

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

HJ 1132-2020

Stationary source emission - Determination of nitrogen oxides - Portable ultraviolet absorption method

固定污染源废气 氮氧化物的测定 便携式紫外吸收法

(English Translation)

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Foreword

To implement the Environmental Protection Law of the People's Republic of China and the Air Pollution Prevention and Control Law of the People's Republic of this standard is formulated to ensure the environment, protect human health, standardize portable measurement methods of nitrogen oxides in exhaust gas from fixed sources.

This standard specifies a portable ultraviolet absorption method for the determination of nitrogen oxides in exhaust gas from stationary sources.

Appendix A of this standard is an informative appendix.

This standard is issued for the first time.

This standard was formulated by the Department of Ecological Environment Monitoring and the Department of Regulations and Standards of the Ministry of Ecology and Environment.

Drafting organizations of this standard. China Environmental Monitoring Center, Shandong Ecological Environment Monitoring Center.

Verification units of this standard. Tianjin Ecological Environment Monitoring Center, Hubei

Province Ecological Environment Monitoring Center Station, Qinhuangdao City Environmental Environmental Monitoring Center, Shenyang Ecological Environment Monitoring Center of Liaoning Province, Binzhou Ecological Environmental Monitoring Center of Shandong Province, and Guiyang Environmental Monitoring Center Test center station.

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

1 Determination of nitrogen oxides in exhaust gas from stationary sources of portable ultraviolet absorption method

1 Scope of application

This standard specifies a portable ultraviolet absorption method for the determination of nitrogen oxides in exhaust gas from stationary sources.

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

The detection limit of nitric oxide method is 1 mg/m³, and the lower limit of determination is 4 mg/m³; the method detection limit of nitrogen dioxide is 2 mg/m³, the lower limit of determination is 8 mg/m³.

2 Normative references

This standard quotes the following documents or their clauses. For undated reference documents, their valid versions are applicable to this standard.

GB/T 16157 Determination of particulate matter in exhaust from stationary sources and sampling method for gaseous pollutants HJ 75 Technical specification for continuous monitoring of emission of stationary pollution source flue gas (SO₂, NO_x, particulate matter) HJ/T 373 Fixed pollution source monitoring quality assurance and quality control technical specifications HJ/T 397 Fixed source exhaust gas monitoring technical specification HJ 1045 Fixed pollution source flue gas (sulfur dioxide and nitrogen oxide) portable ultraviolet absorption method technical requirements Seeking and testing methods

3 Terms and definitions

The following terms and definitions apply to this standard.

Nitrogen oxides

Refers to the oxides of nitrogen in the form of nitrogen monoxide (NO) and nitrogen dioxide

(NO₂) in the exhaust gas from stationary sources.

Calibration span

The concentration value of the standard gas used for calibration (when performing multi-point calibration, it is the highest concentration value of the standard gas used for calibration), the calibration range (indicated by CS below) should be less than or equal to the full range of the instrument.

Error of indication

The absolute or relative error between the measurement result of the standard gas directly imported into the analyzer and the concentration value of the standard gas.

Zero drift

Before and after the measurement, the absolute error of the measurement result of the same zero gas or the absolute error and the percentage of the calibration range ratio.

23.5

Span drift

Before and after the measurement, the absolute error or absolute error of the measurement result of the instrument on the same calibration range point standard gas is compared with the calibration Percentage of range.

Systematic error

The standard gas is directly introduced into the air inlet of the main body of the instrument (direct measurement mode).

The absolute error between the measurement results obtained by the instrument (system measurement mode) or the absolute error and the percentage of the calibration range ratio.

4 Principle of the method

Nitric oxide has a characteristic wavelength of 200 nm~235 nm in the ultraviolet range, and nitrogen dioxide has a characteristic wavelength of 220 nm~ 250 nm or 350 nm~500 nm characteristic wavelength light has selective absorption, quantitative determination of exhaust gas according to Lambert-Beer law the concentration of nitrogen monoxide and nitrogen dioxide.

5 Interference and elimination

5.1

The particulate matter in the exhaust gas is easy to pollute the absorption pool. The particulate matter in the exhaust gas should be eliminated or reduced by means of

high-efficiency filter dust removal.

For the contamination of the instrument by particles, the material of the filter material should avoid physical adsorption or chemical reaction with nitrogen oxides.

5.2

The water vapor in the exhaust gas will absorb the nitrogen dioxide in the sample when it is cold and produce condensed water during the sampling process, resulting in the test result.

If the result is too low, it should be eliminated by heating sampling pipes and air ducts, cooling devices for rapid dehumidification or measuring hot and humid exhaust gas samples, etc.

Or reduce the pollution of the instrument caused by the condensation of water vapor in the exhaust gas and the loss of nitrogen oxide adsorption and dissolution.

6 Reagents and materials

6.1

Standard gas of nitric oxide and nitrogen dioxide. commercially available certified standard gas, expanded uncertainty $\leq 2\%$; or use 6.2 the gas distribution device used to dilute high-concentration commercially available certified standard gas with suitable concentration gas with nitrogen.

6.2

Gas distribution device. a commercially available dilution gas distribution device, the maximum output flow is not less than 5 L/min, all input and output flow the maximum allowable error of the meter flow should meet. when the flow is less than 50% of the full range, the maximum allowable error of the flow does not exceed the full range when the flow is not less than 50% of the full scale, the maximum allowable error of the flow does not exceed $\pm 1.0\%$ of the set flow.

The material of the gas system of the gas distribution device should avoid physical adsorption or chemical reaction with nitrogen oxides.

6.3

Zero gas. nitrogen or air with purity $\geq 99.99\%$ that does not interfere with the measurement.

7.1.1 Composition

Ultraviolet absorption method nitrogen oxide analyzer (abbreviation. instrument) composition. analyzer (including light source, detector, absorption cell,

3 Control unit, etc.), gas flow meter, air pump, sampling pipe, air duct, dehumidification and