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

HJ 657-2013

**Ambient air and stationary source emission. Determination of
metals in ambient particulate matter. Inductively coupled
plasma/mass spectrometry (ICP-MS)**

空气和废气 颗粒物中铅等金属元素的测定 电感耦合等离子体质谱法 含2018年第
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Foreword

In order to implement the Environmental Protection Law of the People's Republic of China and the Law of the People's Republic of China on the Prevention and Control of Air Pollution, protect the environment and protect people this standard is established for the determination of metal elements in air and exhaust particulates.

This standard specifies the inductively coupled plasma for the determination of lead and other metal elements in ambient air, unorganized emissions and pollutants.

Mass spectrometry.

This standard is the first release.

Appendix A of this standard is a normative appendix, and Appendix B and Appendix C are informative appendices.

This standard was formulated by the Science and Technology Standards Department of the Ministry of Environmental Protection.

This standard is mainly drafted by. Shanghai Environmental Monitoring Center.

This standard is verified by. National Environmental Analysis and Testing Center, Zhejiang Environmental Monitoring Center, Ningbo Environmental Monitoring Center, Shanghai Baoshan District Environmental Monitoring Station, Shanghai Jiading District Environmental Monitoring Station, and Australia Real Analysis and Testing (Shanghai) Co., Ltd.

This standard was approved by the Ministry of Environmental Protection on August 16, 2013.

This standard has been implemented since September 1, 2013.

This standard is explained by the Ministry of Environmental Protection.

Determination of lead and other metallic elements in air and exhaust particulates
Inductively coupled plasma mass spectrometry

1 Scope of application

This standard specifies the determination of antimony (Sb), aluminum (Al), arsenic (As), barium (Ba), barium (Be), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), Lead (Pb), manganese (Mn), molybdenum (Mo), nickel (Ni), selenium (Se), silver (Ag), thallium (Tl), thorium (Th), uranium (U), vanadium (V), Zinc (Zn), bismuth (Bi), Inductively coupled plasma mass spectrometry of metal elements such as strontium (Sr), tin (Sn), and lithium (Li).

This standard applies to ambient air PM_{2.5}, PM₁₀, TSP and sputum (Sb) in unorganized emissions and pollution source exhaust particulates.

Aluminum (Al), arsenic (As), barium (Ba), barium (Be), cadmium (Cd), chromium (Cr), cobalt (Co), copper (Cu), lead (Pb), manganese (Mn), Molybdenum (Mo), nickel (Ni), selenium (Se), silver (Ag), thallium (Tl), thorium (Th), uranium (U), vanadium (V), zinc (Zn), antimony (Bi), antimony (Sr), tin (Sn), lithium (Li), etc.

Determination of metallic elements.

When the air sampling amount is 150m³ (standard state) and the sampling source of the pollution source is 0.600m³ (standard dry flue gas), each the method detection limits for metal elements are given in Appendix A.

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 Determination of particulate matter in fixed pollution source exhaust gas and sampling method of gaseous pollutants HJ/T 48 soot sampler technical conditions HJ/T 55 Technical Guidelines for the Monitoring of Unorganized Emissions of Air Pollutants HJ/T 77.2 Determination of Dioxins in Ambient Air and Exhaust Gases Isotope Dilution High Resolution Gas Chromatography - High Resolution Spectral method HJ 93 ambient air particulate matter (PM₁₀ and PM_{2.5}) sampler technical requirements and test methods HJ/T 194 Technical Specifications for Manual Air Quality Monitoring HJ/T 374 total suspended particulate sampler technical requirements and testing methods HJ/T 397 Fixed Source Exhaust Gas Monitoring Technical Specification "Regulations on Environmental Air Quality Monitoring (Trial)" (State Environmental Protection Administration Announcement No. 4, 2007)

3 Terms and definitions

The following terms and definitions apply to this standard.

3.1 Calibration Blank (Calibration Blank)

The composition should be the same as the solution used to dilute the standard, usually a nitric acid solution at a concentration of (1 99).

3.2 Laboratory Reagent Blank (Laboratory Reagent Blank)

The preparation process must be the same as the preparation of the sample, except that the reagents used are the same as those used for the preparation of the sample.

3.3 Washing blank solution (Rinse Blank)

Typically a nitric acid solution at a concentration of (2 98) is used primarily to flush residues from the instrument system that may have originated from the previous measurement.

3.4 Field Blank (Field Blank)

The blank sample does not need to be evacuated or the source of exhaust gas passes through the blank filter (filter cartridge), but passes through the same place as the actual sample.

Management and transportation operations should avoid contamination and loss during sample transportation.

4 Principle of the method

The filter is used to collect the particulate matter in the ambient air, and the filter cartridge is used to collect the particulate matter in the waste gas of the pollution source, and the collected sample is pretreated (micro After wave digestion or electrothermal plate digestion, the content of each metal element was measured by inductively coupled plasma mass spectrometry (ICP-MS).

5.1 Isobaric interference

Table B-1 in Appendix B is the method to avoid such interference (except ^{98}Mo and ^{82}Se will still have ^{98}Ru and ^{82}Kr interference)

The recommended isotope table. If you want to achieve higher sensitivity, choose other natural abundance isotopes in Table B-1.

Can produce one or more isobaric interferences. Such interference can be corrected using mathematical equations, usually measuring interference elements.