INTERNATIONAL STANDARD

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Textiles — Quantitative chemical analysis —

Part 22:
Mixtures of viscose or certain types of cupro or modal or lyocell with flax fibres (method using formic acid and zinc chloride)

Textiles — Analyse chimique quantitative —

Partie 22: Mélanges de viscose ou de certains types de cupro, modal ou lyocell avec des fibres de lin (méthode à l'acide formique et au chlorure de zinc)

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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).

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).

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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, *Textiles 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 1833-22:2013), which has been technically revised. The main changes compared to the previous edition are as follows:

— the title has been changed from “Mixtures of viscose or certain types of cupro or modal or lyocell and flax fibres (method using formic acid and zinc chloride)” to “Mixtures of viscose or certain types of cupro or modal or lyocell with flax fibres (method using formic acid and zinc chloride)”;

— the warning has been removed (it is already mentioned in ISO 1833-1);

— Clause 3 (Terms and definitions) has been added and subsequent clauses have been renumbered;

— in 5.2 (former 4.2), the sodium hydroxide solution has been removed (as listed in ISO 1833-1:2020);

— in 5.2.1, additional instruction in case of the use of zinc chloride other than fused anhydrous zinc chloride has been added;

— in 6.2 (former 5.2), the pre-treatment procedure has been replaced with a reference to ISO 1833-1:2020, A.5.25;

— in 5.3.2, the heating temperature of 40 °C has been removed and changed to 70 °C;

— in 6.3, the testing temperature of 40 °C has been removed and changed to 70 °C, and the neutralisation stage has been detailed;

— in 7.3, the d-factors for flax has been updated;

— in Clause 8, “percentage point” has been added to avoid confusion;

— the former informative Annex A, related to proficiency testing results, has been removed as it was based on the former test method setting the testing temperature at 40 °C;

— the Bibliography has been removed.

A list of all parts in the ISO 1833 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.

Textiles — Quantitative chemical analysis —

Part 22: Mixtures of viscose or certain types of cupro or modal or lyocell with flax fibres (method using formic acid and zinc chloride)

1 Scope

This document specifies a method, using formic acid and zinc chloride, to determine the mass percentage of viscose or certain types of cupro or modal or lyocell, after removal of non-fibrous matter, in textiles made of mixtures of

— viscose or certain types of the cupro or modal or lyocell fibres

with

— flax fibres.

This document is not applicable to mixtures in which the flax fibre has suffered extensive chemical degradation, nor when the viscose, cupro, modal or lyocell fibre is rendered incompletely soluble by the presence of certain permanent finishes or reactive dyes that cannot be removed completely.

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 1833-1:2020, *Textiles — Quantitative chemical analysis — Part 1: General principles of testing*

3 Terms and definitions

No terms and definitions are listed in this document.

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/

4 Principle

After the removal of the non-cellulosic components (pectin, etc.) related to the flax fibre internal structure by means of pre-treatment with sodium hydroxide, the viscose, cupro or modal or lyocell fibre is dissolved out from a known dry mass of the mixture, with a reagent composed of formic acid and zinc chloride. The residue is collected, washed, dried and weighed; its corrected mass is expressed as a percentage of the dry mass of the mixture. The mass percentage of viscose, cupro, modal or lyocell fibre is found by difference.

If a cupro or modal fibre is found to be present, a preliminary test should be carried out to see whether it is soluble in the reagent.

5 Reagents and apparatus

5.1 General

Use the reagents and the apparatus described in ISO 1833-1, together with those specified in 5.2 and 5.3.

5.2 Reagent

5.2.1 **Acetic acid solution** of 0,1 mol/l.

5.2.2 **Formic acid/zinc chloride reagent.**

Prepare a solution containing 20 g of anhydrous zinc chloride (minimum assay to be ≥ 98 %) and 68 g of anhydrous formic acid, made up to 100 g with water.

If zinc chloride other than fused anhydrous zinc chloride is used, then the fibre solubility shall be checked.

5.2.3 **Ammonia, dilute solution**.

Dilute 20 ml of concentrated ammonia solution (ρ = 0,880 g/ml at 20 °C) to 1 l with water.

5.3 Apparatus

5.3.1 **Conical flask**, of minimum capacity 200 ml, glass-stoppered.

5.3.2 **Heating apparatus**, capable of maintaining the temperature of the flask at (70 ± 2) °C.

6 Test procedure

6.1 General

Follow the general procedure described in ISO 1833-1, and then proceed as follows.

6.2 Removal of the non-cellulosic components of the flax fibres

Pre-treat the test specimen according to ISO 1833-1:2020, A.5.25.

6.3 Dissolution of viscose, cupro, modal or lyocell fibre

Place the pretreated specimen without delay in the conical flask pre-heated to 70 °C.

Weigh again the filter crucible because of remaining loose fibres after the transfer.

Determine the dry mass of the mixture before the dissolution test.

Add 100 ml of formic acid/zinc chloride reagent per gram of specimen, preheated to 70 °C.

Stopper the flask and shake it.

Allow the flask and contents to remain at 70 °C for 20 min, shaking it twice during this time at about 5 min and about 15 min.

Filter the contents of the flask through the weighed filter crucible and wash any fibres from the flask into the crucible with the reagent.

Rinse with a further 20 ml of reagent, preheated to 70 °C.

Wash the crucible and residue thoroughly with water at 70 °C.

Place the crucible containing the residue in 100 ml of cold ammonia solution in a 250 ml beaker, ensuring that the residue remains totally immersed in the solution for about 10 min and carefully loosening the fibres with a glass rod. Drain the crucible by suction.

Rinse thoroughly with cold water. Do not apply suction until each washing liquor has drained under gravity.

7 Calculation and expression of results

7.1 Calculation of loss in mass during pre-treatment

Calculate percentage of loss in mass during pre-treatment using Formula (1):

$$P_s = \frac{m_1 - m_2}{m_1} \times 100 \quad (1)$$

where

P_s is the percentage of loss in mass during pretreatment with sodium hydroxide;

m_1 is the dry mass of the test specimen before the pretreatment with sodium hydroxide;

m_2 is the dry mass of the test specimen after the pretreatment with sodium hydroxide.

7.2 Calculation of dry mass of after-transfer mixture corrected to its initial dry mass before pre-treatment

The dry mass of the after-transfer mixture corrected to its initial dry mass before the pretreatment with sodium hydroxide shall be calculated using Formula (2):

$$M = \frac{100\ m_3}{100 - P_s} \quad (2)$$

where

M is the dry mass of the mixture corrected to its initial dry mass before the pretreatment with sodium hydroxide and corrected for the loss in mass during the transfer;

m_3 is the dry mass of the mixture for the dissolution test;

P_s is the percentage of loss in mass during pretreatment with sodium hydroxide.

7.3 Calculation of dry masses of viscose or cupro or modal or lyocell and pretreated flax fibres

The dry masses of the viscose or cupro or modal or lyocell and pretreated flax fibres shall be calculated using Formulae (3) and (4):

$$v = d_1 \left(m_3 - d_2\, m_4 \right) \quad (3)$$

$$f = M - v \quad (4)$$