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

SN/T 5240-2020

**Import and export textiles heat release rate determination cone
calorimeter method
(English Translation)**

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Table of Contents

Foreword	
1 Scope	
2 Normative references	
3 Terms and definitions	
4 Principle	
5 Apparatus and equipment	
6 Test environment	
7 Sample preparation	
7.1 Sample humidity control	
7.2 Specimen	
7.3 Sample installation	
8 Test procedure	
8.1 Safety measures	
8.2 Test preparation	
8.3 Test	
9 Calculation	
9.1 Heat release rate per unit area	
10 Test report	

Foreword

This standard was drafted in accordance with the rules given in GB/T 1.1-2009.

1 Scope

This standard specifies the method for measuring the heat release rate of textiles with a cone calorimeter.

This standard applies to the determination of the heat release rate of various fabrics and their products.

2 Normative references

The following documents are indispensable for the application of this document. For dated reference documents, only the dated version applies to this article Pieces. For undated

reference documents, the latest version (including all amendments) is applicable to this document.

GB/T 6529 Standard atmosphere for textile humidity control and testing GB/T 16172-2007
Test method for heat release rate of building materials GB 18401-2010 National Basic
Safety Technical Code for Textile Products

3 Terms and definitions

The following terms and definitions apply to this document.

Textiles

It is made of natural fiber and chemical fiber as the main raw materials through spinning, weaving, dyeing and other processing techniques or through sewing and compounding techniques.

Products, such as yarn fabrics and their finished products.

[GB 18401-2010, definition 3.1] 3.2 Heat release rate; HRR the rate of heat released per unit area of the ignited sample under a certain heat flux radiation intensity, in kW/m².

Oxygen consumption principle the proportional relationship between the mass of oxygen consumed during combustion and the amount of heat released.

[GB/T 16172-2007, definition 3.7] 3.4 Irradiance the radiant flux incident on a surface element (including the point and the unit area) at a certain point on the surface of the sample divided by the the area of the face element.

Note: The convective heat transfer on the specimen can be ignored when positioned horizontally. Therefore, this standard uses the term "irradiance" instead of "heat flow" to better express Bright radiation is the main heat transfer method.

[GB/T 16172-2007, definition 3.4] 3.5 Orientation During the test, the exposed surface of the sample is on the plane, vertical or horizontal.

[GB/T 16172-2007, definition 3.6] 3.6 Flashing A burning phenomenon with a flame duration of less than 1 s that occurs on or above the sample surface.

[GB/T 16172-2007, definition 3.2] 3.7 Ignition A continuous flame appears.

[GB/T 16172-2007, definition 3.3] 3.8 Sustained flaming A flame lasting more than 10 s appears on or above the sample surface.

[GB/T 16172-2007, definition 3.10] 3.9 Transitory flaming A flame with a duration of 1 s to 10 s appears on or above the surface of the sample.

[GB/T 16172-2007, definition 3.11]

4 Principle

This method is based on the principle of oxygen consumption. When a general substance is burned, every 1 kg of oxygen will release 13.1×10^3 kJ of heat. In Under ambient atmospheric conditions, place the sample under the specified external heat radiation conditions of 0 kW/m² to 100 kW/m², and measure with a cone calorimeter the oxygen concentration and exhaust flow rate when the sample is burned, and the heat release rate characteristics of the test sample are evaluated.

5 Apparatus and equipment

5.1

Cone Calorimeter. See Figure A.1 in Appendix A.

5.2

Grid. See Figure B.1 in Appendix B.

5.3

Balance. a sense of 0.01 g.

6 Test environment

Relative humidity 20% ~ 80%, temperature 15 °C ~ 30 °C, no obvious air flow disturbance environment.

7.1 Sample humidity control

The samples shall be humidified for at least 24 h in the standard atmosphere specified in GB/T 6529.

7.2 Specimen

7.2.1

The size of a single sample is 100 mm x 100 mm.

7.2.2

Three single samples are superimposed to form a combined sample.

7.2.3

Under any irradiance, prepare 3 combined samples for parallel testing.

7.3 Sample installation

7.3.1

Wrap the humidity-conditioned combined sample with a single-layer aluminum foil with a thickness of 0.025 mm ~ 0.04 mm, with the glossy surface of the aluminum foil facing the sample;

The aluminum foil should be cut in advance so that it can cover the bottom and sides of the sample and extend beyond the upper surface of the sample by at least 3 mm; the sample should be placed on the aluminum in the middle of the foil, wrap the bottom and sides of the foil, and cut off the excess aluminum foil so that the aluminum foil does not exceed 3 mm of the upper surface of the sample.

7.3.2

The composite sample covered with aluminum foil is placed on the positioning frame as shown in Figure A.3.

- a) Place the positioning frame upside down on a flat surface and put it into the grid (see Figure B.1);
- b) Put the combined sample covered with aluminum foil into the positioning frame with the test side facing down
- c) Put a refractory fiber layer (density 65 kg/m³) on the top, just beyond the edge of the positioning frame;
- d) Place the sample mounting frame (see Figure A.2) on top of the refractory fiber layer, install it into the positioning frame, and press it tightly;
- e) Place the positioning frame on the sample mounting frame.

8.1 Safety measures

Take appropriate precautions for safety protection. In the combustion test, the test sample may emit toxic and harmful gases when exposed to the radiation cone, and with high temperature and burning, operators should wear protective masks and protective gloves.

8.2 Test preparation

8.2.1

Check the CO₂ filter and moisture filter, and replace the adsorbent if necessary. Drain the condensed water in the cold trap, and the normal operation of the cold trap the temperature does not exceed 4 °C.