Glue down Evaluation

Foreword

In accordance with GB/T 1.1-2009 "guidelines for Standardization-part 1: Structure and edit of Standards". This standard is proposed by China Feather and Down Industry Association and the Standardization Technical Committee of the China Feather and Down Industry Association.

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Evaluation method for glue down

1 Scope

This standard specifies the terms and definitions for glue down, requirements, preparation, inspection procedures, evaluation of results, test reports and others. This standard is applicable to the inspection of feather, down and its product fillers.

2 Normative citation documents

The following documents are essential for the application of this document. Any reference to the date, only the version of the date is applicable to this document. The latest version (including all modification orders) of the undated reference file is applicable to this document.

General rules of Methods for infrared spectroscopic analysis of GB/T 6040

Test method for down feathers of GB/T 10288

3 Terms and definitions

The terms and definitions set forth in the normative citation document of this Standard shall apply to this Standard.

3.1 Glue down

Using some unconventional methods, such as special performance of chemical aids or special processing technology during the production process of feather and down, to glue the down fibers, feather fibers and landfowl fibers, dust and others together as a down cluster for the purpose of increasing the weight and content of down in the feather and down products..

3.2 Silkworm Cocoon Shaped Down

Down core are wrapped in cocoon-like feather products by down fiber, feather fiber, land fowl feather fiber, dust and other substances.

4 Assessment requirements

4.1 Assessment of programs and descriptions

4.1.1 Evaluation items for glue down include the appearance, morphology under microscope and physical and chemical analysis (infrared or X-ray fluorescence analysis, Either-or).

4.1.2 Evaluation of glue down according to 4.1.1. The detection sequence specified in this paper is

carried out in turn. Accumulative two items with glue down dominant characteristics or meeting the requirements of relevant indicators can stop testing, or single item of Silkworm Cocoon Shaped Down to achieve the required number can also stop testing.

4.2 Requirements

The requirements for glue down shall have the following dominant characteristics or meet the prescribed indicator requirements, as shown in Table 1:

Table 1 The dominant features and index requirements of glue down

Testing program	Dominant features and index requirements
Appearance form	1) Uneven distribution of down and serious bond. 2) Abnormal down shape, not obvious down core, with many down fibers, feather fibers, land fowl feather fibers or dust and so on. 3) The existence of "silkworm cocoon" shaped down. 4) Other appearance dominant characteristics of glue down.
The morphology under the microscope	The number of fleece with dominant image of glue down ≥1.
Physical and chemical analysis	Contain unusual elements or chemicals： Infrared spectrum analysis: in infrared spectrum, there are obvious absorption peaks of characteristic functional groups of abnormal compounds such as silicon compounds and polyurethanes. X-ray fluorescence spectrometry: including, but not limited to, the proportion of silicon: >0.05%.

5 Sample preparation

5.1 Sampling mode, sampling quantity, sampling requirements, atmospheric conditions for testing, sample humidity control and sample retention are carried out in accordance with the relevant product standards.

5.2 Homogenization and shrinkage: reduce to 50 grams in accordance with the method specified in GB/T 10288.

5.3 The number of samples required for each inspection item shall be in accordance with Table 2.

Table 2 Quantity of samples required for each inspection items

Testing items	Weight of a single specimen / g	Specimens needed
Down appearance form	5±0.1	2
The morphology under the microscope	0.1±0.01	1
Infrared spectrum analysis	3.0±0.1	4
X-ray fluorescence spectrometry	0.5±0.1	2

6 Testing

6.1 Reagents, instruments and equipment

6.1.1 Microscope: magnification ≥ 100;

6.1.2 Analytical balance, with accuracy of 0.001g;

6.1.3 Infrared spectrometer, having with a wave number length range of 4000 cm-1 to 600 cm-1 or more, and a spectral resolution of 4 cm-1 or more;

6.1.4 X-ray fluorescence spectrometer, wavelength dispersion type;

6.1.5 Containers for holding and weighing samples or residues, such as beakers, round-bottom flasks, glass dishes, etc.

6.2 Down appearance form (see appendix A)

6.2.1 Personnel requirements

This project shall be operated by professional technicians who have been engaged in down inspection for more than 5 years.

6.2.2 Appearance form

Two samples, 5 g ± 0.1 g each, were taken by quadrangle method and scattered on the test bed to observe the down morphology and appearance carefully. Record the morphological characteristics of suspected glue down in detail and take pictures.

6.2.2.1 Down distribution uniformity

The samples were scattered on the test-bed to observe whether the samples were bonded to each other in the form of flocculence or tuft. The down sample that exists this phenomenon is taken out and gently clapped by hand to see if it can be patted away, and the down sample which can not be separated by patted hand to see the difference between its bond degree and that of normal down.

6.2.2.2 The structure of individual down cluster

To see if the individual down cluster shape from the sample is clear, whether the core is obvious, and whether there are obvious down fiber, feather fiber, fowl feather fiber or dust glued together or wrapped around the down cluster.

6.2.2.3 "Silkworm cocoon" shaped down

On the basis of the appearance and morphology detection of down, the sample was homogenized to 0.1g ± 0.01g by using quadrangular bisection, and the "silkworm cocoon" shaped down selected out, and the number of down clusters recorded. When the number of "silkworm cocoon" reaches 10 or more, the number of "cocoon" feather can be checked and recorded as "≥ 10".

6.3 The morphology under the microscope

6.3.1 Two samples, 5 g ± 0.1 g each, were taken by quadrangular dichotomy and scattered on the test-bed. The shape and appearance of the down in the samples were observed carefully. Record in detail the morphological characteristics of suspected glue down and take photos.

6.3.2 The sample presented abnormal down images, such as granular matter scattered on the plush, obviously irregular colloidal matter, more fibers, filament wrapped around the root of the down unclear and reflective material at the core of the down, including but not limited to the case in Appendix B.

6.3.3 The above abnormal down image photographed and described, and the number of fleece that the image recorded.

6.4 Infrared spectrum analysis

6.4.1 Sample preparation

Four samples (3 g ± 0.1 g) were obtained by quadrangular dichotomy and wrapped in filter paper or defatted cotton cloth.

6.4.2 Chemical material extraction

6.4.2.1 Method A

The samples prepared in 6.4.1 were put into two extractors respectively. The round bottom flask of 250 ml was filled with a solvent with appropriate polarity, such as 150 ml ether. The sample was extracted by Soxhlet extractor for 4 h, circulated for 6-8 times an hour, and then the solvent was evaporated. The remaining extracts are used for detection.

6.4.2.2 Method B

The samples prepared in 6.4.1 were put into two 250ml flasks, and then appropriate polar solvents of 150ml dimethylformamide were filled into. The samples were heated at 90 ℃ in water

bath for (20 ± 2) min,. The sample was evaporated and the remaining extracts were used for detection.

6.4.2.3 Method A and method B are carried out at the same time when the sample is extracted.

6.4.3 Extraction analysis

Test the extract in 6.4.2 according to the method of GB/T 6040 and analyze the abnormal chemicals in the extract.

6.5 X-ray fluorescence spectrometry

6.5.1 Two samples, 0.5g ± 0.1g each, were obtained by quadrangular dichotomy. The samples were uniformly loaded into the sample box for x-ray fluorescence analysis, so that the samples were distributed evenly as far as possible;

6.5.2 X-ray fluorescence full spectrum analysis using helium mode;

6.5.3 The organic matrix model was used to analyze the results by semi-quantitative element analysis;

6.5.4 The reliability of the analysis results is judged according to the actual situation of the sample;

6.5.5 Test the second sample according to the above steps. The average value of the calculated results was revised to last three decimal points according to GB/T8170.

7 Result evaluation

7.1 Evaluation

The occurrence of one of the following cases, determined as "glue down". The results of the test shall be recorded in the evaluation table, as shown in appendix C.

7.1.1 In appearance, 10 or more "silkworm shaped cocoon" down can be clearly seen in 0.1g sample.

7.1.2 In appearance, morphology under microscope and physicochemical analysis have two or more "Y" items.

7.1.2.1 Appearance has the following two or more characteristics, denoted as "Y"; otherwise, "N".

1) The down distribution is not uniform and the bonding is serious;
2) Abnormal shape of the pile, the core of the pile is not obvious, silk, feather, chicken or dust, and so on;
3) The existence of "silkworm cocoon shaped " down;
4) Other unique appearance dominant characteristics of glue down.

7.1.2.2 Microscopic observation showed that the number of fleece with dominant image of glue down was more than 1, denoted as "Y"; otherwise, "N".

7.1.2.3 Physical and chemical analysis found that one or more abnormal elements or chemical substances (such as: infrared spectra, there are significant silicon compounds, polyurethane and other abnormal compounds of the characteristic functional group absorption peak; The silicon content in x-ray fluorescence spectroscopy is > 0.05%), denoted as "Y"; otherwise, "N".

7.1.2.4 If the above characteristics are not met or the relevant requirements are not met, the measured phenomena shall be recorded and not be judged.

7.2 Uncertainty

In the evaluation process, due to the lack of information under the existing scientific research or the upgrading of glue down technology, there is some uncertainty in the final evaluation results.

8 Testing report

The test report include the following contents:

a) Number of this standard;

b) Sample description, including product name, specification;

c) Test temperature, relative humidity and sample status adjustment;

d) Name, model and selected parameters of the equipment used if necessary.

e) Evaluation results;

f) Testers and date;

g) Any deviation from the details of this standard or factors affecting the evaluation results.

9 Others

In order to ensure the accuracy and stability of the results, only the third-party inspection agencies, which are compared by the special technical comparison organized by the China Down Industry Association, are allowed to undertake the relevant testing tasks.

Appendix A
(informative Appendix)
Example of appearance

A.1 Comparison of the overall appearance and morphology of normal down and glue down

Figure A.1.1 Normal down: Evenly

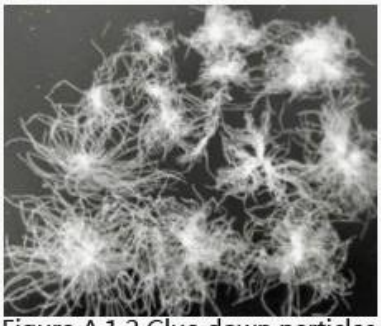

Figure A.1.2 Glue down particles attached, bonded into blocks

Figure A.1.3 Uneven down distribution, cotton shaped

Figure. a. 1.4 Twisted down fibers and feather fibers, down cluster is not obvious

A.2 Comparison of normal down and "silkworm cocoon shaped " down

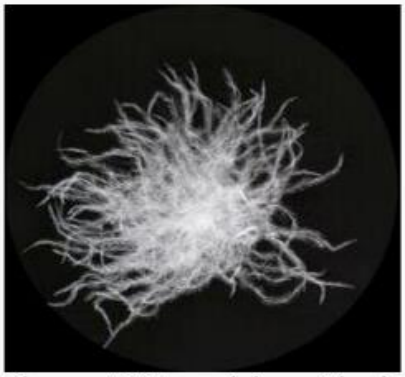

Figure a.2.1 Normal down: Clearly shape and down cluster is obvious

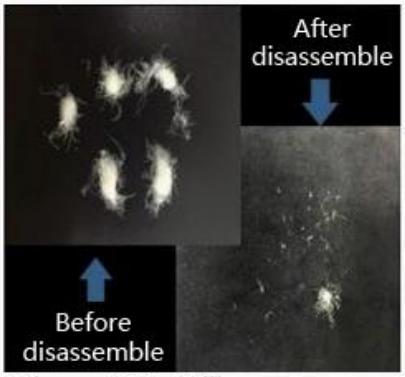

Figure A.2.2 "Silkworm cocoon shaped" down before and after disassemble

Appendix B
(informative appendix)
Examples of microscope image comparison

B. 1 Example of morphological contrast of normal down and glue down under microscope.

Figure B.1.1 Normal down: The core is clear and Down fibers emanating from the down core and showing a cluster in shape

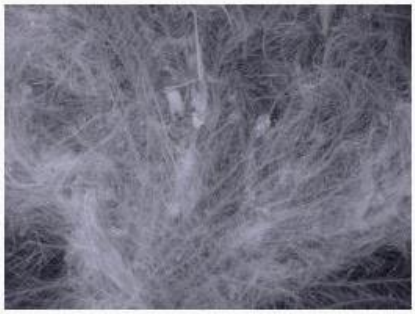

Figure B.1.2 Glue down: particulate matter scattered on down cluster

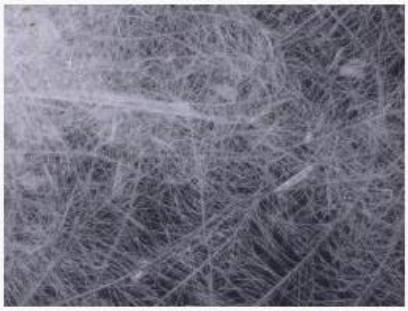

Figure B.1.3 Glue down: Obviously irregular glue

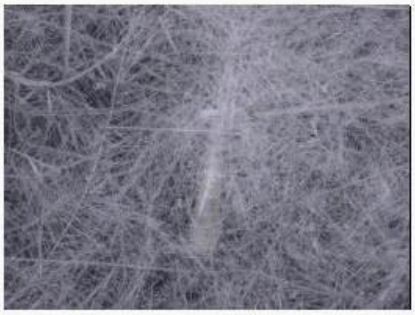

Figure B.1.4 Gule down: Down fibers and feather fibers twisted the root of the down cluster

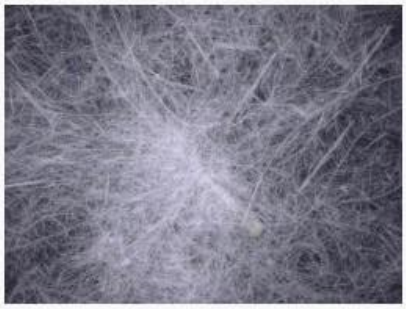

Figure B.1.5 Glue down: The core is not clear and has a reflective substance

Appendix C

(information appendix)

Example of glue down assessment record table

C.1 Glue down evaluation record table, for example, as shown in table C.1.

Table c.1 example of glue down evaluation record representation

No.	Testing program	Standard specification, test results and feature description	Individual evaluation result
1	Appearance form	Individual evaluation: "Silkworm cocoon shaped" down: standard: ≥ 10 / 0.1g, Test value : ____ / 0.1g	
		Comprehensive evaluation: Standard: Should have the following two or more dominant characteristics Test results: 1) The distribution of down is not uniform, bond is serious; 2) The down shape is abnormal, The corn is not obvious, contains many down fibers, feather fibers, feather fibers or contains much dust and so on; 3) Silkworm cocoon shaped down:____ / 0.1 g; 4) Other dominant characteristics of glue down. Attached images:	
2	Microscopic morphology	Standard: Number of down cluster image with dominant characters of glue down ≥ 1	
		Test results: Number of plumes with abnormal down images in 20 suspected samples: _____ Attached image and morphological description:	
3	Physicochemical analysis	**Infrared spectrum analysis**	
		Standard: contains one or more abnormal chemical substances (e.g., characteristic functional group absorption peaks of abnormal compounds such as silicon compounds, polyaminoesters, etc.).	
		Test results:	
		X-ray fluorescence spectrometry	
		Standard: contains one or more abnormal elements (e.g. silicon content: > 0.05%, etc.)	
		Test result:	
Comprehensive assessment results			