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Leather — Physical and mechanical tests — Determination of water absorption by capillary action (wicking)

Cuir — Essais physiques et mécaniques — Détermination de l'absorption en eau par capillarité (mèche)

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (www.iso.org/directives).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information.

ISO 19074 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 co-operation 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 Standardising Body for the preparation of test methods for leather.

Leather — Physical and mechanical tests — Determination of water absorption by capillary action (wicking)

1 Scope

This International Standard specifies a method for determining the rate of absorption of water by capillary action or wicking in leathers. It is applicable to all types of leather.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 2589, *Leather — Physical and mechanical tests — Determination of thickness*

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

3 Principle

For the determination of wicking the absorption of water by capillary action, a strip of leather is partially immersed in water in a vertical position. After 120 min, the following parameters are measured:

a) wicking value as the maximum height reached by the water front on the strip of leather;

b) percentage increase of the weight of the test piece due to absorption of water.

4 Apparatus and materials

4.1 250 ml beaker, of low form or container ensuring the compliance with the conditions shown in Figure 2.

4.2 A means of holding the top of the leather test piece, so that the lower end can be immersed in the water.

4.3 Balance, with an accuracy less than 0,01 g.

4.4 Ruler, or other similar device, with an accuracy less than 0,5 mm.

4.5 Metal mass, of (10 ± 1) g.

4.6 Press knife, the inner wall of which is a rectangle (100 ± 2) mm × (25 ± 1) mm.

4.7 Circular press knife, with diameter approximately 2 mm.

4.8 Distilled or deionised water, conforming to the requirements of grade 3 of ISO 3696.

4.9 **Thickness gauge**, as specified in ISO 2589.

5 Sampling and sample preparation

5.1 If possible, sample in accordance with ISO 2418. From the sample, using the press knife specified in 4.6, cut four rectangular test pieces (100 ± 2) mm × (25 ± 1) mm, in accordance with ISO 2419, two with the longer side parallel to the backbone and two with the longer side perpendicular to the backbone.

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

5.2 Condition the leather sample in accordance with ISO 2419.

5.3 Measure the thickness of the test pieces in accordance with ISO 2589.

5.4 Using a water resistant marker, mark lines parallel to the lower shorter edge test piece at the following distances (see Figure 1):

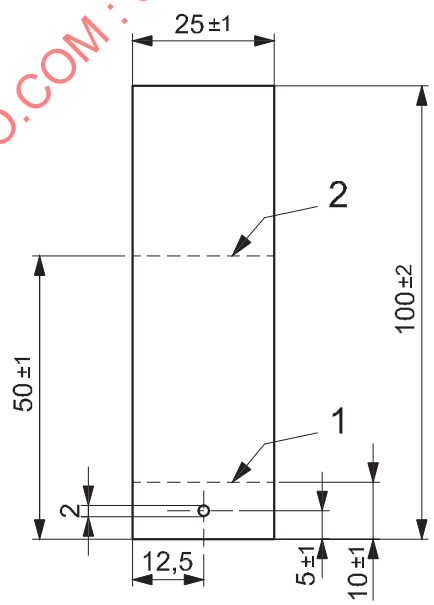
— line 1: (10 ± 1) mm;

— line 2: (50 ± 1) mm.

5.5 For very flexible leathers or leathers having heavy finishing, a "rolling" of the test piece could occur preventing it from maintaining a vertical position during the test. In this case, a mass (4.5) of (10 ± 1) g shall be applied to the lower edge of the test piece using a nylon thread or a small hook through a hole (4.7) of approximately 2 mm diameter made at a distance of (5 ± 1) mm from the lower edge and in the centre of the width of the test piece (see Figure 1).

The hole (4.7) is only required for those leather specimens that need to be prevented from "rolling".

Dimensions in millimetres



Key

1 line 1

2 line 2

Figure 1 — Test piece marked and prepared for testing

6 Procedure

6.1 Carry out the test in standard atmosphere according to ISO 2419.

6.2 Pour distilled water (4.8) into the container verifying with the ruler (4.4) that the height of water is (40 ± 5) mm (see Figure 2).

6.3 Determine the mass of each test piece after conditioning, m_0, to the nearest 0,05 g.

6.4 Immerse each test piece in distilled water in a vertical position until line 1 drawn on the surface (see Figure 2); the test piece shall be kept suspended by its upper part (4.2) so as to leave at least 65 mm of free height (including the immersed part) as shown in Figure 2. Do not immerse more than two test pieces in the same container and ensure that the test piece does not touch the other one or the container walls.

Dimensions in millimetres

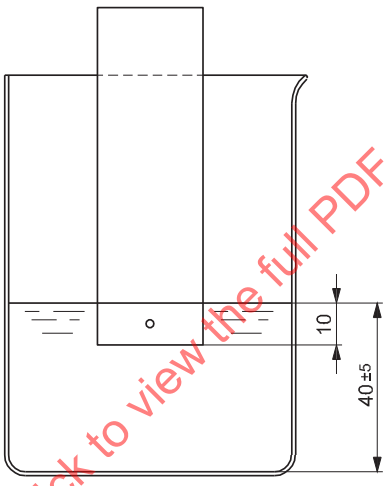


Figure 2 — Test piece suspended in distilled water

6.5 If necessary, apply the metal mass of 10 g (4.5) to the test piece as indicated in 5.5.

6.6 After (120 ± 5) min, remove the test piece and blot gently to remove adhering water on the surfaces using filter paper.

6.7 In the shortest time possible (within 3 min), with the ruler (4.4), determine the wicking of water as the maximum distance reached by the water front in the longitudinal direction of the test piece, in the following positions (see Figure 3):

— maximum distance on the grain side (or front side), W_A;

— maximum distance on the flesh side (or reverse side), W_B;

— maximum distance on the lateral sides (thickness), W_C and W_D.

Round each water front distance to the nearest 1 mm.

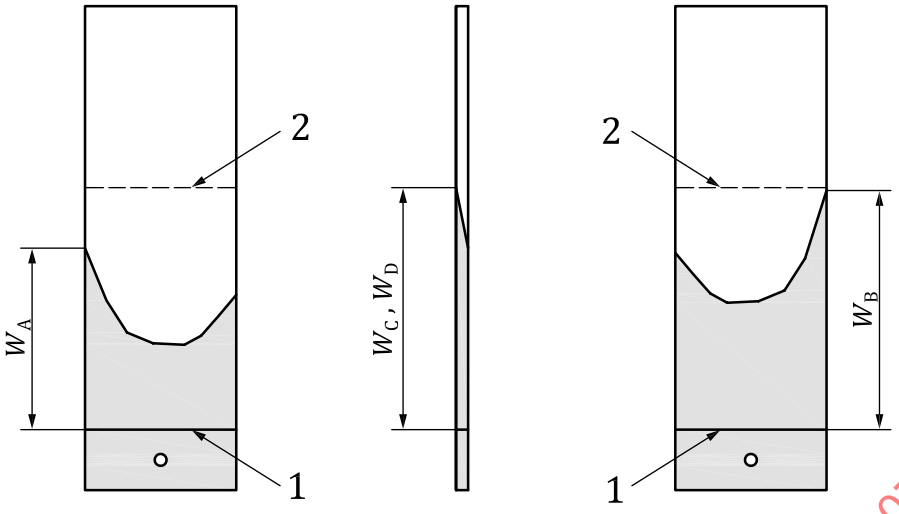


Figure 3 — Measurement of height of water front on each side of test piece

6.8 Maximum water front distance on the lateral sides (thickness), W_C and W_D, shall be assessed only for leathers with thickness greater than 1 mm.

6.9 Within 5 min after removal of water, determine the mass m_1 of the test piece to the nearest 0,05 g.

6.10 If the water front reaches line 2 (see 5.4) on one of the sides before 120 min, immediately stop the test.

6.11 If required, the test pieces can be used to determine if a change in appearance occurs through contact with water. Allow the test pieces to dry, examine them for any change in appearance or staining in the part that was immersed in water.

7 Expression of results

7.1 Wicking by capillary action (W)

7.1.1 For each test piece, determine the wicking value, W_i, as the maximum of the four water front distances (in mm) measured as indicated in 6.7.

$$W_i = \max(W_A, W_B, W_C, W_D) \quad (1)$$

For leathers with thickness ≤1 mm, W_C and W_D are not determined (see 6.8) and therefore, the wicking value, W_i, is determined as the maximum of two water front distances (in mm) measured as indicated in 6.7.

$$W_i = \max(W_A, W_B) \quad (2)$$

7.1.2 Calculate the arithmetic mean of the values W_i for the test pieces parallel to the backbone and the test pieces perpendicular to the backbone to the nearest 1 mm.

7.1.3 Determine the wicking value of the sample, W, as the higher of these two average values.