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

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**Water quality. Determination of total phosphorus. Flow injection
Analysis(FIA) and Ammonium molybdate spectrophotometry**

水质 总磷的测定 流动注射-钼酸铵分光光度法

(English Translation)

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Foreword

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, to protect the environment, this standard is formulated to ensure human health and standardize monitoring methods for total phosphorus in water.

This standard specifies a flow injection-ammonium molybdate spectrophotometric method for the determination of total phosphorus in water.

This standard is the first release.

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

This standard is mainly drafted by. Suzhou Environmental Monitoring Center Station and Changshu Environmental Monitoring Station.

This standard is verified by. Beijing Environmental Protection Monitoring Center, Nantong Environmental Monitoring Center Station, Jiangsu Marine Fisheries Institute, Suzhou Water Supply Company Water Quality Testing Center, Nanchang Environmental Monitoring Station and Changshu Environmental Monitoring Station.

This standard was approved by the Ministry of Environmental Protection on October 25, 2014.

This standard has been implemented since January 1, 2014.

This standard is explained by the Ministry of Environmental Protection.

Water quality - Determination of total phosphorus - Flow injection - Ammonium molybdate spectrophotometric method

1 Scope of application

This standard specifies a flow injection-ammonium molybdate spectrophotometric method for the determination of total phosphorus in water.

This standard applies to the determination of total phosphorus in surface water, groundwater, domestic sewage and industrial wastewater.

When the detection cell optical path is 10mm, the detection limit of this method is 0.005mg/L (in P), and the measurement range is 0.020 mg/L.

~1.00mg/L.

2 Normative references

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

GB 11893 Determination of total phosphorus in water - Ammonium molybdate spectrophotometric method HJ/T 91 Surface Water and Wastewater Monitoring Technical Specifications HJ/T 164 Technical Specifications for Groundwater Environmental Monitoring

3.1 Working principle of flow injection analyzer

In a closed pipeline, a volume of sample is injected into a continuous flow of carrier liquid, and the sample and reagent are in a chemical reaction module.

Mix and react in a specific order and ratio, and enter the flow detection cell for photometric detection under incomplete reaction conditions.

3.2 Principles of chemical reactions

Under acidic conditions, various forms of phosphorus in the sample are hydrolyzed by high temperature and high pressure at 125 ° C, and then mixed with potassium persulfate solution.

UV digestion, all of which is oxidized to orthophosphate. Under the catalysis of cerium salt, orthophosphate reacts with ammonium molybdate to form heteropolyphosphate acid. The compound was reduced by ascorbic acid to form a blue complex, and the absorbance was measured at a wavelength of 880 nm.

Refer to the work flow chart, as shown in Figure 1.

1-peristaltic pump 2 - heating tank (125 ° C) 3-UV digestion device (UV254nm) 4-excluding

bubbles 5-injection valve 6-reaction (mixing) ring 7-detection cell 10mm 880nm S-sample
 R1-sulfuric acid solution I (5.13) R2-potassium persulfate digestion solution (5.15)
 R3-developer (5.18) R4-reducing agent (5.19) C-sulfuric acid carrier liquid (5.20) W-waste
 liquid Fig.1 Flow chart of flow injection-ammonium molybdate spectrophotometric
 determination of total phosphorus

4 Interference and elimination

4.1

The arsenic, chromium and sulfur in the sample interfere with the determination of total phosphorus. For the specific elimination method, see GB 11893.

4.2

The turbidity or chromaticity interference of the sample can be corrected by the compensation measurement. Specific elimination method. using chroma-turbidity compensation solution (5.28) Replace the molybdate developer (5.18), analyze the sample, and measure the correction value. Sample measurement minus subtraction Value, the corrected measurement is obtained.

4.3

When the pH of the sample is 10, it will cause positive interference to the measurement. Therefore, when the sample pH 10, it should be before analysis the pH of the sample was adjusted to neutral.

5 Reagents and materials

Unless otherwise stated, analytically pure reagents that meet national standards were used for the analysis. Experimental water is freshly prepared and conductance Deionized water having a rate of less than 0.5 $\mu\text{S}/\text{cm}$ (25 ° C). In addition to the standard solution, other solutions and experimental water are used with helium (5.30) or ultrasonic (6.3) degassing.

5.1

Sulfuric acid. $\rho(\text{H}_2\text{SO}_4) = 1.84 \text{ g/ml}$.

5.2

Potassium persulfate ($\text{K}_2\text{S}_2\text{O}_8$).

5.3

Ammonium molybdate $[(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4\text{H}_2\text{O}]$.

5.4

Potassium bismuth tartrate $[\text{K}(\text{SbO})\text{C}_4\text{H}_4\text{O}_6 \cdot 1/2\text{H}_2\text{O}]$.