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

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**Water quality. Determination of phosphorus.
Phosphomolybdenum blue spectrophotometric method**

水质 单质磷的测定 磷钼蓝分光光度法

(English Translation)

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Foreword

In order to implement the "Environmental Protection Law of the People's Republic of China" and the "Water Pollution Prevention and Control Law of the People's Republic of China" the body health, standardize the determination method of elemental phosphorus in water, and develop this standard.

This standard specifies the phosphorus molybdenum blue spectrophotometric method for the determination of elemental phosphorus in water.

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

This standard is mainly drafted by. Beijing Environmental Protection Monitoring Center.

This standard was approved by the Ministry of Environmental Protection on October 21, 2010.

This standard has been implemented since January 1, 2011.

This standard is explained by the Ministry of Environmental Protection.

1 Water quality - Determination of phosphorus - Molybdenum blue spectrophotometric method

Warning. Toluene is toxic, perchloric acid, potassium bromate-potassium bromide solution is corrosive, and the mixture of perchloric acid and organic matter may explode when heated.

Operation must be carried out in a fume hood, the operator must be careful

1 Scope of application this standard specifies the phosphorus molybdenum blue spectrophotometric method for the determination of elemental phosphorus in water.

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

When the sampling volume is 100ml, the detection limit of the direct colorimetric method is 0.003mg/L, and the lower limit of determination is 0.010 mg/L.

The upper limit of the measurement was 0.170 mg/L.

2 Normative references

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

Used in this standard.

GB/T 6682 Analytical laboratory water specifications and test methods

3 Principle of the method

The toluene is used as an extractant to extract elemental phosphorus from the water sample. The extract is oxidized into elemental phosphorus by potassium bromate-potassium bromide solution.

Orthophosphate, under acidic conditions, the phosphomolybdate heteropoly acid formed by the reaction of orthophosphate with ammonium molybdate is reduced by the reducing agent stannous chloride to a blue complex, the absorbance is proportional to the content of elemental phosphorus, and the absorbance is measured by a spectrophotometer to calculate the elemental phosphorus.

The content.

When the content of elemental phosphorus in water is less than 0.05mg/L, the coloration determination after enrichment with butyl acetate can reduce the dryness.

Disturbance, improve sensitivity and reliability of detection.

4 Interference and elimination

When the amount of arsenide, silicide and sulfide in the water sample is 100 times, 200 times and 300 times of the elemental phosphorus content, respectively, There is no significant interference with this method.

5 Reagents and materials

Unless otherwise stated, analytically pure reagents that meet national standards were used for the analysis. The test water is in accordance with GB/T 6682.

Three levels.

5.1

Toluene. ρ (C_7H_8) = 0.867 g/ml, excellent grade pure.

5.2

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

25.3 Perchloric acid. ρ ($HClO_4$) = 1.67g/ml, excellent grade pure.

5.4

Ascorbic acid ($C_6H_8O_6$), excellent grade.

5.5

Glycerol. ρ ($C_3H_8O_3$) = 1.26g/ml, excellent grade pure.

5.6

Anhydrous ethanol. ρ (CH_3CH_2OH) = 0.789 g/ml, excellent grade pure.

5.7

butyl acetate. ρ ($C_8H_{16}O_2$) = 0.776 g/ml, excellent grade pure.

5.8

Potassium dihydrogen phosphate (KH_2PO_4). excellent grade pure.

5.9

Nitric acid solution. 1 5.

5.10

Sulfuric acid solution. 1 1.

5.11

Sodium hydroxide solution. ω (NaOH) = 20%.

20.0 g of sodium hydroxide was weighed and dissolved in 100 ml of water.

5.12

Potassium bromate-potassium bromide solution.

10 g of potassium bromate (KBrO_3) and 8 g of potassium bromide (KBr) were weighed and dissolved in 400 ml of water.

5.13

Ammonium molybdate solution I. $\omega[(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4\text{H}_2\text{O}] = 2.5\%$.

2.5 g of ammonium molybdate was weighed, and 70 ml of a 1.1 sulfuric acid solution (5.10) was added. After the ammonium molybdate was dissolved, it was diluted with water to 100 ml.

5.14

Ammonium molybdate solution II. $\omega[(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4\text{H}_2\text{O}] = 5\%$.

Weigh 12.5g of ammonium molybdate, dissolve it in 150ml of water, stir constantly, add it slowly to 100ml (1.5) Acid solution (5.9).

5.15

Stannous chloride solution. $\omega(\text{SnCl}_2) = 1\%$.

Weigh 1g of stannous chloride, dissolve it in 15ml of hydrochloric acid (5.2), add 50ml of water, and weigh 1.5g of ascorbic acid.

(5.4), dissolved in the above solution, diluted with water to 100ml, stored in a brown bottle, can be stored in the refrigerator for 4 to 5 days.

5.16

Stannous chloride glycerol solution. $\omega(\text{SnCl}_2) = 2.5\%$.

2.5 g of stannous chloride was weighed and dissolved in 100 ml of glycerol (5.5). This solution can be heated in a water bath to promote dissolution solution.

5.17

Potassium dihydrogen phosphate standard stock solution. $\rho(\text{P}) = 50.0 \mu\text{g/ml}$.

Accurately weigh 0.2197g potassium dihydrogen phosphate (5.8) (previously dried in an electric oven at $105^\circ\text{C} \sim 110^\circ\text{C}$ for 2 h to constant weight), Dissolve in water, transfer to a 1000 ml volumetric flask, dilute with water to the score line, and mix.

5.18

Potassium dihydrogen phosphate standard use solution. $\rho(\text{P}) = 2.00 \mu\text{g/ml}$.

For use, draw 10.00 ml of potassium dihydrogen phosphate standard stock solution (5.17) in a 250 ml volumetric flask and dilute with water until now.