

ICS 13.040.40  
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**HJ**

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

**HJ 548-2016**

Replacing HJ 548-2009

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**Stationary source emissions. Determination of hydrogen  
chloride. Silver nitrate titration**

固定污染源废气 氯化氢的测定 硝酸银容量法

**(English Translation)**

**Issued on: May 13, 2016**

**Implemented on: August 1, 2016**

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**Issued by: Ministry of Ecology and Environment**

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### 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, Protection of human health, regulate the fixed source of waste gas in the determination of hydrogen chloride, the development of this standard.

This standard specifies the silver nitrate volumetric method for the determination of hydrogen chloride in the waste of fixed sources.

This standard is the "fixed source of waste gas hydrogen chloride determination of silver nitrate capacity (temporary)" (HJ 548-2009) of the Revised.

This standard was first published in 2009, the original standard drafting unit for the Beijing Environmental Protection Monitoring Center. This time for the first time the main contents of the amendments and amendments are as follows.

- revised method of reagents and materials, instruments and equipment, sample collection and analysis steps.
- complements the interference and elimination and quality assurance and quality control parts.
- Increased precision, accuracy, result representation and waste disposal terms.

Since the implementation of the standard date, the original standard "fixed sources of waste gas hydrogen chloride determination of silver nitrate capacity (temporary)" (HJ 548-2009).

This standard is organized by the Ministry of Environmental Protection Science and Technology Standards Division.

The drafting of this standard. Beijing Environmental Protection Monitoring Center.

The standard verification unit. Beijing Physical and Chemical Analysis and Testing Center, Peking University Environmental Engineering Laboratory, Beijing Fangshan District Environmental Protection Monitoring Station, Beijing Haidian District Environmental Protection Bureau Monitoring Station, Jiangsu Province Environmental Monitoring Center,

Beijing Environmental Protection Monitoring center.

The environmental protection department of this standard approved on May 13, 2016.

This standard has been implemented since August 1, 2016.

This standard is explained by the Ministry of Environmental Protection.

Determination of hydrogen chloride in fixed sources - Silver nitrate volumetric method

WARNING. Hydrogen chloride is harmful to the human body. When sampling, wear protective equipment in a sampling environment to avoid inhalation or contact with skin and eyes. Nitric acid used in the experiment has strong oxidizing and corrosive, the operation should wear protective equipment, solution preparation and sample the pretreatment process should be carried out in a fume hood.

## 1 Scope of application

This standard specifies the silver nitrate volumetric method for the determination of hydrogen chloride in the waste of fixed sources.

This standard is applicable to the determination of hydrogen chloride in waste gas from fixed sources.

When the sampling volume is 15 L (standard state), the detection limit is 2 mg/m<sup>3</sup> and the determination limit is 8.0 mg/m<sup>3</sup>.

## 2 Normative reference documents

The contents of this standard refer to the following documents or their terms. Those who do not specify the date of the reference file, the effective version of the appropriate for this standard.

Determination of particulate matter and sampling method of gaseous pollutants in exhaust gas of fixed pollution sources GB/T 16157 HJ/T 373 fixed pollution source monitoring quality assurance and quality control technical specifications (Trial)

## 3 Principle of the method

Hydrogen chloride is absorbed by sodium hydroxide solution, under neutral conditions, with potassium chromate as indicator, with silver nitrate standard solution Titration, the formation of silver chloride precipitation, excessive silver ions and potassium chromate indicator reaction to produce shallow brick red silver chromate precipitation, indicating Titration end point, the reaction is as follows.

## 4 Interference and elimination

When the exhaust gas contains sulfide, sulfur dioxide, the method has a positive interference. Hydrogen sulfide concentration  $\leq 1000 \text{ mg/m}^3$ , the concentration of sulfur dioxide  $\leq 10000 \text{ mg/m}^3$ , can be added by adding 1 ml of 30% hydrogen peroxide to eliminate interference.

Granular chloride has a positive effect on the process; when the sulfuric acid mist concentration in the exhaust gas is  $> 15 \text{ g/m}^3$ , the process of white precipitation, the impact of the end of the titration process to determine; when the test liquid iron content  $> 10 \text{ mg/L}$ , the method the end point of the titration process has an effect. The above interference can be removed by filtration through sampling at the time of sampling.

Exhaust gas in the coexistence of chlorine ( $\text{Cl}_2$ ), with sodium hydroxide reaction to produce the same amount of chloride ions and hypochlorite ions, interference Determination of hydrogen chloride. Determination of hypochlorite by iodometric method, from the total chloride minus its content, that is, to obtain hydrogen chloride content.

## 5 Reagents and materials

Unless otherwise stated, analytical reagents conforming to national standards are used for analysis. Experimental water is a newly prepared deionized Water or water of the same purity.

(down) ->

(down) ->

$\text{CrOAgCrO}_2\text{Ag}$

$\text{AgClNOAgNOCl}$

(Shallow brick red)

### 5.1

nitric acid.  $\rho(\text{HNO}_3) = 1.42 \text{ g/ml}$ .

### 5.2

anhydrous ethanol.  $\rho(\text{CH}_3\text{CH}_2\text{OH}) = 0.79 \text{ g/ml}$ .

### 5.3

Sodium chloride ( $\text{NaCl}$ ). excellent grade pure.

Before use should be placed in the porcelain crucible, at  $400^\circ\text{C} \sim 500^\circ\text{C}$  burning 40 min ~ 50 min, and no longer burst sound. Set Cooled in the dryer.

#### 5.4

Sodium hydroxide (NaOH).

#### 5.5

Silver nitrate (AgNO<sub>3</sub>).

Before use should be baked at 105 °C for 30 min, placed in the dryer cooling standby.

#### 5.6

Potassium chromate (K<sub>2</sub>CrO<sub>4</sub>).

#### 5.7

phenolphthalein (C<sub>20</sub>H<sub>14</sub>O<sub>4</sub>).

#### 5.8

nitric acid solution.  $c(\text{HNO}_3) \sim 0.1 \text{ mol/L}$ .

Remove 6.2 ml of nitric acid (5.1) and dilute to 1000 ml with water.

#### 5.9

Ethanol solution. 1 1.

Take 250 ml of absolute ethanol (5.2) and dilute to 500 ml with water.

#### 5.10

sodium hydroxide absorption solution.  $c(\text{NaOH}) = 0.10 \text{ mol/L}$ .

Weigh 4.0 g of sodium hydroxide (5.4), with a small amount of water dissolved after the full amount into the 1000 ml volumetric flask, diluted with water and volume to the mark line, shake, with the current allocation.

#### 5.11

sodium chloride standard solution.  $c(\text{NaCl}) \sim 0.0141 \text{ mol/L}$ .

8.24 g of sodium chloride (5.3) (accurate to 0.0001 g) was weighed by reduction, washed with a small amount of water and transferred to 1000 ml Capacity bottle, diluted with water and volume to the mark, shake. Stored in a polyethylene bottle, refrigerated below 4 °C, sealed to save 6 Month.

Accurately remove 10.00 ml The above standard solution in 100 ml volumetric flask, diluted with water volume to the mark, shake, Now with Calculate the concentration of sodium chloride standard solution according to formula (1) accurately.

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NaClc x =

Where. () NaClc - sodium chloride standard solution concentration, mol/L;