INTERNATIONAL STANDARD

ISO 24334

Third edition
2019-07

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
ISO 24334:2019(E)

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 219, *Floor coverings*.

This third edition cancels and replaces the second edition (ISO 24334:2014), which has been technically revised.

The main changes compared to the previous edition are as follows:

— addition of a note in the Scope,

— change in 7.4.3 in order to specify that pulling speed may also be performed at 5 mm/min.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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

1 Scope

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

NOTE This method is also applicable to other mechanically assembled panels, e.g. modular multilayer floorings.

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.

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

3 Terms and definitions

No terms and definitions are listed in this document.

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

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

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

4 Principle

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

5 Apparatus

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

5.2 Measuring instrument (sliding calliper) with an accuracy of 0,1 mm, to determine the length, width and thickness of the specimen.

5.3 Saw to cut down the specimen.

5.4 Balance with an accuracy of 0,1 g.

5.5 External extensometer or optical measurements with an accuracy of 0,01 mm.

5.6 Two clamping devices attached to the tensile testing machine. The clamping devices (e.g. Zwick/Roell[1)], Type 8355, 20 kN) are used to hold the grippers.

5.7 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).

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

6 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 may 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 by more than 0,1 % of the mass of the panels.

7 Testing

7.1 Cutting of the short panel sides

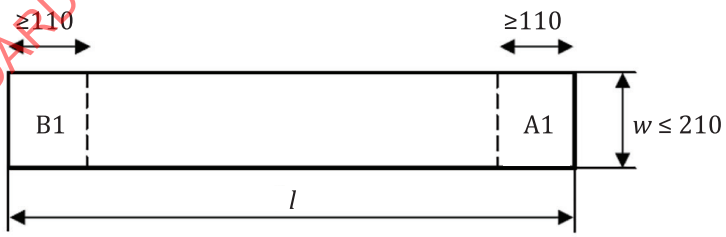
Cut two pieces, A1 and B1, from each panel. The length of the specimen shall be a minimum of 110 mm (to fit the machine).

If the width of the panel is equal to or less than 210 mm, the actual width shall be used in the specimen (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 (Figure 2).

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

Dimensions in millimetres



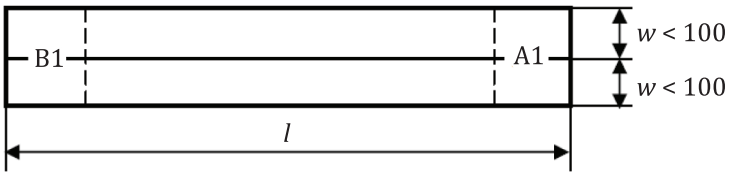
Key

l	surface dimension, length of panel
w	surface dimension, width of panel
A1, B1	test specimens (length ≥110 mm)

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

1) Zwick/Roell 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 ISO of this product.

Dimensions in millimetres

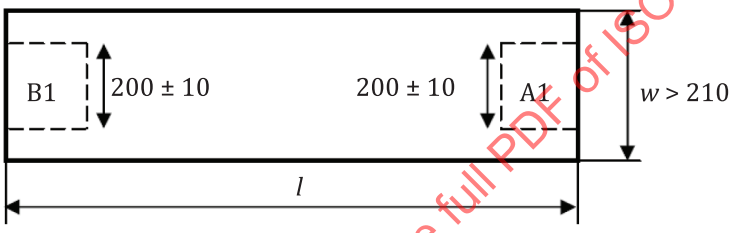


Key

l	surface dimension, length of panel
w	surface dimension, width of panel
A1, B1	test specimens (length ≥110 mm)

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 (length ≥110 mm)

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

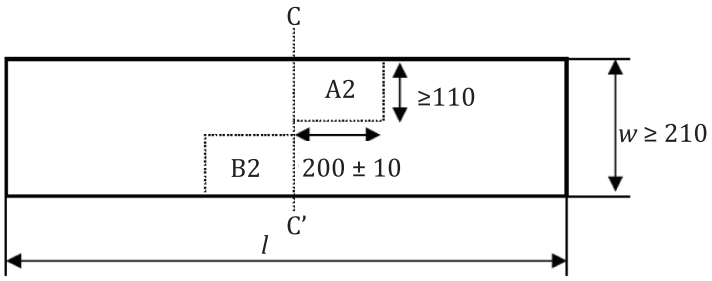
7.2 Cutting of the long panel sides

Cut two pieces, 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 should be cut from the centre line of the panel (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 (Figure 5).

Dimensions in millimetres

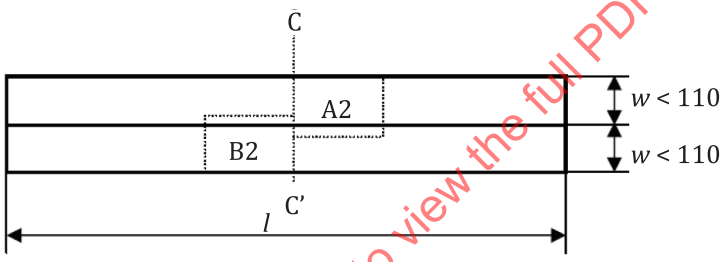


Key

l	surface dimension, length of panel
w	surface dimension, width of panel
C-C'	centre line of the panel
A2, B2	test specimens (length 200 ± 10 mm; width ≥110 mm)

Figure 4 — Cutting of panels for long side testing ($w \geq 110$ 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 (length 200 ± 10 mm; width ≥110 mm)

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

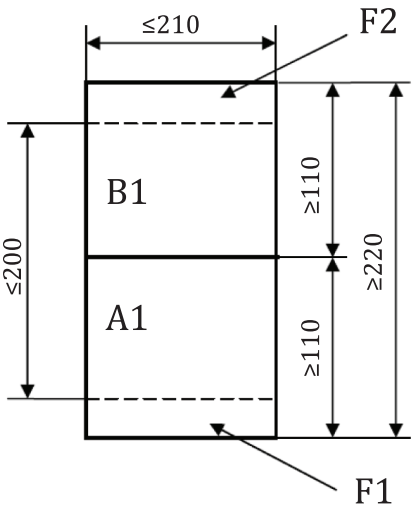
7.3 Assembling of test specimens

7.3.1 Assembling of short side specimens

Measure the width of the flooring surface 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

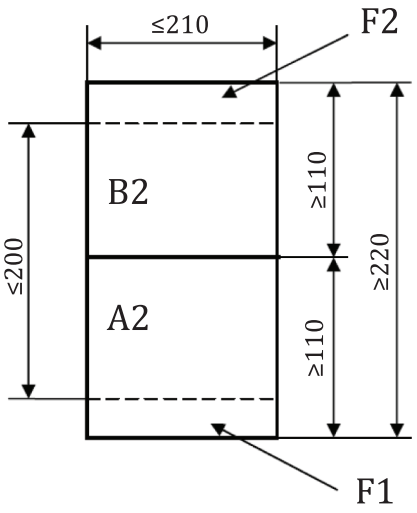
Figure 6 — Assembled test piece for short side testing

7.3.2 Assembling of long side specimens

Measure the width of the flooring surface 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 instruction 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

7.4 Tensile testing

7.4.1 General

The test atmosphere shall be (50 ± 5) % relative humidity (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.

7.4.2 Preparation

The coplanar guiding of the clamping devices is to 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.

Adjust the lower clamping device with the help of the calibration plate to the upper clamping device.

7.4.3 Procedure

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 has to have a 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 centreline of the gripper perpendicular to the attachment areas, no more than 200 mm apart.

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

Operate the testing machine, employing a 10 N pre-compression, then pull the test specimens apart at a speed of 0,5 mm/min or at a speed of 5 mm/min. Use the subscript in the test results for the respective speed of 0,5 or 5 mm/min.

Record the force $F_{0,2/0,5}$ or $F_{0,2/5}$ in newtons required to reach an opening of 0,20 mm.

Record the force $F_{max/0,5}$ or $F_{max/5}$ in newtons required to reach joint breaking point, as well as the opening between the separated elements $\Delta s_{0,5}$ or Δs_5 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 registered measurements of $F_{0,2/0,5}$ or $F_{0,2/5}$, $F_{max/0,5}$ or $F_{max/5}$ and $\Delta s_{0,5}$ or Δs_5 respectively. Check their validity according to Clause 8.

For the long side testing, the same procedure as for the short side testing is used with samples A2 and B2.

8 Repetition

Concerning the three parameters, F_{max}, $F_{0,2}$ and Δs, each result shall not differ by more than 20 %, 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 replaces 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 ones.

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 for Δs, five completely new tests shall be carried out and checked for validity in the same way as the first ones.

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 indicated to be needed to achieve results within the tolerance of repetition, the test shall be interrupted and considered not possible to finish.

9 Expression of results

For $F_{0,2}$ and F_{max}, the average values shall be divided by the average measured width of the flooring surface of the clamped side of the test specimen. The results, which are designated $f_{0,2/0,5}$ or $f_{0,2/5}$ and $f_{max/0,5}$ or $f_{max/5}$ respectively, are expressed in kilonewtons 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 the short sides of the panels.

In the case that Δs is equal to 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.

10 Test report

The test report shall contain at least the following information:

— name of product;

— indication of sample;

— reference to this document, i.e. ISO 24334:2019;

— speed of traction;