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Surface active agents — Detergents for washing fabrics — Guide for comparative testing of performance

Agents de surface — Détergents pour le lavage du linge — Guide pour des essais comparatifs d'évaluation de performance

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FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been set up 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.

International Standard ISO 4319 was developed by Technical Committee ISO/TC 91, *Surface active agents*, and was circulated to the member bodies in August 1975.

It has been approved by the member bodies of the following countries :

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The member body of the following country expressed disapproval of the document on technical grounds :

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Surface active agents — Detergents for washing fabrics — Guide for comparative testing of performance

0 INTRODUCTION

The methods of assessing performance of detergents for washing fabrics depend on many variables which are linked together in a complex way. This is why it has been considered necessary to lay down a guide concerning the drawing up and application of comparative test methods.

This guide has been drawn up in the full recognition that no single test, or series of tests, carried out in a laboratory will be able to define completely the limits of product performance for the numerous different washing products on the market today. The position is all the more complex when the many different national washing habits and soils, and the wide variety of textiles, are taken into account.

Soil is composed of a variety of substances such as fats, proteins, pigments and other coloured particles which exhibit quite different adhesive properties on the fabric. The chemical composition of the fibre, the textile structure and the finish will also greatly influence soil adhesion to the fabric. It is therefore very important, in comparative testing, to understand that differences in the degree of soil removal may be observed if the soiled material is unfinished or resin-finished cotton, shrink-resistant wool, nylon, polyester, or polyacrylic fabric and if the fabrics are loosely or closely knit or woven, are light or heavy, or have a smooth or rough surface.

In addition to the aspects relating directly to cleaning, a good detergent should have other properties in order to ensure good acceptance and to present no danger. In particular, it should not attack either the fabric (materials, dyes, finishes) being washed or the washing machines, and it should retain its properties during long periods of storage.

Although toxicological and ecological properties are also extremely important for products widely used in the home, their assessment is beyond the scope of this guide.

Despite these complexities, it should be possible for a given country or group of countries to devise satisfactory comparative test methods.

1 SCOPE

This International Standard constitutes a guide for carrying out comparative tests of fabric washing products in such a way as to realistically reflect the performance of the products likely to be used by consumers.

It gives details of the variables to be considered, indicating the significance and importance of each of these variables, and provides a basis for the drawing up of adequate comparative test methods which will give a valid estimation of the performance of a fabric washing product when two or more products are compared during the same series of tests.

2 FIELD OF APPLICATION

This International Standard applies to all products sold for use in domestic washing machines.

In general, it does not apply to industrial washing products or to other specialized products.

3 REFERENCES

ISO 607, *Surface active agents — Detergents — Methods of sample division.*¹⁾

ISO 2267, *Surface active agents — Verification of certain effects of laundering — Preparation and use of unsoiled cotton control cloth.*

ISO 3758, *Textiles — Care labelling code.*²⁾

ISO 4312, *Surface active agents — Verification of certain effects of laundering — Methods of analysis and test for unsoiled cotton control cloth.*²⁾

4 GENERAL

When the products to be compared are recommended for several laundry conditions, they shall be examined under these varied conditions according to the manufacturer's directions in order to obtain a true assessment of their value; conversely, a product shall not be tested under conditions for which it has not been recommended.

1) In preparation. (Revision of ISO/R 607.)

2) At present at the stage of draft.

The choice of the products and the characteristics which the testing laboratory will examine has a strong influence on the design of the experiment, including the washing process, the selection of the fabric load and other variables. The performance testing shall be carried out on products readily available in the particular country. Knowledge of the formulation of the products is unnecessary as it is not, in general, possible to predict the performance of a product on the basis of the formulation alone.

Sampling of the products shall be performed following the procedure specified in ISO 607.

This International Standard contains four clauses covering the principal considerations in fabric washing product assessment. These considerations are

- the characteristics of the fabric to be assessed;
- the fabric loads required for this assessment;
- the washing processes to be employed;
- the most significant aspect of the physical characteristics of the product.

In the clauses dealing with fabric load, washing process and physical characteristics, a number of variables and secondary variables are listed. For each secondary variable, a limited number of recommendations are given for a test method which is designed to compare two or more products, together with the reasons behind these recommendations and possible interactions with other variables.

5 CHOICE OF PERFORMANCE CHARACTERISTICS TO BE ASSESSED

5.1 General comments

There is no single assessment that will give the overall performance of a fabric washing product.

In order to assess cleaning or redeposition, it is recommended that naturally soiled fabrics, as referred to in clause 6, be used.

A series of assessments is necessary in order to evaluate the various aspects of the end results of performance tests.

These aspects of the end results are classified below and the method of appraisal is detailed in clause 8.

5.2 Classification of end results of performance tests

The (overall) performance of the washing product may be classified according to several separate criteria :

a) *Fabric appearance*

This criterion covers soil removal, redeposition, brightening, stain removal and overall whiteness.

b) *Fabric feel*

This criterion is influenced by the fabric, its construction, the drying methods used, the type and quantity of product, water hardness, deposition and the washing machine.

c) *Fabric stability*

This criterion covers chemical and physical damage, including the effect on the colour or the finish of the fabric, the dimensional stability and the physical strength of the fabric.

d) *Effect on washing and drying equipment*

This criterion covers any interaction between the product and the washing machine.

5.3 Difficulties of assessment of the performance

Except perhaps for stain removal, all the characteristics mentioned under criterion 5.2a) are very difficult to estimate after only one wash, differences usually being too small and too variable to allow any meaningful assessment. For this reason, several wash cycles are necessary to obtain a clear picture of the effect of redeposition, partial removal of dirt and fading of colours.

An assessment may be made either by using similar articles from a large number of family bundles (see 6.2.1) or preferably by repeated wash and wear cycles (generally at least ten) on the same articles (see 6.2.2), stopping the experiment when the differences between the products are stable, at the required confidence level.

The removal of stains derived from natural soils, artificially applied to test pieces, may be estimated after each wash and averaged across all the washes.

Certain characteristics which reflect the possible damage caused to the articles by the washing products will require at least twenty-five washes and sometimes up to fifty washes. This is a very lengthy operation. In addition, it is very difficult to differentiate between the damage caused by the detergent itself and the damage caused by other factors, such as abrasion or stresses of the physical effects of the washing process.

The effect on colours is also difficult to estimate because of the extreme variety of dyes. Assessment should separate what is due to the detergent itself and what is due to the actual stability of the dye in the washing environment (temperature effect, bleeding, dye transfer). Soil (mainly perspiration) may also influence the dye resistance. The assessment should include a control whereby articles of the same colour are washed in plain water at the same temperature to determine the inherent dye stability of the fabrics and to determine the effect of the products being tested on colours which are fast in water alone.

The amount of residue retained on the cloth depends on the performance of the washing machine (rinsing and spinning) as well as on the efficiency of the washing product. The amount alone is not sufficient to describe