

HJ

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

HJ 654-2013

**Specifications and test procedures for ambient air quality
continuous automated monitoring system for SO₂, NO₂, O₃ and
CO**

环境空气气态污染物（SO₂、NO₂、O₃、CO）连续自动监测系统技
(English Translation)

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Table of Contents

Foreword	3
1 Scope of application	4
2 Normative references	4
3 Terms and definitions	4
4 System composition and structure	6
5 Specifications	9
6 Performance indicators	14
7 Test procedures	19
8 Test items	35
Annex A (Normative) Performance indicators of the zero gas generator monitoring system performance testing	43
HJ 654-2013 (2018XG1)	48

1 Scope of application

This Standard specifies the composition, specifications, test indicators and test procedures for ambient air quality continuous automated monitoring system for

SO₂, NO₂, O₃ and CO.

This Standard is applicable to the design, production and testing of ambient air quality continuous automated monitoring system for SO₂, NO₂, O₃ and CO.

2 Normative references

This Standard refers to the terms in the following documents. For undated references, the latest editions apply to this Standard.

GB 3095-2012 Ambient air quality standards

GB 4793.1 Safety requirements for electrical equipment for measurement, control, and laboratory use -- Part 1: General requirements (IEC 61010-

1:2001, IDT)

3 Terms and definitions

The following terms and definitions apply to this Standard.

3.1 Ambient air quality continuous monitoring

The process of continuous sample collection, processing and analysis of ambient air quality using a continuous monitoring instrument at monitoring points.

3.2 Point analyzer

A monitoring and analysis instrument that takes ambient air through a sampling system at a fixed point and determines the concentration of air pollutants.

3.3 Open path analyzer

An apparatus for determining the average concentration of air pollutants over the optical path of the beam by means of a method of emitting a beam of light from the transmitting end through an open environment to a receiving end.

3.4 Zero drift

The deviation between the reading of the instrument and the zero input after the instrument has been operated for a specified period of time without maintenance, care or adjustment.

3.5 Span drift

The deviation between the reading of the instrument and the known reference value after the instrument has been operated for a specified period of time without maintenance, care or adjustment.

3.6 Period of unattended operation

The time interval during which the instrument meets the requirements of the indicator for long-term drift (≥ 7 d) without manual maintenance and calibration.

3.7 Converter efficiency

The efficiency of converting NO₂ to NO.

3.8 Standard state

The state when the temperature is 273K, and the pressure is 101.325kPa. The concentration of pollutants in this Standard is the concentration under standard state.

3.9 ppm parts per million

Millionth volume concentration.

3.10 ppb parts per billion

One billionth volume concentration.

3.11 Optical path

The path length of the monitoring beam of the open optical path analysis instrument from the transmitting end to the receiving end of the light source.

3.12 Zero optical path

The optical path of the light from the transmitting end to the receiving end of the light source in the calibration state of the open optical path analysis instrument, which is much smaller than the optical path of the actual measurement, is called

5.1.1 Appearance requirements

5.1.1.1

The monitoring system shall have a product nameplate indicated with the instrument name, model, production organization, factory number, date of manufacture, etc.

5.1.1.2

The surface of the monitoring system instrument shall be intact, with no obvious defects. The components shall be connected reliably, and the operation keys and buttons shall be flexible and valid.

5.1.1.3

The instrument main unit panel shall be clear in display, and easy to identify characters and identifications.

5.1.2 Operating conditions

The monitoring system shall function properly under the following conditions.

- (1) Ambient temperature: (15 ~ 35) °C;
- (2) Relative humidity: $\leq 85\%$;
- (3) Atmospheric pressure: (80 ~ 106) kPa;
- (4) Supply voltage: AC (220 $\pm$ 22) V, (50 $\pm$ 1) Hz.

NOTE 1: Under special environmental conditions such as low temperature and low pressure, the instruments and equipment shall be configured to meet the requirements of local environmental conditions.

5.1.3.1 Insulation resistance

Under the conditions of ambient temperature of (15 ~ 35) °C, and relative humidity of $\leq 85\%$, the insulation resistance of the instrument power terminal to the ground or the casing shall not be less than 20Mohm.

5.1.3.2 Insulation strength

Under the conditions of ambient temperature of (15 ~ 35) °C, and relative humidity of ≤ 85%, the instrument will last for 1min under the 1500V (RMS value), 50Hz sine wave test voltage, and there shall be no breakdown or arcing.

5.1.4.1 Sampling device

sampling manifold stably.

(3) The materials used for the sampling device shall be selected from materials that do not chemically react with the monitored pollutants and do not release interfering substances. Generally, it is made of polytetrafluoroethylene (PTFE) or borosilicate glass, etc. Stainless steel is also available for the sampling manifold used to monitor NO₂ and SO₂ only.

(4) The inner diameter of the sampling manifold is within the range of 1.5cm to 15cm. The airflow in the manifold shall be laminar. The residence time of the sample gas in the manifold shall be less than 20s. Meanwhile, the pressure of the collected gas sample shall be close to atmospheric pressure. The branch connector shall be placed in the laminar flow area of the sampling manifold. The distance between the branch connectors is greater than 8cm.

(5) In order to prevent condensation on the inner wall of the sampling manifold due to the difference in indoor and outdoor air temperatures, the sampling manifold shall be equipped with a thermal insulation sleeve or heater. The heating temperature is generally controlled at (30 to 50) °C.

(6) The pipeline connecting the analytical instrument to the branch connector shall be made of materials that do not chemically react with the monitored pollutants and do not release the interfering substances; the length shall not exceed 3m, and the air outlet of the air conditioner shall be prevented from being directly blown to the sampling manifold and the branch pipe.

(7) The pipeline connecting the analytical instrument to the branch connector shall be equipped with a PTFE membrane with a pore diameter of ≤ 5μm.

(8) The pipeline connecting the analytical instrument to the branch connector shall be extended to the position where the manifold is close to the center when connecting the manifold.

(9) When not using the sampling manifold, it can be sampled directly in the pipeline. However, the sampling pipeline shall use materials that do not chemically react with the monitored pollutants and do not release interfering substances. The time that the sample gas is trapped in the sampling pipeline shall be less than 20s.