure.

4.3.5

p-benzoquinone (chromatographically pure), >99.5%.

4.3.6

Desorbed solution. Take 0.10g of 2,4-dinitrophenylhydrazine, 85% (by volume) of phosphoric acid 0.5mL into a 100mL volumetric flask, add acetonitrile Mix to the scale.

4.3.7

Benzoquinone standard solution. Accurately weigh 0.1000g of phenylhydrazine into a 10mL volumetric flask, add acetonitrile to the scale, this liquid is the standard stock solution, the concentration was 10.0 mg/mL, and it was allowed to stand for 3 months in a refrigerator (4 ° C). Dilute to 100.0 μ g/mL standard solution with acetonitrile before use. 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 silicone tube and collect the air sample for 15 minutes at a flow rate of 200 mL/min.

4.4.3

Long-time sampling. At the sampling point, open both ends of the silicone tube and collect the air sample for 1h~4h at a flow rate of 50mL/min.

4.4.4

Individual sampling. Open both ends of the silicone tube at the sampling point, and wear it on the upper part of the chest of the monitoring object, as close as possible to the breathing zone.

The air sample was collected for 1 h to 4 h at a flow rate of 50 mL/min.

4.4.5

Sample blank. Bring the silicone tube to the sampling point. Except for not collecting air, the other operations are the same as the blank control of the sample.

4.4.6

Immediately after sampling, the ends of the silicone tube are closed, transported and stored in a clean container, and stored at room temperature for 14 days.

4.5 Analysis steps

4.5.1

Sample processing. Pour the front and back sections of the sampled silicone tube into the sample desorption bottle, add 2.0 mL of desorbing solution, and after blocking, vibrate. After shaking for 1 min, the reaction was allowed to stand at room temperature for 2 h.

4.5.2

Standard curve drawing. Dilute the benzoquinone standard solution with a desorption solution to a concentration range of 0.0-25.0 µg/mL. After blocking, shake for 1 min.

The reaction was allowed to stand at room temperature for 2 hours. Adjust the HPLC to the best measurement state according to the operating conditions of the instrument, and inject 20 µL.