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GB/T 14644-2014

Replacing GB/T 14644-1993

Textiles – Burning Behaviour - 45° Test

Determination of Flame Spread Rate

纺织品 燃烧性能 45°方向燃烧速率的测定

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Standardization Administration of PRC.

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Foreword

This Standard was drafted as per the rules specified in GB/T 1.1-2009.

This Standard replaced GB/T 14644-1993 *Fabrics - Burning Behaviour - The 45° Test Determination of Flame Spread Rate*; compared with GB/T 14644-1993, the major changes are as follows:

--- Modified the scope of the original standard;

--- Deleted “flammability” terminology in the original standard; modified “burning rate” into “flame spread rate”; added two terms, i.e. “burning time”, and “surface flash”;

--- Added detailed description and requirements of the combustion test chamber (see 5.1.1);

--- Modified the schematic diagram of combustion test chamber in the original standard (see Figure 1);

---Modified the schematic diagram of specimen clamp, and added the detailed description and requirements of the specimen clamp (see 5.1.3);

--- Modified the brushing device in the original standard, and the detailed description of the brushing device; added the technical requirements of the template (see 5.2);

--- Added “pre-test” (see Chapter 6);

--- Modified the specimen dimension into 160mm×50mm (see 7.1);

--- Added “installation” (see 7.3);

--- Modified the Chapter 7 “Flammability Tester Adjustment” in the original standard into Chapter 8 “Instrument Setting” in this Standard;

--- Added the technical requirements for “when igniting, the flame is vertically affected on the specimen surface” (see 8.3);

--- Added the technical requirements for “the distance from igniting place to the specimen bottom edge is 19mm” (see 8.4);

--- Added the requirements for “re-test when bottom-edge igniting is found” to the test procedures (see 9.2);

--- Deleted Chapter 9 “Record, Calculation and Result Instructions” in the original standard;

--- Re-wrote the classification of combustibility (see Chapter 10);

Textiles – Burning Behaviour - 45° Test Determination of Flame Spread Rate

1 Scope

This Standard specifies using 45° directional surface ignition to determine the test method and rating of the fabric combustibility.

This Standard is applicable to all types of fabrics and their products.

2 Normative References

The following documents are essential to the application of 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) are applicable to this standard.

GB/T 6836 Sewing Threads

GB/T 8629 Textiles - Domestic Washing and Drying Procedures for Textile Testing

3 Terms and Definitions

The following terms and definitions are applicable to this document.

3.1 Raised surface

The fabric surface with piles, for instance, brushed, napped, tufted, flocked, cut-pile or the like surface.

3.2 Flame spread rate; rate of flame spread

Under the specified test conditions, the distance that flame spreads forward in unit time.

3.3 Burning time

The time required by the whole period from the beginning of the ignition to the breakage of the marker line, it shall be measured by a timer. In second (s).

3.4 Surface flash

In case the basic structure of the materials is not ignited, the flame spreads rapidly on its surface.

NOTE: if the basic structure of the materials is burnt at the time of surface flash or burnt in succession, then it shall not be regarded as part of the surface flash.

[GB/T 3291.3-1997, definition 2.186].

4 Principles

Under the specified condition, the specimen surface shall be ignited at 45° angle, assess the flame spread rate of the specimen as per the burning time. For the raise surface specimen, the ignition of foundation fabric shall be regarded as the additional indicator for the degree of burning intensity.

5 Apparatus and Materials

5.1 Combustion tester

5.1.1 Combustion test chamber: it is made of heat-and-smoke-resistant materials, the chamber internal dimension is 370mm×220mm×350mm, the allowable tolerance is ±10mm. In the front of the chamber, the observation door made of heat-resistant and transparent materials is mounted, the bottom of observation door is equipped with ventilation strip. On the rear part of the chamber top is evenly arranged by 11 or 12 vent holes with diameter of 12.7mm. see Figure 1.

The direction of the fastest flame spread rate of the fabric shall be regarded as the length direction of the specimen; if the direction of the fastest flame spread rate of the fabric is unknown, then the direction of the fastest flame spread rate in the pre-test shall be determined as the length direction of the specimen.

NOTE: For the non-raised surface textile in the pre-test, if its specimen has no distinction of flame spread rate between the latitude and longitude (vertical and horizontal); then the longitude (vertical) direction shall be regarded as the length direction.

7.3 Installation

7.3.1 Place the lower clamping plate of the specimen clamp onto the sliding frame of the brushing device; so that the template is within the inner frame of the lower clamping plate.

7.3.2 Place the specimen on the lower clamping plate, the to-be-burnt side shall be upward; the direction end of the specimen with fastest flame spread rate shall be placed on top of the specimen clamp; cover the upper clamping plate of the specimen clamp, tighten the upper and lower clamping plates with clamp.

NOTE: to ensure the flatness of the specimen after installation, especially the lightweight and extremely thin specimen, the tape can assist in fixing. To reduce the possibility of occurring the ignition of bottom-edge, when installing the specimen, the bottom-edge of the specimen clamp can be exceeded 3.2mm~12.7mm.

7.4 Brushing

Non-raised surface textile needs not to be brushed.

Place the specimen clamp equipped with specimen onto the sliding frame of the brushing device (see Figure 3), the raised surface of the specimen is upward, brush once reversely.

7.5 Drying

Place the specimen clamp equipped with specimen into 105°C±3°C oven horizontally, take out after 30min±2min; place it into the dryer, cool off no less than 30min. During the drying and cooling off period, pay attention not to touching the specimen surface.

8 Instrument Setting

8.1 The general room temperature condition can be adopted; however, test shall be performed under the condition without wind.

8.2 Place the specimen clamp equipped with specimen onto the specimen holder, adjust the latter, so that the distance from the burner top to the specimen surface is

				specimens
		2 and above	$\bar{t}$≥3.5s	Grade 1 (normal flammability)
			$\bar{t}$<3.5s	Additionally add 5 blocks of specimens, rating as per 10 blocks of specimens
	Textile with raised surface	Not considering the burning time, base cloth is not ignited		Grade 1 (normal flammability)
		None		Grade 1 (normal flammability)
		Only 1	t_i<4s, base cloth is not ignited; t_i≥4s, not considering the base cloth	Grade 1 (normal flammability)
			t_i<4s, meanwhile 1 base cloth is ignited	Additionally add 5 blocks of specimens, rating as per 10 blocks of specimens
		2 and above	0s< $\bar{t}$ <7s, only 1 block surface flash; $\bar{t}$ >7s, not considering base cloth; 4s≤ $\bar{t}$ ≤7s, 1 block of base cloth is ignited; $\bar{t}$ <4s, 1 block of base cloth is ignited	Grade 1 (normal flammability)
			4s≤ $\bar{t}$ ≤7s, equal to and more than 2 blocks of base clothes are ignited	Grade 2 (medium flammability)
			$\bar{t}$ <4s, equal to and more than 2 blocks of base clothes are ignited	Additionally add 5 blocks of specimens, rating as per 10 blocks of specimens
10 blocks [a] (1≤*i*≤10)	Textile with non-raised surface	Only 1		Grade 1 (normal flammability)
		2 and above	$\bar{t}$≥3.5s	Grade 1 (normal flammability)
			$\bar{t}$<3.5s	Grade 3 (rapid and intense flammability)
	Textile with raised surface	Only 1		Grade 1 (normal flammability)
		2 and above	$\bar{t}$ <4s, equal to and less than 2 blocks of base clothes are ignited;	Grade 1 (normal flammability)

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