ICS 75.160.20
CCS E 31

NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 8019-2025

Replacing GB/T 8019-2008

Determination of gum content in fuels - Jet evaporation

燃料胶质含量的测定 喷射蒸发法

Issued on: October 5, 2025 **Implemented on: May 1, 2026**

Issued by: State Administration for Market Regulation;
Standardization Administration of the PRC

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1 Scope

1.1 This Standard specifies the test method for gum content in existent gum of aviation fuels, and motor gasoline and other volatile fractions (including products that contain alcohol, ether oxygen-compounds and sediment inhibitor additives) during the test.

1.2 This Standard specifies the determination method for the insoluble part of

n-heptane in non-aviation fuel residues.

1.3 This Standard adopts the units of International System of Units (SI).

1.4 This Standard involves certain hazardous materials, operations and

equipment, but it does not intend to make recommendations on all related safety issues. Therefore, it is necessary for users to establish appropriate safety and protection measures and determine an applicable management system before using this Standard. For special warning statements, see 6.4, 7.2 and 8.2.1 for details.

2 Normative references

GB/T 514

GB/T 4756

GB/T 4756

ISO 3170

GB/T 8170

6 Apparatuses

6.1 Balance: the sensitivity is 0.1 mg.

6.2 Beaker: 100 mL in capacity. Its size is shown in Figure 1.

Group the beakers. The number of each group is determined by the number of beaker holes in the evaporation bath. Mark each beaker in each group with a number or letter, including the tared beaker.

6.3 Cooling container: desiccator or other containers that can be tightly closed.

It is used to cool the beaker before weighing, and it's unnecessary to use desiccant.

Note: The use of desiccant will cause incorrect results.

6.4 A solid metal block bath or a liquid bath can be used for electrical heating.

It is composed according to the principle that is shown in Figure 1. The bath shall have two or more beaker holes and exhaust ports. When it is equipped with a conical adapter that is made of 500 μm ~ 600 μm copper or stainless- steel sieve, the flow rate of each exhaust port shall be 1 000 (mL/s) ± 150 (mL/s).

If a liquid bath is used, it shall contain a suitable liquid within 25 mm from the top. A temperature controller or appropriate liquid reflux can be used to maintain the temperature.

Warning -- If an evaporation bath that is filled with liquid is used, make sure that the flash point of the used liquid is at least 30 °C higher than the expected maximum bath temperature.

6.5 Flowmeter: As shown in Figure 1, it can measure a flow rate of air or steam at each exhaust port of 1 000 mL/s. Alternatively, a pressure gauge can be used to measure a flow rate of air or steam at each exhaust port of 1 000 (mL/s) ± 150 (mL/s).

6.6 Sintered glass funnel: coarse hole, 150 mL in capacity.

6.7 Steam: A suitable method can be used to generate the required amount of steam of 232 °C ~ 246 °C at the air inlet of the evaporation bath.

6.8 Thermometer: It shall meet the technical requirements of the thermometer

No. GB-29 in GB/T 514.

6.9 Graduated cylinder: 50 mL ± 0.5 mL in capacity.

6.10 Transferring tool: Brazier-head stainless-steel tweezers or stainless-steel

pliers, which are used to take out the beaker and the conical adapter.

7 Materials and reagents

7.1 Air: Filtered air whose pressure is not greater than 35 kPa.

7.2 Steam: Without oily residue; the pressure is not less than 35 kPa.

Warning -- If a steam heater is used, use protective equipment as required to avoid contact with exposed skin.

7.3 N-heptane: analytical reagent.

7.4 Gum solvent: A mixture of equal volume of toluene and acetone.

8 Sampling

The sampling method is specified in GB/T 4756; the taken samples shall be representative.

9.1 Assembly of air jet apparatus

9.1.1 Assemble the air jet apparatus as shown in Figure 1. Adjust the air flow rate at the outlet of the test device to 600 (mL/s) ± 90 (mL/s) at room temperature. Check whether the air flow rates at the remaining outlets are consistent.

Note: The reading of each outlet at normal temperature and pressure of 600 (mL/s) ± 90 (mL/s) will ensure that the output is 1 000 mL/s ± 150 mL/s at a temperature of 155 °C ± 5°C.

9.1.2 Heat the evaporation bath (see 6.4), until the temperature of the bath

reaches 160 °C ~ 165 °C; introduce air into the apparatus, until the flow rate of each outlet reaches the flow rate that is required in 9.1. Use a thermometer (see 6.8) to measure the temperature of each hole. The temperature-sensitive bubble of the thermometer shall be inserted into the bottom of the beaker in the hole. This method does not apply to any hole whose temperature exceeds the range of 150 °C ~ 160 °C. in millimeters 10.1.2 A method to calibrate the air flow is to separate the calibrated flowmeter from the apparatus that is described in 6.5, and directly detect the flow of each outlet under normal temperature and pressure. To ensure the accuracy of the data, the back pressure of the flowmeter shall be

less than 1 kPa.

10.1.3 Alternatively, another method of calibrating air flow is to measure and

adjust the corresponding total air flow that is supplied to all outlets. The total air flow is equal to the air flow of each outlet multiplied by the number of outlets (for example, if the apparatus has 5 holes, and the measured total flow is 3 000 mL/s, that is, the flow of each hole is 600 mL/s). When the total flow rate that is supplied to all outlets reaches an appropriate value after testing, compare the relative flow rate of each hole, to check whether it is consistent and meets the requirements in 10.1.1.

10.2 Steam flow correction

10.2.1 Check or calibrate the steam flow to ensure that all outlets reach 1 000 (mL/s) ± 150 (mL/s) under normal temperature and pressure. Refer to the manual of the apparatus to complete the steam flow calibration process.

10.2.2 A method to calibrate the steam flow is to connect a copper tube to the steam outlet and extend the copper tube into a mass-weighed 2 L graduated cylinder that contains crushed ice. Let the steam be discharged into the graduated cylinder for about 60 seconds. Adjust the position of the graduated cylinder, so that the end of the copper tube is immersed in water for less than

50 Mm, to prevent excessive back pressure. After a reasonable period of time,

remove the copper tube from the graduated cylinder and weigh the mass of the cylinder. The increased mass represents the amount of condensed steam.

Calculate the steam flow rate according to Formula (1): Where:

R -- steam flow, in milliliters per second (mL/s);

m1 -- mass of the graduated cylinder that contains the condensed steam, in grams (g);

m2 -- mass of ice and the graduated cylinder, in grams (g);

mk -- mass of 1 000 mL of steam at 232 °C under normal pressure; its value is 0.434 g;

t -- condensation time, in seconds (s).

11.5 Use a graduated cylinder to weigh 50 mL ± 0.5 mL of the sample; pour it into each weighed beaker (except the tared beaker). Use a beaker for each to- be-tested fuel. Put the beaker that contains the sample and the tared beaker into the evaporation bath; the time between the first beaker and the last beaker shall be as short as possible. When using air to evaporate the sample, stainless steel tweezers or pliers shall be used, to place the conical adapter. When using steam to evaporate, it's allowed to heat the beaker for 3 min ~ 4 min