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HJ

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

HJ 539-2015

Replacing HJ 539-2009

**Ambient air. Determination of lead. Graphite furnace atomic
absorption spectrometry**

环境空气 铅的测定 石墨炉原子吸收分光光度法 含2018年第1号修改单

(English Translation)

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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 Atmospheric Pollution, Environment, the protection of human health, regulate the ambient air lead monitoring methods, the development of this standard.

This standard specifies the determination of lead in ambient air by graphite furnace atomic absorption spectrophotometry.

This standard is the "ambient air lead determination of graphite furnace atomic absorption spectrophotometry (provisional)" (HJ 539-2009) the revision.

This standard was first published in 2009, the original standard drafting unit for the Beijing Environmental Protection Monitoring Center. This is the first the main contents of the amendment are as follows.

- choose a more appropriate filter;
- increased the microwave digestion of the pre-treatment and improve the digestion of the hot plate digestion conditions, changing the digestion with acid;
- Increased interference cancellation and quality assurance and quality control.

From the date of implementation of this standard, the original standard "Determination of ambient air lead graphite furnace atomic absorption spectrophotometry (temporary)" (HJ 539-2009).

This standard is organized by the Ministry of Environmental Protection Science and Technology Standards Division.

The drafting of this standard. Beijing Environmental Protection Monitoring Center.

The standard verification unit. Beijing Fengtai District Environmental Monitoring Station, Beijing Yanqing County Environmental Monitoring Station, Beijing Miyun District Environmental Monitoring Station, Beijing China Measurement North Detection Technology Co., Ltd., Beijing Fangshan District Environmental Monitoring Station, Beijing Environmental Protection Monitoring center.

The Environmental Protection Department of this standard approves on November 20, 2015.

This standard is implemented as of December 15, 2015.

This standard is explained by the Ministry of Environmental Protection.

Ambient air - Determination of lead - Graphite furnace atomic absorption spectrophotometric method

1 Scope of application

This standard specifies the determination of lead in ambient air by graphite furnace atomic absorption spectrophotometry.

This standard applies to the determination of lead in ambient air.

Collect the ambient air 10 m³ (standard state), the sample volume to 50 ml, the detection limit of 0.009 µg/m³, the lower limit of determination was 0.036 µg/m³.

2 Normative reference documents

The contents of this standard refer to the following documents or their terms. Those who do not specify the date of the reference file, the effective version of the appropriate for this standard.

Ambient air - Determination of total suspended particulates - Gravimetric method GB/T Technical specification for manual monitoring of ambient air quality Technical requirements and testing methods for HJ/T 374 total suspended particulate matter sampler

3 Principle of the method

With quartz fiber and other filters to collect ambient air particles in the sample, after digestion, into the graphite furnace atomizer, After drying, ashing and atomization, the ground state atoms of 283.3 nm at the line of selective absorption, the absorbance value and the quality of lead is proportional to the concentration.

4 Interference and elimination

Ammonium dihydrogen phosphate is added as a matrix modifier to eliminate matrix interference. High concentrations of calcium, sulfate, phosphate, iodine Chemical, fluoride or acetic acid can interfere with the determination of lead, can be corrected by standard addition method. Background interference can be done by deducting background the way to eliminate.

5 Reagents and materials

Unless otherwise stated, the analytical grade is used in accordance with national standards. Experimental water. specific resistance $\geq 18 \text{ M ohm} \cdot \text{cm}$.

5.1

nitric acid. $\rho(\text{HNO}_3) = 1.42 \text{ g/ml}$.

5.2

Hydrochloric acid. $\rho(\text{HCl}) = 1.19 \text{ g/ml}$.

5.3

Hydrogen peroxide. $\phi(\text{H}_2\text{O}_2) = 30\%$.

5.4

nitric acid solution. I9.

Prepared with nitric acid (5.1).

5.5

Nitric acid solution. $\phi(\text{HNO}_3) = 1\%$.

Prepared with nitric acid (5.1).

5.6

Lead standard stock solution. $\rho(\text{Pb}) = 1.00 \text{ mg/ml}$.

Accurately weighed 1.0000 g Spectrum of pure metal lead placed in 100 ml beaker, in the fume hood by adding 15 ml of nitric acid (5.1), Slowly heat on the hot plate until it is completely dissolved and set to 1000 ml with nitric acid solution (5.5). Transferred to polyethylene plastic Bottle, in the refrigerator in the cold storage, at least 30 days can be stable preservation. You can also purchase a certified standard solution.

5.7

lead standard use of liquid. $\rho(\text{Pb}) = 0.5 \mu\text{g/ml}$.

The lead standard stock solution (5.6) was diluted with nitric acid solution (5.5) to prepare a standard containing $0.5 \mu\text{g/ml}$ of lead liquid.

5.8

Quartz fiber filter. the particle size of more than 0.3 μm particles retention efficiency $\geq 99\%$. The background concentration value should meet the determination Claim.

5.9

Substrate modifier. ammonium dihydrogen phosphate solution.

Weigh 5 g of ammonium dihydrogen phosphate, with 100 ml of nitric acid solution (5.5) dissolved, prepared into a mass concentration of 5% of dihydrogen phosphate Ammonium solution.

5.10

argon. purity of not less than 99.99%.

6 Instruments and equipment

Unless otherwise noted, the use of A-level glassware in accordance with national standards.

6.1

TSP cutter. cutting diameter $\text{Da}_{50} = 100 \pm 0.5 \mu\text{m}$, other performance and technical indicators should be consistent with the provisions of HJ/T 374.

6.2

sampler. large flow sampler operating point flow is generally 1.05 m^3/min ; in the flow sampler operating point flow is generally 0.100 m^3/min . Large flow sampler and medium flow sampler Other performance and technical specifications shall comply with the requirements of HJ/T 374.

6.3

Graphite Furnace Atomic Absorption Spectrophotometer.

6.4

electric plate or microwave digestion. With programmable power setting function, precision control.

6.5

conical flask.

7.1 Collection of samples

The sampling of the particles is carried out in accordance with the sampling requirements for particulate matter in GB/T 15432 and HJ/T 194. Sampling should be noted in detail Recorded environmental conditions.