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

HJ 504-2009

Replacing GB/T 15437-1995

**Ambient air. Determination of ozone. Indigo disulphonate
spectrophotometry**

环境空气 臭氧的测定 靛蓝二磺酸钠分光光度法 含2018年第1号修改单
(English Translation)

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Foreword

To protect the environment and protect people 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 Air Pollution this standard is formulated for the health of the body and the monitoring method for the regulation of ozone in the ambient air.

This standard specifies the indigo disulphonate spectrophotometric method for the determination of ozone in ambient air.

This standard is a revision of the "Measurement of ambient air ozone by indigo disulfonate spectrophotometry" (GB/T 15437-1995).

This standard was first published in 1995. The original drafting unit was the Shenyang Environmental Monitoring Center Station. This is the first revision.

The main contents of this revision are as follows.

- Revised the scope of application of the standard, increasing the upper limit of measurement and the lower limit of measurement;
- modified the concentration of indigo disulphonate (IDS) absorption solution;
- Sampling two pairs of porous glass plate absorption tubes sampled into a single porous glass plate absorption tube sampling;
- Added "field blank" in the sampling section;
- Added "Precautions" clause;
- "Draw a working curve with a known mass concentration of ozone standard gas" from the standard text to the appendix.

Since the date of implementation of the standard, the national environmental protection standard "Environmental Empty" approved and issued by the former National Environmental Protection Agency on March 25, 1995 Determination of gas ozone Determination of indigo disulfonate spectrophotometry (GB/T 15437-1995).

Appendix A of this standard is a normative appendix.

This standard is revised by the Science and Technology Standards Department of the Ministry of Environmental Protection.

This standard is mainly drafted by. Shenyang Environmental Monitoring Center Station.

This standard was approved by the Ministry of Environmental Protection on October 20, 2009.

This standard has been implemented since December 1, 2009.

This standard is interpreted by the Ministry of Environmental Protection.

Determination of ambient air ozone - Indigo disulfonate spectrophotometry

1 Scope of application

This standard specifies the indigo disulphonate spectrophotometric method for the determination of ozone in ambient air.

This standard applies to the determination of ozone in ambient air. Relatively closed environment (such as indoors, cars, etc.) can also be used to determine ozone in the air.

According to this standard.

When the sampling volume is 30 L, the detection limit of ozone in this standard is 0.010 mg/m³, and the lower limit of determination is 0.040 mg/m³.

When the sample volume is 30 L and the mass concentration of the solution is 2.5 µg/ml or 5.0 µg/ml, the upper limit of determination is 0.50 mg/m³ or 1.00 mg/m³. When the mass concentration of ozone in the air exceeds the upper limit, the sampling volume can be appropriately reduced.

2 Principle of the method

The ozone in the air reacts with the blue indigo disulphonate in the presence of a phosphate buffer solution in an equimolar amount to decolorize to form ruthenium.

Sodium red disulfonate, the absorbance is measured at 610 nm, and the concentration of ozone in the air is quantified according to the degree of blue decrease.

3 Reagents and materials

Unless otherwise stated, the reagents used in this standard use analytical purification reagents that meet national standards, and experimental waters are newly prepared for removal.

Sub-water or distilled water.

3.1

Potassium bromate standard stock solution, $c(1/6 \text{ KBrO}_3) = 0.1000 \text{ mol/L}$. accurately weigh 1.3918 g potassium bromate (excellent grade, 180 °C baked 2 h), in a beaker, add a small amount of water to dissolve, transfer to a 500 ml volumetric flask, and dilute to the mark with water.

3.2

Potassium bromate-potassium bromide standard solution, $c(1/6 \text{ KBrO}_3) = 0.0100 \text{ mol/L}$. Pipette 10.00 ml Potassium bromate standard stock solution (3.1) in a 100 ml volumetric flask, add 1.0 g of potassium bromide (KBr) and dilute to the mark with water.

3.3

sodium thiosulfate standard stock solution, $c(\text{Na}_2\text{S}_2\text{O}_3) = 0.1000 \text{ mol/L}$.

3.4

sodium thiosulfate standard working solution, $c(\text{Na}_2\text{S}_2\text{O}_3) = 0.00500 \text{ mol/L}$. before use, take sodium thiosulfate standard stock solution (3.3) Dilute 20 times with water freshly boiled and cooled to room temperature.

3.5

sulfuric acid solution, 16.

3.6

Starch indicator solution, $\rho = 2.0 \text{ g/L}$. Weigh 0.20 g of soluble starch, make a paste with a small amount of water, slowly pour into 100 ml of boiling water, Boil until the solution is clear.

3.7

Phosphate buffer solution, $c(\text{KH}_2\text{PO}_4\text{-Na}_2\text{HPO}_4)=0.050 \text{ mol/L}$. Weigh 6.8 g potassium dihydrogen phosphate (KH_2PO_4), 7.1 g Disodium hydrogen phosphate (Na_2HPO_4), dissolved in water, diluted to 1 000 ml.

3.8

Indigo disulphonate ($\text{C}_{16}\text{H}_8\text{O}_8\text{Na}_2\text{S}_2$) (IDS for short), analytically pure, chemically pure or biochemical reagents.

3.9

IDS standard stock solution. Weigh 0.25 g of sodium indigo disulphonate (3.8) dissolved in water and transfer to a 500 ml brown volumetric flask.

Dilute to the mark, shake well, and store in the dark at room temperature for 24 h and then calibrate. This solution can be stored in the dark at 20°C for 2 weeks.

Calibration method. Accurately absorb 20.00 ml IDS standard stock solution (3.9) in 250 ml iodine flask, add 20.00 ml bromic acid Potassium-potassium bromide solution (3.2), add 50 ml of water, cover the stopper, and place in a $16^\circ \text{C} \pm 1^\circ \text{C}$ biochemical incubator (or water bath) to the solution when the temperature is balanced with the bath temperature [Note 1], add 5.0 ml of sulfuric acid solution (3.5), immediately cover, mix and start timing, dark at $16^\circ \text{C} \pm 1^\circ \text{C}$ After placing for $35 \text{ min} \pm 1.0 \text{ min}$, add 1.0 g of potassium iodide, immediately cover it, gently shake until dissolved, and place it in the dark for 5 min.

The sodium solution (3.4) is titrated until the brown color just fades to a pale yellow color. Add 5 ml of starch indicator solution (3.6) and continue titration to blue.

Retreat, the end point is bright yellow. Record the volume of sodium thiosulfate standard working solution (3.4) consumed [Note 2].

Note 1: The time to reach equilibrium is related to the temperature difference. You can replace the solution with the same volume of water in advance, add it to the iodine bottle, and put it into the thermometer to observe the balance.

The time required.

Note 2: The volume of sodium thiosulfate standard solution consumed by parallel titration should not be 0.10 ml larger.

The mass concentration of ρ ($\mu\text{g/ml}$) equivalent to ozone per milliliter of indigo disulphonate solution is calculated by formula (1).