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Leather — Physical and mechanical tests — Determination of water vapour absorption

Cuir — Essais physiques et mécaniques — Détermination de l'absorption de vapeur d'eau

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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 17229 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 42 which was published in *J. Soc. Leather Tech. Chem.* **84**, p. 395, (2000) and confirmed as an official method in March 2001.

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Leather — Physical and mechanical tests — Determination of water vapour absorption

1 Scope

This International Standard specifies a method for determining the water vapour absorption of leather. The method is applicable for all leathers but is particularly relevant for leathers intended for footwear uppers and linings.

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 3696:1987 *Water for analytical laboratory use - Specification and test methods*

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3 Principle

The test piece and an impermeable material are clamped over the opening of a metal container containing 50 ml of water for a specified time. The water vapour absorption of the test piece is determined by the increase in mass.

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4 Apparatus

4.1 Cylindrical metal or glass container, with internal diameter of 35 mm ± 0,5 mm, internal depth 104 mm ± 1 mm and an external diameter at the top opening of at least 55 mm, fitted with a metal ring or lid which can be securely clamped to the cylindrical metal container.

4.2 Balance, weighing to 0,001 g.

4.3 Stop clock, reading to 1 min.

4.4 Vernier callipers, reading to 0,1 mm.

4.5 Disc of impermeable material, for example rubber or metal, with the same diameter as the test piece.

4.6 Press knife, the inner wall of which is a right angled circular cylinder of diameter 43 mm ± 1 mm as specified in ISO 2419.

4.7 Distilled or deionized water, conforming to the requirements of grade 3 of ISO 3696:1987.

5 Sampling and sample preparation

5.1 Sample in accordance with ISO 2418. From the sample, cut three circular test pieces by applying the press knife to the grain surface, if distinguishable.

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 test pieces.

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5.2 Condition the test piece in accordance with ISO 2419.

NOTE Results will vary depending on the conditioning method used.

5.3 Weigh the test piece to the nearest 0,001 g and record its mass as M_1.

6 Procedure

6.1 Using vernier callipers, measure the internal diameter of the cylindrical container (to the nearest 0,1 mm) in two mutually perpendicular directions and calculate the mean diameter.

6.2 Pour 50 ml ± 5 ml of distilled or deionized water at 20 °C ± 2 °C or 23 °C ± 2 °C into the cylindrical metal container (4.1).

6.3 Place the test piece centrally over the container with the side which would be exposed to the higher humidity in use facing downwards. Place a disc of impermeable material over the test piece and clamp the upper ring or lid in place taking care not to splash water onto the test piece.

6.4 Keep the container at a temperature of 20 °C ± 2 °C or 23 °C ± 2 °C for 8 h ± 0,1 h.

6.5 Remove the test piece, weigh immediately to the nearest 0,001 g and record its mass as M_2.

6.6 If the test piece is splashed with water discard it and repeat the test with a fresh test piece.

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7 Expression of results

Calculate the water vapour absorption, A_{wv}, in milligrams per square centimetre, using the following equation:

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$$A_{wv} = \frac{4(M_2 - M_1) \times 10^5}{\pi d^2}$$

where

M_1 is the initial mass of the test piece, in grams;

M_2 is the final mass of the test piece, in grams;

d is the internal diameter of the cylindrical container, in millimetres.

8 Test report

The test report shall include the following:

a) reference to this International Standard, i.e. ISO 17229:2002;

b) the mean water vapour absorption, A_{wv}, in milligrams per square centimetre, expressed to one decimal place;

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

d) any deviations from the method specified in this International Standard;

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

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Annex A
(informative)

Water vapour number

It is common practice to combine the results of water vapour permeability, P_{wv}, as determined in ISO 14268, and water vapour absorption, A_{wv}, as determined in this standard, to determine the water vapour number, W_{pn}.

Calculate the water vapour number, W_{pn}, in milligrams per square centimetre 8 hours, using the following equation:

$$W_{pn} = (t \times P_{wv}) + A_{wv}$$

where

t is 8 h;

P_{wv} is the water vapour permeability;

A_{wv} is the water vapour absorption.

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