INTERNATIONAL STANDARD

ISO 20705

First edition
2019-12

Textiles — Quantitative microscopical analysis — General principles of testing

Textiles — Analyse quantitative par microscopie — Principes généraux des essais

Reference number
ISO 20705:2019(E)

© ISO 2019



COPYRIGHT PROTECTED DOCUMENT

© ISO 2019

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
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

 © ISO 2019 – All rights reserved

Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Principle ... **1**
5 Apparatus ... **2**
6 Reagents ... **2**
7 Preparation of the test specimens ... **2**
7.1 Selection of the test specimens ... 2
7.1.1 General ... 2
7.1.2 Loose fibres ... 3
7.1.3 Slivers ... 3
7.1.4 Yarns ... 3
7.1.5 Fabrics ... 3
7.2 Preparation of a test specimen slide (LM) or stub (SEM) ... 4
7.2.1 Preparation for longitudinal view for LM ... 4
7.2.2 Preparation for longitudinal view for SEM ... 4
7.2.3 Preparation for cross view for LM or SEM ... 4
8 Procedures ... **5**
8.1 General ... 5
8.2 LM procedure ... 5
8.2.1 Longitudinal view ... 5
8.2.2 Cross view ... 5
8.3 SEM procedure ... 5
8.3.1 Longitudinal view ... 5
8.3.2 Cross view ... 6
9 Calculation and expression of the results ... **6**
9.1 Calculation based on fibre diameter measurements (Longitudinal view) ... 6
9.2 Calculation based on fibre area measurements (Cross view) ... 7
9.3 Calculating the percentage by mass of fibre component in woven fabric sample ... 7
10 Test report ... **7**
Annex A (normative) **Fibre density (Conventional)** ... **9**
Annex B (informative) **Statistical data** ... **10**
Bibliography ... **17**

© ISO 2019 – 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 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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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*.

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 2019 – All rights reserved

Introduction

This document is used for the quantitative analysis of textiles containing mixtures of fibres which cannot be separated readily by mechanical methods or by chemical methods, as described in the different parts of ISO 1833.

The quantitative microscopical analysis rely on the ability of a fibre analyst to identify and count, by means of a microscope [light microscope (LM) or scanning electron microscope (SEM)], the relative number of fibres of each type in a prepared test specimen (based on fibre apparent diameter of a longitudinal view or fibre section area of a cross view, depending on the fibre types).

Fibre counts lead to the calculation of the percentage in the mixture of the test specimen by number of fibres (based on fibre apparent diameter or fibre section area) and by their respective density. And then, the calculation of the fibre percentage by mass of the laboratory sample is carried out in relation to its structure (loose fibres, yarns, woven fabrics, knitted fabric, etc.).

© ISO 2019 – All rights reserved

Textiles — Quantitative microscopical analysis — General principles of testing

1 Scope

This document specifies common methods for the quantitative microscopical analysis of various mixtures of fibres. The methods described are based on the use of a light microscope (LM) or a scanning electronic microscope (SEM), on the measurements of the fibre apparent diameter (preparation of longitudinal views) or on the measurements of fibre section area (preparation of cross views), depending on the section shape of the fibres.

NOTE 1 When the section shape is circular or almost circular, the longitudinal views are appropriate. For the other section shapes, the cross views are adequate and Annex A lists conventional density of fibres to be used for the calculation of the mass percentage of the components. Pictures of section shapes of fibres can be found in ISO/TR 11827.

NOTE 2 Annex B presents statistical data on fibre diameter measurements (longitudinal view) and on fibre area measurements (cross view).

The given procedures apply to fibres in any textile form when mixtures of fibres cannot be separated by manual methods or by chemical methods.

Examples of mixtures of fibres are cashmere and wool, cotton and flax, flax and hemp.

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 1833-1, *Textiles — Quantitative chemical analysis — Part 1: General principles of testing*

3 Terms and definitions

For the purposes of this document, the following term and definition apply.

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

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

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

3.1
test specimen unit
linear portion of a single thread

Note 1 to entry: The length of the test specimen unit depends on the test specimen holder dimension.

Note 2 to entry: This expression is not applicable to test specimen prepared from samples of loose fibre (see 7.1.2) or sliver (see 7.1.3).

4 Principle

A longitudinal view image (respectively, a cross view image) of fibre snippets representative of a test specimen is magnified to an appropriate scale/size under optical light microscope or scanning

© ISO 2019 – All rights reserved