SLOVENSKI STANDARD
SIST EN 314-1:1996

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Vezan les - Kakovost zlepljenih spojev - 1. del: Preskusne metode

Plywood - Bonding quality - Part 1: Test methods

Sperrholz - Qualität der Verklebung - Teil 1: Prüfverfahren

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

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ICS:

79.060.10 Vezan les Plywood

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English version

Plywood - Bonding quality - Part 1: Test methods

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

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart,36 B-1050 Brussels

Contents list

Foreword

This European Standard was prepared by Working Group 2 "Plywood" (Secretariat: France) of Technical Committee CEN/TC 112, Wood-based panels (Secretariat: Germany).

This standard is one of a series of standards specifying requirements and test methods for plywood.

No existing European Standard is superseded.

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of an identical text or by endorsement, at the latest by August 1993, and conflicting national standards shall be withdrawn at the latest by December 1994.

In accordance with the CEN/CENELEC Internal Regulations, the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.

1 Scope

This European Standard specifies methods for determining the bonding quality of veneer plywood by shear testing [1].

The relevant requirements are specified in EN 314-2.

2 Normative references

This European Standard incorporates by dated or 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 European Standard, only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to 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 [2]

Test pieces

3.1 Sampling

Sampling shall be according to EN 326-1.

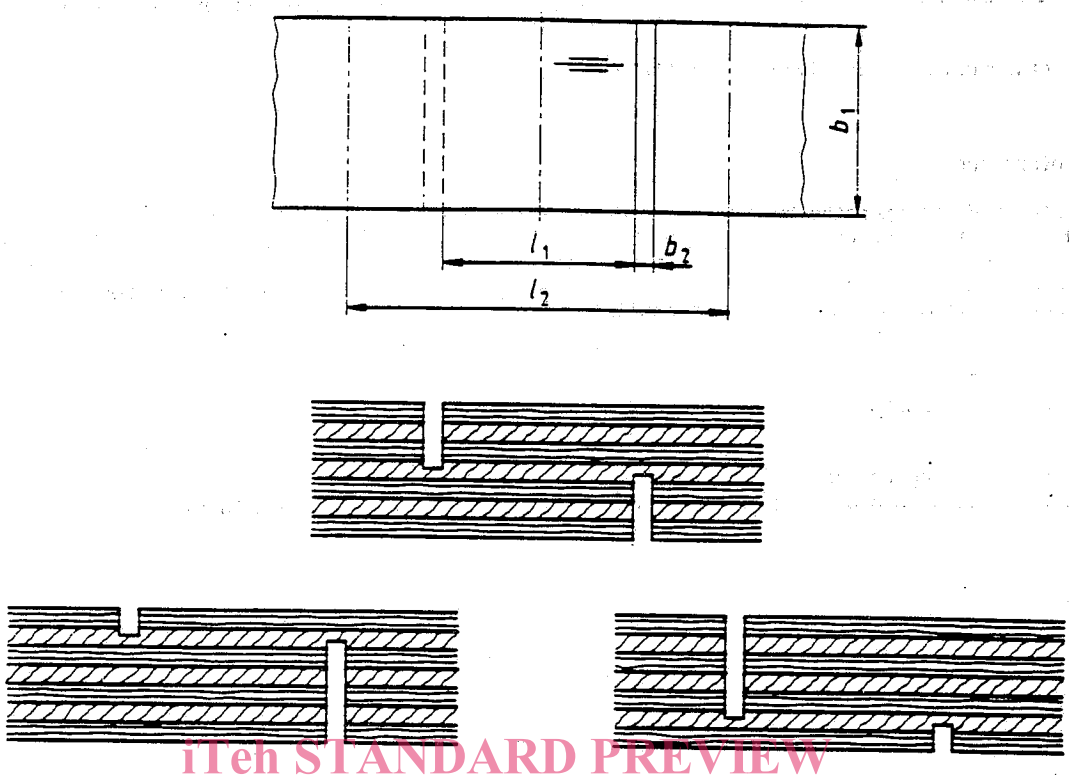
Test pieces shall be without any visible defect in the testing area.

3.2 Shape and sizes

The test pieces shall be prepared as shown in figure 1.

[1] If it is proved that there is a correlation between the methods defined in this standard and other methods, these could be used.

[2] At present at the draft stage



shear length l_1 = (25 ± 0,5) mm [3])
shear width b_1 = (25 ± 0,5) mm
(width of test piece)
width of saw cuts b_2 = 2,5 mm to 4 mm
thickness = panel thickness

minimum distance between clamps l_2 = 50 mm

Direction of face grain for all types of lay-up

Figure 1: Test piece examples with 7 plies

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 inside the layer.

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

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

[3]) In some cases (see 6.2) length l = 25 mm can be reduced to 10 mm.

4 Apparatus

4.1 Physical tests

- 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.

4.2 Shear test

A tensile testing machine fitted with serrated wedge action grips, capable of operating continuously and measuring the load to an accuracy of ± 1 %.

5 Pretreatments

5.1 Procedures of pretreatment

5.1.1 Immersion for 24 hours in water at (20 ± 3) °C.

5.1.2 Immersion for 6 hours in boiling water, followed by cooling in water at (20 ± 3) °C for at least 1 hour to decrease the temperature of the test pieces to 20 °C.

5.1.3 Immersion for 4 hours in boiling water, then drying in the ventilated drying oven for 16 hours to 20 hours at (60 ± 3) °C, then immersion in boiling water for 4 hours, followed by cooling in water at (20 ± 3) °C for at least 1 hour to decrease temperature of test pieces to 20 °C.

5.1.4 Immersion for (72 ± 1) hours in boiling water, followed by cooling in water at (20 ± 3) °C for at least 1 hour to decrease temperature of test pieces to 20 °C.

5.2 Choice of pretreatment

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

5.3 Positioning of test pieces

The test pieces shall be placed, well separated and free to move, in a 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 excess surface moisture has been removed.

- 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.

- 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 N. The shear strength shall be calculated in N/mm^2 according to clause 7.

- After the shear test, the apparent cohesive wood failure shall be determined according to 6.2 and by comparison with a standard illustration (see annex A).

6.2 Determination of the percentage of apparent cohesive wood failure

The failure should normally occur in the wood, or in the gluelines between the saw cuts, i.e. within the shear test area. When failure occurs outside the test area, or 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 10 mm. Failures resulting from the presence of strength-reducing defects shall also be excluded, though with the exception of test pieces containing tape. 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 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 N/mm^2) is calculated from the following formula:

$$f_v = \frac{F}{l \times b}$$

where:

F is the failing force of the test piece in Newtons

l is the length of the shear area, in millimeters

b ist the width of the shear area, in millimeters

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 %.

8 Test report

As described in EN 326-1, and:

a) the mean shear strength value and the standard deviation in N/mm^2.

b) the average apparent cohesive wood failure percentage value,

c) details of pretreatments (5.1).

Annex A (normative)

Determination of the percentage of apparent cohesive wood failure by comparison

Determine the percentage of apparent cohesive wood failure of the dried individual specimens to the nearest 10 % by comparison with reference illustration (see figures A 1 to A 3).

For photo technical reasons, the illustrations are only for plywood bonded with a brown glue.

The determination shall take account of wood fibres present on the broken surfaces. Very fine fibres, which may be difficult to see without the use of a hand lens (x10 magnification) shall be given equal weighting to easily visible, large fibres. Wood dust shall not be taken into account.

The determination of percentage wood fibres is subjective and is a skill not instantly acquired. While trained and experienced operators obtain accurate and reproducible results, differences between operators and laboratories may occur. To minimise this possiblility, it is essential to adhere to the above guidelines.