

Plywood – Limningskvalitet –
Del 1: Provning

Plywood – Bonding quality –
Part 1: Test methods

Europastandarden EN 314-1:2004 gäller som svensk standard. Detta dokument innehåller den officiella engelska versionen av EN 314-1:2004.

Denna standard ersätter SS-EN 314-1, utgåva 1.

The European Standard EN 314-1:2004 has the status of a Swedish Standard. This document contains the official English version of EN 314-1:2004.

This standard supersedes the Swedish Standard SS-EN 314-1, edition 1.

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English version

Plywood - Bonding quality - Part 1: Test methods

Contreplaqué - Qualité du collage - Partie 1: Méthodes
d'essai

Sperrholz - Qualität der Verklebung - Teil 1: Prüfverfahren

This European Standard was approved by CEN on 14 October 2004.

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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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.



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Contents

	page
Foreword.....	3
1 Scope	4
2 Normative references	4
3 Test pieces	4
3.1 Sampling	4
3.2 Shape and sizes	4
4 Apparatus	8
4.1 Physical test.....	8
4.2 Shear test.....	8
5 Pre-treatments.....	8
5.1 Sequence of pre-treatment	8
5.2 Choice of pre-treatment	8
5.3 Positioning of test pieces	8
6 Procedure	9
6.1 Determination of behaviour of bonding by shear test.....	9
6.2 Determination of the percentage of apparent cohesive wood failure	9
7 Expression of results	9
8 Test report	10
Annex A (normative) Determination of the percentage of apparent cohesive wood failure by comparison.....	11
Annex B (informative) Guidelines for the evaluation of glue bond of insulating core plywood	14
Bibliography	20

Foreword

This document (EN 314-1:2004) 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 June 2005, and conflicting national standards shall be withdrawn at the latest by June 2005..

This document supersedes EN 314-1:1993.

In the revised version the following modifications have been made as compared to EN 314-1:1993:

- the standard contains not only test methods for veneer plywood but also for blockboard and laminboard;
- the normative annex A "Determination of the percentage of apparent cohesive wood failure by comparison" has been extended;
- a new informative annex B "Guidelines for the evaluation of glue bond of insulating core plywood" has been added.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

EN 314-1:2004 (E)**1 Scope**

This document specifies methods for determining the bonding quality of veneer plywood, blockboard and laminboard by shear testing.

The relevant requirements are specified in EN 314-2.

This document is suitable for insulating core plywood as defined in Annex B.

Annex A is normative. Annex B is informative.

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 314-2, *Plywood — Bonding quality — Part 2: Requirements*

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

3 Test pieces**3.1 Sampling**

Sampling shall be according to EN 326-1.

Test pieces shall be without any manufacturing defects or characteristics inherent in wood (see EN 635-1) in the testing area.

3.2 Shape and sizes

The test pieces of veneer plywood shall be prepared as shown in Figure 1.

Each test piece shall be cut so that the grain direction of the layer between the gluelines under test is perpendicular to the length of the test piece.

The test pieces have to be prepared and the nicking is made to allow the examination of each glueline of the panel.

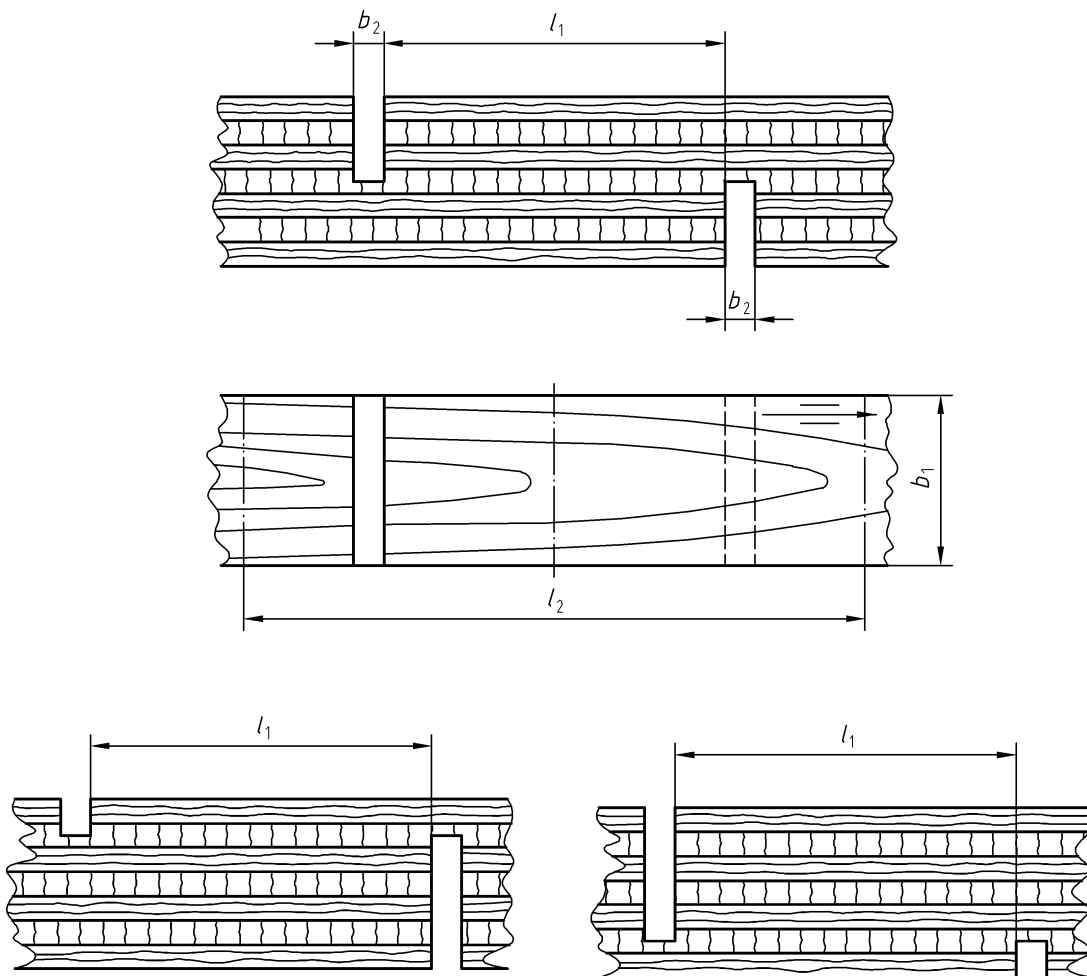
The saw cuts shall extend into the layer between the gluelines under test, as shown in Figure 1.

Full panel thickness test pieces may be used for veneer plywood with 3 to 9 layers.

For panels of more than 9 layers, excess layers may be removed by planing, cutting or sanding.

Similar procedure can be used for determining the bonding quality of blockboard and laminboard (Figure 2) or thin faces veneered plywood (Figure 3). The saw cuts shall extend into one of the layers between the gluelines under test between face layers and core layers, as shown in Figures 2 and 3.

NOTE For insulating core plywood, see Annex B.



Key

b_1 $(25 \pm 0,5)$ mm (shear width of test piece)

b_2 2,5 mm to 4 mm (saw cut width)

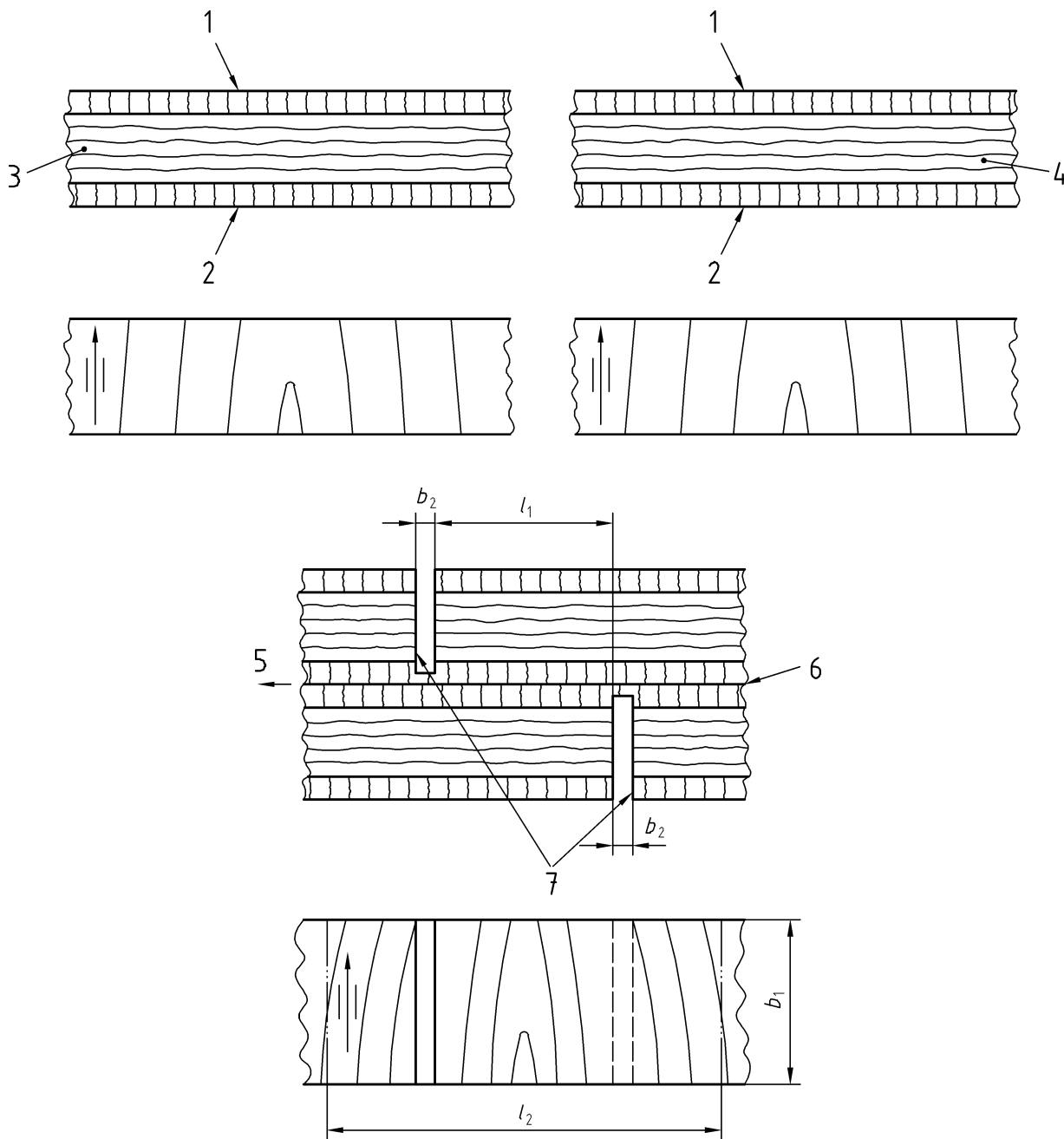
l_1 $(25 \pm 0,5)$ mm (shear length)

l_2 50 mm min (distance between clamps)

→ along the grain direction

Figure 1 — Test piece example for a 7 ply veneer plywood

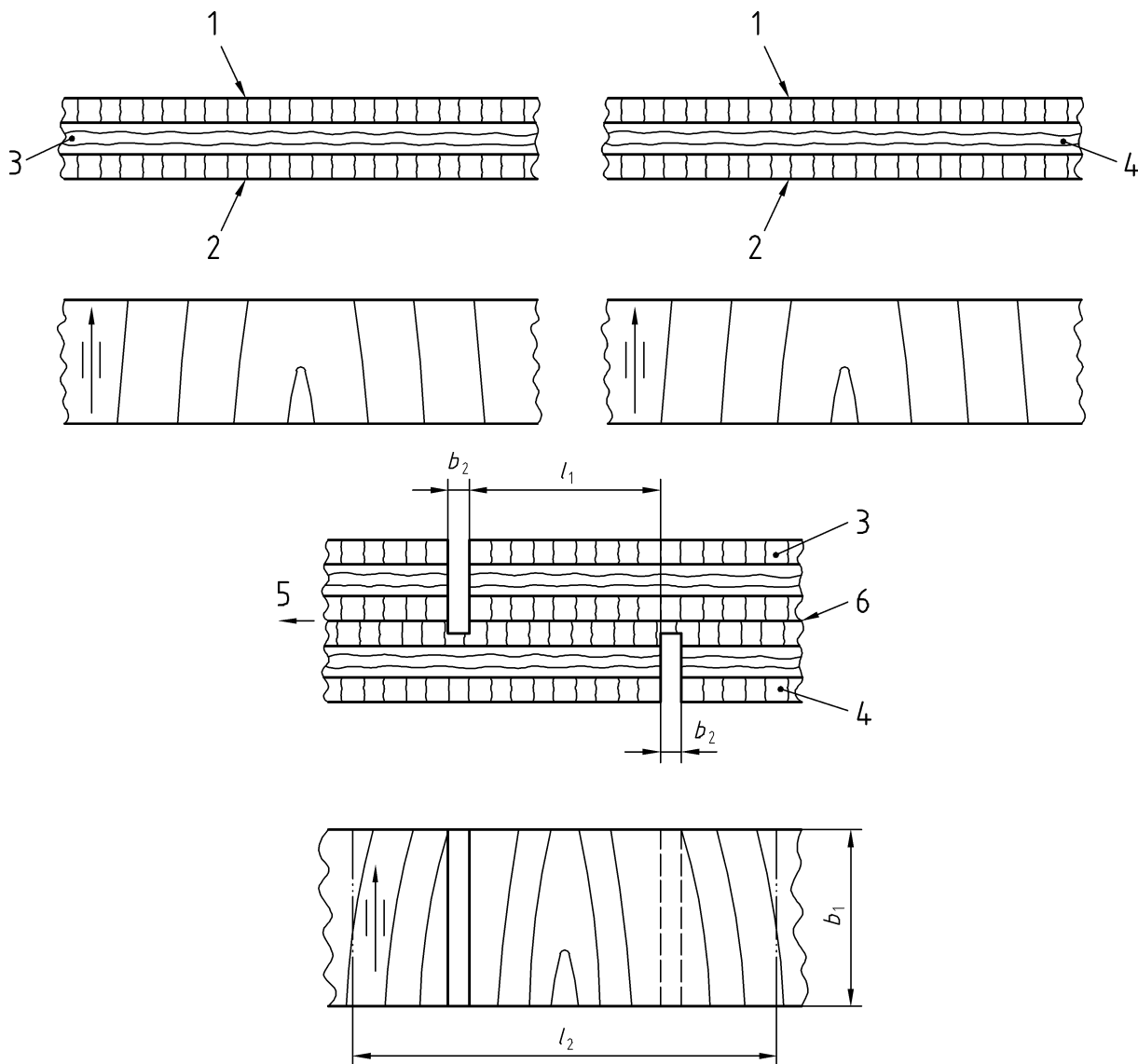
EN 314-1:2004 (E)



Key

- 1 Face
 - 2 Back face
 - 3 Part 1
 - 4 Part 2
 - 5 Faces of part 1 and part 2, the same set-up shall be made for the back face of part 1 and part 2
 - 6 Glueline not subject to the shear test
 - 7 Saw cuts throughout the face layers
 - b_1 (25 ± 0,5) mm (shear width)
 - b_2 (2,5 to 4) mm (saw cut width)
 - l_1 (25 ± 0,5) mm (shear length)
 - l_2 50 mm min (distance between clamps)
- along the grain direction

Figure 2 — Composite test piece for blockboard and laminboard



Key

- 1 Face
- 2 Back face
- 3 Part 1
- 4 Part 2
- 5 Faces of part 1 and part 2, the same set-up shall be made for the back face of part 1 and part 2
- 6 Glueline not subject to the shear test
- b_1 (25 ± 0,5) mm (shear width)
- b_2 (2,5 to 4) mm (saw cut width)
- l_1 (25 ± 0,5) mm (shear length)
- l_2 50 mm min (distance between clamps)

→ along the grain direction

Figure 3 — Composite test piece for thin face plywood panel

EN 314-1:2004 (E)**4 Apparatus****4.1 Physical test**

- 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.
- Measuring instrument of lengths with an accuracy of 0,1 mm.
- A lens with a magnification of 10.

4.2 Shear test

A tensile testing machine with suitable serrated grips capable of operating continuously and measuring the applied load to an accuracy of ± 1 %.

5 Pre-treatments**5.1 Sequence of pre-treatment**

- 5.1.1** Immersion for 24 h in water at (20 ± 3) °C.
- 5.1.2** Immersion for 6 h in boiling water followed by cooling in water at (20 ± 3) °C, for at least 1 h.
- 5.1.3** Immersion for 4 h in boiling water, then drying in the ventilated drying oven for 16 h to 20 h at (60 ± 3) °C, then immersion in boiling water for 4 h, followed by cooling in water at (20 ± 3) °C for at least 1 h.
- 5.1.4** Immersion for (72 ± 1) h in boiling water, followed by cooling in water at (20 ± 3) °C for at least 1 h.

5.2 Choice of pre-treatment

EN 314-2 gives information on pre-treatments for particular plywood types.

5.3 Positioning of test pieces

The test pieces shall be placed, well separated, in a suitable rack or wire basket. During soaking, each test piece shall remain completely immersed in water.

6 Procedure

6.1 Determination of behaviour of bonding by shear test

- Before the water treatment, the length and width of the shear area shall be measured to an accuracy of 0,1 mm and recorded.
- The shear test shall be carried out on wet test pieces from which a wiping can be realized.
- The shear test pieces shall be arranged in the centre of the clamping devices in such a way that the load can be transmitted from the testing machine, via the ends of the test pieces, to the shear area without any transverse loads. If slipping occurs it is only allowed in the initial stage of the loading. This clamping is made on faces.
- The load shall be applied at a constant rate of motion so that rupture occurs within (30 ± 10) s.
- The breaking load shall be determined to an accuracy of 1 %. The shear strength shall be calculated in Newton per square millimetre (N/mm^2) according to clause 7.
- After the shear test, the apparent cohesive wood failure shall be determined according to 6.2.

6.2 Determination of the percentage of apparent cohesive wood failure

The failure should normally occur in the wood, or in the glue-lines between the saw cuts, i.e. within the shear test area. When failure occurs outside the test area, or if by cross-grain breaking within 50 % or more of the surface of a face veneer, the result shall be rejected and the test shall be repeated with a shear length of 25 mm by using the procedure for plywood with faces made of thin veneers in Figure 3.

With the exception of results from test pieces containing tape, the results of failures arising from the presence of strength reducing defects shall be excluded. Test pieces with such defects should normally be identified and replaced during the cutting operation. If the number of test pieces rejected exceeds 20 %, it will be necessary to resample. If the resampling is also rejected on this basis, then the batch shall be rejected.

The test pieces shall be allowed to dry before the determination of apparent cohesive wood failure.

The apparent cohesive wood failure percentage shall be recorded by use of the written guidelines and comparison with the pictures in Annex A (determination of apparent cohesive wood failure percentage, if possible by 5 % increment from 0 % to 100 %).

7 Expression of results

The shear strength f_v of each test piece in Newtons per square millimetre (N/mm^2) is calculated from the following equation:

$$f_v = \frac{F}{l_1 \times b_1}$$

where

F is the failing force of the test piece, in Newton;

l_1 is the length of the shear area in millimetres;

b_1 is the width of the share area in millimetres.

NOTE l_1 and b_1 are measured before pre-treatment.

Calculate the mean shear strength to 0,01 N/mm^2 and the standard deviation.

Also determine the average cohesive wood failure percentage value to an accuracy of 5 %.