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

HJ 533-2009

Replacing GB/T 14668-1993

**Ambient air exhaust gas. Determination of ammonia.
Nesslerreagent spetcrophotometry**

环境空气和废气 氨的测定 纳氏试剂分光光度法

(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" Health, standard

ammonia monitoring methods, the development of this standard.

This standard specifies the Nessler's reagent spectrophotometric method for the determination of ammonia in ambient air and industrial waste gases.

This standard amends the "Air Quality Ammonia Determination of Nessler Colorimetric Method" (GB/T 14668-93).

This standard was first published in 1993, and the original standard drafting unit is the Shanghai Environmental Protection Monitoring Center. This is the first revision. this time the main contents of the revision are as follows.

-- Added warnings.

-- Increased sampling method and detection limit of 10 ml of absorbent volume.

-- Added quality assurance and quality control provisions, including. no ammonia water check, sampling full blank, reagent preparation and sampling Precautions, etc.

-- Combine the calculation formula of the result.

As of the date of implementation of this standard, the air quality ammonia test approved and issued by the former National Environmental Protection Agency on October 27, 1993 the Dina reagent colorimetric method (GB/T 14668-93) is abolished.

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 December 31, 2009.

This standard has been implemented since April 1, 2010.

This standard is explained by the Ministry of Environmental Protection.

Determination of ambient air and exhaust ammonia - Nessler reagent spectrophotometry
WARNING. Mercury dichloride (HgCl_2) and mercury iodide (HgI_2) are highly toxic substances and are protected from skin and oral contact.

1 Scope of application

This standard specifies the Nessler's reagent spectrophotometric method for the determination of ammonia in ambient air and industrial waste gases.

This standard is applicable to the determination of ammonia in ambient air, and is also applicable to the determination of ammonia in the exhaust gas of pharmaceutical, chemical, coking and other industrial industries.

The method detection limit of this standard is 0.5 µg/10 ml of absorption solution. When the volume of the absorbent is 50 ml and the gas is 10 L, the detection limit of ammonia is 0.25 mg/m³, the lower limit of determination is 1.0 mg/m³, and the upper limit of determination is 20 mg/m³. When the volume of the absorbent is 10 ml and the gas is 45 L, the ammonia the detection limit was 0.01 mg/m³, the lower limit of determination was 0.04 mg/m³, and the upper limit of determination was 0.88 mg/m³.

2 Principle of the method

Absorption of ammonia in the air with a dilute sulfuric acid solution, the resulting ammonium ions react with the Nessler reagent to form a yellow-brown complex, and the absorbance of the complex the degree is proportional to the ammonia content, the absorbance is measured at a wavelength of 420 nm, and the ammonia content in the air is calculated based on the absorbance.

3 Interference and elimination

Interference measurement when metal ions, sulfides, and organics such as ferric iron are contained in the sample can be eliminated by the following methods.

3.1 Metal ions such as trivalent iron

In the analysis, 0.50 ml of sodium potassium tartrate solution (4.6) was used to form a mask to eliminate the interference of metal ions such as ferric iron.

3.2 Sulfide

If the sample is disturbed by the occurrence of a heterochromatic color (such as green when the sulfide is present), dilute hydrochloric acid may be added to the sample solution to remove the dry matter.

Disturb.

3.3 Organics

Some organic substances (such as formaldehyde) produce precipitation interference measurement, and the absorption liquid can be used with 0.1 mol/L hydrochloric acid solution (4.7) before colorimetry.

Acidify to a pH not greater than 2 and then boil it.

4 Reagents and materials

Unless otherwise stated, the reagents used in the analysis were analyzed analytical reagents in accordance with national standards, and the experimental water was prepared

according to 4.1.

water.

4.1

No ammonia water, prepared in one of the following ways in an ammonia-free environment (see 10.1 for inspection without ammonia).

4.1.1 Ion exchange method

The distilled water was passed through a column of strongly acidic cation exchange resin (hydrogen type), and the effluent was collected in a ground glass bottle. Per liter of effluent Add 10 g of strong acid cation exchange resin (hydrogen type) for easy storage.

4.1.2 Distillation method

0.1 ml of sulfuric acid (4.2) was added to 1 000 ml of distilled water and redistilled in a full glass distiller. Discard the first 50 ml of distillate, then Approximately 800 ml of distillate was then collected in a ground glass vial. 10 g of strong acid cation exchange resin (hydrogen) per liter of distillate collected Type), in order to save.

4.1.3 Water Purifier Method

Prepared with a commercially available water purifier before use.

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

4.3 Hydrochloric acid, $\rho(\text{HCl}) = 1.18 \text{ g/ml}$.

4.4 Sulfuric acid absorption solution, $c(1/2\text{H}_2\text{SO}_4) = 0.01 \text{ mol/L}$.

2.8 ml of sulfuric acid (4.2) was added to the water and diluted to 1 L to obtain a 0.1 mol/L stock solution. Dilute 10 times with water when it is ready.

4.5 Nessler Reagent

Weigh 12 g of sodium hydroxide (NaOH) dissolved in 60 ml of water and cool;

Weigh 1.7 g of mercury dichloride (HgCl_2) dissolved in 30 ml of water;

Weigh 3.5 g of potassium iodide (KI) in 10 ml of water, and slowly add the above mercury dichloride solution to the potassium iodide solution while stirring.

Until the red precipitate formed is no longer dissolved;

Slowly add the sodium hydroxide solution cooled to room temperature to the above mixture of mercury dichloride and potassium iodide while stirring, and then add the remaining mercury dichloride solution was mixed and allowed to stand in the dark for 24 h. The supernatant was decanted, stored in a brown bottle, and stoppered with a rubber stopper, 2