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Textile -- Determination and evaluation for shape memory property

纺织品 形状记忆性能监测和评价

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1 Scope

This document describes methods for testing and evaluating the shape memory properties of textiles.

This document applies to force-caused shape memory woven fabrics.

This document does not apply to other types of shape memory fabrics such as thermotropic shape memory fabrics.

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

3 Terms and Definitions

The following terms and definitions apply to this document.

3.1 Shape memory property

The property with which the fabric that has a certain original shape, after being deformed by the external force, can fix its temporary deformation (shaping ability) under specific conditions and restore its original shape (recovery ability) under external conditions. According to the different deformation conditions, it can be divided into force-caused shape memory, thermotropic shape memory, photoinduced shape memory, and so on.

3.2 Force-caused shape memory property

The property with which the fabric that has a certain original shape, after being deformed and fixed, can return to the original shape under the action of external force.

6.2 Recovery heavy hammer: (20±0.5) g; the bottom edge of the heavy hammer shall be round; the diameter shall be (22±2) mm, and the size shall be able to cover all creases.

6.3 Angle measuring device: It is mainly composed of a disc carved with angles and a sample holder. The cutting edge of the sample holder shall be 2 mm away from the axis of the dial, and the crease line of the sample can be guaranteed to coincide with the axis of the dial. The sample holder shall be able to be rotated around the axis of the dial to keep the free wing of the sample in a vertical position. The graduation value of the dial of the recovery angle measurer shall be 1°.

6.4 Tweezers: The edges shall be smooth and not hook on the surface of the sample when gripping.

6.5 Stopwatch: It shall be accurate to 0.1 s.

6.6 Others: The instruments that work on the same principle and meet the technical conditions of this document can be used.

7 Preparation of specimens

7.1 The specimen shall be representative. The specimen shall be taken at a distance of more than 150 mm from the edge of the fabric. Avoid wrinkles, holes, and deformation, and cut the specimen out of a flat fabric.

7.2 The size of the specimen shall be a rectangle of 40 mm × 15 mm. The number of specimens for each sample shall be at least 10, that is, 5 specimens in the warp and weft directions of the samples. The length direction of the specimen shall be parallel to the warp or weft direction of the sample. 10 specimens shall be sampled at different locations to ensure that each specimen does not contain the same yarn.

7.3 The specimen shall be subjected to humidity conditioning in an environment that meets the requirements of Chapter 5.

8 Test steps

8.1 Along the length of the sample and with the reverse side facing inward, align the two ends and fold it; clamp the edge of the sample with tweezers; the clamped position shall be no more than 5 mm from the edge of the short side of the sample; place the sample on the testing platform, and apply the shaping heavy hammer (6.1) on the sample along the edge of the crease; the pressure area shall be 225 mm^2.

8.2 After applying pressure for 5 minutes, remove the load, hold the sample with tweezers, and transfer it to the sample holder of the angle measuring device. This process shall be completed within 5 s. Do not touch the crease when using the tweezers

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