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**Leather — Tests for colour fastness —  
Colour fastness to perspiration**

*Cuir — Essais de solidité des coloris — Solidité des coloris à la sueur*

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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 11641 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).

The first edition of ISO 11641 was based on IUF 426 published in *J. Soc. Leather Tech. Chem.*, **71**, pp. 22-24 (1987), and declared an official method of the IULTCS in October 1989.

This second edition of ISO 11641 cancels and replaces the first edition (ISO 11641:1993). This new version is an update of the procedures and includes provision for an acidic artificial perspiration solution (4.6), the option of instrumental grey scale measurement (7.2) and precision information (8).

IULTCS, originally formed in 1897, is a worldwide 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.

# Leather — Tests for colour fastness — Colour fastness to perspiration

## 1 Scope

This International Standard specifies a method for determining the colour fastness to perspiration of leather of all kinds at all stages of processing. It applies particularly to gloving, clothing and lining leathers, as well as leather for the uppers of unlined shoes.

The method uses an artificial perspiration solution to simulate the action of human perspiration. Since perspiration varies widely from one individual to the next, it is not possible to design a method with universal validity, but the alkaline artificial perspiration solution specified in this International Standard will give results corresponding to those with natural perspiration in most cases.

**NOTE** In general, human perspiration is weakly acidic when freshly produced. Micro-organisms then cause it to change, the pH usually becoming weakly alkaline (pH 7,5 to 8,5). Alkaline perspiration has a considerably greater effect on the colour of leather than has acid perspiration. Therefore, for coloured leather, an alkaline perspiration solution is used to simulate the most demanding conditions encountered in practice.

## 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-A01, *Textiles — Tests for colour fastness — Part A01: General principles of testing*

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-E04, *Textiles — Tests for colour fastness — Part E04: Colour fastness to perspiration*

ISO 105-F01, *Textiles — Tests for colour fastness — Part F01: Specification for wool adjacent fabric*

ISO 105-F02, *Textiles — Tests for colour fastness — Part F02: Specification for cotton and viscose adjacent fabrics*

ISO 105-F03, *Textiles — Tests for colour fastness — Part F03: Specification for polyamide adjacent fabric*

ISO 105-F04, *Textiles — Tests for colour fastness — Part F04: Specification for polyester adjacent fabric*

ISO 105-F05, *Textiles — Tests for colour fastness — Part F05: Specification for acrylic adjacent fabric*

ISO 105-F06, *Textiles — Tests for colour fastness — Part F06: Specification for silk adjacent fabric*

ISO 105-F07, *Textiles — Tests for colour fastness — Part F07: Specification for secondary acetate adjacent fabric*

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

ISO 2418, *Leather — Chemical, physical and mechanical and fastness tests — Sampling location*

ISO 3696:1987, *Water for analytical laboratory use — Specification and test methods*

### 3 Principle

A leather specimen is soaked in artificial perspiration solution and a piece of adjacent fabric, also soaked in artificial perspiration solution, is laid against each side to be tested. The composite specimen is left under pressure for a specified time in a suitable apparatus. The leather specimen and adjacent fabric are then dried, and the change in colour of the specimen and the staining of the adjacent fabric assessed with the grey scales.

Leathers with a finish may be tested intact or with the finish broken.

The general colour fastness testing principles shall be in accordance with those described in ISO 105-A01, taking into account that the substrate is leather.

### 4 Apparatus and materials

Ordinary laboratory apparatus and

**4.1 Test apparatus**, consisting of a stainless-steel frame, into which a rectangular weight-piece approximately 5 kg in mass and approximately 115 mm × 60 mm in cross-section fits accurately, so that a uniform pressure of  $12,5 \pm 1,0$  kPa can be applied on the composite specimen placed between rectangular plates of an inert material, e.g. glass or acrylic-resin, of the same length and width as the weight-piece and about 1,5 mm thick.

The test apparatus shall be constructed so that if the weight-piece is removed during the tests, the pressure of 12,5 kPa remains unchanged.

Other devices may be used provided that equivalent results are obtained.

NOTE An example of a suitable apparatus available commercially is given in Annex A.

**4.2 Oven**, maintained at  $37\text{ °C} \pm 2\text{ °C}$ .

**4.3 Adjacent fabrics** (see ISO 105-A01). Either

- a) a multifibre adjacent fabric, complying with ISO 105-F10, measuring approximately 100 mm × 40 mm, or
- b) two single-fibre adjacent fabrics, complying with the relevant specification in ISO 105-F01 to F07.

NOTE Examples of suitable commercial sources are given in Annex A.

**4.4 Demineralized water**, grade 3 in accordance with ISO 3696:1987.

**4.5 Alkaline artificial perspiration solution**, containing, per litre of solution: