International Standard ISO 2267

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Surface active agents — Evaluation of certain effects of laundering — Methods of preparation and use of unsoiled cotton control cloth

Agents de surface — Contrôle de certains effets de blanchissage — Méthodes d'élaboration et de mise en œuvre d'un tissu de coton témoin non souillé

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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 2267 was prepared by Technical Committee ISO/TC 91, *Surface active agents*.

This third edition cancels and replaces the second edition (ISO 2267-1979), of which it constitutes a minor revision.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Surface active agents — Evaluation of certain effects of laundering — Methods of preparation and use of unsoiled cotton control cloth

0 Introduction

The quality of laundering for household textile articles may be assessed in two different ways, depending on whether the cleaning effect, or the conservation of the initial characteristics of cloth subjected to repeated laundering, is under consideration.

In the first case, some tests may be carried out on the articles themselves, which may be re-used. However, for measurement of greying and yellowing, it is essential to use unsoiled control cloths. Furthermore, as the measurement of certain characteristics of the household textile articles, particularly their mechanical properties, entails the destruction of samples, it is quite impossible to perform these tests on household textile articles which are in use.

It has therefore been proposed to define the harmlessness of a laundering process on household textile articles by reference to the behaviour of control material treated in the same way at the same time as the cloth washed in the normal manner.

Since the behaviour of household textile articles in use is influenced by many and complex factors, and depends to a large extent on the yarn linear density of the cloth, it is necessary, in order to obtain satisfactory reproducibility of the results, to standardize all matters relating to the preparation of the control cloth, and to its use.

In this International Standard, the characteristics of the control cloth are defined with the greatest possible precision, and its use is standardized.

The test methods to be applied to the control cloth before and after use are described in ISO 4312.

1 Scope and field of application

This International Standard specifies the characteristics of a cotton material and the preliminary treatments which are to be applied to it in order to make it an *unsoiled cotton control cloth*[1)] for the testing of certain effects of laundering.

It also defines the conditions of use of this control cloth (in the form of control test pieces) during the laundering processes which are being tested from the point of view of the conservation of the original characteristics of the cloth.

The unsoiled cotton control cloth is primarily intended to enable the laundering of white cloth to be tested. It may be used with all detergents and all types of domestic or industrial machines designed to wash, hydroextract and dry household textile articles.

The unsoiled cotton control cloth may also be used for testing the laundering of other categories of textile articles (coloured, for example).

2 References

ISO 2, *Textiles — Designation of the direction of twist in yarns and related products.*

ISO 862, *Surface active agents — Glossary.*

ISO 1144, *Textiles — Universal system for designating linear density (Tex system).*

ISO 1973, *Textile fibres — Determination of linear density — Gravimetric method.*

ISO 2061, *Textiles — Determination of twist in yarns — Direct counting method.*

ISO 2174, *Surface active agents — Preparation of water with known calcium hardness.*

ISO 3801, *Textiles — Woven fabrics — Determination of mass per unit length and mass per unit area.*

ISO 4312, *Surface active agents — Evaluation of certain effects of laundering — Methods of analysis and test of unsoiled cotton control cloth.*

ISO 5081, *Textiles — Woven fabrics — Determination of breaking strength and elongation (Strip method).*

1) The names and addresses of the suppliers of unsoiled cotton control cloth complying with this International Standard may be obtained from the Secretariat of ISO/TC 91 (AFNOR) or from the Central Secretariat.

ISO 7211/2, *Textiles — Woven fabrics — Construction — Method of analysis — Part 2: Determination of number of threads per unit length.*

3 Definitions

3.1 laundering process: All the operations carried out during laundering. These may comprise

- soaking
- one or more washes
- bleaching
- one or more rinses
- hydroextraction
- drying
- calendering, pressing or ironing.

3.2 detergent: A product specially formulated for cleaning through the process of detergency.[1)]

NOTE — A detergent comprises essential components (surface active agents) and, generally, complementary components (builders, etc.).

3.3 normally soiled household textile articles: An average sample of the articles which are washed in the usual way and which present an average degree of soiling resulting from normal use.

NOTE — The qualitative and quantitative variability of soiling in household textile articles which have been washed in the normal way, depending on the circumstances of place and time, makes it impossible to define a standard soiled article or cloth which would be suitable in all cases.

This variability, which cannot be avoided, does not, nevertheless, prevent meaningful results being obtained if appropriate statistical methods are used.

Although the nature of the soil affects the behaviour during laundering of the cloth of which the articles are made, the control cloth will be affected in the same way because part of the soil is redeposited on it during washing. As a result, the conclusions arrived at from the application of this International Standard will depend, to some extent, on what constitutes normally soiled articles in the particular circumstances which are of interest to the user of this International Standard.

If it is necessary, for certain tests, to use soiled articles which do not conform to this definition, this shall be specifically mentioned in the test report relating to the methods of test.

3.4 unprepared control cloth: Undyed cloth provided by the textile industry for the preparation of the control cloth and having certain specified characteristics, so that it can provide a control conforming to the requirements.

3.5 control cloth: Unprepared control cloth which has been subjected to a given number of preparatory treatments under defined conditions in order to bring its essential characteristics to specified initial values.

4 Principle

A given number of test pieces of control cloth and machine loads of normally soiled articles are together subjected to a given number of consecutive laundering processes.

After these processes, characteristic properties of the test pieces of control cloth are measured and compared with their initial values.

The changes in these properties during washing should enable the causes of damage in household textile articles in the laundering process to be detected.

5 Cotton control cloth

5.1 Characteristics and requirements

The methods of analysis and test to be used to determine the characteristics and requirements and also the designations are described in ISO 2, ISO 1144, ISO 1973, ISO 2061, ISO 3801, ISO 4312, ISO 5081 and ISO 7211/2.

5.1.1 Unprepared control cloth

The cloth provided by the textile industry shall be selected in such a way that, after having been subjected to the preparatory treatments (see 5.2), it has the characteristics defined in 5.1.2.

The unbleached yarn to be used for both warp and weft shall comply with the following requirements:

- nature: pure cotton, minimum commercial length 27 mm (see note 1);
- linear density: single yarn 30 ± 2 tex;
- twist: Z 700 ± 25.

The width, mass, yarn linear density, and warp strength shall be such that it is possible to obtain the values laid down for the control cloth (5.1.2), allowing for dimensional variations. The latter occur either during any treatment aimed at giving dimensional stability or during preparatory treatment. They are usually of the order of 3 to 8 % in the warp and 1 to 5 % in the weft for stabilized cloth "direct from the loom".

The unprepared control cloth shall also comply with the following requirements:

- it shall have a plain weave;

1) See ISO 862.

— it shall have been completely desized and shall not contain any fluorescent whitening agent revealed by inspection under ultraviolet light;

— it shall have been boiled and laundered in such a way that the fluidity value of the cotton is less than 50 $(Pa \cdot s)^{-1}$ or its degree of polymerization greater than 1 600 (after boiling for 1 h in a 1 % sodium hydroxide solution without being allowed to come into contact with the air);

— it shall have been boiled and laundered in such a way that the degree of radiance (percentage) of the cloth is greater than 86.

NOTES

1 It is important to verify that the control cloth consists of cotton only, and contains no other fibre whatsoever. A microscopic examination of the constituent fibres is recommended.

2 It is desirable, but not essential, for the cloth to have a certain number of coloured warp, and possibly also weft, threads, dyed with a fast dye, or white threads of a larger linear mass, or double threads, which indicate:

— the surface area of each test piece (see figure 1);

— within this area, the area of the specimens to be used for the measurement of tensile strength (see figure 2).

This will facilitate the cutting of both test pieces and specimens. Allowance should be made, when determining the dimensions of these, for the dimensional variations envisaged during the preliminary treatments.

It is also desirable for the two selwedges to be different, so that the two sides of the material can be identified.

5.1.2 Control cloth

The unprepared control cloth becomes a control cloth after it has undergone the preparatory treatments (see 5.2), provided that after these treatments it satisfies the following requirements:

— number of threads in warp determined in accordance with ISO 7211/2: 25 ± 2 threads per centimetre;

— number of threads in weft determined in accordance with ISO 7211/2: 25 ± 2 threads per centimetre;

— mass per unit area determined in accordance with ISO 3801: 170 ± 10 g/m^2, after conditioning at 20 °C and 65 % relative humidity;

— width: at least 800 mm;

— breaking strength in warp determined in accordance with ISO 5081: at least 500 N;

— fluidity value determined in accordance with ISO 4312 between 40 and 50 $(Pa \cdot s)^{-1}$, or degree of polymerization between 1 700 and 1 550;

— degree of radiance (percentage) (measured immediately after the last preparatory treatment) determined in accordance with ISO 4312: greater than 86.

NOTE — The maximum degree of radiance (percentage) that can be obtained on the control cloth depends to some extent on the measuring apparatus used. If the measuring conditions are such that the specular component is excluded (which is the case with the measuring geometry 45°/normal (45/0), the maximum degree of radiance (percentage) is about 92. If the measuring conditions are such that the specular component is not excluded, or is only partly excluded (measurement in a photometric sphere), the maximum degree of radiance (percentage) may exceed 92 (values related to $BaSO_4$ = 100).

The above values apply only under measuring conditions which exclude any contribution of the fluorescence.

5.2 Preparatory treatments

5.2.1 Materials

5.2.1.1 Water, of zero hardness corresponding to 0 mg of Ca^{++} ions per litre determined in accordance to ISO 2174.

5.2.1.2 Pure soap flakes.

Verify that the soap does not contain any fluorescent whitening agent, for example, by examining under ultraviolet light a sample of the same cloth washed with a solution of the soap.

5.2.1.3 Sodium metasilicate pentahydrate ($Na_2SiO_3 \cdot 5H_2O$).

5.2.2 Apparatus

5.2.2.1 Washing machine, rotating-drum type, diameter of drum greater than 500 mm, made entirely of stainless steel and of a size suitable for the size of the pieces of control cloth to be washed in it.

5.2.2.2 Conventional hydroextraction, pressing or calendering equipment.

5.2.3 Preparation of cloth

Cut the unprepared control cloth into a number of pieces corresponding together to the required number of test pieces of the specified dimensions (see 6.2 and figure 1), or, if the pressing or ironing equipment will accommodate them, into a number of pieces each corresponding to several such test pieces, and hem them.

Number the pieces of cloth with indelibile ink, so that their original position in the large piece of cloth can be identified (see 6.3). All the numbers shall be put on the same side of the cloth (see 5.2.4.6).

5.2.4 Procedure

Apply to the unprepared control cloth, which shall not be used without preparation, five preparatory treatments, under the following conditions:

5.2.4.1 Loading of washing machine

Load the machine with pieces of unprepared control cloth only.