

HJ

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

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Stationary source emission - Determination of sulphur dioxide - Non-dispersive infrared absorption method

固定污染源废气 二氧化硫的测定 非分散红外吸收法

(English Translation)

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Foreword

This Standard was formulated in order to implement "Environmental Protection Law of the People's Republic of China" and "Law of the People's Republic of China on the Prevention and Control of Atmospheric Pollution", protect the environment, safeguard human health and standardize the determination of sulfur dioxide from exhausted gas of stationary source.

This Standard specifies the non-dispersive infrared absorption method in the determination of sulfur dioxide from exhausted gas of stationary source.

This Standard was formulated for the first time.

The formulation of this Standard was organized by Department of Science, Technology and Standards of State Environmental Protection Administration. Main drafting organization of this Standard. Sino-Japan Friendship Center for Environmental Protection.

The verification organizations of this Standard. National Research Center for Environmental Analysis and Measurement, Beijing Municipal Environmental

Protection Monitoring Center, Shenyang Environmental Monitoring Central Station, Shanghai Baoshan District Environmental Monitoring Station, and Beijing University of Chemical Technology.

This Standard was approved by State Environmental Protection Administration on September 8, 2011.

This Standard shall be implemented since November 1, 2011.

This Standard shall be interpreted by State Environmental Protection Administration.

Stationary source emission

- determination of sulphur dioxide
- Non-dispersive infrared absorption method

1 Scope

This Standard specifies the non-dispersive infrared absorption method that is to determine the sulphur dioxide from organized exhausted gas of stationary source.

This Standard is applicable to instantaneous monitoring and continuous monitoring on sulphur dioxide from organized exhausted gas of stationary source. The detection limit of this method is 3 mg/m³; the lower limit of determination is 10 mg/m³.

2 Normative references

The following standards contain the provisions which, through reference in this Standard, constitute the provisions of this Standard. For undated references, the effective edition of the referenced document applies.

GB/T 16157 The determination of particulates and sampling methods of gaseous pollutants emitted from exhaust gas of stationary source

HJ/T 47 Technical conditions of sampler for stack gas

HJ/T 75 Specifications for continuous emissions monitoring of flue gas emitted from stationary sources (on trial)

HJ/T 76 Specification and test procedures for continuous emission monitoring systems of flue gas emitted from stationary sources (on trial)

HJ/T 397 Technical specifications for emission monitoring of stationary source

3 Method-principle

Sulfur dioxide gas is selectively absorbable in infrared spectrum of which the wavelength is $6.82 \sim 9 \mu\text{m}$. When a beam of infrared light of which the constant $x(\text{SO}_2)$ - sulfur dioxide of mole fraction in determined gas, $\mu\text{mol/mol}$;

2.86 - conversion factor for converting sulfur dioxide's mass concentration

TO the mass concentration under standard conditions.

8.1.3 Calculation of sulfur dioxide's emission rate

Where,

G - sulfur dioxide's emission rate, kg/h ;

ρ - mass concentration of sulfur dioxide in dry exhaust gas, (mg/m^3) ;

Q_{sn} - dry exhaust gas flow under standard conditions (273K , 101.325 kPa), m^3/h .

8.2 Result representation

The calculation results of sulfur dioxide's concentration and emission rate shall be rounded off to three significant digits.

9.1 Precision

Six laboratories have determined the unified simulated gas samples of which the sulfur dioxide concentrations are $64 \text{ mg}/\text{m}^3$, $116 \text{ mg}/\text{m}^3$, and $268 \text{ mg}/\text{m}^3$ respectively.

Relative standard deviations in laboratories are respectively. $0.4\% \sim 3.4\%$, $0.3\% \sim 1.8\%$, $0.1\% \sim 0.8\%$;

Relative standard deviations among laboratories are respectively. 3.0% , 1.0% , 0.3% ;

Repeatability limits are. 2.7 mg/m³, 2.8 mg/m³, 3.0 mg/m³;

Reproducibility limits are. 5.9 mg/m³, 4.1 mg/m³, 3.5 mg/m³.

9.2 Accuracy

Six laboratories have determined the certified reference gases of which the sulfur dioxide concentrations are 146 mg/m³, 636 mg/m³, and 1403 mg/m³ respectively.

Relative errors are respectively. 0~1.5%, 0.1%~0.9%, 0.1%~0.7%;

Final values of relative errors are. 0.5%±1.1%, 0.4%±0.6%, 0.3%±0.4%.

10.1 The dew-point temperature of the sample gas must be lower than ambient

temperature. When sample gas has moisture, it shall use dehumidifier to reduce the dew-point temperature to 5°C. The dehumidifier shall make the determined sulfur dioxide's loss in the dehumidified gas not to be greater than 5%.

10.2 When determining sulfur dioxide, it shall choose the instrument of which

the ability of resisting negative pressure is better than negative pressure of gas duct, so as to avoid the instrument's sampling flow reduces and causes the determination result lower or unable to be determined.

10.3 When sample gas has sulfur dioxide or other aerial fog, it shall use mist filter or condenser to filter.

10.4 Before and after determination each time, it shall check the tightness of determination system, and use standard gas to calibrate.

10.5 The sample gas temperature that is directly imported into the analyzer shall not be greater than 50°C.

11.1 In order to prevent the moisture in sampling gas being condensed in the connecting pipe and in the instrument, which will interfere the determination, the sampling tube and dehumidifier shall be heated to 120°C before sampling,