

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

HJ 787-2016

**Solid waste. Determination of lead and cadmium. Graphite
furnace atomic absorption spectrometry**

固体废物 铅和镉的测定 石墨炉原子吸收分光光度法

(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 Environmental Pollution by Solid Wastes, Protect the environment, protect human health, regulate the solid waste and solid waste leaching solution of lead and cadmium determination method, the development of this standard quasi.

This standard specifies the graphite furnace atomic absorption spectrophotometric method for the determination of lead and cadmium in solid waste and solid waste leachate.

This standard is the first release.

Appendix A and Appendix B of this standard are informative.

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

The main drafting unit of this standard. Jiangsu Province Environmental Monitoring Center.

The standard verification unit. Nanjing Environmental Monitoring Center Station, Zhejiang Province Environmental Monitoring Center, Shanghai Environmental Monitoring Center, Changzhou City Environmental Monitoring Center Station, Ma On Shan City Environmental Monitoring Center Station, Lianyungang City Environmental Monitoring Center Station.

The environmental protection department of this standard approved on March 29, 2016.

This standard has been implemented since May 1, 2016.

This standard is explained by the Ministry of Environmental Protection.

Solid waste - Determination of lead and cadmium - Graphite furnace atomic absorption spectrophotometric method Warning. nitric acid used in the experiment, perchloric acid with strong oxidizing and corrosive, hydrochloric acid, hydrofluoric acid with strong volatile and corrosive, the operation should be required to wear protective equipment, solution preparation and sample pretreatment process should be in the fume hood into Line operation.

1 Scope of application

This standard specifies the graphite furnace atomic absorption spectrophotometric method for the determination of lead and cadmium in solid waste and solid waste leachate.

This standard is applicable to the determination of lead and cadmium in solid waste and solid waste leachate.

When the amount of solid waste is 0.5 g and the volume of the volume is 25 ml after digestion, the detection limits of lead and cadmium are 0.3 Mg/kg and 0.1 mg/kg, with a lower limit of 1.2 mg/kg and 0.4 mg/kg, respectively. When the solid waste leachate is sampled in volume 50 ml, digested to 50 ml, the lead and cadmium detection limit were 0.9 µg/L and 0.6 µg/L, the determination of the lower limit Do not be 3.6 µg/L and 2.4 µg/L.

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.

Technical specification for SJ sample preparation for industrial solid waste Technical Specification for Hazardous Waste Identification HJ/T 299 Solid waste leaching toxicity leaching method sulfuric acid nitric acid method HJ/T 300 solid waste leaching toxicity leaching method acetic acid buffer solution method HJ 557 Solid waste leaching toxicity leaching method Horizontal oscillation method

3 Principle of the method

Solid waste or solid waste leachate after acid digestion, into the graphite furnace atomizer, after drying, ashing and the original Sub-atomization, as the ground state of the vapor, the element of the hollow cathode lamp or electrodeless discharge lamp emission characteristics of the radiation line selectivity absorb. In a certain concentration range, the absorption intensity and the sample to be measured in proportion to the mass concentration.

4 Interference and elimination

When the mass concentration of Ca in the sample is higher than 500 mg/L, the mass concentration of Fe is higher than 50 mg/L, the mass concentration of Mn is high at 25 mg/L, the determination of lead and cadmium interference, sample dilution method or standard addition method to eliminate its interference. solid Waste matrix composition is more complex, adding matrix modifier ammonium dihydrogen phosphate, can eliminate the organic matter caused by matrix interference. when when the sample matrix composition is unknown or the recoveries are more than the range of the control requirements of this method, the standard addition method should be used to measure and calculate the results, see Appendix A.

5 Reagents and materials

Unless otherwise stated, analytical reagents conforming to national standards are used in the analysis, and the test water is a newly prepared deionized water.

5.1

sulfuric acid. $\rho(\text{H}_2\text{SO}_4) = 1.84 \text{ g/ml}$, excellent grade pure.

5.2

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

5.3

hydrochloric acid. $\rho(\text{HCl}) = 1.19 \text{ g/ml}$, excellent grade pure.

5.4

hydrofluoric acid. $\rho(\text{HF}) = 1.49 \text{ g/ml}$, excellent grade pure.

5.5

perchloric acid. $\rho(\text{HClO}_4) = 1.68 \text{ g/ml}$, excellent grade pure.

5.6

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

5.7

Metal Lead. Spectrum Pure.

5.8

Metal cadmium. Spectrum pure.

5.9

Ammonium dihydrogen phosphate ($\text{NH}_4\text{H}_2\text{PO}_4$). excellent grade pure.

5.10

nitric acid solution. 1 9 (v/v), prepared with nitric acid (5.2).

5.11

nitric acid solution. 1 99 (v/v), prepared with nitric acid (5.2).

5.12

hydrochloric acid solution. 1 1 (v/v), prepared with hydrochloric acid (5.3).

5.13

matrix modifier. ammonium dihydrogen phosphate solution.

Accurately weigh 13.8 g (accurate to 0.0001 g) ammonium dihydrogen phosphate (5.9), dissolved with experimental water and set to 1000 ml.

5.14

lead standard stock solution. $\rho = 1000 \text{ mg/L}$.

Accurately weigh 1.000 g (accurate to 0.0001 g) of metal lead (5.7), add 15 ml of nitric acid (5.2) to dissolve, if necessary can be dissolved by heating. The whole volume into the 1000 ml volumetric flask, with nitric acid solution (5.11) constant volume to the mark, shake. Can also be used Commercially available standard solution.

5.15

cadmium standard stock solution. $\rho = 1000 \text{ mg/L}$.

Accurately weigh 1.000 g (accurate to 0.0001 g) of metal cadmium (5.8), add 15 ml of nitric acid (5.2) to dissolve, if necessary can be dissolved by heating. The whole volume into the 1000 ml volumetric flask, with nitric acid solution (5.11) constant volume to the mark, shake. Can also be used Commercially available standard solution.

5.16

Lead Standard Intermediate. $\rho = 100 \text{ mg/L}$.

Accurate removal of lead standard stock solution (5.14) 10.0 ml in 100 ml volumetric flask, with nitric acid solution (5.11) constant volume to standard Line, shake well. Pro is now available.

5.17

cadmium standard intermediate liquid. $\rho = 100 \text{ mg/L}$.

Accurate removal of cadmium standard stock solution (5.15) 10.0 ml in 100 ml volumetric flask, with nitric acid solution (5.11) constant volume to standard Line, shake well. Pro is now available.