

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

HJ 920-2017

**Ambient air--Emergency monitoring method for inorganic
hazardous gas--Portable fourier infrared spectrometer method**

环境空气 无机有害气体的应急监测 便携式傅里叶红外仪法

(English Translation)

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Foreword

In order to implement the Law of the People's Republic of China on Environmental Protection and the Law of the People's Republic of China on Prevention and Control of Atmospheric Pollution, this standard is formulated by the portable Fourier infrared method for the protection of human health and the determination of inorganic harmful gases in ambient air.

This standard specifies the determination of ambient air carbon monoxide, nitrogen dioxide, nitrogen monoxide, sulfur dioxide, carbon dioxide, Hydrogen chloride, hydrogen cyanide, hydrogen fluoride, nitrous oxide, ammonia and other 10 kinds of inorganic harmful gas portable Fourier infrared method.

Appendix A and Appendix B of this standard are normative appendices, Appendix C is an informative annex.

This standard is released for the first time.

This standard by the Environmental Protection Department of Environmental Monitoring

Division and Science and Technology Standards Division to develop.

This standard was drafted. Zhejiang Provincial Environmental Monitoring Center.

This standard verification unit. Hangzhou Environmental Monitoring Center Station, Ningbo City Environmental Monitoring Center, Fengxian District of Shanghai Environmental Supervisor Station, Shanghai Jiading District Environmental Monitoring Station, Nanhui District, Shanghai Environmental Monitoring Station, Xinchang County, Zhejiang Province Environmental Monitoring Station, Zhejiang Jiangde Jiande City Environmental Monitoring Station, Cixi City, Zhejiang Province Environmental Monitoring Station and Beijing Chengtianyouyou Technology Co., Ltd.

This standard MEP approved on December 28, this standard since April 1, 2018 come into operation.

This standard is interpreted by the MEP.

Ambient Air Inorganic Hazardous Gas Emergency Monitoring Portable Fourier infrared method

1 Scope of application

This standard specifies the portable Fourier infrared method for the determination of inorganic harmful gases in the ambient air.

This standard is qualitative and semi-quantitative method for the ambient air carbon monoxide, nitrogen dioxide, nitrogen monoxide, dioxide Sulfur, carbon dioxide, hydrogen chloride, hydrogen cyanide, hydrogen fluoride, nitrous oxide, ammonia and other inorganic harmful gases on-site emergency monitoring, as well as screening, census and other preliminary investigations. If other inorganic gases can also be verified by this method.

The detection limits and determination of the method in Appendix A.

2 Normative references

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

HJ 194 Manual Air Quality Monitoring Technical Specifications HJ 589 emergency environmental monitoring technical specifications HJ/T 55 Guidelines for Unorganized Emissions Monitoring of Air Pollutants

3 Method principle

When the molecules to be measured are irradiated with infrared light having a continuously changing wavelength, the specific wavelength of the same specific vibrational frequency as that of the molecule Infrared light is absorbed, the infrared light irradiation molecules with a

monochromatic dispersion, according to the wavenumber order, and determine the different wavenumber Absorption intensity, infrared absorption spectrum. By comparing the sample with the infrared spectrum and standard reference library quantitative reference material the spectral peak in the characteristic wave number of the qualitative analysis of the peak; according to the sample peak response to the target value and the standard library of Semi-quantitative analysis of the ratio of peak area response values of the standard substance absorption peak should be carried out.

4 Interference and elimination

4.1

When the air relative humidity is greater than 85%, not suitable for monitoring.

4.2

When the sample contains a large amount of dust, it will pollute the instrument piping and analysis unit, the analysis of the interference, must be mining Install the dust filter (5.2) before the sample tube.

5 Reagents and materials

5.1

Nitrogen. Purity $\geq 99.9\%$.

5.2

Dust filter. glass fiber material, aperture $\leq 2 \mu\text{m}$.

6.1 Portable Fourier infrared instrument

Working software with qualitative and quantitative functions; Sample pressure is atmospheric pressure; Sample chamber temperature is $50\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$; Light path length Degree $> 9.0\text{ m}$, using multiple reflection and other methods to meet the detection limit requirements; wavelength range of $600 \sim 4500\text{ cm}^{-1}$. instrument Structure diagram shown in Figure 1.

Figure 1 instrument structure diagram

6.2 Auxiliary equipment

6.2.1

Portable nitrogen bottle. purity $\geq 99.9\%$.

6.2.2

Battery. continuous power supply time is greater than 1 h, the output voltage of 220 V.

6.2.3

Thermometer. used to measure the ambient temperature, measuring range (-30 ~ 50) °C, accuracy of ± 0.2 °C.

6.2.4

Barometer. used to measure the ambient atmospheric pressure, measuring range (50 ~ 107) kPa, accuracy ± 0.1 kPa.

6.2.5

Hygrometer. used to measure the ambient humidity, measuring range (0% ~ 100%) RH, accuracy $\pm 1\%$.

7.1 Sampling preparation

7.1.1

Check the pressure of the portable nitrogen cylinder (> 0.2 MPa).

7.1.2

Check whether the battery power meet the power requirements of > 1h.

7.1.3

The instrument is powered on, and connected to the workstation, and then start the instrument until the light intensity, the height of the interferogram, the sample room temperature Degree, test the ambient temperature, humidity to be tested requirements.

7.1.4

Clean with nitrogen gas (5.1) at a flow rate of about 0.2 L/min through the sampler line and sample compartment.

7.2 Sample Collection

7.2.1

Refer to HJ/T 55, HJ 194, HJ 589 for spotting and sampling. Sampling temperature should be (-10 ~ 50) °C.

7.2.2

Zero calibration of the instrument with nitrogen (5.1), draw the background spectrum, the specific operation, see the operating instructions of each instrument.

7.2.3

Open the sampling pump to start continuous sampling, to ensure that the gas sample filled the sample chamber after the start of sample analysis, the analysis time to select 1 min.