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IULTCS/IUF 434

Second edition
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Leather — Tests for colour fastness — Colour fastness of small samples to solvents

Cuir — Essais de solidité des teintures — Solidité des teintures de petits échantillons aux solvants

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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 11643/IUF 434 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 289, *Leather*, in collaboration with the Fastness Tests Commission of the International Union of Leather Technologists and Chemists Societies (IUF Commision, IULTCS), in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement). It is based on IUF 434 published in *J. Soc. Leather Tech. Chem.*, **75**, pp. 30-32, 1991, and was declared an official method of the IULTCS in September 1991.

IULTCS, originally formed in 1897, is a world-wide organization of professional leather societies to further the advancement of leather science and technology. IULTCS has three Commissions, which are responsible for establishing international methods for the sampling and testing of leather. ISO recognizes IULTCS as an international standardizing body for the preparation of test methods for leather.

This second edition cancels and replaces the first edition (ISO 11643:1993), which has been technically revised. The change in the title, from *Leather — Tests for colour fastness — Colour fastness of small samples to dry-cleaning solutions* to *Leather — Tests for colour fastness — Colour fastness of small samples to solvents*, reflects the changes in the technology of dry cleaning from solvent-based to water-based processes. This edition includes an option to use a petroleum hydrocarbon solvent.

Introduction

The testing of leather to determine its colour fastness to solvents can be done in several ways to achieve different aims. Small leather samples can be tested to assess the fastness to solvents of leather dyes and finishes, or of the finished leather itself.

The test method specified in this International Standard covers only the testing of small leather samples, in the absence of any other materials (accessories, adhesives, etc.), that can influence the cleanability with solvents of the finished article. Moreover, it does not consider changes in leather properties, such as the handling characteristics or area stability, as the samples are too small. It must not therefore be used to provide guidance as to the process to be employed for cleaning or spot and stain removal with solvents on complete garments.

Part of the colour of leather is due to the oil content. When treated with solvents some of the colour change is due to the loss of oil into the solvent. The objective of the treatment with triolein is to restore the colour due to changes in the oil content of the leather. The method with one level of triolein can give a guideline for re-oiling. Since different leathers can have different oil contents, a range of re-oiling tests would be necessary to establish the correct re-oiling level.

Leather — Tests for colour fastness — Colour fastness of small samples to solvents

1 Scope

This International Standard specifies a method for determining the resistance to solvent solutions of the colour and finish of unused, and not yet cleaned, leather. It does not cover composite materials or complete leather garments. It is not intended to be used to give any guidance on the process to be employed for cleaning garments.

During the test, the colour of the leather can change and the adjacent fabric used can become stained. Additionally, the finish of the leather can be damaged.

The presence of absorbed water in the leather, adjacent fabric or solvent has not been found to be a critical factor in assessing the colour fastness.

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 105-A02, *Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour*

ISO 105-A03, *Textiles — Tests for colour fastness — Part A03: Grey scale for assessing staining*

ISO 105-A04, *Textiles — Tests for colour fastness — Part A04: Method for the instrumental assessment of the degree of staining of adjacent fabrics*

ISO 105-A05, *Textiles — Tests for colour fastness — Part A05: Instrumental assessment of change in colour for determination of grey scale rating*

ISO 105-F10:1989, *Textiles — Tests for colour fastness — Part F10: Specification for adjacent fabric: Multifibre*

3 Principle

A composite specimen of the leather and an adjacent fabric is agitated, together with PTFE rods, in a solvent, which may contain triolein (and possibly a detergent), then squeezed and dried at ambient temperature. The change in colour of the specimen and staining of the adjacent fabric are assessed with the grey scales and (if applicable) any changes in the finish are noted.

4 Apparatus and materials

Use normal laboratory apparatus and the following.

4.1 Suitable mechanical device, for mechanically agitating the containers (4.2) by rotation at 40 r/min ± 5 r/min and able to maintain a temperature of 30 °C ± 2 °C. The apparatus chosen shall be fitted with a cooling device, if necessary.

4.2 Containers, made of glass or stainless steel, of approximately 500 ml capacity, which can be closed, e.g. using solvent-resistant gaskets, and which are suitable for agitating the composite specimen in the selected solvent solution.

4.3 PTFE (polytetrafluoroethylene) rods, 20 pieces, each approximately 7 mm to 9 mm in diameter and 20 mm ± 2 mm long.

4.4 Plain-weave multifibre fabric, approximately 100 mm wide, for use as the adjacent fabric. The type DW multifibre fabric conforming to ISO 105-F10 is normally used.

4.5 Solvent solution, containing at least one of the following solvents:

— **tetrachloroethylene** (also commonly referred to as perchloroethylene or “per”), of commercial dry-cleaning grade. The solvent shall be stored over anhydrous sodium carbonate to neutralize any hydrochloric acid formed;

— **petroleum hydrocarbon**, boiling point 182 °C to 200 °C, of commercial dry-cleaning grade;

or other solvents commonly used for purposes of dry cleaning in the country concerned. If other solvents are used then they shall be clearly defined and shall be indicated in the test report.

CAUTION — Many solvents are considered to be toxic. Use adequate ventilation and avoid contact with the skin.

NOTE Perchloroethylene is considered to be slightly more severe in solvent-cleaning action than petroleum solvents. Normally, a colour which is not affected by perchloroethylene will not be affected by petroleum solvents, whereas the converse is not always true.

4.6 Glycerol tri(cis-9-octadecenoate) (also referred to as glycerol trioleate or “triolein”), of technical grade.

5 Test specimen

Cut out a leather specimen measuring approximately 40 mm × 100 mm. Fix a piece of adjacent fabric (4.4) measuring approximately 40 mm × 100 mm on the flesh side of the leather for grain leathers, or on the side worn inside for other leathers, using a steel staple at one end of the specimen. Alternatively, the adjacent fabric and the leather can be sewn together at one end of the specimen.

6 Procedure

6.1 The solvent solution used shall be one of those prepared as specified in Table 1.

Table 1 — Solvent solutions

Solvent solution	Solvent	Triolein g/l
No. 1	Perchloroethylene	—
No. 2	Petroleum hydrocarbon	—
No. 3 [a]	Perchloroethylene	30
[a] Add the appropriate amount of triolein to the solvent and stir until a clear solution is obtained.		

NOTE 1 For certain purposes, it can be useful to add different amounts of triolein to the solution.

NOTE 2 For some applications, the addition of a detergent might be appropriate (see Annex A).

6.2 If necessary, set the temperature control of the agitating device (4.1) and pre-heat it to approximately 30 °C.

Place the composite specimen (Clause 5), 100 ml ± 5 ml of the solvent solution (4.5) and 20 PTFE rods (4.3) in the container (4.2) and place the container in the agitating device. Rotate the container at 40 r/min ± 5 r/min for 30 min, maintaining the temperature at 30 °C ± 2 °C.

6.3 Remove the composite specimen from the container, place it between two sheets of absorbent paper, compress it uniformly with a load of 4,5 kg and maintain the pressure for 1 min. Remove the specimen and place the specimen on a horizontal grille so that the leather and adjacent fabric are not touching. Let the solvent evaporate at ambient temperature under a suitable hood with good ventilation.

CAUTION — When removing and drying specimens, use adequate ventilation and avoid contact of the solvent with the skin.

When dry, check if fibres and loose material adhere to the adjacent fabric; remove these by careful use of the sticky side of a clear adhesive tape.

6.4 Visually assess the change in colour of the leather in accordance with the ISO 105-A02 grey scale.

Visually assess the staining of each type of fibre in the adjacent fabric in accordance with the appropriate grey scale in ISO 105-A03.

Alternatively, the change in colour of the leather according to the grey scale and the staining of each type of fibre in the adjacent fabric may be assessed instrumentally in accordance with ISO 105-A05 and ISO 105-A04, respectively.

6.5 Note any changes in the surface finish of the leather, if applicable.

7 Test report

The test report shall include the following information:

a) a reference to this International Standard;

b) a description of the type of leather tested;

c) details of the apparatus used;

d) details of the solvent solution used;

e) the numerical grey scale rating obtained for the change in colour of the leather specimen;

f) the numerical grey scale ratings obtained for the staining of the adjacent fabric, giving a separate rating for each of the different types of fibre;

g) details of any changes in the surface finish, if applicable;

h) details of any deviations from the procedure.

Annex A
(informative)

Preparation of dry-cleaning solution containing a detergent

A.1 Detergent

Prepare the detergent as follows.

Slowly add 21 parts by mass of 3-methoxypropylamine to 79 parts by mass of dodecylbenzenesulfonic acid, while stirring. Do not allow the temperature to rise above 80 °C. On completion of the addition, maintain the temperature between 70 °C and 80 °C. Dilute 1 g of this mixture with 100 ml of water and measure the pH. If the pH-value is not between 4 and 7, add a small amount of dodecylbenzenesulfonic acid or 3-methoxypropylamine to the mixture and check the pH-value as before. Continue the procedure until the pH-value is in the required range. Allow to cool to room temperature.

A.2 Dry-cleaning solutions

The alternative dry-cleaning solution used may be one of those prepared as specified in Table A.1.

Table A.1 — Dry-cleaning solutions with detergent

Dry-cleaning solution	Solvent (4.5)	Triolein (4.6) g/l	Detergent (A.1) g/l	Water g/l
No. 3 [a]	Perchloroethylene	30	1,0	0,25
No. 4 [b]	Perchloroethylene	—	1,0	0,25

[a] Add triolein, detergent and water in the appropriate amounts to the solvent and stir vigorously until a clear solution is obtained.

[b] Add detergent and water in the appropriate amounts to the solvent and stir vigorously until a clear solution is obtained.

Annex B
(informative)

Commercial sources for apparatus and materials

Examples of suitable products available commercially are given below. This information is given for the convenience of users of this International Standard and does not constitute an endorsement by ISO of these products.

B.1 Suitable items of equipment for mechanically agitating the containers are:

— small laboratory-size leather-dyeing drums if made of glass or stainless steel and fitted with solvent-resistant seals.

Commercial suppliers of suitable textile test equipment:

— AATCC Launder-Ometer fastness and dye testing apparatus;

— Linitest laboratory dyeing and fastness testing apparatus.

The supplier for both is: Atlas Material Testing Technology LLC, 4114 North Ravenswood Ave, Chicago, Illinois 60613, USA.

B.2 Examples of suppliers for DW multifibre fabric:

— Society of Dyers and Colourists, P.O. Box 244, Bradford, West Yorkshire, BD1 2JB, UK;

— Testfabrics Inc., P.O. Box 26, West Pittiston, PA 18643, USA;

— EMPA Testmaterials, Mövenstrasse 12, CH-9015 St. Gallen, Switzerland.

B.3 The chemicals can be obtained from laboratory chemical suppliers.

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