SLOVENSKI STANDARD
SIST EN ISO 17751-1:2023

01-september-2023

Tekstilije - Kvantitativna analiza kašmirskih, volnenih, drugih specialnih živalskih vlaken in njihovih mešanic - 1. del: Mikroskopska metoda s svetlobo (ISO 17751-1:2023)

Textiles - Quantitative analysis of cashmere, wool, other specialty animal fibers and their blends - Part 1: Light microscopy method (ISO 17751-1:2023)

Textilien - Quantitative Analyse von Kaschmir, Wolle, anderen speziellen tierischen Fasern und deren Mischungen - Teil1:Lichtmikroskopie-Verfahren (ISO 17751-1:2023)

Textiles - Analyse quantitative du cachemire, de la laine, d'autres fibres animales spéciales et de leurs mélanges - Partie 1: Méthode de microscopie optique (ISO 17751-1:2023)

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59.060.10	Naravna vlakna	Natural fibres

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Textiles - Quantitative analysis of cashmere, wool, other specialty animal fibers and their blends - Part 1: Light microscopy method (ISO 17751-1:2023)

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EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN ISO 17751-1:2023) has been prepared by Technical Committee ISO/TC 38 "Textiles" in collaboration with Technical Committee CEN/TC 248 “Textiles and textile products” the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by January 2024, and conflicting national standards shall be withdrawn at the latest by January 2024.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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The text of ISO 17751-1:2023 has been approved by CEN as EN ISO 17751-1:2023 without any modification.

INTERNATIONAL STANDARD

ISO 17751-1

Second edition
2023-07

Textiles — Quantitative analysis of cashmere, wool, other specialty animal fibres and their blends —

Part 1: Light microscopy method

Textiles — Analyse quantitative du cachemire, de la laine, d'autres fibres animales spéciales et de leurs mélanges —

Partie 1: Méthode de microscopie optique

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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 document 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,* in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 248, *Textile and textile products,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 17751-1:2016), which has been technically revised.

The main changes are as follows:

— in 3.1, a note to entry of different types of speciality animal fibres has been added;

— in 3.5, a note to entry of a micrograph has been added as Figure 1 to indicate the distal edge;

— the title of Clause 5 has been changed to “Reagents” and the reagent used is listed;

— Clause 6, “Apparatus”, has been added and the apparatus are listed with corresponding subclause numbers; subsequent clause and subclause numbers are changed accordingly;

— in 6.1 and 6.2, requirement on stage micrometer for calibration of magnification has been added;

— in 6.4, two alternative apparatus for scalpel and double blades have been added;

— Clause 7, “Sampling”, has been added and its content is rephrased to match with the property adjustment of Annex A;

— Clause 8, “Conditioning”, has been added;

— Clause 9 has been added as “Preparation of test specimens”;

— in 9.1, the amount of test specimens has been increased, together with the requirement for a third set of test specimens to be tested in case of discrepancy on the 2 test results;

— the title of 9.2 has been changed from “Preparation of the test specimens” to “Preparation method for test specimens”;

— in 9.2.1.3, some necessary complementary operations on specimen preparation have been added;

— in 9.2.4.1, missing information on marking of masses of warp and weft yarns and on laboratory sample has been supplemented;

— in 9.3, the title has been changed from “Decolouring of the laboratory sample” to “Pre-treatment of the laboratory sample”, and the Soxhlet extraction description has been adjusted into this subclause. The requirement of reporting of pre-treatment, if applied, has been added in both 9.3.1 and 9.3.2;

— Clause 10 has been renamed as “Procedure”;

— 10.1, “General”, and its content has been added, the subsequent subclauses have been renumbered;

— in 10.3.1.1, the description has been rewritten to elaborate operation procedures and qualitative test descriptions have been added;

— the title of Clause 11 has been changed from “Calculation of test result” to “Calculation and expression of test result”;

— 11.1 and 11.2 and their subclause titles have been added, respectively;

— a new Clause 12, Test report, has been added;

— the status of Annex A has been changed from informative to normative;

— in Annex D, density of some fibres has been modified and the density of coarse rabbit has been added;

— in Annex D, a footnote has been added to coarse rabbit.

A list of all parts in the ISO 17751 series can be found on the ISO website.

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.

Introduction

Cashmere is a high-value speciality animal fibre, but cashmere and other animal wool fibres such as sheep's wool, yak, camel, etc. exhibit great similarities in their physical and chemical properties, so that their fibre blends are difficult to distinguish from each other by both mechanical and chemical methods. In addition, these fibres show similar scale structures. It is very difficult to accurately determine the fibre content of such fibre blends by current testing means.

Research on the accurate identification of cashmere fibres has been a long undertaking. At present, the most widely used and reliable techniques include the light microscopy (LM) method and the scanning electron microscopy (SEM) method.

— The advantage of LM method is that the internal medullation and pigmentation of fibres can be observed; the disadvantage is that some subtle surface structures cannot be clearly displayed. A decolouring process needs to be carried out on dark samples for testing, while improper decolouring process can affect the judgment of fibre analyst.

— The SEM method shows complementary characteristics to those of LM method, so some types of fibres need to be identified by scanning electron microscope.

The LM and SEM methods need be used together to identify some difficult-to-identify samples in order to utilize the advantages of both methods.

It has been proven in practice that the accuracy of a fibre analysis is highly related to the ample experience, full understanding, and extreme familiarity of the fibre analyst to the surface morphology of various types of animal fibres. In addition to the textual descriptions, micrographs of different types of animal fibres are given in Annex C.

Textiles — Quantitative analysis of cashmere, wool, other specialty animal fibres and their blends —

Part 1: Light microscopy method

1 Scope

This document specifies a method for the identification, qualitative and quantitative analysis of cashmere, wool, other speciality animal fibres, and their blends using light microscopy (LM).

It is applicable to loose fibres, intermediate-products, and final products of cashmere, wool, other speciality animal fibres, and their blends.

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

3 Terms and definitions

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

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
speciality animal fibre
any type of keratin fibre taken from speciality animals (hairs) other than sheep

Note 1 to entry: Speciality animal fibres include cashmere, camel, yak, mohair, angora, rabbit, alpaca etc.

3.2
light microscope
optical instrument used to produce magnified images utilizing a visible light source

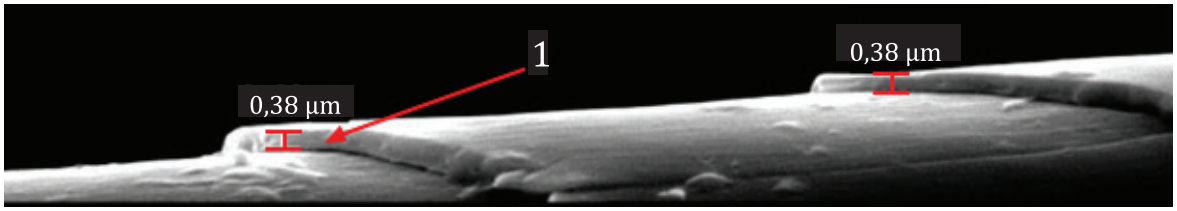
Note 1 to entry: Types of microscopes suitable for fibre identification include projection microscopes and visual microscopic image analysers. Transmitted-light type microscopes with direct graduated scale equipped on optical lens are also applicable.

3.3
scale
cuticle covering the surface of animal fibres

3.4
scale frequency
number of *scales* (3.3) along the fibre axis per unit length

3.5
scale height
height of the cuticle at the *scale's* (3.3) distal edge

Note 1 to entry: The distal edge is shown in Figure 1.



Key
1 distal edge

Figure 1 — Distal edge

3.6
surface morphology
fibre surface morphology
sum of the physical properties/attributes characterizing the fibre surface

Note 1 to entry: The fibre surface morphology includes scale frequency, scale height, patterns of scale edge, scale surface smoothness, fibre evenness along its axis, transparency under light microscope, etc.

3.7
lot sample
portion representative of the same type and same lot of material drawn according to the requirements from which it is taken

3.8
laboratory sample
portion drawn from a *lot sample* (3.7) according to the requirements for preparing test specimens

3.9
test specimen
portion taken from fibre snippets randomly cut from a *laboratory sample* (3.8) for measurement purposes

3.10
warping angle
angle of the free edge of the *scale* (3.3) deviating from the parallel edges of the fibre

4 Principle

A longitudinal view image of fibre snippets representative of a test specimen is magnified to an appropriate scale/size under optical microscope. All the fibre types found in the test specimen are identified by comparing them with known fibre surface morphologies for different types of animal fibres.

For each fibre type, the number and the diameter of the fibre snippets are counted and measured. The mass fraction is calculated from the data for the number of fibre snippets counted, mean value and standard deviation of the snippet diameter and the true density of each fibre type.

5 Reagents

5.1 Liquid paraffin, with a refractive index between 1,43 and 1,53.

6 Apparatus

6.1 Projection microscope, comprised of a light source, a light condenser, a stage, an objective, an ocular and a circular transparent viewing screen or non-transparent projection table with a graduated scale in millimetres. The objective and ocular shall be capable of providing at least a magnification of 500× at the screen. A stage micrometer shall be equipped to calibrate the magnification.

6.2 Visual microscopic image analyser, comprised of a microscope, a camera, a computer, a data acquisition card, exclusive analysing software and a display. The objective and ocular of the microscope shall be capable of providing at least a magnification of 500×. A stage micrometer shall be equipped to calibrate the magnification.

6.3 Transmitted-light type microscope, comprised of a light source, a light condenser, a stage, an objective, an ocular with a graduated scale. The objective and ocular of this type of microscope shall be capable of providing a magnification of 400× to 500×.

6.4 Microtome and razor blade, scalpel or double blades.

6.5 Scissors, tweezers, cleaning fabric, watch-glass, etc.

6.6 Slides and cover glasses.

6.7 Wedge scale, with divisions of 500× magnification. A moveable linear ruler-type scale finely graduated in millimetre may also be used.

7 Sampling

Lot samples and laboratory samples shall be drawn in accordance with the sampling methods described in Annex A.

8 Conditioning

The laboratory sample shall be conditioned for at least 4 h under the standard atmospheres as defined in ISO 139.

9 Preparation of test specimens

9.1 Number of test specimens

Prepare two sets of test specimens (see 9.2.1.3).

Fibres shall be sufficient to ensure a total of at least 1 000 fibres to be identified, whatever the number of operators.

In case of discrepancy on the test results between the two sets, a third set of test specimen shall be prepared and tested.