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NATIONAL STANDARD OF THE PEOPLE'S REPUBLIC OF CHINA

GB/T 14644-2014

Replacing GB/T 14644-1993

Textiles - Burning behaviour - Determination of the flame spread rate in the 45 degree direction

纺织品 燃烧性能 45°方向燃烧速率的测定

Issued on: September 30, 2014 **Implemented on: April 1, 2015**

Issued by: General Administration of Quality Supervision, Inspection and Quarantine;
Standardization Administration of the PRC

Table of Contents

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 160mmx50mm (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);

1 Scope

China's national method for the burning behaviour of textiles at 45 degrees - the test in which a specimen is mounted at forty-five degrees to the horizontal, ignited at its lower edge, and the time taken for the flame to travel a defined distance is measured. It specifies the determination of the flame spread rate of textiles by surface ignition in the 45 degree direction. The angle is the point of the method and is not arbitrary. A fabric held vertically burns fastest, because the flame is directly beneath the material it is about to ignite and preheats it; held horizontally it burns slowest. Forty-five degrees is the compromise the apparel industry settled on, and it corresponds roughly to the orientation of clothing on a moving body - which is the situation the test exists to represent, since the clothing fire that this method is used to guard against is the one where a garment catches at the hem and the flame runs up the wearer. What the standard sets is everything that makes such a result reproducible: the specimen dimensions and how they are cut in both fabric directions, the conditioning atmosphere, which matters greatly because a damp fabric burns differently from a dry one, the igniting flame and its application time, the mounting and the marking threads by which the spread is timed, the number of specimens, and the treatment of a specimen that does not propagate at all. It also sets how the result is reported, since a flame spread rate is only meaningful alongside the observations that accompany it - whether the fabric melted, dripped, or formed a hole rather than burning. Issued on 30 September 2014 and in force since 1 April 2015, it replaces GB/T 14644-1993.

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.

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

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.

5.1 Combustion tester

5.1.1 Combustion test chamber. it is made of heat-and-smoke-resistant materials, the chamber internal dimension is 370mmx220mmx350mm, the allowable tolerance is ±10mm.

5.1.2 Specimen holder. it can support and fix the specimen clamp, and tilt it to be 45° angle; and adjust the relative position with the front of the flame according to the different thickness of the specimen.

5.1.3 Specimen clamp. it consists of two U-shaped steel plates with thickness of 2.0mm; its inner frame dimension is 152mmx38mm; the specimen is fixed in between two plates, clamp the two sides. See Figure 2.

5.1.4 Burner. it is made of the No. 41/2 syringe needle.

5.1.5 Gas. butane (chemically pure).

5.2 Brushing device It is used for preparing the specimen, and consists of underplate, guide rail, sliding frame, temperate and brush.

5.3 Oven It shall be equipped with ventilation and temperature control functions, the temperature inside the oven is 105°C±3°C.

6 Pre-Test

For the fabric with unknown combustibility shall be pre-tested; so as to determine the

direction and position with the fastest flame spread rate.

7 Specimen Preparation

7.1 Dimension and quantity The dimension is 160mmx50mm, quantity is 5 blocks.

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.

7.4 Brushing Non-raised surface textile needs not to be brushed.

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 8mm.

8.4 The distance from the specimen surface to the marker line of the ignition place is 127mm. The ignition place is 19mm away from the bottom-edge of the specimen. See Figure 2.

9 Test Procedures

9.1 Take out a specimen clamp equipped with specimen from the dryer, place it onto the specimen holder of the combustion test chamber; pass the marker line through the guide wire hook on the plate of specimen holder;

9.2 Ignite the burner, so that the flame contact with specimen surface for 1s±0.05s; meanwhile, start the timer. When the flame burns to the marker line, the heavy hammer dropped due to the breakage of the line, the timer stops timing. Re-test if the bottom- edge is ignited.

9.3 Observe the burning status of the specimen, record the burning time and burning status