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

HJ 1041-2019

**Stationary source emission - Determination of trimethylamine -
Suppressed ion chromatography**

固定污染源废气 三甲胺的测定 抑制型离子色谱法

(English Translation)

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Table of Contents

Foreword
1 Scope
2 Normative references
3 Methodology
4 Interference and cancellation
5 Reagents and materials
6 Instruments and equipment
7 Sample
8 Analysis steps
9 Results calculation and representation
10 Precision and accuracy
11 Quality Assurance and Quality Control
12 Waste disposal

Foreword

In order to implement the Law of the People's Republic of China on Environmental Protection and the Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution, Environment, protect human health, standardize the determination method of trimethylamine in exhaust gas from fixed pollution sources, and formulate this standard.

This standard specifies ion chromatography for the determination of trimethylamine in exhaust gas from stationary sources.

This standard is issued for the first time.

This standard is formulated by the Department of Eco-Environmental Monitoring, Laws and Standards Department of the Ministry of Ecology and Environment.

This standard was drafted. Shandong Ecological Environment Monitoring Center.

Verification units of this standard. Tianjin Ecological Environment Monitoring Center, Shandong Jinan Ecological Environment Monitoring Center, Shandong Province Fang Eco-environment Monitoring Center, Shandong Product Quality Inspection Research Institute, Shandong Ante Testing Co., Ltd. and Chinese Academy of Sciences Island Bioenergy and Process Institute.

This standard was approved by the Ministry of Ecology and Environment on October 24, 2019.

This standard will be implemented from April 24, 2020.

This standard is explained by the Ministry of Ecology and Environment.

Determination of trimethylamine in exhaust gas from stationary sources. Suppressed ion chromatography Warning. The hydrochloric acid used in the experiment is strongly irritating and corrosive. The reagent preparation process should be performed in a fume hood;

Wear protective equipment as required during operation to avoid breathing into the respiratory tract and contact with skin and clothing.

1 Scope

This standard specifies an inhibitory ion chromatography method for the determination of trimethylamine in exhaust gas from stationary sources.

This standard applies to the determination of trimethylamine in exhaust gas from stationary sources.

When the sampling volume is 20 L (standard state) and the absorption volume is 50 ml, the method detection limit is 0.03 mg/m³.

The lower limit of determination was 0.12 mg/m³.

2 Normative references

This standard refers to the following documents or clauses therein. For undated references, the valid version applies to this standard.

GB 14554 Emission Standard for Odor Pollutants GB/T 16157 Determination of particulate matter and sampling of gaseous pollutants in exhaust from stationary sources HJ 905 Technical Specification for Odor Pollution Environmental Monitoring HJ/T 397 Fixed source exhaust gas monitoring technical specifications

3 Method principle

After the trimethylamine in the exhaust gas from the fixed pollution source is absorbed by the acidic solution, it is separated by ion chromatography and detected by a suppressed conductivity detector.

Measurement. Qualitative according to retention time, quantified by external standard method.

4.1 Under the analysis conditions recommended by this method, Li, Na, NH₄

, K, Mg²⁺, Ca²⁺ 6 common cations, both methylamine and dimethylamine can be effectively separated from trimethylamine without disturbing the determination.

4.2 Some hydrophobic compounds in the sample may affect the chromatographic separation effect and the service life of the column.

Activated pre-treatment columns eliminate or reduce effects.

5 Reagents and materials

Unless otherwise specified, analytical reagents that meet national standards are used.

Experimental water is resistivity $\geq$

18 Mohm · cm of fresh deionized water.

5.1

Sulfuric acid. ρ (H₂SO₄) = 1.84 g/ml, excellent purity.

5.2

Hydrochloric acid. ρ (HCl) = 1.189 g/ml, excellent grade pure.

5.3

Methanesulfonic acid. w (CH₃SO₃H) $\geq$ 99%.

5.4

Trimethylamine hydrochloride standard. w (CH₃)₃N · HCl $\geq$ 98%.

5.5

Absorption liquid. One of the following two absorption liquids can be used.

5.5.1

Sulfuric acid absorption solution. c (H₂SO₄) = 0.03 mol/L.

Pipet 1.60 ml of sulfuric acid (5.1), slowly add an appropriate amount of water, cool and dilute to a 1000 ml volumetric flask.

Mix well. Provisional use.

5.5.2

Hydrochloric acid absorption solution. c (HCl) = 0.06 mol/L.

Pipette 5.00 ml of hydrochloric acid (5.2), slowly add an appropriate amount of water, and dilute to a 1000 ml volumetric flask after cooling.

Mix well. Provisional use.

5.6

Trimethylamine (TMA) standard stock solution. $\rho((\text{CH}_3)_3\text{N}) = 1000 \text{ mg/L}$.

Accurately weigh 0.1620 g of trimethylamine hydrochloride standard (5.4), dissolve it in absorbent solution (5.5), and determine the volume to 100 ml.

It can be stored stably for 1 month if refrigerated below 4 °C.

5.7

Trimethylamine standard solution. $\rho((\text{CH}_3)_3\text{N}) = 10.00 \text{ mg/L}$.

Accurately transfer 1.00 ml of trimethylamine standard stock solution (5.6) into a 100 ml volumetric flask and dilute with absorbent solution (5.5) to the mark, it can be stored for 1 month under 4 °C.

5.8

Methanesulfonic acid eluent. Prepare according to the instrument model and the operating conditions of the column manual. Leaching given below Liquid conditions for reference.

5.8.1

Methanesulfonic acid eluent stock solution. $c(\text{CH}_3\text{SO}_3\text{H}) = 0.92 \text{ mol/L}$.

Accurately weigh 88.42 g of methanesulfonic acid (5.3) and slowly add it into a volumetric flask containing an appropriate amount of deionized water. After cooling, dilute Reconstitute to 1000 ml and mix.

5.8.2

Methanesulfonic acid eluent. $c(\text{CH}_3\text{SO}_3\text{H}) = 0.023 \text{ mol/L}$.

Accurately pipette 25.00 ml of methanesulfonic acid eluent stock solution (5.8.1) into a 1000 ml volumetric flask and dilute to volume with water.

5.9

Filter membrane. glass fiber, PTFE or equivalent material.

5.10

Water phase needle filter. 0.45 μm , polyethersulfone or equivalent.

6 Instruments and equipment

6.1

Flue gas sampler. The flow range is 0.1 L/min ~ 2.0 L/min. The sampling tube is made of hard glass or fluororesin.

It is equipped with heating and heat preservation function. The heating temperature is $\geq 120 \text{ }^\circ\text{C}$. Other performance and technical indicators should meet the requirements of