INTERNATIONAL STANDARD

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Leather - Physical and mechanical tests - Determination of dimensional change

Cuir — Essais physiques et mécaniques — Détermination des variations dimensionnelles

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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 17130 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 worldwide 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 the sampling and testing of leather. ISO recognizes IULTCS as an international standardizing body for the preparation of test methods for leather.

Leather - Physical and mechanical tests - Determination of dimensional change

1 Scope

This International Standard specifies a method of determining the dimensional change (shrinkage) of leathers caused by ageing. It is applicable to all leathers.

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 105-B06, *Textiles — Tests for colour fastness — Part B06: Colour fastness and ageing to artificial light at high temperatures: Xenon arc fading lamp test*

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

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

ISO 17228, *Leather — Tests for colour fastness — Change in colour with accelerated ageing*

3 Principle

A conditioned test piece is aged using the conditions defined in ISO 17228. The shrinkage is determined after reconditioning.

4 Apparatus and materials

4.1 Oven, as specified in ISO 17228.

4.2 Climate chamber, as specified in ISO 17228.

4.3 Vernier calliper, reading to 0,1 mm.

4.4 Support, glass plate covered with a polyester nonwoven fabric (as specified in ISO 105-B06).

NOTE   The glass plate support keeps the test piece flat and the polyester fabric stops the test piece from sticking to the glass.

4.5 Press knife, square, as specified in ISO 2419 with inner walls measuring 150 mm ± 1 mm.

4.6 Indelible marker.

5 Sampling and sample preparation

5.1 Sample in accordance with ISO 2418. Cut at least two test pieces (150 × 150) mm for each of the ageing conditions required, by applying the press knife (4.5) to the grain surface, if distinguishable.

NOTE   For some applications, it can be necessary to use larger test pieces e.g. (300 × 300) mm to enhance the accuracy, especially in the case of low shrinkage.

5.2   Using an indelible marker (4.6), mark the lines and measurement reference points A, B, C and D on the test pieces. Mark a square with a length of (100 ± 1) mm (Figure 1).

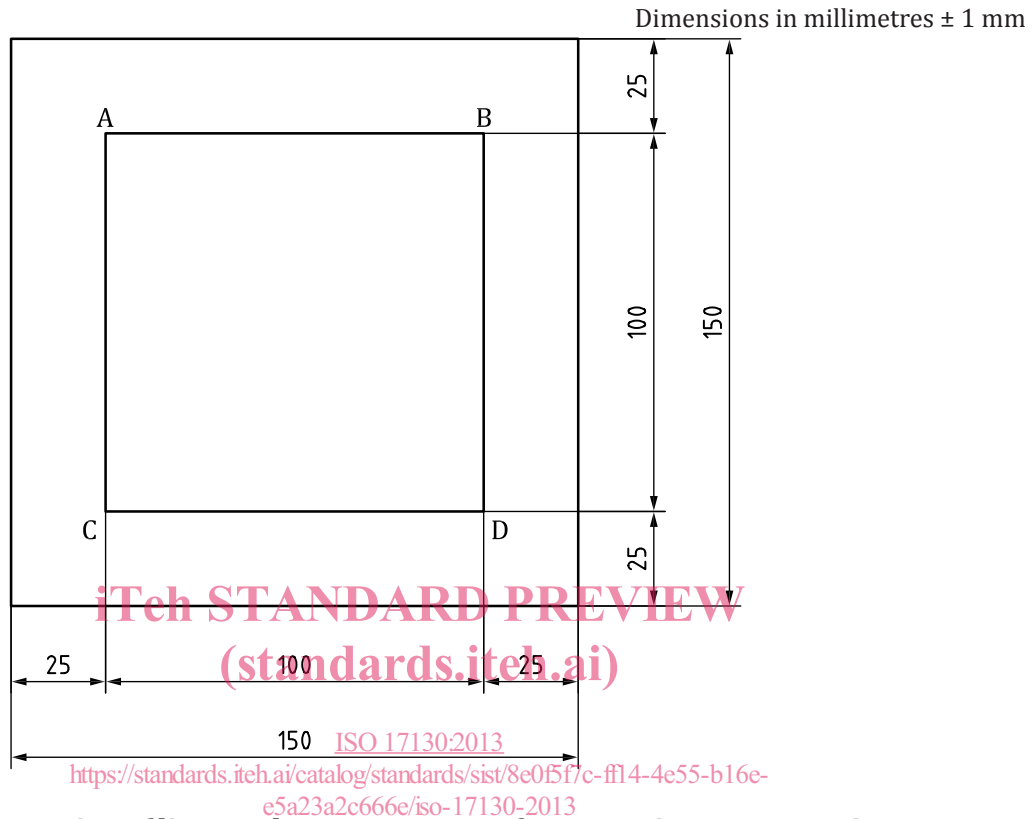Dimensions in millimetres ± 1 mm

Figure 1 — Location of lines and measurement reference points on a test piece

If test pieces with another dimension, e.g. (300 × 300) mm, are used, a square should be marked with a distance to each edge of (25 ± 1) mm.

5.3   Condition the test pieces in accordance with ISO 2419 for at least 48 h.

6   Procedure

6.1   Measure the distances AB, CD, AC and BD on each test piece using the vernier calliper (4.3).

6.2   Preheat the oven (4.1) to the test temperature or adjust the climate chamber (4.2) to the starting conditions. Place the test pieces with the grain side, top side or coated side downward on the support (4.4) in the centre of the oven or climate chamber.

To allow a fast exchange of humidity, it is necessary to place the leather in such a way that an intensive contact of the air in the oven or climate chamber with the flesh side of the leather is guaranteed.

6.3   Age the test pieces as described in ISO 17228.

6.4   If required, measure the distances between the measurement points following the description in 6.1 immediately after ageing (not later than 5 min). In this case, report that the measurement was made immediately.

6.5 Recondition the test pieces for at least 48 h in accordance with ISO 2419.

6.6 Measure the distances between the measurement points following the description in 6.1.

6.7 Note any visual changes of the test piece, such as distortion and any changes in flexibility and softness manually.

7 Expression of results

7.1 The shrinkage may be expressed as linear shrinkage (see 7.2) or loss of area (area shrinkage)(see 7.3).

7.2 The linear shrinkage is calculated using Formulae (1), (2) and (3).

Calculate the mean of original length, L_1, bounded by the points ABCD on the test piece, as follows:

$$L_1 = (a_1 + c_1 + b_1 + d_1) \div 4 \tag{1}$$

where a_1, b_1, c_1, and d_1 are the values of the dimensions AB, BD, CD, AC respectively (see Figure 1), measured before the test.

Calculate the mean of length after the test, L_2, bounded by the points ABCD on the test piece, as follows:

$$L_2 = (a_2 + c_2 + b_2 + d_2) \div 4 \tag{2}$$

where a_2, b_2, c_2 and d_2 are the values of the dimensions AB, BD, CD, AC respectively (see Figure 1), measured after the test.

Calculate the percentage linear shrinkage S_L using the Formula (3):

$$S_L = \frac{L_1 - L_2}{L_1} \times 100 \tag{3}$$

where

  L_1 is the mean of original length, calculated from Formula (1);

  L_2 is the mean of length after the test, calculated from Formula (2).

7.3 For the calculation of loss of area (area shrinkage) S_A proceed as follows:

Calculate the original area, A_1, bounded by the points ABCD on the test piece, as follows:

$$A_1 = \frac{a_1 + c_1}{2} \times \frac{b_1 + d_1}{2} \tag{4}$$

where a_1, b_1, c_1 and d_1 are the values of the dimensions AB, BD, CD, AC respectively (see Figure 1), measured before the test.

Calculate the area after the test, A_2, bounded by the points ABCD on the test piece, as follows:

$$A_2 = \frac{a_2 + c_2}{2} \times \frac{b_2 + d_2}{2} \tag{5}$$

where a_2, b_2, c_2 and d_2 are the values of the dimensions AB, BD, CD, AC respectively (see Figure 1), measured after the test.

Calculate the percentage loss of area (area shrinkage) S_A, using Formula (6):

$$S_A = \frac{A_1 - A_2}{A_1} \times 100 \tag{6}$$

where

A_1 is the original area, calculated from Formula (4);

A_2 is the area after the test, calculated from Formula (5).

8 Test report

The test report shall include the following:

a)   reference to this International Standard, i.e. ISO 17130;

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

c)   the test conditions used for ageing;

d)   mean value of the percentage linear shrinkage S_L as calculated in 7.2 or mean value of percentage loss in area S_A (area shrinkage) as calculated in 7.3 to the nearest 0,1 %;

e)   details of any visual changes or changes in flexibility and softness;

f)   the standard atmosphere used for conditioning and testing as given in ISO 2419;

g)   any deviations from the method specified in this International Standard.

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