

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

HJ 547-2017

Replacing HJ 547-2009

Stationary source emission -- Determination of chlorine--Iodometric method

固定污染源废气 氯气的测定 碘量法

(English Translation)

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Table of Contents

Foreword	.ii
1 Scope of application	.1
2 Normative references	.1
3 Method principle	.1
4 Interference and elimination	.1
5 Reagents and materials	.2
6 Instruments and equipment	.3
7 Samples	.3
8 Analysis steps	.5
9 Results calculated and said	.5
10 Precision and accuracy	
11 Quality Assurance and Quality Control	.6
12 Waste treatment	
13 Matters needing attention	

Foreword

In order to implement "Law of the People's Republic of China on Environmental Protection" and "Law of the People's Republic of China on Prevention and Control of Atmospheric Pollution," Paul Protect the environment, protect human health, standardize the determination of chlorine in exhaust gas pollution sources, the development of this standard.

This standard specifies the amount of iodine method for the determination of chlorine emissions from organized sources of emissions of fixed sources of pollution.

This standard is "a fixed source of emissions of chlorine gas Determination of iodine method (Interim)" (HJ 547-2009) amendment.

This standard was first released in 2009, the original standard drafting unit for the Beijing Municipal Environmental Protection Monitoring Center, this is the first time the main content of the revision and amendment are as follows.

- Revised methods of reagents and materials, apparatus and equipment, reagent preparation, sample collection and analysis steps and other articles paragraph.
- Complement and improve the method of principle, interference and eliminate some of the

content.

- Added precision, accuracy, result representation, sample penetration experiments, quality assurance and quality control content.

- Added waste disposal content.

Since the implementation of this standard, "fixed sources of chlorine emissions Determination of iodine method (Interim)" (HJ 547-2009) Abolished.

This standard by the Environmental Protection Department of Environmental Monitoring Division and Science and Technology Standards Division to develop.

This standard was drafted. Beijing Environmental Protection Monitoring Center.

This standard verification unit. Beijing Environmental Protection Monitoring Center, Changping District, Beijing Environmental Protection Monitoring Station, Beijing North Korea Yang District Environmental Protection Bureau, Fengtai District, Beijing Environmental Protection Monitoring Station, Beijing Kangju Environmental Monitoring Station and the Beijing Municipal Physical and Chemical Analysis test Center.

This standard MEP approved on December 29, 2017.

This standard since April 1, 2018 come into operation.

This standard is interpreted by the MEP.

Stationary sources - Determination of chlorine gas - Iodometric method Warning. chlorine gas is harmful to the human body. When sampling, wear protective equipment as required to avoid inhalation, contact with skin and eyes.

1 Scope of application

This standard specifies the determination of iodine content of chlorine gas emissions from fixed sources of pollution.

This standard applies to fixed sources of emissions of organized emissions of chlorine gas, does not apply to the determination of unorganized emissions.

When the sampling volume is 10 L, the detection limit is 12 mg/m³ and the lower limit of determination is 48 mg/m³.

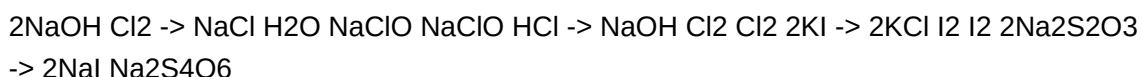
2 Normative references

This standard references the following documents in the terms. For undated references, the effective version applies to this book standard.

GB/T 16157 fixed emission sources of particulate matter measurement and gaseous pollutants sampling method HJ/T 47 gas sampler technical conditions

3 Method principle

Chlorine is absorbed by the sodium hydroxide solution to produce sodium hypochlorite. After the sample was added potassium iodide, acidified with hydrochloric acid, released Free chlorine oxidizes iodide ions to iodine and titrates with sodium thiosulfate standard solution. Based on consumption of sodium thiosulfate standard solution Volume and sampling volume, calculate the concentration of chlorine in the exhaust gas. The reaction is as follows.



4 Interference and elimination

Hydrogen fluoride in the exhaust gas and hydrogen chloride do not interfere with the determination; particles will affect the determination, can be added in front of the sampling tube filter to remove;

Exhaust gases contain other oxidizing or reducing gases that interfere with the assay.

5 Reagents and materials

Unless otherwise specified, analytical grade reagents and distilled water are used in accordance with national standards.

5.1

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

5.2

potassium iodide (KI).

5.3

potassium iodate (KIO_3). reference reagent or excellent grade pure.

5.4

Sodium hydroxide (NaOH).

5.5

Sodium thiosulfate pentahydrate ($\text{Na}_2\text{S}_2\text{O}_3 \cdot 5\text{H}_2\text{O}$).

5.6

anhydrous sodium carbonate (Na_2CO_3).

5.7

hydrochloric acid solution. 2 L.

Take 250 ml of hydrochloric acid (5.1), add to 125 ml of water and mix well.

5.8

Hydrochloric acid solution. $c(\text{HCl}) = 1.2 \text{ mol/L}$.

Measure 100 ml of hydrochloric acid (5.1) slowly into 900 ml of water.

5.9

Sodium hydroxide absorbent. $\rho(\text{NaOH}) = 4.0 \text{ g/L}$.

Weigh 4.0 g sodium hydroxide (5.4), dissolved in a small amount of water, diluted to 1000 ml.

5.10

potassium iodate standard solution. $c(1/6 \text{ KIO}_3) = 0.1000 \text{ mol/L}$.

Weigh accurately 3.567 g at $105^\circ\text{C} \sim 110^\circ\text{C}$ drying 2 h and cooled in a desiccator potassium iodate (5.3), dissolved in water, Move into a 1000 ml volumetric flask, dilute to the mark, shake well and store in a brown glass stopper. Room temperature preservation, the time is generally not more than two months. When the solution appears cloudy, precipitation, color changes and other phenomena, should be re-formulated.

5.11

sodium thiosulfate standard solution. $c(\text{Na}_2\text{S}_2\text{O}_3) \sim 0.1 \text{ mol/L}$.

Weigh 25 g of sodium thiosulfate pentahydrate (5.5), dissolved in freshly boiled and chilled water, add 0.20 g of anhydrous carbonated Sodium (5.6), dissolved, mixed, set to 1000 ml, stored in a brown glass bottle. If the solution is cloudy, it should be added to filter. $0^\circ\text{C} \sim 4^\circ\text{C}$ can be stored for 6 months, temporary calibration.

Calibration method. Pipette 10.00 ml potassium iodate standard solution (5.10), placed in 250 ml iodine bottle, add 85 ml Freshly boiled and cooled water, add 1.0 g of potassium iodide (5.2), shake to completely dissolve, then add 10.0 ml of hydrochloric acid Liquid (5.8), immediately covered the bottle stopper, mix well. After 5 min in the dark place, with the standard solution of sodium thiosulfate to be calibrated (5.11) Titration to light yellow, add 5 ml of starch indicator (5.13), continue titration until the blue just fade, record consumption of thiosulfuric acid Volume of sodium standard solution (V). According to formula (1) calculate the concentration of sodium thiosulfate standard solution.

$c(\text{Na}_2\text{S}_2\text{O}_3) =$

0.1000×10.00

Where. C ($\text{Na}_2\text{S}_2\text{O}_3$) - sodium thiosulfate standard solution concentration, mol/L;