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Textiles -- Tests for colour fastness to flat abrasion -- Emery method

纺织品 耐平磨色牢度试验 金刚砂法

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Textile -- Tests for colour fastness to flat abrasion -- Emery method

1 Scope

This document specifies the method for the determination of the color fastness (frosting) of various textiles to flat abrasion by the emery method.

This document is applicable to all kinds of dyed or printed fabrics and their products, especially for fabrics and products with poor dye penetration.

This document does not apply to the sanded, raised, flocked, loose-structured fabrics, and easily damaged fabrics and their products after flat abrasion.

Note: This document introduces a fast way to simulate the severe frictional movement of fabrics and their products in actual use.

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 250 Textiles -- Tests for colour fastness -- Grey scale for assessing change in colour

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

JB/T 7498 Coated abrasives -- Abrasive paper

3 Terms and Definitions

The following terms and definitions apply to this document.

3.1 Frosting

The phenomenon of local lightening of the color of the fabric due to abrasion during use.

Note: Frosting is caused by the different fading ability of fabrics due to abrasion: the coloring ability of

various fibers in multi-component blended fabrics is inconsistent, and the fading ability after abrasion is not consistent; frosting in the monofilament fabrics is mainly due to poor dye penetration.

4 Principles

Install the sample on a rubber diaphragm that can apply certain air pressure. Under the specified load, the sample is repeatedly rubbed with the emery paper fixed to the flat-grinding test head in multiple directions. Take the original sample as the reference sample, and use the gray sample card to evaluate the discoloration of the sample.

5 Equipment and materials

5.1 Tester for color fastness to flat abrasion

The tester for color fastness to flat abrasion shall meet the following conditions. The schematic diagram of the structure is shown in Figure 1. The flat-grinding test head is located above the reciprocating table:

a) Flat-grinding test head: It consists of a balancing head and an abrasive plate. The abrasive plate can be equipped with emery paper. The upper surface of the balancing head has a fixed locating pin, which can be vertically loaded with a 0~2.5 kg heavy hammer. One side of the heavy hammer has a groove, and the other side has a fixed locating pin.

b) The reciprocating table consists of a sample clamping ring with an inner diameter of (94±1) mm, a locking ring with an inner diameter ≥95 mm, a rubber diaphragm, a sample plate, and a pawl, which can provide air pressure of 0~41 kPa; the rubber diaphragm has high extensibility and is non-electronic touch, with a thickness of (1.5±1) mm, which can withstand air pressure of 0~41 kPa; The upper part of the sample plate has a horizontal groove and the bottom has a vertical groove. See Figure 2 for the order in which the locking ring, the sample, the rubber diaphragm, and the sample plate are placed.

c) Driving device: The speed is (115±15) times/min, and the linear motion stroke is (25±1) mm; it can do reciprocating motion. When the pawl drives the sample plate to rotate a circle on its center at a certain speed, the reciprocating table reciprocates 100 times in a straight line.

d) Counter: It displays and records the number of tests, and the result is accurate to 1 time.

5.2 Emery paper

Emery paper shall be 600 mesh, conforming to the requirements of JB/T 7498, and the

8 Test steps

8.1 Install the unused emery paper on the abrasive plate, and fix both ends of the emery paper with the tension clamps; adjust the front tension clamp, and apply appropriate tension to make the emery paper flat on the lower surface of the abrasive plate to ensure the surface of the emery paper is smooth.

8.2 Install the first sample face up on the non-electronic touch rubber diaphragm, and place the sample clamping ring on the sample; fix the sample with the locking ring to ensure that the sample is flat and free from deformation.

8.3 Install a heavy hammer with a mass of (1360±5) g on the locating pin of the balancing head, and set the air pressure on the rubber diaphragm to be (20±1) kPa; make the pawl in contact with the vertical groove at the bottom of the sample plate. Gently lower the flat-grinding test head, so that the emery paper on the abrasive plate is just in parallel contact with the sample on the reciprocating table.

8.4 Set the number of tests to 100 and start the test.

8.5 After the test, remove the sample, and use a brush to remove fibers and abrasive debris from the sample.

8.6 Complete the test of the second sample in accordance with the steps in 8.2~8.5.

8.7 Rinse the two samples with running water at a temperature not exceeding 38 °C to remove debris.

8.8 Put the sample between two absorbent papers and squeeze out the excess water, and then hang it or lay it flat to dry in the air not exceeding 60 °C. When hanging it to dry, avoid the test area of the sample being clamped.

If the sample slips out of the locking ring, the air pressure does not remain constant during the test, or the abrasion pattern is abnormal (e.g., the abrasion pattern is not a circle, or the degree of discoloration of the center area is inconsistent with the edge area), then, the test result shall be discarded, and another sample shall be re-tested.

8.9 After the test of every 2 samples, new emery paper shall be used. After each sample is tested, the position of the emery paper needs to be adjusted to ensure that each sample is tested for flat abrasion on different areas of the same emery paper.

9 Rating

Compare the sample with the original one, and use the gray sample card (5.3) to evaluate the degree of discoloration (frosting) of the sample.

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