

European standard

French standard

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Solid wood panels (SWP)

Bonding quality

Test method

F : Bois panneautés (SWP) — Qualité du collage — Méthode d'essai
D : Massivholzplatten (SWP) — Qualität der Verklebung — Prüfverfahren

French standard approved

by decision of the Director General of AFNOR on December 10, 2008 taking effect on January 10, 2009.

Replaces the experimental standard XP CEN/TS 13354, dated July 2005.

Correspondence

The European standard EN 13354:2008 has the status of French standard.

Analysis

This document is part of a series of standards finalized by CEN/TC 112 "Wood based panels". It specifies a method for determining the bonding quality of single-layer and multi-layer wood panels by a shear test.

Descriptors

Technical International Thesaurus: wood, wooden boards, gluing, tests, determination, quality, inspection.

Modifications

With respect to the replaced document, change of status and vacuum impregnation was removed in 6.1.

Corrections



National foreword*References to French standards*

The correspondence between the standards figuring in the clause "Normative references" and the identical French standards is as follows:

EN 314-1 : NF EN 314-1 (classification index: B 51-338-1)

EN 326-1 : NF EN 326-1 (classification index: B 51-190-1)

EN 350-2 : NF EN 350-2 (classification index: B 50-103-2)

EN 13353 : NF EN 13353 (classification index: B 54-178)

EN 1995-1-1 : NF EN 1995-1-1 (classification index: P 21-711-1)



English Version

Solid wood panels (SWP) - Bonding quality - Test method

Bois panneaux (SWP) - Qualité du collage - Méthode
d'essai

Massivholzplatten (SWP) - Qualität der Verklebung -
Prüfverfahren

This European Standard was approved by CEN on 18 October 2008.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN Management Centre has the same status as the official versions.

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Foreword

This document (EN 13354:2008) has been prepared by Technical Committee CEN/TC 112 "Wood-based panels", the secretariat of which is held by DIN.

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 May 2009, and conflicting national standards shall be withdrawn at the latest by May 2009.

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 13354:2003.

Compared to CEN/TS 13354:2003 the following changes have been made:

- a) deliverability changed from CEN/TS to EN;
- b) vacuum impregnation in 6.1 deleted.

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, 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 test method for determining the bonding quality of single-layer and multi-layer solid wood panels by a shear test.

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 314-1, *Plywood — Bonding quality — Part 1: Test methods*

EN 326-1, *Wood-based panels — Sampling, cutting and inspection — Part 1: Sampling and cutting of test pieces and expression of test results*

EN 1995-1-1, *Eurocode 5 — Design of timber structures — Part 1-1: General — Common rules and rules for buildings*

EN 13353, *Solid wood panels (SWP) — Requirements*

3 Principle

Test pieces of single and multi-layer solid wood panels are subjected to a pre-treatment, according to the service class as defined in EN 1995-1-1, and then strained to failure by a compressive shear force. The shear strength is calculated and the cohesive wood failure of the shear area is determined.

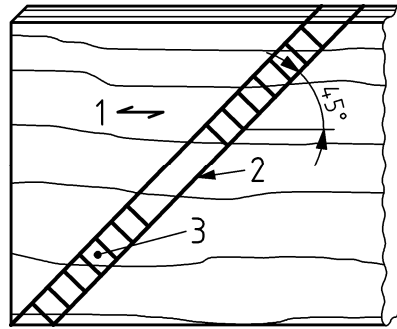


4 Test pieces

4.1 Sampling

From multi layer solid wood panels a series of at least 10 test pieces shall be cut from each panel to be tested. When cutting the sample strips the cutting plan should provide test pieces from both near the edge of the board and from the centre (see Figure 1). The test pieces shall be free of defects (e. g. knots).

In case of single layer solid wood panels at least 10 glue lines shall be tested.



Key

- 1 grain direction of outer layer
- 2 sample strip
- 3 test piece

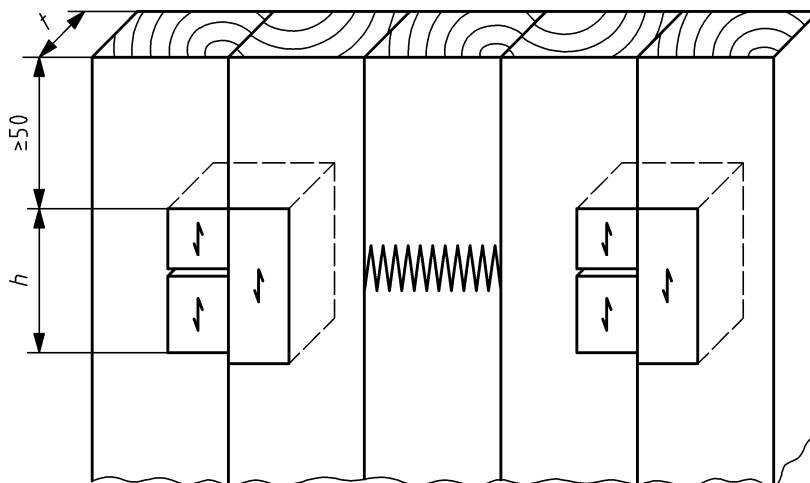
Figure 1 — Example for cutting plan for test pieces of a multi-layer solid wood panel

4.2 Form and dimensions of test pieces

4.2.1 Single-layer solid wood panels

The shape and dimensions of the test pieces shall be as shown in Figure 2.

Dimensions in millimetres



Key

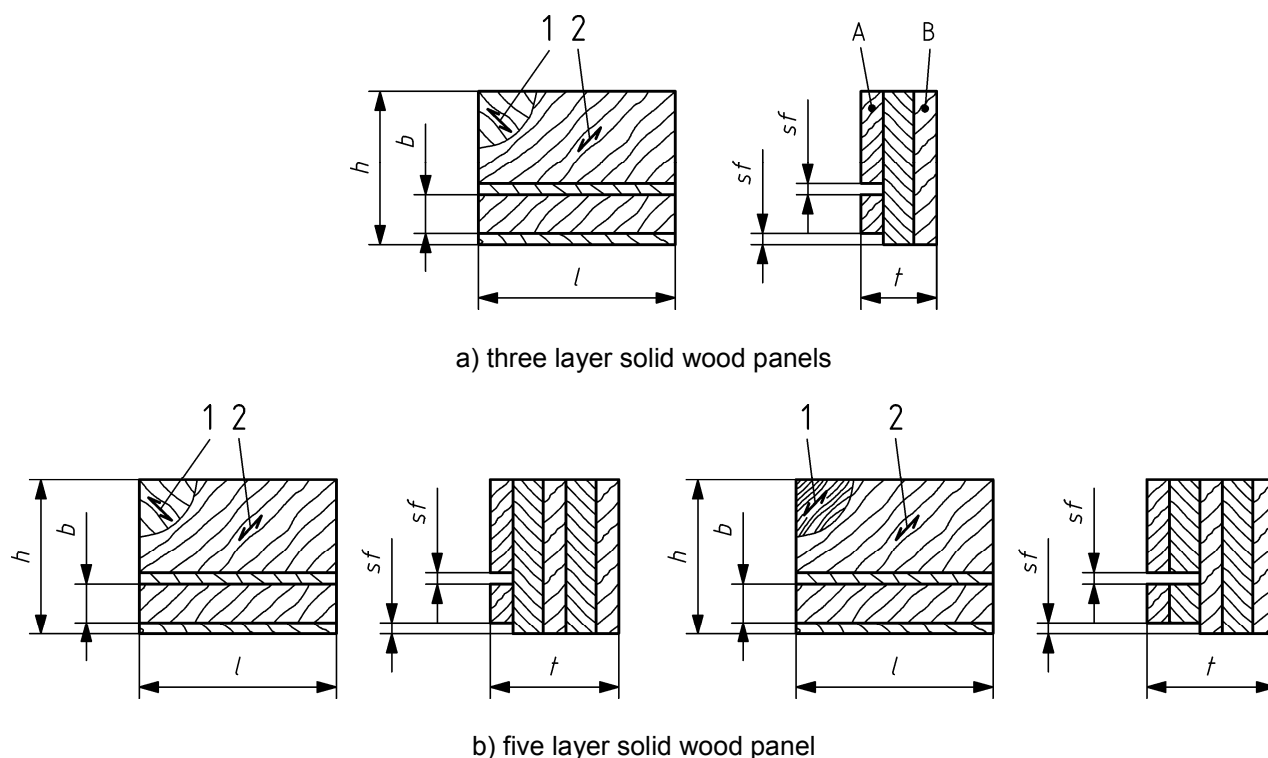
- t panel thickness
- h height of test piece: 50 mm
- b shear width: 25 mm
- sf width of saw cuts (≥ 3 mm)

Figure 2 — Example for cutting plan and test pieces for single layer solid wood panels
(only two of ten necessary pieces shown)

4.2.2 Multi-layer solid wood panels

The form and dimensions of test pieces shall be as shown in Figure 3. For solid wood panels with three layers half the test pieces shall have the saw cuts in face A, and the remainder shall have the saw cuts in face B (see Figure 3 a). For solid wood panels with more than three layers, at least 2 test pieces for each glue line shall be tested.

The saw cuts shall be parallel, exactly sawn and shall penetrate to the glue line.



Key

- 1 grain direction of the layer at the bottom of the saw cuts
- 2 grain direction of outer layer
- l shear length and length of test piece: 50 mm
- h height of test piece: 40 mm
- b shear width: 10 mm
- sf width of saw cuts (≥ 3 mm)
- t panel thickness = test piece thickness

Figure 3 — Test pieces from multi-layer solid wood panel

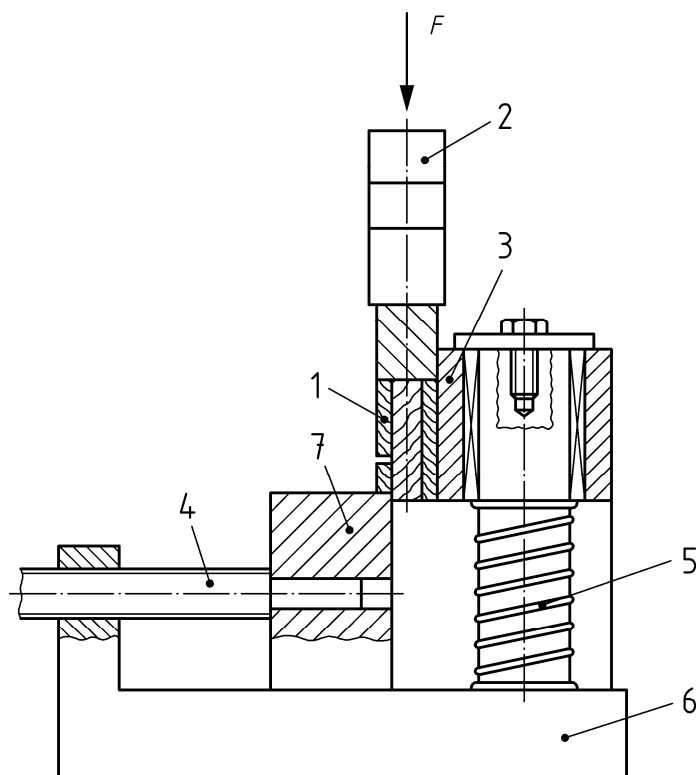
5 Apparatus

— Compression testing machine fitted with a shearing tool. Either of the following types is suitable:

- a) machine, capable of maintaining a constant rate of loading; or
- b) machine with a constant cross head speed.

The accuracy of the measurement of the ultimate load shall be better than ± 2 %.

- Thermostatically controlled water bath suitable for immersing test pieces and capable of maintaining a temperature of (20 ± 3) °C.
- Boiling tank enabling the test piece to be immersed in boiling water.
- Ventilated drying oven capable of maintaining a temperature of (60 ± 3) °C at all points.
- Shearing tool as shown in Figure 4.



Key

- F force
- 1 test piece
- 2 loading block with cylindrical bearing
- 3 side support against tilt over of the test piece
- 4 spindle
- 5 spring
- 6 base plate
- 7 shear bar

Figure 4 — Adjustable shearing tool with test piece in position
(side view of loading block with cylindrical bearing)

6 Pre-treatment of test pieces

6.1 General

After cutting the test pieces (see 4.2), subject them to the appropriate pre-treatment according to the use in dry, humid or exterior conditions.

6.2 Type and duration of pre-treatment

Type and duration of pre-treatment depending on the intended end-use environment (dry, humid or exterior) are shown in Table 1.

Table 1 — Pre-treatment for single and multi-layer solid wood panels intended for use in dry, humid or exterior conditions

Short term according to EN 13353 Intended use	Pre-treatment		
	1	2	3
SWP/1 Dry conditions	24 h in water (20 ± 3)°C	— ^a	— ^a
SWP/2 Humid conditions	— ^a	6 h boiling in water, min. 1 h cooling in water (20 ± 3)°C	— ^a
SWP/3 Exterior conditions	— ^a	— ^a	4 h boiling in water — (16 to 20) h drying (60 ± 3)°C — 4 h boiling in water — 1 h cooling in water (20 ± 3)°C
^a Not applicable			

7 Testing procedure

- Determine the length and width of the shear area before pre-treatment to an accuracy of 0,1 mm.
- Position the test piece in the shearing tool as shown in Figure 4. The shearing force shall be applied parallel to the glue line under test. Apply a constant rate of motion or load so that failure occurs within approximately (60 ± 30) s. It shall be ensured that the test piece is loaded evenly. Further, it has to be seen that friction at the side support of the test piece is marginal. When adjusting the shear bar, no clamping forces shall be put on the test piece. Make sure that there is no strain on the middle layer from inexact cuts.
- Record the maximum load at failure to the nearest 10 N.
- Determine the apparent cohesive wood failure percentage value of the shear area in accordance with EN 314-1.

8 Calculation and expression of results

The shear strength f_v (in N/mm²) of each test piece is calculated from the following equation:

$$f_v = F / (l \cdot b)$$

where:

- F is the maximum load of the test piece, in Newton;
- l is the length of the shear area, in millimetres;
- b is the width of the shear area, in millimetres.

Calculate the mean shear strength $f_{v, \text{mean}}$ and the standard deviation according to EN 326-1.

Calculate the mean cohesive wood failure percentage with two significant digits.



9 Test report

The test report shall give at least the following information:

- a) sampling procedure (date and place of sampling, declaration of random sampling, present persons, cutting plan etc.);
- b) specification of the panels to be tested and the intended use (dry, humid or exterior) according to EN 13353 respectively, type of glue;
- c) sizes of the test piece;
- d) details of pre-treatment (see clause 6);
- e) for each test piece: Shear strength, apparent cohesive wood failure percentage of the shear area;
- f) for each panel: Mean value of shear strength and cohesive wood failure percentage calculated according to EN 326-1;
- g) for the test sample: Mean value of shear strength and cohesive wood failure percentage and 5 percentile value of shear strength calculated according to EN 326-1;
- h) relevant observation made during or after testing;
- i) signature of the person responsible for the testing.

NOTE It is not necessary to register and to file directly the information mentioned in items c) to e), if other data are filed from which the information can be derived.

