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Leather — Physical and mechanical test methods for the determination of soiling —

Part 1: Rubbing (Martindale) method

Cuir — Méthodes d'essai physique et mécanique de détermination de la salissure —
Partie 1: Méthode par frottement (Martindale)

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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 26082-1 was prepared by the European Committee for Standardization (CEN) Technical Committee CEN/TC 289, *Leather*, in collaboration with the Physical Tests Commission of the International Union of Leather Technologists and Chemists Societies (IUP Commission, IULTCS) in accordance with the agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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 sampling and the testing of leather. ISO recognizes IULTCS as an international standardizing body for the preparation of test methods for leather.

This first edition of ISO 26082-1 cancels and replaces ISO 26082:2007, which has been technically revised. It has a modified title and small changes have been made to 5.3, 5.7 and 6.2.

ISO 26082 consists of the following parts, under the general title *Leather — Physical and mechanical test methods for the determination of soiling*:

— *Part 1: Rubbing (Martindale) method*

— *Part 2: Tumbling method*

Leather — Physical and mechanical test methods for the determination of soiling —

Part 1:
Rubbing (Martindale) method

1 Scope

This part of ISO 26082 specifies a method for determining the resistance of all forms of leather to visible soiling through repeated contact with soiled objects. It provides a physical pretreatment routine for leathers that may be vulnerable to loss of soiling resistance while in service, prior to conducting further tests such as cleaning.

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

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

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

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

ISO 12947-1, *Textiles — Determination of the abrasion resistance of fabrics by the Martindale method — Part 1: Martindale abrasion testing apparatus*

ISO 12945-2, *Textiles — Determination of the fabric propensity to surface fuzzing and to pilling — Part 2: Modified Martindale method*

3 Principle

A test specimen of leather is subjected to a rubbing-type soiling process under standard conditions and the change in colour of the leather is evaluated.

A pretreatment to simulate wear and/or an after-treatment to test cleaning procedures is possible.

4 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

4.1
soiling
change in colour of a leather specimen caused by rubbing a standard soiled fabric on the coated surface of the leather

5 Apparatus and materials

Normal laboratory apparatus and, in particular, the following.

5.1 Martindale abrasion apparatus, as specified in ISO 12947-1.

5.2 Abrasion specimen holder heads, for the Martindale apparatus (5.1) as defined in ISO 12947-1. The holder shall be fitted with loading pieces so that the sum of the mass of the applied load and the mass of the specimen holder assembly is (795 ± 10) g. This exerts a nominal pressure of 12 kPa on the test specimen during the test.

Use the abrasion option that forms a Lissajous figure with a (60 ± 1) mm stroke.

5.3 Pilling specimen holder heads, for the Martindale apparatus (5.1), including the auxiliary mandrel device for specimen mounting, as defined in ISO 12945-2. The pilling specimen holder shall be fitted with ring weight and the nominal 12 kPa loading piece (as in 5.2), so that the sum of the mass of the applied load and the mass of the specimen holder assembly is (1 010 ± 15) g. This exerts a nominal pressure of 1,6 kPa on the test specimen during the test.

The use of the mandrel is necessary to correctly mount the soiling cloth on the holder and to avoid contact with the soiling surface of the cloth.

Use the abrasion option that traces a Lissajous figure with a (60 ± 1) mm stroke. It should be noted that this stroke differs from the standard machine setting for the textile pilling test.

NOTE This might not be possible with all Martindale machines, particularly old machines.

5.4 Circular sample cutters, for the specimen and soiling cloth. One cutter with a diameter of at least 140 mm and another with a diameter of at least 38 mm.

5.5 Standard soiling cloth, cut to a diameter of either

— at least 38 mm for the abrasion specimen holder of the Martindale apparatus (5.2), or

— at least 140 mm for the pilling specimen holder of the Martindale apparatus (5.3).

The standard soiling test cloth is impregnated with a soilant mix of carbon black and olive oil. Alternative soiling cloths can be specified by the client.

NOTE Various standard soiling cloths are commercially available, see Annex A.

5.6 Polyetherurethane foam underlay, as specified in ISO 12947-1, cut to a diameter of at least 38 mm, for the abrasion specimen holder of the Martindale apparatus (5.2).

5.7 Wool felt underlay, as specified in ISO 12945-2, cut to a diameter of (90 ± 1) mm, for the pilling specimen holder (5.3). This is available pre-cut to size.

5.8 Wool felt underlay, as specified in ISO 12947-1, cut to a diameter of at least 140 mm, for the abrading table of the Martindale apparatus (5.1).

5.9 Grey scale for measuring change in colour, complying with ISO 105-A02, or an **instrumental system for measuring change in colour**, complying with ISO 105-A05, or both.

NOTE For very lightly coloured leather samples, it is more suitable to use the grey scale for measuring staining, complying with ISO 105-A03, or an instrumental system for measuring staining, complying with ISO 105-A04, or both.

6 Sampling and sample preparation

6.1 Prior to cutting the test specimens, condition the leather in accordance with ISO 2419.

6.2 Using the circular cutting device (5.4), cut two circular test specimens meauring not less than 140 mm in diameter out of the leather piece. Set aside one test specimen as the unsoiled reference.

If the leather piece available for testing is a whole hide or skin, sample the test specimens in accordance with standard procedures given in ISO 2418.

7 Pretreatment wearing procedures

In particular situations, at the client's request, it may be instructive to test the specimen after it has been subject to simulated wear. Pieces of leather may, for example, first be subjected to a repeated flexing treatment in a suitable machine prior to the soiling testing. Or the leather test specimen may, for example, be subjected to an appropriate abrasion treatment prior to the soiling testing.

8 Procedure using a standard soiling cloth

8.1 The soiling procedure takes place on the abrading table of the Martindale abrasion machine (5.1). The leather test specimen backed with the wool felt underlay (5.8) is fitted on the abrading table (lower position) with the leather test side facing upwards. Check the leather specimen and backing wool felt are centrally positioned in the clamp of the abrading table.

8.2 The standard soiling cloth (5.5), backed with the appropriate underlay, shall be fitted to the specimen holder head (upper position) of the Martindale abrasion machine (5.1). The size of the specimen holder head to be used shall be specified by the client, either

— according to ISO 12945-2 for the larger pilling specimen holder head (5.3) with a circular soiling cloth surface of approximately 90 mm diameter, or

— according to ISO 12947-1 for the smaller abrasion specimen holder head (5.2) with a circular soiling cloth surface of approximately 28 mm diameter.

NOTE 1 The larger size of the soiling cloth for the pilling holder means that normally heavier soiling will occur when this holder is used. However, the levelness of the soiling on the test specimen is considerably better and the larger size is the preferred option.

Use a piece of wool felt underlay (5.7) for the pilling specimen holder head. For the abrasion specimen holder head, use a new piece of foam underlay (5.6) for each change of the soiling cloth.

Check that the machine settings for the Lissajous figure stroke is (60 ± 1) mm.

NOTE 2 The machine setting for the stroke of 60 mm is used for both sizes of the specimen holder. This gives a much better levelness of soiling on the specimen when compared with the 24 mm stroke, which is the standard machine setting for the textile pilling test.

8.3 Add the loading piece so as to bring the total mass (i.e. of the soiling-cloth holder and the loading piece) applied to the test specimen to that defined in either 5.2 or 5.3, depending on the type of holder head. Place

the soiling-cloth holder head on the leather test specimen and immediately carry out 250 abrasion rubs (as defined in ISO 12947-1) of the Martindale tester.

NOTE The number of abrasion rubs can be changed if so specified by the client.

8.4 On completion of the required number of abrasion rubs, remove the soiling-cloth holder from the leather and remove the leather test specimen from the abrading table.

8.5 Visually assess the colour difference between the leather test specimen subjected to soiling and the reference leather test specimen using the appropriate change in colour grey scale in accordance with ISO 105-A02 (5.9).

To assist in visually assessing the grey scale rating, it is suggested that the circular soiled and reference specimens be cut in half and placed adjacent to each other.

The grey scale colour difference can be instrumentally assessed according to ISO 105-A05 (5.9).

NOTE The results will depend on the colour of the leather. For example, dark colours will appear to soil less and light colours will appear to soil more.

8.6 Visually assess any change in appearance or hue, or both, of the test piece in comparison with the reference specimen.

9 Cleaning after-treatment

In particular situations at the client's request, it may be informative to evaluate the degree of permanent soiling by testing the ease of cleaning the soiled surface of the specimen. This can be done either directly after the specimen has been subject to soiling or after the soiled specimen has been subjected to an ageing test. The soiled test specimen shall be after-treated with a cleaning procedure which has been agreed with the client. The change in colour after cleaning shall be determined as in 8.5 and 8.6.

10 Test report

The test report shall include at least the following information:

a) a reference to this part of ISO 26082 (i.e. ISO 26082-1:2012);

b) a description of the type of leather tested;

c) details of any wearing pretreatment carried out;

d) details of any cleaning after-treatment carried out;

e) details of the soiling cloth used;

f) details of the size of the soiling-cloth holder head used;

g) the number of abrasion rub cycles and the loading on the sample holder;

h) the numerical ratings obtained for the change in colour of the test specimen(s), stating whether visual or instrumental assessment was used;

i) if a cleaning after-treatment is made, the numerical ratings obtained for the change in colour of the test specimen(s);

j) any changes noted in appearance or hue, or both, of the test specimen from the visual assessment;

k) the standard atmosphere used for conditioning and testing according to ISO 2419;

l) details of any deviations from this standard test method.

Annex A
(informative)

Sources of apparatus and materials

A.1 Apparatus

A suitable apparatus, the Martindale abrasion testing apparatus, can be obtained, for example, from:

— SATRA Technology Centre, Wyndham Way, Telford Way, Kettering, Northamptonshire NN16 8SD, UK. Web-address: http://www.satra.co.uk

— James H. Heal & Co. Ltd, Richmond Works, Halifax, West Yorkshire HX3 6EP, UK. Web-address: http://www.james-heal.co.uk

— Technical Department, Prüf- und Forschungsinstitut Pirmasens e.V., Marie-Curie-Strasse 19, D-66953 Pirmasens, Germany. Web-address: http://www.pfi-germany.de

— MUVER - Francisco Muñoz Iries, Avda. Hispanoamérica, 42, E-03610 Petrer (Alicante), Spain. Web-address: http://www.muver.com.

A.2 Materials

Standard soiling cloths can, for example, be obtained from:

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

EXAMPLE EMPA 104 – carbon black / olive oil mix printed on a plain woven polyester/cotton fabric, such that the reflectance of the soiled fabric when measured at a wavelength of 460 nm is 11 % ± 2 %. The carbon black pigment particles have an average size of 30 nm. The warp and weft of the plain woven fabric are both approximately 35 % PES / 65 % CO and the fabric has a mass of approximately 160 g/m^2.

— Westlairds Ltd, Patrixbourne, Datchet, Slough SL3 9JH, UK.

Alternative standard soiling cloths can be used if specified by the client.