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Textiles — Domestic washing and drying procedures for textile testing

Textiles — Méthodes de lavage et de séchage domestiques en vue des essais des textiles

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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).

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*, Subcommittee SC 2, *Cleansing, finishing and water resistance tests*.

This fourth edition cancels and replaces the third edition (ISO 6330:2012), which has been technically revised.

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

- inclusion of terminology for clarification, update to available detergents, clarification of ballasts, updating of acceptable devices, harmonization of annexes within the document

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.

Introduction

This document is utilized by a broad range of textile quality and performance evaluations including but not exclusive to: smoothness appearance, dimensional change, stain release, water resistance, water repellence, colour fastness to domestic laundering, and care labelling that are prescribed in other international and regional test method standards.

This document is also used to evaluate not only the attributes of fabrics themselves but also the performance of apparel, home products and other textile end-products. The selection of washing and drying machines and their associated ballast types, detergents, and other drying options are to be made according to the international region in which the textile will be used by consumers.

NOTE Suitable machines, detergents and ballast are available commercially. If you need this information, please contact the ISO TC 38/SC 2 Secretariat.

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Textiles — Domestic washing and drying procedures for textile testing

1 Scope

1.1 This document specifies domestic washing and drying procedures for textile testing. The procedures are applicable to textile fabrics, garments or other textile articles which are subjected to appropriate combinations of domestic washing and drying procedures. This document also specifies the reference detergents and ballasts for the procedures.

1.2 Provision is made for

13 different washing procedures based on the use of the reference washing machine Type A: horizontal axis, front-loading type,

11 procedures based on the use of the reference washing machine Type B: vertical axis, top-loading agitator type, and

7 procedures based on the use of the reference washing machine Type C: vertical axis, top-loading pulsator type.

1.3 Each washing procedure represents a single domestic wash.

1.4 This document also specifies six drying procedures:

A — Line dry

B — Line drip dry

C — Flat dry

D — Flat drip dry

E — Flat press

F — Tumble dry

1.5 A complete test consists of a washing and drying procedure.

NOTE Use of different parameters (washing machine type, detergent type and type of tumble drier) may affect test results for any test using this document. Therefore, parties using this standard are strongly encouraged to agree on the parameters to be used.

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 6059, *Water quality — Determination of the sum of calcium and magnesium — EDTA titrimetric method*

ISO 139, *Textiles — Standard atmospheres for conditioning and testing*

AATCC Laboratory Procedure 1

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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 ambient conditions

temperature and relative humidity in the test environment not differing from the normal indoor condition or the normal outdoor condition in the region where the test is performed

3.2 ballast

textile fabric to be added to the specimen(s) under test in order to fill the mass required by the washing procedure.

3.3 controlled humidity device

control unit in a tumble dryer capable of measuring the humidity of the load and ending the drying operation at a predetermined residual moisture level

3.4 overdrying

prolonged drying operation where the load is dried until all remaining moisture in the load has been removed

3.5 reference detergent

detergent with specified formulations to be used for testing purposes

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3.6 reference washing machine

washing machine with defined engineering specifications to be used for testing purposes

3.7 washing procedure

cycle of the washing action including water supplying, washing, and repeated rinsing, spinning and water supplying and ended by spinning as predetermined on the washing machine

3.8 spinning process

water-extracting process in the washing machine by which water is removed from the textiles by centrifugal action as a part of the washing procedure

3.9 still air

air not influenced by any natural wind or mechanical device giving it a forced flow

3.10 total air-dry mass

the mass the specimen under test and the ballast in a conditioned state according to ISO 139

3.11 Wash Load

the material to be processed, comprised of the ballast and test specimen mixed together

4 Principle

A specimen is washed in an automatic washing machine and dried according to specified procedures.

5 Apparatus and materials

5.1 Automatic washing machines

5.1.1 Reference washing machine Type A — Horizontal axis, front-loading type

The specification for reference washing machine Type A is given in [Annex A](#).

5.1.2 Reference washing machine Type B — Vertical axis, top-loading agitator type

The specification for reference washing machine Type B is given in [Annex C](#).

5.1.3 Reference washing machine Type C — Vertical Axis, top-loading pulsator type

The specification for reference washing machine Type C is given in [Annex D](#).

5.2 Tumble dryers

5.2.1 Type A1 tumble dryer - Vented

The specification for Type A1 tumble dryer is given in [Annex F](#).

5.2.2 Type A2 tumble dryer - Condenser

The specification for Type A2 tumble dryer is given in [Annex F](#).

5.2.3 Type A3 tumble dryer - Large vented

The specification for Type A3 tumble dryer is given in [Annex F](#).

5.3 Electrically (dry) heated flat-bed press

If this method of drying is used, the type of press shall be specified among the interested parties.

5.4 Line drying

For procedure for line drying, see [10.1.1](#); for line drip drying, see [10.1.2](#).

5.5 Drying racks

Use screen drying racks of approximately 16 mesh stainless steel or plastic for flat drying (see [10.1.3](#)) or flat drip drying (see [10.1.4](#)).

5.6 Ballasts

5.6.1 Type I, 100 % Cotton ballast

The nominal composition of 100 % Cotton ballast is given in [Annex G](#).

5.6.2 Type II, 50 % Cotton/50 % Polyester ballast

The nominal composition of 50 % Cotton/50 % Polyester ballast is given in [Annex G](#).

5.6.3 Type III, 100 % Polyester ballast

The nominal composition of 100 % Polyester ballast is given in [Annex G](#).

NOTE Ballast associated with another product performance specification can be used if agreed upon between interested parties. If used, include alternate ballasts in the test report.

6 Reagents

6.1 Reference detergents

6.1.1 Reference detergent 1

Reference detergent 1 is a non-phosphate powder detergent without enzymes and is available both with and without optical brightener. [Other designations are 1993 AATCC standard reference detergent without optical brightener (WOB) and 1993 AATCC standard reference detergent with optical brightener.]

Reference detergent 1 can only be used in machine Type B.

The nominal composition of reference detergent 1 is given in [Annex H](#).

6.1.2 Reference detergent 2

Reference detergent 2 is a non-phosphate powder detergent with optical brightener and with enzymes. (Another designation is IEC reference detergent A*)

Reference detergent 2 can be used in both machine Type A and Type B.

The nominal composition of reference detergent 2 is given in [Annex I](#).

For distribution and mixing, see [Annex N](#).

6.1.3 Reference detergent 3

Reference detergent 3 is a non-phosphate powder detergent without optical brightener and without enzymes. (Another designation is ECE reference detergent 98.)

Reference detergent 3 can be used in both machine Type A and Type B.

The nominal composition of reference detergent 3 is given in [Annex J](#).

For distribution and mixing, see [Annex N](#).

6.1.4 Reference detergent 4

Reference detergent 4 is a non-phosphate powder detergent with optical brightener and with enzymes. [Another designation is JIS K 3371 (Category 1)]. Reference detergent 4 can only be used in washing machine Type C.

The nominal composition of reference detergent 4 is given in [Annex K](#).

6.1.5 Reference detergent 5

Reference detergent 5 was a non-phosphate liquid detergent available from AATCC. It is no longer commercially available and has been removed from this standard. In order to maintain continuity through the rest of the document and eliminate confusion in the markets, subsequent references will maintain their original names (ie Reference Detergent 6 will continue to be known as Reference Detergent 6).

6.1.6 Reference detergent 6

Reference detergent 6 is a non-phosphate powder detergent with optical brightener and without enzymes. (Another designation is SDC Reference Detergent Type 4. This was incorrectly designated as IEC reference detergent A in ISO 6330:2000.)

Reference detergent 6 can be used in machine Type A. The nominal composition of reference detergent 6 is given in [Annex L](#).

For distribution and mixing, see [Annex N](#).

6.1.7 Reference detergent 7

Reference detergent 7 is a liquid detergent for wool/ silk material for mild /delicate washing process. This detergent can be suitable for materials such as wool, silk, or materials that are typically labelled as delicate or hand wash.

The nominal composition of reference detergent 7 is given in [Annex M](#).

6.2 Water

6.2.1 Water hardness

Water hardness shall be lower than 0,7 mmol/l expressed as calcium carbonate, when determined in accordance with ISO 6059.

NOTE A water hardness of lower than 2,7 mmol/l can be applicable with a consent among the interested parties in accordance with IEC 60456.

6.2.2 Water pressure

The laboratory water-supply pressure at the inlet to the reference washing machine shall be higher than 150 kPa.

6.2.3 Cold-water inlet temperature

The water temperature at the inlet to the reference washing machines shall be $(20 \pm 5) ^\circ\text{C}$

In tropical countries, the water temperature $(20 \pm 5) ^\circ\text{C}$ should be regarded as a minimum temperature. When the measurement is carried out with a water temperature that differs from these limits, the supply temperature should be stated in the test report.

7 Conditioning and testing atmosphere

The atmospheres used for conditioning textile specimens shall be in accordance with ISO 139.

8 Wash load

8.1 Total wash load

The total air-dry load mass (i.e., test specimen plus appropriate ballast, see 5.6 and 10.2) shall be $(2,0 \pm 0,2)$ kg for all types of reference washing machines.

NOTE In the case of testing a whole garment, report the total load if it is more than 2,2 kg.

8.2 Number of specimens

The number of specimens to be subjected to the washing and drying procedures specified in this document shall be determined by the purpose for which the material is being tested.

8.3 Selection of ballast

For specimens with 51% or more of cellulosic fibres, the Cotton ballast, Type I shall be used (see 5.6.1), unless otherwise agreed upon by interested parties. For specimens with 51% or more of synthetic fibres, the Polyester ballast, Type III shall be used (see 5.6.3), unless otherwise agreed upon by interested parties. For specimens that are made of other fibres or blends, either the Polyester/Cotton ballast, Type II or the Polyester ballast, Type III may be used (see 5.6.2 and 5.6.3), unless otherwise agreed upon by interested parties. In all cases the ballast type shall be reported.

A ballast associated with another product performance specification that references procedures in this document shall be used so long as it is agreed upon between interested parties and is reported.

8.4 Ratio of load to ballast

If dimensional stability is being determined, not more than half of the wash load shall consist of test specimens.

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NOTE In the case of testing a whole garment, report the ratio of load to ballast if it is more than 1/1.

9 Washing procedure

9.1 Select the washing procedure to be used from those given in Annex B for a type A reference washing machine, from Annex D for a type B reference washing machine, or from Annex E for a type C reference washing machine.

9.2 Weigh the (individual) specimens, made-up articles, or garments before washing. If required add ballast to meet the required load mass (see 8.1). The specimen and the ballast shall be evenly mixed before it is loaded into the reference machine.

9.3 Place the material to be washed in the washing machine (see 5.1.1 to 5.1.3).

- a) In Reference washing machines Type A, add (20 ± 1) g of the reference detergent 2, 3 or 6 directly into the dispenser. For reference detergent 7 add (47 ± 1) g into the dispenser.
- b) In Reference washing machines Type B fill the machine with water at the selected temperature, then add (66 ± 1) g of reference detergent 1 or if reference detergent 2 or 3 is used, add the appropriate amount to provide good running suds having a height of not more than $(3,0 \pm 0,5)$ cm at the end of the washing cycle.
- c) In Reference machines Type C, fill the machine with water at the selected temperature, then add 1,33 g/l of reference detergent 4 directly into the dispenser.