DRAFT FOR DEVELOPMENT

DD CEN/TS 13354:2003

Solid wood panels — Bonding quality — Test method

ICS 79.060.99

BSI British Standards

National foreword

This Draft for Development is the official English language version of CEN/TS 13354:2003.

This publication is not to be regarded as a British Standard.

It is being issued in the Draft for Development series of publications and is of a provisional nature because it is a new test and there is insufficient experience of its use in the majority of CEN member countries. It should be applied on this provisional basis, so that information and experience of its practical application may be obtained.

Comments arising from the use of this Draft for Development are requested so that UK experience can be reported to the European organization responsible for its conversion to a European standard. A review of this publication will be initiated 2 years after its publication by the European organization so that a decision can be taken on its status at the end of its 3-year life. Notification of the start of the review period will be made in an announcement in the appropriate issue of *Update Standards*.

According to the replies received by the end of the review period, the responsible BSI Committee will decide whether to support the conversion into a European standard, to extend the life of the Technical Specification or to withdraw it. Comments should be sent in writing to the Secretary of BSI Technical Committee B/541, Wood based panels, at British Standards House, 389 Chiswick High Road, London W4 4AL, giving the document reference and clause number and proposing, where possible, an appropriate revision of the text.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

The British Standards which implement European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled "International Standards Correspondence Index", or by using the "Search" facility of the *BSI Electronic Catalogue* or of British Standards Online.

This Draft for Development was published under the authority of the Standards Policy and Strategy Committee on 15 September 2003

Summary of pages

This document comprises a front cover, an inside front cover, the CEN/TS title page, pages 2 to 10, an inside back cover and a back cover.

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Amendments issued since publication

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TECHNICAL SPECIFICATION
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CEN/TS 13354

May 2003

ICS 79.060.99

English version

Solid wood panels - Bonding quality - Test method

Massivholzplatten - Qualität der Verklebung - Prüfverfahren

This Technical Specification (CEN/TS) was approved by CEN on 31 February 2003 for provisional application.

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Ref. No. CEN/TS 13354:2003 E

Foreword

This document (CEN/TS 13354:2003) has been prepared by Technical Committee CEN/TC 112 “Wood-based panels”, the secretariat of which is held by DIN.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

This Technical Specification 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

This Technical Specification incorporates by dated of undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this Technical Specification, only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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 350-2, *Durability of wood and wood-based products — Natural durability of solid wood — Part 2: Guide to natural durability and treatability of selected wood species of importance in Europe.*

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

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

3 Principle

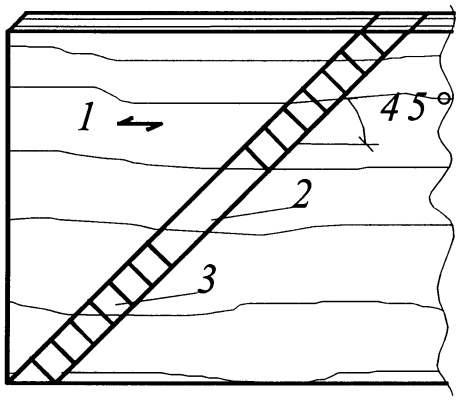
Test pieces of single and multi-layer solid wood panels are subjected to a pretreatment, according to the service class as defined in ENV 1995-1-1, and then strained to failure by a compressive shear force. The shear strength is calculated and the cohesive wood failure of the shear area is determined.

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

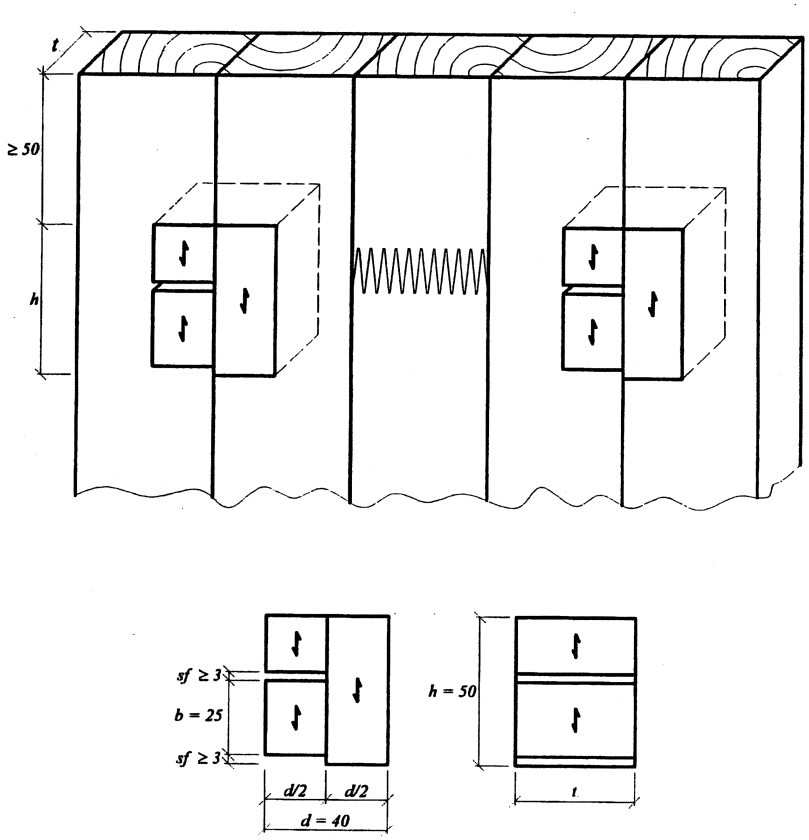
Figure 1 — Example for cutting plan for test pieces of a multi-layer solid wood panel

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



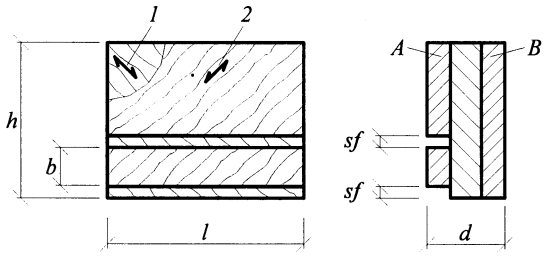
Key
t panel thickness
h height of test piece: 50 mm
b shear width: 25 mm
sf width of saw cuts (≥ 3 mm)
d test piece thickness

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

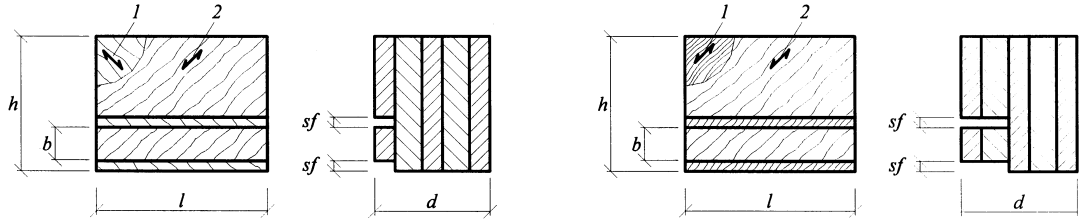
4.2.2 Multi-layer solid wood panels

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.



a) three layer solid wood panels



b) five layer solid wood panel

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)
d 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) a machine, capable of maintaining a constant rate of loading; or
b) a machine with a constant cross head speed. The accuracy of the measurement of the ultimate load shall be better than ± 2 %.

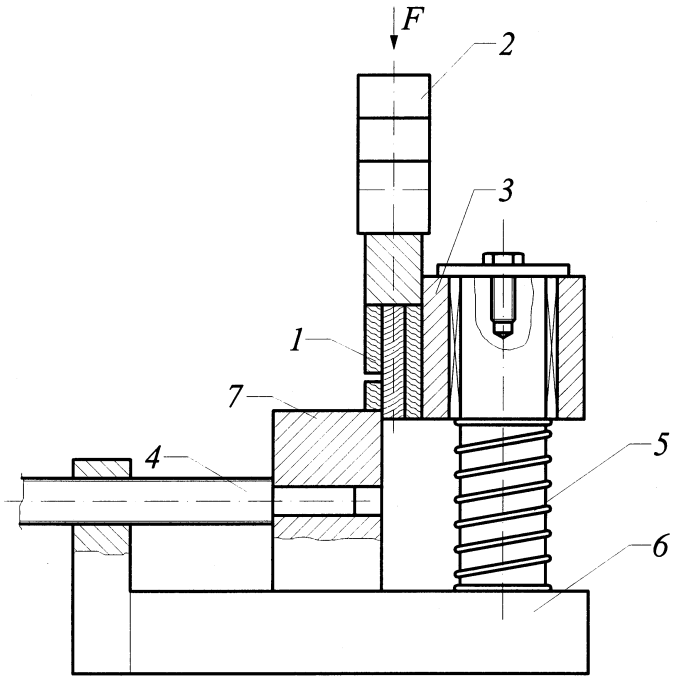
— Thermostatically controlled waterbath suitable for immersing test pieces and capable of maintaining a temperature of (20 ± 3) °C.

— 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.

— Vacuum desiccator capable of reducing the pressure in the desiccator to below 30 kPa absolute.

— 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 Pretreatment of test pieces

6.1 General

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

Wood species that are difficult to impregnate (i.e. with a permeability class of 2 or higher according to EN 350-2) shall be fully impregnated with water, using a vacuum desiccator, before the relevant pretreatment is carried out. A vacuum has to be applied at least for 30 min with an absolute pressure of less than 30 kPa.

6.2 Type and duration of pretreatment

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

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

Short term according to EN 13353	Pretreatment[a]		
Intended use	1	2	3
SWP/1 Dry conditions	24 h cold water (20 °C)	—[b]	—[b]
SWP/2 Humid conditions	—[b]	6 h boiling, min. 1 h cooling in water 20 °C	—[b]
SWP/3 Exterior conditions	—[b]	—[b]	4 h boiling — (16 to 20) h drying 60 °C — 4 h boiling — 1 h cooling in water 20 °C

[a] Details about pretreatment conditions see EN 314-1

[b] Not applicable

7 Testing procedure

— Determine the length and width of the shear area before pretreatment 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/mm^2) 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 Newtons;

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 $f_{v,\,mean}$ and the standard deviation according to EN 326-1. The 5 percentile value of the shear strength $f_{v,\,0,05}$ has to be calculated 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 informations:

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 pretreatments (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) Any 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 item c) to e), if other data are filed from which the information can be derived.

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