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CCS C 60



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

GBZ/T 307.1-2018

Replacing WS/T 32-1996

**Determination of cadmium in urine -- Part 1: Graphite furnace
atomic absorption spectrometric method**

尿中镉的测定 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 307 "Determination of cadmium in urine" 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 307.

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

This section replaces WS/T 32-1996 "Method for the determination of cadmium in urine by graphite furnace atomic absorption spectrometry".

Compared with WS/T 32-1996, the main changes are as follows.

- The use of new matrix modifiers;
- 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 307 specifies a graphite furnace atomic absorption method for the determination of cadmium in urine.

This section applies to the determination of cadmium in urine 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.

General rules for biological monitoring of GBZ/T 295 occupational population

3 Principle

A urine sample (hereinafter referred to as a urine sample) is diluted with a mixed solution of palladium chloride and nitric acid (ie, a matrix modifier) at a wavelength of 228.8 nm.

Next, the concentration of cadmium was determined by graphite furnace atomic absorption spectrometry.

4 Instruments

4.1

Covered polyethylene plastic bottle. 100 mL.

4.2

Volumetric flask. 10 mL.

4.3

stoppered polyethylene centrifuge tube. 1.5 mL.

4.4

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

4.5

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 Atomization 1600 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.

5.2

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

5.3

Matrix modifier. Weigh 0.20 g of palladium chloride, add slightly heat to 10.0 mL of nitric acid, shake well, and dilute to 500 mL with water. Storage Store in a brown reagent bottle and store it for 1 year in cold storage and protected from light.

5.4

Blank urine sample. normal human urine that does not touch cadmium, add nitric acid in a ratio of 100.1, and mix.

5.5

Standard solution. Use a nationally recognized standard solution.

6 Sample collection, transportation and storage

6.1

Collect 100 mL of urine sample in polyethylene plastic bottle, add nitric acid in a ratio of 100.1, mix well, and measure urinary muscle as soon as possible.

anhydride.

6.2

Sample blank. randomly take 2 parts of the urine collection container with the same batch number as the sample collection, and add water equivalent to the sample collection amount.

The product is blank and transported and stored at the same time as the sample.

6.3

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

6.4

Sample storage. Store at 4 °C for 2 months.

7.1 Preparation of urinary cadmium working curve solution series

Dilute the cadmium monolith standard solution to 100 µg/L urethane cadmium standard application solution with a blank urine sample, and then take 6 10 mL volumetric flasks.

No. 1 to 6. Add urinary cadmium standard application solution 0.0 mL, 0.2 mL, 0.5 mL, 0.8 mL, 1.0 mL, 1.5 mL, respectively.

The urine sample is fixed to the mark, which is formulated to a concentration of 0.0 µg/L, 2.0 µg/L, 5.0 µg/L, 8.0 µg/L, 10.0 µg/L, and 15.0 µg/L.

The urinary cadmium working curve solution series.

7.2 Treatment of urinary cadmium working curve solution series, sample and sample blank

7.2.1

Urinary cadmium working curve solution series treatment. Take 0.20 mL of each concentration of urinary cadmium standard solution in a stoppered polyethylene centrifuge tube, each Add 0.80 mL of matrix modifier to the tube, cover the lid, and mix for measurement.

7.2.2

Sample and sample blank pretreatment. The sample dilution factor is consistent with the dilution factor of the working curve. Refrigerated urine samples and sample blanks Remove and return to laboratory temperature. Shake well and mix well. Take 0.20 mL and place in a 1.5 mL stoppered polyethylene centrifuge tube.

The procedure is the same as the standard curve solution. At the same time, the reagent is blank.