

HJ

INDUSTRY STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

HJ/T 45-1999

**Stationary source emission. Determination of asphaltic smoke.
Gravimetric method**

固定污染源排气中沥青烟的测定 重量法

(English Translation)

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1 Scope

1.1

This Standard is applicable to the determination of asphaltic smoke discharged from a stationary pollution source in an intentional emission manner.

1.2

The limit of detection for asphaltic smoke is 5.1mg; while the quantitative measurement range is 17.0mg~2000mg.

2 Definition

Asphaltic smoke: it refers to the mixed smoke of liquid hydrocarbon particulate matter and a small amount of gaseous hydrocarbon matter that is formed during the production and processing of asphalt and asphalt products. In this Standard, it refers to the granular liquid hydrocarbon matter that can be captured by the 3# glass fiber filter cartridge with a weight of 1.1 ± 0.1 g.

3 Method Principle

The asphaltic smoke in the exhaust cylinder is collected into a glass fiber filter cartridge that has a constant weight. After the moisture is removed, the concentration of the asphaltic

smoke is calculated from the increment in the glass fiber filter cartridge before and after sampling. If the asphaltic smoke contains significant solid particles, extract the sampled glass fiber filter cartridge by cyclohexane; and determine the asphaltic smoke in the extract.

4 Normative References

The following standards contain provisions which, through reference in this Standard, constitute provisions of this Standard.

GB 16297-1996 Comprehensive Emission Standard of Air Pollutants

GB 16157-1996 The Determination of Particulates and Sampling Methods of Gaseous Pollutants Emitted from Exhaust Gas of Stationary Source

13. Heating socket 14. Sampling pipe 15. Suction end of sampling pipe

6.1.2 3# glass fiber filter cartridge

The weight is 1.1 ± 0.1 g; caliber is 25mm; and length is 70mm.

6.2 Soxhlet extractor: 250mL.

6.3 Temperature-controlled electric heating bowl: 250mL.

6.4 Nylon screen cloth: 100~120mesh.

7 Collection and Storage of Sample

7.1

Sampling points, location and frequency.

7.1.1

The sampling location and points shall be implemented according to 4.2 in GB 16157-1996.

7.1.2

The sampling time and frequency shall be determined according to 8.2.1 in GB 16297-1996.

7.2.1 Treatment and constant weight of glass fiber filter cartridge

Use a pencil to number the filter cartridge (6.1.2); bake at 105°C for 2h, or bake at 400°C for 1h; then place in a desiccator to cool to room temperature; and weigh to constant weight by a balance, accurate to 0.1mg. "Constant weight" refers to the difference between two weighings with an interval of 24h; and the 3 # filter cartridge shall be no greater than

5.0mg.

7.2.2 Installation of the filter cartridge

Put the 3# filter cartridge (7.2.1) with constant weight into the filter cartridge holder; gently press the filter cartridge mouth by the filter cartridge gland; and write down the number of filter cartridge.

7.2.3 Start the filter cartridge insulation system

Connect the heating socket of the filter cartridge holder to 220V power supply; and turn on the temperature control switch; so that the temperature of the filter cartridge holder raised to $42 \pm 10^\circ\text{C}$, and the indicator light shall flash.

7.2.4 Inspection

Inspect whether the connections and functions of all instruments in the sampling system are normal; and perform leak detection on the sampling system in accordance with the relevant provisions of 5.2.2.3 C in GB 16157-1996.

7.3 Sampling

Extend the sampling nozzle and front elbow of the sampling pipe (6.1.1) into the flue opening; the filter cartridge holder and cooling jacket shall be outside the flue opening; and maintain the temperature of the filter cartridge holder insulation system at $42^\circ\text{C} \pm 10^\circ\text{C}$ for sampling.

When the temperature of the asphaltic smoke is greater than or equal to 150°C , the cooling device shall be activated. When the temperature of the asphaltic smoke is lower than 150°C , the cooling device is not required. Adjust the cooling water flow rate so that the asphaltic smoke enters the filter cartridge holder at no lower than 40°C .

The sampling steps are operated in accordance with items c ~ n in 8.3.5 of GB 16157-1996.

After sampling, take out the sampling nozzle and front elbow; wipe off the shoot on the outside; put the 3# glass fiber filter cartridge into the numbered sample box; and bring the sampling nozzle, front elbow and sampling pipe together back to the laboratory for analysis.

8.1 Weighing the filter cartridge

Put the sampled filter cartridge in a desiccator for 24h, and then weigh it to a constant weight by a balance. The constant weight requirements are the same as (7.2.1).

Record the weight gain of 3# filter cartridge as ΔW_1 .

8.2 Washing the sampling pipe

When the concentration of asphaltic smoke is high, the sampling tube shall retain a small amount of asphaltic smoke. Wash the sampling nozzle, front bend and sampling pipe with cyclohexane (5.1). Combine the washing liquid and place it in a weighed beaker. Cover it by filter paper and let it evaporate naturally at room temperature and pressure. After the cyclohexane has evaporated completely; move the beaker to a desiccator for 24h to a constant weight; and record the weight gain of the beaker as ΔW_2 .

9.1 Calculation of the concentration of asphaltic smoke

Appendix A (Standard)

Operation Procedures for Determining the Asphaltic Smoke after
Cyclohexane Extraction

Wrap the filter cartridge, after sampling and with constant weight, by 100~120 mesh nylon screen cloth (6.4) (note; do not cut the filter cartridge); and put it into the extraction tube of Soxhlet extractor (6.2); the height shall be lower than the extractor

Siphon area. Pour an appropriate amount of cyclohexane (5.1) to immerse the extractor siphon tube; add about another 40mL after siphoning; install the condenser;

turn on the electric heating bowl (6.3) to heat; and make the cyclohexane droplets in the extractor cool at a rate of 0.5~1 drop/s. After siphoning backflows for 8~10 times, the asphaltic smoke-cyclohexane solution in the receiving bottle is about 40mL; stop heating; cool off the receiving bottle; and transfer the extract of the receiving bottle to

100mL beaker with constant weight, (siphon the cyclohexane in the extraction tube into the receiving bottle, discard the filter cartridge); and wash the receiving bottle by cyclohexane (5.1) for three times, 5 mL each time. The washing solution is combined with the extract in the beaker; and the total volume is about 60mL. Cover the beaker by filter paper and evaporate naturally at room temperature and pressure. After the cyclohexane has evaporated completely, place the beaker in a desiccator for 24h and weigh it to a constant weight. Record the weight gain ΔW_{tot} of the beaker, (there shall be $\Delta W_{tot} \sim \Delta W_1$), accurate to 0.1mg. At the same time, take the same batch of filter cartridges for a blank test. When the blank test value is less than $\pm 1\text{mg}$, the correction value can be ignored.

Additional Information