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Textile -- Determination of dimensional change in dry heat or damp heat conditions

纺织品 干湿热条件下尺寸变化率的测定

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Textile -- Determination of dimensional change in dry heat or damp heat conditions

1 Scope

This document describes a test method for determining the rate of dimensional change of textiles treated with dry heat or moist heat.

This document applies 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) is applicable to this standard.

GB/T 6529 Textiles -- Standard atmospheres for conditioning and testing

GB/T 6682 Water for analytical laboratory use -- Specification and test methods

GB/T 8628 Textiles -- Preparation, marking and measuring of fabric specimens and garments in tests for determination of dimensional change

3 Terms and Definitions

There are no terms and definitions that need to be defined in this document.

4 Principles

The sample shall be conditioned in the specified standard atmosphere, marked, and measured with a ruler or other measuring tool for initial dimensions; then, after treatment under the specified conditions, such as the temperature, the humidity, and time, measure its size again, and calculate the dimensional change rate of the sample after dry heat or damp heat treatment.

5 Test methods

The test water shall be grade 3, which meets the requirements of GB/T 6682.

6 Instruments and equipment

6.1 Oven: The temperature can be adjusted within the range of room temperature to 200 °C, and it shall be accurate to 1 °C.

6.2 Constant temperature and humidity oven: the temperature can be adjusted within the range of room temperature to 70 °C, and it shall be accurate to 1 °C; the relative humidity can be adjusted to 85%, and it shall be accurate to 5%.

6.3 Measuring tools: a straightedge, and a steel tape; the length shall be greater than the maximum size measured, and the unit shall be mm, accurate to 1 mm.

6.4 Marking tools: non-fading marker pens, fabric marking printers, and other marking tools.

6.5 Flat measuring table: it shall be large enough to place the entire sample.

6.6 Metal mesh: it is used to support the sample without deformation; it shall be made of stainless steel, and the area of the metal mesh shall be larger than the size of the sample.

6.7 Pool or other containers: the size of the area shall be not less than 500 mm × 500 mm; it shall be able to make the surface of the sample wet.

6.8 Timer: it shall be accurate to 1 s.

6.9 Metal rod: it shall be metal material with a diameter of 5 mm~6 mm; it can be fixed in the oven.

6.10 Heavy hammer hanging rod: it shall be metal material and used for hanging the heavy hammer; its length shall be slightly longer than the width of the sample; the total mass of the heavy hammer hanging rod and the heavy hammer shall be (500±5) g, the diameter of the heavy hammer hanging rod shall be (5±1) mm.

7 Atmosphere for humidity control and test

The atmosphere for humidity control and testing shall be in accordance with the standard atmospheric conditions specified in GB/T 6529.

8 Sampling

8.1 The samples shall be representative. Cut 3 samples at the position that is more than 150 mm away from the edge of the cloth and more than 1 m away from the end of the cloth. Each sample shall contain yarns or fibers in different length and width directions, and be marked with directions [warp direction (vertical direction), weft direction (transverse direction)]. There shall be no creases, wrinkles, holes, dirt, or other anomalies on the specimen. For samples tested under the treatment conditions of Method 2 in Appendix A, if testing is required in both directions, the number of samples shall be doubled.

8.2 The size of the cut sample shall be 300 mm×300 mm, and each side shall be parallel to the length and width directions of the fabric, respectively.

Note: If the fabric may fall apart during the test, use the dimensionally stable sewing thread to overlock sew the sample.

8.3 For special samples, such as narrow fabrics that are not enough for the production of standard size samples, only cut in the length direction, and the size of the sample shall be 300 mm × the entire width.

8.4 For textile products, follow the provisions of GB/T 8628; thereinto, the length of the front piece, the length of the back piece, the total shoulder width, and the chest width shall be tested for tops; for trousers, the length and waist width shall be tested; for flat textile products, cut samples at the position that shall be more than 150 mm away from the edge, and the samples shall meet the requirements of 8.2.

9 Test steps

9.1 The sample shall be adjusted the humidity to equilibrium in the standard atmosphere specified in Chapter 7.

9.2 Place the sample on the measuring table, and make at least 3 pairs of marks respectively in the length and width directions of the sample. The distance between each pair of marks shall be 200 mm, and the distance between the marks and the edge of the sample shall not be less than 50 mm. The marks shall be evenly distributed on the sample; see Figure 1 and Figure 2 for examples.

9.3 Place the measuring tool (6.3) on the sample, and measure the distance between the two marked points; the record shall be accurate to 1 mm.

9.4 Treat the sample according to Appendix A. Lay the conditioned sample on the measuring table, and measure the distance between the two marked points; the record shall be accurate to 1 mm. If the samples after the test appear blistering, falling apart,

Appendix A

(Normative)

Processing method of specimens

A.1 General

As required, select conditions from A.2, A.3, A.4, or A.5 to process the samples. Other treatment conditions of temperature and humidity can also be adopted according to the product standards or the negotiation between the interested parties; it shall be explained in the test report.

A.2 Method 1: No-load dry heat treatment

Ordinary fabric: First, preheat the oven to the set temperature of 110 °C, spread the sample on the metal mesh, and put them into the oven together. Start to time when the temperature in the oven reaches (110±2) °C; after 5 min, take the sample out from the oven, and place it horizontally in the standard atmospheric conditions specified in GB/T 6529 to adjust the humidity for 4 h.

For the polyurethane (PU) coated fabrics, the treatment temperature is (150±2) °C; for the polyvinyl chloride (PVC) coated fabrics, the treatment temperature is (180±2) °C.

Note: No-load dry heat treatment conditions are suitable for automotive decorative textiles, synthetic leather base fabrics, medical base fabrics, etc. The method can be used as a reference to other products based on their product characteristics and application fields.

A.3 Method 2: Dry heat treatment under load

A.3.1 Along the length of the sample, sew a tubular edge respectively at the positions that are 20 mm away from the edges of the upper and lower end of the sample, so as to facilitate penetration of the metal rod and the heavy hammer hanging rod; cut a gap in the middle of the tubular edge of the sample's lower end for hanging the heavy hammer; see Figure A.1.

A.3.2 Put the metal rod into the upper end of the sample and put the heavy hammer hanging rod into the lower end of the sample.

A.3.3 First, preheat the oven to the set temperature of 180 °C. Hang the heavy hammer on the heavy hammer hanging rod, and quickly put the combined sample into the oven. Start to time when the temperature in the oven reaches 180 °C.

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