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Part 2: Ternary fibre mixtures

Textiles — Analyse chimique quantitative —

Partie 2: Mélanges ternaires de fibres

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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*, 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 1833-2:2006), which has been technically revised.

The main changes compared to the previous edition are as follows:

— the Introduction has been deleted and relevant information have been moved to Clause 4;

— Clause 2 has been updated;

— the mandatory Clause 3 has been added;

— in Clause 4 (former Clause 3), the explanation of the 4 variants has been added;

— in 9.3, additional instruction in case of pre-treatment by extraction with light petroleum and water has been introduced;

— in Table B.1

  — reference to lyocell (beside viscose, cupro and/or modal) has been added;

  — additional cases: n°36 for Variant 3, n°37 and n°38 for new fibres (elastolefin, melamine), n°39 and n°40 for mixtures with elastane have been introduced;

— the Bibliography has been updated (references to parts of ISO 1833 have 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 2: Ternary fibre mixtures

1 Scope

This document specifies methods of quantitative analysis of various ternary mixtures of fibres.

The field of application of each method for analysing mixtures, specified in the parts of ISO 1833, indicates the fibres to which the method is applicable.

This document is applicable to mixtures of fibres with more than three components provided that the combination of test methods leads back to simple cases of fibre mixtures. Table B.1 illustrates the typical ternary mixtures and their applied corresponding parts of the ISO 1833 series.

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 identification of the components of a mixture, the non-fibrous matter is removed by a suitable pre-treatment, and then one or more of the four variants of the process of selective solution described in this clause is applied.

Except where this presents technical difficulties, it is preferable to dissolve the major fibre component so as to obtain the minor fibre component as the final residue.

In general, the methods for quantitative chemical analysis of ternary fibre mixtures are based on the selective solution of the individual components. Four variants of this procedure are possible:

— Variant 1: Using two different test specimens, component (*a*) is dissolved from the first test specimen and component (*b*) from the second test specimen. The insoluble residues of each test specimen are weighed and the percentage of each of the two soluble components is calculated from the respective losses in mass. The percentage of the third component (*c*) is calculated by difference.

— Variant 2: Using two different test specimens, a component (*a*) is dissolved from the first test specimen, and two components (*a* and *b*) from the second test specimen. The insoluble residue of the

first test specimen is weighed and the percentage of the component (*a*) is calculated from the loss in mass. The insoluble residue of the second test specimen is weighed: it corresponds to component (*c*). The percentage of the third component (*b*) is calculated by difference.

— Variant 3: Using two different test specimens, two components (*a* and *b*) are dissolved from the first test specimen and two components (*b* and *c*) from the second test specimen. The insoluble residues correspond to the two components (*c*) and (*a*) respectively. The percentage of the third component (*b*) is calculated by difference.

— Variant 4: Using only one test specimen, after removal of one of the components, the insoluble residue formed by the two other fibres is weighed and the percentage of the soluble component is calculated from the loss in mass. One of the two fibres of the residue is dissolved, the insoluble component is weighed, and the percentage of the second soluble component is calculated from the loss in mass. If this variant is used when a test specimen is subjected to the successive action of two different solvents, correction factors shall be applied for possible losses in mass undergone by the test specimen in the two treatments.

Where a choice is possible, it is recommended to use one of the first three variants. Where chemical analysis is used, take care to choose methods prescribing solvents which dissolve only the required fibre or fibres, and leave undissolved the other fibre or fibres.

In order to reduce the possibility of error to a minimum, it is recommended that, whenever possible, chemical analysis using at least two of the four above-mentioned variants should be made.

NOTE By way of example, Annex B contains a certain number of ternary mixtures, together with methods for analysing binary mixtures which can, in principle, be used for analysing these ternary mixtures.

If the fibre mixture in a sample contains more than 3 components, where relevant, the application of combined manual separations and chemical analysis leads to decrease the number of components in sub-samples so that the given procedure in ISO 1833-1 or ISO 1833-2 can be applied.

5 Reagents and apparatus

Use the apparatus and reagents described in ISO 1833-1.

6 Conditioning and testing atmosphere

See ISO 1833-1.

7 Sampling and pre-treatment of laboratory test sample

See ISO 1833-1.

8 Procedure

See ISO 1833-1.

9 Calculation and expression of results

9.1 General

Express the mass of each component as a percentage of the total mass of fibre present in the mixture. Calculate the result on the basis of clean dry mass, to which is applied firstly the agreed moisture regain and secondly the correction factor necessary to take account of loss of matter during pre-treatment and analysis.

9.2 Calculation of percentages of mass of clean dry fibres, disregarding loss of fibre mass during pre-treatment

NOTE Some examples of calculation are given in Annex A.

9.2.1 Variant 1

Formulae (1) to (3) are applied where a component of the mixture is removed from one specimen and another component from a second specimen.

$$P_1 = \left[\frac{d_2}{d_1} - d_2 \times \frac{r_1}{m_1} + \frac{r_2}{m_2} \times \left(1 - \frac{d_2}{d_1}\right)\right] \times 100 \quad (1)$$

$$P_2 = \left[\frac{d_4}{d_3} - d_4 \times \frac{r_2}{m_2} + \frac{r_1}{m_1} \times \left(1 - \frac{d_4}{d_3}\right)\right] \times 100 \quad (2)$$

$$P_3 = 100 - (P_1 + P_2) \quad (3)$$

where

P_1 is the percentage of the first clean dry component (component in the first specimen soluble in the first reagent);

P_2 is the percentage of the second clean dry component (component in the second specimen soluble in the second reagent);

P_3 is the percentage of the third clean dry component (component undissolved in both specimens);

m_1 is the dry mass of the first specimen after pre-treatment;

m_2 is the dry mass of the second specimen after pre-treatment;

r_1 is the dry mass of the residue after removal of the first component from the first specimen in the first reagent;

r_2 is the dry mass of the residue after removal of the second component from the second specimen in the second reagent;

d_1 is the correction factor for loss in mass, in the first reagent, of the second component undissolved in the first specimen;

d_2 is the correction factor for loss in mass, in the first reagent, of the third component undissolved in the first specimen;

d_3 is the correction factor for loss in mass, in the second reagent, of the first component undissolved in the second specimen;

d_4 is the correction factor for loss in mass, in the second reagent, of the third component undissolved in the second specimen.

The values of d are indicated in the relevant parts of the ISO 1833 series.

9.2.2 Variant 2

Formulae (4) to (6) are applied in cases where a component (*a*) is removed from the first test specimen, leaving as residue, the other two components (*b* + *c*), and the two components (*a* + *b*) are removed from the second test specimen, leaving as residue the third component (*c*).

$$P_1 = 100 - (P_2 + P_3) \tag{4}$$

$$P_2 = 100 \times \frac{d_1 r_1}{m_1} - \frac{d_1}{d_2} \times P_3 \tag{5}$$

$$P_3 = \frac{d_4 r_2}{m_2} \times 100 \tag{6}$$

where

P_1 is the percentage of the first clean dry component (component of the first specimen soluble in the first reagent);

P_2 is the percentage of the second clean dry component (component soluble, at the same time as the first component of the second specimen, in the second reagent);

P_3 is the percentage of the third clean dry component (component undissolved in both specimens);

m_1 is the dry mass of the first specimen after pre-treatment;

m_2 is the dry mass of the second specimen after pre-treatment;

r_1 is the dry mass of the residue after removal of the first component from the first specimen in the first reagent;

r_2 is the dry mass of the residue after removal of the first and second components from the second specimen in the second reagent;

d_1 is the correction factor for loss in mass in the first reagent, of the second component undissolved in the first specimen;

d_2 is the correction factor for loss in mass, in the first reagent, of the third component undissolved in the first specimen;

d_4 is the correction factor for loss in mass, in the second reagent, of the third component undissolved in the second specimen.

The values of *d* are indicated in the relevant parts of the ISO 1833 series.

9.2.3 Variant 3

Formulae (7) to (9) are applied where two components (*a* + *b*) are removed from a specimen, leaving as residue the third component (*c*), then two components (*b* + *c*) are removed from another specimen leaving as residue, the first component (*a*):

$$P_1 = \frac{d_3 r_2}{m_2} \times 100 \tag{7}$$

$$P_2 = 100 - (P_1 + P_3) \tag{8}$$

$$P_3 = \frac{d_2 r_1}{m_1} \times 100 \tag{9}$$

where

P_1 is the percentage of the first clean dry component (component soluble in the first specimen in the first reagent);

P_2 is the percentage of the second clean dry component (component soluble in the first specimen in the first reagent and in the second specimen soluble in the second reagent);

P_3 is the percentage of the third clean dry component (component soluble in the second specimen in the second reagent);

m_1 is the dry mass of the first specimen after pre-treatment;

m_2 is the dry mass of the second specimen after pre-treatment;

r_1 is the dry mass of the residue after removal of the first and second components from the first specimen with the first reagent;

r_2 is the dry mass of the residue after removal of the second and third components from the second specimen with the second reagent;

d_2 is the correction factor for loss in mass in the first reagent, of the third component undissolved in the first specimen;

d_3 is the correction factor for loss in mass, in the second reagent, of the first component undissolved in the second specimen.

The values of d are indicated in the relevant parts of ISO 1833.

9.2.4 Variant 4

Formulae (10) to (12) are applied where two components are successively removed from the mixture using the same test specimen:

$$P_1 = 100 - (P_2 + P_3) \tag{10}$$

$$P_2 = 100 \times \frac{d_1 r_1}{m} \frac{d_1}{d_2} \times P_3 \tag{11}$$

$$P_3 = \frac{d_3 r_2}{m} \times 100 \tag{12}$$

where

P_1 is the percentage of the first clean dry component (first soluble component);

P_2 is the percentage of the second clean dry component (second soluble component);

P_3 is the percentage of the third clean dry component (undissolved component);

m is the dry mass of the test specimen after pre-treatment;

r_1 is the dry mass of the residue after removal of the first component by the first reagent;

r_2 is the dry mass of the residue after removal of the first and second components by the first and second reagents;

d_1 is the correction factor for loss in mass of the second component in the first reagent;

d_2 is the correction factor for loss in mass of the third component in the first reagent;

d_3 is the correction factor for loss in mass of the third component in the first and second reagents.

The values of d are indicated in the relevant parts of ISO 1833.

Wherever possible, d_3 should be determined in advance by experimental methods.

9.3 Calculation of the percentage of each component with adjustment by agreed moisture regains and, where appropriate, by correction factors for losses in mass during pre- treatment operations

$$A=1+\frac{a_1+b_1}{100} \quad B=1+\frac{a_2+b_2}{100} \quad C=1+\frac{a_3+b_3}{100} \tag{13}$$

hence

$$P_{1A}=\frac{P_1A}{P_1A+P_2B+P_3C}\times 100 \tag{14}$$

$$P_{2A}=\frac{P_2B}{P_1A+P_2B+P_3C}\times 100 \tag{15}$$

$$P_{3A}=\frac{P_3C}{P_1A+P_2B+P_3C}\times 100 \tag{16}$$

or

$$P_{3A}=100-\left(P_{1A}+P_{2A}\right) \tag{17}$$

where

P_{1A} is the percentage of the first clean dry component, including moisture content and loss in mass during pre-treatment;

P_{2A} is the percentage of the second clean dry component, including moisture content and loss in mass during pre-treatment;

P_{3A} is the percentage of the third clean dry component, including moisture content and loss in mass during pre-treatment;

P_1 is the percentage of the first clean dry component obtained by one of the formulae given in 9.2;

P_2 is the percentage of the second clean dry component obtained by one of the formulae given in 9.2;

P_3 is the percentage of the third clean dry component obtained by one of the formulae given in 9.2;

a_1 is the agreed moisture regain of the first component;

a_2 is the agreed moisture regain of the second component;

a_3 is the agreed moisture regain of the third component;

b_1 is the percentage of loss in mass during pre-treatment of the first component;

b_2 is the percentage of loss in mass during pre-treatment of the second component;

b_3 is the percentage of loss in mass during pre-treatment of the third component.

Where a pre-treatment is used, the values of b_1, b_2 and b_3 should be determined if possible, by submitting each of the pure fibre components to the pre-treatment applied in the analysis. Pure fibres are those free from all non-fibrous material except that which they normally contain (either naturally or because of the manufacturing process) in the state (unbleached, bleached) in which they are found in the material to be analysed.

Where no pre-treated separate fibre components used in the manufacture of the material to be analysed are available, average values of b_1, b_2 and b_3 as obtained from tests performed on clean fibres similar to those in the mixture under examination should be used. If pre-treatment by extraction with light petroleum and water is applied, correction factors b_1, b_2 and b_3 may generally be ignored, except in the case of unbleached cotton, unbleached flax (or linen) and unbleached hemp where the loss due to pre-treatment is usually accepted as 4 % and in the case of polypropylene as 1 %.

In the case of other fibres, usually, no allowance is made in the calculation for the loss during pre-treatment. However, any significant mass loss should be taken into consideration.

NOTE Some examples of calculations are given in Annex A.

9.4 Calculation of the quantitative analysis by manual separation

9.4.1 General

Express the mass of each component fibre as a percentage of the total mass of the fibre in the mixture. Calculate the result on the basis of clean dry mass to which are applied the agreed moisture regain and the correction factor necessary to take account of loss of mass during pre-treatment operations.

9.4.2 Calculation of the percentage mass of clean dry fibre disregarding loss in fibre mass during pre-treatment

$$P_1 = \frac{100m_1}{m_1+m_2+m_3} = \frac{100}{1+\dfrac{m_2+m_3}{m_1}} \tag{18}$$

$$P_2 = \frac{100m_2}{m_1+m_2+m_3} = \frac{100}{1+\dfrac{m_1+m_3}{m_2}} \tag{19}$$

$$P_3 = 100-(P_1+P_2) \tag{20}$$

where

P_1 is the percentage of the first clean dry component;

P_2 is the percentage of the second clean dry component;

P_3 is the percentage of the third clean dry component;

m_1 is the clean dry mass of the first component;

m_2 is the clean dry mass of the second component;

m_3 is the clean dry mass of the third component.

9.4.3 Calculation of the percentage of each component with adjustment by agreed moisture regain and, where appropriate, by correction factors for losses in mass during pre-treatment

See 9.3.

10 Method of quantitative analysis by a combination of manual separation and chemical means

Manual separation (as described in ISO 1833-1:2020, Annex B) shall be used taking account of the proportions of components separated before proceeding to any chemical treatment of each of the separated components.

11 Precision of methods

The precision indicated in each method of analysis of binary mixtures relates to the reproducibility (see ISO 1833-1:2020, Clause 11).

To determine the precision of analysis of a ternary mixture, the values indicated in the methods for analysis of binary mixtures which have been used to analyse the ternary mixture are applied in the usual way.

Given that, in the four variants of the quantitative chemical analysis of ternary mixtures, provision is made for two dissolutions (using two separate specimens for the first three variants and a single specimen for the fourth variant) and, assuming that E_1 and E_2 denote the respective precisions of the two methods for analysing binary mixtures, the precision of the results for each component is shown in Table 1.

Table 1 — Precisions of ternary mixture analysis in relation to the applied variants

Component fibres	Variants		
	1	2 and 3	4
a	E_1	E_1	E_1
b	E_2	$E_1 + E_2$	$E_1 + E_2$
c	$E_1 + E_2$	E_2	$E_1 + E_2$

If the fourth variant is used, the precision can be found to be lower than that calculated by the method indicated above, owing to possible action of the first reagent on the residue consisting of components (*b*) and (*c*), which would be difficult to evaluate.

12 Test report

The test report shall be in accordance with ISO 1833-1:2020, Clause 12.

Annex A
(informative)

Examples of the calculation of percentages of the components of certain ternary mixtures using some of the variants described in 9.2

A.1 Variant 1

A.1.1 General

Consider the case of a fibre mixture which, when qualitatively analysed, gave the following components: carded wool, polyamide, unbleached cotton.

Suppose that, using this variant, i.e. using two different specimens and removing one component (a = wool) by dissolution from the first test specimen and a second component (b = polyamide) from the second test specimen, the following results are obtained:

1) Dry mass of the first specimen after pre-treatment: m_1 = 1,600 0 g;

2) Dry mass of the residue after treatment with alkaline sodium hypochlorite (polyamide + cotton): r_1 = 1,416 6 g;

3) Dry mass of the second specimen after pre-treatment: m_2 = 1,800 0 g;

4) Dry mass of the residue after treatment with formic acid (wool + cotton): r_2 = 0,900 0 g.

Treatment with alkaline sodium hypochlorite does not entail any loss in mass of polyamide, while unbleached cotton loses 3 %, therefore d_1 = 1,00 and d_2 = 1,03.

Treatment in formic acid does not entail any loss in mass of wool or unbleached cotton, therefore d_2 = 1,00 and d_3 = 1,00.

A.1.2 Dry masses

If the values obtained by chemical analysis and the correction factors are substituted in Formulae (1), (2) and (3) respectively, the following result is obtained:

$$P_1 = \left[\frac{1,03}{1,00} - 1,03 \times \frac{1,416\,6}{1,600\,0} + \frac{0,900\,0}{1,800\,0} \times \left(1 - \frac{1,03}{1,00}\right)\right] \times 100 = 10,30$$

$$P_2 = \left[\frac{1,00}{1,00} - 1,00 \times \frac{0,900\,0}{1,800\,0} + \frac{1,416\,6}{1,600\,0} \times \left(1 - \frac{1,00}{1,00}\right)\right] \times 100 = 50,00$$

$$P_3 = 100 - (10,30 + 50,00) = 39,70$$

The percentages of the various clean dry fibres in the mixture are as follows:

Polyamide (P_2) 50,00 %

Cotton (P_3) 39,70 %

Wool (P_1) 10,30 %

A.1.3 Masses after application of allowance for moisture

The percentages have been corrected according to Formulae (14), (15) and (17) respectively in order to also take into account the agreed moisture regain and the correction factors for any losses in mass after pre-treatment.

Supposing that the unbleached cotton sustains a loss in mass of 4 % after pre-treatment in petroleum ether and water, and that the agreed moisture regains to be applied is 17 % for wool, 6,25 % for polyamide and 8,5 % for cotton, the following results are obtained:

$$P_{1A} = \frac{10{,}30 \times \left(1 + \frac{17{,}0+0{,}0}{100}\right)}{10{,}30 \times \left(1 + \frac{17{,}0+0{,}0}{100}\right) + 50{,}00 \times \left(1 + \frac{6{,}25+0{,}00}{100}\right) + 39{,}70 \times \left(1 + \frac{8{,}5+4{,}0}{100}\right)} \times 100 = 10{,}97\%$$

$$P_{2A} = \frac{50{,}00 \times \left(1 + \frac{6{,}25+0{,}00}{100}\right)}{109{,}8385} \times 100 = 48{,}37\%$$

$$P_{3A} = 100 - (10{,}97 + 48{,}37) = 40{,}66\%$$

The composition of the mixture is thus as follows:

Polyamide (P_{2A})	48,4 %
Cotton (P_{3A})	40,6 %
Wool (P_{1A})	11,0 %
	100,0 %

A.2 Variant 4

A.2.1 General

Consider the case of a fibre mixture which, when qualitatively analysed, gave the following components: carded wool, viscose, unbleached cotton.

Supposing that, using variant 4, i.e. successively removing two components from the mixture of one single test specimen, the following results are obtained:

1) Dry mass of test specimen after pre-treatment: m_1 = 1,600 0 g

2) Dry mass of test specimen after the first treatment with alkaline sodium hypochlorite (viscose + cotton): r_1 = 1,416 6 g

3) Dry mass of residue after the second treatment of the residue r_1 with formic acid/zinc chloride (cotton): r_2 = 0,663 0 g

Treatment with alkaline sodium hypochlorite does not entail any loss of mass in viscose, while unbleached cotton loses 3 %, therefore d_1 = 1,00 and d_2 = 1,03. After treatment in formic acid/zinc chloride, the mass of cotton decreases by 2 % so that d_3 = (1,03 × 1,02) = 1,050 6 rounded to 1,05 (d_3 being the correction factor for the respective loss or increase in mass of the third component in the first and second reagent).

A.2.2 Dry masses

Using Formulae (11), (12) and (10) respectively, the values obtained by chemical analysis and the correction factors are substituted and the following result is obtained:

$$P_2 = \frac{1,0 \times 1,416\,6}{1,600\,0} \times 100 - \frac{1,00}{1,03} \times 43,51 = 46,32\,\%$$

$$P_3 = \frac{1,05 \times 0,663\,0}{1,600\,0} \times 100 = 43,51\,\%$$

$$P_1 = 100 - (46,32 + 43,51) = 10,17\,\%$$

where P_2 is viscose, P_3 is cotton and P_1 is wool.

A.2.3 Mass after application of agreed moisture regains

As has already been indicated for variant 1, the percentages are corrected by Formulae (14), (15) and (17) respectively. Taking the same values as above, then:

$$P_{1A} = \frac{10,17 \times \left(1 + \frac{17,0+0,0}{100}\right)}{10,17 \times \left(1 + \frac{17,0+0,0}{100}\right) + 46,32 \times \left(1 + \frac{13,0+0,0}{100}\right) + 43,51 \times \left(1 + \frac{8,5+4,0}{100}\right)} \times 100 = 10,51\,\%$$

$$P_{2A} = \frac{46,32 \times \left(1 + \frac{13,0+0,0}{100}\right)}{113,21} \times 100 = 46,24\,\%$$

$$P_{3A} = 100 - (10,51 + 46,24) = 43,25\,\%$$

The composition of the mixture is thus:

Viscose (P_{2A})	46,2 %
Cotton (P_{3A})	43,3 %
Wool (P_{1A})	10,5 %
	100,0 %

Annex B
(informative)

Typical ternary mixtures which can be analysed using methods of analysis of binary mixtures specified in the parts of ISO 1833

NOTE In Table B.1, the expression "in the order of dissolution" is relevant for Variant 4 and kept for convenience).

Table B.1 — Typical ternary mixtures and their corresponding parts of ISO 1833

Mixture	Component fibres (in the order of dissolution)			Variant	Corresponding parts of ISO 1833 (showing reagents used, in the order of dissolution)
	1st component	2nd component	3rd component		
1	wool or hair	viscose, cupro, lyocell or certain types of modal	cotton	1 and/or 4	ISO 1833-4 (hypochlorite) and ISO 1833-6 (zinc chloride/formic acid)
2	wool or hair	polyamide	cotton, viscose, cupro, modal, lyocell	1 and/or 4	ISO 1833-4 (hypochlorite) and ISO 1833-7 (formic acid 80 % mass fraction)
3	wool, hair or silk	certain chlorofibres	cotton, viscose, cupro, modal, lyocell	1 and/or 4	ISO 1833-4 (hypochlorite) and ISO 1833-13 (carbon disulphide/ acetone 55,5/44,5 volume fraction)
4	wool or hair	polyamide	polyester, polypropylene, acrylic or glass fibre	1 and/or 4	ISO 1833-4 (hypochlorite) and ISO 1833-7 (formic acid 80 % mass fraction)
5	wool, hair or silk	certain chlorofibres	polyester, acrylic, polyamide or glass fibre	1 and/or 4	ISO 1833-4 (hypochlorite) and ISO 1833-13 (carbon disulphide/ acetone 55,5/44,5 volume fraction)
6	silk	wool or hair	polyester	2	ISO 1833-18 (sulphuric acid 75 % mass fraction) and ISO 1833-4 (hypochlorite)
7	polyamide	acrylic	cotton, viscose, cupro, modal or lyocell	1 and/or 4	ISO 1833-7 (formic acid 80 % mass fraction) and ISO 1833-12 (dimethylformamide)

Table B.1 *(continued)*

Mixture	Component fibres (in the order of dissolution)			Variant	Corresponding parts of ISO 1833 (showing reagents used, in the order of dissolution)
	1st component	2nd component	3rd component		
8	certain chlorofibres	polyamide	cotton, viscose, cupro, modal or lyocell	1 and/or 4	ISO 1833-12 (dimethylformamide) and ISO 1833-7 (formic acid 80 % mass fraction) or ISO 1833-13 (carbon disulphide/acetone 55,5/44,5 volume fraction) and ISO 1833-7 (formic acid 80 % mass fraction)
9	acrylic	polyamide	polyester	1 and/or 4	ISO 1833-12 (dimethylformamide) and ISO 1833-7 (formic acid 80 % mass fraction)
10	acetate	polyamide	cotton, viscose, cupro, modal or lyocell	4	ISO 1833-3 (acetone) and ISO 1833-7 (formic acid 80 % mass fraction)
11	certain chlorofibres	acrylic	polyamide	2 and/or 4	ISO 1833-13 (carbon disulphide/acetone 55,5/44,5 volume fraction) and ISO 1833-12 (dimethylformamide)
12	certain chlorofibres	polyamide	acrylic	1 and/or 4	ISO 1833-13 (carbon disulphide/acetone 55,5/44,5 volume fraction) and ISO 1833-7 (formic acid 80 % mass fraction)
13	polyamide	cotton, viscose, cupro or modal	polyester	4	ISO 1833-7 (formic acid 80 % mass fraction) and ISO 1833-11 (sulphuric acid 75 % mass fraction)
14	acetate	cotton, viscose, cupro or modal	polyester	4	ISO 1833-3 (acetone) and ISO 1833-11 (sulphuric acid 75 % mass fraction)
15	acrylic	cotton, viscose, cupro or modal	polyester	4	ISO 1833-12 (dimethylformamide) and ISO 1833-11 (sulphuric acid 75 % mass fraction)
16	acetate	wool, hair or silk	cotton, viscose, cupro, modal, lyocell, polyamide, polyester, acrylic	4	ISO 1833-3 (acetone) and ISO 1833-4 (hypochlorite)
17	triacetate or polylactide	wool, hair or silk	cotton, viscose, cupro, modal, lyocell, polyamide, polyester, acrylic	4	ISO 1833-10 (dichloromethane) and ISO 1833-4 (hypochlorite)