

ICS 13.030
CCS Z11



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

GB/T 16157-1996

Replacing GB 9078-1988

**Determination of particulates and sampling methods of
gaseous pollutants emitted from exhaust gas of stationary
source**

固定污染源排气中颗粒物测定与气态污染物采样方法

Issued on: January 12, 1996

Implemented on: March 6, 1996

Issued by: Ministry of Ecology and Environment

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1 Content and applicable scope

GB/T 16157-1996 is the Chinese national standard on determination of particulates and sampling methods of gaseous pollutants emitted from exhaust gas of stationary source, in the field of environment and health protection, safety. The /T suffix marks it as a recommended standard: it is not compulsory by itself, but it becomes binding as soon as a contract, a tender or a customer specification calls it up - which in practice is how most foreign buyers meet it. It was issued on 12 January 1996 by the Ministry of Ecology and Environment, and has been in force since 6 March 1996. Classification: ICS 13.030, CCS Z11. This page is published from the official record of the standard held by the Chinese standards administration: the identification, the dates, the classification and the issuing body are taken from there. The clause text, the tables and the numeric limits are in the document itself, which is delivered complete in English translation.

1.1 This Standard specifies the determination methods of particulates in exhaust gas emitted from stationary sources such as flue ducts, chimneys and gas exhaust cylinders (hereafter called "flue duct"), and sampling methods of gaseous pollutants.

1.2 This Standard applies to determination of particulates in exhaust gas emitted from stationary pollution sources such as various boilers, industrial kilns and other pollution sources, and sampling of gaseous pollutants.

1.3 When determining the concentration of particulates in exhaust gas emitted from stationary pollution sources, if the concentration is less than or equal to 20 mg/m³. HJ 836 (Stationary source emission - Determination of mass concentration of particulate matter at low concentration - Manual gravimetric method) is applicable; if concentration is greater than 20 mg/m³ and does not exceed 50 mg/m³, this Standard applies in conjunction with HJ 836. When the concentration, determined by using this Standard, is less than or equal to 20 mg/m³, the determination result is expressed as "< 20 mg/m³". [see Amendment]

2 Definitions

2.1 Particulates Particulates refer to those solid and liquid particulate matters suspending in the exhaust gas, which are generated during combustion, composition, decomposition of fuel and other substances, or generated during mechanical treatment of various materials.

2.2 Gaseous pollutants Gaseous pollutants refer to those various pollutants in gaseous state dispersed in the exhaust gas.

2.3 Dry exhaust gas under standard condition Dry exhaust gas under standard condition refers to the exhaust gas which does not contain moisture at the temperature of 273 K, and the pressure of 101,300 Pa.

3 Determination and calculation content

3.1 Determination of the exhaust gas parameters (temperature, pressure, moisture and composition).

3.2 Calculation of the exhaust gas density and gas molecular weight.

3.3 Determination of exhaust gas flow speed and flow.

3.4 Determination of particulates in exhaust gas and calculation of emission concentration and emission rate.

3.5 Sampling of gaseous pollutants in exhaust gas and calculation of emission concentration and emission rate.

4 Basic requirements of sampling

4.1 Sampling operating conditions Sampling shall be conducted when the production equipment is under normal operating conditions, or according to the requirements of relevant pollutant emission standard, to determine under the specified operating conditions.

4.2.2 Sampling holes

4.2.2.1 Sampling hole shall be made at selected measurement position. The inner diameter of sampling hole shall not be less than 80 mm, the length of sampling tube shall not be

longer than 50 mm. When it is not used, it shall be covered by plate, tube plug or tube cap (Fig.1, Fig.2, and Fig.3). When it is only used for sampling gaseous pollutants, its inner diameter shall not be less than 40 mm.

4.2.3 Sampling platform The sampling platform is setup for sampling by the measurement personnel, it shall have sufficient working area for safety and easy operation by the working personnel. The platform shall not be less than

1.5 m² in area, and it shall be installed with

1.1 m high guardrails. The distance between the sampling hole and the platform surface shall be approximately

5.1.1 Measurement positions and points According to

4.2.1 and 4.2.4. In normal case, the measurement may be made at a point close to the center of flue duct.

5.1.3 Determination steps

5.2 Determination of moisture content in exhaust gas The moisture content in exhaust gas shall be measured with one of the methods such as the condensation method, dry-wet bulb method or weight method, depending on different measurement objects.

5.2.1 Sampling positions and measurement points According to

4.2.1 and 4.2.4. The samples shall be taken at a measurement point close to the center of the flue duct.

5.2.2 Condensation method

5.2.2.1 Principle Draw a certain volume of exhaust gas from the flue duct and let it pass the condenser. Calculate the moisture content in exhaust gas by the amount of the condensate plus that of the vapor contained in the saturated gas exhausted from the condenser.

5.2.3 Dry-wet bulb method

5.2.3.1 Principle Make the gas flow through the dry-wet bulb thermometer at a certain speed. Calculate the moisture content in the exhaust gas based on the reading of the dry-wet bulb thermometer and the pressure of exhaust gas at the measurement point.

5.2.4 Weight method

5.2.4.1 Principle Draw a certain volume of exhaust gas from the flue duct, let it pass through the moisture absorption tube loaded with moisture absorbent. As the moisture in exhaust gas is absorbed by the moisture absorbent, the increased weight of the moisture