भारतीय मानक

Indian Standard

IS 6191 (Part 4) : 2024
ISO 11640 : 2018

चमड़े के लिए सूक्ष्म-जैविक, रंग स्थिरता और अणवीक्षण यंत्र संबंधी परीक्षण पद्धतियाँ

भाग 4 आगे-पीछे रगड़ने के चकर की रंग स्थिरता

(पहला पुनरीक्षण)

Methods of Micro-Biological, Colour Fastness and Microscopical Tests for Leather

Part 4 Colour Fastness to Cycles of to-and-fro Rubbing

(First Revision)

ICS 59.140.30

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Leather, Tanning Materials and Allied Products Sectional Committee, CHD 17

NATIONAL FOREWORD

This Indian Standard (First Revision) (Part 4) which is identical to ISO 11640 : 2018 'Leather — Tests for colour fastness — Colour fastness to cycles of to-and-fro rubbing' issued by the International Organization for Standardization (ISO) was adopted by the Bureau of Indian Standards on the recommendation of the Leather, Tanning Materials and Allied Products Sectional Committee and approval of the Chemical Division Council.

IS 6191 : 1971 'Methods of micro-biological, colour fastness and microscopical tests for leather' prescribes various microbiological test methods, colour fastness test methods and test methods for the preparation of microscopical slides for assessment of leather, hides and skins. The Committee responsible for formulating this standard has decided to harmonize the methods of test prescribed in IS 6191 with those prescribed in ISO/IULTCS standards. Accordingly, the committee decided to retain IS 6191 and publish the harmonized/ adopted test methods published by ISO/IULTCS in various parts of IS 6191 as this standard is widely recognized by the Indian Leather Industry.

This standard was first published in 2018 as an identical adoption of ISO 11640 : 2012 under dual numbering. This Part specifies a method for determining the behavior of the surface of a leather on rubbing with a wool felt.

This Indian Standard is published in several parts. The other parts in this series are:

Part 1 Colour fastness to water spotting

Part 2 Colour fastness to water

Part 3 Colour fastness to machine washing

Part 5 Test for adhesion of finish

Part 6 Colour fastness to perspiration

The first revision of this standard has been brought out in order to align it with the latest version of ISO 11640 : 2018. In this revision following modifications have been done:

a) Clause **3** is added; and

b) Clause **5.2**, **7.2**, **7.4**, **8.2**, **8.6**, and **8.7** have been revised.

The text of ISO standard has been approved as suitable for publication as an Indian Standard without deviations. Certain conventions are however not identical to those used in Indian Standards. Attention is particularly drawn to the following:

a) Wherever the words 'International Standard' appear referring to this standard, they should be read as 'Indian Standard'; and

b) Comma (,) has been used as a decimal marker while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

In this adopted standard, reference appears to certain International Standards for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted in their places, are listed below along with their degree of equivalence for the edition indicated:

International Standard	*Corresponding Indian Standard*	*Degree of Equivalence*
ISO 105-A01 Textiles — Tests for colour fastness — Part A01: General principles of testing	IS/ISO 105-A01 : 2010 Textiles — Tests for colour fastness: Part A01 General principles of testing (*first revision*)	Identical
ISO 105-A02 Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour	IS/ISO 105-A02 : 1993 Textiles — Tests for colour fastness: Part A02 Grey scale for assessing change in colour	Identical
ISO 105-A03 Textiles — Tests for colour fastness — Part A03: Grey scale for assessing staining	IS/ISO 105-A03 : 2019 Textiles — Tests for colour fastness: Part A03 Grey scale for assessing staining	Identical
ISO 105-A04 Textiles — Tests for colour fastness — Part A04: Method for the instrumental assessment of the degree of staining of adjacent fabrics	IS/ISO 105-A04 : 1989 Textiles — Tests for colour fastness: Part A04 Method for the instrumental assessment of the degree of staining of adjacent fabrics	Identical
ISO 105-A05 Textiles — Tests for colour fastness — Part A05: Instrumental assessment of change in colour for determination of grey scale rating	IS/ISO 105-A05 : 1996 Textiles — Tests for colour fastness: Part A05 Instrumental assessment of change in colour for determination of grey scale rating	Identical
ISO 9073-2 Textiles — Test methods for non wovens — Part 2: Determination of thickness	IS 15891 (Part 2) : 2011/ ISO 9073-2 : 1995 Textiles — Test methods for non-wovens: Part 2 Determination of thickness	Identical
ISO 11641 Leather — Tests for colour fastness — Colour fastness to perspiration	IS 6191 (Part 6) : 2023/ ISO 11641 : 2012 Methods of micro-biological, colour: Part 6 Colour fastness to perspiration	Identical
ISO 4045 Leather — Chemical tests — Determination of pH and difference figure	IS 582 (Part 9) : 2022/ ISO 4045 : 2018 Methods of chemical testing of leather: Part 9 Determination of *p*H and difference figure	Identical

The Committee has reviewed the provisions of the following International Standards referred in this adopted standard and has decided that they are acceptable for use in conjunction with this standard.

International Standard	*Title*
ISO 2418	Leather — Chemical, physical, mechanical and fastness tests — Position and preparation of specimens for testing

International Standard	*Title*
ISO 2419	Leather — Physical and mechanical tests — Sample preparation and conditioning
ISO 3696	Water for analytical laboratory use — Specification and test methods
EN 15987	Leather — Terminology — Key definitions for the leather trade

In this adopted standard, reference appears to certain International Standards where the standard atmospheric conditions to be observed are stipulated which are not applicable to tropical/subtropical countries. The applicable standard atmospheric conditions for Indian conditions are 27°C ± 2°C and (65 ± 5) percent, relative humidity and shall be observed while using this standard.

In reporting the result of a test or analysis made in accordance with this standard, if the final value, observed or calculated,is to be rounded off, it shall be done in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’

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METHODS OF MICRO-BIOLOGICAL, COLOUR FASTNESS AND MICROSCOPICAL TESTS FOR LEATHER

PART 4 COLOUR FASTNESS TO CYCLES OF TO-AND-FRO RUBBING

(*First Revision*)

1 Scope

This document specifies a method for determining the behaviour of the surface of a leather on rubbing with a wool felt.

It is applicable to leathers of all kinds.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 2418, *Leather — Chemical, physical and mechanical and fastness tests — Sampling location*

ISO 2419, *Leather — Physical and mechanical tests — Sample preparation and conditioning*

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

ISO 4045, *Leather — Chemical tests — Determination of pH and difference figure*

ISO 9073-2, *Textiles — Test methods for nonwovens — Part 2: Determination of thickness*

ISO 11641, *Leather — Tests for colour fastness — Colour fastness to perspiration*

EN 15987, *Leather — Terminology — Key definitions for the leather trade*

3 Terms and definitions

For the purposes of this document, the leather terms and definitions given in EN 15987 shall apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Principle

One side of the leather specimen is rubbed with pieces of reference wool felt under a given pressure for a given number of forward and backward motions.

The degree of colour staining of the wool felt and the change in colour of the leather are assessed with grey scales. Any other visible change in, or damage to, the surface of the leather is also reported.

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.

5 Apparatus and materials

Ordinary laboratory apparatus and the following:

5.1 Rub fastness test apparatus incorporating the elements specified in 5.1.1 to 5.1.3, and optionally including those described in 5.1.4.

5.1.1 A carriage with:

a) a horizontal, completely planar metal platform;

b) a holder for fastening the leather to the platform, leaving approximately 80 mm exposed;

c) a device with which the leather may be extended at least 20 % linearly in the direction of rubbing.

5.1.2 A finger, 500 g ± 25 g in mass, removable, yet able to be fixed firmly in place and able to freely move vertically, with:

a) a base measuring 15 mm × 15 mm;

b) a device for attaching pieces of wool felt (see 5.2) to the base; the depth of the cavity shall be 3,9 mm ± 0,1 mm;

c) a weight-piece of mass 500 g ± 10 g to load the finger up to a total mass of 1 000 g ± 35 g;

d) means of lowering the finger with the base flat onto the test specimen.

5.1.3 Means for driving the carriage to and fro with a distance of travel of 35 mm to 40 mm at a frequency of 40 cycles/min ± 2 cycles/min for the complete forward and backward motion.

5.1.4 Convenient, but not essential, elements as follows:

a) means of adjusting the position of the finger at right angles to the direction of rubbing, so that two or three positions may be used for rubbing on one piece of leather;

b) a motor to drive the carriage forward and backward (see 5.1.3);

c) means for pre-selecting a given number of cycles.

5.2 Rubbing material, square pieces of white or black wool felt, measuring approximately 15 mm × 15 mm, punched out of a sheet of pure wool felt meeting the following specifications:

— pH of water extract between 4,5 and 8,0, according to ISO 4045;

— mass per unit area: 1 900 g/m^2 ± 150 g/m^2;

— thickness, determined in accordance with ISO 9073-2, Method A: 6,0 mm ± 0,5 mm.

The black felt shall be dyed with Acid Black 24 (C.I. 26370) or a black dye with equivalent properties.

NOTE An example of suitable wool felts available commercially is given in Annex A.

5.3 Vessel suitable for evacuation, for example vacuum-desiccator.

5.4 Vacuum pump, capable of evacuating the vessel (5.3). For the wetting of leather, according to 7.3, the vacuum pump shall be capable of achieving approximately 5 kPa.

5.5 Demineralized water, grade 3, in accordance with ISO 3696.

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

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

5.8 Spectrophotometer or colorimeter for assessing change in colour and staining, in accordance with ISO 105-A04 and ISO 105-A05.

6 Test specimens

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

6.2 Test specimens shall be rectangular pieces of leather, at least 100 mm long and, for each position of the finger [see 5.1.4 a)], at least 20 mm wide.

Usually with one set of conditions (e.g. conditioning of leather and felt, number of cycles) only one specimen is tested. In case of dispute, it is strongly recommended to test several specimens, sampled from different positions on the hide or skin.

7 Conditioning of test specimens and pieces of felt

7.1 Dry leather and dry felt

Condition leather and wool felt in accordance with ISO 2419.

7.2 Wet felt

Wet the felt by placing pieces of felt in demineralized water (5.5). Heat the water to boiling and allow it to boil gently until the felt pieces sink. Then decant off the hot water and replace it with cold demineralized water. Allow to stand until the wetted felt pieces have reached room temperature. Alternatively, place the containing vessel in the vacuum vessel, produce a vacuum of approximately 5 kPa and hold it for 2 min. Restore normal pressure. Carry out this procedure two more times. Take each piece of felt from the water just before use and squeeze or wipe it in order to reduce its water uptake to approximately 1 g. The wet pieces of felt shall not be allowed to soak in the water for more than 24 h.

Due to the possible discoloration of the black felt if boiled, it is desirable to prepare the wet black felt using the vacuum procedure.

7.3 Wet leather

Wet the leather by immersing specimens in demineralized water (5.5) in such a way that there is no contact between specimens. Place the containing vessel in the vacuum vessel (5.3), produce a vacuum

of approximately 5 kPa and hold it for 2 min. Restore normal pressure. Carry out this procedure two more times.

Just before use, take the specimens out of the water and remove excess water on their surfaces with blotting paper.

The specimens shall not be allowed to soak in the water for more than 1 h.

7.4 Felt wetted with artificial perspiration solution

Wear suitable gloves to avoid direct contact with the skin while handling the wet felt in this procedure.

Wet the felt with the alkaline artificial perspiration solution, prepared as specified in ISO 11641. Place the containing vessel in the vacuum vessel (5.3), evacuating and restoring pressure repeatedly until the felt pieces sink. Just before use, take each felt piece out of the solution and squeeze or wipe it in order to reduce its uptake of artificial perspiration solution to approximately 1 g.

The felt shall not be allowed to soak in the artificial perspiration solution for more than 24 h.

8 Procedure

8.1 Mount a conditioned specimen on the apparatus and stretch it 10 % in the direction of rubbing. If the specimen cannot be extended linearly by 10 %, stretch it less or not at all. If the specimen at 10 % extension does not remain stable during rubbing, stretch it sufficiently to achieve stability. In both of the latter cases, state the extension in the test report.

8.2 For normal leathers, attach the weight-piece so that the total mass of the finger is 1 000 g ± 35 g (5.1.2).

NOTE Due to the higher friction on suede or nubuck leathers and suede-like or nubuck-like leathers or the flesh side, as well as leather with hair, it can be desirable in such cases to carry out the test with a total mass of 500 g ± 25 g (i.e. without the additional weight-piece).

8.3 Attach a piece of conditioned felt to the finger (5.1.2). Place the finger on the leather and carry out the required number of cycles.

Upon completion of the test, lift the finger off the leather test specimen, especially if using wet felts.

8.4 If required, repeat the test with another number of cycles with the finger in a fresh position on the specimen (or a new specimen) and after replacing the felt with a new piece.

8.5 In the case of a pilling effect on the felt, the test should be repeated. If the pilling effect reoccurs, report this in the test report.

Release the specimen and assess the rubbed area on the specimen and/or on the pieces of felt for change in colour and staining, respectively, as specified in 8.7. Wetted specimens and pieces of felt shall be dried at ambient temperature before assessment.

Before assessing the change in colour of leathers with a finish, it can be useful to apply a colourless shoe polish and polish lightly with a woollen fabric. Similarly, with suede leathers and similar leathers (for example velour and nubuck) it can be useful to brush with a brush in the direction of the nap.

It is preferable to use the colourless wax emulsion as the shoe polish. In some cases a wax emulsion is unsuitable and a polish consisting of waxes and organic solvents only may have to be used. If a shoe polish is used, this shall be stated in the test report, together with the composition or other details identifying the polish.

If required by the client, white- or light-coloured leathers can be tested with a black felt. Slight discoloration of the leather, due to colour rub-off from the felt, may be possible. In this case, do not assess the change in colour of the leather. This shall be assessed after rubbing in a different place with a white felt.

8.7 Using D65 illumination according to ISO 105-A01, visually assess the change in colour of the leather (5.7) and the staining (5.6) of the pieces of felt with the grey scales in accordance with ISO 105-A02 and ISO 105-A03. For the assessment of the felts after the test, reference felts shall be used which have been treated in the same way as the tested felt. For example, for wet test, the reference felt is wetted with water and dried. The reference felt shall be from the same supplier and the same production batch as the felt used for testing.

Note any other visible changes in the surface of the specimen, for example loss of gloss, development of polish, flattening of the nap or destruction of finish. Possible destruction shall be assessed without any magnification.

8.8 Alternatively, provided the staining and colour change is even, the grey scale staining and colour difference can be assessed instrumentally (5.8) in accordance with ISO 105-A05 and ISO 105-A04, respectively.

9 Precision

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

10 Test report

The test report shall include the following information:

a) a reference to this document;

b) a description of the type of leather tested;

c) an indication as to which surface of the leather was tested;

d) the conditions under which the leather and felt were conditioned before testing and the type of felt used (white or black);

e) the number of cycles completed;

f) the numerical grey scale ratings for the change in colour of the specimens and for the staining of each piece of felt;

g) details of any other visible change in the surface of the specimen;

h) details of any deviations from the method specified in this document.

Annex A
(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 document and does not constitute an endorsement by ISO of these products.

A.1 A suitable apparatus is the VESLIC Rub Fastness Tester, which is made by SATRA Technology Centre, Wyndham Way, Telford Way, Kettering, Northamptonshire, NN16 85D, UK, https://www.satra.com/

Another source of suitable apparatus is PFI Germany, Test and Research Institute, Marie-Curie-Strasse 19, D-66953 Pirmasens, Germany, http://pfi.pfi-germany.de/start.html

A.2 Suitable pieces of wool felt may be obtained as reference felts for use with the VESLIC Rub Fastness Tester, in packs of 1 000 for white felts and packs of 100 for black felts, from Swissatest Testmaterialien AG, Mövenstrasse 12, CH-9015 St. Gallen-Winkeln, Switzerland, http://www.swissatest.ch/en/

Bureau of Indian Standards

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Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-www.bis.gov.in or www.standardsbis.in.

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