GB

NATIONAL STANDARD OF THE

PEOPLE'S REPUBLIC OF CHINA

ICS 59.040

B 45

GB/T 10288-2016

Replacing GB/T 10288-2003

Test method for down and feather

羽绒羽毛检验方法

Issued on: December 30, 2016 **Implemented on: July 01, 2017**

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

Standardization Administration of PRC.

Table of Contents

Test method for down and feather

1 Scope

This standard specifies the terms and definitions, sampling and specimen treatment, inspection and test reports of down and feather inspection,.

This standard applies to the inspection of down and feathers and the filling materials of 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 601 Chemical reagent - Preparations of standard volumetric solutions

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

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

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

GB/T 17685 Down and feather

GSB 16-2763 Standard sample photo of down and feather

3 Terms and definitions

The terms and definitions as defined in GB/T 17685, as well as the following terms and definitions, apply to this document.

3.1

Moisture content

The percentage of water content in down and feathers TO the original weight of down and feathers.

as down bedding, which has a nominal down filling capacity of 500 g and above for a single sample, samples shall be taken from at least three parts. For other down products, all fillings shall be taken, as test samples.

4.3.3 Sampling container: The test specimen for moisture content/moisture regain shall be placed in a clean, intact, airtight container. The specimens for other test items shall be placed in a normal sample bag.

4.4 Test atmospheric conditions and sample balance

Component analysis, type identification, filling power test shall be carried out, under constant temperature and humidity conditions. The atmospheric conditions, which are used for the test, shall be carried out in accordance with the provisions of GB/T 6529. The samples shall be balanced for 24 hours and above. Other inspection items can be carried out, at room temperature OR under actual conditions.

4.5 Specimen treatment

4.5.1 Instruments and equipment

Mixing tank, length (150 cm ~ 200 cm) × width (80 cm ~ 100 cm), depth (20 cm ~ 30 cm), height from the bottom to the ground (55 cm ~ 65 cm). It is made of antistatic materials, such as wood or stainless steel.

4.5.2 Uniformity and reduction of samples

4.5.2.1 Put all the samples in the sample mixing tank. Adopt the method of “mixing first and then spreading”, to first evenly spread the samples by hand. The method of down spreading is lifting from left and falling to right, AND lifting from right and falling to left, to flatly spread the down alternatively in layers. Then use the four-corner halving method, to repeatedly reduce it to 100 g. In the middle circular sampling area from the center to the edge of the sample, select 5 evenly distributed points, to use fingers to clamp the sample. During sampling, pay attention to take sample from top to bottom. If it is found that the sample, after the reduction, is still uneven, it is necessary to repeatedly reduce the sample, to the specified specimen mass.

4.5.2.2 According to the designated inspection items, according to the provisions of Table 2, respectively weigh the specimen of the corresponding mass.

4.5.2.3 The remaining samples are retained for reference.

4.5.3 The number of specimens required for each inspection item

The number of specimens, which are required for each inspection item, shall

5.1.1.5 Tweezers.

5.1.2 Requirements

5.1.2.1 The component analysis includes the separation of down, down fiber, feather fiber, waterfowl feathers, waterfowl damaged feather, landfowl feather, long feather, quill feather, residues.

5.1.2.2 The component analysis is carried out in two steps:

- Preliminary sorting, it is necessary to separate the mixture, which contains down/down fiber/feather fiber, waterfowl feathers, waterfowl damaged feather, landfowl feather (including landfowl damaged feather and landfowl fiber), long feather pieces, quill feather, residues;

- Second sorting, separate the down, down fiber, feather fiber from the mixture, which contains down/down fiber/feather fiber. If there are still other components, such as waterfowl feathers and residues, during the second sorting, it needs to be further separated.

If the sample is a pure feather, the second sorting is not required.

5.1.2.3 The specimens shall be classified and separated, according to the requirements of GSB 16-2763.

5.1.3 Preparation of specimen

According to the requirements of Table 2, weigh three sets of specimens. Place them under the atmospheric conditions, which are specified in 4.4. Accurately weigh them after the humidity conditioning for 24 hours. Record the initial mass, accurate to 0.0001 g.

5.1.4 Preliminary sorting

5.1.4.1 Operation method of preliminary sorting

Place the test specimen and seven beakers in the sorting box. Use tweezers to pick out all kinds of feathers. Then use thumb and index finger, to flick the feather, to remove other attached components. Respectively place the seven components of complete waterfowl feathers, waterfowl damaged feather, landfowl feather (including landfowl damaged feather and landfowl feather fiber), long feather, quill feather, a mixture of down/down fiber/feather fiber, residues, etc., in different containers.

5.1.4.2 Calculation of preliminary sorting

After sorting, weigh and record the mass of the contents in each container, accurate to 0.0001 g.

Add the contents of the seven containers together, to get the total mass (m_1) after sorting.

Taking the waterfowl feather content in formula (1) as an example, respectively calculate the percentages of the various components, which are obtained in the preliminary sorting, to the total mass after sorting; the calculation result is expressed in %, which is rounded to 0.1, according to GB/T 8170:

$$\text{Waterfowl feather content (\%)} = (m_F/m_1) \times 100 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where:

m_F - The mass of waterfowl feathers, in grams (g);

m_1 - The total mass of various components, which are obtained after preliminary sorting, in grams (g).

5.1.5 Sorting and calculation of colored down and feather

5.1.5.1 Sorting method of colored down and feather

After the preliminary sorting is completed, the colored down and feather (including colored down, down fiber, feather fiber, waterfowl feathers, waterfowl damaged feather, landfowl feather, landfowl damaged feather, fiber), in each component, are sorted out together. Weigh it (m_3), accurate to 0.0001 g. Then put the colored down and feather components back into the original components.

5.1.5.2 Calculation of colored down and feather

Calculate the content of colored down and feather, according to formula (2). The calculation result is expressed in %. It is rounded off to 0.1, according to GB/T 8170:

$$\text{Content of colored down and feather (\%)} = (m_3/m_1) \times 100 \quad \ldots\ldots\ldots\ldots (2)$$

Where:

m_3 - The mass of colored down and feather, in grams (g);

m_1 - The total mass of various components, which are obtained after preliminary sorting, in grams (g).

5.1.6 Second sorting

5.1.6.1 Specimen preparation for the second sorting

Mix the mixture, which contains down/down fiber/feather fiber, in the mixing tank.

5.1.7 Final report results

5.1.7.1 The sum of the results of the same component, in the preliminary sorting and the second sorting, is the content result of the component in this test.

For example: The sum, of the residue content in the second sorting AND the residue content in the preliminary sorting, is the residue content of this test.

5.1.7.2 The final report results include: down, down fiber, feather fiber, waterfowl feathers, waterfowl damaged feather, landfowl feather, long feather, quill feather, residues.

5.1.7.3 Use the same method to inspect the second set of specimens. Take the average of the two test results as the final result, expressed in %. It is rounded off to 0.1, according to GB/T 8170.

5.2 Type identification of goose and duck down

5.2.1 Instruments and equipment

5.2.1.1 Projector or microscope, 70X above.

5.2.1.2 Analytical balance, which has an accuracy of 0.0001 g.

5.2.1.3 Containers that can be used for weighing, such as beakers.

5.2.1.4 Tweezers.

5.2.2 Requirements

Specific requirements are as follows:

a) If the sample is nominally goose feather (down), goose and duck down shall be subject to type identification;

b) If the sample is nominally duck feather (down), no type identification is required;

c) For goose feather (down), which has a nominal down content of < 80%, it needs to be subject to down and feather type identification, respectively; for goose down, which has a nominal down content of ≥ 80%, it only needs to be subject to the down type identification.

5.2.3 Preparation of specimen

5.2.3.1 The specimen preparation for the completion of the component analysis test:

Place the down, which is sorted out by the component analysis, in the sample

5.3.1.7 Electronic scale: The weighing pan size is above 20 cm × 20 cm; the maximum weighing is above 3000 g, accurate to 0.1 g.

5.3.1.8 Stopwatch.

5.3.2 Preparation of specimen

5.3.2.1 Put 40 g of sample into the pre-treatment box. Use a wooden stick, to gently break it up.

5.3.2.2 At the nozzle of the steam generator, which is 10 cm ~ 15 cm away from the gauze of the pretreatment box, blow the steam into the pretreatment box, 15 s for each side, 60 s in total for four sides.

5.3.2.3 Place the sample for 5 min ~ 10 min.

5.3.2.4 Place the hair dryer, at 1 cm ~ 2 cm away from the gauze of the pretreatment box, to dry the sample, for at least 30 s on each side, more than 2 min for four sides.

5.3.2.5 Check whether the sample is completely dry by hand. If it is not dry, continue to blow until the sample is completely dry.

5.3.2.6 Equilibrate the pretreatment box, which contains 40 g of samples, in a standard atmosphere, for more than 24 hours.

5.3.3 Operation method

5.3.3.1 Weighing: Use a funnel-type pouring bucket, to weigh (30 ± 0.1) g of the treated specimen.

5.3.3.2 Open the bottom cover of the pouring bucket, to let all the specimens slowly fall into the filling power measuring bucket. Remove the pouring bucket. Use a stirring rod, to gently smooth and level the surface of the specimen.

5.3.3.3 Cover the platen. Start timekeeping, when the platen slowly drops to the surface of the specimen. After 2 min, record the corresponding scale value of the filling power meter of the platen.

5.3.3.4 Repeat the test three times, for the same specimen.

5.3.4 Result calculation

Take the average of the three results, as the final result, in cm, which is rounded off to 0.1, according to GB/T 8170.

5.4 Oxygen number

5.4.1 Instruments and equipment

5.4.1.1 Horizontal oscillator: The frequency is (150 ± 2) times/min; the oscillation amplitude is (40 ± 2) mm; it can be timing.

5.4.1.2 Magnetic stirrer.

5.4.1.3 Standard sieve, 150-mesh aperture, 6 cm height, 20 cm diameter.

5.4.1.4 Micro titration device: Micro burette or pipette, which has an accuracy of 0.01 mL.

5.4.1.5 Stopwatch.

5.4.1.6 Wide-mouth plastic bottle, which can be sealed by a cap, has a capacity of 2000 mL.

5.4.1.7 Triangular beaker: 250 mL.

5.4.1.8 Beaker: 1000 mL, 2000 mL.

5.4.1.9 Suction tube: 10 mL.

5.4.1.10 Measuring cylinder: 5 mL, 100 mL.

5.4.2 Reagents and materials

5.4.2.1 Sulfuric acid: 3 mol/L.

5.4.2.2 Potassium permanganate solution: 0.02 mol/L, which is prepared or diluted according to GB/T 601; OR it is purchased standard solution.

The prepared solution shall be stored in a brown bottle AND protected from light.

5.4.2.3 Distilled water or deionized water, which is in line with the provisions of grade 3 water in GB/T 6682.

5.4.3 Preparation of specimen

According to Table 2, weigh two sets of specimens. Put them into two 2000 mL wide-mouth plastic bottle. Add 1000 mL of distilled water. Cover and seal it. Use hands to shake it uniformly, until the specimen is completely wetted.

5.4.4 Operation method

5.4.4.1 Place the wide-mouth bottle, which contains the specimen, horizontally in the oscillator, to oscillate it for 30 minutes, in a horizontal direction (see Figure 1). If the sample is still not completely wetted by water after shaking in a wide-mouth bottle, for 5 minutes, it needs to be shaken again by hand.

Gradually release the filtrate, after the bubbles disappear. In the day light or artificial light source of 600 lx ~ 1000 lx, observe the double cross-line, from the top, until it can see the two cross-line (compared to the level 2 of the 5-level system, which is specified in GSB 16-2763). Record the highest height at which the double cross-line can be seen clearly. The unit is expressed in mm.

5.5.3.2 Method B (special turbidity meter method)

Pour the sample liquid into the measuring dish of a special turbidity tester, for measurement. Before use, make the "absorbance-visual value" working curve. Input the working curve regression equation in the tester. At least 30 sets of "absorbance-visual value" data are required, wherein the "visual value" shall be evenly distributed within 50 mm ~ 1000 mm. When measuring, directly read the mm value, which is displayed by the turbidity tester.

5.5.4 Result calculation

Test the second set of specimen, according to the provisions of 5.5.3. Take the average of the two test results, as the final result, in mm, which is rounded off to 1, according to GB/T 8170.

5.6 Fat and oil content (Soxhlet extraction method)

5.6.1 Instrument, equipment and materials

5.6.1.1 Soxhlet extractor and its matching extraction spherical flask, which has a specification of 250 mL.

5.6.1.2 Constant temperature water bath.

5.6.1.3 Circulating water cooler.

5.6.1.4 Dryer.

5.6.1.5 Fume hood.

5.6.1.6 Ventilated drying box.

5.6.1.7 Analytical balance, which has an accuracy of 0.0001 g.

5.6.1.8 Degreasing filter paper.

5.6.1.9 Anhydrous ether, which is analytically pure.

5.6.1.10 Beakers: 150 mL, 250 mL.

5.6.2 Preparation of specimen

According to Table 2, weigh two sets of specimens. Put them in a 250 mL flask.

Bake to constant weight, in a drying oven at (105 ± 2) °C. Make accurate weighing, accurate to 0.0001 g.

5.6.3 Operation method

5.6.3.1 Put the baked specimen into two filter paper cylinders, respectively; put them into two pre-washed and dried extractors. Put an empty filter paper tube, in another pre-washed and dried extractor, as a blank control.

5.6.3.2 Install the extractor in order. Connect the condensed water. Add 120 mL of anhydrous ether, to each pre-washed, dried, weighed extraction spherical bottle, so that it covers the filter paper tube, beyond the siphon pipe opening, produces backflow, flows into the extraction spherical bottle.

5.6.3.3 Put it in a constant temperature water bath (the temperature of the constant temperature water bath can be determined, according to the actual reflux times of anhydrous ether. If the reflux is too fast, reduce the temperature of the water bath; if the reflux is too slow, increase the temperature of the water bath; it may first set the temperature to 50 °C).

5.6.3.4 Connect the extractor. Control the reflux for 20 ~ 25 times (reflux 5 ~ 6 times per hour; reflux time is about 4 h). The ether, after extraction, shall be recovered.

5.6.3.5 Put the three spherical bottles, which contain the extracted lipids, into a ventilated drying oven at (105 ± 2) °C, to dry it to a constant weight. Take them out and place them in a desiccator. Cool to room temperature. Weigh the mass, respectively, after 30 minutes.

5.6.4 Result calculation

Calculate according to formula (18). Inspect the second set of specimen, according to the provisions of 5.6.3. Take the average of the two test results, as the final result, expressed in %, which is rounded off to 0.1, according to GB/T 8170.

$$\text{Fat and oil content (\%)} = [(m_4 - m_5)/m_6] \times 100 \quad \ldots\ldots\ldots\ldots \quad (18)$$

Where:

m_4 - The mass of the constant weight ball bottle, which contains fat and oil, minus the mass of the original empty bottle, in grams (g);

m_5 - The mass of the blank control spherical bottle, after extraction, minus the mass of the original empty bottle, in grams (g);

5.7.5.2 The inspection requires at least three inspectors to participate. More than half of the same evaluation results are used as the inspection results.

5.8 Acidity (pH value)

5.8.1 Instrument, equipment, materials

5.8.1.1 Analytical balance, which has an accuracy of 0.01 g.

5.8.1.2 pH meter, which has a glass electrode AND an accuracy of 0.1.

5.8.1.3 Standard sieve, 150-mesh aperture, 6 cm height, 20 cm diameter.

5.8.1.4 Horizontal oscillator: The frequency is (60 ± 2) times/min; the oscillation amplitude is (40 ± 2) mm; it can be timing.

5.8.1.5 Measuring cylinder: 100 mL.

5.8.1.6 Beaker: 100 mL.

5.8.1.7 Conical flask, which has a glass stopper, 250 mL.

5.8.1.8 Flat-headed glass rod.

5.8.1.9 Plastic gloves.

5.8.1.10 Scissors.

5.8.1.11 Buffer solution:

- Phthalic acid buffer solution: 0.05 mol/L solution; its pH value is 4.0 at 25 °C;
- Sodium borate buffer solution: 0.01 mol/L solution; its pH value is 9.18 at 25 °C.

5.8.1.12 Distilled water or deionized water, which is in line with the provisions of grade-3 water in GB/T 6682.

5.8.2 Preparation of specimen

Use scissors to cut two sets of about 5 g of down & feather, into two sets of pieces, which are about 5 mm in length. Wear plastic gloves, to avoid direct contact between hands and samples.

5.8.3 Operation method

5.8.3.1 Weigh (1 ± 0.01) g of specimen, from the cut sample. Put it into a 250 mL conical flask, which contains 70 mL of boiling distilled water. Use flat-headed glass rod, to make it completely wet. Cover a glass stopper. Shake vigorously

This is an excerpt of the PDF (Some pages are marked off intentionally)

------ The End ------