



SLOVENSKI STANDARD
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Pohištvo - Ocenjevanje odpornosti površine proti razenju

Furniture - Assessment of the surface resistance to scratching

Möbel - Bewertung der Kratzfestigkeit von Oberflächen

Ameublement - Evaluation de la résistance de la surface à la rayure
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97.140

Pohištvo

Furniture

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EUROPEAN STANDARD
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Furniture - Assessment of the surface resistance to scratching

Ameublement - Evaluation de la résistance de la surface à la rayure

Möbel - Bewertung der Kratzfestigkeit von Oberflächen

This European Standard was approved by CEN on 8 March 2012.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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EN 15186:2012 (E)**Foreword**

This document (EN 15186:2012) has been prepared by Technical Committee CEN/TC 207 "Furniture", the secretariat of which is held by UNI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by October 2012, and conflicting national standards shall be withdrawn at the latest by October 2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes CEN/TS 15186:2005.

Regarding the significant technical changes that have been made in this new edition of EN 15186, see the informative Annex B.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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1 Scope

This European Standard specifies a method for the assessment of the surface resistance to penetrating scratches. It relates to the rigid surfaces of all finished products, regardless of their material.

It does not apply to finishes on leather and fabrics.

Method A is suitable for all types of surface coatings and coverings except for melamine faced boards (according to EN 14322) and HPL (according to EN 438-1). It simulates measurable penetrating and/or deforming scratches.

Method B is suitable for all types of surfaces. It simulates first visible scratches that may only be a change in the gloss.

The test is intended to be carried out on a part of finished furniture. It can however be carried out on test panels of the same material, finished in an identical manner to the finished product, and of a size sufficient to meet the requirements of the test.

It is essential that the test be carried out on unused surfaces.

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.

EN ISO 1518-1, *Paint and varnishes — Determination of scratch resistance – Part 1: constant loading method (ISO 1518-1)*

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3 Terms and definitions

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

3.1

test surface

part of the test panel

3.2

test panel

panel including the test surface

Note 1 to entry: The panel may be cut from a finished item of furniture or it may be a separate panel produced in the same manner as the finished item of furniture.

3.3

test area

part of the test surface under the equipment, where the measurement is carried out

3.4

scratching tip

3.4.1

method A

needle with a point of defined geometry

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Note 1 to entry: See 4.2.3.

3.4.2**method B**

needle with a point of defined geometry

Note 1 to entry: See 5.2.1.6.

3.5**scratching trace****3.5.1****method A**

visible and measurable mark on the tested surface which is produced under the specified load of the scratching tip; the shapes of the traces can be different depending on the substrate and coating type as shown in Table 2

3.5.2**method B**

first visible scratches which may only be a change in the gloss

3.6**scratching resistance****3.6.1****method A**

minimum load, in N, applied to the scratching tip, which produces a measurable width trace (W) of $\geq 0,30$ mm

3.6.2**method B**

minimum load, in N, applied to the scratching tip, which produces a continuous visible mark

3.7**preliminary assessments of the scratching resistance (method A)**

minimum load causing the specified trace on one test surface

3.8**intermediate assessment of scratching resistance (method A)**

mean value of preliminary assessments of one test surface

3.9**final value of scratching resistance (method A)**

mean value of intermediate assessments of three test surfaces

Note 1 to entry: See Figure A.2 in the informative Annex A.

4 Linear method (method A)**4.1 Principle**

Surface scratching resistance is defined as the minimum load in N (Newtons) applied to the tip with specified geometry, which produces a specified scratch width (see 4.4.2).

The width of the scratching trace is the result of the assessment of the series of scratches produced by the tip.

4.2 Apparatus and materials

4.2.1 Test apparatus

4.2.1.1 Equipment for linear, without hand movement of the scratching tip or the test surface, according to the principle of EN ISO 1518-1.

4.2.2 Equipment parameters

Technical parameters of the apparatus shall be as specified in Table 1.

Table 1 — Technical parameters

Parameter	Description/values
Tip/test surface movement	Linear
Load range (N)	1,0 - 20,0
Increment of load (N)	$1,0 \pm 0,1$
Speed of the tip's/test surface movement (mm/s)	20 ± 10
Travel length of the tip or test surface (mm)	Minimum 22

4.2.3 Scratching tip

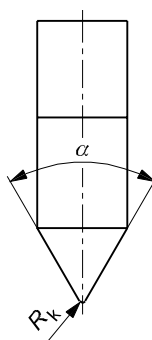
Scratching tip made of diamond, with a radius (R) of $(0,30 \pm 0,01)$ mm.

The coupling between the spherical part of the tool and the truncated cone section shall allow the width of the trace produced by the tool on the test area to be higher than 0,30 mm, without disturbing this truncated cone section.

An example of this tool is shown in Figure 1.

The tip shall be mounted in the holder with the flat part on the leading side of the shank facing the working direction.

The tip shall be checked before use (see 4.3.3).



Key

α tip's angle $\alpha = (60,0 \pm 1,0)^\circ$

R_k radius of tip's rounded part $R_k = (0,30 \pm 0,01)$ mm

Figure 1 — Scratching tip of the cone type

EN 15186:2012 (E)**4.2.4 Optical measurement equipment**

Any suitable equipment (e.g. a microscope) for measuring the trace's width with $\pm 0,05$ mm accuracy and for assessment of the scratching tip's geometry with $\pm 0,01$ mm accuracy.

4.2.5 Suitable illumination

Suitable illumination for measurement of the trace's width with $\pm 0,05$ mm accuracy.

4.2.6 Conditioning chamber

A chamber with a standard atmosphere of (23 ± 2) °C and relative humidity of (50 ± 5) %.

4.2.7 Cleaning cloth

White, soft, absorbent cloth.

4.3 Preparation and conditioning**4.3.1 Conditioning**

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

The conditioning time shall be stated in the test report.

NOTE Some finishing systems may not have achieved full cure after one week of conditioning.

4.3.2 Test surface

Three test surfaces shall be prepared.

The test surface taken shall be at least 20 mm from the edge.

Each test surface shall be a piece of the test panel, shaped to fit the type of clamping device used.

The test surface shall be carefully wiped with a cleaning cloth (see 4.2.7) before the test without scratching the surface.

The test surface shall be largely flat.

4.3.3 Checking of the tip's geometry

The scratching tip shall be inspected visually before each test (see Figure 2).

The scratching tip shall be checked using the optical measurement equipment to obtain an accuracy of $\pm 0,01$ mm and $\pm 1^\circ$, at least every series of 1 000 tests.

In both cases, if any flatness, holes, mass losses or other kind of damages are found, the scratching tip shall be rejected and replaced by a new one.

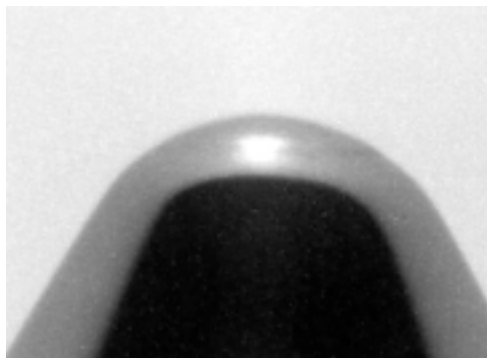


Figure 2 — Shape of the tip before use

4.4 Test Procedure

4.4.1 General

Check the geometry of the scratching tip according to 4.3.3.

Place the test apparatus (see 4.2.1) in a horizontal position to the test surface, with the tip perpendicular to the test surface.

Carry out the test in a conditioned atmosphere of $(23 \pm 2) ^\circ\text{C}$ and $(50 \pm 5) \% \text{R.H.}$

4.4.2 Scratching of test area (standards.iteh.ai)

For each test surface, repeat the scratch test and record the results of width measurements rounded to 0,05 mm (see the protocol example in Table A.1).

The scratches shall be carried out across the grain direction, if applicable.

Start the test with the first test surface with a load of 1,0 N and continue with increments of 1,0 N, until 20,0 N, or until the scratch width is $\geq 0,30$ mm, whichever is reached first.

NOTE The determination of the width of the scratches on the second and third test surface can normally begin 3,0 N below the load found for the first test surface.

The distance between two adjacent scratching traces shall be at least 5 mm, and at least 20 mm between the scratching trace and the edge of the test surface.

4.4.3 Determination of scratching resistance

The determination of scratching resistance shall be established by one observer experienced in this type of assessment, by measuring, after 24 h, all the scratching trace widths using the optical measurement equipment (see 4.2.4).

In case of a dispute, three experienced observers shall carry out the determination.

NOTE For easier assessment of the scratching trace width, the surfaces of the estimated test areas before the measurement can be marked with a soft pencil (or another suitable colouring agent) across the scratching traces.

The points of width measurement of the different types of traces (depending on the substrate and coating) are shown in Table 2.