

ICS 13.060
CCS Z 16

HJ

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

HJ 748-2015

**Water quality. Determination of Thallium. Graphite furnace
absorption Aectrophotometric method**

水质 铊的测定 石墨炉原子吸收分光光度法

(English Translation)

Issued on: June 4, 2015

Implemented on: August 1, 2015

Issued by: Ministry of Ecology and Environment

Table of Contents

Preface

1 Scope of application

2 Normative reference document

Principle of Method

4 Interference and elimination

5 Reagents and materials

6 Instruments and equipment

7 Samples

8 Analysis Step

Foreword

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 the Prevention and Control of Water Pollution, the protection of the environment and the protection of the human body Safety and health, regulate the determination of thallium in water, the development of this standard.

This standard specifies the thallium in water graphite furnace atomic absorption spectrophotometry.

This standard is the first release.

This standard is organized by the Ministry of Environmental Protection Science and Technology Standards Division.

The main drafting unit of this standard. Shanghai Environmental Monitoring Center.

The standard verification unit. the East China Sea Environmental Monitoring Center, Shanghai Metrology and Testing Technology Research Institute, Shanghai Xuhui District Environmental Monitoring Station, on Pudong New Area Environmental Monitoring Station, Shanghai Environmental Science Research Institute, Shanghai Textile Energy Conservation and Environmental Protection Center.

The Environmental Protection Department of this standard approves on June 23, 2015.

This standard is implemented from August 1, 2015.

This standard is explained by the Ministry of Environmental Protection.

Determination of thallium in water - Graphite furnace atomic absorption spectrophotometric method Warning thallium and thallium salts are highly toxic, thallium oxide and chloride have a certain volatility, the entire experimental process must be carried out in the fume hood.

1 Scope of application

This standard specifies the determination of soluble thallium and total thallium in water by graphite furnace atomic absorption spectrophotometry.

This standard is applicable to the determination of thallium in surface water, groundwater, domestic sewage and industrial waste water.

When the sample enrichment method was 50 times, the detection limit was 0.03 µg/L and the lower limit was 0.14 µg/L.

When the direct determination, the detection limit of 0.83 µg/L, the determination of the lower limit of 3.3 µg/L.

2 Normative reference documents

The contents of this standard refer to the following documents or their terms. For undated references, the valid version applies to this standard.

Technical specification for surface water and wastewater monitoring Technical specification for groundwater monitoring of HJ/T 164 HJ 677 water quality of the total amount of metal digestion nitric acid digestion method Microwave digestion method for digestion of total water quality of HJ 678

3 Principle of the method

Precipitation enrichment method. in acidic conditions, with bromine as oxidant, the water thallium was trivalent state, with ammonia to adjust the pH, so that thallium in alkaline Conditions, and iron solution produced coprecipitation. Centrifugal separation of precipitation, and then dissolved in nitric acid solution precipitation, the treated sample into the graphite furnace atom in the vibrator, the thallium ions are atomized at high temperature in the graphite tube, and the characteristic lines of the thallium atoms in the ground state are selectively absorbed at 276.8 nm. The absorbance values Thallium concentration is proportional to.

Direct method. the digestion of the pretreatment of the sample into the graphite furnace atomizer, the thallium ion in the graphite tube high temperature atomization, the ground state thallium atoms the absorbance of 276.8 nm characteristic lines is selectively absorbed, and the absorbance is proportional to the concentration of thallium.

4 Interference and elimination

Chloride ion on the thallium negative interference, plus ammonium nitrate can effectively eliminate the concentration of less than 1.2 g/L of chloride ion interference. Sample storage, preparation and the preparation of standard solutions should avoid the use of hydrochloric acid.

5 Reagents and materials

Unless otherwise stated, analytical reagents conforming to national standards are used in the analysis, and the test water is freshly prepared deionized or distilled water.

25.1 concentrated nitric acid. ρ (HNO_3) = 1.42 g/ml, excellent grade pure.

5.2

Nitric acid solution. 1 99.

5.3

Nitric acid solution. 1 1.

5.4

bromine water (Br_2).

5.5

iron solution (Fe). ρ = 4 mg/ml.

Weigh 14.28 g of ferric sulfate [$\text{Fe}_2 (\text{SO}_4)_3$] in 1000 ml of water.

5.6

Ammonia ($\text{NH}_3 - \text{H}_2\text{O}$). ω = 28%, ρ = 0.907 g/ml (20 ° C).

5.7

Ammonia ($\text{NH}_3 - \text{H}_2\text{O}$) solution. 1 9.

5.8

Mixed solution of palladium nitrate [$\text{Pd} (\text{NO}_3)_2$] (0.3%)/magnesium nitrate [$\text{Mg} (\text{NO}_3)_2$] (0.2%).

Weigh 0.3 g of palladium nitrate, add 1 ml of concentrated nitric acid (5.1) dissolved. Weigh 0.2 g of magnesium nitrate dissolved in water. Mix the two solutions Water volume to 100 ml.

5.9

Ammonium nitrate (NH_4NO_3) solution. ω = 3%.

Weigh 3.0 g of ammonium nitrate in 100 ml of water.

5.10

Thallium standard stock solution. $\rho(\text{TI}) = 1000 \text{ mg/L}$.

Accurately weighed 1.3 g (accurate to 0.1 mg) about 105 °C drying 1 hour thallium nitrate (TI NO_3 , excellent grade pure), add 50 ml Concentrated nitric acid (5.1), diluted with water to a volume of 1000 ml, shaken, stored in a polyethylene plastic bottle, or sold in a commercial Thallium standard solution. Standard stock solution can be stored for 12 months, commercially available thallium standard solution according to the manufacturer's storage time.

5.11

Thallium Standard Intermediate. $\rho(\text{TI}) = 50.0 \text{ mg/L}$.

Remove the 5.00 ml thallium standard stock solution (5.10) in a 100 ml volumetric flask and dilute it with a nitric acid solution (5.2) and shake it. thallium Standard intermediate can be stored for 6 months.

5.12

Thallium standard use of liquid. $\rho(\text{TI}) = 1.00 \text{ mg/L}$.

Remove 2.00 ml of thallium standard intermediate (5.11) in a 100 ml volumetric flask and dilute to the mark with nitric acid solution (5.2) and shake well. thallium Standard use of liquid can be stored for 6 months.

5.13

argon. purity not less than 99.99%.

6 Instruments and equipment

Unless otherwise stated, the use of the national standard A-class glass gauge is used for the analysis.

6.1

Graphite Furnace Atomic Absorption Spectrophotometer.

36.2 Thallium hollow cathode lamp.

6.3

Magnetic stirrer.

6.4

centrifuge, with 50-100 ml centrifuge tube, the maximum speed. 4000 rpm (r/min).

6.5

microwave digestion device or electric plate.