INTERNATIONAL STANDARD

ISO 17751-2

Second edition
2023-08

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

Part 2: Scanning electron microscopy method

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

Partie 2: Méthode par microscopie électronique à balayage

Reference number
ISO 17751-2:2023(E)

© ISO 2023



COPYRIGHT PROTECTED DOCUMENT

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

© ISO 2023 – All rights reserved

Contents

Page

Foreword ... **iv**
Introduction ... **vi**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Principle ... **3**
5 Reagents and materials ... **3**
6 Apparatus ... **3**
7 Sampling ... **3**
8 Preparation of test specimens ... **4**
8.1 Number of test specimens ... 4
8.2 Preparation method for test specimens ... 4
8.2.1 Loose fibre ... 4
8.2.2 Sliver ... 5
8.2.3 Yarn ... 5
8.2.4 Woven fabrics ... 5
8.2.5 Knitted fabrics ... 6
8.3 Coating of the test specimens ... 6
9 Procedure ... **6**
9.1 General ... 6
9.2 Preparation and test on test specimen stubs ... 6
9.3 Qualitative analysis (purity analysis) ... 6
9.4 Quantitative analysis ... 6
10 Calculation and expression of test result ... **7**
10.1 Calculation of test result ... 7
10.2 Expression of test result ... 7
11 Test report ... **8**
Annex A (normative) **Drawing of the lot sample and the laboratory sample** ... **9**
Annex B (informative) **Surface morphology of common animal fibres** ... **10**
Annex C (normative) **Density of common animal fibres** ... **52**
Bibliography ... **53**

© ISO 2023 – All rights reserved

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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 17751-2:2016), which has been technically revised.

The main changes are as follows:

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

— in 3.6, a note to entry and a new Figure 1 have been added to indicate the distal edge, and subsequent figures have been renumbered;

— a new term, 3.11 warping angle, has been added;

— a new Clause 5 titled “reagents and materials” and its content has been separated from former clause;

— a new Clause 6 titled “Apparatus” has been added and its contents have been renumbered, subsequent clause and subclause numbers are changed accordingly;

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

— in 8.1, the numbers of test specimen sets and test specimen stubs have been increased;

— the title of 8.2 (former 6.2) has been changed from “Preparation method for test specimens of various types of samples” to “Preparation method for test specimens”;

© ISO 2023 – All rights reserved

— in 8.2.4.1, missing information on marking of masses of warp and weft yarns and laboratory sample has been supplemented;

— the title of Clause 9 has been changed to “Procedure”;

— 9.1 titled “General” and its content has been added;

— the title of 9.2 has been changed from “Test on each test specimen stub” to “Preparation and test on test specimen stubs”;

— the title of 9.3 has been changed from “Qualitative analysis (Purity analysis) and determination of fibre content” to “Qualitative analysis (Purity analysis)”;

— 9.4 titled “Quantitative analysis” has been added, number of fibre snippets to be examined and measured are changed due to the change of number of test specimen stubs;

— the title of Clause 10 has been changed from “Calculation of test result” to “Calculation and expression of test result”;

— 10.1 “Calculation of test result” has been added;

— 10.2 “Expression of test result” has been added;

— Clause 11 titled “Test report” and its contents have been added;

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

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

— in Annex C, a table footnote has been added to coarse angora or rabbit;

— two references have been added in the bibliography.

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.

© ISO 2023 – All rights reserved

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 textual descriptions, micrographs of different types of animal fibres are given in Annex B.

© ISO 2023 – All rights reserved

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

Part 2:
Scanning electron 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 scanning electron microscopy (SEM).

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

2 Normative references

There are no normative references in this document.

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 or rabbit, alpaca, etc.

3.2
scanning electron microscope
intermediate type of microscopic morphology observation instrument between transmitted electron microscope and light microscope which use a focused beam of high-energy electrons to generate a variety of physical information signals

Note 1 to entry: The principle consists of scanning a primary focused electron beam over a whole area of interest on the surface of solid test specimen, and the signal derived from which is then received, amplified and displayed in images for full observation of surface area topography of the test specimen.

Note 2 to entry: The signals obtained by a scanning electron microscope are, e.g. secondary electrons, Auger electrons, characteristic X-ray, etc.

© ISO 2023 – All rights reserved