SLOVENSKI STANDARD

SIST-TS CEN/TS 14689:2006

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Usnje ï Fizikalno in mehansko preskuġanje ï Ugotavljanje stopnje izboļenja in lezenja usnja pod pritiskom in po sprostitvi napetosti

Leather - Physical and mechanical tests - Determination of bagginess, creep and relaxation

Leder - Physikalische und mechanische Prüfungen - Bestimmung von Ausbeulneigung, Kriechen und Relaxation

Cuir - Essais physiques et mécaniques - Détermination du pochage, du fluage et de la relaxation

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TECHNICAL SPECIFICATION

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English Version

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Foreword

This Technical Specification (CEN/TS 14689:2006) has been prepared by Technical Committee CEN/TC “289”, the secretariat of which is held by UNI.

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1 Scope

This Technical Specification specifies a method of determining the bagginess of leather together with its creep and stress relaxation properties. It is applicable to all non-rigid leathers. e.g. shoe upper leather, upholstery leather, leathergoods leather and apparel leather. Leather is a viscoelastic material and, upon removal of any applied force, only a proportion of the extension observed is recovered. Even some time after removal of the force there is some degree of permanent deformation which is known as the retained set or bagginess of the leather. Due to the nature of the test method described below it is also possible to obtain a measure of the creep and stress relaxation properties of leather. Although the creep index quoted is not obtained via the true definition of creep, it will however provide a valuable comparative indication of this property in 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.

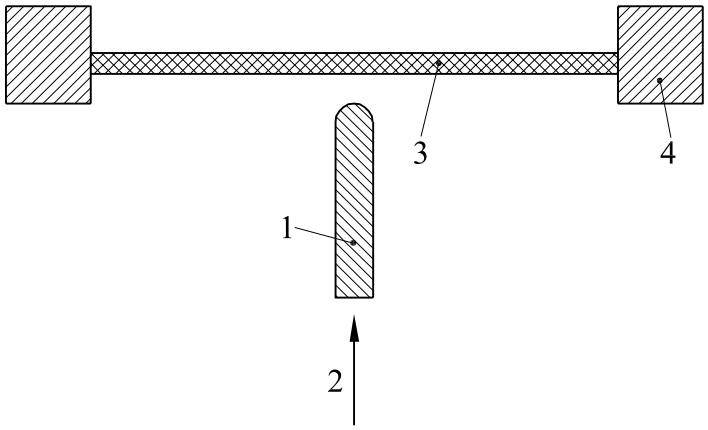
EN ISO 2418, *Leather - Chemical, physical and mechanical and fastness tests - Sampling location (ISO 2418:2002)*

EN ISO 2419, *Leather - Physical and mechanical tests - Sample preparation and conditioning (ISO 2419:2006)*

EN ISO 7500-1, *Metallic materials - Verification of static uniaxial testing machines - Part 1: Tension/compression testing machines - Verification and calibration of the force-measuring system (ISO 7500-1:2004)*

3 Principle

A test piece is secured around its circumference and a probe is applied until a prescribed force is obtained (see Figure 1). The probe is held at the position required to obtain the load for a specific time and is then retracted. This is repeated for five cycles after which the test piece is allowed to relax with no force applied. The residual distension of the test piece is recorded to give a measure of the degree of bagginess (or retained set). A creep index and stress relaxation index can also be determined using this method by recording the extension required to reach the prescribed force at each cycle and the rate at which the applied force decays whilst the probe is held in position.



Key:

1 Probe

2 Force (applied to centre of sample)

3 Leather

4 Sample holder

Figure 1 — Diagrammatic representation of the test method

4 Apparatus

4.1 Tensile testing machine, with:

— a force range appropriate to the specimen under test;

— a means of recording the force to an accuracy of at least 2% as specified by Class 2 of EN 7500-1;

— a uniform speed of separation of the jaws of 100 mm/min ± 20 mm/min;

— a means of following a programme of compression cycles as detailed in the procedure (6.4 to 6.7).

4.2 Cylindrical probe, comprised of steel or other suitable material with a hemispherical test head of diameter 9 mm ± 0,1 mm and a radius of curvature of 20 mm ± 0,1 mm. The length of the probe should be suitable to allow ease of testing whilst retaining rigidity. e.g. approximately 40 mm.

4.3 A method of securing the probe (4.2), vertically in the motional cross head of the tensile testing machine (4.1).

4.4 Clamping device, to clamp a circular test piece around its circumference. A circular area of 35 mm ± 0,2 mm diameter must be exposed for testing. The clamping device should be positioned centrally beneath the probe. Contact of the probe with the leather should allow unrestricted extension of the leather sample.

5 Sampling and sample preparation

5.1 Sample in accordance with EN ISO 2418. Cut three test pieces to a suitable size for the clamping procedure employed (4.4) and to ensure that there is no slippage of the test piece during testing.

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

5.2 Condition the test piece in accordance with EN ISO 2419.

6 Procedure

6.1 All testing should be carried out in a standard atmosphere as specified in EN ISO 2419.

6.2 Secure the probe (4.2) in the motional cross head of the tensile testing machine (4.1) and place a test piece in the clamping device (4.4).

NOTE For the majority of leathers the load should be applied to the flesh side of grain leather or the grain side of suede leathers, thus simulating wear to clothing etc. For upholstery leather the load should be applied to the grain side of the test piece.

6.3 Ensure the tensile testing machine is set to follow the programme given below (6.4 to 6.6).

6.4 The zero position for this test shall be taken as the point where the probe contacts the leather resulting in a force of 0,25 N ± 0,01 N.

6.5 The probe shall move from the zero position towards the leather surface at a speed of 100 mm/min ± 20 mm/min until a force of 75 N ± 1 N is produced. The probe should then maintain the displacement required to reach this load.

6.6 The probe shall be held in position for 10 s ± 0,5 s, and then return to the zero position at a speed of 600mm/min ± 20 mm/min.

6.7 Immediately the probe returns to the zero position, steps 6.5 to 6.6 shall be carried repeated so a total of 5 times cycles are completed.

6.8 After the 5th cycle, the probe should be returned to the zero position and held for a final relaxation time of 60 s ± 0,5 s.

6.9 After the 60 s relaxation time the probe shall move towards the leather surface at a speed of 100 mm/min ± 20 mm/min until a force of 0,25 N ± 0,01 N is obtained.

6.10 The distance required to obtain the 0,25 N force (residual distension) in millimetres shall be taken as the bagginess result for the leather sample.

7 Expression of Results

7.1 Bagginess value

The mean residual distension in millimetres taken from three separate test results as determined in 6.10.

7.2 Creep index

From a graph of displacement versus time (obtained during the testing procedure), record the displacement required to obtain a 75 N load for each of the 5 test cycles. Plot a graph of displacement (y-axis) versus the natural logarithm of the test cycle number (x-axis). The gradient of this graph is defined as the creep index.

7.3 Relaxation index

From a graph of force versus time (obtained during the testing procedure), record the force exerted by the probe 1, 2, 4, 6 and 8 seconds after application of the initial 75 N load. This should be taken from the 1st test cycle. Plot a graph of force (y-axis) versus the natural logarithm of time (x-axis). The gradient of this graph is defined as the stress-relaxation index.

8 Test report

The test report shall include the following:

a) reference to this Technical Specification; i.e. CEN/TS 14689:2006

b) mean value for bagginess in mm (7.1);

c) mean value for creep index, if required (7.2);

d) mean value for stress-relaxation index, if required (7.3);

e) whether the load was applied to the leather grain or flesh;

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

g) any deviations from the method specified in this

h) full details for identification of the sample and any deviations from EN ISO 2418 with respect to sampling.