

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

HJ 965-2018

**Ambient air - Automatic determination of carbon monoxide -
Non-dispersive infrared spectrometry method**

环境空气 一氧化碳的自动测定非分散红外法

(English Translation)

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Foreword

To protect the "Environmental Protection Law of the People's Republic of China" and the "Air Pollution Control Law of the People's Republic of China" this standard is formulated to ensure human health and to regulate the automatic determination of carbon monoxide in ambient air.

This standard specifies a non-dispersive infrared method for the automatic determination of carbon monoxide in ambient air.

This standard is the first release.

This standard is formulated by the Environmental Monitoring Department and the Science and Technology Standards Department.

This standard was drafted. Dalian Environmental Monitoring Center.

The standard verification unit. Harbin Environmental Monitoring Center Station, Hangzhou Environmental Monitoring Center Station, Anshan City Environmental Monitoring Central Station, Guangzhou Environmental Monitoring Center Station, Shenyang Environmental Monitoring Center Station and Qingdao Environmental Monitoring Center Station.

This standard was approved by the Ministry of Ecology and Environment on August 31, 2018.

This standard has been implemented since September 1, 2018.

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

Automatic determination of ambient air carbon monoxide by non-dispersive infrared method Warning. Carbon monoxide is a toxic gas. It should be prevented from leaking during operation and should be protected as required.

1 Scope of application

This standard specifies a non-dispersive infrared method for the automatic determination of carbon monoxide in ambient air.

This standard applies to the automatic determination of carbon monoxide in ambient air.

When the instrument range is (0 ~ 50) $\mu\text{mol/mol}$, the detection limit of the method is 0.07 mg/m^3 , the lower limit of determination it is 0.28 mg/m^3 .

The mass concentration of this standard refers to the concentration under the reference state (298.15 K, 1013.25 hPa).

2 Normative references

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

HJ 193 Environmental Air Gaseous Contaminant (SO_2 , NO_2 , O_3 , CO) Continuous Automatic Monitoring System Installation Acceptance Technology specification HJ 654 Technical requirements and inspection of continuous automatic monitoring system for ambient air gaseous pollutants (SO_2 , NO_2 , O_3 , CO) Measuring method HJ 663 Technical Specifications for Ambient Air Quality Assessment (Trial) HJ 818 ambient air gaseous pollutants (SO_2 , NO_2 , O_3 , CO) continuous automatic monitoring system operation and quality control technology Specification

3 Principle of the method

The sample air enters the instrument reaction chamber through the particulate filter at a constant flow rate, and the carbon monoxide is selectively absorbed.

4.7 μm is the infrared light in the center band. In a certain concentration range, the infrared light absorbance is proportional to the concentration of carbon monoxide.

4 Interference and elimination

4.1

Water vapor can interfere with the measurement and can be removed by a cooling or narrow band filter.

4.2

When the concentration of carbon dioxide in ambient air is 610 mg/m^3 , the interference is equivalent to 0.2 mg/m^3 of carbon monoxide.

If necessary, it can be removed with soda lime.

4.3

In general, hydrocarbons in ambient air do not interfere with the determination of carbon monoxide. When the ambient air is rich in methane at a rate of 326 mg/m^3 , the interference is equivalent to 0.6 mg/m^3 of carbon monoxide.

5 Reagents and materials

5.1

Zero gas. Zero gas is generated by zero gas generating device, and can also be provided by zero gas cylinder. The performance index of zero gas should conform to HJ 654.

Appendix A requirements. If synthetic air is used, the concentration of oxygen should be $(20.9 \pm 2)\%$ of the synthetic air.

5.2

Standard gas. certified reference material in $\mu\text{mol}/\text{mol}$.

5.3

Filter membrane. The material is PTFE, the pore size is $\leq 5 \mu\text{m}$.

6 Instruments and equipment

6.1

Injection line. It should be PTFE, fluorinated polyethylene propylene, stainless steel that does not react with carbon monoxide.

Or materials such as borosilicate glass.

6.2

Particulate filter. Installed between the sampling manifold and the instrument inlet. The other part of the filter except the filter membrane should be Materials such as polytetrafluoroethylene, fluorinated polyethylene propylene, stainless steel or borosilicate glass that do not chemically react with carbon monoxide.

If the instrument has a built-in particulate filter, no external particulate filter is required.

6.3

Carbon monoxide analyzer. Performance indicators should meet the requirements of HJ 654. The carbon monoxide measurement system is shown in Figure 1.

1-fan; 2-multiple pipe; 3-air inlet; 4-roof; 5-dehumidifier; 6-particulate filter; 7-motor; 8-infrared source; 9-band pass filter 10-infrared detector; 11-cutter; 12-correlation wheel; 13-amplifier; 14-data output; 15-pump; 16-flow controller; 17-flow 18-exhaust port; 19-standard gas; 20-four-way valve; 21-zero gas; 22-injection line.

Figure 1 Schematic diagram of carbon monoxide measurement system

7.1 Installation and commissioning of the instrument

After the newly purchased instrument is installed, the parameters should be set according to the operation manual for debugging. Debugging indicators include zero noise, Minimum detection limit, range noise, indication error, range precision, 24 h zero drift and 24 h range drift, commissioned Test methods and indicators are performed in accordance with HJ 193.

7.2 Inspection

Zero check, span check and linear check are required during the operation of the instrument. The inspection method is in accordance with HJ 818.

Record B execution. If the inspection result is unsatisfactory, the instrument should be calibrated and the instrument repaired if necessary.

After the instrument is repaired, a linear inspection should be performed and the instrument recalibrated.