

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

HJ 917-2017

**Stationary source emission--Determination of total gaseous
mercury --Carbon sorbent traps / thermal cracking atomic
absorption spectrophotometric method**

固定污染源废气 气态汞的测定 活性炭吸附热裂解原子吸收分光光度法

(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, Habitat, to protect human health, standardize the determination of gaseous mercury in the exhaust gas pollution sources, the development of this standard.

This standard specifies the determination of gaseous fixed-source emissions of mercury in activated carbon adsorption/thermal cracking atomic absorption spectrophotometry.

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. National Environmental Analysis Test Center.

This standard verification unit. Beijing Environmental Protection Monitoring Center, Xinjiang Uygur Autonomous Region Environmental Monitoring Station, China Central Environmental Science Research Institute, Tsinghua University, Chaoyang District, Beijing Environmental Protection Monitoring Station and Binhai New Area, Tianjin Environmental Protection Monitoring Station.

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

This standard is interpreted by the MEP.

Stationary source emissions - Determination of gaseous mercury - Activated carbon adsorption/thermal cracking Atomic absorption spectrophotometry Warning. The sulfuric acid used in the experiment has a strong corrosive, HgCl_2 standard solution is toxic, reagent preparation process should be carried out in the fume hood, operation should be required to wear protective equipment, to avoid inhalation of the respiratory tract and skin, clothing.

1 Scope of application

This standard specifies the determination of gaseous fixed-source emissions of mercury in activated carbon adsorption/thermal cracking atomic absorption spectrophotometry.

This standard applies to the installation of denitration, dust removal, desulfurization of coal-fired power plant emissions of mercury in the determination of gaseous mercury.

When the sampling volume is 10 L (dry flue gas under standard conditions), the detection limit is $0.1 \mu\text{g}/\text{m}^3$ and the lower limit of determination is $0.4 \mu\text{g}/\text{m}^3$.

2 Normative references

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

Determination of Particulate Matter and Gaseous Pollutants in Exhaust of Fixed Pollution Sources GB/T 16157

3 Method principle

Through this standard sampling system, the exhaust gas in the effective enrichment of gaseous mercury in the iodine or other halogen and its compounds Treated activated carbon material, using direct pyrolysis atomic absorption spectrophotometry Determination of activated carbon in the adsorbent tube of mercury in the material Content, based on the sampling volume, calculate the concentration of gaseous mercury.

4 Interference and elimination

SO_2 , NO_x will inhibit the capture of mercury on the activated carbon, dioxide compounds in the front of the adsorption tube to remove acid gas interference.

5 Reagents and materials

Unless otherwise specified, all analytical reagents used in the analysis are in accordance with national standards. The experimental water is freshly prepared deionized water or distilled water.

5.1

Mercury chloride (HgCl_2).

5.2

Sulfuric acid. $\rho(\text{H}_2\text{SO}_4) = 1.84 \text{ g/ml}$.

5.3

sulfuric acid solution. $c(1/2 \text{ H}_2\text{SO}_4) = 0.5 \text{ mol/L}$.

Pipette 6.9 ml sulfuric acid (5.2) slowly adding an appropriate amount of water, diluted after cooling, constant volume to 500 ml, mix.

5.4

Mercury standard stock solution. $\rho(\text{Hg}) = 1000 \text{ mg/L}$.

Weigh 0.1354 g mercuric chloride (5.1), with sulfuric acid solution (5.3) dissolved and diluted to a constant volume of 100 ml. Can also be used Mercury certified reference material on the market.

5.5

Mercury standard solution. $\rho(\text{Hg}) = 10.0 \text{ mg/L}$.

Remove the standard stock solution of mercury (5.4) 1.00 ml, dilute it with sulfuric acid solution (5.3) to make a volume of 100 ml. Pro use now with.

6.1.1 Sampling system components

Typical gaseous mercury sampling systems typically include activated carbon sorbent tubes, sampling probes, temperature sensors, dehumidification units, Sampling controller, sampling pump, see Figure 1.

Figure 1 Typical gaseous mercury sampling system

6.1.2.1 Two-stage

The adsorption tube contains two sections of specially prepared activated carbon treated with iodine or other halogen and its compounds and each section can be divided Analysis, see Figure 2.

Figure 2 two-stage activated carbon adsorption tube

6.1.2.2 Three-stage type

Adsorption tube equipped with three sections of special activated carbon, which plus the standard section of activated carbon to add a known quality of mercury, can also be used on the market Activated carbon tubes have been spiked, see Figure 3.

Figure 3 Three-stage activated carbon adsorption tube

6.1.3 Sampling probe

Probe with heating function (heating temperature not less than 120 °C), to prevent flue gas condensation.

6.1.4 Temperature sensor

Measurement accuracy within ± 1.5 °C.

6.1.5 Dehumidification device

Before the airflow enters the sampling controller, the dehumidifier should be used to remove the water vapor from the airflow.

6.1.6 Sampling controller

Used to determine the total volume of dry flue gas, you can control the sampling flow to maintain within $\pm 10\%$.

6.1.7 Sampling pump

Power should be able to meet the system flow range requirements.

6.2 Mercury analyzer

Has a thermal cracking unit, the sample of mercury atomized to form gaseous mercury, atomic absorption spectrophotometric quantitative analysis Mercury, the detection limit should be less than 2.0 $\mu\text{g/kg}$.

6.3 Other

Common laboratory equipment and equipment.

7.1 Sample Collection

Fixed pollution source sampling and laying of sampling points should be consistent with GB/T 16157 in the relevant provisions. Before and after sampling should be Airtight testing. For each sampling, two activated carbon adsorption tubes (6.1.2.1) must be used for