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**Textiles - Methods of testing the down-proof property - Part  
1: Rubbing test**

纺织品 防钻绒性试验方法 第1部分:摩擦法

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# Textiles - Methods of testing the down-proof property - Part 1: Rubbing test

## 1 Scope

This document describes a method for determining the down-proof property of fabrics and products made from them by the rubbing method.

This document applies to textile products filled with down and feathers and the fabrics used to make such products.

This document does not apply to products filled with a blend of down, feathers and other fillings.

## 2 Normative references

The provisions of the following documents constitute the essential clauses of this document through normative references in this text. Among them, for referenced documents with dates, only the versions corresponding to the dates are applicable to this document; for referenced documents without dates, the latest versions (including all amendments) are applicable to this document.

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

GB/T 8170 Rules of rounding off for numerical values & expression and judgment of limiting values

GB/T 8629-2017 Textiles - Domestic washing and drying procedures for textile testing

GB/T 17685-2016 Down and feather

QB/T 1514-2011 Needles for household sewing machines

## 3 Terms and definitions

The following terms and definitions apply to this document.

### 3.1 down-proof property

The property of a fabric to prevent feathers, down, down fibers and feather fibers from

sticking out from its surface.

**NOTE:** It is generally expressed by the number of the roots of the down sticking out from the fabric under specified conditions.

## 4 Principle

The fabric sample is made into a sample bag of a certain size and filled with a certain mass of down and feather filling, or the down and feather products are directly cut into sample bags of a certain size. The sample bag is placed in a plastic bag and installed on the instrument. After being squeezed, kneaded and rubbed, the down-proof property of the fabric or down and feather products is evaluated by counting the number of feathers, down, down fibers and feather fibers sticking out from the inside of the sample bag.

## 5 Equipment, utensils and materials

### 5.1 Down-proof testing machine

The down-proof testing machine consists of a driving wheel and two clamps. The rear clamp is connected to the driving wheel. When the driving wheel rotates, it runs on an elliptical track. The driving wheel speed is  $(135\pm 1)$  r/min. The front clamp is installed on the movable unit at the bottom of the down-proof testing machine, which can be used to adjust the distance between the two clamps. The distance between the two clamps is adjustable within the range of 5 mm~60 mm, and the clamp plate is  $(180\pm 2)$  mm  $\times$   $(80\pm 2)$  mm. In addition, the down-proof testing machine shall have functions such as preset revolutions and the full-count automatic stop.

Appendix A provides a schematic diagram of the down-proof testing machine for reference; other instruments with the same performance may be used.

### 5.2 Thickness tester

The indication is accurate to 0.1 mm, and the size of the pressure plate is  $(160\pm 2)$  mm  $\times$   $(180\pm 2)$  mm. The thickness tester applies a pressure of  $(14.7\pm 0.2)$  N to the sample.

### 5.3 Balance

The indication is accurate to 0.01 g.

### 5.4 Steel ruler

The graduation value is 1 mm.

### 5.5 Sewing thread and sewing needle

## 8 Sample bag preparation

### 8.1 Fabric sample bag preparation

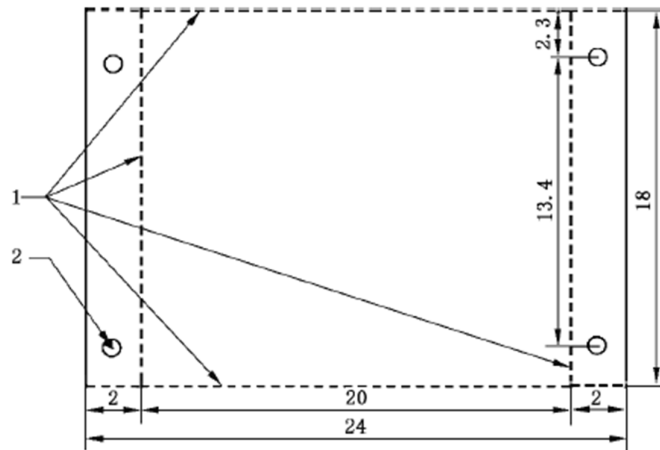
**8.1.1** Use a steel ruler (5.4) to measure and cut two specimens each in the warp and weft directions with a length of  $(48\pm 0.5)$  cm and a width of  $(20\pm 0.5)$  cm from the fabric. The specimens shall be cut at least 1/10 of the fabric width away from the edge.

**8.1.2** With the test surface of the cut specimen facing inward, fold it in half along the long side to form a 24 cm×20 cm bag. Use the sewing thread and sewing needle (5.5) to sew, with a stitch density of 12 (stitches/3 cm) ~ 14 (stitches/3 cm); sew along the two sides 1 cm away from the edge. The starting and ending stitches shall be back-stitched 0.5 cm~1 cm and shall be back-stitched on the original line. Then turn the test surface of the sample out, sew a line 2 cm away from the folded edge, back-stitch 0.5 cm~1 cm at both ends, and cut the folded edge open.

**NOTE:** For fabrics produced by special processing technology, such as channel fabrics with bonded surface and lining, directly cut a sample bag with the same effective size as Figure 1 from the fabric and fill it according to the actual design style. It is necessary to ensure that the sample is even and flat after filling.

**8.1.3** Use a balance (5.3) to weigh  $(8\pm 0.1)$  g of down and feather filling (5.6) that has been conditioned to equilibrium and put it into a sample bag. Sew the bag mouth 2 cm away from the edge and back-stitch 0.5 cm~1 cm at both ends. The effective test size of the sample bag after sewing is  $(20\pm 0.5)$  cm ×  $(18\pm 0.5)$  cm. Other weights of down and feather filling can also be weighed according to the agreement between the relevant parties and indicated in the test report.

**8.1.4** Drill two fixing holes on the outside of the two short-side seams of the sample bag respectively as shown in Figure 1.



Description of indexing numbers:

- 1 -- Laboratory seams;
- 2 -- Fixing holes.

**Figure 1 -- Schematic diagram of the fabric sample bag**

**8.1.5** Repeat steps 8.1.2~8.1.4 to prepare another 3 sample bags.

## **8.2 Preparation of sample bags of down and feather products**

**8.2.1** Select one longitudinal location and one transverse location on the down and feather products to sew the sample bag. For the down and feather filling location, give priority to the part that is flat and includes the stitches, and keep at least one original seam of the product.

**8.2.2** Use a sewing needle to sew a sample with an effective test size of  $(20 \pm 0.5)$  cm  $\times$   $(18 \pm 0.5)$  cm directly at the selected sampling location (see 8.2.1). The stitch density is 12 stitches/3 cm ~ 14 stitches/3 cm. The structure of the surface material, lining, original stitches and filling materials of the original product shall be maintained. The starting and ending stitches shall be back-stitched by 0.5 cm~1 cm and shall be back-stitched on the original line.

**8.2.3** Carefully cut parallel to the stitches at 1 cm outside the long sides of the seams and 2 cm outside the short sides to form a sample bag with an outer size of  $(24 \pm 0.5)$  cm  $\times$   $(20 \pm 0.5)$  cm. Remove the excess down and feather filling outside the laboratory seams.

**8.2.4** Drill two fixing holes on the outside of the two short-side seams of the sample bag respectively as shown in Figure 2.

evenly contact the middle of the sample bag during the descent process. Read the thickness value when the pressure plate naturally descends for 1 minute.

**9.2** Take twice the measured thickness value (see 9.1) as the test gauge (the distance between the two clamps) for the specimen and round it off to 1 mm in accordance with GB/T 8170.

**9.3** Use the sealing liquid (5.7) to seal the laboratory seams of the sample bag and the gaps between the upper and lower layers of fabric (make sure the needle holes of the laboratory stitches are sealed) to prevent feathers, down, down fibers and feather fibers from sticking out from the seams during the test and affecting the test results. The original seams on the down and feather product samples are retained without sealing.

**9.4** Before testing, clean the down-proof testing machine (5.1) and the outer surface of the sample bag from feathers, down, down fibers and feather fibers.

**9.5** Place the sample bag in a plastic bag (5.8) with four fixing holes drilled according to the dimensions shown in Figure 1. Fix the sample bag and the plastic bag on two clamps at the same time, adjust the test gauge of the down-proof testing machine, make the front of the sample bag face inwards, and fold the sample bag in half between the two clamps along the length direction (see Figure A.1). Lift the middle of the plastic bag so that the fabric in the middle of the sample bag can be touched each other. A new plastic bag shall be used for each test.

**NOTE:** Plastic bags are used to collect filling material that has been completely stuck out from the specimen bag.

**9.6** Preset the revolution of the counter of the down-proof testing machine to 2700, and press the start button, then the driving wheel starts to rotate and drives the sample bag to start rubbing.

**9.7** When the testing machine automatically stops after the full count, take the sample bag out of the plastic bag and count the number of feathers, down, down fibers and feather fibers in the plastic bag. Place the sample bag under a suitable light source and count the number of feathers, down, down fibers and feather fibers that stick out more than 2 mm from the surface of the sample bag. Add up all the counted numbers to get the test result for one sample bag. If the counted number is greater than 50, stop counting and mark the result as "Greater than 50".

**NOTE 1:** When counting, the counted feathers, down, down fibers and feather fibers counted shall be clipped off one by one to avoid double counting.

**NOTE 2:** Down and feather filling is used only during one complete test.

**9.8** Repeat steps 9.1~9.7 until all sample bags have been tested.

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