SLOVENSKI STANDARD
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Laminatne talne obloge - Preskusna metoda za ugotavljanje odpornosti proti mikropraskam

Laminate floor coverings - Test method for the determination of micro-scratch resistance

Laminatböden - Prüfverfahren zur Bestimmung der Mikrokratzbeständigkeit

Revêtements de sol stratifiés - Méthode d'essai pour la détermination de la résistance aux micro-rayures

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Laminate floor coverings - Test method for the determination of micro-scratch resistance

Revêtements de sol stratifiés - Méthode d'essai pour la détermination de la résistance aux micro-rayures

Laminatböden - Prüfverfahren zur Bestimmung der Mikrokratzbeständigkeit

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 134.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Page

European foreword ... 3
1 Scope ... 4
2 Normative references ... 4
3 Terms and definitions ... 4
4 Principle ... 5
5 Apparatus and materials ... 5
5.1 Martindale tester ... 5
5.2 Holder for scrub material ... 5
5.3 Diffuse light source ... 5
5.4 Reflectometer ... 5
5.5 Positioning device ... 5
5.6 Scrub materials ... 6
5.7 Double-sided tape ... 6
5.8 Soft cotton cloth ... 7
5.9 Reference black high gloss HPL with antiscratch surface by corundum in the surface layer ... 7
6 Assembly and maintenance of the Martindale tester ... 7
7 Preparation and conditioning ... 7
7.1 Preparation ... 7
7.2 Test surface ... 7
8 Test procedure ... 7
8.1 General ... 7
8.2 Testing ... 8
8.2.1 Procedure A ... 8
8.2.2 Procedure B ... 9
8.2.3 Procedure C ... 10
Annex A (normative) Method for checking the Lissajous figure ... 12
Annex B (normative) Classification of the image after scratching according to procedure B ... 13

European foreword

This document (prEN 16094:2020) has been prepared by Technical Committee CEN/TC 134 “Resilient, textile and laminate floor coverings”, the secretariat of which is held by NBN.

This document is currently submitted to Enquiry.

This document will supersede EN 16094:2012.

In comparison with the previous edition, the following technical modifications have been made:

— addition of a method C for evaluation of polishing effect on mat laminate flooring surfaces;

— Introduction of a reference HPL for calibration of the respective scrub materials.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

1 Scope

This document specifies a test method for the micro-scratch resistance with two procedures (A and B) and a test method for polishing resistance (procedure C) which can be used for all types of laminate floor coverings. The resistance to polishing is related to mat surfaces.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 2813, *Paints and varnishes — Determination of specular gloss of non-metallic paint films at 20°, 60° and 85° (ISO 2813)*

EN ISO 12945-2, *Textiles — Determination of fabric propensity to surface fuzzing and to pilling — Part 2: Modified Martindale method (ISO 12945-2)*

EN ISO 12947-1, *Textiles — Determination of the abrasion resistance of fabrics by the Martindale method — Part 1: Martindale abrasion testing apparatus (ISO 12947-1)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
cycle
completion of all the translational movements tracing a Lissajous figure comprising 16 rubs

Note 1 to entry: This comprises of 16 revolutions of the two outer drives and 15 revolutions of the inner drive of the Martindale tester.

3.2
Lissajous figure
figure created by movement which changes from a circle gradually narrowing ellipses, until it becomes a straight line, from which progressively widening ellipses develop, in a diagonally opposite direction before the pattern is repeated

3.3
rub
one revolution of the two outer drives of the Martindale tester

3.4
mat surface
surface with a Reflectometer value R' ≤ 10, measured with 60° geometry (5.4)

4 Principle

The sample is fixed on a horizontal table. A circular scrub material fixed on a holder impacts on the sample with a defined load. Table and holder are moved perpendicular to each other in a translational movement, with defined frequencies, tracing a Lissajous figure. The holder is additionally freely rotatable around its own axis perpendicular to the horizontal plane.

The sample is exposed to the scrub material for a predetermined number of rubs. The changes of the surface are determined by gloss measurement and visual assessment.

5 Apparatus and materials

5.1 Martindale tester

The Martindale tester shall be as described in EN ISO 12947-1 with the following exceptions:

— the “abrading table” is the table for the sample;

— the “clamping ring and mechanism” is not necessary;

— the “specimen holder” is the holder for the scrub material;

— the “loading pieces” are not necessary.

5.2 Holder for scrub material

The holder for scrub material shall be as described in EN ISO 12945-2, with the following exceptions:

— version 1: the rubber retaining ring is not required. This assembly consists of spindle, scrub holder and small ring weight. The total mass of this assembly is (413 ± 2) g (nominally called 4N);

— version 2: the assembly according to version 1, however the small ring weight is replaced by the large weight. The total mass of this assembly is (612 ± 2) g (nominally called 6N).

5.3 Diffuse light source

Light source with artificial light providing evenly diffused light giving an illumination on the test surface of (1 200 ± 400) lx.

5.4 Reflectometer

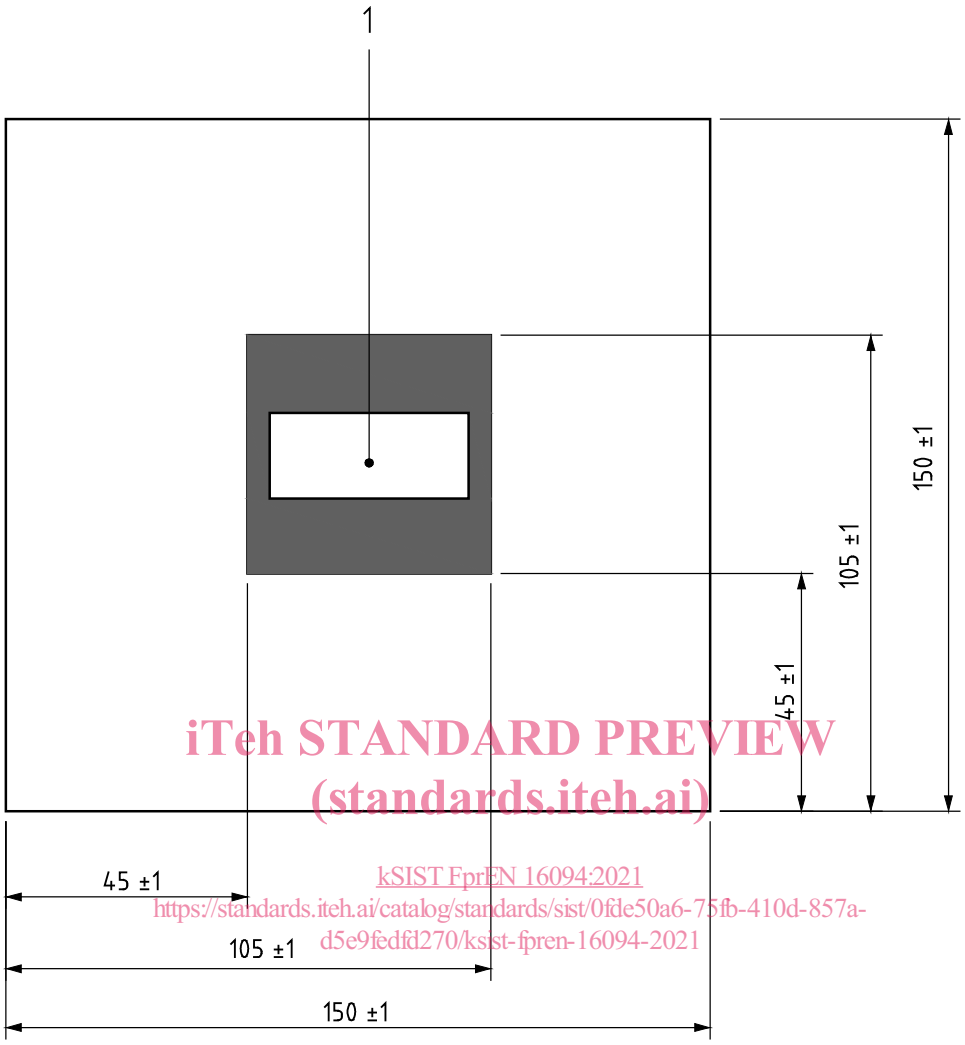
For gloss measurement with 3 angle measurement geometry as described in EN ISO 2813.

5.5 Positioning device

For gloss measurement on the same position before and after the test with 4 measurement points.

An example of a positioning device is shown in Figure 1.

Dimensions in millimetres



Key

1 measurement area

reflectometer – direction of movement for the measurement

Figure 1 — Sample with measurement area for the 4 gloss measurement points

5.6 Scrub materials

The scrub material shall be a nylon web imbedded with alumina abrasive. Three types of scrub materials (very fine, medium fine and ultra-fine) are to be used. The scrub materials shall be cut or stamped on a diameter of (89 ± 1) mm.

NOTE Scotch Brite fleece SB 7447 (very fine), SB 7440 (medium fine) and SB 7448+ (ultra-fine) are examples of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by CEN of this product.

5.7 Double-sided tape

The double-sided tape is to attach the scrub material on the guide plate of the holder and the sample on the table.

5.8 Soft cotton cloth

The soft cotton cloth is for cleaning of the samples before and after the test.

5.9 Reference black high gloss HPL with antiscratch surface by corundum in the surface layer

Every new batch of scrub material shall be tested on this HPL plate as described in 8.2.1, 8.2.2 and 8.2.3.

NOTE James Heal Article Nr. JH701–501 is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by CEN of this product.

6 Assembly and maintenance of the Martindale tester

The assembly of the tester shall be carried out in accordance with the instructions of the apparatus manufacturer. For the described test, the outer position C shall be used for both axes to create the larger Lissajous figure as explained in EN ISO 12947-1 or the manufacture guidebook.

The checking of the Lissajous figure shall be done according to Annex A.

7 Preparation and conditioning

7.1 Preparation

Six samples with the dimensions of 150 mm × 150 mm shall be prepared for the microscratch test and three additional samples with the same dimensions for testing of the polishing resistance. The surface of the samples shall be substantially flat.

If the panel width is smaller than 150 mm, assemble a sample of two parts with length joint in the middle.

7.2 Test surface

Conditioning of test surface shall begin at least one week before testing and shall be carried out in air at a temperature of (23 ± 2) °C and relative humidity of (50 ± 5) %.

8 Test procedure

8.1 General

Two different procedures (A / B) are described for the micro scratch resistance test. One procedure (C) is described for the resistance to polishing. All the necessary parameters (scrub material, load, speed factor, number of cycles) are shown in Table 1.

Table 1 — Test procedures for determination of resistance to micro scratches

Test parameter	**Procedure A**	**Procedure B**	**Procedure C**
Scrub material	Very fine	Medium fine	Ultra Fine
Holder for scrub material	Version 2 (Sample holder plus large weight)	Version 1 (Sample holder plus small weight)	Version 2 (Sample holder plus large weight)
Speed	48 rev/min	48 rev/min	48 rev/min
Number of rubs	80 rubs (= 5 Lissajous movements)	160 rubs (= 10 Lissajous movements)	320 rubs (= 20 Lissajous movements)
Assessment	Gloss change	Visual according to Annex B	Gloss change

8.2 Testing

8.2.1 Procedure A

Immediately after conditioning, the test shall be carried out in a test temperature of (23 ± 2) °C at 3 samples.

Before starting the test, the samples shall be cleaned with a soft cotton cloth (5.8).

Before the test, 4 gloss measurements on each sample using the reflectometer (5.4) with a geometry of 60° and the positioning device (5.5) shall be carried out. If there is a decor or preferential structure direction or a joint on the sample the measurement shall be done parallel to this direction. Calculate the mean value for each sample.

The gloss measurement on samples with a joint has to be made at least 5 mm away from the joint.

If the mean value is higher than 70 (high gloss surface), four additional measurements with the 20° geometry shall be carried out.

Fix the sample on the table of the Martindale tester using the adhesive tape (5.7). The very fine scrub material (5.6) shall be fixed with the adhesive tape on the guide plate of holder.

Select 80 rubs on the counter of the Martindale device and start the test.

After finishing, remove the sample from the table and clean it with the cotton cloth (5.8). Remove also the used scrub material.

Measure the gloss again with the chosen geometry according to the above-described procedure.

Calculate for each sample the gloss change $\Delta R'$ according to Formula (1):

$$\Delta R' = \frac{(R_I - R_F)}{R_I} \times 100\ \% \qquad (1)$$

where

R_I is the mean value at initial state;

R_F is the mean value after finishing the test.