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

GBZ/T 317.1-2018

Replacing WS/T 34-1996

**Determination of cadmium in blood -- Part 1: Graphite furnace
atomic absorption spectrometry method**

血中镉的测定 第1部分：石墨炉原子吸收光谱法

(English Translation)

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Foreword

This standard is formulated in accordance with the Law of the People's Republic GBZ/T 317 "Determination of Cadmium in Blood" is divided into two parts.

-- Part 1. Graphite furnace atomic absorption spectrometry.

-- Part 2. Inductively coupled plasma mass spectrometry.

This part is the first part of GBZ/T 317.

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

This section replaces WS/T 34-1996 "Method for the determination of cadmium in blood by graphite furnace atomic absorption spectrometry".

The main changes compared to WS/T 34-1996 are as follows.

-- Improved standard formulation and sample handling methods.

This section is mainly drafted by. China Center for Disease Control and Prevention, Occupational Health and Poison Control Institute, Guangdong Provincial Occupational

Disease Prevention and Treatment Institute, Jiangsu Provincial Center for Disease Control and Prevention, Shandong Institute of Occupational Health and Occupational Diseases.

1 Scope

This part of GBZ/T 317 specifies graphite furnace atomic absorption spectrometry for the determination of cadmium in blood.

This section applies to the determination of cadmium and its compounds in the blood of occupational contacts.

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/T 295 General rules for occupational health biological monitoring

3 Principle

Blood samples (hereinafter referred to as blood samples) were extracted with a nitric acid solution and determined by graphite furnace atomic absorption spectrometry at a wavelength of 228.8 nm.

The concentration of cadmium.

4 Instruments

4.1

Blood collection supplies. disposable blood collection needle, sterile cotton swab, lithium heparin (sodium) vacuum blood collection tube, etc.

4.2

Volumetric flask. 5mL.

4.3

stoppered polyethylene centrifuge tube. 1.5mL.

4.4

Vortex mixer.

4.5

Centrifuge. The speed is greater than 10000r/min.

4.6

Micropipette. The range is 20 μ L~200 μ L and 100 μ L~1000 μ L.

4.7

Atomic Absorption Spectrometer. with graphite furnace, cadmium hollow cathode lamp and background correction device. Refer to Table 1 for instrument operation reference conditions.

Table 1 Instrument operation reference conditions

step

temperature

Heating time

Residence time

Carrier gas flow

mL/min

Drying 110 5 10 250

Drying 130 10 20 250 Ashing 500 20 30 250 Atomic 1800 0 3 0 Clear 2300 1 5 250 Note.

The above conditions are provided for the convenience of standard users. If the conditions are changed, the same effect should be achieved.

5 Reagent

5.1

Deionized water, medical alcohol.

5.2

Nitric acid, excellent grade pure, $\rho_{20}=1.42\text{g/mL}$.

5.3

Nitric acid solution, 0.2% (volume fraction).

5.4

Nitric acid solution, 1% (volume fraction).

5.5

Nitric acid solution, 5% (volume fraction).

5.6

Heparin anticoagulated bovine blood, stored at -20 ° C, shake to room temperature when used. Heparin anticoagulated sheep blood can also be used. Background cadmium content should be Less than 0.2 µg/L.

5.7

Standard solution. Nationally approved cadmium monolith standard solution.

6 Sample collection, transportation and storage

6.1

Environmental conditions. The blood collection site should be clean and tidy, and there is no source of cadmium pollution.

6.2

Personnel requirements. After rigorous training and familiarity with the blood collection process, wear powder-free latex gloves.

6.3

Sample collection. Sample collection is performed according to GBZ/T 295. Clean blood with 0.2% nitric acid solution, deionized water and medical alcohol for the skin of the site, the blood sample should be collected more than 2 mL, and shake immediately to prevent clot formation in the blood. Collect duplicate samples if necessary, One copy as a backup sample.

6.4

Sample blank. randomly take 2 parts of the blood collection container with the same batch number as the sample collection, and use the same batch of blood collection needle to extract 2.0 mL of deionized water.

In the blood collection tube, it is used as a sample blank.

6.5

Sample transportation. Store the collected samples and sample blanks in a clean container for refrigerated transport.

6.6

Sample storage. The sample can be stored for half a year at -20 °C.

7.1 Preparation of blood cadmium working curve series

The cadmium monolith standard solution was diluted to 1.0 µg/mL cadmium standard application solution with 1% nitric acid solution, and then the concentration was 0.0 µg/L, 25.0.