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

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**Water quality. Determination of the total amount of the
developing agent and their oxides. Iodine-starch
spectrophotometry**

水质 显影剂及其氧化物总量的测定 碘-淀粉分光光度法

(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 developed for the monitoring of health and the total amount of developer and its oxides in wastewater.

This standard specifies the iodine-starch spectrophotometric method for determining the total amount of developer and its oxide in wastewater.

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 was drafted. 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.

Water quality - Determination of total oxidizers and their oxides - iodine-starch spectrophotometric method

1 Scope of application

This standard specifies the iodine-starch spectrophotometric method for determining the total amount of developer and its oxide in wastewater.

This standard applies to the determination of the total amount of developer and its oxides in waste water discharged from color and black-and-white sheets.

When using a 20 mm cuvette with a sample volume of 20.0 ml, the minimum detection limit is 1×10^{-6} mol/L, which is equivalent to hydroquinone.

0.11 mg/L; the lower limit of determination is 4×10^{-6} mol/L, which is equivalent to 0.44 mg/L of hydroquinone; the upper limit of determination is 2.50×10^{-5} mol/L, which is equivalent.

In the case of hydroquinone 2.75 mg/L.

2 Normative references

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

GB/T 6682 Analytical laboratory water specifications and test methods

3 Terms and definitions

The following terms and definitions apply to this standard.

Developer. A drug that causes a latent image produced by exposure of a photosensitive material to appear as a visible image. Commonly used black and white developer Phenol sulfate (Mitol), hydroquinone (hydroquinone), etc.; commonly used color developers are p-aminodiethylaniline hydrochloride (TSS), 2-ammonia Benz-5-diethylaminotoluene hydrochloride (CD-2), 4-amino-N-ethyl-N-(beta-methanesulfonamideethyl) m-toluidine sulfate (CD-3) and 4-amino-N-ethyl-N (beta-hydroxyethyl) m-toluidine sulfate (CD-4), etc., the structural formula is shown in Appendix A.

4 Principle of the method

Most commonly used developers have the chemical structure of hydroquinone, para-aminophenol or p-phenylenediamine, which can be produced by oxidative hydrolysis.

Paired benzoquinone. Using bromine as an oxidant, the developer is oxidized to a quinone

compound. In an acidic medium, hydrazine is a strong oxygen.

The agent, with the action of potassium iodide, precipitates elemental iodine. The iodine reacts with starch and turns blue. It has maximum absorption at 570 nm, and its absorbance and the concentration of the developer substance is in accordance with Lambert-Beier's law, and the result is expressed in hydroquinone (mg/L) (other main developers may also be present) Said).

In the case of Mitur, the chemical reaction of oxidation to hydrazine is.

NHCH_3

$\text{H}_2\text{O Br}_2$

$\text{CH}_3\text{NH}_2 \text{ 2H}$

2Br^-

5 Interference and elimination

Fe_3 and Cu_2 below 20 μg do not interfere with the method. Cr_6 has a large interference with this method. When the water sample contains Cr_6 , it affects the measurement.

Timing, you can use NaNO_2 to reduce Cr_6 to Cr_3 , and use excess urea to remove excess NaNO_2 to interfere with this experiment.

In addition to the purpose of chromium ion interference.

6 Reagents and materials

Unless otherwise stated, analytically pure reagents that meet national standards were used for the analysis. The experimental water is in accordance with GB/T 6682, Level 3.

6.1

Phosphoric acid solution. 1 1.

6.2

Hydrochloric acid (HCl). $\rho = 1.19 \text{ g/ml}$, excellent grade pure.

6.3

Hydrochloric acid solution. $c(\text{HCl}) = 6 \text{ mol/L}$.

6.4

Potassium bromate-potassium bromide solution. $c(1/6\text{KBrO}_3\text{-KBr}) = 0.1 \text{ mol/L}$.

Weigh 2.8 g potassium bromate and 4.0 g potassium bromide dissolved in water, dissolve and transfer to a 1 000 ml volumetric flask, dilute with water to the mark, store in a brown reagent bottle.

6.5

Saturated sodium chloride solution. $w(\text{NaCl}) = 40\%$.

Weigh 40 g of sodium chloride and dissolve in 100 ml of distilled water.

6.6

Potassium bromide solution. $w(\text{KBr}) = 20\%$.

Weigh 20 g of potassium bromide, dissolve in water, and dilute to 100 ml.

6.7

Phenol solution. $w(\text{C}_6\text{H}_6\text{O}) = 5\%$.

Weigh 5 g of colorless phenol, dissolve in water, dilute to 100 ml, and store in the refrigerator.

6.8

Potassium iodide solution. $w(\text{KI}) = 5\%$.

Weigh 5 g of potassium iodide, dissolve in water, dilute to 100 ml, store in a brown reagent bottle, use it immediately, and store in a dark place.

6.9

Starch solution. $w[(\text{C}_6\text{H}_{10}\text{O}_5)_n] = 0.2\%$.

Weigh 1 g of soluble starch, add a small amount of water and mix well, inject into boiling 500 ml of water, continue to boil for 5 min, cool, and then set the refrigerator. Save inside. Salicylic acid 0.2 g can be added in summer.

6.10

Sodium nitrite solution. $w(\text{NaNO}_2) = 10\%$.

Weigh 10 g of sodium nitrite, dissolve in water, and dilute to 100 ml.

6.11

Urea solution. $w[(\text{NH}_2)_2\text{CO}] = 20\%$.

Weigh 20 g of urea, dissolve in water, and dilute to 100 ml.

6.12

Standard stock solution. $c = 0.0100 \text{ mol/L}$.

Accurately weigh hydroquinone (molecular weight 110.11) 0.2760 g, if it is photographic grade Mitol (molecular weight 344.40) can be weighed 0.8610 g, photographic grade TSS (molecular weight 262.33) can be weighed 0.6560 g (or calculated according to the molecular weight and purity of the drug used) Dissolve in 25 ml of 6 mol/L hydrochloric acid solution (6.3), transfer to a 250 ml volumetric flask, dilute with water to the mark, and store