SLOVENSKI STANDARD
SIST EN ISO 17751-1:2016

01-junij-2016

Tekstilije - Kvantitativna analiza kašmirskih, volnenih, drugih specialnih živalskih vlaken in njihovih mešanic - 1. del: Mikroskopska metoda s svetlobo (ISO 17751-1:2016)

Textiles - Quantitative analysis of cashmere, wool, other specialty animal fibers and their blends - Part 1: Light Microscopy method (ISO 17751-1:2016)

Textilien - Quantitative Analyse von Kaschmir, Wolle, anderen speziellen tierischen Fasern und deren Mischungen - Teil 1: Lichtmikroskopie-Verfahren (ISO 17751-1:2016)

Textiles - Analyse quantitative du cachemire, de la laine, d'autres fibres animales spéciales et leurs mélanges - Partie 1: Méthode de microscopie optique (ISO 17751-1:2016)

Ta slovenski standard je istoveten z: **EN ISO 17751-1:2016**

ICS:

59.060.10	Naravna vlakna	Natural fibres

SIST EN ISO 17751-1:2016 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 17751-1

April 2016

ICS 59.060.10

English Version

Textiles - Quantitative analysis of cashmere, wool, other specialty animal fibers and their blends - Part 1: Light Microscopy method (ISO 17751-1:2016)

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European foreword

This document (EN ISO 17751-1:2016) 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of an identical text or by endorsement, at the latest by October 2016, and conflicting national standards shall be withdrawn at the latest by October 2016.

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INTERNATIONAL STANDARD

ISO 17751-1

First edition
2016-03-15

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

Part 1: Light microscopy method

Textiles — Analyse quantitative du cachemire, de la laine, d'autres fibres animales spéciales et leurs mélanges —
Partie 1: Méthode de microscopie optique

Reference number
ISO 17751-1:2016(E)

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Foreword

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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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The committee responsible for this document is ISO/TC 38, *Textiles*.

ISO 17751 consists of the following parts, under the general title *Textiles — Quantitative analysis of cashmere, wool, other speciality animal fibres and their blends:*

— *Part 1: Light microscopy method*

— *Part 2: Scanning electron microscopy method*

Introduction

Cashmere is a high-value specialty 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 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 identification techniques include the light microscopy (LM) method and the scanning electron microscopy (SEM). The SEM method shows complementary characteristics to those of LM method.

— The advantage of the 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. An improper decolouring process can affect the judgment of the fibre analyst.

—The SEM method shows opposite 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 so besides the textual descriptions, several micrographs of different types of animal fibres are given in Annex C.

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

Part 1: Light microscopy method

1 Scope

This part of ISO 17751 specifies a method for the identification, qualitative, and quantitative analysis of cashmere, wool, other speciality animal fibres, and their blends using light microscopy (LM).

This part of ISO 17751 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, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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.

3.1
specialty animal fibre
any type of keratin fibre taken from animals (hairs) other than sheep

3.2
light microscope
optical instrument used to produce magnified images utilizing 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

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

EXAMPLE The fibre surface morphology includes *scale frequency* (3.4), *scale height* (3.5), patterns of scale edge, scale surface smoothness, fibre evenness along its axis, transparency under *light microscope* (3.2), 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 specimens

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

4 Principle

A longitudinal view image of fibre snippets representative of a test specimen is magnified to an appropriate scale/size under an 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 mean diameters 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 Apparatus, materials, and reagents

5.1 Apparatus

5.1.1 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.

5.1.2 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.

5.1.3 Transmitted-light type microscope, comprised of a light source, a light condenser, a stage, an objective, and 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.

5.2 Materials

5.2.1 Microtome.

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

5.2.3 Slides and cover glasses.

5.2.4 Wedge scale, with divisions of ×500 magnification. A moveable linear rule-type scale finely graduated in millimetres may also be used.

5.3 Reagents

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

6 Drawing of laboratory sample and conditioning

6.1 Drawing methods for lot samples and laboratory samples are given in Annex A.

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

7 Preparation of the test specimens

7.1 Number of test specimens

Prepare one or more slides so that at least 1 000 fibres shall be identified.

7.2 Preparation of the test specimens

7.2.1 Loose fibre

7.2.1.1 Place the laboratory sample flat on the test table, pick up approximately 500 mg of fibres randomly on not less than 20 spots with tweezers (5.2.2) from the top and bottom sides of the sample. Blend them homogeneously and divide them into three equal portions. Sort these drawn fibres into basically parallel fibre bundles.

7.2.1.2 Cut each fibre bundle in the middle with a microtome (5.2.1) to get approximately 0,6 mm long fibre snippets. Cut only once in each of the fibre bundles.

7.2.1.3 Place all the fibre snippets on the watch glass, drop an appropriate amount of liquid paraffin (5.3.1), stir with tweezers (5.2.2) to make the suspended snippet liquid distribute uniformly on the watch glass, then take an appropriate amount of this specimen blend and put it on the slide. Cover with a cover glass.

7.2.2 Sliver

7.2.2.1 Cut the laboratory sliver sample into three sections. Take out an appropriate amount of the fibre bundle in the longitudinal direction from each sliver section.

7.2.2.2 Cut in the middle of each fibre bundle to obtain approximately 0,6 mm long fibre snippets with a microtome (5.2.1). Cut only once in each fibre bundle.

7.2.2.3 Other operating procedures are the same as those stipulated in 7.2.1.3.

7.2.3 Yarn

7.2.3.1 Divide the laboratory sample into three equal portions.