

**Leather — Tests  
for colour fastness  
— Colour fastness  
of small samples  
to solvents (ISO  
11643:2009)**

ICS 59.140.30

## National foreword

This British Standard is the UK implementation of EN ISO 11643:2009. It supersedes BS EN ISO 11643:1998 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee TCI/69, Footwear, leather and coated fabrics.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

**Compliance with a British Standard cannot confer immunity from legal obligations.**

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 June 2009.

© BSI 2009

ISBN 978 0 580 58263 9

### Amendments/corrigenda issued since publication

Date	Comments

English Version

Leather - Tests for colour fastness - Colour fastness of small samples to solvents (ISO 11643:2009)

Cuir - Essais de solidité des teintures - Solidité des teintures de petits échantillons aux solvants (ISO 11643:2009)

Leder - Farbechtheitsprüfungen - Farbechtheit kleiner Proben gegenüber Lösemitteln (ISO 11643:2008)

This European Standard was approved by CEN on 6 May 2009.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

## Foreword

This document (EN ISO 11643:2009) has been prepared by Technical Committee CEN/TC 289 "Leather", the secretariat of which is held by UNI, in collaboration with Technical Committee ISO/TC IULTCS "International Union of Leather Technologists and Chemists Societies".

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2009, and conflicting national standards shall be withdrawn at the latest by November 2009.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 11643:1998.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

## Contents

Page

Foreword.....	iv
Introduction .....	v
1 Scope .....	1
2 Normative references .....	1
3 Principle.....	1
4 Apparatus and materials.....	2
5 Test specimen .....	2
6 Procedure .....	3
7 Test report .....	4
Annex A (informative) Preparation of dry-cleaning solution containing a detergent .....	5
Annex B (informative) Commercial sources for apparatus and materials .....	6

## 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 Commission, 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  $40 \text{ r/min} \pm 5 \text{ r/min}$  and able to maintain a temperature of  $30 \text{ °C} \pm 2 \text{ °C}$ . 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  $20 \text{ mm} \pm 2 \text{ mm}$  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  $182 \text{ °C}$  to  $200 \text{ °C}$ , 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  $40 \text{ mm} \times 100 \text{ mm}$ . Fix a piece of adjacent fabric (4.4) measuring approximately  $40 \text{ mm} \times 100 \text{ mm}$  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 <sup>a</sup>	Perchloroethylene	30

<sup>a</sup> 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 <sup>a</sup>	Perchloroethylene	30	1,0	0,25
No. 4 <sup>b</sup>	Perchloroethylene	—	1,0	0,25

<sup>a</sup> Add triolein, detergent and water in the appropriate amounts to the solvent and stir vigorously until a clear solution is obtained.

<sup>b</sup> 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.



---

## BSI - British Standards Institution

BSI is the independent national body responsible for preparing British Standards. It presents the UK view on standards in Europe and at the international level. It is incorporated by Royal Charter.

### Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover. Tel: +44 (0)20 8996 9000. Fax: +44 (0)20 8996 7400.

BSI offers members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

### Buying standards

Orders for all BSI, international and foreign standards publications should be addressed to Customer Services. Tel: +44 (0)20 8996 9001. Fax: +44 (0)20 8996 7001 Email: [orders@bsigroup.com](mailto:orders@bsigroup.com) You may also buy directly using a debit/credit card from the BSI Shop on the Website <http://www.bsigroup.com/shop>

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

### Information on standards

BSI provides a wide range of information on national, European and international standards through its Library and its Technical Help to Exporters Service. Various BSI electronic information services are also available which give details on all its products and services. Contact Information Centre. Tel: +44 (0)20 8996 7111 Fax: +44 (0)20 8996 7048 Email: [info@bsigroup.com](mailto:info@bsigroup.com)

Subscribing members of BSI are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration. Tel: +44 (0)20 8996 7002 Fax: +44 (0)20 8996 7001 Email: [membership@bsigroup.com](mailto:membership@bsigroup.com)

Information regarding online access to British Standards via British Standards Online can be found at <http://www.bsigroup.com/BSOL>

Further information about BSI is available on the BSI website at <http://www.bsigroup.com>.

### Copyright

Copyright subsists in all BSI publications. BSI also holds the copyright, in the UK, of the publications of the international standardization bodies. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI.

This does not preclude the free use, in the course of implementing the standard, of necessary details such as symbols, and size, type or grade designations. If these details are to be used for any other purpose than implementation then the prior written permission of BSI must be obtained.

Details and advice can be obtained from the Copyright and Licensing Manager. Tel: +44 (0)20 8996 7070 Email: [copyright@bsigroup.com](mailto:copyright@bsigroup.com)