

HJ

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

HJ 57-2017

**Stationary source emission - Determination of sulfur dioxide -
Fixed potential by electrolysis method
(English Translation)**

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1 Scope

This standard specifies the fixed potential electrolysis method for the determination of sulfur dioxide in stationary source emission.

This standard applies to the determination of sulfur dioxide in stationary source emission.

The detection limit of this standard is 3 mg/m³. The lower limit of determination is 12 mg/m³.

2 Normative references

The contents of this standard refer to the following documents or their terms.

For undated references, the valid version applies to this standard.

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

HJ 75 Specifications for continuous emissions monitoring of SO₂, NO_x, and particulate matter in the flue gas emitted from stationary sources

HJ 76 Specifications and test procedures for continuous emission monitoring system for SO₂, NO_x and particulate matter in flue gas emitted from stationary

HJ/T 46 Technical conditions of detector of sulfur dioxide concentration for constant potential electrolysis method

HJ/T 373 Technical specifications of quality assurance and quality control for monitoring of stationary pollution source (on trial)

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

3 Terms and definitions

3.1

Zero gas

The gas which has no measurement component or less than the specified value, meanwhile other component's concentrations do not interfere with the measurement component results or the interference from the resulting measurement component is negligible.

3.3

Calibration error

The error between the measurement result of standard gas as directly led into the analyzer and the concentration value of the standard gas.

3.4

System bias

The percentage of the difference between the measurement result of the standard gas as directly led into the analyzer and the measurement result of the gas as led into the instrument via the sampling tube to the calibration span.

3.5

Zero drift

Before and after the test, the percentage of the difference between the analyzer for the measurement results of same zero gas, to the calibration span.

4 Principle of method

The sample is taken into a sensor consisting mainly of an electrolytic cell, an electrolyte, electrodes (sensitive electrode, reference electrode, counter electrode). Sulfur dioxide diffuses through the permeable membrane to the surface of the sensitive electrode; an oxidation reaction occurs on the sensitive electrode.

5 Interference and elimination

5.1

The particulate matter, moisture and sulfur trioxide in the gas to be tested are easy to condense on the surface of the sensor's permeable membrane and cause damage to the sensor, which affects the determination; it shall be filtered by a dust filter device, a dehumidifier, a mist filter, etc. to eliminate the influence.

5.3

Carbon monoxide's interference is significant, so the concentration of carbon monoxide must be determined simultaneously when measuring the sample. When the concentration of carbon monoxide does not exceed 50

μmol/mol, the sample can be determined by this standard.

6.1 Sulfur dioxide standard gas

Commercially available certified standard gas, uncertainty ≤ 2%.

7.1.1 Composition

Fixed potential electrolysis sulfur dioxide analyzer (shortly referred to as

analyzer or instrument) consists of. analyzer (including gas flowmeter and control unit, pump, sensor, etc.), sampling tube (including dust filter, heating and insulation device), air duct, dehumidifiers, portable printers, etc.

7.3 Gas bag

Used to calibrate the analyzer by air bag method. The volume is 4 L ~ 8 L; the lining material shall be selected from the aluminum-plastic composite film, polytetrafluoroethylene film and other inert materials that have little influence on the measured components.

7.4 Emission parameter tester

An instrument capable of testing parameters such as moisture content, flue gas's temperature, flue gas's pressure, flue gas's flow rate, flow rate.

7.5 Carbon monoxide measuring device

A device or apparatus capable of measuring the concentration of carbon monoxide in an emission.

8.1 Determination of sampling points and sampling frequency

According to GB/T 16157, HJ/T 397, HJ/T 373, HJ 75 and HJ 76 and related requirements, determine the sampling position, sampling point, sampling frequency.

8.3.1 Zero calibration

Lead zero gas into the analyzer to calibrate the instrument's zero point.

8.3.2 Calibration of range

Lead the sulfur dioxide standard gas into the analyzer for measurement. If the calibration error meets the requirements of 7.1.2 a), the analyzer is available;

otherwise, it requires calibration. The calibration method is as follows.

8.4 Determination of emission parameters

Follow the provisions of GB/T 16157 to determine the emission parameters.

8.5.1 Determine the concentration of carbon monoxide in the emission

according to the relevant standards. According to the measurement results, determine whether the sulfur dioxide in the emission can be determined using this standard according to 5.3.

8.5.2 Place the front end of the sampling tube of the analyzer on the sampling point in the emission cylinder; block the sampling hole so that it does not leak.

8.5.3 Start the air pump, to take sample at the sampling flow rate as specified by the analyzer for measurement. After the analyzer is stable, save the measurement data in minutes and take the average value of the measured data for 5 minutes ~ 15 minutes as one measurement value.

8.5.5 After obtaining the measurement result, use the zero gas to clean the

analyzer. After its indication value returns to near zero point, turn off the power and end the measurement.

9.1.1 Calculation of emission flow

According to the provisions of GB/T 16157, calculate the dry exhaust flow Q_{sn} (m³/h) in the standard state (273 K, 101.325 kPa).