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

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Replacing GB/T 15436-1995; GB/T 8969-1988

**Ambient air. Determination of nitrogen oxides. N-(1-Naphthyl)
ethylene diamine dihydrochloride spectrophotometric method**

环境空气 氮氧化物(一氧化氮和二氧化氮)的测定 盐酸萘乙二胺分光光度法 含2018年第1号修改单

(English Translation)

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10 ml 50 ml

50 ml 10 ml

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 Atmospheric Pollution this standard is established for human health and the determination of nitrogen oxides in ambient air.

This standard specifies methods for determining nitrogen oxides (nitrogen monoxide and nitrogen dioxide) in ambient air.

This standard is for the determination of air quality nitrogen oxides, naphthylamine diamine colorimetric method (GB 8969-88) and ambient air.

The determination of nitrogen oxides was carried out by the Saltzman method (GB/T 15436-1995).

"Determination of Air Quality Nitrogen Oxide Determination of Naphthylethylenediamine Hydrochloride" (GB 8969-88) was first published in 1988.

The quasi-drafting unit is the Beijing Environmental Monitoring Center; the first is the Saltzman Method for the Determination of Nitrogen Oxides in the Ambient Air (GB/T 15436-1995) it was released in 1995, and the original standard drafting unit was the Shenyang Environmental Monitoring Center Station. This is the first revision.

The main revisions are as follows.

-- Revised the name and scope of the standard;

- Improve the textual content of the standard method principle;
- Defining the amount of potassium permanganate and barium hydroxide used in the preparation of experimental water;
- Increased interference and elimination clauses and sample retention terms;
- Refined the analysis steps and increased the blank test requirements;
- Eliminated the second book "Soxidation" in the Saltzman Method for the Determination of Nitrogen Oxides in Environmental Air (GB/T 15436-1995) Chromium-quartz sand oxidation method.

From the date of implementation of this standard, the national environmental protection standard "Air" approved and issued by the former National Environmental Protection Agency on March 26, 1988.

Determination of mass nitrogen oxides - Naphthylethylenediamine hydrochloride colorimetric method (GB 8969-88) and former National Environmental Protection Agency March 25, 1995 National Environmental Protection Standards for the Determination and Determination of Environmental Air Nitrogen Oxides by the National Standard for Environmental Protection (GB/T 15436-1995) Abolished.

Appendix A of this standard is a normative appendix, and Appendix B is an informative appendix.

This standard was formulated 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 September 27, 2009.

This standard has been implemented since November 1, 2009.

This standard is explained by the Ministry of Environmental Protection.

Determination of ambient air NO_x (nitrogen monoxide and nitrogen dioxide)
Naphthylethylenediamine hydrochloride spectrophotometry

1 Scope of application

This standard specifies the spectrophotometric method for the determination of nitrogen oxides in ambient air.

This standard applies to the determination of nitrogen oxides, nitrogen dioxide and nitrogen monoxide in ambient air.

The method detection limit of this standard is 0.12 µg/10 ml of absorption liquid. When the

total volume of the absorption liquid is 10 ml and the sampling volume is 24 L, it is empty.

The detection limit of nitrogen oxides in the gas is 0.005 mg/m³. When the total volume of the absorbent is 50 ml and the sampling volume is 288 L, the nitrogen oxides in the air the detection limit was 0.003 mg/m³. When the total volume of the absorbent is 10 ml and the sampling volume is 12 to 24 L, the nitrogen oxides in the ambient air the measurement range is from 0.020 to 2.5 mg/m³.

2.1 Nitrogen oxides

Refers to the oxide of nitrogen (as NO₂) in the form of nitrogen monoxide and nitrogen dioxide in the air.

2.2 Saltzman experimental coefficient Saltzman-factor

The mixed gas for calibration of nitrogen dioxide prepared by the osmosis method, and the azo dye formed by absorption by the absorption liquid during gas production is equivalent to nitrous oxide the ratio of the amount of acid to the total amount of nitrogen dioxide passing through the sampling system (see Appendix B for the determination method).

2.3 Oxidation coefficient

Nitric oxide in the air is oxidized to nitrogen dioxide by an acidic potassium permanganate solution and is absorbed by the absorption liquid to form an azo dye.

The ratio of the amount of material to the total amount of nitric oxide passing through the sampling system.

3 Principle of the method

Nitrogen dioxide in the air is absorbed by the absorption liquid in the first absorption bottle in series and reacts to form a pink azo dye. One in the air Nitric oxide does not react with the absorption liquid, and is oxidized to the nitrogen dioxide by the acidic potassium permanganate solution through the oxidation tube, and is connected in the second absorption bottle in series.

The absorption liquid absorbs and reacts to form a pink azo dye. The absorbance of the generated azo dye at a wavelength of 540 nm and the content of nitrogen dioxide the amount is proportional. The absorbances of the samples in the first and second absorption bottles were measured, and the nitrogen dioxide and nitrogen monoxide in the two absorption bottles were calculated.

The mass concentration, the sum of the two is the mass concentration of nitrogen oxides (in terms of NO₂).

4 Reagents and materials

Unless otherwise stated, analytically pure reagents and nitrite-free distilled water in accordance with national or professional standards are used for analysis.

Sub-water or water of considerable purity. If necessary, experimental water can be added to 0.5 g of potassium permanganate (KMnO₄) per liter of water in a full glass distiller.

And steamed with 0.5 g of barium hydroxide [Ba(OH)₂].

4.1

Glacial acetic acid.

4.2

Hydroxylamine hydrochloride solution, $\rho = 0.2 \sim 0.5 \text{ g/L}$.

4.3

sulfuric acid solution, $c(1/2\text{H}_2\text{SO}_4) = 1 \text{ mol/L}$. take 15 ml of concentrated sulfuric acid ($\rho_{20} = 1.84 \text{ g/ml}$), slowly added to 500 ml of water, stir Evenly, cool for later use.

4.4

Acidic potassium permanganate solution, $\rho(\text{KMnO}_4) = 25 \text{ g/L}$. Weigh 25g potassium permanganate in a 1 000 ml beaker and add 500 ml of water.

Slightly heat to dissolve all of them, then add 1 ml/L sulfuric acid solution (4.3) 500 ml, stir well, and store in a brown reagent bottle.

4.5

N-(1-Naphthyl)ethylenediamine hydrochloride stock solution, $\rho(\text{C}_{10}\text{H}_7\text{NH}(\text{CH}_2)_2\text{NH}_2 \cdot 2\text{HCl}) = 1.00 \text{ g/L}$. Weigh 0.50 g N-(1-naphthalene Ethyldiamine hydrochloride in a 500 ml volumetric flask, diluted with water to dilute to the mark. This solution is stored in a closed brown bottle in the refrigerator Refrigerated for stable storage for three months.

4.6

Coloring solution. Weigh 5.0 g of p-aminobenzenesulfonic acid [$\text{NH}_2\text{C}_6\text{H}_4\text{SO}_3\text{H}$] and dissolve it in about 200 ml of hot water of 40-50 °C to cool the solution.

At room temperature, transfer all into a 1 000 ml volumetric flask and add 50 ml of N-(1-naphthyl)ethylenediamine hydrochloride stock solution (4.5) and 50 ml.

Glacial acetic acid, diluted to the mark with water. This solution is stored in a closed brown bottle and stored in the dark at 25 °C for three months. If solution it is light red and should be discarded.