FZ

Textile Industry Standard of the People's Republic of China

Dehaired cashmere

分梳山羊绒

（*English Translation*）

Foreword

SAC/TC 209/SC 3 is in charge of this English translation. In case of any doubt about the contents of English translation, the Chinese original shall be considered authoritative.

This standard is drafted in accordance with the rules given in the GB/T 1.1-2009.

This standard replaces the FZ/T 21003-1998 *Dehaired cashmere* in whole, the following technical deviations have been made with respect to the FZ/T 21003-1998 *Dehaired cashmere.*

——revised the English title of this standard;
——modified the scope (see Clause 1, Clause 1 in 1998 edition);
——modified normative references (see Clause 2, Clause 2 in 1998 edition);
——added terms and definitions (see Clause 3);
——revised technical requirements (see 4.2, 3.3 in 1998 edition);
——modified the sampling method and quantity for test samples (see 6.2.2, 5.2 in 1998 edition);
——deleted the sampling and test methods for moisture regain test (see 5.2.1 in 1998 edition);
——revised weight requirement for guard hair content test samples (see 6.2.4, 5.2.2 in 1998 edition);
——revised test procedures for mean fiber length test (see 6.3.2.2, 7.2 in 1998 edition);
——revised the calculation formula for fiber length test (see 6.3.2.3, 7.3 in 1998 edition);
——added the calculation formula for coloured fiber content (see 6.3.3.2);
——revised the calculation formula for conditioned weight (see 7.3, 8.2 in 1998 edition);
——modified the acceptance rules for conditioned weight (see 7.4, 8.3 in 1998 edition) ;
——modified clauses of packaging, marking, transportation and storage (see Clause 8, Clause 7 in 1998 edition);
——added descriptions of provisions for some items in the standard, such as "In the case of otherwise required, carry out as specified in contract" (see Clause 9);
——added Annex A.

This standard was proposed by China National Textile and Apparel Council.

This standard was prepared by SAC/ TC209/ SC3 (Subcommittee 3 on Wool Textiles of National Technical Committee 209 on Textiles of Standardization Administration of China).

This standard was issued in 1998 as first edition. This is the first revised edition.

Dehaired cashmere

1   Scope

This standard specifies the unified type, test methods, sampling requirements, packaging, marking and acceptance rules for dehaired cashmere.

This standard is applicable to the assessment of dehaired cashmere (natural colour white, brown, grey and red cashmere) after dehairing process from raw cashmere, as a unified specification for delivery and acceptance.

2   Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 6500, *Test method for moisture regain of hair fibers—Oven method*

GB/T 6529, *Textiles—Standard atmospheres for conditioning and testing*

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

GB 9994, *Conventional moisture regains of textile materials*

GB/T 10685, *Wool—Determination of fiber diameter—Projection microscope method*

GB/T 16988, *Quantitative determination for mixtures of special animal fibre and wool*

FZ/T 20002, *Determination of ether extractable matter in wool textiles*

3   Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

cashmere

cashmere fiber with diameter not more than 30 μm, with many crimps and no medulla

3.2

guard hair

fiber with diameter more than 30 μm, with or without medulla and/or crimp, including atypical cashmere fiber

3.3

atypical cashmere fiber

fiber of which guard hair accounts for more than one third of the total fiber length, with one end showing cashmere features and the other end showing guard hair features

3.4

foreign matter

dandruff and/or other foreign matter mixed in cashmere

3.5

coloured fiber

hair fiber longer than 5 mm and its colour exhibits difference from white cashmere

3.6

crossing length

length corresponding on the crossing between fiber length distribution curve and the vertical axis
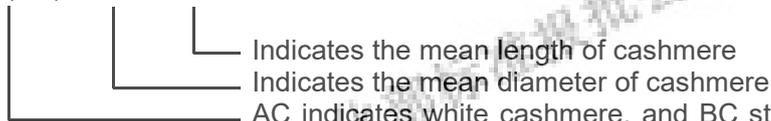
4　Technical requirements

4.1　Type designation

According to natural colour, quality characteristics and considering its different purpose of use, dehaired cashmere (white, brown, grey and red cashmere) is designated into different types, mainly based on mean fiber diameter, mean fiber length and by combining the specifications shown in Table 1 and Table 2.

4.2　Expression of type

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AC(BC)　 XX 　XX
                        └── Indicates the mean length of cashmere
                 └────── Indicates the mean diameter of cashmere
  └─────────── AC indicates white cashmere, and BC stands for coloured cashmere
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such as brown, grey or red cashmere.

Specific expression method is shown in Table 1.

Table 1

Type	Diameter (μm)	Remarks	Length (mm)	Remarks
AC (BC)	14	14 —14,50 and below, μm	28~40	28—28,0 and below, mm 30—28,1~30,0, mm
AC (BC)	15	15 —14,51~15,50, μm	28~40	32—30,1~32,0, mm 34—32,1~34,0, mm
AC (BC)	16	16 —15,51~16,50, μm	28~40	36—34,1~36,0, mm 38—36,1~38,0, mm
AC (BC)	17	17 —16,51 and above, μm	28~40	40—38,1 and above, mm

EXAMPLE: Type AC1440 indicates white cashmere with a mean diameter of 14 μm and mean length of 40 mm.

Type BC1538 indicates coloured cashmere of brown, grey or red with a mean diameter of 15 μm and mean length of 38 mm.

5　Grading specification

Grades of dehaired cashmere are classified into qualified and unqualified products on lot basis. If any item of mean fiber diameter, mean fiber length, guard hair content, foreign matter content specified in the following Table 2 fails to meet the corresponding requirements, the lot shall be evaluated as unqualified product.

Table 2

Item		Unit	Limit value	Tolerance and evaluating parameter	Remarks
Mean fiber length		mm		In accordance with specified type	See Table 1
Diameter deviation		%	≤	24	
Short fiber content	Length type 40~38	%	≤	10,0	Short fiber length is 20 mm and below
	Length type 36~32	%	≤	15,0	
	Length type 30~28	%	≤	20,0	
Guard hair content		%	≤	0,3	
Foreign matter content		%	≤	0,3	
Single fiber strength		cN	≥	3,00	

Note 1: Moisture regain on packing is not higher than 18%.
Note 2: In the case there are more than 6 pieces/g coloured fiber in type AC, it may be settled between the buyer and the supplier.
Note 3: Conventional grease content of dehaired cashmere is 1,5%.
Note 4: No other fibers shall be blended into dehaired cashmere except for a small amount of inevitable variation fiber, cashmere content shall not be less than 95%.

6 Test methods

6.1 Test conditions

The standard atmospheres for testing and conditioning shall be as specified in GB/T 6529.

6.2 Sampling method

6.2.1 Considering that dehaired cashmere is a high-priced product, no compulsory requirement is given here on how many bales from which specific volume shall be drawn, but the minimum amount shall be guaranteed to meet the buyer's requirements. Some bale numbers are given for reference in the following Table 3.

Table 3

Production quantity	Sampling bales	Production quantity	Sampling bales
≤5 bales	Each bale	21~30 bales	8 bales
6~10 bales	6 bales	31~50 bales	9 bales
11~20 bales	7 bales	51~100 bales	10 bales
Notes: One extra bale is drawn from each additional 20 bales for lot size larger than 100 bales per batch.			

6.2.2 Samples for testing shall be drawn randomly from the production lot as specified. Draw samples of total 100~200 g from the upper, middle and lower parts 15 cm or deeper from the bale surface (the sampling amount may be increased to ensure the retained weight as specified in sub-clause 6.2.3 if necessary), immediately put the drawn samples in a sealed container to ensure the accuracy of the test.

6.2.3 After drawing samples for moisture regain test as specified in GB/T 6500, gently tear the remaining samples and blend as homogeneously as possible, then subdivide it into 4 portions along the diagonals, keep the opposite 2 portions and discard the other 2 portions, repeat such operations more than 3 times, retain 2 portions of each 100 g (150 g for lot size larger than 30 bales). One portion is used for quality tests, and the other is retained and sealed as spare sample.

6.2.4 Take 3 test specimens for each testing item with the following corresponding weight: 5 g (8 g for lot size larger than 30 bales) of each test specimen for guard hair content, foreign matter content and coloured fiber content test; 5 g (10 g for lot size larger than 30 bales) of each test specimen for grease content test.

6.3 Test

6.3.1 Mean fiber diameter test

Perform the test as specified in GB/T 10685.

6.3.2 Mean fiber length test (diagram arrangement method)

6.3.2.1 Sample preparation

Spread samples on the testing bench, take equal amount of fibers from different points (not less than 20 points) with tweezers for about total 200 mg and blend, sub-divide into 3 equal test specimens. Two specimens are used for parallel test, and the remaining one as spare specimen.

6.3.2.2 Test procedures

Sort the test specimen by hands into a naturally straight bundle approximately aligned at one end (baste oil may be used during the sorting process if necessary). Slowly draw an equivalent amount of fibers from long to short out of the fiber bundle, then successively arrange the fibers flatly from left to right, from top to bottom on the flannelette board while keeping one end aligned; During the sorting process, avoid breaking the fiber, eliminate entangled fibers and put floating fibers back again in the fiber bundle. Sort the fiber bundle repeatedly for several times until all the fibers are uniformly arranged in a specific density from left to right into a length distribution graph whose bottom margin is about 250 mm as shown in Figure 1.

Figure 1

Put glass plate on the distribution graph, draw the fiber length arrangement diagram, the length corresponding to the intersection of the fiber length curve and the vertical axis is the crossing length, mark as L_0. Draw the figure with translucent graph paper, take 5 mm as a group, record the length at the boundary of each group. In the case that the last group is greater or equals to 3 mm, record it to another group, otherwise, combine it with the previous group, mark as L_n.

6.3.2.3 Calculation of test results

Calculate the mean fiber length and short fiber content respectively according to Formula (1) and Formula (2) as follows:

$$L = \frac{\frac{1}{2}(L_0 + L_n) + \sum_{i=1}^{n-1} L_i}{n} \qquad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \quad (1)$$

$$U = \frac{\frac{1}{2}(L_u + L_n) + \sum_{i=u+1}^{n-1} L_i}{\frac{1}{2}(L_0 + L_n) + \sum_{i=1}^{n-1} L_i} \times 100 \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \quad (2)$$

where:

L　mean fiber length, expressed in millimetre (mm);

L_0　fiber length at the intersection of fiber length distribution curve and the vertical axis, expressed in millimetre (mm);

L_n　fiber length at the shortest position of the fiber length distribution curve, expressed in millimetre (mm);

L_i　fiber length at group boundary of each group, expressed in millimetre (mm);

n　number of fiber groups;

U　short fiber content, %;

L_u　20, expressed in millimetre (mm).

Take the mean value of the 2 test results as the test result. In the case that the absolute difference value between the 2 mean fiber length exceeds 2 mm, or the difference of short fiber content is greater than 20% of the mean value, the 3rd specimen shall be tested, take the mean value of the 3 test results as the final result.

Round off the test result to one decimal place as specified in GB/T 8170.

6.3.3　Test for guard hair content, foreign matter content and coloured fiber content

6.3.3.1　Test procedure

Prepare two test specimens respectively for guard hair content, foreign matter content and coloured content, pick out guard hair, foreign matters with tweezers or other appropriate tools according to the limit value for cashmere and guard hair as well as foreign matter specifications, then weigh them respectively, accurate to the nearest 0,000 1 g. Directly count and record the number of coloured fibers.

6.3.3.2　Calculation of the test results

Calculate guard hair content, foreign matter content and coloured fiber content according to Formula (3), Formula (4) and Formula (5) respectively.

$$H_c = \frac{m_c}{m} \times 100 \qquad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \quad (3)$$

$$H_z = \frac{m_z}{m} \times 100 \qquad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \quad (4)$$

$$H_s = \frac{C_s}{m} \qquad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \quad (5)$$

where:

H_c　guard hair content, %;

m_c guard hair weight, expressed in gram (g);

m test specimen weight, expressed in gram (g);

H_z foreign matter content, %;

m_z foreign matter weight, expressed in gram (g);

H_s coloured fiber content, expressed in pieces per gram (pcs/g);

C_s number of coloured fibers.

Take the mean value of the 2 test results as the test result, in the case that the absolute difference value between the 2 calculated results for guard hair content or foreign matter content is larger than 0,05%, the 3rd specimen shall be tested, take the mean value of the 3 test results as the final result.

Round off the test results of guard hair content and foreign matter content to one decimal place as specified in GB/T 8170, round off the test result of coloured fibre content to integer.

6.3.4   Fiber content test

Perform the test as specified in GB/T 16988.

6.3.5   Grease content test

Perform the test as specified in FZ/T 20002.

6.3.6   Moisture regain test

Perform the test as specified in GB/T 6500.

6.3.7   Single fiber strength

Perform the test as specified in the method given in Annex A.

7   Inspection Rules

7.1   The concerned parties may use this standard to inspect whether the products comply with quality requirements according to various parameters stipulated.

7.2   An inspection lot may be formed in the factory based on the continuous production each day or each shift according to its own production characteristics. One production lot may consist of only one inspection lot, or be comprised of different inspection lots. Products are graded on inspection lot basis. Lot number may be determined by the supplier, or according to negotiation between the buyer and the supplier. Quality inspection report shall be provided to each product lot.

7.3   Conditioned weight is calculated according to Formula (6), conventional moisture regain of dehaired cashmere according to GB 9994.

$$m = m_1 \times \frac{(100 + W_0) \times (100 - Y_1)}{(100 + W_1) \times (100 - Y_0)} \quad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots（6）$$

where:

m conditioned weight, expressed in kilogram (kg);

m_1 tested weight, expressed in kilogram (g);

W conventional moisture regain, %;

W_1 tested moisture regain, %;

Y_0 conventional grease content, %;

Y_1 tested grease content, %.

7.4 If the difference of conditioned weight on acceptance lies within $\pm 0,5\%$ (including 0,5%), no correction needs to be added to the delivery weight, settle at actual weight in case of exceeding $\pm 0,5\%$ unless otherwise agreed by both parties.

7.5 In case any party disagrees with the inspection result, re-inspection may be submitted to the arbitration institution agreed by both parties for re-test according to sampling and testing methods specified in this standard, the re-inspection result is the final result.

7.6 In the case that quality and quantity of the products on acceptance are different from those recorded on the inspection report or weight record, re-inspection may be submitted to the manufacturer within one month of delivery. In the case of circulation or on stock for over one month, if most of the whole lot products are not used, re-test other items may also be submitted except for weight and moisture regain. The manufacturer shall respond within one month on accepting the re-inspection notice, otherwise, it shall be handled according to the user's requirements.

8 Packaging, marking, transportation and storage

8.1 Packaging

8.1.1 Product package shall be kept complete and intact to ensure fibers free from damage and convenient for storage and transportation.

8.1.2 Products from different lots, grades and specifications shall be packed separately.

8.2 Marking

Distinctive unfading marks shall be made on both ends of the package after packing. Packaging marks shall clearly indicate trade mark, manufacturer's name, address, product name, specification, grade, delivery lot, bale number, gross weight, net weight, applicable standard number and manufacturing date.

8.3 Transportation

Keep fibers free from damage, moist and direct sun during the transportation.

8.4 Storage

Store products according to different types, specifications and batch numbers respectively, stack in dry and ventilated warehouse.

9 Others

9.1 Some items in this standard may be carried out by agreements in case of otherwise agreed by both parties.

9.2 In case of any item not covered in this standard, it can be negotiated by the two concerned parties.

Annex A

(Normative)

Test method for single fiber strength

A.1 Test apparatus

Constant speed elongation strength tester (CRE).

A.2 Sampling and the preparation of test samples

A.2.1 Put test samples on the testing stand, take equal amount each time from different points (not less than 20 points) for about 100 mg~200 mg fibers and blend them, then divide into 3 equal test samples.

A.2.2 Repeatedly arrange the fibers in the sample on the velvet plate 3-5 times according to procedures for fiber length test, ensuring the fibers are arranged evenly on the velvet plate in the order from long to short with appropriate density, no oil agent shall be used during the diagram arrangement process.

A.2.3 Classify the bottom margin length of the fiber diagram into 5 equal groups, take at random 20 fibers in each group as test specimens. Cut respectively from each length group, take middle length for about 40 mm, minimum not shorter than 20 mm as specimen length. In case that most fibers in the shortest length group are shorter than 20 mm, discard both the shortest group and the longest group, take 30 fibers from each of the remaining 3 groups as test specimen.

A.3 Adjustment of the apparatus

A.3.1 Adjust the levelness and null of the strength tester.

A.3.2 Check and adjust the positions of the upper and lower grip to maintain the gripping surfaces on the same vertical level, the distance between the upper and lower grips is 10 mm.

A.3.3 The gripping jaw face shall be smooth and flat, no movement when gripping and no obvious damage shall be observed. If severe damage is observed, some inlay objects (such as transparent adhesive tape) may be applied to avoid fiber damage.

A.3.4 Adjust the stretching speed of the strength tester, normally at 12 mm/min.

A.4 Test procedures

A.4.1 Pre-tension: Apply pre-tension to straighten the fiber till no elongation, normally about 0,11 cN/dtex.

A.4.2 Grip the test specimen between the upper and lower gripping jaws of the strength tester.

A.4.3 Start the tester till the fiber breaks, record the breaking strength and breaking elongation values.

A.4.4 If obvious movement or breaking is found near the grip jaw during the stretching process, such test results shall be discarded.

A.5 Calculation of the test result

Calculate the mean breaking strength according to Formula (A.1).

$$F = \frac{\sum\limits_{i=1}^{n} F_i}{n}$$ ·····························（A.1）

where:

F mean fiber strength at breaking, expressed in centi-Newton (cN);

F_i the breaking strength of fiber number i, expressed in centi-Newton (cN);

n number of fibers.

The test results shall be rounded off to 2 decimal places as specified in GB/T 8170.