BRITISH STANDARD

BS EN
310:1993

Wood-based panels — Determination of modulus of elasticity in bending and of bending strength

The European Standard EN 310:1993 has the status of a British Standard

UDC 674.03:620.172.225:620.174

Cooperating organizations

The European Committee for Standardization (CEN), under whose supervision this European Standard was prepared, comprises the national standards organizations of the following countries.

Austria	Oesterreichisches Normungsinstitut
Belgium	Institut belge de normalisation
Denmark	Dansk Standardiseringsraad
Finland	Suomen Standardisoimisliito, r.y.
France	Association française de normalisation
Germany	Deutsches Institut für Normung e.V.
Greece	Hellenic Organization for Standardization
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Sweden	Standardiseringskommissionen i Sverige
Switzerland	Association suisse de normalisation
United Kingdom	British Standards Institution

This British Standard, having been prepared under the direction of the Technical Sector Board for Building and Civil Engineering (B/-), was published under the authority of the Standards Board and comes into effect on 15 April 1993

The following BSI references relate to the work on this standard:
Committee reference B/541
Draft for comment 90/15587 DC

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Amendments issued since publication

Amd. No.	Date	Comments

Contents

National foreword

This British Standard has been prepared under the direction of the Technical Sector Board for Building and Civil Engineering and is the English language version of EN 310:1993 *Wood-based panels — Determination of modulus of elasticity in bending and of bending strength,* published by the European Committee for Standardization (CEN).

EN 310 was produced as a result of international discussion in which the UK took an active part.

The principle of this method is technically equivalent to **A.10** and **A.12** of BS 1142:1989 *Specification for fibre building boards* and to clauses **10** and **11.1** of BS 5669 *Particleboard* — Part 1:1989 *Methods of sampling, conditioning and test,* both of which will be withdrawn in due course.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 8, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 310

February 1993

UDC 674.03:620.172.225:620.174

Descriptors: Wood-based panel, particleboard, plywood, fibreboard, OSB, cement-bonded particleboard, test method, modulus of elasticity, bending strength

English version

Wood-based panels — Determination of modulus of elasticity in bending and of bending strength

Panneaux à base de bois —
Détermination du module d'élasticité en flexion et de la résistance à la flexion

Holzwerkstoffe —
Bestimmung des Elastizitätsmoduls und der Biegefestigkeit

This European Standard was approved by CEN on 1992-12-15. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CEN

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

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

Foreword

This European Standard was prepared by Working Group 4 "Common test methods" (Secretariat: United Kingdom) of Technical Committee CEN/TC 112 "Wood-based panels" (Secretariat: Germany).

The text is based on ISO 9429 (at present ISO/DIS) which has been elaborated with European participation.

This standard is one of a series of standards specifying methods of test for determining dimensions and properties of wood-based panels.

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.

Contents

1 Scope

This European Standard specifies a method of determining the apparent modulus of elasticity in flatwise bending and bending strength of wood-based panels of nominal thickness equal to or greater than 3 mm.

NOTE Structural design values shall be determined according to methods according to EN 789.

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 325, *Wood-based panels — Determination of dimensions of test pieces.*

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

3 Principle

The modulus of elasticity in bending and bending strength are determined by applying a load to the centre of a test piece supported at two points. The modulus of elasticity is calculated by using the slope of the linear region of the load-deflection curve; the value calculated is the apparent modulus, not the true modulus, because the test method includes shear as well as bending. The bending strength of each test piece is calculated by determining the ratio of the bending moment M, at the maximum load F_{max}, to the moment of its full cross section.

4 Apparatus

4.1 *Measuring instruments*, as specified in EN 325.

4.2 *Testing apparatus (Figure 1)*, having the following essential components.

4.2.1 *Two parallel, cylindrical, roller-bearing supports* of length exceeding the width of the test piece and of (15 ± 0,5) mm diameter.

The distance between the supports shall be adjustable.

A cylindrical loading head, of the same length and (30 ± 0,5) mm in diameter, placed parallel to the supports and equidistant from them.

4.2.2 A suitable instrument capable of measuring the deflection of the test piece in the middle of the span with an accuracy of 0,1 mm.

4.2.3 A suitable load measurement system capable of measuring the load applied to the test piece with an accuracy of 1 % of the measured value.

5 Test pieces

5.1 Sampling and cutting

Sampling and cutting of the test pieces shall be carried out according to EN 326-1. Series of both transverse and longitudinal test pieces are required.

5.2 Dimensions of test pieces

The test pieces shall be rectangular, and of the following dimensions:

The width b shall be (50 ± 1) mm.

In the case of extruded panels, cellular panels, or panels of similar structure with cavities parallel to the length of the test piece, the width of the test piece shall be at least twice the width of an individual core element (e.g. two tube diameters plus two web thicknesses) and the test pieces shall have a symmetrical cross-sectional area as shown in Figure 2.

In test pieces with cavities perpendicular to the length, the loading head shall be located directly above a web.

The length l_2 shall be 20 times the nominal thickness plus 50 mm, with a maximum length of 1 050 mm and a minimum length of 150 mm.

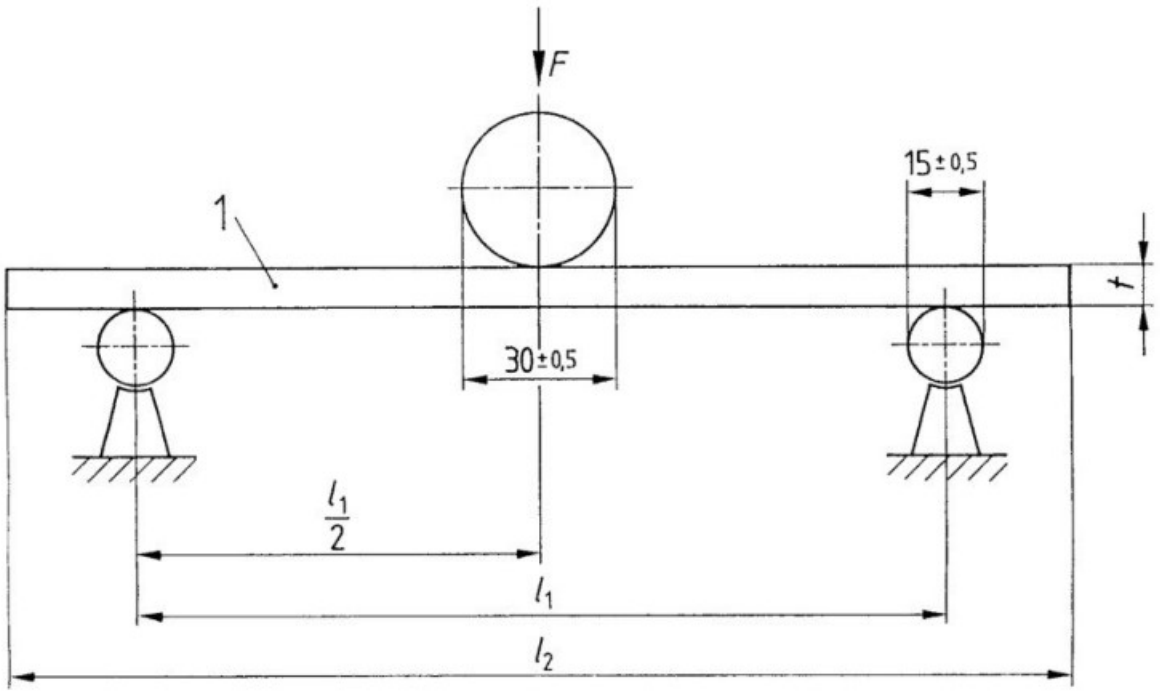
If the deflection of the test piece is large but rupture (failure) does not occur, the distance between supports shall be reduced for testing the bending strength. The test report shall include the distance between supports at which failing tests were conducted. If this procedure needs to be adopted, a new set of test pieces shall be used.

Plywood test pieces shall be free of visible strength-reducing characteristics.

5.3 Conditioning

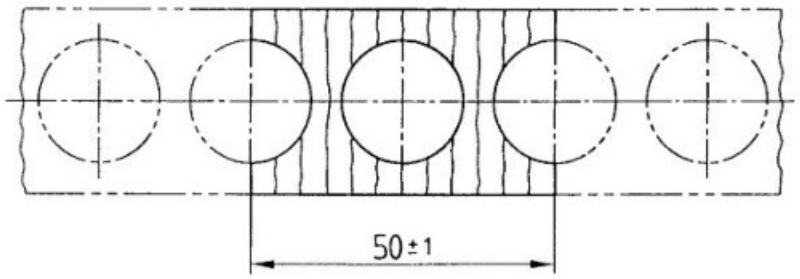
The test pieces shall be conditioned to constant mass in an atmosphere with a relative humidity of (65 ± 5) % and a temperature of (20 ± 2) °C. Constant mass is considered to be reached when the results of two successive weighing operations, carried out at an interval of 24 h, do not differ by more than 0,1 % of the mass of the test piece.

[1)] At present at the draft stage.



1 = test piece
F = load
t = thickness of the test piece
l_1 = 20 t
l_2 = l_1 + 50
Dimensions in millimetres.

Figure 1 — Arrangement of the bending apparatus



Dimensions in millimetres.

Figure 2 — Cross section of tubular boards

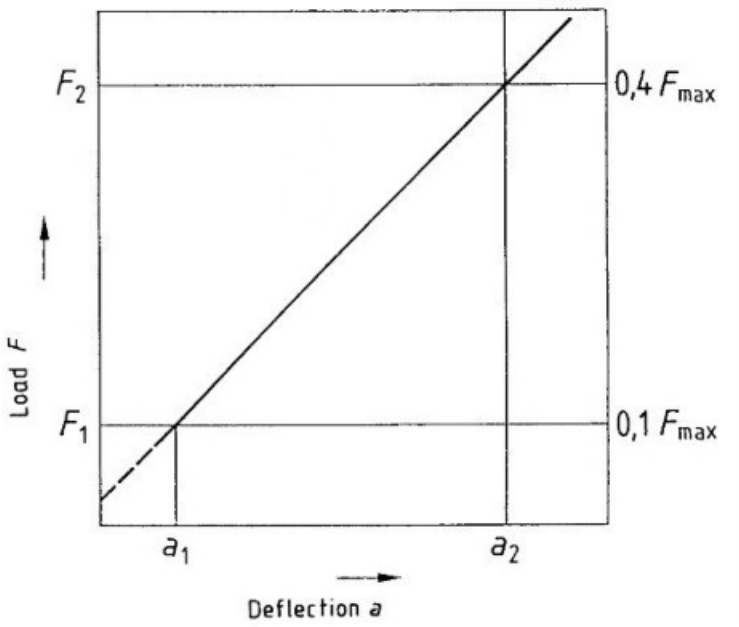


Figure 3 — Load-deflection curve within the range of elastic deformation

Annex A (informative)
Bibliography

EN 789, *Timber structures — Testing of wood-based panels for the determination of mechanical properties for structural purposes*[2)].

ISO 9429:1987, *Wood-based panels — Determination of apparent modulus of elasticity in bending and of bending strength.*

[2)] At present at the draft stage.

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National annex NA (informative)
Committees responsible

The United Kingdom participation in the preparation of this European Standard was entrusted by the Technical Sector Board for Building and Civil Engineering (B/-) to Technical Committee B/541, upon which the following bodies were represented:

American Plywood Association
Association of British Plywood and Veneer Manufacturers
British Woodworking Federation
Chartered Institute of Building
Coordinator for Timber and Timber Products
Council of the Forest Industries of British Columbia
Department of the Environment (Timber Division, Building Research Establishment)
Fibre Building Board Organisation (FIDOR)
Finnish Plywood International
Flat Roofing Contractors' Advisory Board
Forestry Commission
Furniture Industry Research Association
Institution of Structural Engineers
National Federation of Roofing Contractors
National House-building Council
National Panel Products Association
Royal Institute of British Architects
Timber Research and Development Association
Timber Trade Federation
United Kingdom and Ireland Particleboard Association
Coopted member

National annex NB (informative)
Cross-reference

Publication referred to	Corresponding British Standard
EN 325:1993	BS EN 325:1993 *Wood-based panels — Determination of dimensions of test pieces*

BSI — British Standards Institution

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