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Laminate floor coverings — Determination of locking strength for mechanically assembled panels

Revêtements de sol stratifiés — Détermination de la résistance à la traction des lames assemblées mécaniquement

Reference number
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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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Foreword

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 219, *Floor coverings*.

This second edition cancels and replaces the first edition (ISO 24334:2006), which has been technically revised.

Laminate floor coverings — Determination of locking strength for mechanically assembled panels

1 Scope

This International Standard specifies a method for the determination of the locking strength of joints between laminate floor covering panels which are assembled with both vertical and horizontal mechanical locking systems.

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

3 Principle

Mechanically assembled panels with mechanical locking systems are pulled apart to an opening of 0,20 mm or until the lock breaks.

4 Apparatus

The following set of equipment is needed:

4.1 Tensile testing machine, verified and calibrated in accordance with ISO 7500-1 and conforming to class 3 for the force range which is applied for the locking strength measurement.

4.2 External extensometer or optical measurement system, with an accuracy of 0,01 mm.

4.3 Two clamping devices, attached to the tensile testing machine to hold the grippers.

NOTE Zwick/Roell clamps Type 8355[1)], 20 kN are found suitable for the purpose.

4.4 Two grippers, 50 mm × 210 mm, attached to the clamping devices to hold the specimen with an anti-slip coating material (see Figure 6 and Figure 7).

4.5 Sliding calliper, with an accuracy of 0,1 mm, to determine the length, width, and thickness of the specimen.

4.6 Saw, for cutting the specimen.

4.7 Balance, with an accuracy of 0,1 g.

1) Zwick/Roell clamps Type 8355 are examples of suitable products available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of these products. Equivalent products may be used if they can be shown to lead to the same results.

4.8 Calibration plate, iron steel 200 mm × 200 mm, (7 ± 1) mm thick, to adjust the clamping device coplanar in the tensile testing machine.

5 Sampling and conditioning of panels

Sample five panels, preferably from the same package, for the preparation of five test specimens for the short side locks and five for the long side locks. If panel dimensions allow it, the sampling of the short side and the long side can come from the same panel.

The panels from which the test specimens are cut shall be conditioned to a constant mass at (50 ± 5) % relative humidity (RH) and (23 ± 2) °C.

Constant mass is considered to be reached when the results of two successive weighing operations, carried out at an interval of 24 h, do not differ more than 0,1 % of the mass of the panels.

6 Testing

6.1 Cutting of the short panel sides

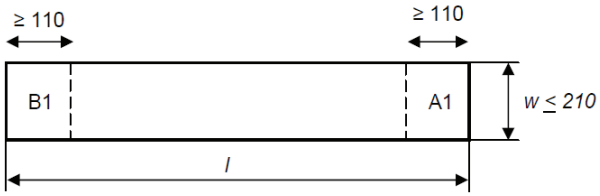
Cut two specimens, A1 and B1, from each panel. The length of the specimen shall be a minimum of 110 mm (to fit the machine).

If the width of the panel is equal to or less than 210 mm, but more than 100 mm, the actual width shall be used in the specimen (see Figure 1).

If the width of the panel is less than 100 mm, the long-side profiles of two panels shall be glued together. The new actual width shall be used in the specimen (see Figure 2).

If the width of the panel is more than 210 mm, the specimen shall be cut down to a width of 200 ± 10 mm (see Figure 3).

Dimensions in millimetres

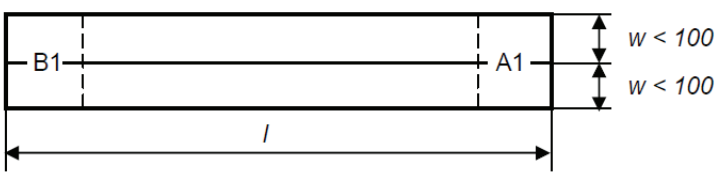


Key

l	surface dimension, length of panel
w	surface dimension, width of panel
A1, B1	test specimens

Figure 1 — Cutting of panels for short side testing (w > 100 mm and ≤ 210 mm)

Dimensions in millimetres



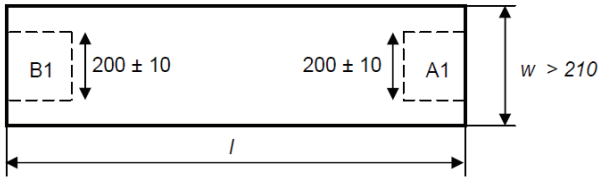
Key

l	surface dimension, length of panel

w surface dimension, width of panel
A1, B1 test specimens

Figure 2 — Cutting of panels for short side testing (w < 100 mm)

Dimensions in millimetres



Key

l surface dimension, length of panel
w surface dimension, width of panel
A1, B1 test specimens

Figure 3 — Cutting of panels for short side testing (w > 210 mm)

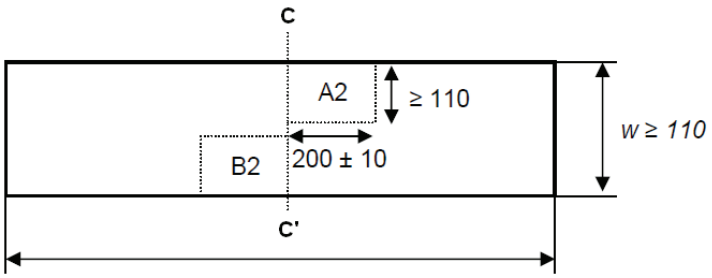
6.2 Cutting of the long panel sides

Cut two test specimens, A2 and B2, from each panel. The length of the specimen shall be (200 ± 10) mm and the width shall be a minimum of 110 mm (to fit the machine).

If the width of the panel is more than or equal to 110 mm, the specimen shall be cut from the centre line of the panel (see Figure 4).

If the width of the panel is less than 110 mm, the long-side profiles of two panels shall be glued together and the specimen should be cut from the centre line of the panel (see Figure 5).

Dimensions in millimetres

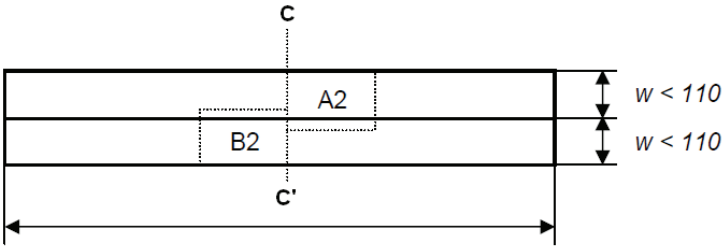


Key

l surface dimension, length of panel
w Surface dimension, width of panel
C-C' centre line of the panel
A2, B2 test specimens

Figure 4 — Cutting of panels for long side testing (w ≥ 110 mm)

Dimensions in millimetres



Key

l	surface dimension, length of panel
w	Surface dimension, width of panel
C-C'	centre line of the panel
A2, B2	test specimens

Figure 5 — Cutting of panels for long side testing (w < 110 mm)

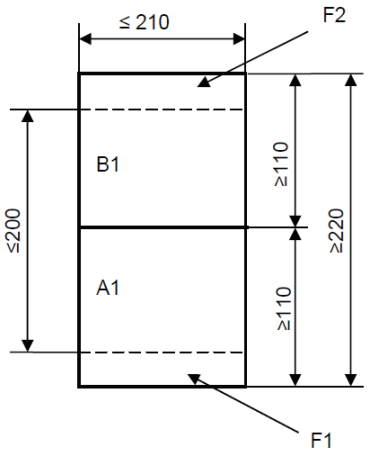
6.3 Assembling of test specimens

6.3.1 Assembling of short side specimens

Measure the width of A1 and B1 to the nearest millimetre and their thickness to the nearest 0,1 mm.

As shown in Figure 1, Figure 2, and Figure 3, connect the short side lock from A1 and B1 according to the fitting instruction from the manufacturer.

Dimensions in millimetres



Key

F1 attachment area 1 for the first gripper

F2 attachment area 2 for the second gripper

A1, B1 test specimens

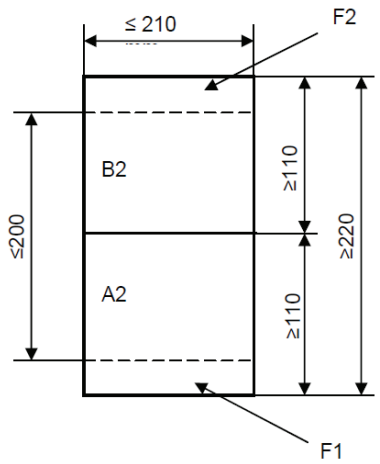
Figure 6 — Assembled test piece for short side testing

6.3.2 Assembling of long side specimens

Measuring of A2 and B2 to the nearest millimetre and their thickness to the nearest 0,1 mm.

As shown in Figure 4 and Figure 5 connect the long side lock from A2 and B2 according to the fitting instructions from the manufacturer.

Dimensions in millimetres



Key

F1 attachment area 1 for the first gripper

F2 attachment area 2 for the second gripper

A2, B2 test specimens

Figure 7 — Assembled test piece for long side testing

6.4 Tensile testing

6.4.1 General

The test atmosphere shall be (50 ± 5) % RH and (23 ± 2) °C unless the test is completed within 60 min of removal of the test specimens from the conditioning atmosphere.

The pulling direction shall be perpendicular to the lock in a coplanar direction of the specimen.

6.4.2 Preparation

The coplanar guiding of the clamping devices shall be adjusted with the calibration plate.

Assemble the grippers in the clamping devices. Fix the calibration plate in the gripper of the upper clamping device and adjust the lower clamping device with the help of the calibration plate to the upper clamping device.

6.4.3 Procedure

6.4.3.1 Short side testing

For the short side testing, first, attach the clamp to A1 (in attachment area F1). When attaching the clamp to B1 (attachment area F2), ensure that there is no added stretch or pull. Therefore, the tensile testing machine shall have zero-force adjustment control software installed to avoid the additional force resulting from clamping the specimen.

If the width of the specimen is smaller than 210 mm, attach the specimen in the vertical centre line of the gripper perpendicular to the attachment areas, no more than 200 mm apart.

Adjust the external extensometer (or optical measurement) in the vertical centre line of the test specimen as close as possible to the joint.

Operate the testing machine, employing a 10 N pre-tension, then pull the test specimens apart at a speed of 0,5 mm/min.

Record the force (in Newton), $F_{0,2}$, required to reach an opening of 0,20 mm.

Record the force (in Newton), $F_{\max}$, required for reaching the joint breaking point, as well as the opening between the separated elements, Δs, at joint break. Measure Δs to the nearest 0,01 mm.

Perform the test on five specimens, made from five different panels.

Calculate the average value of the five measurements of $F_{0,2}$, $F_{\max}$, and Δs respectively. Check their validity according to Clause 7.

6.4.3.2 Long side testing

For the long side testing, use the same procedure as the short side testing, but with the samples A2 and B2.

7 Repetition testing

For the three parameters ($F_{\max}$, $F_{0,2}$, and Δs), each result shall not differ more than 20 % (tolerance of repetition) from the average value of the five results in order to be valid.

If only one of the five results in a test series is outside the tolerance of repetition, either for $F_{\max}$, $F_{0,2}$, or for Δs, one new test specimen shall be prepared and tested. If the result of this single test is within the tolerance of repetition, this result shall replace the earlier result that was outside the tolerance of repetition. If not, five completely new tests shall be carried out and checked for validity in the same way as the first series.

If two or more of the five results in a test series are outside the tolerance of repetition, either for F_{max}, $F_{0,2}$, or Δs, five completely new tests shall be carried out and checked for validity in the same way as the first series.

The new results shall be checked for validity in the same way as the first ones. The procedure shall be repeated until five test specimens give valid results. If more than three complete test series are needed to achieve results within the tolerance of repetition, the test shall be interrupted and considered not possible to finish.

8 Expression of results

For $F_{0,2}$ and F_{max}, the average values shall be divided by the average measured width of the clamped side of the test specimen. The results, which are designated $f_{0,2}$ and f_{max} respectively, are expressed in kilo-Newton per metre (kN/m). f_{max} is the locking strength for the assembled panels.

$f_{0,2}$, f_{max}, and Δs shall be stated separately for the long sides and for the short sides of the panels.

If Δs is equal or less than 0,2 mm, the relevant locking strength for $f_{0,2}$ is f_{max}.

All reported values shall be according to the registration from the external extensometer.

9 Test report

The test report shall contain at least the following information:

a) name of the product;

b) indication of the sample;

c) reference to this International Standard, i.e. ISO 24334;

d) $f_{0,2}$ in kN/m, to the nearest 0,1 kN/m, for the long sides and for the short sides;

e) the locking strength, f_{max}, in kN/m, to the nearest 0,1 kN/m, for the long sides and for the short sides;

f) the average opening Δs in mm, to the nearest 0,01 mm, for the long sides and for the short sides;

g) if at least one lock on one of the sides breaks before 0,20 mm, all opening values (not only average Δs) measured for that side;

h) the thickness of the panels in mm, to the nearest 0,1 mm;

i) the width of the panels in mm, to the nearest 0,1 mm;

j) if any, the numbers of repeated test needed to achieve valid results;

k) date of the test.

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