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Textiles — Quality labelling specification for dehaired cashmere

Textiles — Spécification d'étiquetage qualité du cachemire épilé

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 23, *Fibres and yarns*.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Textiles — Quality labelling specification for dehaired cashmere

1 Scope

This document specifies the terms and definitions, labelling requirements, test methods, inspection rules, packaging, labelling and test report of pure virgin dehaired cashmere.

This document is not applicable to dehaired cashmere tops, skin cashmere, recycled cashmere and products after spinning, including yarns, fabrics, garments, apparel and accessories, household textiles, etc.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

ISO 137, *Wool — Determination of fibre diameter — Projection microscope method*

ISO 139, *Textiles — Standard atmospheres for conditioning and testing*

ISO 1833 (all parts), *Textiles — Quantitative chemical test*

ISO 3071, *Textiles — Determination of pH of aqueous extract*

ISO 3074, *Wool — Determination of dichloromethane-soluble matter in combed sliver*

ISO 17751-1, *Textiles — Quantitative analysis of cashmere, wool, other specialty animal fibers and their blends — Part 1: Light microscopy method*

ISO 17751-2, *Textiles — Quantitative analysis of cashmere, wool, other specialty animal fibers and their blends — Part 2: Scanning electron microscopy method*

ISO 18254-1, *Textiles — Method for the detection and determination of alkylphenol ethoxylates (APEO) — Part 1: Method using HPLC-MS*

ISO 18596, *Test method for staple length of dehaired cashmere — Hand-arranging method*

ISO 20705, *Textiles — Quantitative microscopical analysis — General principles of testing*

IWTO-12 *Measurement of the Mean and Distribution of Fibre Diameter Using the Sirolan-Laserscan Fibre Diameter Analyser*

IWTO 19 *Determination of Wool Base and Vegetable Matter Base of Core Samples of Raw Wool*

IWTO-33 *Method for the Determination of Oven-Dry Mass and Calculated Invoice Mass of Scoured or Carbonised Wool*

IWTO-47 *Measurement of the Mean and Distribution of Fibre Diameter of Wool using an Optical Fibre Diameter Analyser (OFDA)*

3 Terms and definitions

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

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ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
raw cashmere
unprocessed down fibre from the fine, soft undercoat or underlayer of live cashmere goat producing two layers of hair, predominated by fine undercoat down with minor amount of natural *foreign matters* (3.8)

3.2
dehaired cashmere
processed cashmere after industrialized scouring and dehairing of *raw cashmere* (3.1)

3.3
pure virgin cashmere
100 % unused *dehaired cashmere* (3.2) without any other animal and non-animal fibre, which never goes through process(es) of dyeing, spinning, knitting or weaving, finishing or chemically treated (such as bleaching, decolouration, depigmentation etc.)

3.4
skin cashmere
cashmere recovered from the pelts of dead cashmere goat by chemical method or reagents

3.5
recycled cashmere
loose cashmere fibre recollected after going through processing stage(s), such as spinning, knitting, weaving, finishing, felting or used by consumers

3.6
guard hair
coarser hair in cashmere fibre with diameter ≥ 30 µm

3.7
guard hair content
percentage of mass of coarse fibre with diameter ≥ 30 µm in the total fibre mass

3.8
foreign matter
non-fibrous matter such as soil, dandruff and burrs etc. included in cashmere

3.9
foreign matter content
number of pieces of *foreign matters* (3.8) in one gram of *dehaired cashmere* (3.2)

3.10
dark fibre
fibre longer than 5 mm with colour showing obvious difference from the original base colour of cashmere, including dark fibre and non-white fibre

3.11
short fibre content
percentage of number of cashmere fibres ≤ 15 mm in the total number of a specific mass

3.12
damaged fibre content
percentage of number of fibres showing fibrillation, axial splitting, ruptures, split ends, scale lifting, kinked bends or other damage in the total number of a specific number of fibres observed

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3.13
non-animal matter
vegetable fibres, chemical fibres and/or other *polymer matter* (3.15) contained in *dehaired cashmere* (3.2)

3.14
other animal fibre
animal fibres other than cashmere in *dehaired cashmere* (3.2)

3.15
polymer matter
synthetic matter in particles or fragments of polymer matter (such as polypropylene), but not confined to those derived from packing materials

4 Quality labelling requirements

4.1 Product classification

Based on its natural colour, cashmere is classified into white, grey and brown cashmere, which is expressed with letter W, G and B, respectively. The characteristics of each type is described as follows:

— white cashmere(W): both cashmere and coarse hair show natural white colour;

— grey cashmere(G): cashmere shows grey, white and light brown colours, coarse hair shows light brown and white or brown colour;

— brown cashmere(B): cashmere shows brown colour, coarse hair shows dark brown colour.

In the case that different colour types are blended, colour class is assigned according to the darker one.

4.2 Product type

Pure virgin cashmere is classified into five types of A, B, C, D and E based on its corresponding mean fibre diameter range. It is further sub-classified by combining mean fibre length, short fibre content, guard hair content and foreign matter content, as shown in Table 1.

Table 1 — Dehaired cashmere types

Type and grade		Mean fibre diameter (μm)	Mean fibre length (mm)	Short fibre content (%)	Guard hair content (%)	Foreign matter content (pcs/g)	Non-animal matter (%)
A	1	≤ 14,9	≥ 36,0	≤ 19	≤ 0,15	≤ 40	≤ 0,02
	2		32,0 - 36,0	19 - 21	0,15 - 0,20	40 - 70	
	3		28,0 - 32,0	21 - 25	0,20 - 0,28	70 - 100	
	4		≤ 28,0	≥ 25	≤ 0,35	≥ 100	
B	1	14,9 - 15,9	≥ 36,0	≤ 19	≤ 0,15	≤ 40	≤ 0,02
	2		32,0 - 36,0	19 - 22	0,15 - 0,25	40 - 70	
	3		28,0 - 32,0	22 - 25	0,25 - 0,30	70 - 100	
	4		≤ 28,0	≥ 25	≤ 0,60	≥ 100	
C	1	15,9 - 16,9	≥ 36,0	≤ 19	≤ 0,25	≤ 40	≤ 0,02
	2		32,0 - 36,0	19 - 23	0,25 - 0,30	40 - 70	
	3		28,0 - 32,0	23 - 26	0,30 - 0,35	70 - 100	
	4		≤ 28,0	≥ 26	≤ 0,65	≥ 100	

NOTE The value range in each column is an open interval, the same value in each column is classified into its upper interval in its corresponding type and grade.

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Table 1 *(continued)*

Type and grade		Mean fibre diameter (μm)	Mean fibre length (mm)	Short fibre content (%)	Guard hair content (%)	Foreign matter content (pcs/g)	Non-animal matter (%)
D	1	16,9 - 17,9	32,0 - 36,0	≤ 23	≤ 0,30	≤ 40	≤ 0,03
	2		28,0 - 32,0	23 - 27	0,30 - 0,35	40 - 70	
	3		≤ 28,0	≥ 27	≤ 0,70	>70	
E	1	17,9 - 19,0	28,0 - 32,0	≤ 30	≤ 0,35	≤ 70	≤ 0,03
	2		≤ 28,0	>30	≤ 0,80	>70	
NOTE The value range in each column is an open interval, the same value in each column is classified into its upper interval in its corresponding type and grade.							

4.3 Other quality parameters

All types of pure virgin cashmere shall meet the following requirements:

a) Coefficient of variation (CV %) of mean fibre diameter ≤ 24 %;

b) No other animal fibre shall be present;

c) Dark fibre number for white cashmere: Whiter in white type(L)≤ 15 dark fibres/5 g; Normal white type(N):16 to 30 dark fibres/5 g;

d) pH value 6,0 to 7,5;

e) Residual surfactant APEO (OP, OPEO, NP, NPEO) shall be less than 50 mg/kg.

4.4 Quality labelling

Quality labelling codes of dehaired cashmere are composed of the English name of dehaired cashmere, cashmere-d, colour code (see 4.1 and 4.3 c) for white cashmere only) and type code (see 4.2).

EXAMPLE Dehaired white in white cashmere with mean fibre diameter 14,9 μm to 15,9 μm, mean fibre length 36,0 mm – 32,0 mm, short fibre content 19 % – 22 %, guard hair content ≤ 0,25 % - 0,30 %, foreign matter content 50 pcs/g, and other parameters meet all requirements described in 4.3, its quality labelling code is "cashmere-d-W-(L)-B2232", which represents dehaired white cashmere with less than 15 dark fibres in 5/g of mean fibre diameter type B with mean fibre length grade 2, short fibre content grade 2, guard hair content grade 3 and foreign matter content grade 2.

5 Test methods

5.1 Standard atmospheres

The standard atmosphere for conditioning and testing textiles in ISO 139 shall be used.

5.2 Mean fibre diameter test

The mean fibre diameter test shall be in accordance with the methods given in either: ISO 137, IWTO-12 or IWTO-47.

In case issues arise concerning the test results, ISO 137 shall be used to distinguish the results.

5.3 Mean fibre length and short fibre content test

The mean fibre length and short fibre content test shall be as described in ISO 18596.

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5.4 Guard fibre content test

Condition the test specimen as described in ISO 139 and then take 2 test specimens, mass of each 2 g, accurate to 0,000 1 g. Place each test specimen respectively onto a board or a flat surface exhibiting distinctive colour difference from the fibre to be tested. Pick out all the guard fibres in accordance with ISO 20705. Weigh and record the mass, with an accuracy of 0,000 1 g. Calculate guard fibre percentage using Formula (1):

$$B_c = \frac{m_c}{m} \times 100 \quad (1)$$

where

B_c is the guard hair content, in %;

m_c is the mass of guard hair, in gram (g);

m is the mass of test specimen, in gram (g).

Take the mean value of the two test specimens as the test result. In case the absolute difference between the two test results exceeds 0,05 %, a third test specimen shall be tested. Take the mean value of the 3 test results from the 3 test specimens as the final result, rounding off to 2 decimals.

5.5 Foreign matter content test

Weigh two test specimens, mass of each 1 g, accurate to 0,01 g. Put each test specimen on a working table with its surface exhibiting a distinctive colour difference from the fibre to be tested (or a bench magnifier), pick out each dandruff and burr or other non-fibrous matter from every fibre and those dropped from the test specimen, count and record the number. Foreign matter content of each test specimen is expressed as how many pieces per gram “xx pcs/g”.

Take the mean value of the 2 foreign matter test results as the final result. If the absolute difference between the two test specimens exceeds 10 pcs/g, a third test specimen shall be tested. In this case, take the mean value of the 3 test results from the 3 test specimens as the final result, rounding off the calculated result to an integer.

5.6 Dark fibre test

Weigh two test specimens each of 5 g, accurate to 0,01 g. Loosen the test specimen on an appropriate plate. Place the test specimen in an illuminated desktop magnifier (6x to 8x) and on white lining paper. Carry out the test under a white light source (5 500 °K to 6 500 °K and not less than 400 lx). Pick out with tweezers dark fibre equal to or longer than 5 mm in white cashmere and record the number. The number of dark fibres in each lot of sample is expressed as how many pieces per 5 gram “xx pcs/5 g”.

Take the mean value of the 2 test specimens as the test result, rounding off to an integer.

5.7 Damaged fibre content test

Prepare a test specimen as described in ISO 17751-1, observe at least 1 000 fibres by light microscopy at the magnification of 500x. Determine whether a fibre is a damaged fibre by comparing with damaged cashmere fibre images shown in Annex A. Record the number of damaged fibres and calculate the damaged fibre percentage of the number in the total number of observed fibres.

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5.8 Animal fibre, other animal fibre, non-animal matter and polymer matter content test

The animal fibre and other animal fibre test shall be in accordance with ISO 17751-1 or ISO 17751-2; The test on non-animal matter including polymeric matter shall be in accordance with the ISO 1833 series or IWTO 19.

5.9 Moisture regain test

The moisture regain test shall be in accordance with IWTO-33.

5.10 Grease content test

The grease content test shall be in accordance with ISO 3074.

5.11 pH value test

The pH value test shall be in accordance with ISO 3071.

5.12 APEO test

The APEO test shall be in accordance with ISO 18254-1.

5.13 Calculation of conditioned weight

Conditioned weight can be calculated in accordance with Formula (2). The moisture regain of dehaired cashmere is as per commercial conventional moisture regain.

$$m = m_1 \times \frac{(100+W_0)\mathrm{X}(100-Y_1)}{(100+W_1)X(100-Y_0)} \tag{2}$$

where

m is the conditioned mass, in kilogram (kg);

m_1 is the tested mass, in kilogram (kg);

W_0 is the conditioned moisture regain, in % (conventional moisture regain of dehaired cashmere is 17 %);

W_1 is the tested moisture regain, in %;

Y_0 is the conditioned grease content, in % (conventional grease content of dehaired cashmere is 1,5 %);

Y_1 is the tested grease content, in %.

6 Inspection rules

6.1 Sampling

6.1.1 Lot sample proportion and number

Draw samples at 30 % if a lot size is ≤ 10 bales; for a lot size larger than 10, draw at 20 % of the increased bale number exceeding 10; draw at 30 % of the increased bale number exceeding 20 bales in a lot; an incomplete bale is counted as one bale when calculating the number of bales to be drawn. The total

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mass of quality samples shall be not less than 300 g. The sampling proportion for the moisture regain test is the same as above; the total sample mass shall be not less than 400 g.

6.1.2 Drawing of samples

6.1.2.1 Hard package

Choose a sampling bale at random and draw samples from the top, middle and bottom positions of the bale.

6.1.2.2 Soft package

Cashmere from each soft package shall be taken out; test samples shall be taken from multiple points on both internal and external parts of the fleece by test operators on the front and reverse side.

6.1.3 Test specimen preparation

Homogeneously mix the drawn sample fibres on the test table, dividing the sample into two equal parts by halving method, one for the test specimen, the other for a spare sample.

6.2 Inspection

6.2.1 Inspection is carried out on a lot basis; the lot number may be determined by the supplier or negotiated between concerned parties. Product type is evaluated on a lot basis.

6.2.2 Each lot of dehaired cashmere that can meet the requirements described in 4.3 shall be labelled according to quality labelling requirements as described in 4.2, Table 1 and 4.3.

6.2.3 Acceptance weight is based on conditioned weight or as discussed between concerned parties.

6.2.4 In case any dispute concerning the test results arises, a third-party arbitration body, agreed between concerned parties, should be chosen to carry out a re-test as described in this document. The re-test result will be taken as the final result.

6.2.5 For acceptance inspection, in case the quality or number conflicts with the issued test report, a re-test application shall be submitted to the supplier within a month. For those cases that are beyond one month, it shall be negotiated between concerned parties.

7 Packaging and labelling

7.1 Dehaired cashmere is packed in specific-weight packages. The mass of each package may be negotiated between concerned parties or as per the description in the contract.

7.2 Packing materials shall be appropriately selected to prevent secondary contamination. Synthetic fibre, such as polypropylene, or packing materials containing synthetic polymer matter shall be avoided.

7.3 Packages shall be complete, intact and not damaged during the delivery and storage process. They shall be clear from staining and damp and be suitable for storage and shipment.

7.4 Each package unit shall attach a label tag, which includes the following information:

a) trade mark, commodity name, specification, lot number, bale number, manufacturing date;

b) standard number, quality labelling code;

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c) gross weight, net weight;

d) supplier's name and address.

8 Test report

The test report shall include at least the following information:

a) a reference to this document, i.e. ISO 5162:2023;

b) test results of each parameter and test method used;

c) quality labelling code of each lot of dehaired cashmere;

d) temperature and humidity of test condition;

e) test apparatus and its model number;

f) any factor that can affect the test results;

g) test date(s);

h) test operator(s);

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Annex A
(informative)

Identification of skin cashmere

A.1 General principles

Various parameters can be used to identify skin cashmere, including fibre morphology identification with light microscopy, pH value test and colour difference test. Firstly, use a light microscope to examine fibre morphology. If damaged fibres (as shown in Figure A.1 to Figure A.3) are found, and if the damaged fibre content percentage is more than 2 %, then the lot can be determined directly as skin cashmere.

If no damaged fibres are found, other parameters, such as pH value and dyeing properties can also be taken into consideration to identify skin cashmere. If the pH value is higher than 7,5 while the dye uptake rate is lower than normal cashmere and colour difference is lower than grade 4 compared to that of normal cashmere, the combination of these 3 parameters can be used to determine the cashmere in question as skin cashmere.

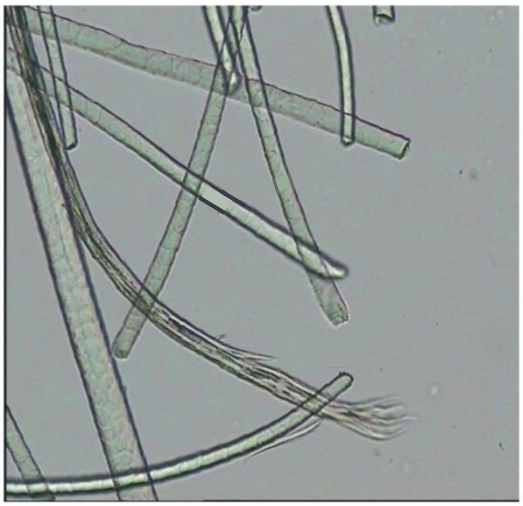
A.2 Identification of skin cashmere

A.2.1 Identification based on fibre morphology

Observe fibre morphology as described in ISO 17751-1 or ISO 17751-2. The presence of split, broken or fibrillated fibres can be caused by mechanical action as shown in Figure A.1 to Figure A.3.

Skin cashmere will show chemical damage, swelling, residual skin and in the case of enzyme depilation, may show fibrillation at the root ends. Effects are normally confined to the root ends. For this reason, skin cashmere is best recognised microscopically.

a) Shape I



b) Shape II

Figure A.1 — Different shapes of split-end fibres

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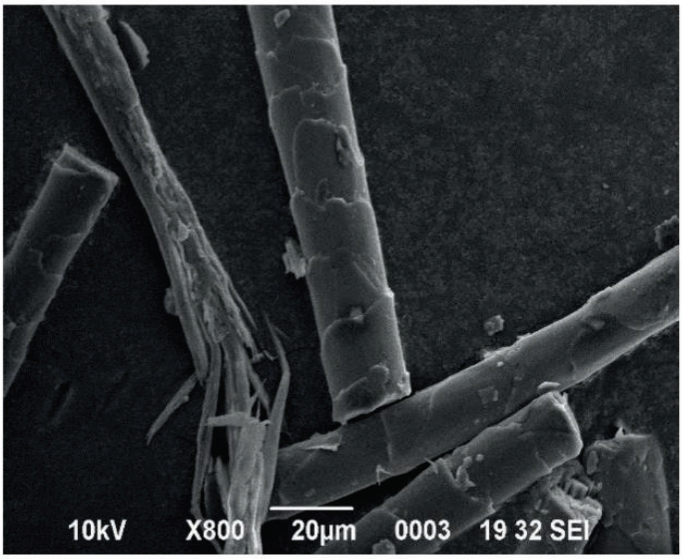

Figure A.2 — Fibre breakage

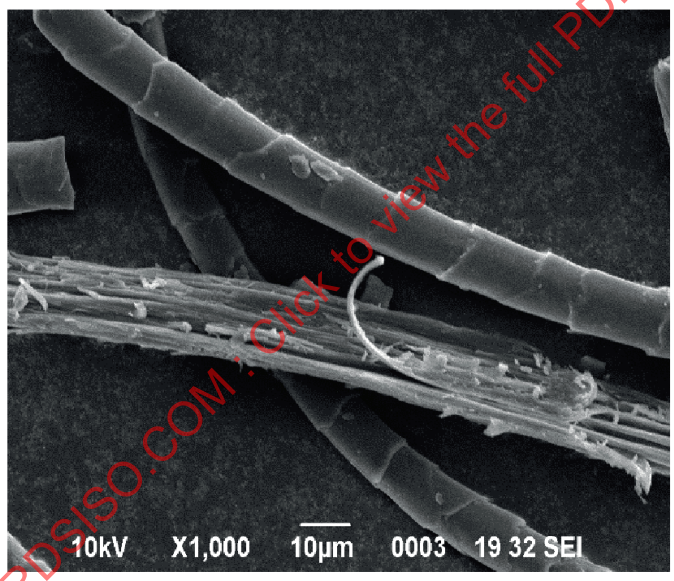

Figure A.3 — Fibre fibrillation

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A.2.2 Identification by pH value test

Carry out pH value test in accordance with ISO 3071.

A.2.3 Identification by dyeing comparison test

A.2.3.1 Optimization of dyes and concentration

Based on dyeing properties (uptake, levelling, etc.), the same batch of sample have been tested by choosing different dye stuff with different uptake and levelling properties as well as carrying out orthogonal experiments in practical production practices. Reactive dye Red 5B with a concentration of 0,05 %(owf) has been optimized for dyeing.

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