INTERNATIONAL STANDARD

ISO 17186

IULTCS/IUP 41

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Leather — Physical and mechanical tests — Determination of surface coating thickness

Cuir — Essais physiques et mécaniques — Détermination de l'épaisseur du revêtement de surface

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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 17186 was prepared by the Physical Test Commission of the International Union of Leather Technologists and Chemists Societies (IUP Commission, IULTCS) in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 289, *Leather*, the secretariat of which is held by UNI, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement). It is based on IUP 41 which was published in *J. Soc. Leather Tech. Chem.* **84**, p. 389, (2000) and confirmed as an official method in March 2001.

Leather — Physical and mechanical tests — Determination of surface coating thickness

1 Scope

This International Standard specifies a method for determining the thickness of the surface coating applied to leather when measured under zero compression. It is applicable to all types of leather.

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*

3 Principle

A section of leather is taken perpendicular to the coated surface. The thickness of the surface coating is measured using a microscope and expressed both as a thickness and as a percentage to the total thickness.

4 Apparatus

4.1 Light microscope or scanning electron microscope, capable of giving a magnification of at least 15 times and fitted with either a means of taking photographs or a graduated scale capable of measuring to at least 0,01 mm.

4.2 Razor blade, if the microscope illuminates from above or a scanning electron microscope is used.

4.3 Microtome, if the microscope illuminates from below.

4.4 Cork, or similar material, to hold the leather while it is sectioned, if a microtome is used.

4.5 Grid, reading to at least 0,01 mm and suitable for use in the microscope or scanning electron microscope used.

4.6 Coating unit, sputter or evaporation including gold or gold-palladium alloy for coating, if scanning electron microscope is used.

4.7 Specimen stubs, suitable for scanning electron microscope.

5 Sampling and sample preparation

5.1 Sample in accordance with ISO 2418. Condition in accordance with ISO 2419.

5.2 Cut three test pieces approximately 10 mm square. Section each of the three test pieces as described in 5.3 or 5.4.

NOTE If there is a requirement for more than two hides or skins to be tested in one batch, then only one test piece need be taken from each hide or skin, provided that the overall total is not less than three pieces.

5.3 Place the cutting edge of the razor blade (4.2) on the coated surface with the blade perpendicular to the coated surface and press the blade through the whole thickness of the leather ensuring that the blade remains vertical.

NOTE 1 It is recommended that a new razor blade is used for each section.

NOTE 2 A section made as in 5.3 is suitable for examination under a microscope illuminated from above or by scanning electron microscopy.

5.4 Place the leather between two pieces of cork or other suitable material (4.4) and cut a section from it using a microtome (4.3).

NOTE A section made as in 5.4 is suitable for examination under a microscope illuminated from below.

6 Procedure

6.1 Measurement using light microscope fitted with graduated scale.

6.1.1 Calibrate the graduated scale in the microscope (4.1) using the grid (4.5).

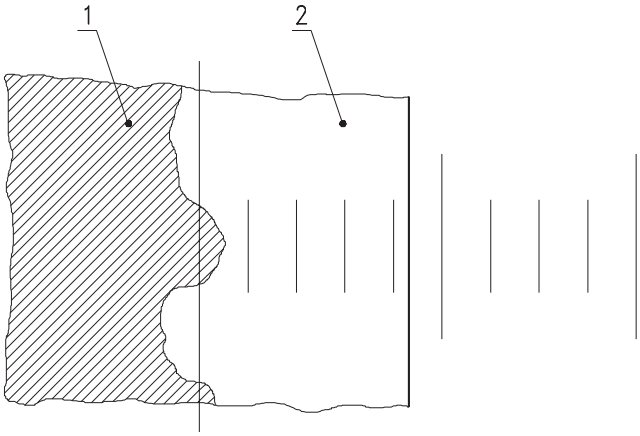
6.1.2 Place one section prepared in 5.3 or 5.4 under the microscope. Position the section such that the crosswire or one of the major graduations is aligned with the coating/leather boundary. If the coating/leather boundary undulates position the crosswire or major graduation midway between the peaks and troughs as shown in Figure 1. Either take the reading of the scale graduation corresponding to the outer surface of the coating or realign the crosswire with the outer surface of the coating and note the distance moved.

6.1.3 Measure the total thickness at the same point by positioning the section such that the crosswire or one of the major graduations is aligned with the flesh side of the leather. Either take the reading of the scale graduation corresponding to the outer surface of the coating or realign the crosswire with the outer surface of the coating and note the distance moved.

6.1.4 Convert the readings obtained in accordance with 6.1.2 and 6.1.3 to millimetres using the calibration described in 6.1.1. Express the coating thickness and the total thickness to the nearest 0,01 mm.

6.1.5 Repeat 6.1.2 to 6.1.4 for the two remaining sections.

6.1.6 Calculate the arithmetic mean of the three coating thicknesses and the three total thicknesses.



Key

1 Leather

2 Coating

Figure 1 — Positioning of graduations

6.2 Measurement using a light microscope fitted with a means of obtaining photographs.

6.2.1 Place the grid (4.5) under the microscope, photograph and obtain a print.

6.2.2 Place one section prepared in 5.3 or 5.4 under the microscope, photograph at the same magnification as used in 6.2.1 and obtain a print.

6.2.3 Providing that the leather section and the grid were both photographed at the same magnification (6.2.1 and 6.2.2), the print of the grid can be used as the direct means of measuring both the finish and total leather thickness.

6.2.4 Position one of the major graduations of the print of the grid on the coating/leather boundary on the print obtained in 6.2.2. If the coating/leather boundary undulates position the major graduation midway between the peaks and troughs as shown in Figure 1. Take the reading of the scale graduation corresponding to the outer surface of the coating.

6.2.5 Measure the total thickness at the same point on the print by aligning a major scale graduation on the print of the grid with the flesh side of the leather and taking the scale reading corresponding to the outer surface of the coating.

6.2.6 Convert the readings obtained in accordance with 6.2.4 and 6.2.5 to millimetres using the calibration described in 6.2.3. Express the coating thickness and the total thickness to the nearest 0,01 mm.

6.2.7 Repeat 6.2.2 to 6.2.6 for the two remaining sections.

6.2.8 Calculate the arithmetic mean of the three coating thicknesses and three total thicknesses.

6.3 Measurement using a scanning electron microscope.

6.3.1 Stick a section prepared in 5.3 to a specimen stub (4.7) with the cut surface uppermost.

6.3.2 Place the stub and section in the coating unit and coat with either gold or gold/palladium.

6.3.3 Place the grid (4.5) under the scanning electron microscope, photograph and obtain a print.

6.3.4 Place the section coated as in 6.3.2 under the scanning electron microscope, photograph at the same magnification as used in 6.3.3 and obtain a print.

6.3.5 Position one of the major graduations of the print of the grid on the coating leather boundary on the print obtained in 6.3.4. If the coating leather boundary undulates position the major graduation midway between peaks and troughs as shown in Figure 1. Take the reading of the scale graduation corresponding to the outer surface of the coating.

6.3.6 Measure the total thickness at the same point on the print by aligning a major scale graduation on the print of the grid with the flesh side of the leather and taking the scale reading corresponding to the outer surface of the coating.

6.3.7 Convert the readings obtained in accordance with 6.3.5 and 6.3.6 to millimetres using the calibration described in 6.3.3.

6.3.8 Repeat 6.3.1, 6.3.2 and 6.3.4 - 6.3.7 for the two remaining sections.

6.3.9 Calculate the arithmetic mean of the three coating thicknesses and the three total thicknesses.

7 Expression of results

The percentage of the coating shall be calculated using the expression:

$$\frac{t}{T} \times 100$$

where t is the mean coating thickness in millimetres

T is the mean leather thickness in millimetres

8 Test report

The test report shall include the following:

a) reference to this International Standard, i.e. ISO 17186:2002;

b) the mean thickness of the coating;

c) the mean thickness of the leather;

d) the percentage of the coating;

e) the standard atmosphere used for conditioning and testing as given in ISO 2419 (i.e., 20 °C/65 % rh or 23 °C/50 % rh);

f) any deviation from the method specified in this International Standard;

g) full details for identification of the sample and any deviation from ISO 2418 with respect to sampling.