

ICS 13.220.40



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

GB/T 8625-2005

Test method of difficult-flammability for building materials

建筑材料难燃性试验方法

(English Translation)

Issued on: March 31, 2026

Implemented on: October 1, 2026

Issued by: State Administration for Market Regulation

Table of Contents

Foreword...	3
1 Scope...	5
2 Normative References...	5
3 Terms and Definitions...	5
4 Test Device...	6
5 Calibration of the Test Device...	14
6 Specimen...	15
7 Conditioning...	16
8 Test Procedure...	16
9 Presentation of Test Results...	17
10 Judgment Criteria...	18
11 Test Report...	18
Appendix A (Informative) Calorimetric Apparatus...	20
Bibliography...	21

1 Scope

This Document describes a test method for determining the residual combustion length and flue gas temperature of building materials using a vertical combustion furnace.

This Document applies to the determination of the flammability performance of building materials used in industrial and civil buildings; it may also be used as a reference for determining the flammability performance of materials used in other settings.

2 Normative References

The provisions in following documents become the essential provisions of this Document through reference in this Document. For the dated documents, only the versions with the dates indicated are applicable to this Document; for the undated documents, only the latest version (including all the amendments) is applicable to this Document.

GB/T 5907.1 Fire protection vocabulary - Part 1.General terms

GB/T 16839.1 Thermocouples - Part 1.EMF specifications and tolerances

GB/T 40238 Reaction to fire tests for building materials and products - General rules for selection of substrates, conditioning and mounting of specimen

3 Terms and Definitions

For the purposes of this Document, the terms and definitions given in GB/T 5907.1 and the following apply.

3.1 Afterflame

Flaming combustion that persists after the ignition source has been removed.

[SOURCE. ISO 13943.2023, 3.12]

3.2 Afterglow

Phenomenon in which the combustion zone continues to glow after the ignition source has been removed and any flaming combustion has ceased.

[SOURCE. ISO 13943.2023, 3.14, modified]

3.3 Smoldering

Slow combustion of a material without visible light.

NOTE: Typically accompanied by the generation of flue gas and a rise in temperature.

[SOURCE. GB/T 5907.1-2014, 2.28, modified]

4.1.1 General

The vertical combustion furnace consists of a combustion chamber, burner, specimen holder, stable airflow layer, and flue. Its external dimensions are (1000 ± 40) mm x (1000 ± 40) mm x (3930 ± 40) mm, as shown in Figures 1 and 2.

4.1.2 Combustion chamber

The combustion chamber consists of furnace walls and furnace doors; the internal dimensions of the chamber are (800 ± 20) mm x (800 ± 20) mm x $(2\ 000 \pm 20)$ mm. The furnace walls feature an insulated sandwich structure comprising, from inside to outside, a 2 mm thick stainless-steel plate, a (6 ± 2) mm thick refractory fiber blanket, two layers of rock wool insulation [each (40 ± 3) mm thick], a (10 ± 2) mm thick calcium silicate board, and a 2 mm thick stainless-steel plate.

The furnace doors are divided into upper and lower sections, each connected to the furnace body by hinges; the door structure matches that of the furnace walls (see Figure 2). A tight seal against the furnace body is achieved for both doors through the combined action of handwheels and securing screws.

Observation windows are provided on both the upper furnace door and the rear wall of the

combustion chamber.

4.1.3 Burner

The burner (see Figure 3) has a square configuration measuring (200 ± 2) mm x (200 ± 2) mm.

Each of the four side tubes of the burner is fitted with eight stainless-steel nozzles with a diameter of (3.5 ± 0.1) mm; the upper edges of all nozzles must lie in the same horizontal plane, with a levelness deviation not exceeding ± 0.5 mm. The burner shall be installed horizontally at the center of the combustion chamber, at a height of $(1\ 000 \pm 10)$ mm above the furnace floor.

The gas used for the burner is a mixture of air and methane with a purity of no less than 99%.

When using volumetric flow meters, the volumetric flow rates under standard conditions (0°C ,

101.325 kPa) are (35.0 ± 0.5) L/min for methane and (17.5 ± 0.2) L/min for air; when using mass flow controllers, the mass flow rates are (418 ± 6) mg/s for methane (with density of 0.717 g/L under standard conditions) and (378 ± 4) mg/s for air (with density of 1.293 g/L under standard conditions).

The stable airflow layer consists of a square frame made of angle steel, positioned horizontally directly beneath the burner, see Figure 2. A wire mesh is laid at the bottom of the frame; and multiple layers of glass fiber mat are placed over the mesh. To establish uniform airflow within the combustion chamber, air is introduced through a duct with a diameter of (200 ± 10) mm at the lower part of the furnace body; the supplied air shall be maintained at a constant temperature and flow rate.

4.1.6 Flue

The flue of the vertical combustion furnace is a square duct with a cross-sectional area of $(500$

$\pm 10)$ mm x (500 ± 10) mm. The lower part of the flue connects to the combustion chamber, while the upper part connects to the exhaust system.

4.2 Exhaust system

The exhaust system connects to the flue. To maintain negative pressure within the vertical combustion furnace throughout the test, the exhaust capacity of the system shall be adjustable.

4.3.1 Flow meter

4.3.1.1

Mass flow controllers or volumetric flow meters shall be used to control the flow rates of methane and compressed air. If mass flow controllers are used, the measurement range shall be at least 0 mg/s ~ 520 mg/s for methane and 0 mg/s ~ 470 mg/s for air, with a reading accuracy of 2%. If volumetric flow meters are used, the maximum measurement value shall be no less than 40 L/min for methane and no less than 20 L/min for air, with an accuracy class of 2.5 or better.

4.3.1.2

An orifice flow meter, a bidirectional pressure probe, or a vane anemometer shall be used to measure the airflow rate entering the vertical combustion furnace. The flow measurement device shall be installed in a straight section of the air supply pipe with a smooth inner surface, with straight pipe lengths of at least five times the pipe's inner diameter on both sides of the device. The measurement accuracy for the flow rate shall be no less than 0.4 m³/min.

4.3.2.1 The insulated K-type sheathed thermocouple meeting the Class 2 tolerance requirements

of GB/T 16839.1 shall be used to measure the temperature of flue gas and furnace wall. The thermocouple wire diameter shall be 0.5 mm, and the outer diameter shall be no greater than 3 mm.

4.3.2.2 Five thermocouples of the same diameter shall be used to measure flue gas temperature;

they shall be installed at a height of $(1\ 560 \pm 10)$ mm above the top of the burner, see Figure

2a).

4.3.2.3 Two thermocouples of the same diameter shall be used to measure furnace wall temperature; they shall be installed at a height of (460 ± 10) mm above the top of the burner, see Figure 2b).

4.3.2.4 One thermocouple shall be used to measure the temperature of the air entering the vertical combustion furnace; the thermocouple is installed at the same height as the centerline of the air inlet pipe, with the temperature measurement point positioned at the center of the vertical combustion furnace.