BS EN 1534:2010

Incorporating corrigendum October 2010

BSI Standards Publication

Wood flooring — Determination of resistance to indentation — Test method

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National foreword

This British Standard is the UK implementation of EN 1534:2010 incorporating corrigendum October 2010. It supersedes BS EN 1534:2000 which is withdrawn.

The start and finish of text introduced or altered by corrigendum is indicated in the text by tags. Text altered by CEN corrigendum October 2010 is indicated by ⟦AC1⟩ ⟨AC1⟧.

The UK participation in its preparation was entrusted to Technical Committee B/543, Round and sawn timber.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Supersedes EN 1534:2000

English Version

Wood flooring - Determination of resistance to indentation - Test method

Planchers en bois - Détermination de la résistance au poinçonnement - Méthode d'essai

Holzfußböden - Bestimmung des Eindruckwiderstands - Prüfmethode

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Foreword

This document (EN 1534:2010) has been prepared by Technical Committee CEN/TC 175 “Round and sawn timber”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by April 2011, and conflicting national standards shall be withdrawn at the latest by April 2011.

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 EN 1534:2000.

The main changes compared to the previous edition are :

a) Modification in the definitions (3.5) and (3.6);

b) A new definition has been added "test specimen" (3.7);

c) A new definition has been added "component" (3.8);

d) A new definition has been added "Hardness *HB*" (3.9).

This document is one of a series of standards concerning wood flooring.

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 and the United Kingdom.

1 Scope

This European Standard specifies a method, derived from the test, for determining the resistance to indentation of wood flooring.

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 13756:2002, *Wood flooring — Terminology*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13756:2002 and the following apply.

3.1
element
smallest individual part (e.g. a finger, a strip) of wood flooring

3.2
lot
quantity of wood flooring with the same claimed set of features, within a consignment or in a storage facility

3.3
lay-up
description of the assembly of an element

3.4
indentation
concave deformation of the surface of a test specimen from the action of an indenter

3.5
indentation under action
momentarily indentation when the indenter is applied

3.6
residual indentation
indentation after the time of recovery

NOTE The time of recovery is specified in 7.3.

3.7
test specimen
elements or square test piece cut from an element

3.8
component
piece of wood flooring with a face consisting of originate solid timber

3.9
Hardness *HB*
Brinell hardness in newtons per square millimetre

4 Principle

The resistance to indentation is determined by applying a loaded indenter to the face of the test specimen. The diameter of the residual indentation is used to evaluate the resistance to indentation of the test specimen. After the loading the unloaded specimen is left to recover.

5 Apparatus

5.1 Indenter, i.e. a hardened steel spherical body with contact radius of (10 ± 0,01) mm.

5.2 Measurement rig, i.e. a device capable of measuring the diameter of the residual indentation on the face of the test specimen to an accuracy of ± 0,1 mm.

5.3 Loading head, i.e. a device with a load cell accurate to ± 2 % of the maximum applied loads, moving perpendicular to a flat rigid table.

The load and the rate of head movement of the loading head shall be adjustable within specified limits.

6 Test specimens

6.1 Dimensions

The test shall be carried out on test specimens that may be elements or may be square test pieces, cut from elements that preferably have sides approximately 50 mm long.

6.2 Sampling

6.2.1 Within a test specimen

Indentations shall be carried out either in the central area of test pieces or distributed all over the area of the face of the element.

If, in an element, the length of a piece of originate solid timber exceeds 200 mm, up to two indentations can be carried out on that piece of timber. If not, only one indentation can be carried out.

The distance from the centre of the indentation to any edge of a test piece or an element or to a knot shall not be less than 20 mm. However, if the width of the test specimen is less than 40 mm, the indentation shall be placed along its longitudinal axis.

If an element consists of a number of components, each component can be indented.

Within the above defined limits, the indentation points shall be distributed at random.

6.2.2 Within a lot

The number of test specimen to be sampled is related to the number of indentations carried out on each test specimen. It shall be such that the total number of indentations is at least 50.

Test specimens shall be selected at random from the lot.

6.3 Conditioning

The test shall be carried out on test specimens conditioned in accordance with the manufacturer's instructions.

6.4 Possible preparation prior to testing

If the test specimens are fitted with a soft or brittle material on the back, this shall be removed to prevent any displacement during the test.

7 Test method

7.1 Accuracy

All the measurements shall be made to the limits of accuracy specified for the instruments as defined in Clause 5.

7.2 Application of load

The test specimen shall be free of any material that may interfere with the results. Set the test specimen on the table of the loading head. Lower the indenter to the surface of the test specimen. Apply a force increasing at such rate that the nominal value of 1 kN is reached after (15 ± 3) s. Maintain the force at this value for (25 ± 5) s. Withdraw the indenter completely.

Throughout the test, the machinery shall be vibration and shock free, to ensure that the sample is rigidly held.

7.3 Measurement of residual indentation

After withdrawal of the indenter, wait (let recover) for at least 3 min. Measure with the measurement rig two diameters of the residual indentation at right angles to each other: one along the grain d_1, another across the grain d_2, with an accuracy of ± 0, 2 mm.

Contrast on the edge of the indentation can be improved with appropriate lighting and/or application of graphite lead.

8 Expression of results

8.1 Hardness for each indentation

The hardness Brinell HB is calculated to two significant digits, according to the following formula:

$$HB = \frac{2F}{g \cdot \pi \cdot D\left[D - \sqrt{D^2 - d^2}\right]} \quad (1)$$

where

[AC1] HB is the Brinell hardness in newton per square millimetre; [AC1]

g is the acceleration of gravity, in metres per second squared;

π is the "pi" factor (3,14);

F is the maximum load applied force, in newtons;

D is the diameter of the ball, in millimetres,

d is the diameter of the residual indentation, in millimetres (average of d_1 and d_2).

NOTE To express *HB* in kilogram force per square millimetre divide the value by g.

The diameter of the residual indentation d is calculated from the measurements taken in accordance with 7.3, using the formula:

$$d = \frac{d_1 + d_2}{2} \quad (2)$$

8.2 Hardness for a lot

8.2.1 General

A normal distribution is assumed.

The mean value, the standard deviation and the characteristics value of the hardness Brinell shall be calculated.

8.2.2 Mean value

$$m = \frac{\sum_1^n P_i}{n} \quad (3)$$

where

m is the mean value of the performance of the sample;

P_i is the performance of "ith" point of indentation in the sample;

n is the number of indentations carried out in the sample.

8.2.3 Standard deviation

$$S = \sqrt{\frac{\sum_1^n (Pi - m)^2}{n-1}} \quad (4)$$

where

S is the standard deviation.

P_i is the performance of "ith" point of indentation in the sample.

All the other parameters are defined in 8.2.2.

8.2.4 Characteristic value

A characteristic value is defined as the fifth percentile of the assumed normal distribution.

A characteristic value is given by the following formula:

$$X_k = m - (t_{05} \times s) \quad (5)$$

where

X_k is the characteristic value;

t_{05} is the Student coefficient for a one sided 5 % probability.

Table 1 gives the Student coefficient for a range of values of *n*.

All other parameters are defined in 8.2.2 and 8.2.3.

Table 1 — Student coefficient for a range of values of *n*

Number of indentations *n*	Student coefficient t_{05}
6	2,02
7	1,94
8	1,90
9	1,86
10	1,83
11	1,81
12	1,80
13	1,78
14	1,77
15	1,76
16	1,75
17	1,75
18	1,74
19	1,73
20	1,73
21	1,72
22	1,72
23	1,72
24	1,71
25	1,71
26	1,71
27	1,71
28	1,70
29	1,70
30	1,70
40	1,68
60	1,67
120	1,66
∞	1,645

9 Test report

The test report shall contain the following information:

a) The name and address of the laboratory,

b) The name and address of the company requesting the test,

c) The sampling procedure and the identification of the sample,

d) The date of delivery,

e) The date of period of the test(s),

f) The type (the brand, if any) and the full description of the test specimens (lay-up, coating, appearance classification …), face view and cross sections in a suitable scale,

g) If relevant, their characteristics at the time of delivery,

h) The conditioning applied to the test specimens prior to testing,

i) The climatic conditions within the laboratory during the test,

j) The reference to this test method and, if any, the deviations,

k) A short description of the apparatus involved in the test,

l) Each individual result according to the test method,

m) The mean value, the standard deviation of the sampled lot as defined in this standard and the characteristic value of the hardness.

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