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**Textiles — Quantitative chemical  
analysis —**

Part 21:

**Mixtures of chlorofibres, certain  
modacrylics, certain elastanes, acetates,  
triacetates and certain other fibres  
(method using cyclohexanone)**

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*Textiles — Analyse chimique quantitative —*

*Partie 21: Mélanges de chlorofibres, certains modacryliques, certains  
élasthannes, acétates, triacétates et de certaines autres fibres  
(méthode à la cyclohexanone)*



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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 1833-21 was prepared by Technical Committee ISO/TC 38, *Textiles*.

ISO 1833 consists of the following parts, under the general title *Textiles – Quantitative chemical analysis*:

- *Part 1: General principles of testing*
- *Part 2: Ternary fibre mixtures*
- *Part 3: Mixtures of acetate and certain other fibres (method using acetone)*
- *Part 4: Mixtures of certain protein and certain other fibres (method using hypochlorite)*
- *Part 5: Mixtures of viscose, cupro or modal and cotton fibres (method using sodium zincate)*
- *Part 7: Mixtures of polyamide and certain other fibres (method using formic acid)*
- *Part 8: Mixtures of acetate and triacetate fibres (method using acetone)*
- *Part 9: Mixtures of acetate and triacetate fibres (method using benzyl alcohol)*
- *Part 10: Mixtures of triacetate or polylactide and certain other fibres (method using dichloromethane)*
- *Part 11: Mixtures of cellulose and polyester fibres (method using sulfuric acid)*
- *Part 12: Mixtures of acrylic, certain modacrylics, certain chlorofibres, certain elastanes and certain other fibres (method using dimethylformamide)*
- *Part 13: Mixtures of certain chlorofibres and certain other fibres (method using carbon disulfide/acetone)*
- *Part 14: Mixtures of acetate and certain chlorofibres (method using acetic acid)*
- *Part 15: Mixtures of jute and certain animal fibres (method by determining nitrogen content)*
- *Part 16: Mixtures of polypropylene fibres and certain other fibres (method using xylene)*

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- *Part 17: Mixtures of chlorofibres (homopolymers of vinyl chloride) and certain other fibres (method using sulfuric acid)*
- *Part 18: Mixtures of silk and wool or hair (method using sulfuric acid)*
- *Part 19: Mixtures of cellulose fibres and asbestos (method by heating)*
- *Part 21: Mixtures of chlorofibres, certain modacrylics, certain elastanes, acetates, triacetates and certain other fibres (method using cyclohexanone)*

The following parts are under preparation:

- *Part 6: Mixtures of viscose or certain types of cupro or modal or lyocell and cotton fibres (method using formic acid and zinc chloride)*
- *Part 20: Mixtures of elastane and certain other fibres (method using dimethylacetamide)*
- *Part 22: Mixtures of viscose or certain types of cupro or modal or lyocell and flax fibres (method using formic acid and zinc chlorate)*
- *Part 23: Mixtures of polyethylene and polypropylene (method using cyclohexanone)*
- *Part 24: Mixtures of polyester and some other fibres (method using phenol and tetrachloroethane)*

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# Textiles — Quantitative chemical analysis —

## Part 21:

### Mixtures of chlorofibres, certain modacrylics, certain elastanes, acetates, triacetates and certain other fibres (method using cyclohexanone)

#### 1 Scope

This part of ISO 1833 specifies a method, using cyclohexanone, to determine the percentage of chlorofibre, modacrylic, elastane, acetate and triacetate, after removal of non-fibrous matter, in textiles made of binary mixtures of

— acetate, triacetate, chlorofibre, certain modacrylics, certain elastanes

and

— wool, animal hair, silk, cotton, cupro, modal, viscose, polyamide, acrylic and glass fibre.

Where modacrylics or elastanes are present, a preliminary test should be carried out to determine whether the fibre is completely soluble in the reagent. [ISO 1833-21:2006](https://standards.iteh.ai/catalog/standards/sist/bd6364cc-4d5-4f30-b9d8-)

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It is also possible to analyse mixtures containing chlorofibres by using the test methods described in ISO 1833-13 or ISO 1833-17.

#### 2 Normative references

The following referenced documents are indispensable for the application 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 Principle

The acetate and triacetate fibres, chlorofibres, certain modacrylics, and certain elastanes are dissolved out from a known dry mass with cyclohexanone at a temperature close to boiling point. The residue is collected, washed, dried and weighed. Its mass, corrected if necessary, is expressed as a percentage of the dry mass of the mixture. The percentage of chlorofibre, modacrylic, elastane, acetate and triacetate is found by the difference.

## 4 Reagents

Use the reagents described in ISO 1833-1 together with those given in 4.1 and 4.2.

**4.1 Cyclohexanone**, boiling point 156 °C.

**4.2 Ethanol**, 50 % by volume.

**SAFETY PRECAUTIONS — Cyclohexanone is flammable and toxic. Suitable precautions shall be taken in its use.**

## 5 Apparatus

Use the apparatus described in ISO 1833-1 together with those given in 5.1 to 5.5.

**5.1 Hot extraction apparatus** (see Annex A).

NOTE This is a variant of the apparatus described in Reference [5].

**5.2 Filter crucible**, to contain the specimen.

**5.3 Porous baffle (porosity grade 1)**, flat circular stopper of glass with a glass filter in the middle.

The stopper is placed over the glass filter crucible.

**5.4 Reflux condenser**, that can be adapted to the distillation flask.

**5.5 Heating device.**

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## 6 Procedure

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

Pour into the distillation flask 100 ml of cyclohexanone per gram of material.

Insert the extraction container in which the filter crucible, containing the specimen and the porous baffle, slightly inclined, have previously been placed. Insert the reflux condenser. Bring to the boil and continue extraction for 60 min at a minimum rate of 12 cycles per hour.

After extraction and cooling remove the extraction container, take out the filter crucible and remove the porous baffle.

Wash the contents of the filter crucible three or four times with 50 % ethanol heated to about 60 °C and subsequently with 1 l of water at 60 °C.

Do not apply suction during or between the washing operations. Allow the liquid to drain under gravity and then apply suction.

Finally, dry the crucible with the residue, then cool and weigh them.

## 7 Calculation and expression of results

Calculate the results as described in the general instructions of ISO 1833-1.

The value of  $d$  is 1,00 with the following exceptions:

- silk 1,01;
- acrylic 0,98.

## 8 Precision

On homogeneous mixtures of textile fibres, the confidence limits of results obtained by this method are not greater than  $\pm 1$  % for a confidence level of 95 %.

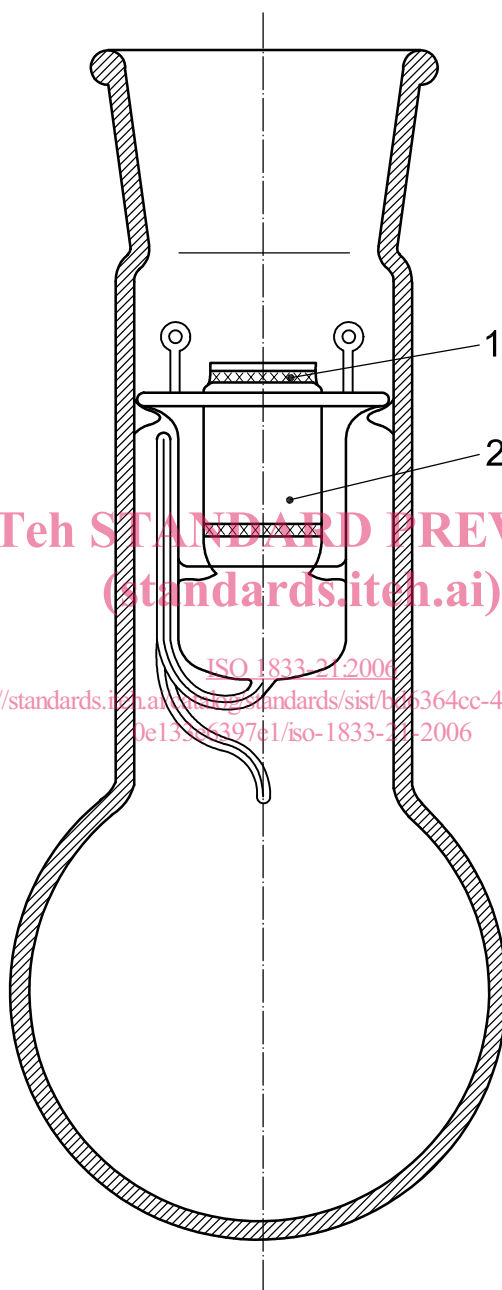
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**Annex A**  
(informative)

**Hot extraction apparatus**



**Key**

- 1 porous baffle
- 2 filter crucible

**Figure A.1 — Hot extraction apparatus**



## Bibliography

- [1] ISO 1833-13, *Textiles — Quantitative chemical analysis — Part 13: Mixtures of certain chlorofibres and certain other fibres (method using carbon disulfide/acetone)*
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- [3] ISO 2076, *Textiles — Man-made fibres — Generic names*
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