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

*Cuir — Essais de solidité des coloris — Solidité des coloris à l'eau*

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ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

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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 11642 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 11642 was based on IUF 421 published in *J. Soc. Leather Tech. Chem.*, **71**, pp. 21-22, (1987), and declared an official method of the IULTCS in October 1989.

This second edition of ISO 11642 cancels and replaces the first edition (ISO 11642:1993). This new version is an general update of the procedures and includes the option for instrumental grey scale evaluation (7.2).

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 water

## 1 Scope

This International Standard specifies a method for determining the colour fastness to water of leather of all kinds at all stages of processing.

## 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-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 demineralized water and a piece of adjacent fabric, also soaked in demineralized water, 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) 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 Fine-grained adhesive paper**, grade P 180.

**4.6 Grey scale for assessing staining**, in accordance with ISO 105-A03.

**4.7 Grey scale for assessing change in colour**, in accordance with ISO 105-A02.

**4.8 Spectrophotometer or colorimeter for assessing change in colour and staining**, complying with ISO 105-A04 and ISO 105-A05.

**4.9 A vessel suitable for evacuation**, e.g. vacuum-desiccator.

**4.10 Vacuum pump**, capable of evacuating the desiccator vessel (4.9) to approximately 5 kPa (50 mbar) within 4 min.

## 5 Test specimens

**5.1** If the piece of leather available for testing is a whole hide or skin, then first take a sample in accordance with ISO 2418.

**5.2** If the leather has a finish and is to be tested with the finish broken, prepare the test specimen as follows:

Cut out a piece of leather approximately 120 mm × 50 mm and lay it out, finish-side down, on a sheet of abrasive paper (4.5), measuring approximately 150 mm × 200 mm, held flat on a work surface. Load the upper side of the piece of leather uniformly with a 1 kg weight. Move the piece of leather approximately 100 mm to and fro on the abrasive paper, carrying out 10 to-and-fro cycles.

NOTE With practice, the same roughening effect can be achieved holding the abrasive paper in the hand.

Brush the roughened area thoroughly to remove all dust. From the roughened area of the leather, cut out a test specimen measuring approximately 100 mm × 40 mm.

To test leather for upholstery application with a surface coating, larger leather pieces, e.g. approximately 110 mm × 50 mm can be used to avoid staining caused by contact of water with the leather fibres at the edge.

The fact that the finish has been broken shall be mentioned in the test report.

**5.3** If the leather has no finish, or if it has a finish but is to be tested with the finish intact, simply cut out a test specimen measuring approximately 100 mm × 40 mm.

**5.4** For each leather specimen cut out a piece (or pieces) of adjacent fabric (4.3), enough to cover the leather sample measuring approximately 100 mm × 40 mm. If both sides are to be tested then another piece(s) of adjacent fabric is required.

## 6 Procedure

**6.1** Immerse the leather specimen and adjacent fabric(s) in demineralized water (4.4) in separate containing vessels, using for example bent glass rods to keep them immersed. (If testing more than one specimen simultaneously, several pieces of adjacent fabric may be immersed in the same containing vessel, but each leather specimen shall be immersed in a separate vessel. Place the containing vessels in the vacuum vessel (4.9), produce a vacuum of approximately 5 kPa within 4 min, and hold this vacuum for 2 min. Restore normal pressure. Repeat the procedure a further two times.

In the case of testing leather for upholstery with a surface coating, wet the surface with water but do not immerse the leather specimen in water.

Lay a piece (or pieces) of adjacent fabric out on a glass or acrylic-resin plate (4.1) and cover it with the leather specimen, with the side under test facing down. If both sides are to be tested, cover the leather specimen with a second piece (or pieces) of adjacent fabric. Cover the composite specimen with a second glass or acrylic-resin plate.

**6.2** Preheat the loading weight-piece in the oven (4.2) at  $37\text{ °C} \pm 2\text{ °C}$  for at least 1 h. Place the composite specimen, between the two plates, in the test apparatus (4.1) and load it with the weight-piece. In order to allow excess demineralized water to run off, tilt the apparatus about  $30^\circ$  to each side for a few seconds. (When testing several composite specimens simultaneously, take care to ensure that each is placed centrally between two plates in such a way that the pressure is exerted evenly on it.) Place the loaded apparatus in the oven and leave at  $37\text{ °C} \pm 2\text{ °C}$  for  $180\text{ min} \pm 10\text{ min}$ .

**6.3** At the end of the 180 min period, take off the load, remove the composite specimen from the apparatus, fix it together at one corner (by stitching or stapling), and dry it by hanging it in air at room temperature, with the specimen and its adjacent fabric(s) in contact only at the point they are fixed together.

## 7 Evaluation

**7.1** When the composite specimen is dry, using D65 illumination according to ISO 105-A01:2010 (Clause 15), visually assess the staining of each kind of fibre in the adjacent fabric(s), using the appropriate grey scale (4.6) in accordance with ISO 105-A03. Also assess the change in colour (4.7) of the leather specimen in accordance with ISO 105-A02.

**7.2** Alternatively, provided the staining and colour change is even, the grey scale staining and colour difference can be assessed instrumentally (4.8) in accordance with ISO 105-A05 and ISO 105-A04.

## 8 Precision

For the visual grey scale evaluations, an inter-person precision of  $\pm 0,5$  grey scale units is normal.

## 9 Test report

The test report shall include the following information:

- a) a reference to this International Standard, ISO 11642;
- b) a description of the type of leather tested and which surface of the leather was tested;
- c) whether there was a finish and, if so, whether the finish was broken;
- d) the numerical grey scale ratings obtained for the staining of the adjacent fabric(s), giving a separate grey scale rating for each of the different types of fibre;
- e) the numerical grey scale rating obtained for the change in colour of the leather specimen;
- f) details of any deviations from the procedure specified.