

ICS 13.220.40
CCS C 80



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

GB/T 16172-2026

Replacing GB/T 16172-2007

**Test method for heat release rate and smoke production rate of
building materials**

建筑材料热释放速率和产烟速率试验方法

(English Translation)

Issued on: January 28, 2026

Implemented on: August 1, 2026

Issued by: State Administration for Market Regulation

Table of Contents

Preface
1 Scope
2 Normative References
3 Terms and Definitions
4 Symbols
5 Experimental Principle
6 Experimental Apparatus
6.1 General Requirements
6.2 Radiation Cone
6.3 Radiation Shielding Plate
6.4 Radiation Control
6.5 Weighing equipment
6.6 Sample Mounting Frame
6.7 Positioning Frame
6.8 Smoke Exhaust System with Flow Meter
6.9 Gas Sampling Device
6.10 Ignition Circuit
6.11 Ignition Timer
6.12 Oxygen Analyzer
6.13 Heat Flow Meter
6.14 Calibrate burner
6.15 Data Acquisition and Analysis System
6.16 Protective shield (optional)
6.17 Flue Gas Measurement System
6.18 Flue gas system thermocouple
6.19 Filter
7 Testing requirements for finished products
7.1 Surface properties
7.2 Asymmetrical products
7.3 Materials with short burning times
7.4 Composite Sample
7.5 Dimensionally Unstable Materials

7.6 Materials requiring testing under constrained conditions

8 Sample Construction and Preparation

8.1 Sample

8.2 Conditioning of the sample

8.3 Preparation of

9 Test Environment

10 Calibration

10.1 Pre-calibration

10.2 Working Calibration

10.3 Calibration of Smoke Densitometer

10.4 Non-recurring calibration

11 Test Procedure

11.1 General Precautions

11.2 Experimental Preparation

11.3 Step

12 Calculate

12.1 General Rules

12.2 Calibration constants for oxygen consumption analysis

12.3 Heat release rate

12.4 Flow rate of smoke exhaust duct

12.5 Mass loss rate

12.6 Smoke Obstruction

13 Test Report

Appendix A (Informative) Notes and Operator Guidelines

A.1 Overview

A.2 Measurement of heat release rate

A.3 Selection of Working Principle

A.4 Design of Radial Cones

A.5 Ignition Device

Foreword

This document complies with the provisions of GB/T 1.1-2020 "Standardization Work Guidelines Part 1: Structure and Drafting Rules of Standardization Documents".

Drafting.

This document replaces GB/T 16172-2007 "Test Method for Heat Release Rate of Building Materials". Compared with GB/T 16172-2007, except for...

Aside from structural adjustments and editorial changes, the main technical changes are as follows.

- a) The scope of application has been changed (see Chapter 1, Chapter 1 of the 2007 edition);
- b) The terms "heat release rate," "smoke obstruction degree," "extinction coefficient," "smoke production rate," and "smoke production" and their definitions have been added (see 3.7).
- 3.12, 3.13, 3.14, 3.15);
- c) Added symbols related to flue gas measurement (see Table 1);
- d) The experimental principles of flue gas measurement have been added (see Chapter 5);
- e) Added general requirements for optional carbon monoxide and carbon dioxide measurement modules for the test apparatus (see 6.1);
- f) The exhaust flow requirements for smoke extraction systems with flow meters have been changed (see 6.8, 6.7 in the 2007 edition);
- g) Added requirements for the test apparatus's "flue gas measurement system," "flue gas system thermocouple," and "filter" (see 6.17, 6.18, and 6.19);
- h) The testing requirements for materials that need to be limited to those undergoing severe deformation have been changed (see 7.5, 2007 edition of 7.5);
- i) Requirements for materials that need to be tested under constrained conditions and their preparation requirements have been added (see 7.6, 8.3.3);
- j) The output drift calibration quality of the weighing equipment has been changed (see 10.1.4, 2007 version 10.1.4);
- k) Added calibration requirements for smoke densitometers (see 10.3);
- l) An alternative method for calibrating the accuracy of flow meters used for burners has been added (see 10.4.3);
- m) Added requirements for setting the extinction coefficient to zero and cleaning the igniter before the test (see 11.2.6, 11.2.7);
- n) The requirements for reporting test data in the "Test Procedures" have been changed (see 11.3.7, 2007 version 11.3.7);
- o) Added "initial exposure area requirement for the specimen during testing without a positioning frame" to the formula explanation (see 12.3.3, 2007 version).

12.3.3);

p) Added calculation requirements for "smoke shielding" (see 12.6);

q) Added requirements for basic information on flue gas measurements in the "Test Report" (see Chapter 13).

This document is modified to adopt ISO 5660-1:2015 "Reaction test for fire - Rate of heat release, rate of smoke production and rate of mass loss" Part 1: Heat release rate (cone calorimeter method) and smoke production rate (dynamic measurement).

Compared with ISO 5660-1:2015, this document has undergone the following structural adjustments.

---Chapter 3.14 corresponds to Chapter 3.15 in ISO 5660-1:2015;

---Chapter 3.15 corresponds to Chapter 3.14 in ISO 5660-1:2015;

---Formula 6.19 in Chapter 6 will be numbered (1), and subsequent formula numbers will be adjusted accordingly;

---Appendix F corresponds to Appendix G in ISO 5660-1:2015;

---Appendix G corresponds to Appendix F in ISO 5660-1:2015.

The technical differences between this document and ISO 5660-1:2015, and the reasons therefor, are as follows.

---ISO 13943 (see Chapter 3) has been replaced with the normatively referenced GB/T 5907 (all parts), improving the standard's readability.

Application of this document;

---The range of external thermal radiation conditions for the test apparatus has been modified (see Chapter 5, 6.2, Chapter 5, 6.2 of ISO 5660-1). Domestic test apparatus...

All units can provide 100kW/m² of external thermal radiation, and have applications in materials production and application.

Actual requirements for testing under conditions of 75kW/m²~100kW/m²;

---ISO 14697 (see 8.1.6) has been replaced with the normatively referenced GB/T 40238, increasing operability and facilitating this document.

application;

---ISO 554 (see 8.2) has been replaced with the normatively referenced GB/T 40238, increasing operability and facilitating the application of this document;

---The curing requirements for materials that require more than one week of curing to reach stability have been changed. The requirement of "curing according to GB/T 2918" will now