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**INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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Replacing GB/T 7468-1987

**Water quality. Determination of total mercury. Cold atomic
absorption spectrophotometry
(English Translation)**

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Foreword

To protect the environment and protect the human body in order to implement the Environmental Protection Law of the People's Republic of China and the Law of the People's Republic of China on Water Pollution Prevention and Control this standard is formulated for the determination of health and normal mercury in water.

This standard specifies cold atomic absorption spectrophotometry for the determination of total mercury in surface water, groundwater, industrial wastewater and domestic sewage.

This standard is a revision of the "Measurement of total mercury in water by cold atomic absorption spectrophotometry" (GB 7468-87).

This standard was first published in 1987. The original standard drafting unit was Hunan Environmental Protection Monitoring Station. This is the first revision. Revision the main contents are as follows.

- Increased method detection limits;
- increased interference and elimination clauses;
- Added pretreatment method for microwave digestion;
- Added quality assurance and quality control provisions;
- Added provisions for waste disposal and precautions.

The national environmental protection standard "Water quality approved and issued by the former National Environmental Protection Agency on March 14, 1987 since the implementation of this standard.

Determination of total mercury by cold atomic absorption spectrophotometry (GB 7468-87) abolished.

Appendix A of this standard is an informative annex.

This standard was formulated by the Science and Technology Standards Department of the Ministry of Environmental Protection.

This standard is mainly drafted by. Dalian Environmental Monitoring Center.

This standard is verified by. Shenyang Environmental Monitoring Center Station, Anshan Environmental Monitoring Center Station, Fushun Environmental Monitoring Center Station, Dandong Municipal Environmental Monitoring Center Station, Changchun Environmental Monitoring Center Station and Harbin Environmental Monitoring Center Station.

This standard was approved by the Ministry of Environmental Protection on February 10, 2011.

This standard has been implemented since June 1, 2011.

This standard is explained by the Ministry of Environmental Protection.

Water quality - Determination of total mercury - Cold atomic absorption spectrophotometric method Warning. Potassium dichromate, mercury and their compounds are very toxic. Ventilation should be strengthened during operation. Operators should wear protective equipment to avoid contact.

Touch the skin and clothing.

1 Scope of application

This standard specifies the cold atomic absorption spectrophotometric method for the determination of total mercury in water.

This standard applies to the determination of total mercury in surface water, groundwater, industrial wastewater and domestic sewage. If the organic content is high, this standard this standard does not apply when the maximum amount of digesting reagent is insufficient to oxidize the organic matter in the sample.

Using potassium permanganate-potassium persulfate digestion method and potassium bromate-potassium bromide digestion method, when the sampling amount is 100 ml, the detection limit is 0.02 µg/L.

The lower limit of determination is 0.08 µg/L; when the sample volume is 200 ml, the detection limit is 0.01 µg/L, and the lower limit of determination is 0.04 µg/L. Microwave elimination Solution, when the sample volume is 25 ml, the detection limit is 0.06 µg/L, and the lower limit of determination is 0.24 µg/L.

2 Terms and definitions

The following terms and definitions apply to this standard.

Total mercury total mercury Refers to mercury measured after digestion of unfiltered samples, including inorganic and organic mercury.

3 Principle of the method

Digestion of the sample with potassium permanganate and potassium persulfate in a sulfuric acid-nitric acid medium under heating; or with potassium bromate-potassium bromide mixture the sample is digested in a sulfuric acid medium; or the sample is digested with a microwave digestion apparatus in a nitric acid-hydrochloric acid medium.

All the mercury contained in the digested sample is converted into divalent mercury, and the excess oxidant is reduced with hydroxylamine hydrochloride, and then the divalent value is determined by stannous chloride.

Mercury is reduced to metallic mercury. The metal mercury is vaporized by introducing air or nitrogen at room temperature and loaded into a cold atomic absorption mercury analyzer at 253.7 nm.

The strength is measured in response, and the mercury content is proportional to the response.

4 Interference and elimination

4.1

Digestion of the sample by potassium permanganate-potassium persulfate digestion method. In the 0.5 mol/L hydrochloric acid medium, the ions in the sample exceed the following masses.

At the concentration, ie, Cu²⁺ 500 mg/L, Ni²⁺ 500 mg/L, Ag 1 mg/L, Bi³⁺ 0.5 mg/L, Sb³⁺ 0.5 mg/L, Se⁴⁺ 0.05 mg/L, As⁵⁺ 0.5 mg/L, I⁻ 0.1 mg/L, interfered with the assay. The interference of these ions can be eliminated by appropriately diluting the sample with water (5.1).

4.2

Digestion of the sample by potassium bromate-potassium bromide method. When the mass concentration of the detergent is greater than or equal to 0.1 mg/L, the recovery rate of mercury is less than 67.7%.

5 Reagents and materials

Unless otherwise stated, analytically pure reagents that meet national standards were used for the analysis, and the experimental water was mercury-free water.

5.1

Mercury-free water. generally use double-distilled water or deionized water, or acidify to pH=3 with hydrochloric acid (5.4), and then pass through the sulfhydryl group.

Cotton fiber tube (5.11.1) ordinary distilled water after mercury removal.

5.2

Potassium dichromate (K₂Cr₂O₇). excellent grade pure.

5.3

concentrated sulfuric acid. ρ (H₂SO₄) = 1.84 g/ml, excellent grade pure.

5.4

Concentrated hydrochloric acid. ρ (HCl) = 1.19 g/ml, excellent grade pure.

5.5

concentrated nitric acid. ρ (HNO₃) = 1.42 g/ml, excellent grade pure.

5.6

Nitric acid solution. 1 1.

Measure 100 ml of concentrated nitric acid (5.5) and slowly pour into 100 ml of water (5.1).