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Textiles — Qualitative and quantitative analysis of some bast fibres (flax, hemp, ramie) and their blends —

Part 1: Fibre identification using microscopy methods

Textiles — Analyses qualitative et quantitative de certaines fibres libériennes (lin, chanvre, ramie) et de leurs mélanges —

Partie 1: Identification des fibres à l'aide de méthodes microscopiques

Reference number
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Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Principle ... **2**
5 Apparatus ... **2**
6 Reagents ... **3**
7 Sampling ... **3**
7.1 Laboratory sample ... 3
7.2 Preparation of the test specimens ... 3
7.2.1 Selection of the test specimens ... 3
7.2.2 Preparation of a test specimen ... 3
8 Procedure ... **3**
8.1 General ... 4
8.2 LM procedure ... 7
8.2.1 Longitudinal view ... 7
8.2.2 Cross view ... 7
8.3 SEM procedure ... 7
8.3.1 Cross view ... 7
8.3.2 Longitudinal view (optional) ... 7
9 Test report ... **7**
Annex A (informative) **Photomicrographs of flax (Light microscopy and SEM)** ... **8**
Annex B (informative) **Photomicrographs of hemp (Light microscopy and SEM)** ... **12**
Annex C (informative) **Photomicrographs of ramie (Light microscopy and SEM)** ... **15**
Annex D (informative) **Rationale** ... **18**
Annex E (normative) **Polarized light test to distinguish flax and hemp** ... **20**
Annex F (normative) **Twisting direction test to distinguish flax and hemp** ... **23**
Annex G (informative) **Decoloration** ... **24**
Annex H (normative) **Sampling of the laboratory sample** ... **25**
Bibliography ... **27**

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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*.

A list of all parts in the ISO 20706 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.

This corrected version of ISO 20706-1:2019 incorporates the following corrections:

— in 8.3, the SEM procedure structure has been corrected;

— in 7.2.1, the missing reference to Annex H has been added.

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Introduction

Among bast fibres used for textiles, flax and hemp are the most expensive. Flax is grown mainly (85 %) in a small coastal area of Northern Europe; hemp textile products are rare. Ramie is less expensive than flax and hemp: 10 % to 20 % cheaper for medium count yarns — and the difference increases for fine counts.

Flax and other bast fibres, such as hemp and ramie exhibit great similarities in their physical and chemical properties, so that their fibre specie and their blends are difficult to distinguish from each other by both mechanical and chemical methods. In addition, these fibres show nearly resembling fibre morphology. It is very difficult to accurately identify the fibre species and accurately determine the fibre content of such fibre blends by current testing means.

Research works on accurate identification of bast fibre has been a long undertaking.

In order to promote fair labelling of products and anti-counterfeiting protection, The European Confederation of Flax and Hemp (CELC) created the Bast Fibre Authority in 2013, inviting laboratories, research centres and providers of quality and control services to develop a common technical protocol. Five laboratories joined in 2013 and comparison testing were carried out between them on May–June 2014 and January–February 2015.

NOTE CELC, founded in 1951, is a non-profit organization and an association for reflection, market analysis, industry concertation and strategic orientations. CELC is the only agro-industrial European organization that covers all stages of production and processing of flax/linen and hemp. It is the chosen representative of more than 10,000 firms in 14 European countries, promoting the fibre from plant to finished product (including sections dealing with agriculture, retting/scutching, trading, spinning, weaving and technical uses).

At present, the most widely used and reliable ones include light microscopy (LM) method and scanning electron microscopy (SEM) method. The advantage of LM method is that the internal morphology of fibres can be observed, but some subtle surface structures are not able to be clearly displayed. Decoloration process can be carried out on dark samples for testing, while improper decoloration process will affect the judgment of fibre analyst.

The scanning electron microscopy (SEM) method shows opposite characteristics to those of LM method. Therefore, some types of fibres need to be identified by scanning electron microscope.

When some samples are difficult to be identified, light microscopy method and scanning electron microscopy method should be used together to identify in order to utilize the advantages of both methods.

It is proven in practice that accuracy of fibre analysis is highly related to the ample experience, fully understanding and extreme familiarity of the fibre analyst to the morphology of various types of bast fibres. Therefore, besides text description, a large amount of micrographs of different types of flax, hemp and ramie are given in Annex A, Annex B, Annex C and Annex D of this document.

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Textiles — Qualitative and quantitative analysis of some bast fibres (flax, hemp, ramie) and their blends —

Part 1: Fibre identification using microscopy methods

1 Scope

This document specifies methods for the identification of some bast fibres (flax, hemp, ramie) using both light microscopy (LM) and scanning electron microscopy (SEM). This document is also applicable to blends of these bast fibres and products made from them.

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 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 20705:2019, *Textiles — Quantitative microscopical analysis — General principles of testing*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 20705 and the following 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
bast fibre
composite fibre obtained from the bast of certain plants, mainly constituted of cellulose and accompanied with incrusting and intercellular materials (pectin bodies, hemicellulose, lignin)

Note 1 to entry: Adapted from ISO 6938:2012, 2.3.

3.2
flax
fibre from the basts of flax *Linum usitatissimum*

Note 1 to entry: Adapted from ISO 6938:2012, 3.2.2.5.

3.3
hemp
fibre from the basts of *Cannabis sativa*

Note 1 to entry: Adapted from ISO 6938:2012, 3.2.2.1.

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