
**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*

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 24334 was prepared by Technical Committee ISO/TC 219, *Floor coverings*.

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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 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.

ISO 7500-1:2004, *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

4.1 Tensile testing machine, verified and calibrated in accordance with ISO 7500-1:2004 and conforming to class 3 for the force range which is applied by the locking strength measurement.

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

4.3 Saw.

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

4.5 External extensometer, with an accuracy of 0,01 mm.

4.6 Two clamping devices, attached to the tensile testing machine. The clamping devices hold the test specimen in attachment area F1 and F2 (Figure 2, Figure 4, Figure 6 and Figure 8).

5 Sampling and conditioning of panels

Sample five panels 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 more than 0,1 % of the mass of the panels.

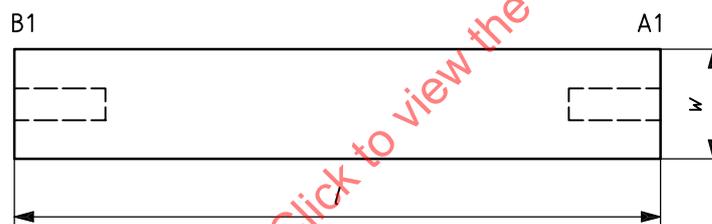
6 Testing of the short panel sides

6.1 Cutting of panels

Cut two pieces from each panel, A1 and B1, as shown in Figure 1.

If the width of the panel is equal to or more than 100 mm, the length shall be optional (to fit the machine) but shall be a minimum of 100 mm.

If the width of the panel is less than 100 mm, the actual width shall be used in the specimen.



Key

- l length of panel
- w width of panel

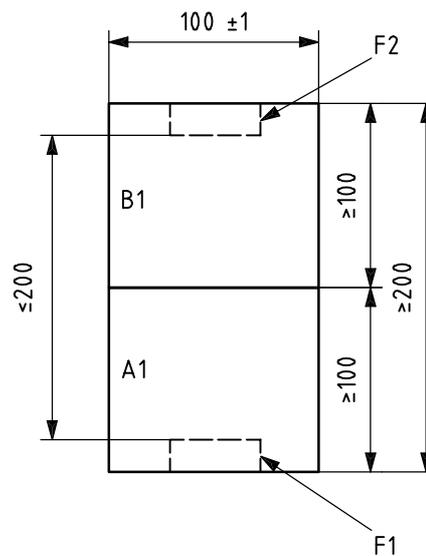
Figure 1 — Cutting of panel for short side testing

6.2 Assembling of test 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 2, 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 clamping device
 F2 attachment area 2 for the second clamping device

Figure 2 — Assembled test piece for short side testing

6.3 Tensile testing

6.3.1 General

The test atmosphere shall be $(50 \pm 5) \% \text{ RH}$ and $(23 \pm 2) ^\circ\text{C}$ 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.

6.3.2 Procedure

First attach the clamp to A1 (in attachment area F1, see Figure 2). When attaching the clamp to B1 (in attachment area F2), ensure that there is no added stretch or pull.

Attach the clamps from the test apparatus in the centre of A1 and B1, and perpendicular to the attachment areas, no more than 200 mm apart.

Fix the external extensometer to the test specimen or to the clamps.

Reset the tensile testing machine before starting the test.

Operate the tensile testing machine, employing a -10 N force tension to pull the test specimens apart at a speed of $0,5 \text{ mm/min}$.

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

Record the force, F_{max} , in newtons required to reach joint break, as well as the opening between the separated elements, Δ_s , at joint break. Measure Δ_s to the nearest $0,01 \text{ mm}$.

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

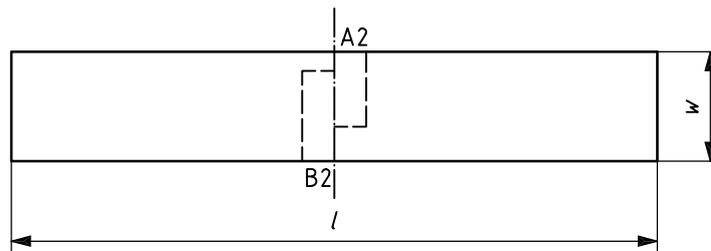
Calculate the average value of the five registered measurements of $F_{0,2}$, F_{max} and Δ_s respectively. Check their validity according to Clause 10.

7 Testing of the long panel sides

7.1 Cutting of panels

Cut two pieces, A2 and B2, from each panel as shown in Figure 3.

If the length of the panel is equal to or more than 100 mm, the width (cut out from the centre line of the panel) shall be a minimum of 100 mm.



Key

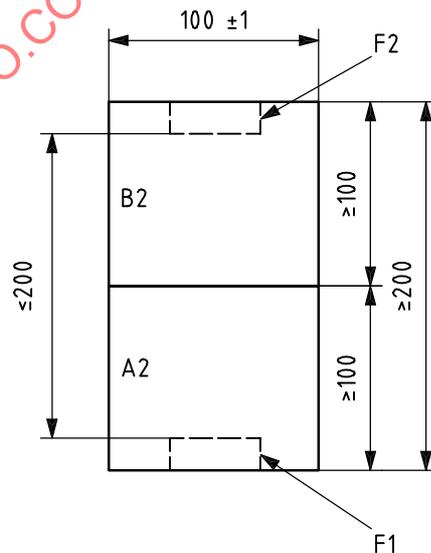
- l* length of panel
- w* width of panel

Figure 3 — Cutting of panel for long side testing

7.2 Assembling of test specimens

Measure the lengths of the main components A2 and B2 to the nearest millimetre, and their thicknesses to the nearest 0,1 mm.

As shown in Figure 4, connect A2 and B2 with the lock to be tested according to the fitting instruction from the manufacturer.



Dimensions in millimetres

Key

- F1 attachment area 1 for the first clamping device
- F2 attachment area 2 for the second clamping device

Figure 4 — Assembled test piece for long side testing

7.3 Tensile testing

7.3.1 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.

7.3.2 Procedure

Attach the clamp to A2 (in attachment area 1, see Figure 4). When attaching the clamp to B2 (attachment area 2), ensure that there is no added stretch or pull.

Attach the clamps from the test apparatus in the centre of the main components and perpendicular to the attachment areas, no more than 200 mm apart.

Fix the external extensometer to the test specimen or to the clamps.

Reset the tensile testing machine before starting the test.

Operate the tensile testing machine, employing a -10 N force tension, to pull the test specimens apart at a speed equal to 0,5 mm/min.

Record the force, $F_{0,2}$, employed to reach an opening of 0,20 mm.

Record the maximum force, F_{\max} , employed to reach joint break, as well as the opening, 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 registered measurements of $F_{0,2}$, F_{\max} and Δs respectively. Check their validity according to Clause 10.

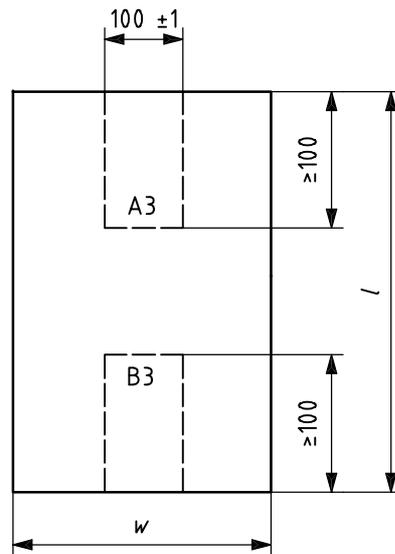
8 Testing of tiles, short side

8.1 Cutting of panels

Cut two pieces, A3 and B3, from each panel as shown in Figure 5.

If the width of the panel is equal to or more than 100 mm, the length shall be optional (to fit the machine) but shall be a minimum of 100 mm.

Dimensions in millimetres



Key

- l* length of panel
- w* width of panel

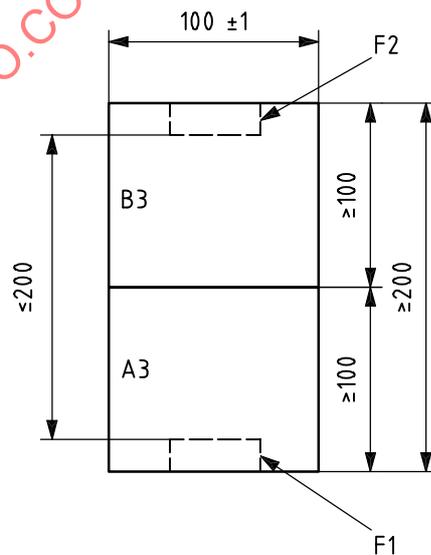
Figure 5 — Cutting of panel for testing tiles, short side

8.2 Assembling of test specimens

Measure the width of A3 and B3 to the nearest millimetre, and their thickness to the nearest 0,1 mm.

As shown in Figure 6, connect A3 and B3 with the lock to be tested according to the fitting instruction from the manufacturer.

Dimensions in millimetres



Key

- F1 attachment area 1 for the first clamping device
- F2 attachment area 2 for the second clamping device

Figure 6 — Assembled test piece for testing tiles, short side

8.3 Tensile testing

8.3.1 General

The test atmosphere shall be $(50 \pm 5) \% \text{ RH}$ and $(23 \pm 2) ^\circ\text{C}$ 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.

8.3.2 Procedure

First attach the clamp to A3 (in attachment area 1, see Figure 6). When attaching the clamp B3 (attachment area 2), ensure that there is no added stretch or pull.

Attach the clamps from the test apparatus in the centre of the main components and perpendicular to the attachment areas, no more than 200 mm apart.

Fix the external extensometer to the test specimen or to the clamps.

Reset the tensile testing machine before starting the test.

Operate the tensile testing machine, employing a -10 N force tension, to pull the test specimens apart at a speed equal to $0,5 \text{ mm/min}$.

Record the force, $F_{0,2}$, employed to reach an opening of $0,20 \text{ mm}$.

Record the maximum force, F_{max} , employed to reach joint break, as well as the opening, Δ_s , at joint break. Measure Δ_s to the nearest $0,01 \text{ mm}$.

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

Calculate the average value of the five registered measurements of $F_{0,2}$, F_{max} and Δ_s respectively. Check their validity according to Clause 10.

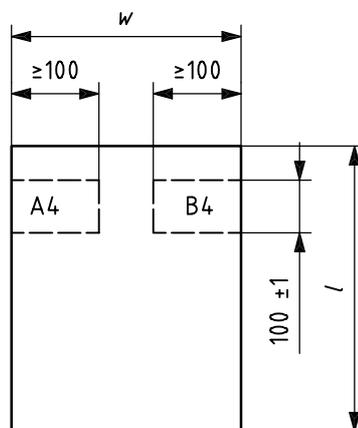
9 Testing of tiles, long side

9.1 Cutting of panels

Cut two pieces, A4 and B4, from each panel as shown in Figure 7.

If the length of the panel is equal to or more than 100 mm , the width shall be optional (to fit the machine) but shall be a minimum of 100 mm .

Dimensions in millimetres



Key

l length of panel

w width of panel

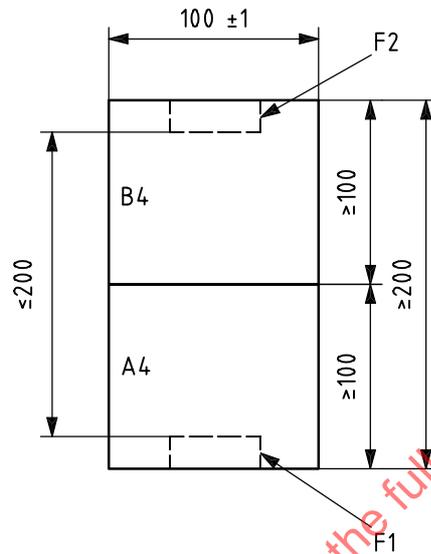
Figure 7 — Cutting of panel for testing tiles, long side

9.2 Assembling of test specimens

Measure the width of A4 and B4 to the nearest millimetre, and their thickness to the nearest 0,1 mm.

As shown in Figure 8, connect A4 and B4 with the lock to be tested according to the fitting instruction from the manufacturer.

Dimensions in millimetres



Key

- F1 attachment area 1 for the first clamping device
- F2 attachment area 2 for the second clamping device

Figure 8 — Assembled test piece for testing tiles, long side

9.3 Tensile testing

9.3.1 General

The test atmosphere shall be $(50 \pm 5) \% \text{ RH}$ and $(23 \pm 2) ^\circ\text{C}$ 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.

9.3.2 Procedure

First attach the clamp to A4 (in attachment area 1, see Figure 8). When attaching the clamp B4 (attachment area 2), ensure that there is no added stretch or pull.

Attach, the clamps from the test apparatus in the centre of the main components and perpendicular to the attachment areas, no more than 200 mm apart.

Fix the external extensometer to the test specimen or to the clamps.

Reset the tensile testing machine before starting the test.

Operate the tensile testing machine, employing a -10 N force tension, to pull the test specimens apart at a speed equal to $0,5 \text{ mm/min}$.